1991 TOYOTA MR2 REPAIR MANUAL VOLUME 2

NOTE: The screen toned sections below are in VOLUME 1 (Pub.No.RM179U1).

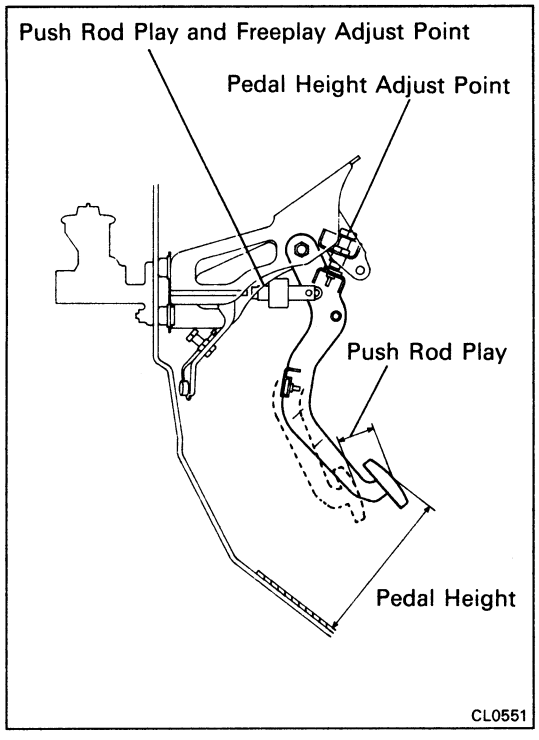
INTRODUCTION IN
MAINTENANCE MA
ENGINE MECHANICAL EM
EXHAUST SYSTEM EX
TURBOCHARGER SYSTEM TC
EMISSION CONTROL SYSTEMS EC
EFI SYSTEM FI
COOLING SYSTEM CO
LUBRICATION SYSTEM LU
IGNITION SYSTEM IG
STARTING SYSTEM ST
CHARGING SYSTEM CH
CLUTCH CL
MANUAL TRANSAXLE MT
AUTOMATIC TRANSAXLE AT
SUSPENSION AND AXLE SA
BRAKE SYSTEM BR
STEERING SR
SRS AIRBAG AB
BODY ELECTRICAL SYSTEM BE
BODY BO
AIR CONDITIONING SYSTEM AC
SERVICE SPECIFICATIONS A
STANDARD BOLT TORQUE SPECIFICATIONS B
SST AND SSM C
ELECTRICAL WIRING DIAGRAMS D

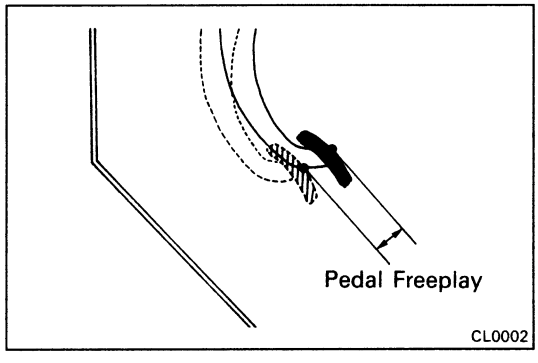
CLUTCH

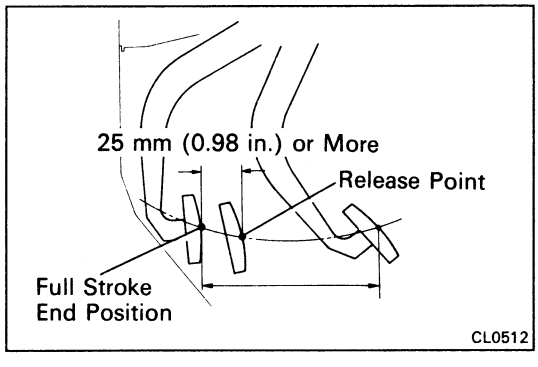
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TROUBLESHOOTING	CL-2
CHECK AND ADJUSTMENT OF CLUTCH PEDAL	CL-3
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TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Hard to shift or will not shift	Clutch pedal freeplay excessive	Adjust pedal freeplay	CL-3
	Air in clutch lines	Bleed clutch system	CL-4
	Clutch release cylinder faulty	Repair release cylinder	CL-8
	Clutch master cylinder faulty	Repair master cylinder	CL-5
	Clutch disc out of true, runout is excessive or lining broken	Inspect clutch disc	CL-13
	Splines on input shaft or clutch disc dirty or burred	Repair as necessary	CL-12
	Clutch pressure plate faulty	Replace clutch cover	CL-12
Clutch slips	Clutch pedal freeplay insufficient	Adjust pedal freeplay	CL-3
	Clutch disc lining oily or worn out	Inspect clutch disc	CL-13
	Pressure plate faulty	Replace clutch cover	CL-12
	Release fork binding	Inspect release fork	
Clutch grabs/ chatters	Clutch disc lining oily or worn out	Inspect clutch disc	CL-13
	Pressure plate faulty	Replace clutch cover	CL-12
	Clutch diaphragm spring bent	Align clutch diaphragm	CL-14
	Engine mounts loose	Repair as necessary	
Clutch pedal spongy	Air in clutch lines	Bleed clutch system	CL-4
	Clutch release cylinder faulty	Repair release cylinder	CL-8
	Clutch master cylinder faulty	Repair master cylinder	CL-5
Clutch noisy	Loose part inside housing	Repair as necessary	
	Release bearing worn or dirty	Replace release bearing	CL-14
	Release fork or linkage sticking	Repair as necessary	







CHECK AND ADJUSTMENT OF CLUTCH PEDAL

1. CHECK THAT PEDAL HEIGHT IS CORRECT

Pedal height from asphalt sheet: 184 – 194 mm (7.2 – 7.6 in.)

2. IF NECESSARY, ADJUST PEDAL HEIGHT

Loosen the lock nut and turn the stopper bolt until the height is correct. Tighten the lock nut.

3. CHECK THAT PEDAL FREEPLAY AND PUSH ROD PLAY ARE CORRECT

(Pedal Freeplay)

Push in on the pedal until the beginning of clutch resistance is felt.

Pedal freeplay: 5.0 – 15.0 mm (0.197 – 0.591 in.)

(Push rod play)

Push in on the pedal with a finger softly until the resistance begins to increase a little.

Push rod play at pedal top: 1.0 – 5.0 mm (0.039 – 0.197 in.)

4. IF NECESSARY, ADJUST PEDAL FREEPLAY AND PUSH ROD PLAY

(a) Loosen the lock nut and turn the push rod until the freeplay and push rod play are correct.

(b) Tighten the lock nut.

(c) After adjusting the pedal freeplay, check the pedal height.

5. INSPECT CLUTCH RELEASE POINT

(a) Pull the parking brake lever and install wheel stopper.

(b) Start the engine and idle the engine.

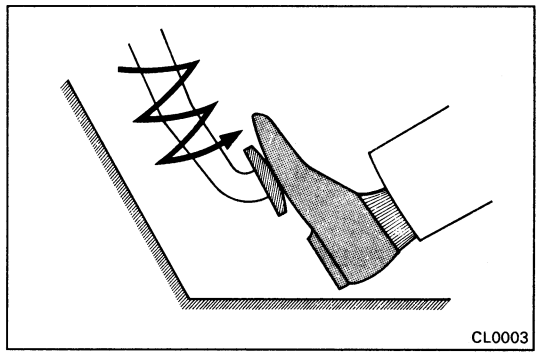
(c) Without depressing the clutch pedal, slowly shift the shift lever into reverse position until the gears contact.

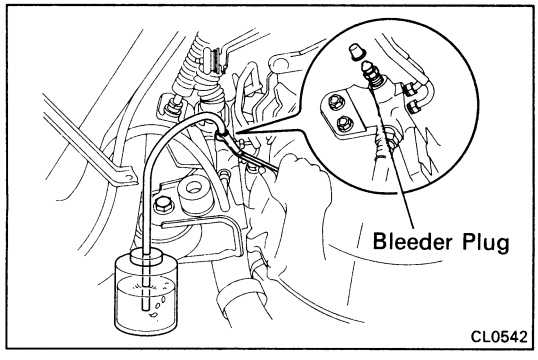
(d) Gradually depress the clutch pedal and measure the stroke distance from the point the gear noise stops (release point) up to the full stroke end position.

Standard distance: 25 mm (0.98 in.) or more
(From pedal stroke end position to release point)

If the distance is not as specified, perform the following operation.

- Inspect pedal height.
- Inspect push rod play and pedal freeplay.
- Bleed the clutch line.
- Inspect the clutch cover and disc.


CL0003



CL0542

BLEEDING OF CLUTCH SYSTEM

HINT: If any work is done on the clutch system or if air is suspected in the clutch lines, bleed the system of air.

NOTICE: Do not let brake fluid remain on a painted surface. Wash it off immediately.

1. **FILL CLUTCH RESERVOIR WITH BRAKE FLUID**

   Check the reservoir frequently. Add fluid if necessary.

2. **CONNECT VINYL TUBE TO BLEEDER PLUG**

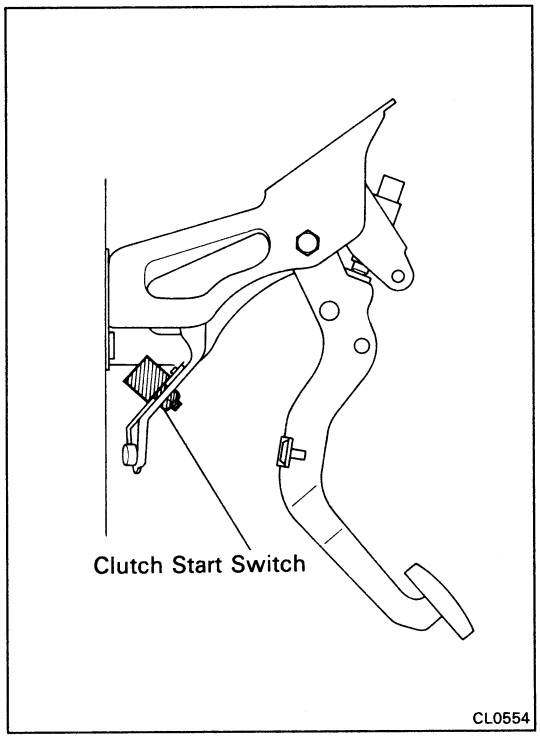
   Insert the other end of the tube in a half-full container of brake fluid.

3. **BLEED CLUTCH LINE**

   (a) Slowly pump the clutch pedal several times.

   (b) While pressing on the pedal, loosen the bleeder plug until the fluid starts to run out. Then close the bleeder plug.

   (c) Repeat this procedure until there are no more air bubbles in the fluid.



INSPECTION OF CLUTCH START SYSTEM

CHECK CLUTCH PEDAL

1. **CHECK THAT PEDAL HEIGHT IS CORRECT**
   (See page CL-3)

2. **CHECK THAT PEDAL FREEPLAY AND PUSH ROD PLAY ARE CORRECT**
   (See page CL-3)

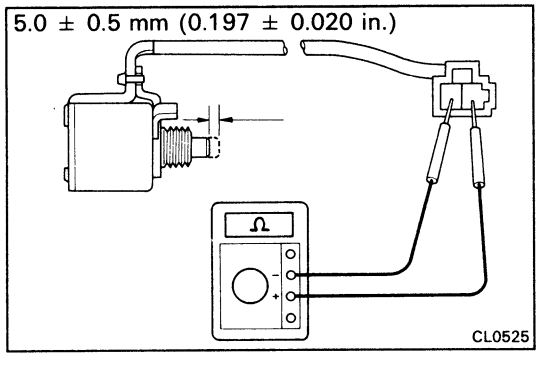
CHECK CLUTCH START SYSTEM

CHECK CLUTCH START SYSTEM

(a) Check that the engine does not start when the clutch pedal is released.

(b) Check that the engine starts when the clutch pedal is fully depressed.

If necessary, adjust or replace the clutch start switch.



INSPECTION OF CLUTCH START SWITCH

INSPECT CONTINUITY OF CLUTCH START SWITCH

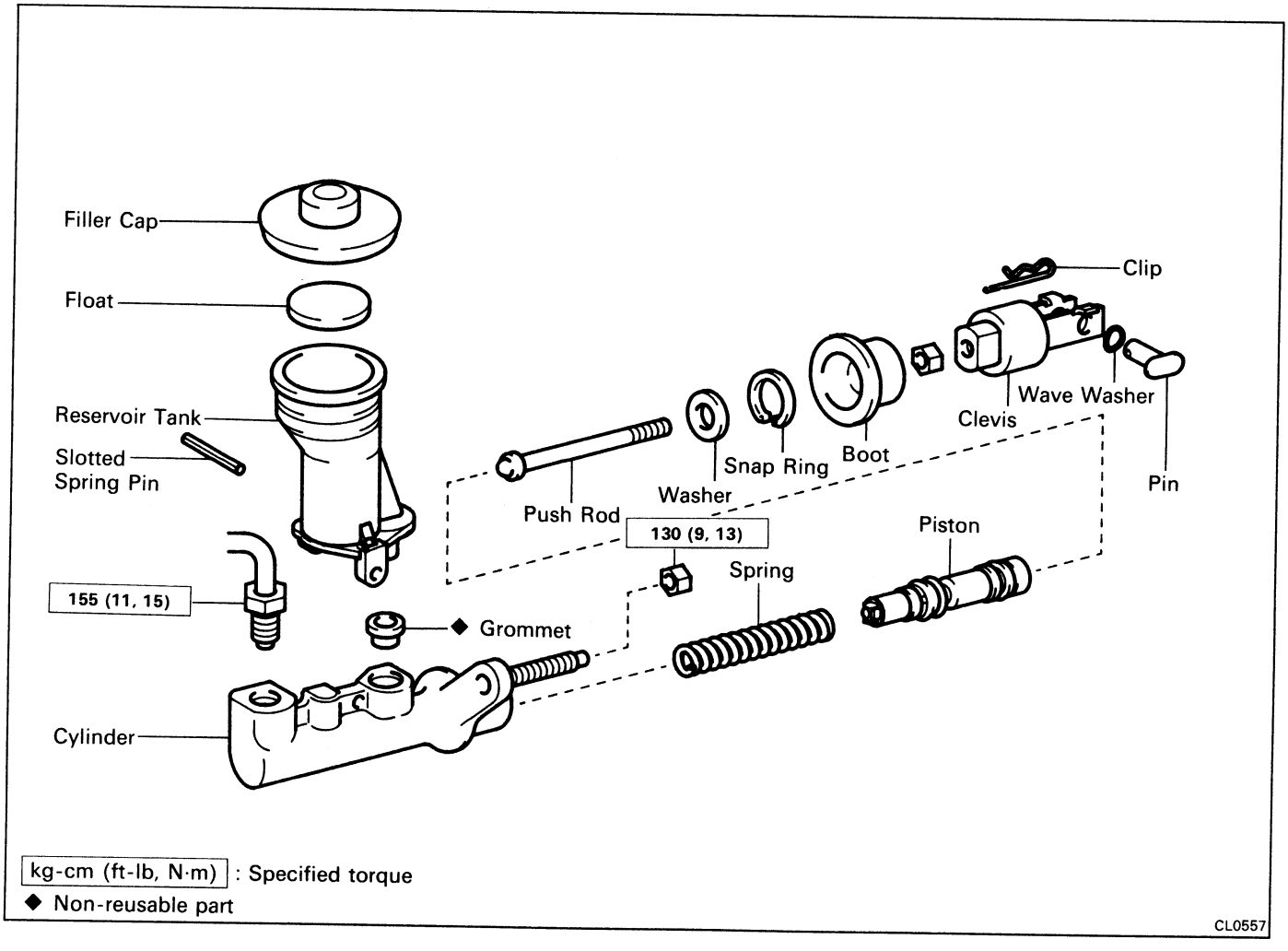
(a) Check that there is continuity between terminals when the switch is ON (pushed).

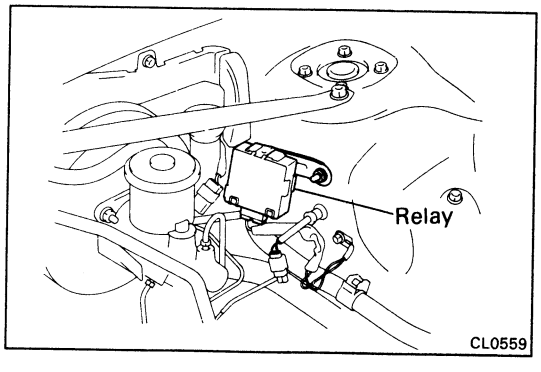
(b) Check that there is no continuity between terminals when the switch is OFF (free).

If continuity is not as specified, replace the switch.

CLUTCH MASTER CYLINDER

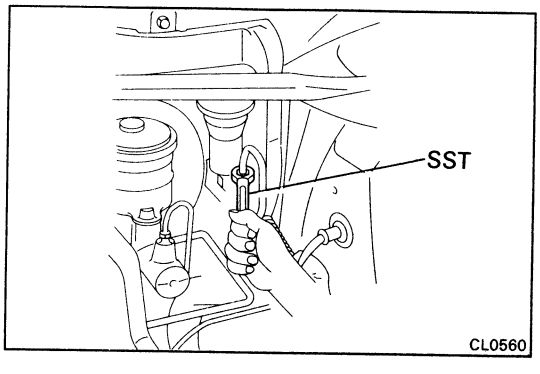
COMPONENTS



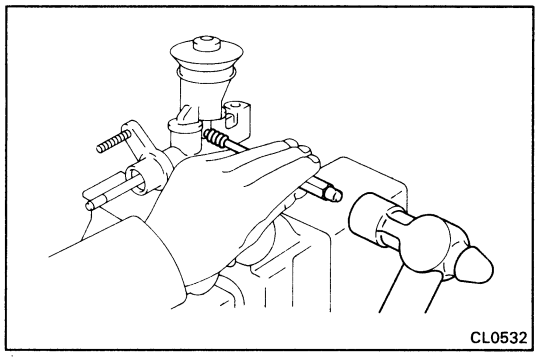


REMOVAL OF MASTER CYLINDER

1. **REMOVE PUSH ROD PIN**
2. **REMOVE RETRACTOR CONTROL RELAY**

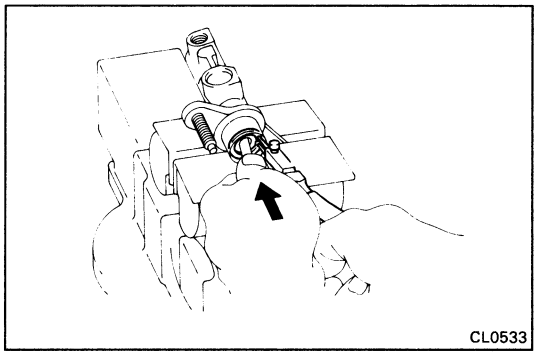


3. **DISCONNECT CLUTCH LINE UNION**
   Using SST, disconnect the union nut.
   SST 09751-36011
4. **REMOVE MASTER CYLINDER**
   (a) Remove the two mounting nuts.
   (b) Pull out the master cylinder.


CL0532

DISASSEMBLY OF MASTER CYLINDER

1. **REMOVE RESERVOIR TANK**
   (a) Using a pin punch and a hammer, drive out the slotted spring pin.
   (b) Remove reservoir tank and grommet.


CL0533

2. **REMOVE PUSH ROD**
   (a) Pull back the boot and, using snap ring pliers, remove the snap ring.
   (b) Pull out the push rod and washer.
   (c) Remove the piston from the cylinder.

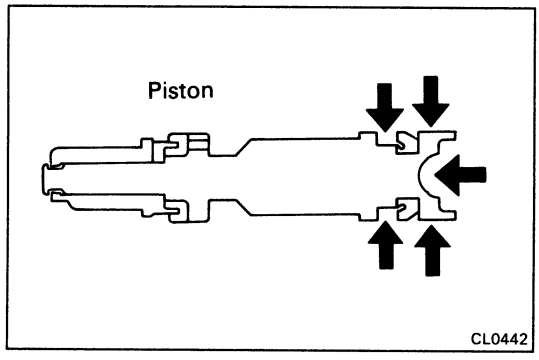
INSPECTION OF MASTER CYLINDER

HINT: Clean the disassembled parts with compressed air.

1. **INSPECT MASTER CYLINDER BORE FOR SCORING OR CORROSION.**
   If a problem is found, clean or replace the cylinder.

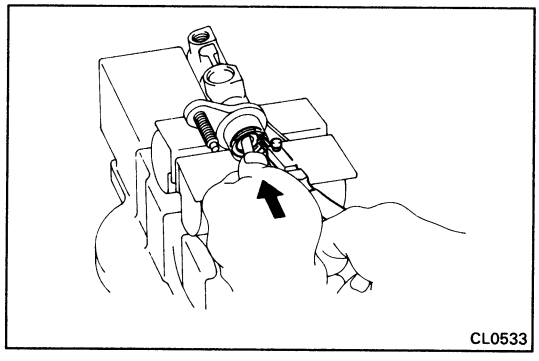
2. **INSPECT PISTON AND CUPS FOR WEAR, SCORING, CRACKS OR SWELLING**
   If either one requires replacement, use the parts from the cylinder kit.

3. **INSPECT PUSH ROD FOR WEAR OR DAMAGE**
   If necessary, replace the push rod.

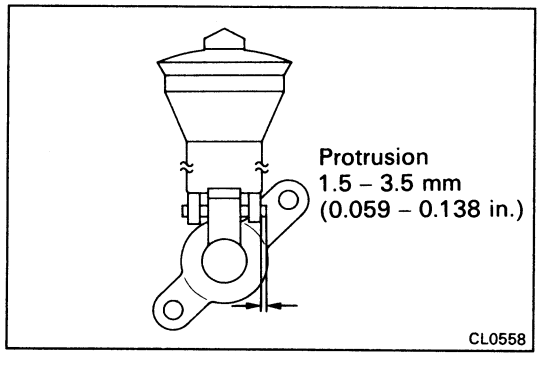


ASSEMBLY OF MASTER CYLINDER

1. **COAT PARTS WITH LITHIUM SOAP BASE GLYCOL GREASE, AS SHOWN**
2. **INSERT PISTON INTO CYLINDER**



3. **INSTALL PUSH ROD ASSEMBLY WITH SNAP RING**



4. **INSTALL RESERVOIR TANK**
   (a) Install reservoir tank and new grommet.
   (b) Using a pin punch and a hammer, drive in the slotted spring pin.

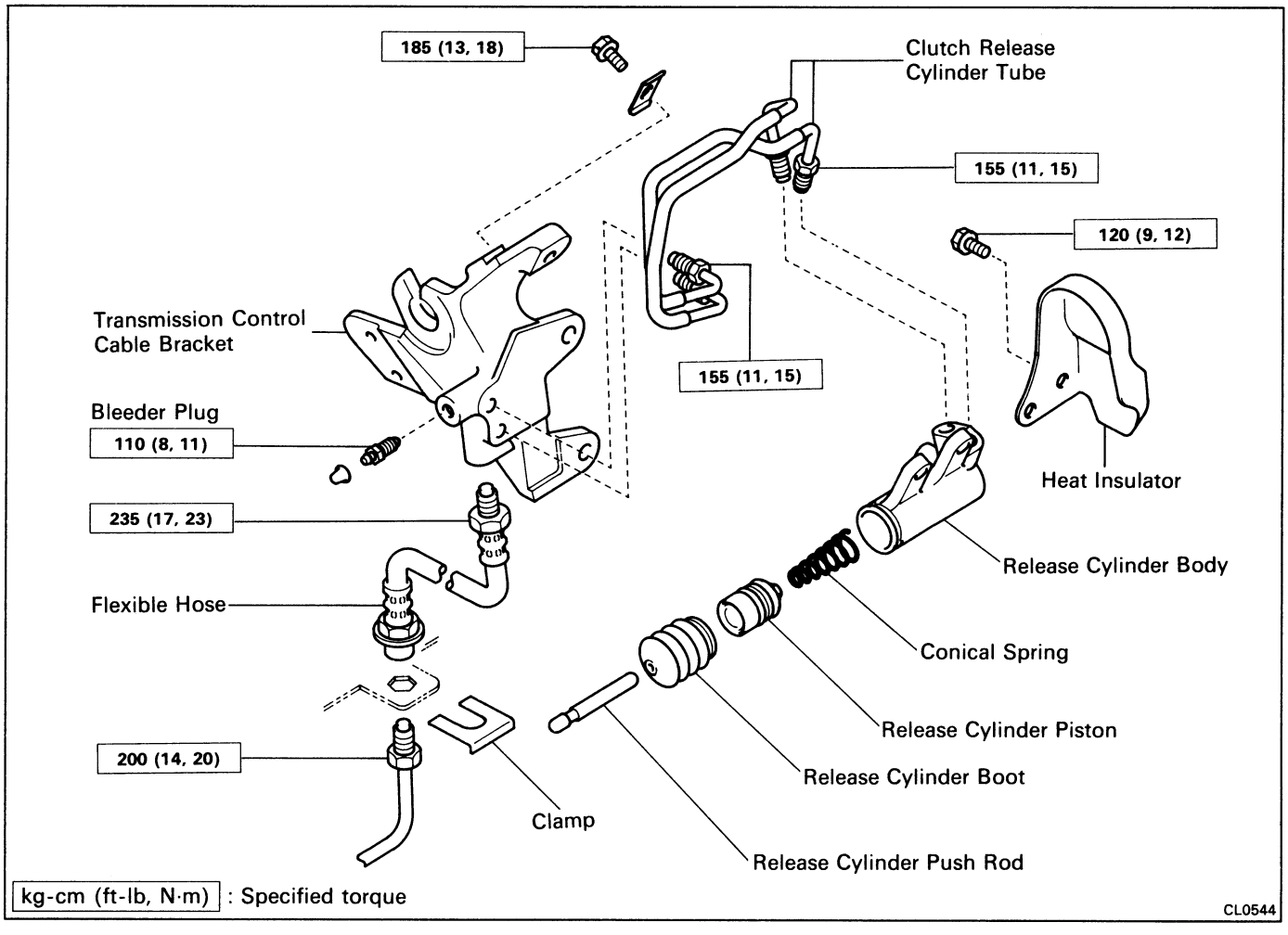
INSTALLATION OF MASTER CYLINDER

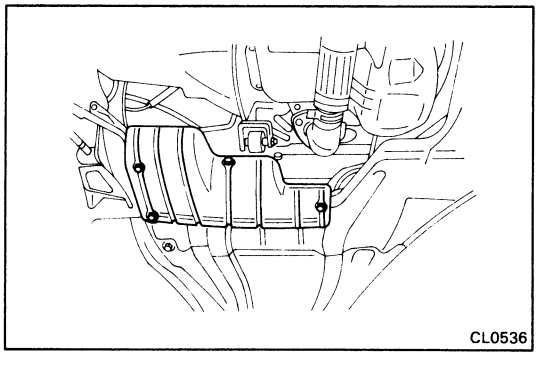
(See page CL-5)

1. **INSTALL MASTER CYLINDER**
   Install the two mounting nuts, and torque them.
   Torque: 130 kg-cm (9 ft-lb, 13 N·m)
2. **CONNECT CLUTCH LINE UNION**
   Using SST, connect the union.
   SST 09751-36011
3. **INSTALL RETRACTOR CONTROL RELAY**
4. **CONNECT PUSH ROD AND INSTALL PIN**
   Install the clip in the push rod pin.
5. **BLEED SYSTEM AND ADJUST CLUTCH PEDAL**
   (See page CL-4)

CLUTCH RELEASE CYLINDER

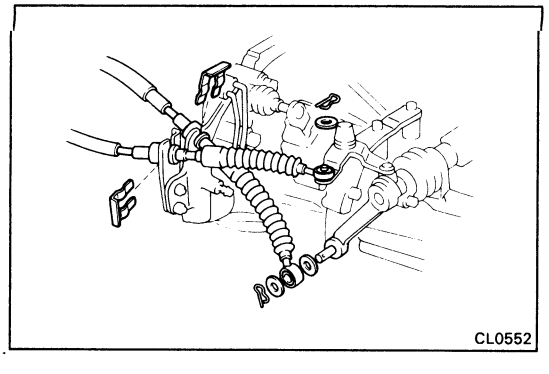
COMPONENTS





REMOVAL OF RELEASE CYLINDER

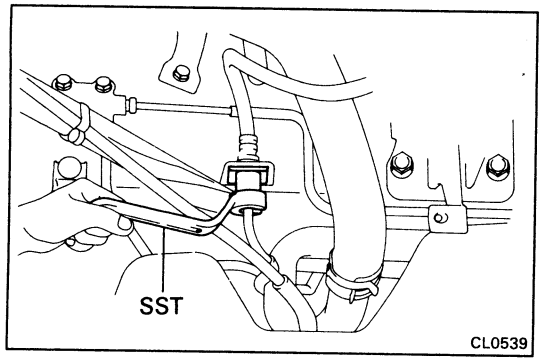
1. REMOVE NO.1 ENGINE UNDER COVER



2. DISCONNECT CONTROL CABLE

(a) Remove the clip and washers.

(b) Remove the retainer from the cable.

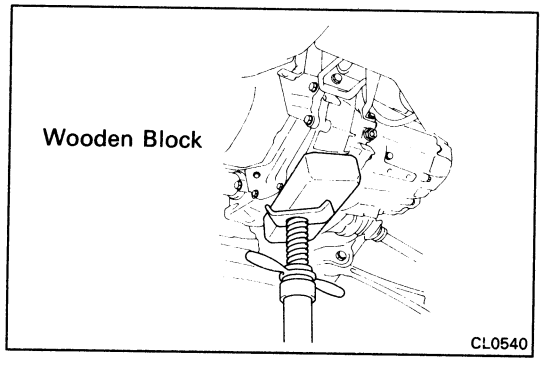


3. **DISCONNECT CLUTCH LINE UNION**

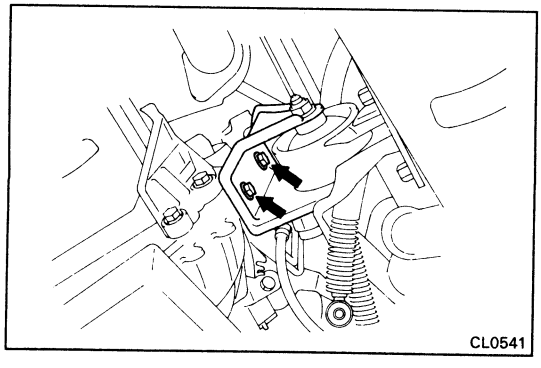
(a) Using SST, disconnect the union. Use a container to catch the brake fluid.

SST 09751-36011

(b) Remove the retainer

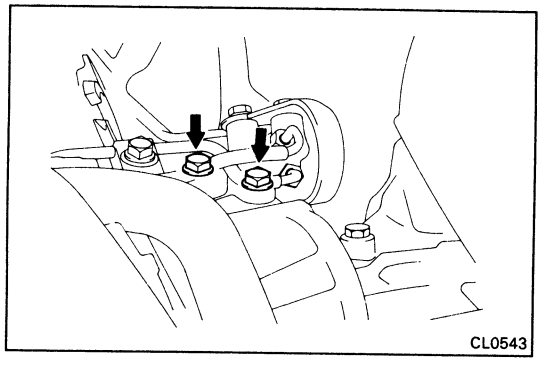


4. **SUPPORT ENGINE AND TRANSMISSION**



5. **REMOVE ENGINE FRONT MOUNTING BRACKET SET BOLTS**

Remove the two bolts from engine side.



6. **REMOVE BOLT AND PULL OUT RELEASE CYLINDER ASSEMBLY**

DISASSEMBLY OF RELEASE CYLINDER

1. **PULL OUT PUSH ROD**

2. **REMOVE BOOT**

3. **REMOVE PISTON**

Using compressed air, remove the piston and spring from the cylinder.

INSPECTION OF RELEASE CYLINDER

HINT: Clean the disassembled parts with compressed air.

1. **INSPECT RELEASE CYLINDER BORE FOR SCORING OR CORROSION**

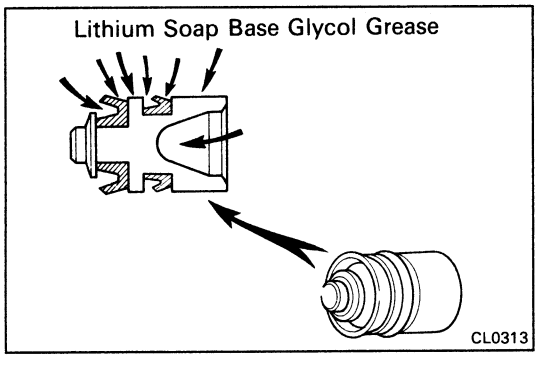
   If a problem is found, clean or replace the cylinder.

2. **INSPECT PISTON AND CUPS FOR WEAR, SCORING, CRACKS OR SWELLING**

   If either one requires replacement, use the parts from the cylinder kit.

3. **INSPECT PUSH ROD FOR WEAR OR DAMAGE**

   If necessary, replace the push rod.



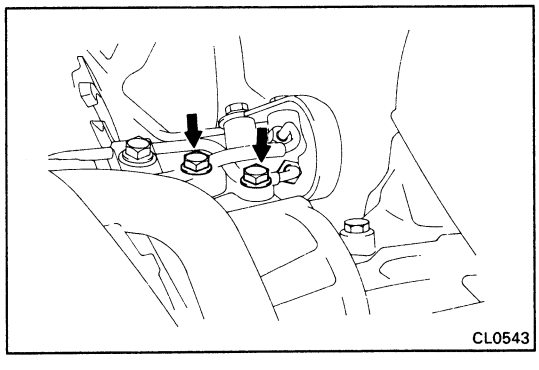
ASSEMBLY OF RELEASE CYLINDER

(See page CL-8)

1. **COAT PISTON WITH LITHIUM SOAP BASE GLYCOL GREASE, AS SHOWN**

2. **INSTALL PISTON**

3. **INSTALL BOOT AND INSERT PUSH ROD**

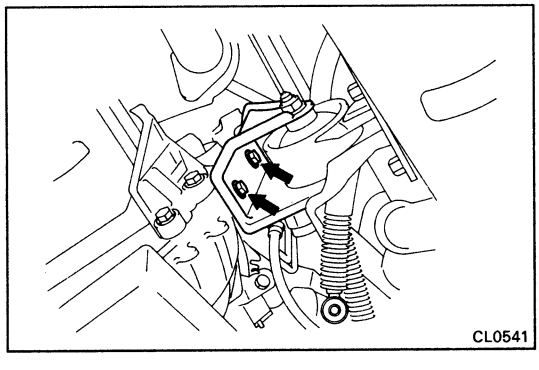


INSTALLATION OF RELEASE CYLINDER

(See page CL-8)

1. **INSTALL RELEASE CYLINDER**

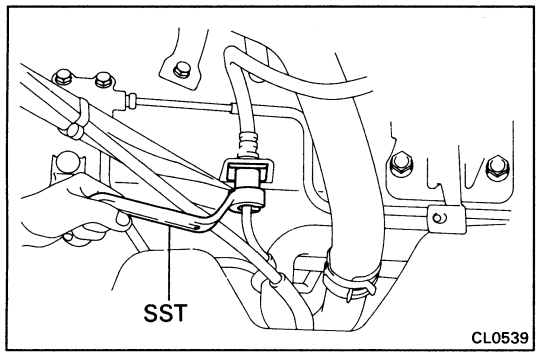
   Torque: 120 kg-cm (9 ft-lb, 12 N·m)



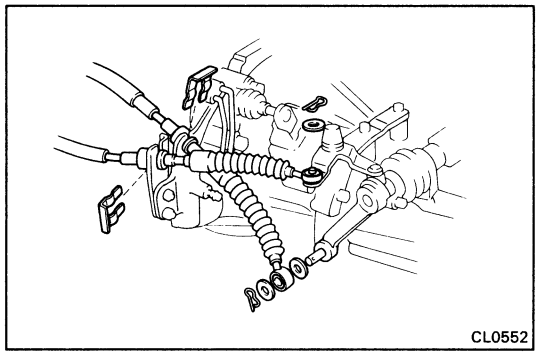
2. **INSTALL ENGINE FRONT MOUNTING BRACKET SET BOLTS**

   Torque: 790 kg-cm (57 ft-lb, 77 N·m)

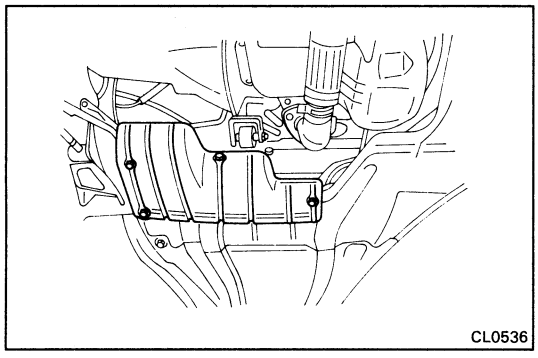
3. **REMOVE SUPPORTS FOR ENGINE AND TRANSAXLE**



4. **CONNECT CLUTCH LINE UNION**
   (a) Using SST, connect the union.
   SST 09751-36011
   (b) Install the retainer.



5. **CONNECT CONTROL CABLE**
   (a) Install the cable and retainer.
   (b) Install the washers and clip.

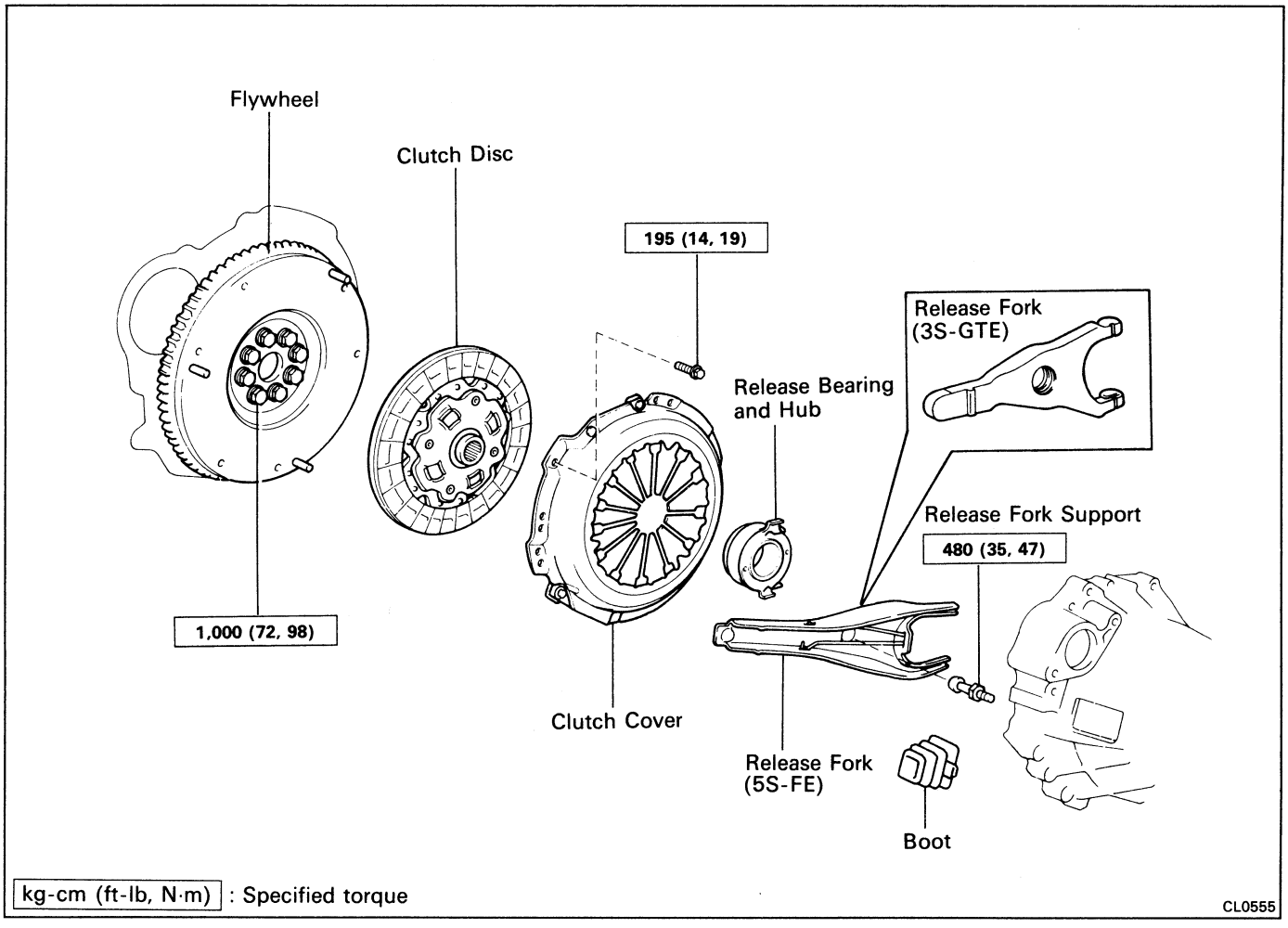


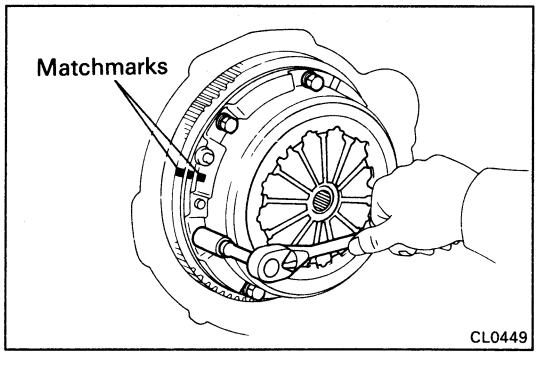
6. **INSTALL NO.1 ENGINE UNDER COVER**

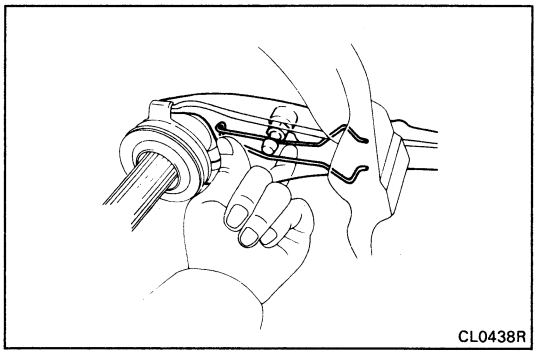
7. **BLEED CLUTCH SYSTEM**
   (See page CL-4)

CLUTCH UNIT

COMPONENTS





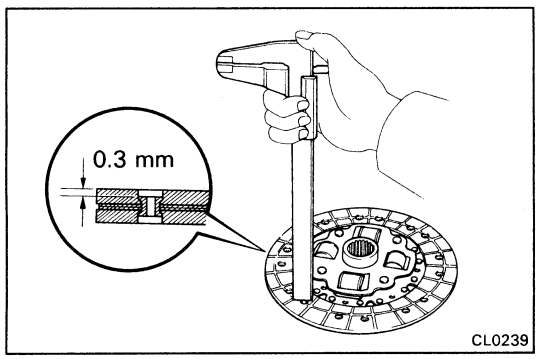


REMOVAL OF CLUTCH UNIT

1. **REMOVE TRANSAXLE (See page MT-5)**

2. **REMOVE CLUTCH COVER AND DISC**
   (a) Put matchmarks on the clutch cover and flywheel.
   (b) Loosen the set bolts one turn at a time until spring tension is released.
   (c) Remove the set bolts and pull off the clutch cover and disc.

3. **REMOVE BEARING, HUB AND FORK FROM TRANSAXLE**
   (a) Remove the retaining clip, pull off the bearing.
   (b) Remove the fork and boot.



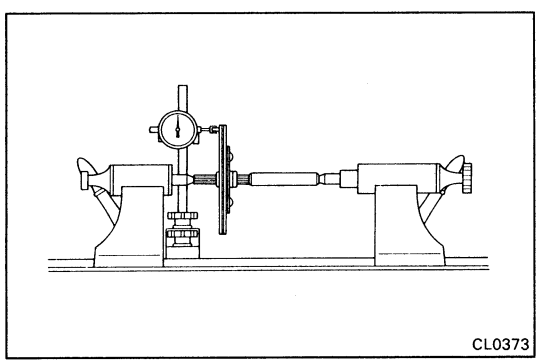
INSPECTION OF CLUTCH PARTS

1. INSPECT CLUTCH DISC FOR WEAR DAMAGE

Using calipers, measure the rivet head depth.

Minimum rivet depth: 0.3 mm (0.012 in.)

If a problem is found, repair or replace the clutch disc.

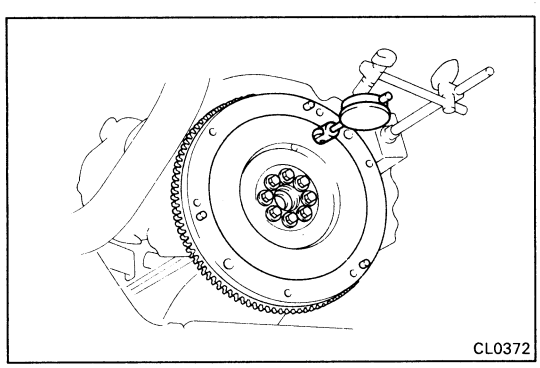


2. INSPECT CLUTCH DISC RUNOUT

Using a dial indicator, check the disc runout.

Maximum runout: 0.8 mm (0.031 in.)

If runout is excessive, replace the disc.

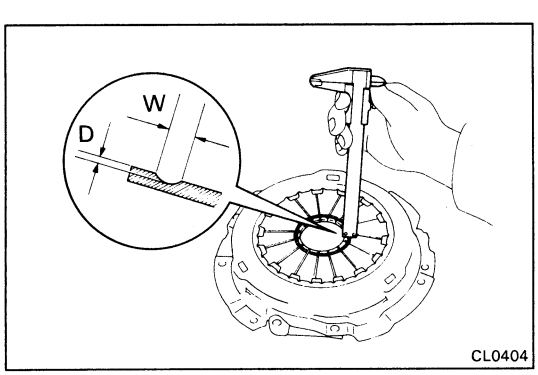


3. INSPECT FLYWHEEL RUNOUT

Using a dial indicator, check the flywheel runout.

Maximum runout: 0.1 mm (0.004 in.)

If runout is excessive, repair or replace flywheel.

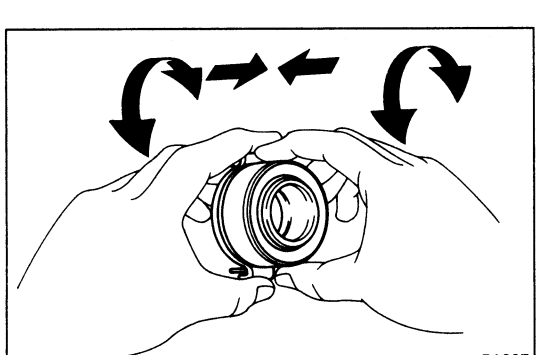


4. INSPECT DIAPHRAGM SPRING FOR WEAR

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.

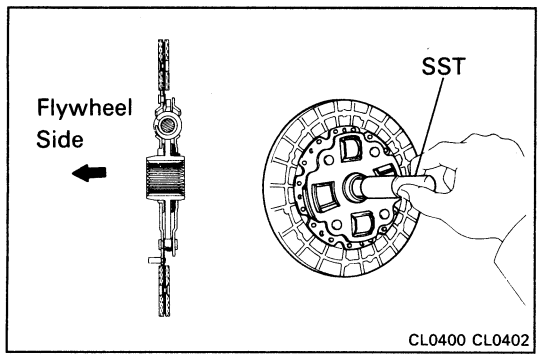


5. INSPECT RELEASE BEARING

Turn the bearing by hand while applying force in the rotation direction.

If the bearing sticks or has much resistance, replace the release bearing.

HINT: The bearing is permanently lubricated and requires no cleaning or lubrication.



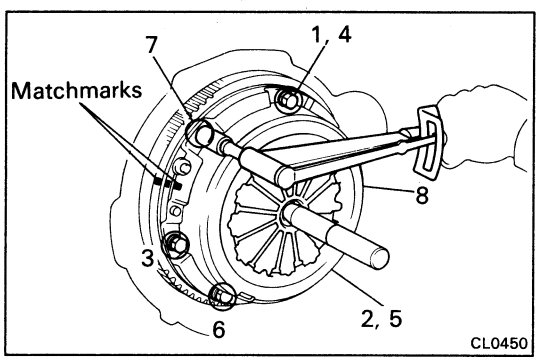
INSTALLATION OF CLUTCH UNIT

(See page CL-12)

1. INSTALL DISC ON FLYWHEEL

Using SST, install the disc on the flywheel.

SST 09301-32010 (5S-FE)
09301-17010 (3S-GTE)



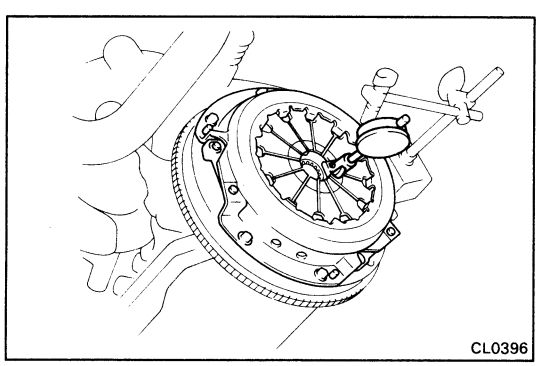
2. INSTALL CLUTCH COVER

(a) Align the matchmarks on the clutch cover and flywheel.

(b) Torque the bolts on the clutch cover in the order shown.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

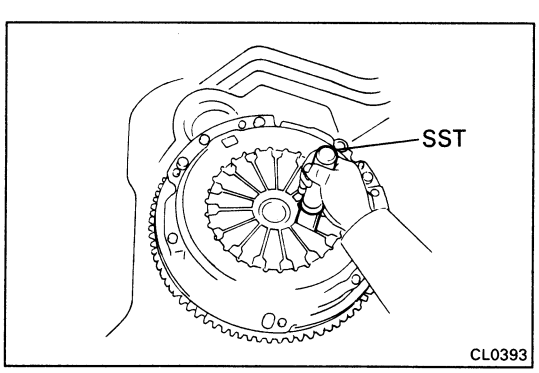
HINT: Temporarily tighten the No.1 and No.2 bolts.



3. CHECK DIAPHRAGM SPRING TIP ALIGNMENT

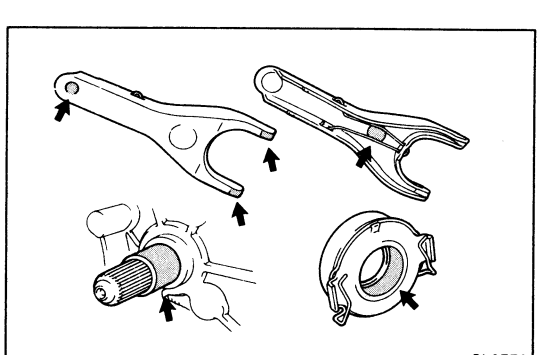
Using a dial indicator with roller instrument, check the diaphragm spring tip alignment.

Maximum non-alignment: 0.5 mm (0.020 in.)



If alignment is not as specified, using SST, adjust the diaphragm spring tip alignment.

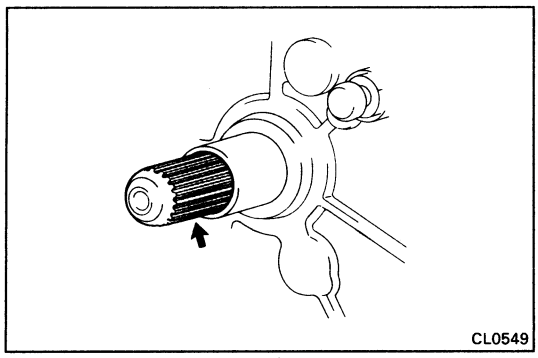
SST 09333-00013



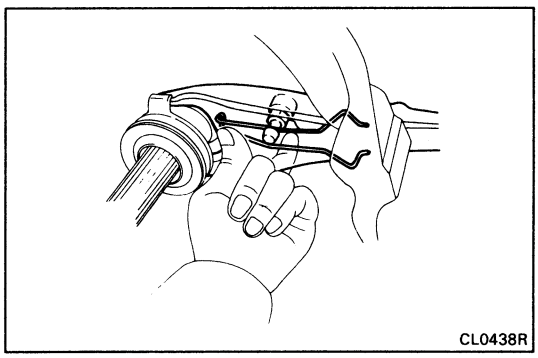
4. APPLY MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE (NLGI NO.2) OR MP GREASE

Apply molybdenum disulphide lithium base grease to the following parts:

- Release fork and hub contact point
- Release fork and push rod contact point
- Release fork pivot point
- Release bearing retainer
- Release bearing hub.



5. **APPLY SPLINE GREASE TO INPUT SHAFT SPLINE**



6. **INSTALL BOOT, FORK, HUB AND BEARING ON TRANSAXLE**

7. **INSTALL TRANSAXLE**
(See page MT-5)

MANUAL TRANSAXLE

	Page
DESCRIPTION	MT-2
PRECAUTIONS	MT-4
TROUBLESHOOTING	MT-4
REMOVAL AND INSTALLATION OF TRANSAXLE	MT-5
(S54 TRANSAXLE/SW21 series)	
REMOVAL OF COMPONENT PARTS	MT-7
COMPONENT PARTS	MT-21
Input Shaft Assembly	MT-21
Output Shaft Assembly	MT-27
Shift and Select Lever Assembly	MT-34
Differential	MT-37
INSTALLATION OF COMPONENT PARTS	MT-47
(E153 TRANSAXLE/SW20 series)	
REMOVAL OF COMPONENT PARTS	MT-57
COMPONENT PARTS	MT-73
Input Shaft Assembly	MT-73
Output Shaft Assembly	MT-79
Oil Pump	MT-85
Shift and Select Lever Shaft	MT-90
Differential	MT-94
INSTALLATION OF COMPONENT PARTS	MT-104
SHIFT LEVER AND CONTROL CABLE	MT-116

DESCRIPTION

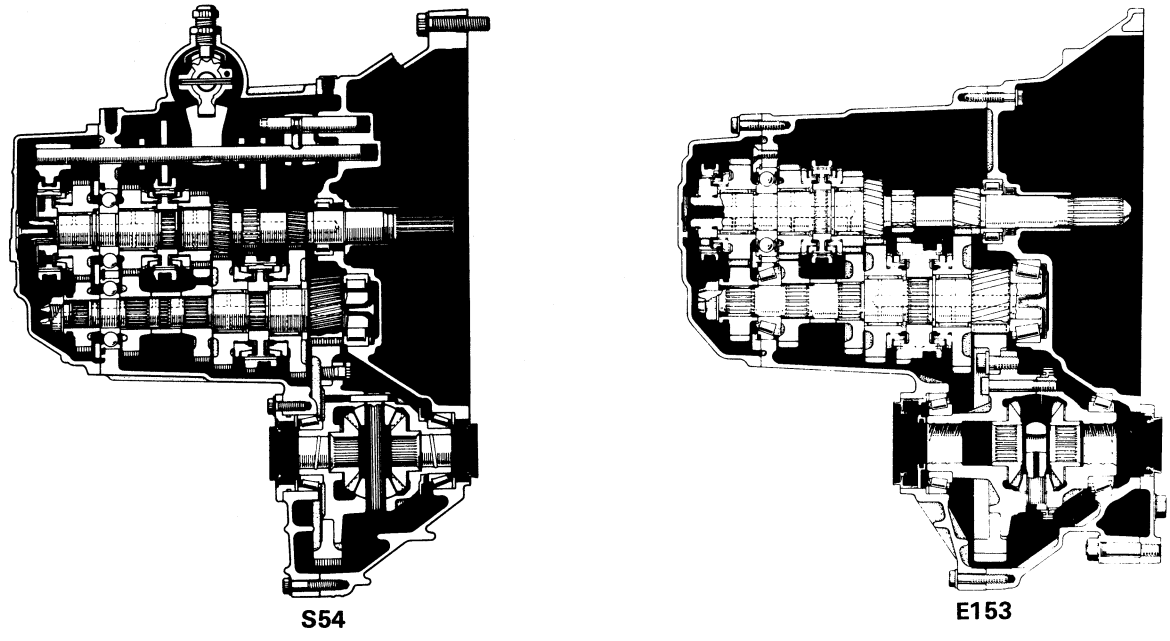
General

- **Transaxle types S54 and E153 are constant mesh synchronizers for forward gears, and a sliding mesh reverse gear.**
- **The input shaft is composed of the 1st and 2nd speed gears and the reverse drive gear, and the output shaft is composed of the drive gear (for use with the ring gear).**
- **The oil used in the transaxles are as follows:**

S51 ..... ATF type DEXRON® II

E153 ..... Transaxle oil E50 (08885 – 80206) or equivalent

Sectional View



CD0007 MT0718

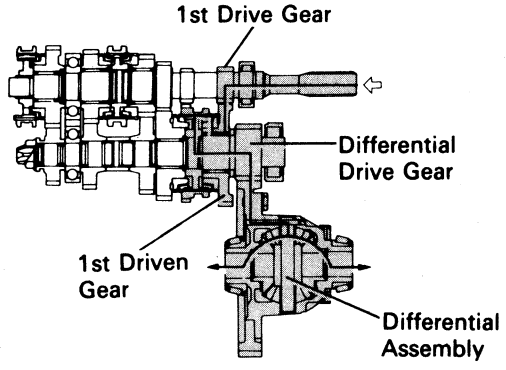
General Specifications

Items \ Type of Engine \ Type of Transmission		5S-FE / S54	3S-GTE / E153
Gear Ratios	1st Gear	3.285	3.230
	2nd Gear	1.960	1.913
	3rd Gear	1.322	1.258
	4th Gear	1.028	0.918
	5th Gear	0.820	0.731
	Reverse Gear	3.153	3.545
Differential Gear Ratio		4.176	4.285
Oil Type		ATF DEXRON® II	Transaxle oil E50 or equivalent
Oil Capacity	liter (US qts, Imp. qts)	2.6 (2.7, 2.3)	4.2 (4.4, 3.7)

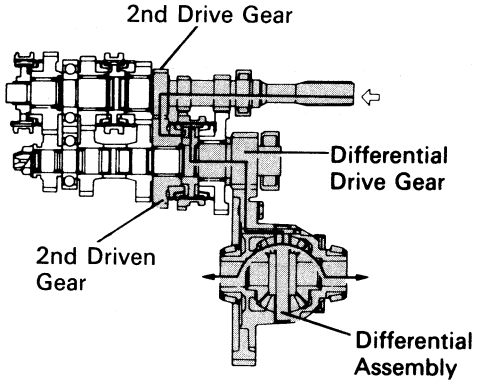
Function of Component Parts

S54 and E153 Transaxles

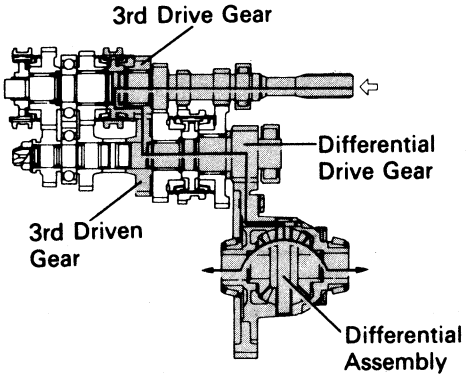
- **The illustrations below show the engagements of transaxle gears.**



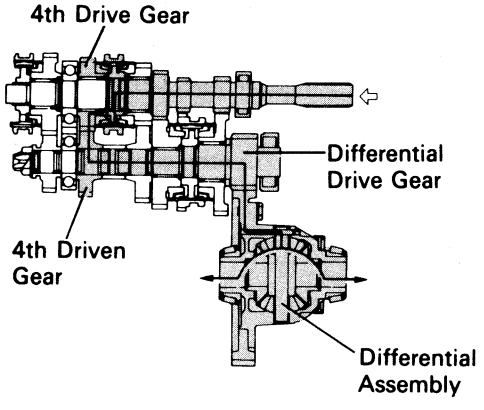
1st



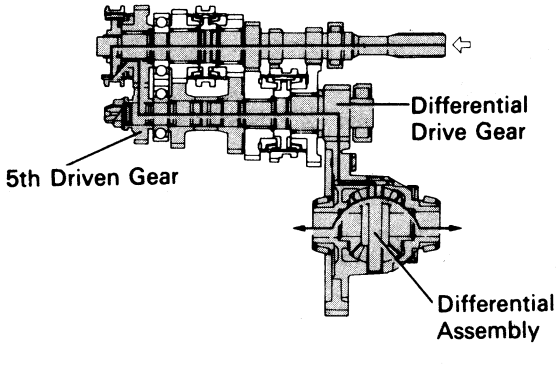
2nd



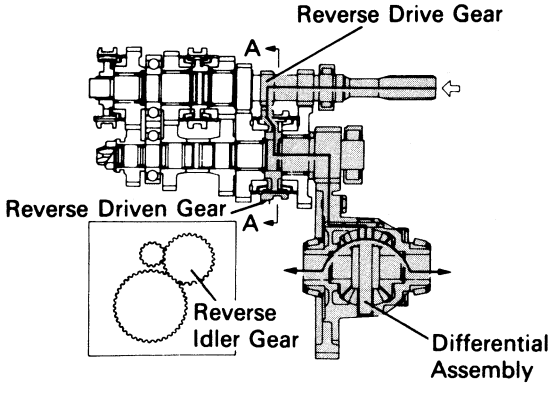
3rd



4th



5th



Rev.

Z9913

PRECAUTIONS

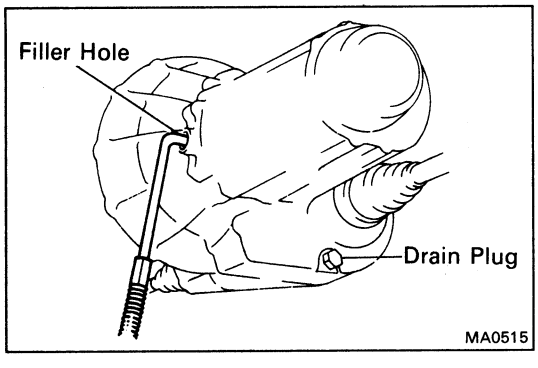
When working with FIPG material, you must be observe the following.

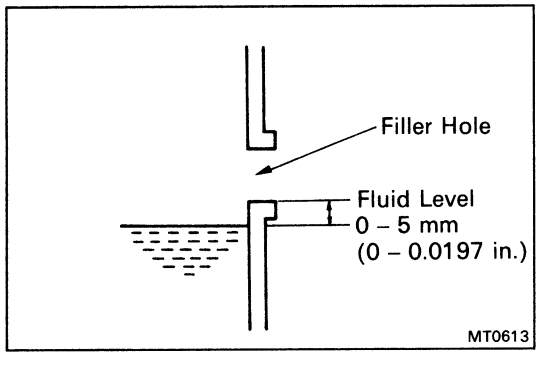
- **Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces.**
- **Thoroughly clean all components to remove all the loose material.**
- **Clean both sealing surfaces with a non-residue solvent.**
- **Apply the seal packing in approx. 1 mm (0.04 in.) bead along the sealing surface.**
- **Parts must be assembled within 10 minutes of application. Otherwise, the packing (FIPG) material must be removed and reapplied.**

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page	
			S54	E153
Noise	Transmission or differential faulty	Disassemble and inspect transmission or differential	MT-7, MT-37	MT-57, MT-94
	Wrong oil grade	Replace oil	MT-4	←
	Oil level low	Add oil	MT-4	←
Oil leakage	Oil level too high	Drain oil	–	–
	Oil seal, O-ring or gasket worn or damaged	Replace oil seal, O-ring or gasket	MT-7	MT-57
Hard to shift or will not shift	Control cable faulty	Replace control cable	MT-116	←
	Transmission faulty	Disassemble and inspect transmission	MT-7	MT-57
Jumps out of gear	Transmission faulty	Disassemble and inspect transmission	MT-7	MT-57

HOW TO REPLACE OR CHECK OIL





1. HOW TO REPLACE TRANSAXLE OIL

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

(b) Reinstall drain plug securely.

Torque: 500 kg-cm (36 ft-lb, 49 N·m)

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

(S54: 5S-FE)

ATF: DEXRON® II

Capacity: 2.6 liters (2.7 US qts, 2.3 Imp. qts)

(E153: 3S-GTE)

Oil: Transaxle oil E50 (08885-80206) or equivalent

Capacity: 4.2 liters (4.4 US qts, 3.7 Imp. qts)

2. HOW TO CHECK TRANSAXLE OIL

(a) Remove the filler plug and check transaxle oil level.

If the level is lower, add transaxle oil until it begins to run out of the filler hole.

(b) After checking, reinstall the filler plug securely.

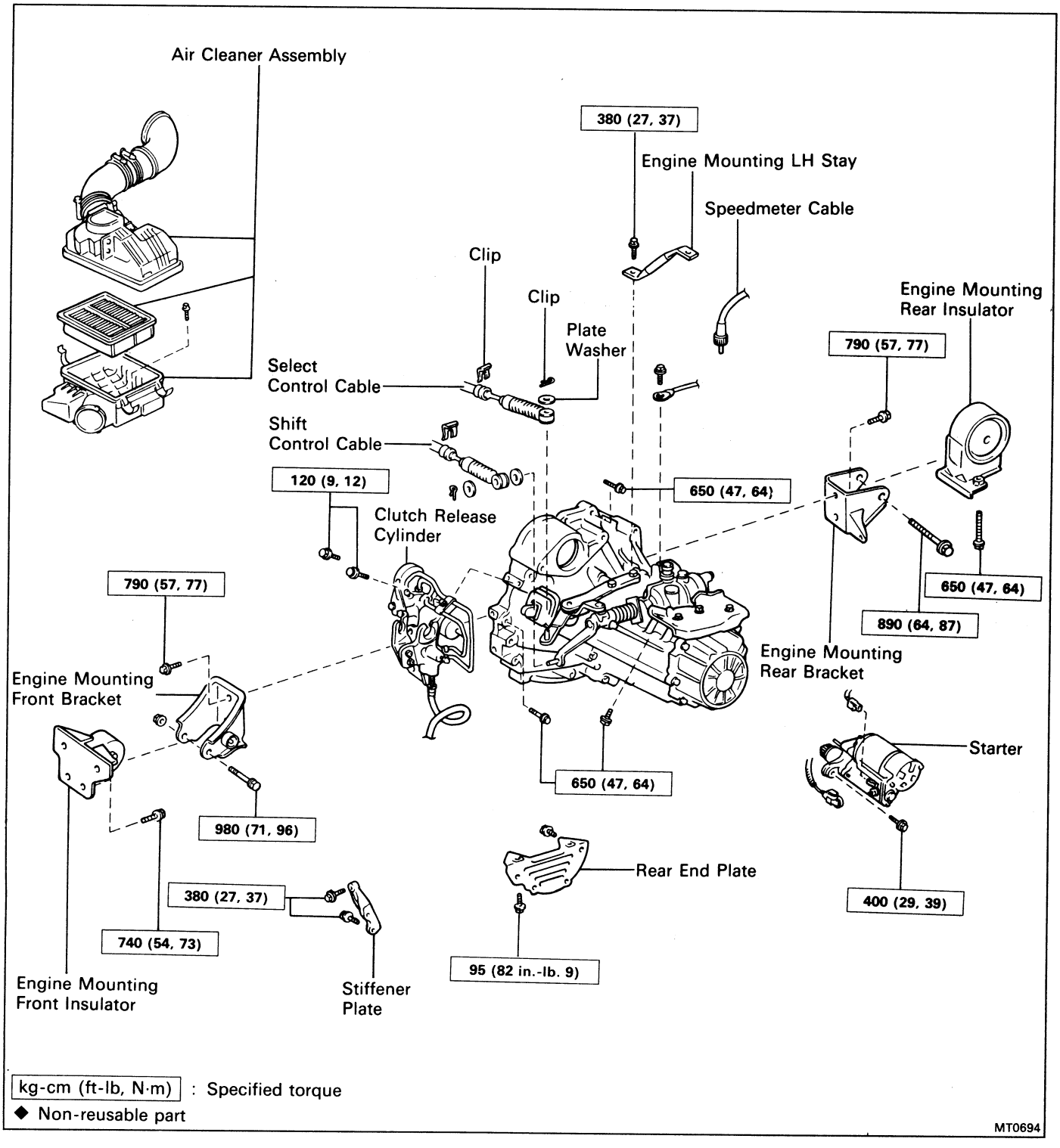
Torque: 500 kg-cm (36 ft-lb, 49 N·m)

REMOVAL AND INSTALLATION OF TRANSAXLE

Remove and install the parts as shown.

HINT: (S54)

ATF type : DEXRON® II
Capacity : 2.6 liter (2.7 US qts, 2.3 Imp. qts)
(E153)
Oil : Transaxle oil E50 (08885-80206) or equivalent
Capacity : 4.2 liter (4.4 US qts, 3.7 Imp. qts)

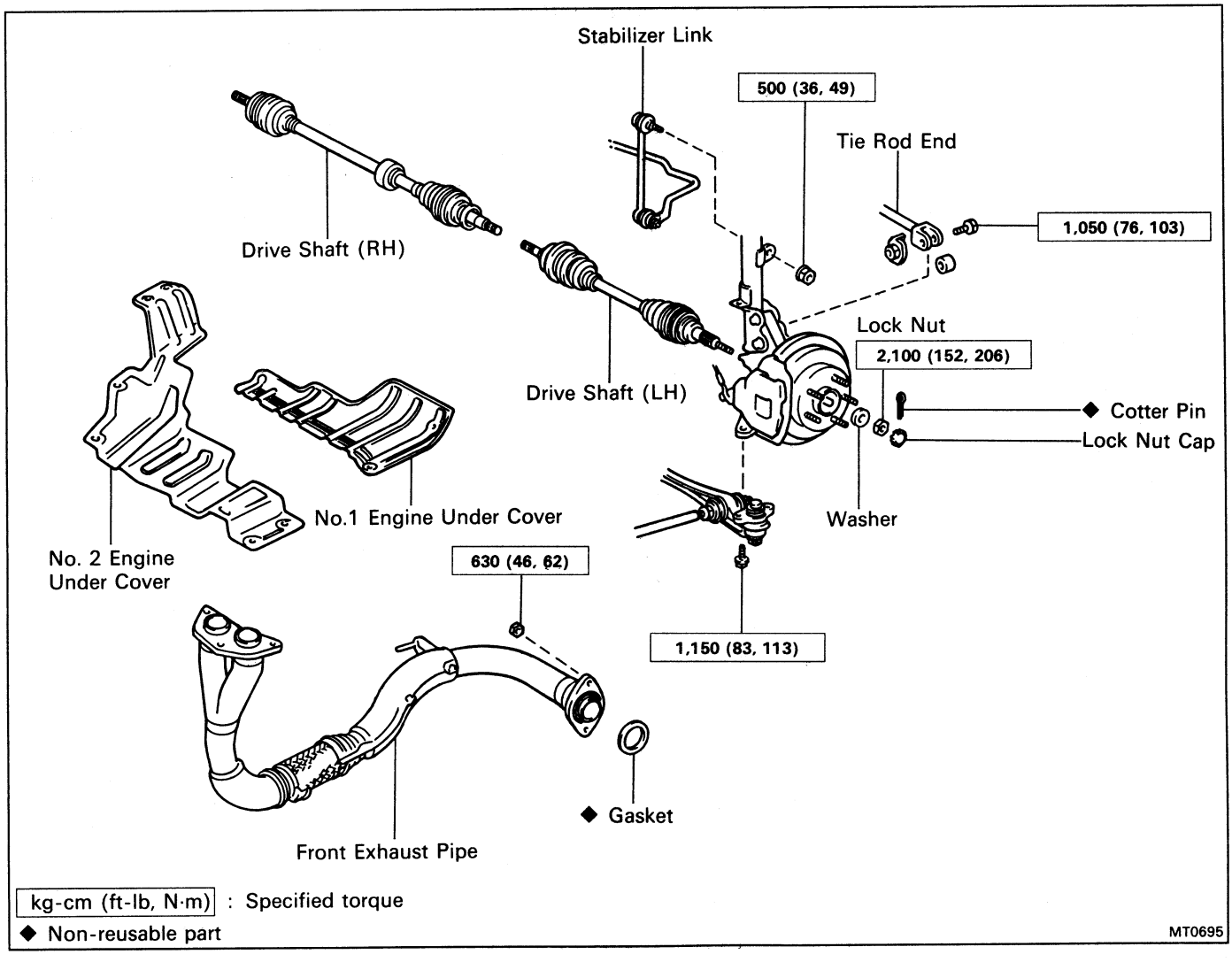


kg-cm (ft-lb, N·m) : Specified torque
◆ Non-reusable part

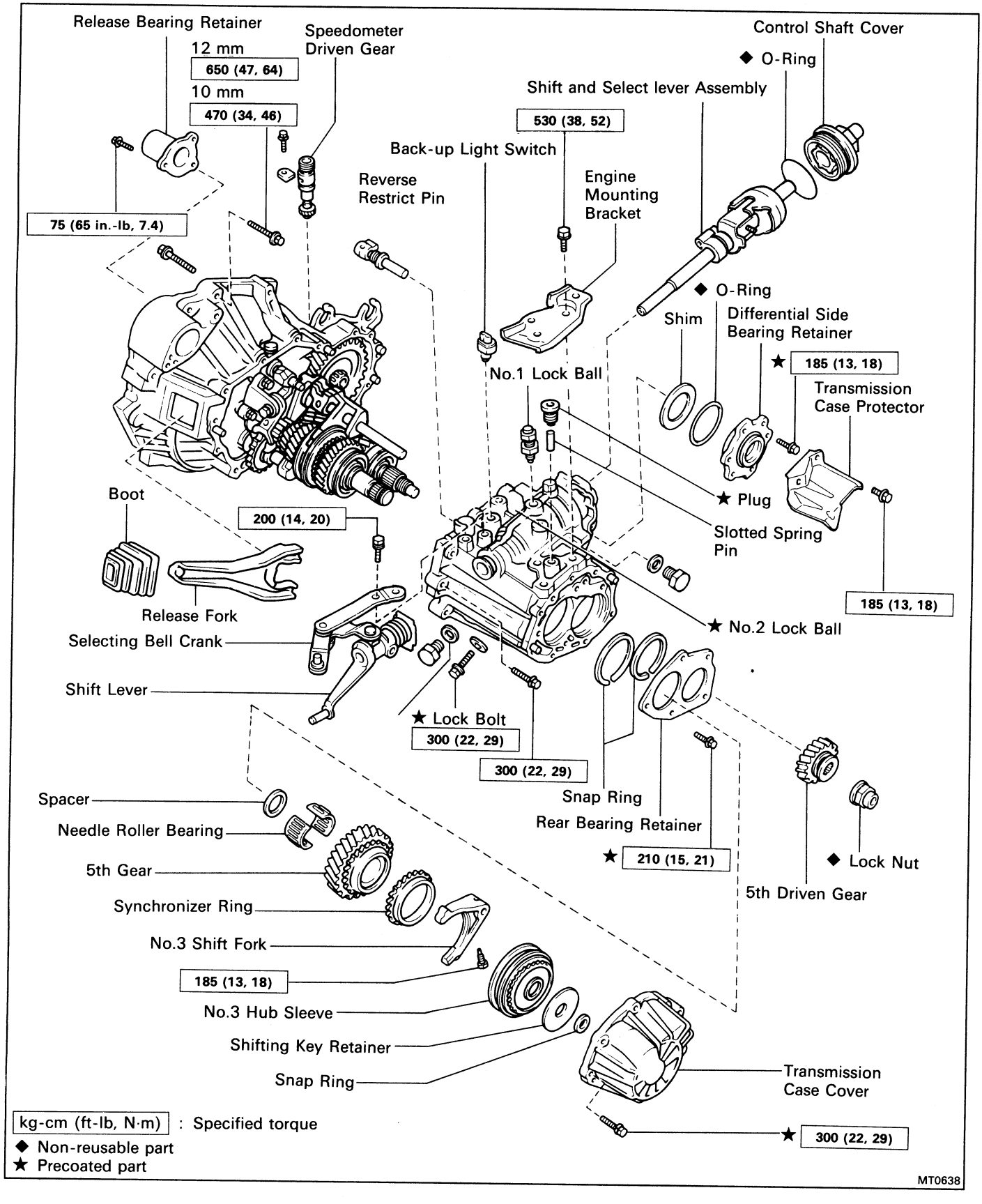
MT0694

REMOVAL AND INSTALLATION OF TRANSAXLE (Cont'd)

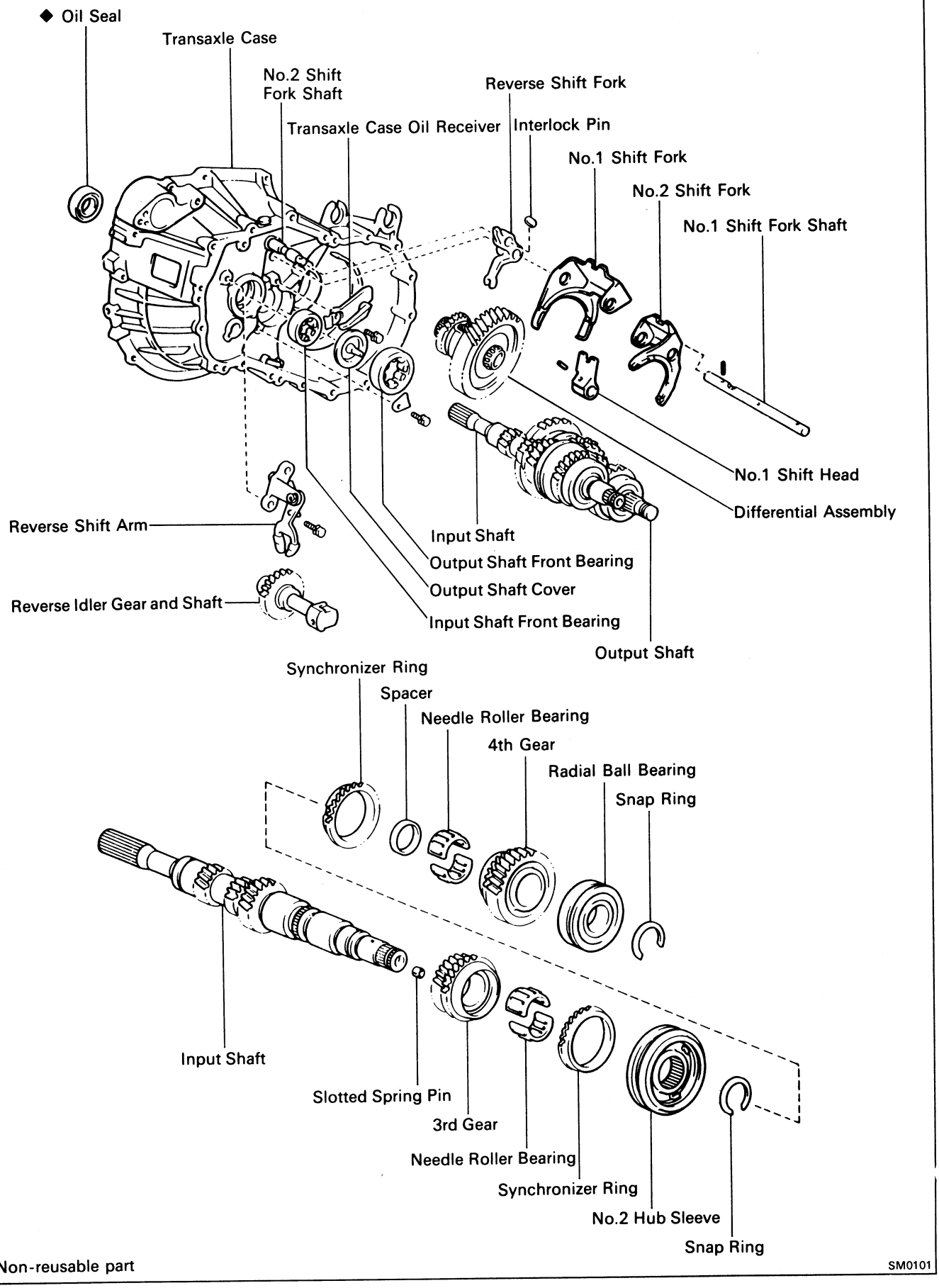
Remove and install the parts as shown.



(S54 TRANSAXLE)
REMOVAL OF COMPONENT PARTS
COMPONENTS



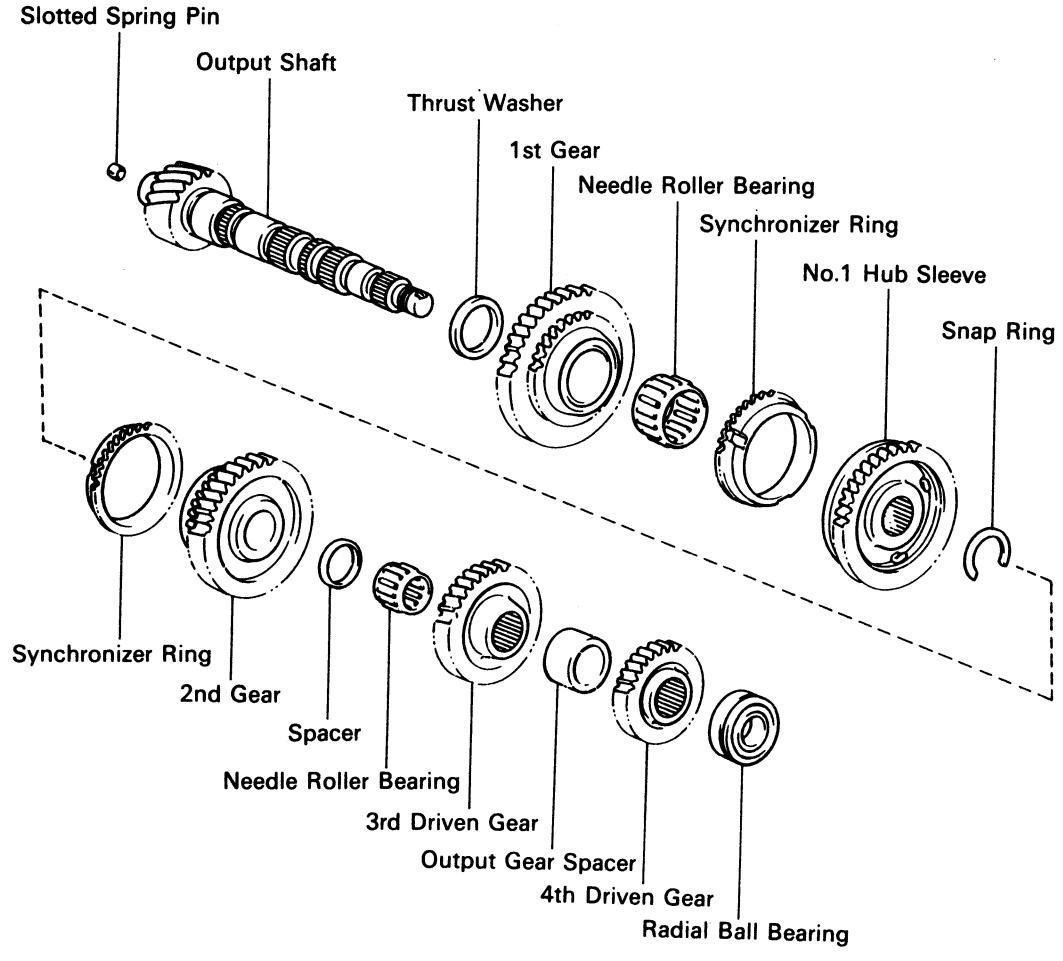
COMPONENTS (Cont'd)

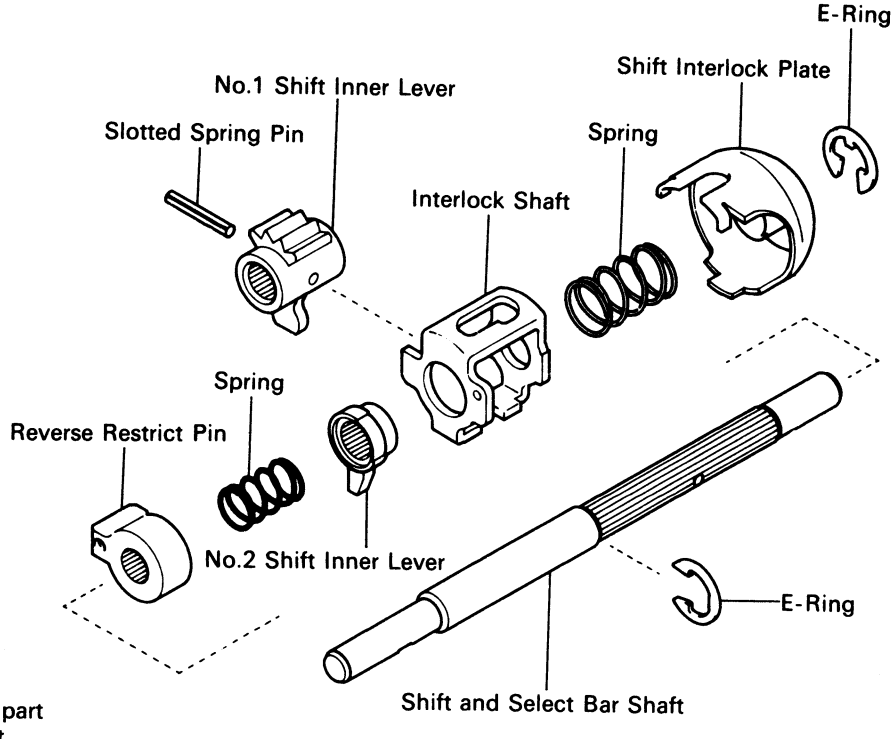


◆ Non-reusable part

SM0101

COMPONENTS (Cont'd)



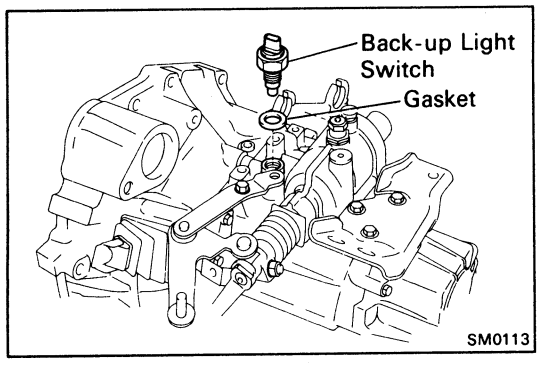


◆ Non-reusable part
★ Precoated part

SM0040
SM0147

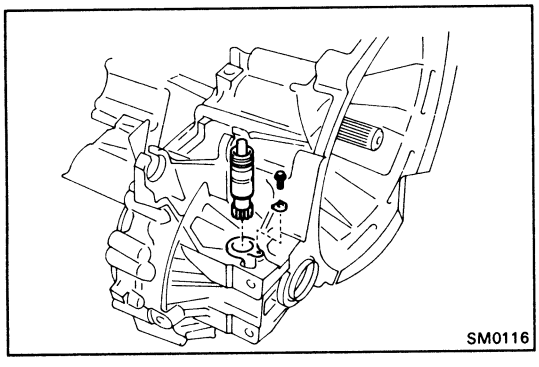
REMOVAL OF COMPONENT PARTS

(See pages MT-7 to 9)

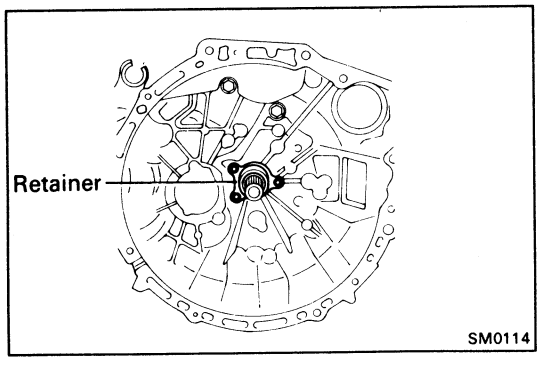


1. **REMOVE RELEASE FORK AND BEARING**

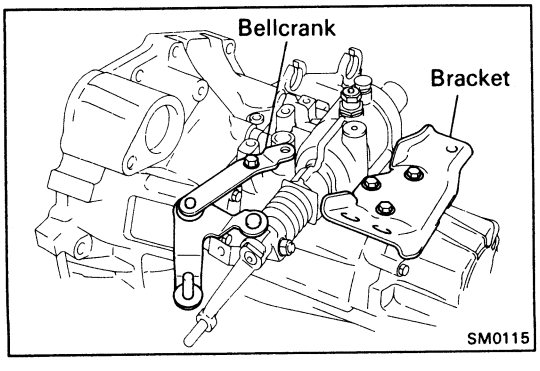
2. **REMOVE BACK-UP LIGHT SWITCH**
   Remove the back-up light switch and gasket.



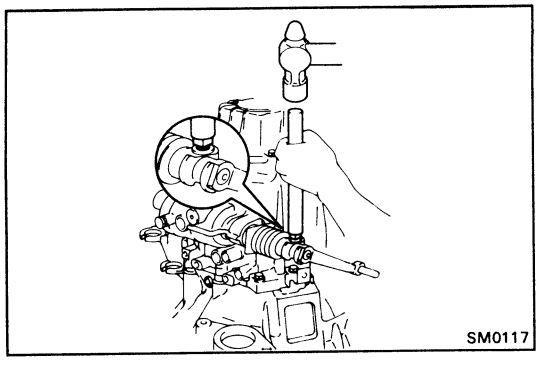
3. **REMOVE SPEEDOMETER DRIVEN GEAR**
   (a) Remove the retaining bolt and plate.
   (b) Pull out the speedometer driven gear.



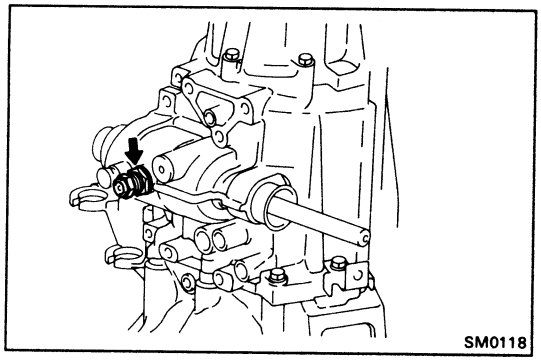
4. **REMOVE RELEASE BEARING RETAINER**
   Remove the three bolts.



5. **REMOVE SELECTING BELLCRANK ASSEMBLY AND ENGINE MOUNTING BRACKET**

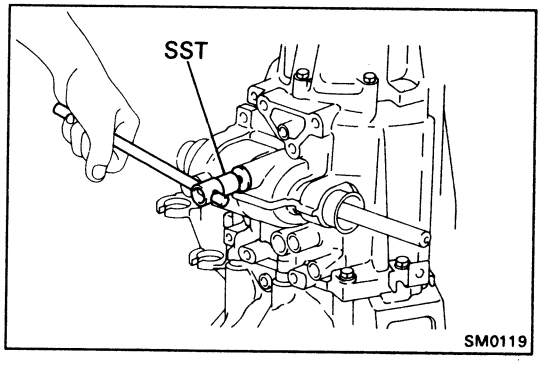


6. **REMOVE SHIFT LEVER**
   (a) Loosen the lock nut as far as the tip of the lock pin.
   (b) Using a brass bar and hammer, tap out the lock pin.
   (c) Pull out the shift lever with dust boot from shift and select lever shaft.

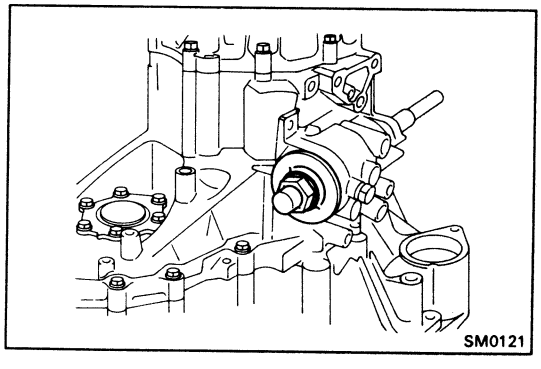


7. REMOVE NO.1 AND NO.2 LOCK BALL ASSEMBLIES

(a) Loosen the lock nut and remove the No.1 lock ball.



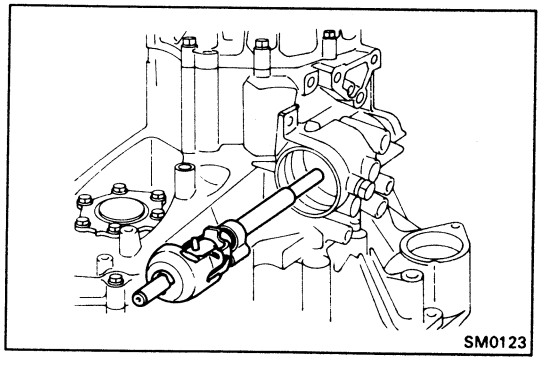
(b) Using SST, remove the No.2 lock ball.
SST 09313-30021



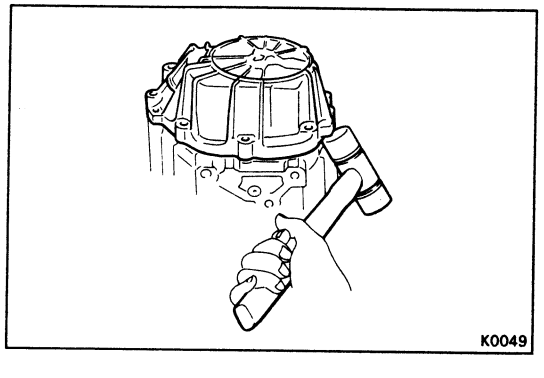
8. REMOVE SHIFT AND SELECT LEVER SHAFT ASSEMBLY

(a) Remove the control shaft cover.

(b) Remove the O-ring from control shaft cover.



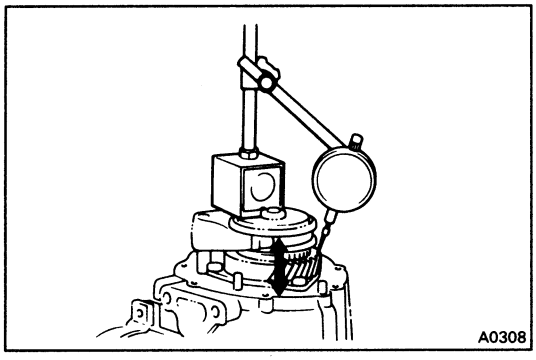
(c) Pull out the shift and select lever shaft assembly.



9. REMOVE TRANSMISSION CASE COVER

(a) Remove the eight bolts.

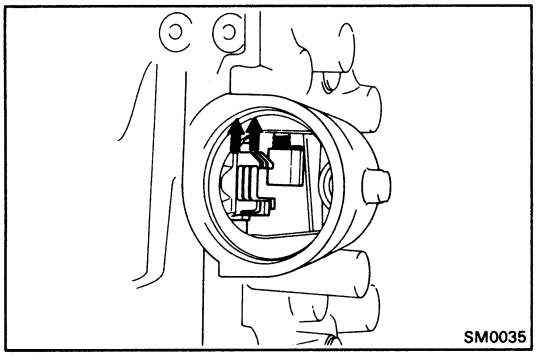
(b) Tap on the circumference of the transmission case cover with a plastic hammer to remove the transmission case cover.



10. MEASURE FIFTH GEAR THRUST CLEARANCE

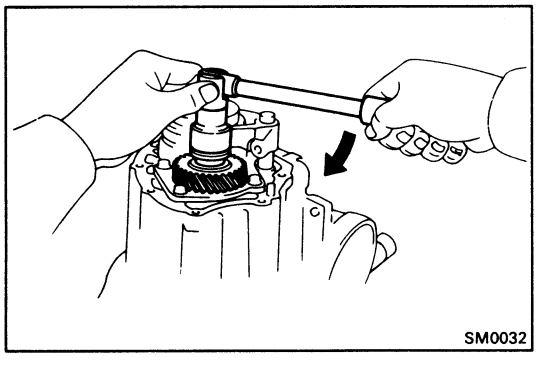
Using a dial indicator, measure the thrust clearance.

Standard clearance: 0.20 – 0.40 mm (0.0079 – 0.0157 in.)
Maximum clearance: 0.45 mm (0.0177 in.)



11. REMOVE OUTPUT SHAFT LOCK NUT

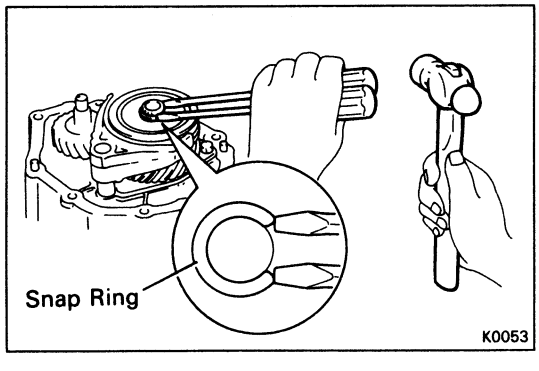
(a) Engage the gear double meshing.
(b) Unstake the nut.



(c) Remove the lock nut.

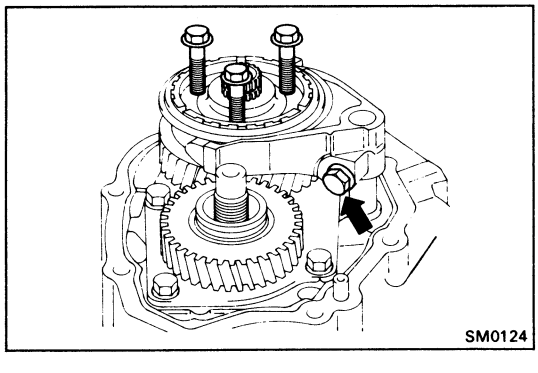
HINT: The lock nut has LH threads.

(d) Disengage the gear double meshing.



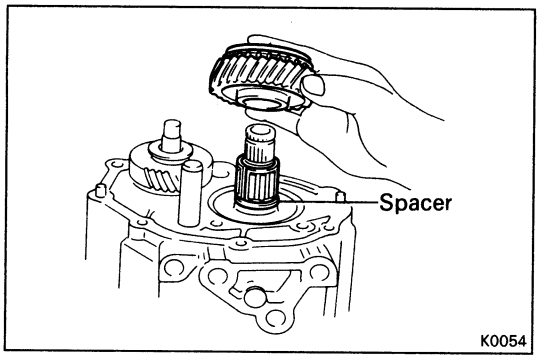
12. REMOVE SHIFTING KEY RETAINER

(a) Using two screwdrivers and a hammer, tap out the snap ring.
(b) Remove the shifting key retainer.

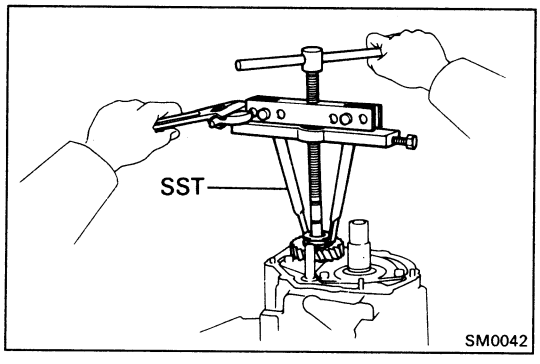


13. REMOVE NO. 3 HUB SLEEVE AND NO. 3 SHIFT FORK

(a) Remove the No. 3 shift fork set bolt.
(b) Using the three case cover bolts, tighten the three bolts a little at a time and remove No. 3 hub sleeve assembly.

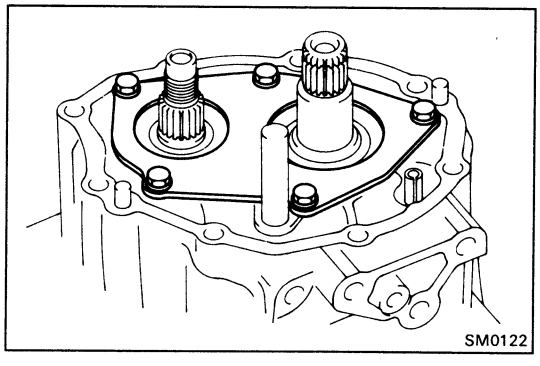


14. REMOVE FIFTH GEAR, SYNCHRONIZER RING, NEEDLE ROLLER BEARINGS AND SPACER



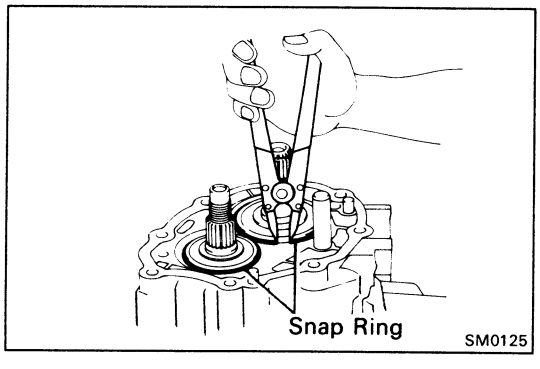
15. REMOVE FIFTH DRIVEN GEAR

Using SST, remove the fifth driven gear.
SST 09950-20017



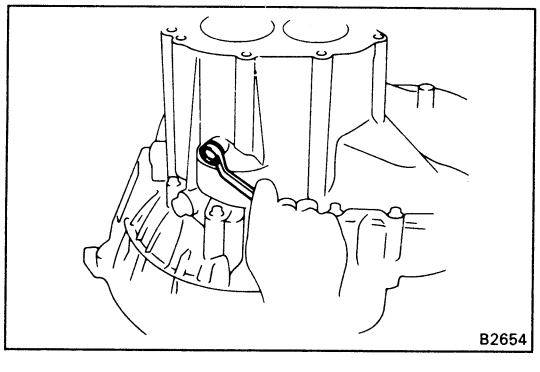
16. REMOVE REAR BEARING RETAINER

Remove the five bolts and bearing retainer.

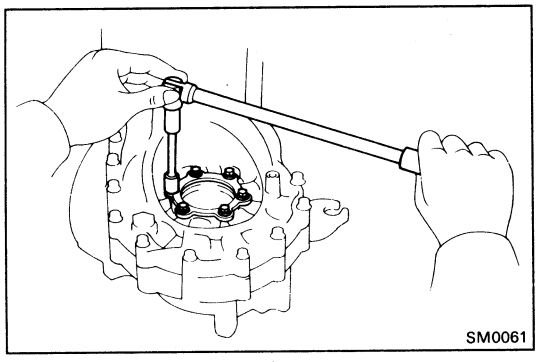


17. REMOVE SNAP RINGS

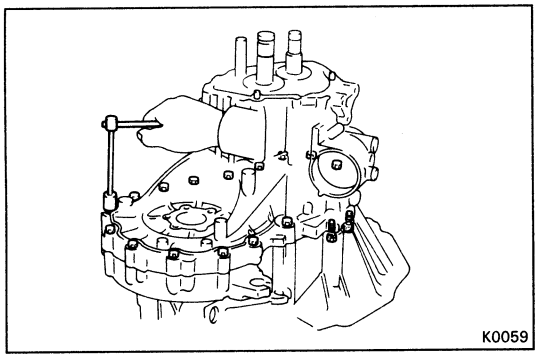
Using snap ring pliers, remove the two snap rings.



18. REMOVE REVERSE IDLER GEAR SHAFT LOCK BOLT



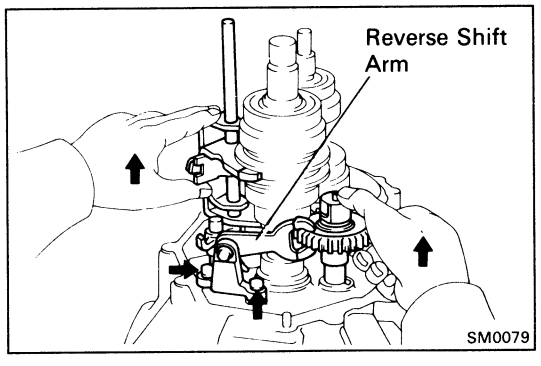
19. REMOVE DIFFERENTIAL SIDE BEARING RETAINER AND SHIM



20. REMOVE TRANSMISSION CASE

Remove the seventeen bolts and tap off the case with plastic hammer.

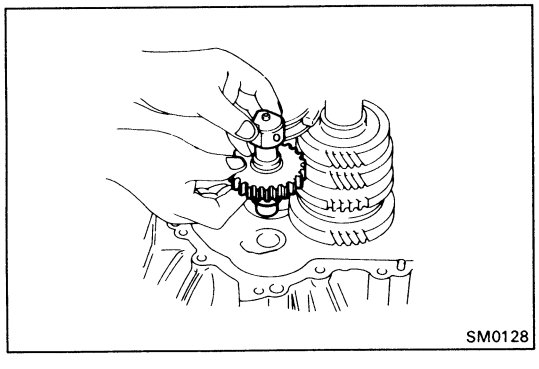
HINT: Remove the two bolts from the transaxle case side.



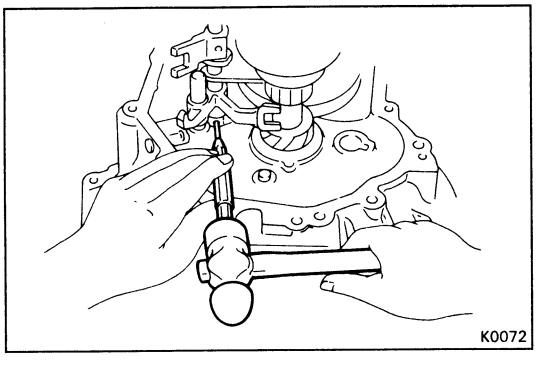
21. REMOVE REVERSE SHIFT ARM BRACKET ASSEMBLY

(a) Shift the shift fork shaft into reverse.

(b) Remove the two bolts and pull off the reverse shift arm.

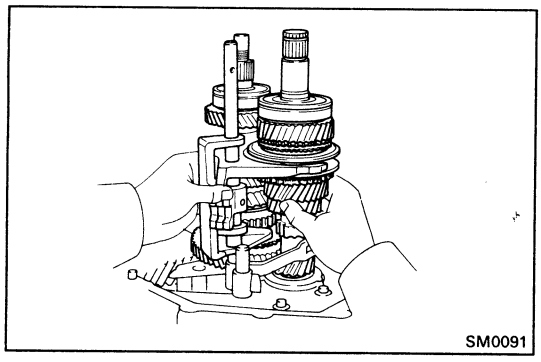


22. REMOVE REVERSE IDLER GEAR AND SHAFT

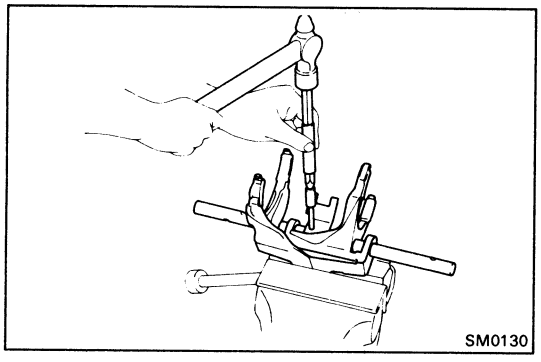


23. REMOVE NO. 1 SHIFT FORK SHAFT, NO. 1 SHIFT HEAD, NO. 1 AND NO. 2 SHIFT FORKS, INPUT SHAFT AND OUTPUT SHAFT

(a) Drive out the slotted spring pin from No. 1 fork shaft.



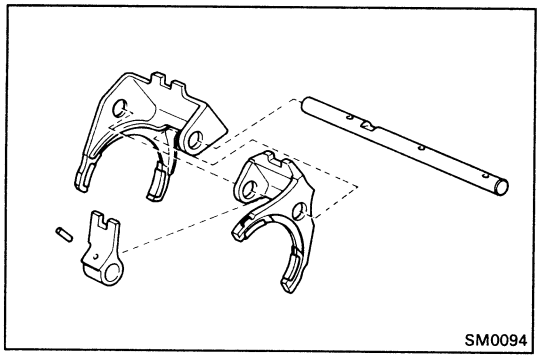
(b) Remove the input shaft and output shaft together with No. 1 fork shaft and shift head and shift forks from the transaxle case.



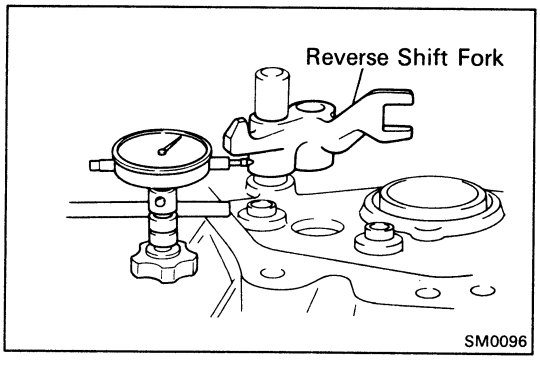
24. SEPARATE NO. 1 FORK SHAFT, NO. 1 SHIFT HEAD, NO. 1 AND NO. 2 SHIFT FORKS

(a) Mount the shift forks in a vise.

(b) Drive out the slotted spring pin from No. 1 fork shaft as shown.



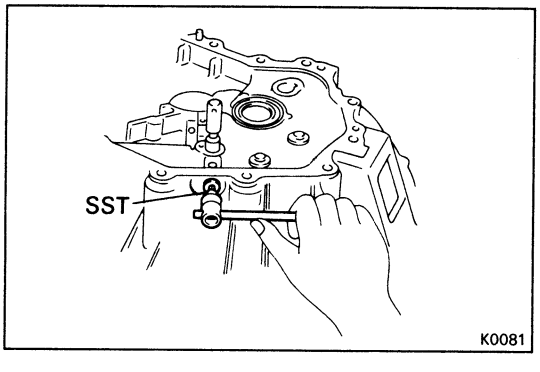
(c) Separate the No. 1 shift fork shaft No. 1 shift head, No. 1 and No. 2 shift fork.



25. CHECK OIL CLEARANCE OF REVERSE SHIFT FORK

Maximum clearance: 0.70 mm (0.0276 in.)

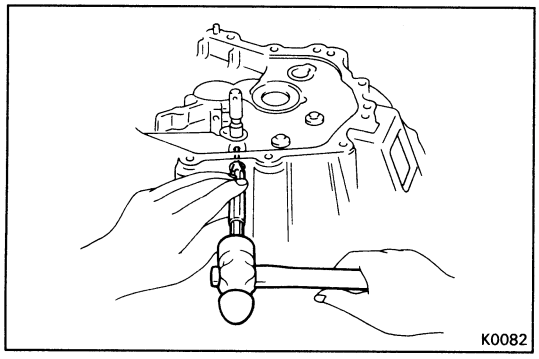
26. REMOVE REVERSE SHIFT FORK AND INTERLOCK PIN



27. REMOVE NO. 2 FORK SHAFT

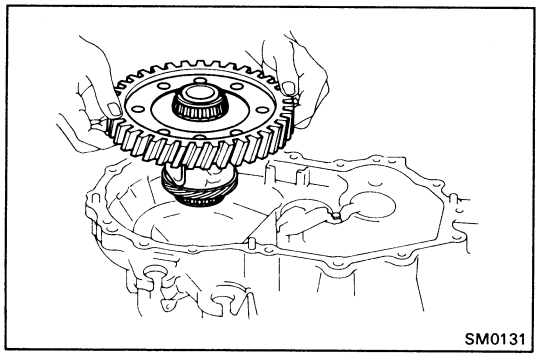
(a) Using SST, remove the screw plug.

SST 09313-30021

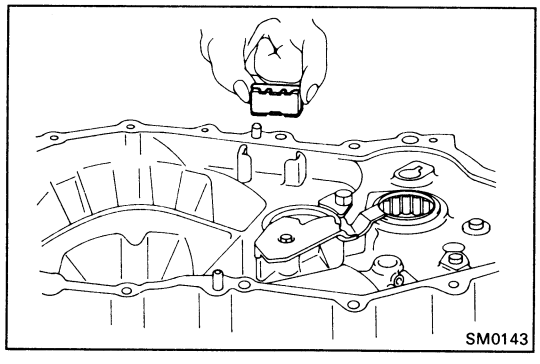


(b) Using a pin punch and hammer, drive out the slotted spring pin.

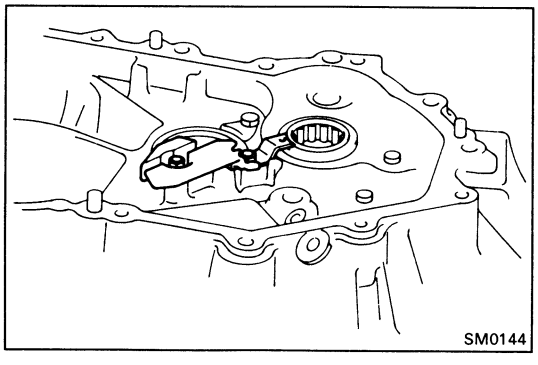
(c) Pull out the shaft.



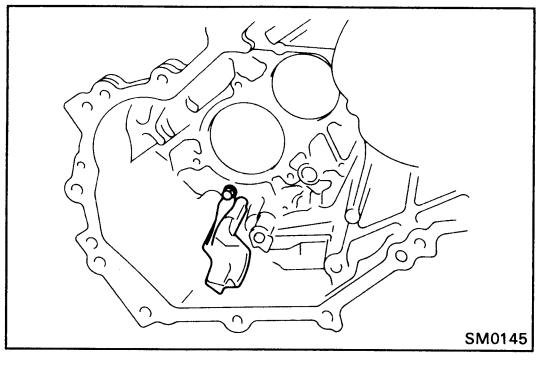
28. REMOVE DIFFERENTIAL ASSEMBLY



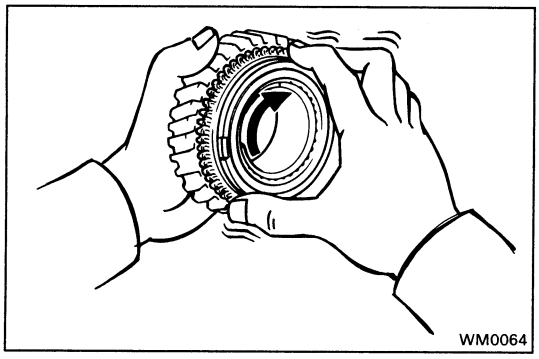
29. REMOVE MAGNET



30. REMOVE TRANSAXLE OIL RECEIVER AND PLATE



31. REMOVE NO. 1 OIL RECEIVER PIPE FROM TRANSMISSION CASE

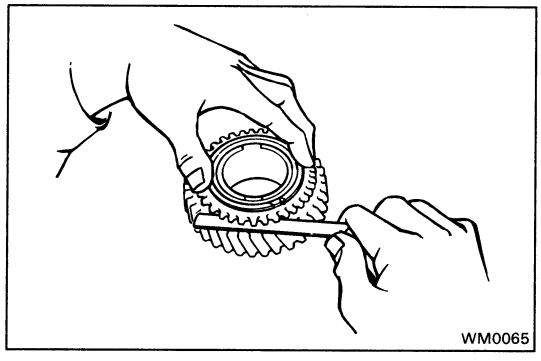


INSPECTION OF COMPONENT PARTS

1. **INSPECT SYNCHRONIZER RING NO. 3 FOR FIFTH GEAR**

   (a) Check for wear or damage.

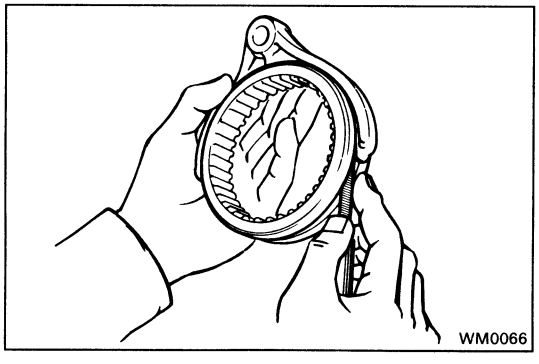
   (b) Turn the ring and push it in to check the braking action.



   (c) Measure the clearance between the synchronizer ring back and the gear spline end.

   Minimum clearance: 0.6 mm (0.024 in.)

   If the clearance is less than the limit, replace the synchronizer ring.

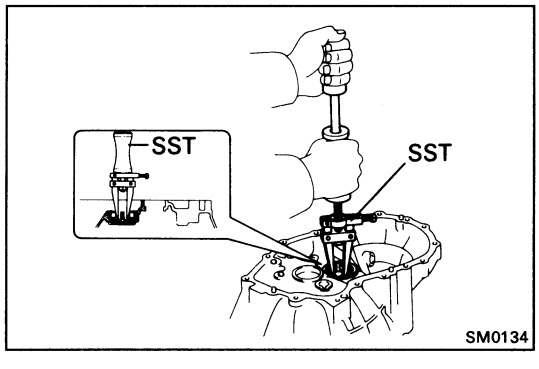


2. **MEASURE CLEARANCE OF SHIFT FORKS AND HUB SLEEVE**

   Using a feeler gauge, measure the clearance between the hub sleeve and shift fork.

   Maximum clearance: 1.0 mm (0.039 in.)

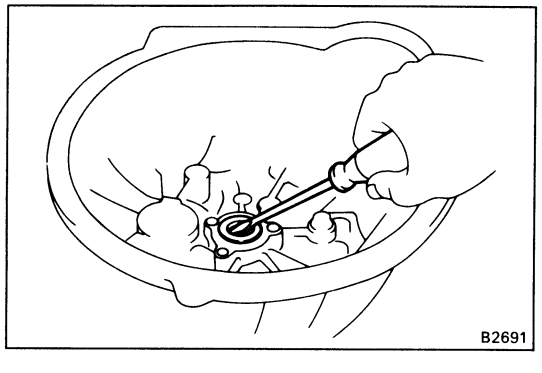
   If the clearance exceeds the limit, replace the shift fork or hub sleeve.



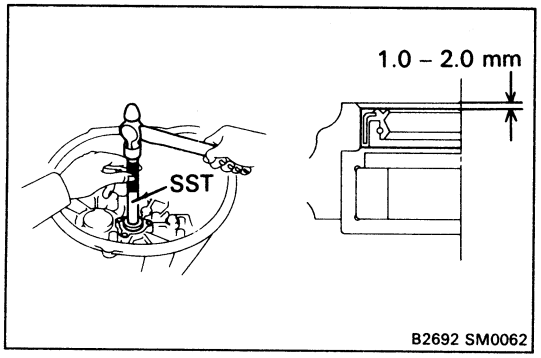
3. **IF NECESSARY, REPLACE INPUT SHAFT FRONT BEARING AND OIL SEAL**

   (a) Using SST, pull out the bearing.

   SST 09308-00010



   (b) Using a screwdriver, remove the oil seal.

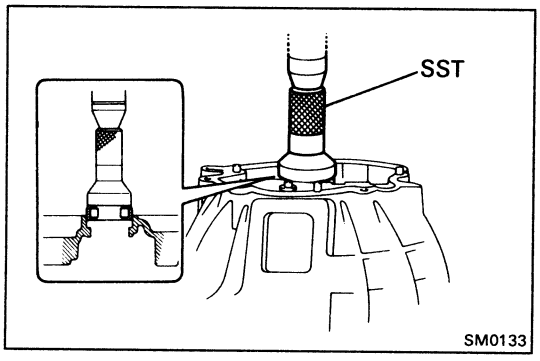


(c) Using SST, drive in a new oil seal.

SST 09608-20012 (09608-00080, 09608-03020)

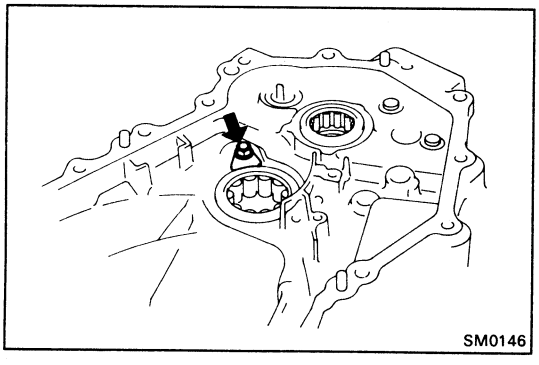
Drive in depth: 1.0 – 2.0 mm (0.039 – 0.079 in.)

(d) Coat the lip of the oil seal with MP grease.



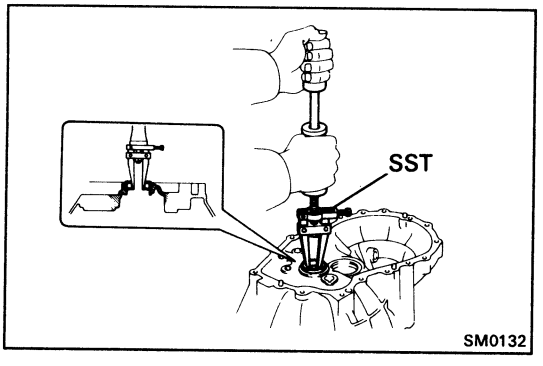
(e) Using SST, press in a new bearing.

SST 09310-35010



4. IF NECESSARY, REPLACE OUTPUT SHAFT FRONT BEARING AND OUTPUT SHAFT COVER

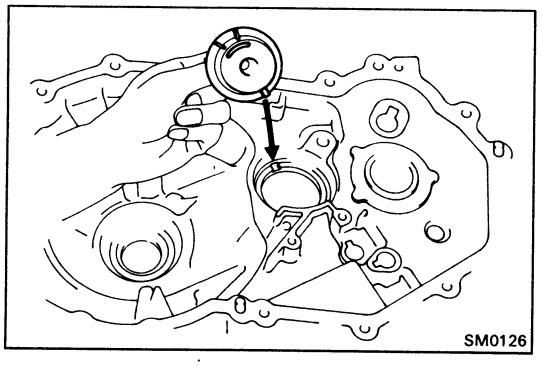
(a) Remove the bolt and bearing lock plate.



(b) Using SST, pull out the bearing.

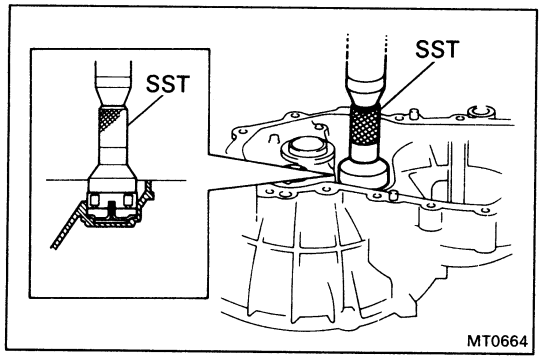
SST 09308-00010

(c) Remove the output shaft cover.

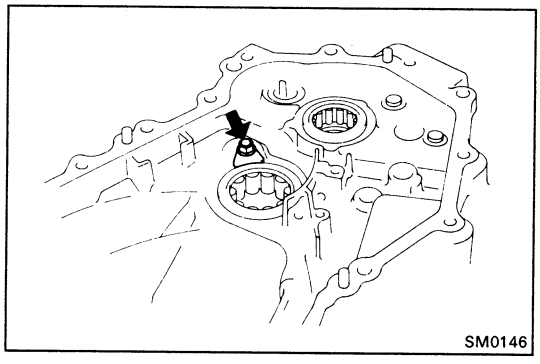


(d) Install the output shaft cover.

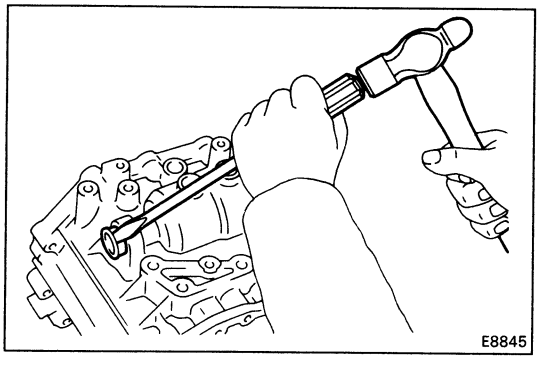
HINT: Install the output shaft cover projection into the case side groove.



(e) Using SST, press in a new bearing.
SST 09310-35010

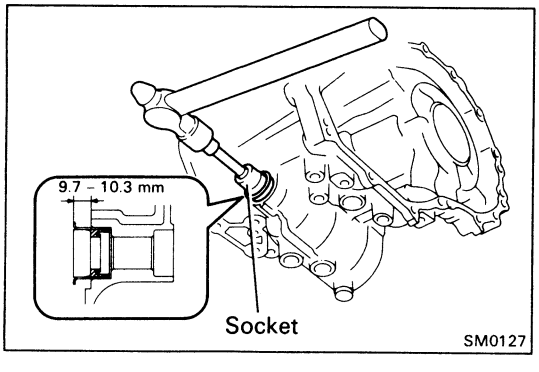


(f) Install the bearing lock plate and torque the bolt.
Torque: 185 kg-cm (13 ft-lb, 18 N·m)

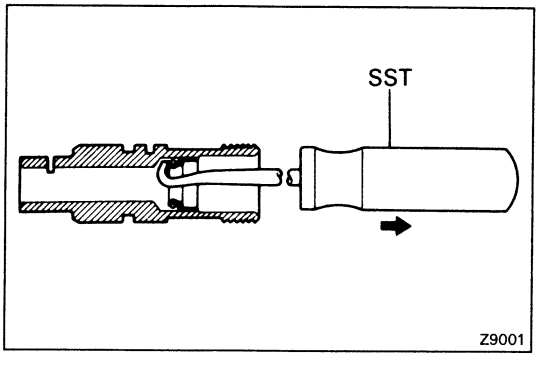


5. IF NECESSARY, REPLACE CONTROL SHAFT COVER OIL SEAL

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

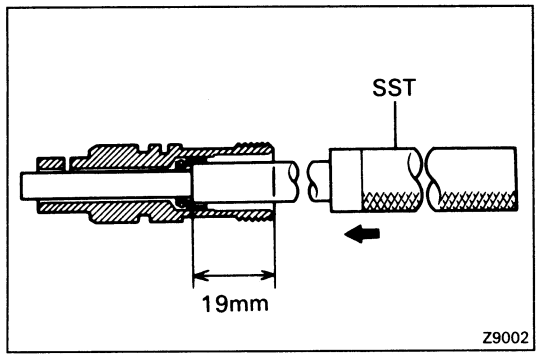


(b) Using a 17 mm socket and extension bar, drive in a new oil seal.
Drive in depth: 9.7 – 10.3 mm (0.382 – 0.406 in.)
(c) Coat the lip of the oil seal with MP grease.



6. IF NECESSARY, REPLACE SPEEDOMETER DRIVEN GEAR OIL SEAL

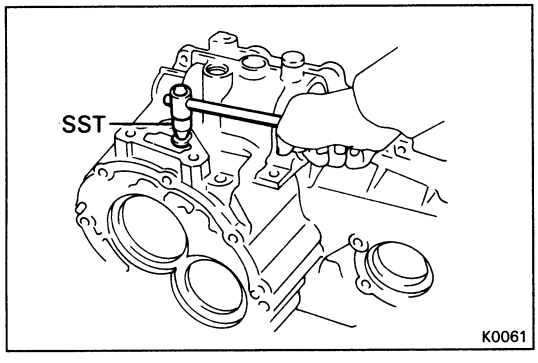
(a) Using SST, pull out the oil seal.
SST 09921-00010



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

SST 09201-60011

Drive in depth: 19 mm (0.75 in.)

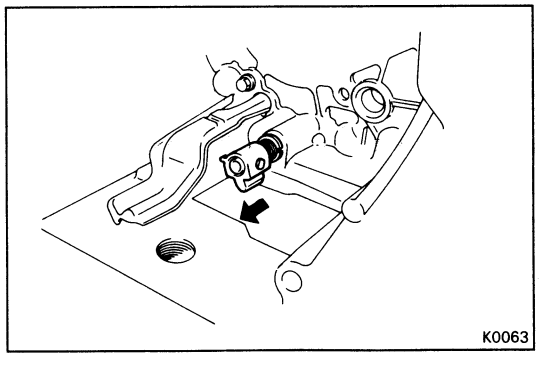


7. IF NECESSARY, REPLACE REVERSE RESTRICT PIN

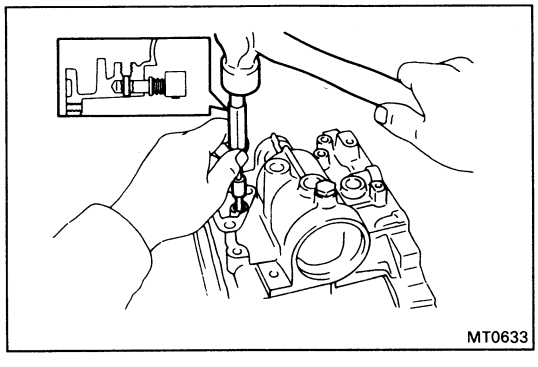
(a) Using SST, remove the screw plug.

SST 09313-30021

(b) Using a pin punch and hammer, drive out the slotted spring pin.



(c) Replace the reverse restrict pin.



(d) Using a pin punch and hammer, drive in the slotted spring pin.

(e) Apply liquid sealant to the plug threads.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

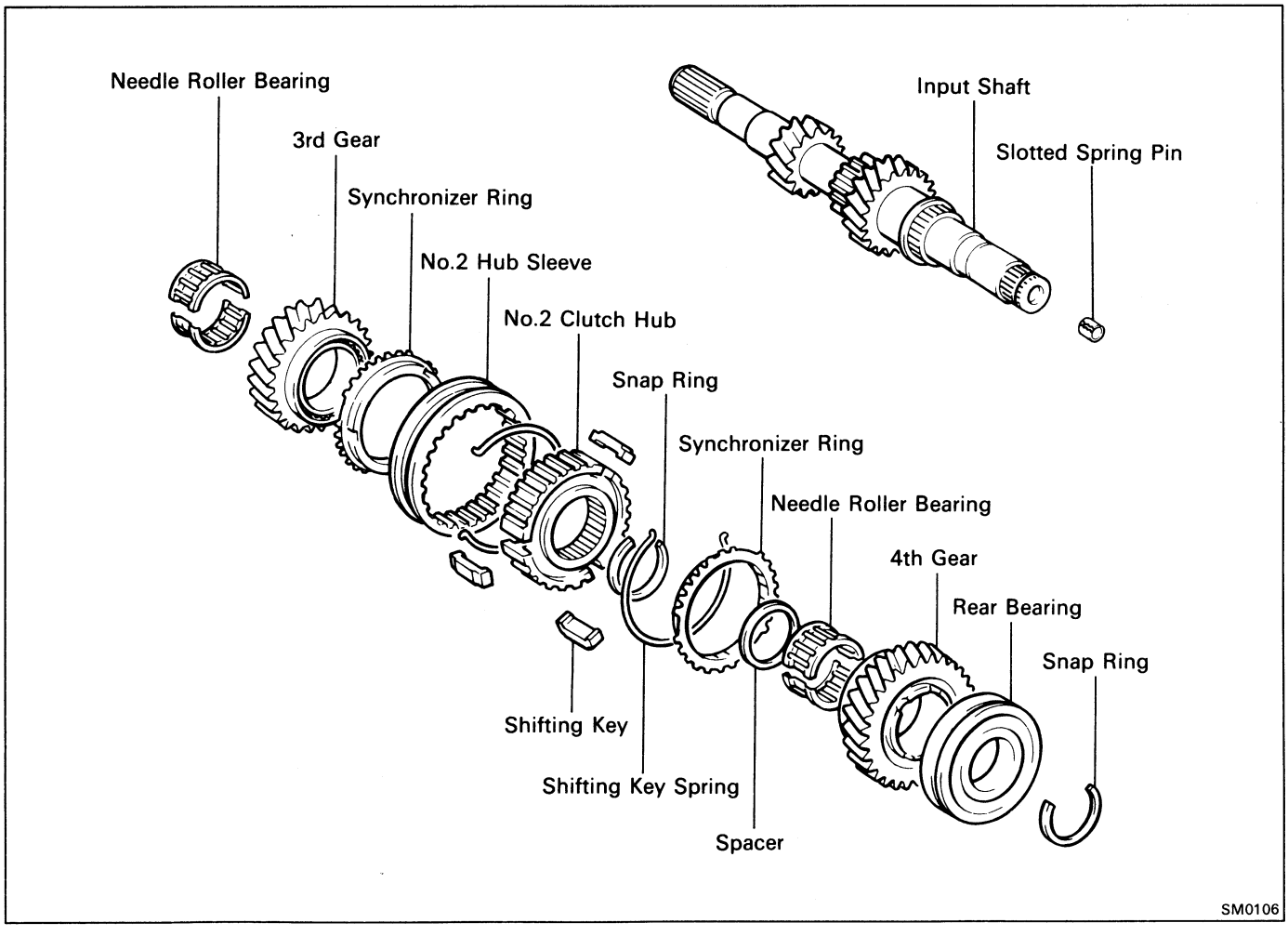
(f) Using SST, install the screw plug.

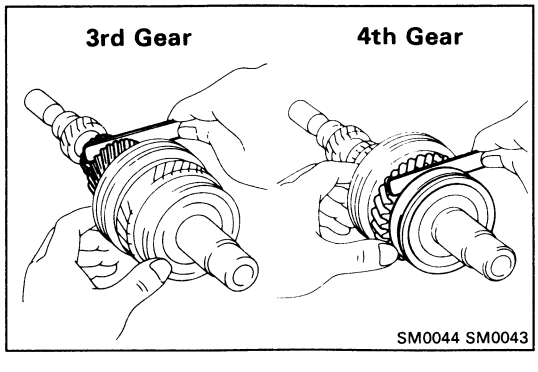
SST 09313-30021

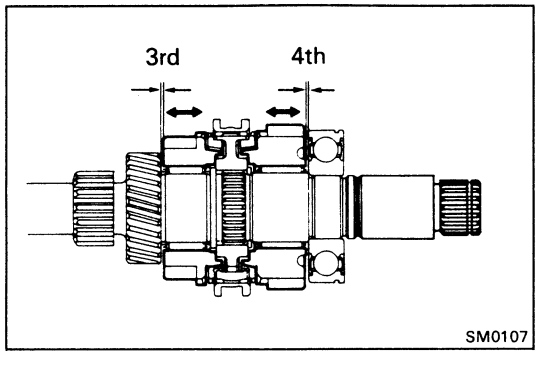
Torque: 130 kg-cm (9 ft-lb, 13 N·m)

COMPONENT PARTS

Input Shaft Assembly







DISASSEMBLY OF INPUT SHAFT ASSEMBLY

1. **MEASURE THIRD AND FOURTH GEAR THRUST CLEARANCE**

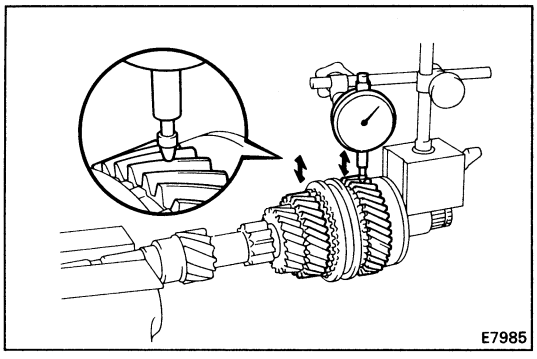
   Using a feeler gauge, measure the thrust clearance.

   Standard clearance:

3rd gear	**0.10 – 0.25 mm (0.0039 – 0.0098 in.)**
4th gear	**0.20 – 0.45 mm (0.0079 – 0.0177 in.)**

   Maximum clearance:

3rd gear	**0.30 mm (0.0118 in.)**
4th gear	**0.50 mm (0.0197 in.)**



2. CHECK OIL CLEARANCE OF THIRD AND FOURTH GEAR

Using dial indicator, measure the oil clearance between the gear and shaft.

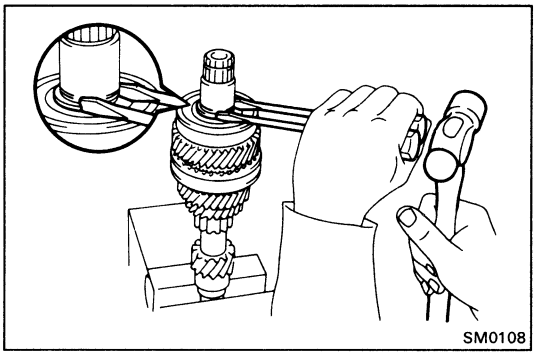
Standard clearance:

3rd and 4th gear	**0.009 – 0.053 mm (0.0004 – 0.0020 in.)**

Maximum clearance:

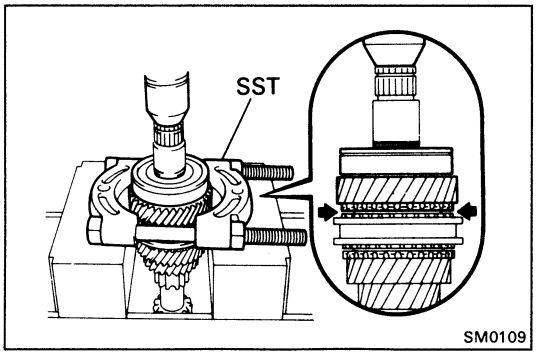
3rd and 4th gear	**0.070 mm (0.0028 in.)**

If clearance exceeds the limit, replace the gear, needle roller bearing or shaft.



3. REMOVE SNAP RING

Using two screwdrivers and a hammer, tap out the snap ring.

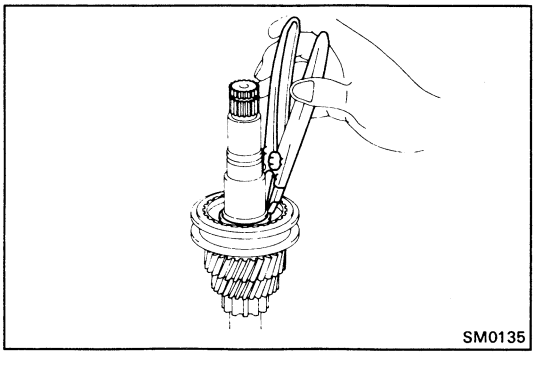


4. REMOVE RADIAL BALL BEARING AND FOURTH GEAR

Using SST and a press, remove the radial ball bearing.

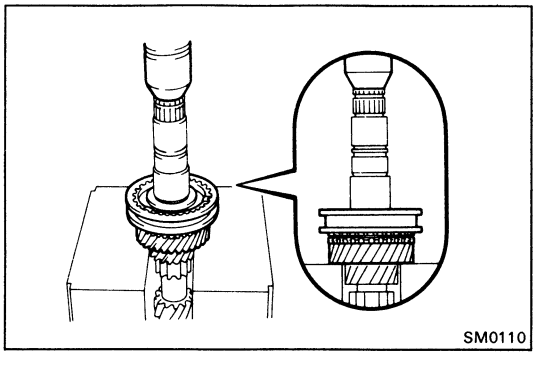
SST 09950-00020

5. REMOVE NEEDLE ROLLER BEARINGS, SPACER AND SYNCHRONIZER RING



6. REMOVE SNAP RING

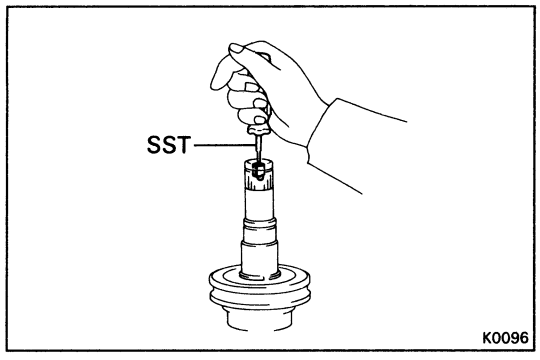
Using snap ring pliers, remove the snap ring.



7. REMOVE NO. 2 CLUTCH HUB ASSEMBLY, SYNCHRONIZER RING AND THIRD GEAR

Using a press, remove No. 2 hub sleeve, 3rd gear, synchronizer ring and needle roller bearings.

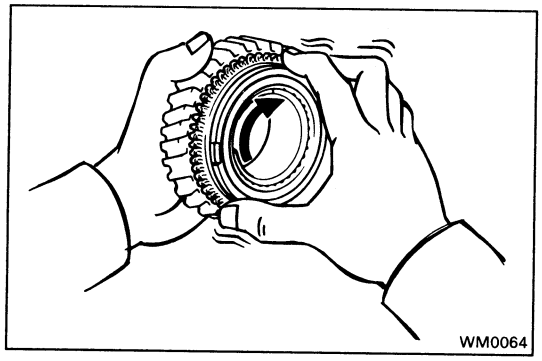
8. REMOVE NEEDLE ROLLER BEARING



9. REMOVE SLOTTED SPRING PIN

Using SST, remove the slotted spring pin.

SST 09921-00010

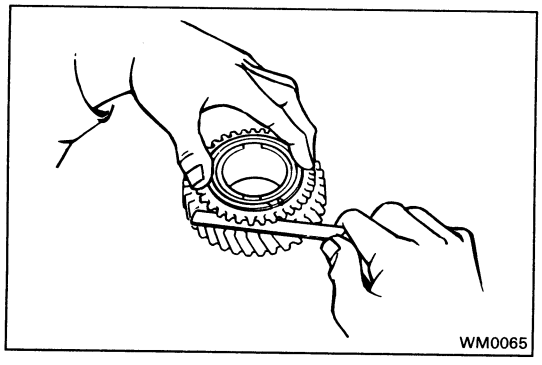

WM0064

INSPECTION OF INPUT SHAFT COMPONENT PARTS

1. INSPECT SYNCHRONIZER RINGS

(a) Check for wear or damage.

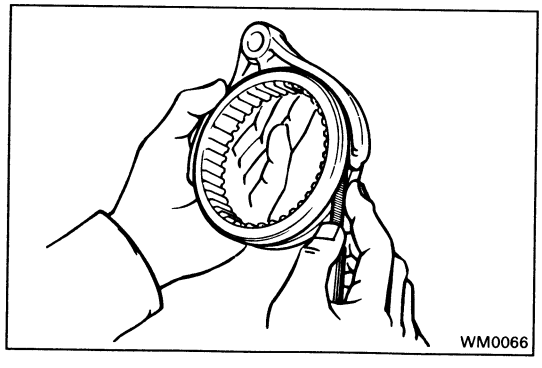
(b) Turn the ring and push it in to check the braking action.


WM0065

(c) Measure the clearance between the synchronizer ring back and the gear spline end.

Minimum clearance: 0.6 mm (0.024 in.)

If the clearance is less than the limit, replace the synchronizer ring.

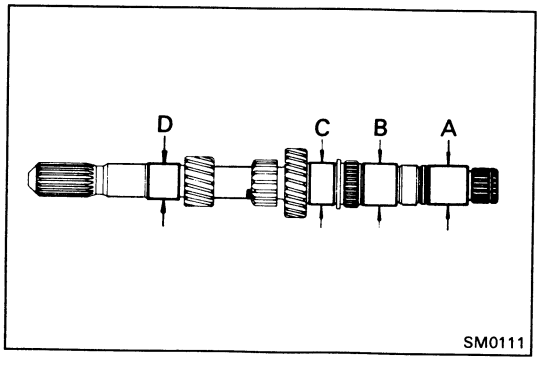

WM0066

2. MEASURE CLEARANCE OF NO. 2 SHIFT FORK AND HUB SLEEVE

Using a feeler gauge, measure the clearance between the hub sleeve and shift fork.

Maximum clearance: 1.0 mm (0.039 in.)

If the clearance exceeds the limit, replace the shift fork or hub sleeve.



SM0111

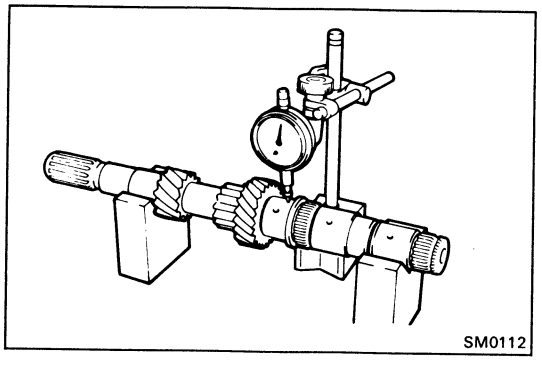
3. INSPECT INPUT SHAFT

(a) Check the input shaft for wear or damage.

(b) Using a micrometer, measure the outer diameter of the input shaft journal surface.

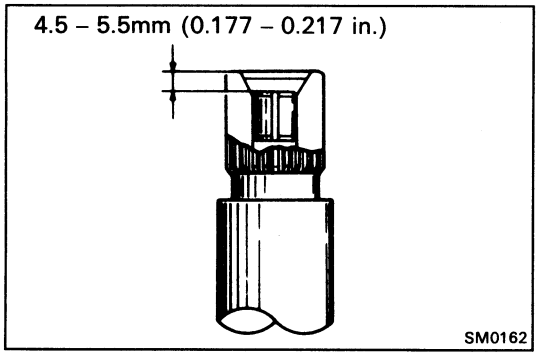
Minimum outer diameter:

Part A 26.970 mm (1.0618 in.)
B 32.420 mm (1.2764 in.)
C 33.090 mm (1.3028 in.)
D 29.970 mm (1.1799 in.)


SM0112

(c) Using a dial indicator, check the shaft runout.

Maximum runout: 0.05 mm (0.0020 in.)



ASSEMBLY OF INPUT SHAFT ASSEMBLY

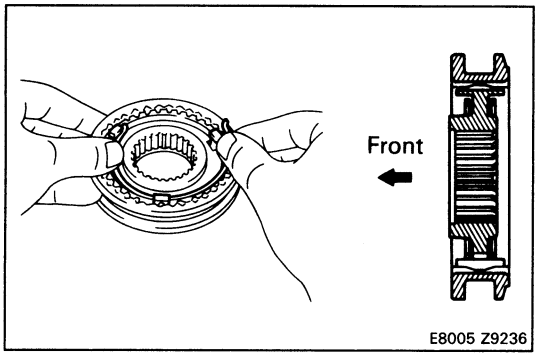
(See page MT-21)

HINT: Coat all of the sliding and rotating surface with ATF before assembly.

1. INSTALL SLOTTED SPRING PIN

Drive in a slotted spring pin.

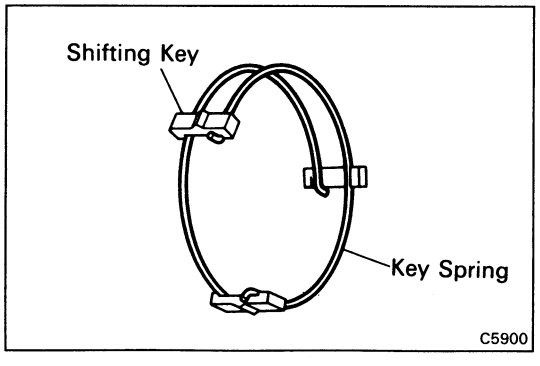
Drive in depth: 4.5 – 5.5 mm (0.177 – 0.217 in.)



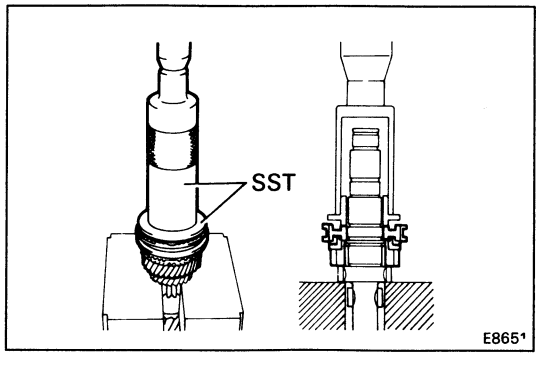
2. INSERT NO. 2 CLUTCH HUB INTO HUB SLEEVE

(a) Install the clutch hub and shifting keys to the hub sleeve.

(b) Install the shifting key springs under the shifting keys.



NOTICE: Install the shifting key springs positioned so that their end gaps are not in line.



3. INSTALL NEEDLE ROLLER BEARING, THIRD GEAR, SYNCHRONIZER RING AND NO. 2 HUB SLEEVE ASSEMBLY TO INPUT SHIFT

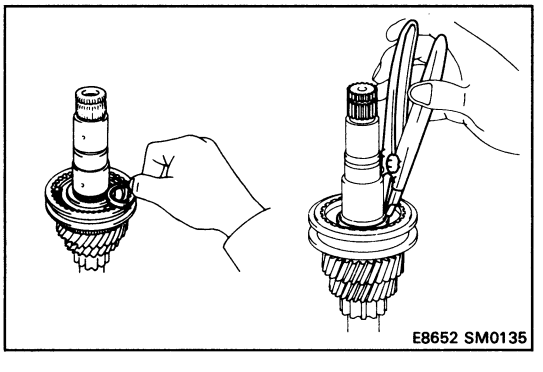
(a) Apply ATF to the needle roller bearings.

(b) Install the 3rd gear.

(c) Place the synchronizer ring on the gear and align the ring slots with the shifting keys.

(d) Using SST and a press, install the 3rd gear and No. 2 hub sleeve.

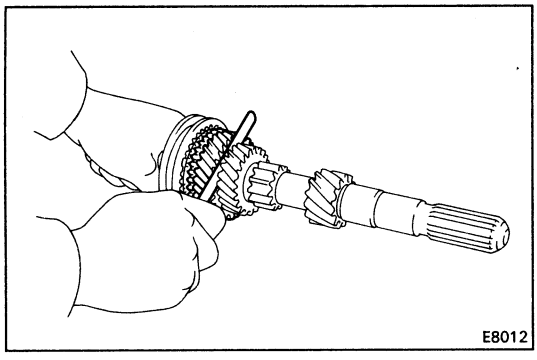
SST 09316-60010 (09316-00010, 09316-00070)



4. INSTALL SNAP RING

Select a snap ring that will allow minimum axial play and install it on the shaft.

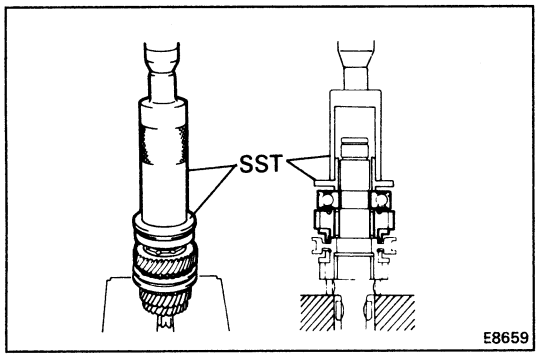
Mark	Thickness mm (in.)
1	1.95 – 2.00 (0.0768 – 0.0787)
2	2.00 – 2.05 (0.0787 – 0.0807)
3	2.05 – 2.10 (0.0807 – 0.0827)
4	2.10 – 2.15 (0.0827 – 0.0846)
5	2.15 – 2.20 (0.0846 – 0.0866)
6	2.20 – 2.25 (0.0866 – 0.0886)


E8012

5. MEASURE THIRD GEAR THRUST CLEARANCE

Using a feeler gauge, measure the 3rd gear thrust clearance.

Standard clearance: 0.10 – 0.25 mm (0.0039 – 0.0098 in.)



E8659

6. INSTALL SPACER, SYNCHRONIZER RING, NEEDLE ROLLER BEARINGS, FOURTH GEAR AND RADIAL BALL BEARING

(a) Install the spacer.

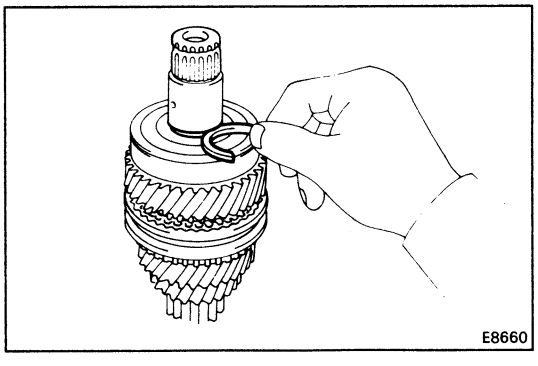
(b) Apply ATF to the needle roller bearings.

(c) Place the synchronizer ring on the gear and align the ring slots with the shifting keys.

(d) Install the 4th gear.

(e) Using SST and a press, install the radial ball bearing.

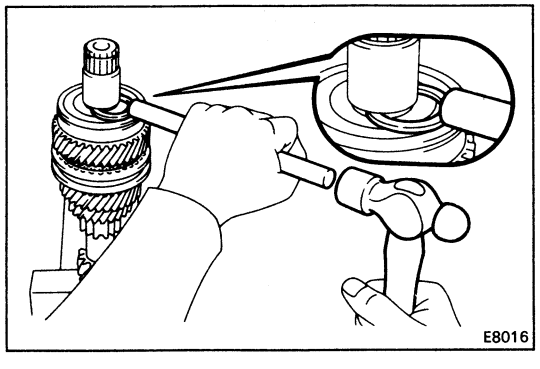
SST 09316-60010 (09316-00010, 09316-00070)

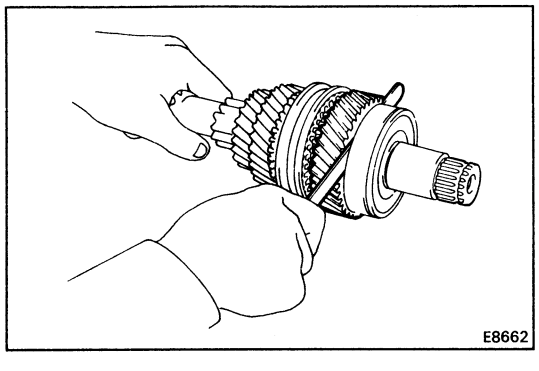

E8660

7. INSTALL SNAP RING

Select a snap ring that will allow minimum axial play and install it on the shaft.

Mark	Thickness mm (in.)
A	2.15 – 2.20 (0.0846 – 0.0866)
B	2.20 – 2.25 (0.0866 – 0.0886)
C	2.25 – 2.30 (0.0886 – 0.0906)
D	2.30 – 2.35 (0.0906 – 0.0925)
E	2.35 – 2.40 (0.0925 – 0.0945)


E8016

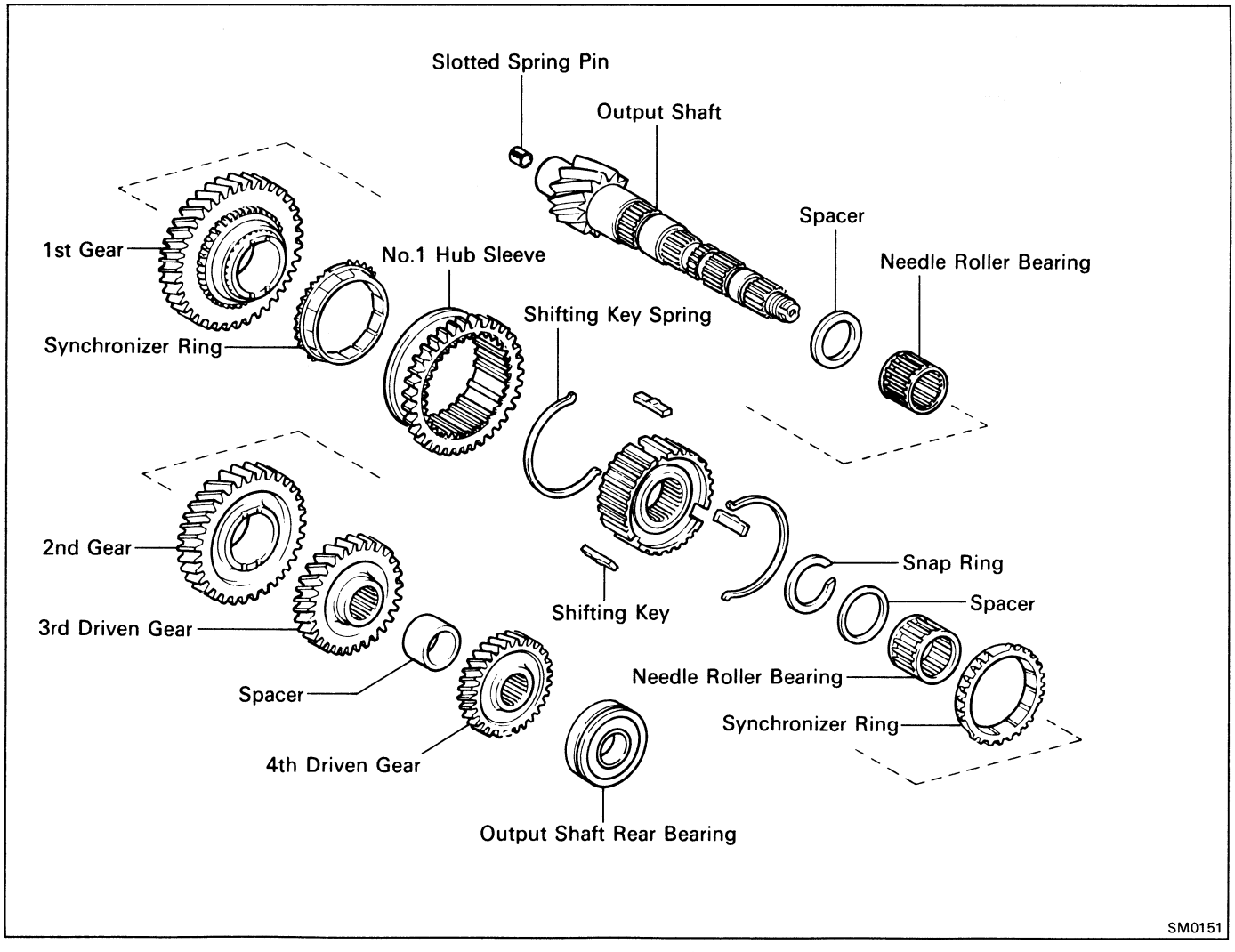

E8662

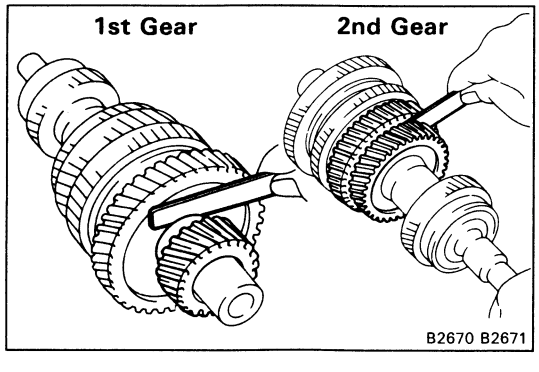
8. MEASURE FOURTH GEAR THRUST CLEARANCE

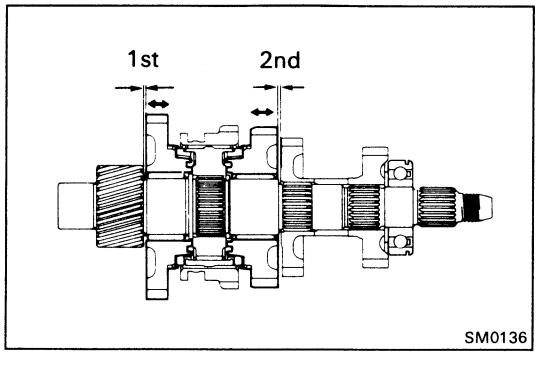
Using a feeler gauge, measure the 4th gear thrust clearance.

Standard clearance: 0.20 – 0.45 mm (0.0079 – 0.0177 in.)

Output Shaft Assembly







DISASSEMBLY OF OUTPUT SHAFT ASSEMBLY

1. MEASURE FIRST AND SECOND GEAR THRUST CLEARANCE

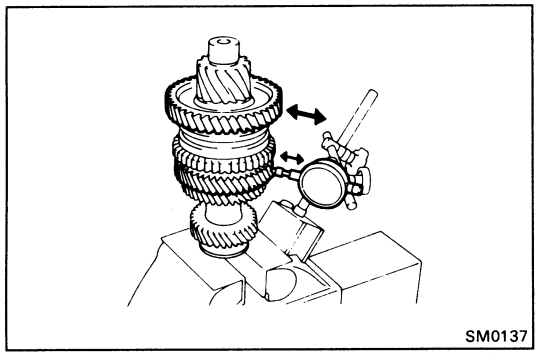
Using a feeler gauge, measure the thrust clearance.

Standard clearance:

1st gear	**0.10 – 0.29 mm (0.0039 – 0.0114 in.)**
2nd gear	**0.20 – 0.44 mm (0.0079 – 0.0173 in.)**

Maximum clearance:

1st gear	**0.35 mm (0.0138 in.)**
2nd gear	**0.50 mm (0.0197 in.)**


SM0137

2. CHECK OIL CLEARANCE OF FIRST AND SECOND GEAR

Using dial indicator, measure the oil clearance between the gear and shaft.

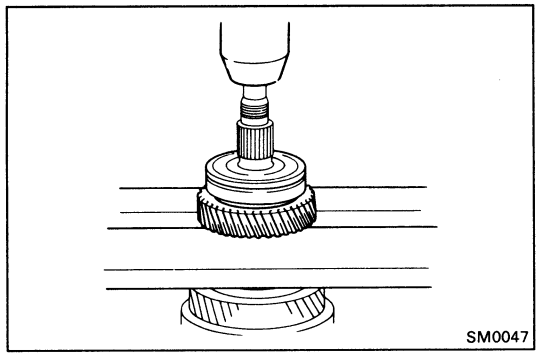
Standard clearance:

1st and 2nd gear	**0.009 – 0.053 mm (0.0004 – 0.0020 in.)**

Maximum clearance:

1st and 2nd gear	**0.070 mm (0.0028 in.)**

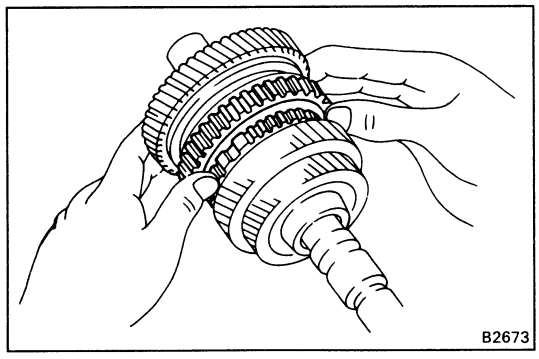
If the clearance exceeds the limit, replace the gear, needle roller bearing or shaft.


SM0047

3. REMOVE OUTPUT SHAFT REAR BEARING, FOURTH DRIVEN GEAR AND SPACER

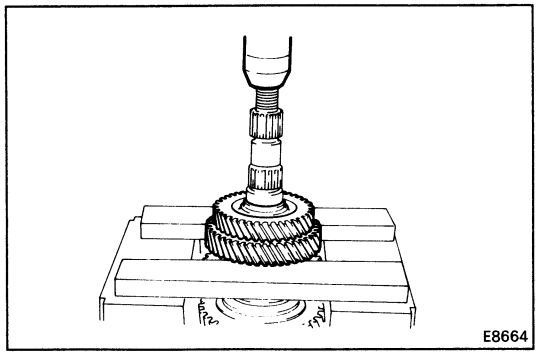
(a) Using a press, remove the bearing and 4th driven gear.

(b) Remove the spacer.


B2673

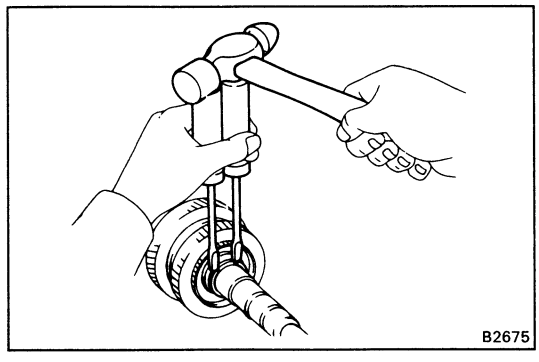
4. REMOVE THIRD DRIVEN GEAR AND SECOND GEAR

(a) Shift the No. 1 hub sleeve into the 1st gear.


E8664

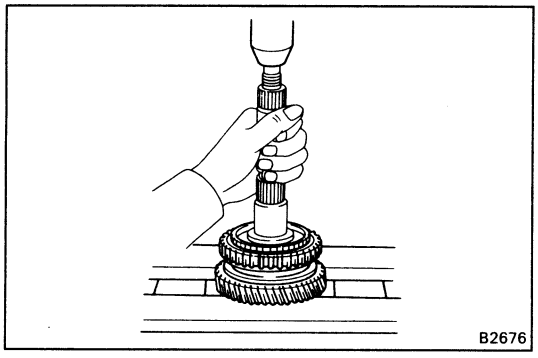
(b) Using a press, remove the 3rd driven gear and 2nd gear.

5. REMOVE NEEDLE ROLLER BEARINGS, SPACER AND SYNCHRONIZER RING


B2675

6. REMOVE SNAP RING

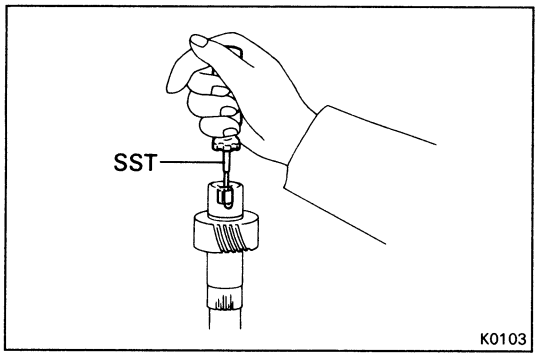
Using two screwdrivers and a hammer, tap out the snap ring.



7. REMOVE NO. 1 HUB SLEEVE ASSEMBLY AND FIRST GEAR

Using a press, remove No. 1 hub sleeve and 1st gear.

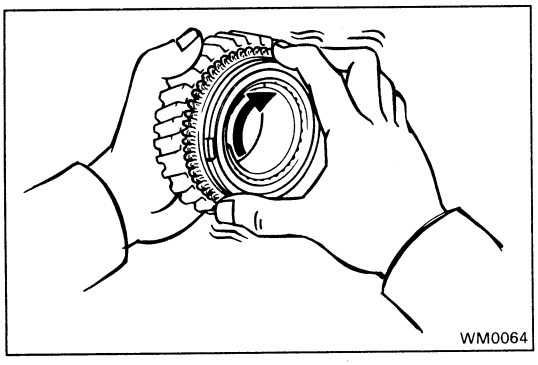
8. REMOVE SYNCHRONIZER RING AND NEEDLE ROLLER BEARING AND THRUST WASHER



9. REMOVE SLOTTED SPRING PIN

Using SST, remove the slotted spring pin.

SST 09921-00010

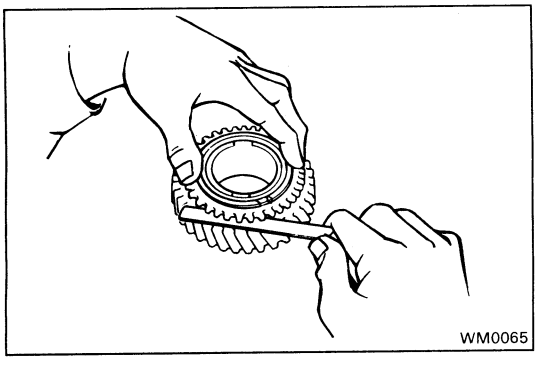

WM0064

INSPECTION OF OUTPUT SHAFT COMPONENT PARTS

1. INSPECT SYNCHRONIZER RINGS

(a) Check for wear or damage.

(b) Turn the ring and push it in to check the braking action.

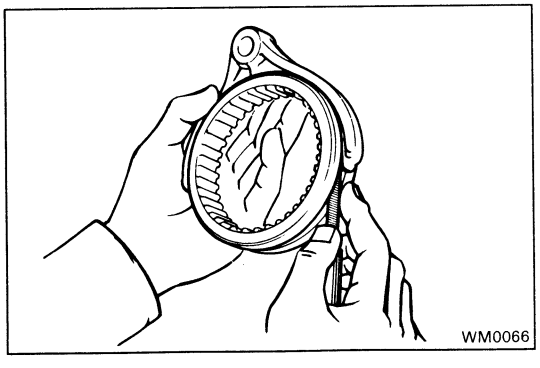

WM0065

(c) Measure the clearance between the synchronizer ring back and the gear spline end.

Maximum clearance: 0.6 mm (0.024 in.)

If the clearance is less than the limit, replace the synchronizer ring.

2. MEASURE CLEARANCE OF NO. 1 SHIFT FORK AND HUB SLEEVE

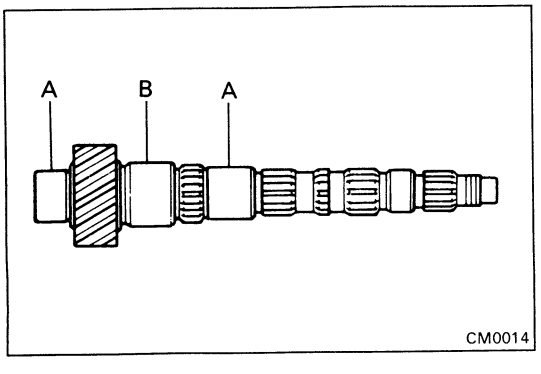

WM0066

Using a feeler gauge, measure the clearance between the hub sleeve and shift fork.

Maximum clearance: 1.0 mm (0.039 in.)

If the clearance exceeds the limit, replace the shift fork or hub sleeve.

3. INSPECT OUTPUT SHAFT



CM0014

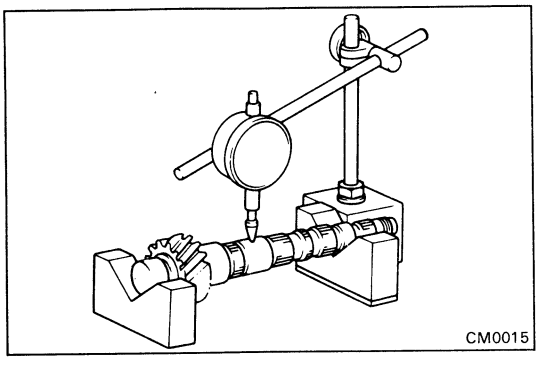
(a) Check the output shaft for wear or damage.

(b) Using a micrometer, measure the outer diameter of the output shaft journal surface.

Minimum outer diameter:

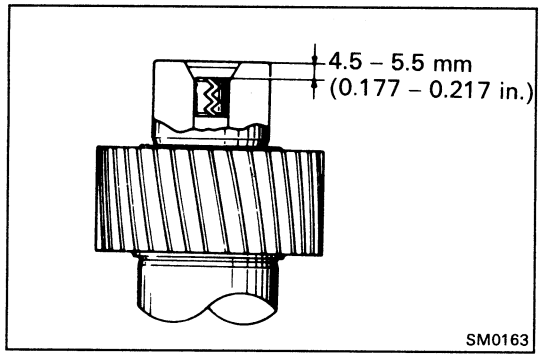
Part A 31.970 mm (1.2587 in.)

B 37.970 mm (1.4949 in.)


CM0015

(c) Using a dial indicator, check the shaft runout.

Maximum runout: 0.05 mm (0.0020 in.)



ASSEMBLY OF OUTPUT SHAFT ASSEMBLY

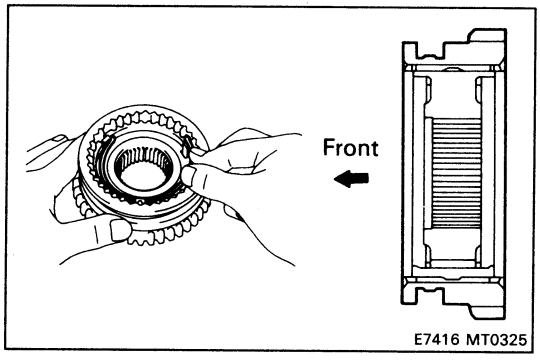
(See page MT-27)

HINT: Coat all of the sliding and rotating surface with ATF before assembly.

1. INSTALL SLOTTED SPRING PIN

Drive in a slotted spring pin.

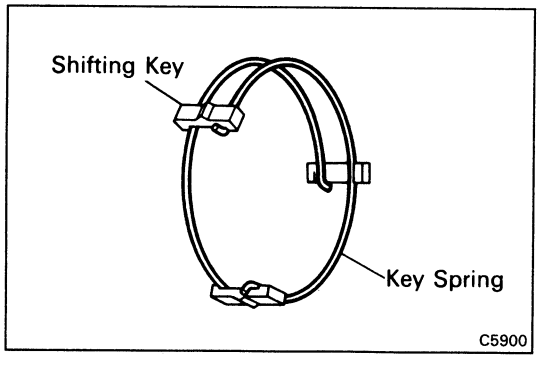
Drive in depth: 4.5 – 5.5 mm (0.177 – 0.217 in.)



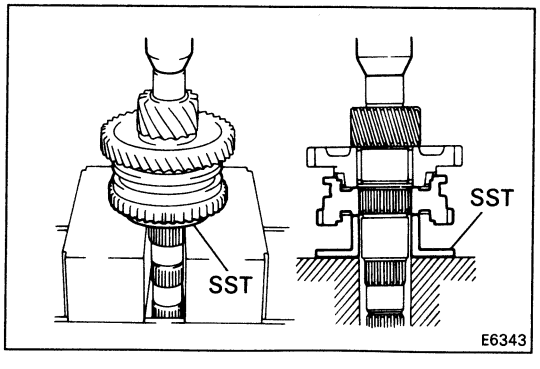
2. INSERT NO. 1 CLUTCH HUB INTO HUB SLEEVE

(a) Install the clutch hub and shifting keys to the hub sleeve.

(b) Install the shifting key springs under the shifting keys.



NOTICE: Install the key springs positioned so that their end gaps are not in line.



3. INSTALL NEEDLE ROLLER BEARING, FIRST GEAR, SYNCHRONIZER RING AND NO. 1 HUB SLEEVE TO OUTPUT SHAFT

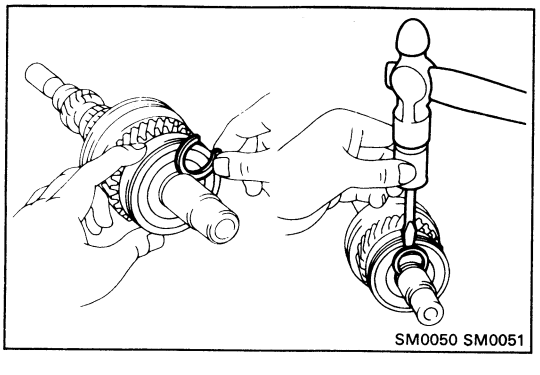
(a) Apply ATF to the needle roller bearings.

(b) Install the 1st gear.

(c) Place the synchronizer ring on the gear and align the ring slots with the shifting keys.

(d) Using SST and a press, install the 1st gear and No. 1 hub sleeve.

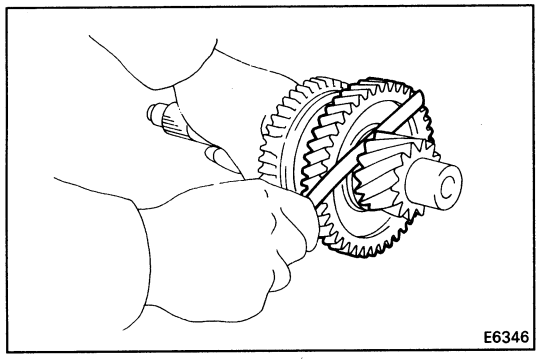
SST 09316-60010 (09316-00030)



4. INSTALL SNAP RING

Select a snap ring that will allow minimum axial play and install it on the shaft.

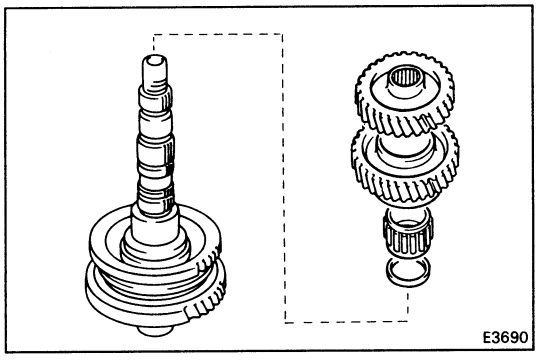
Mark	Thickness mm (in.)
1	2.50 – 2.55 (0.0984 – 0.1004)
2	2.55 – 2.60 (0.1004 – 0.1024)
3	2.60 – 2.65 (0.1024 – 0.1043)
4	2.65 – 2.70 (0.1043 – 0.1063)
5	2.70 – 2.75 (0.1063 – 0.1083)
6	2.75 – 2.80 (0.1083 – 0.1102)


E6346

5. MEASURE FIRST GEAR THRUST CLEARANCE

Using a feeler gauge, measure the 1st gear thrust clearance.

Standard clearance: 0.10 – 0.29 mm (0.0039 – 0.0114 in.)


E3690

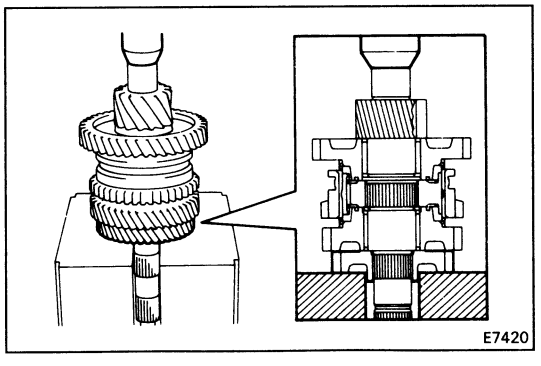
6. INSTALL SPACER, NEEDLE ROLLER BEARING, SYNCHRONIZER RING, SECOND GEAR AND THIRD DRIVEN GEAR

(a) Install the spacer.

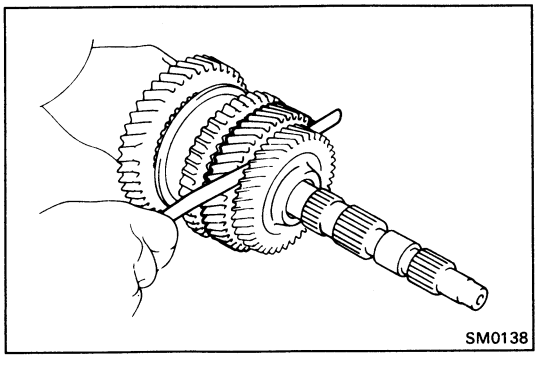
(b) Apply ATF to the needle roller bearing.

(c) Place the synchronizer ring on the gear and align the ring slots with the shifting keys.

(d) Install the 2nd gear.


E7420

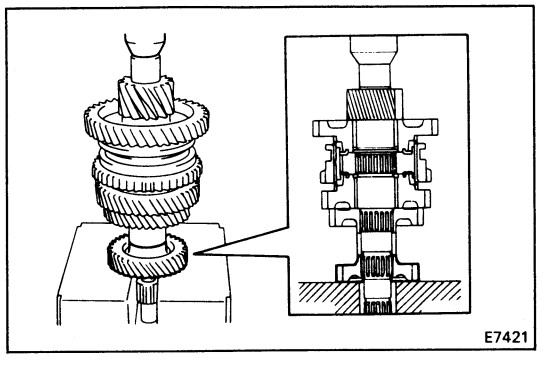
(e) Using a press, install the 3rd driven gear.


SM0138

7. MEASURE SECOND GEAR THRUST CLEARANCE

Using a feeler gauge, measure the 2nd gear thrust clearance.

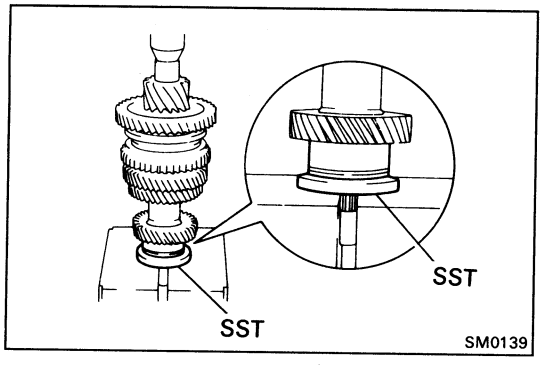
Standard clearance: 0.20 – 0.44 mm (0.0079 – 0.0173 in.)


E7421

8. INSTALL SPACER AND FOURTH DRIVEN GEAR

(a) Install the spacer.

(b) Using a press, install the 4th driven gear.

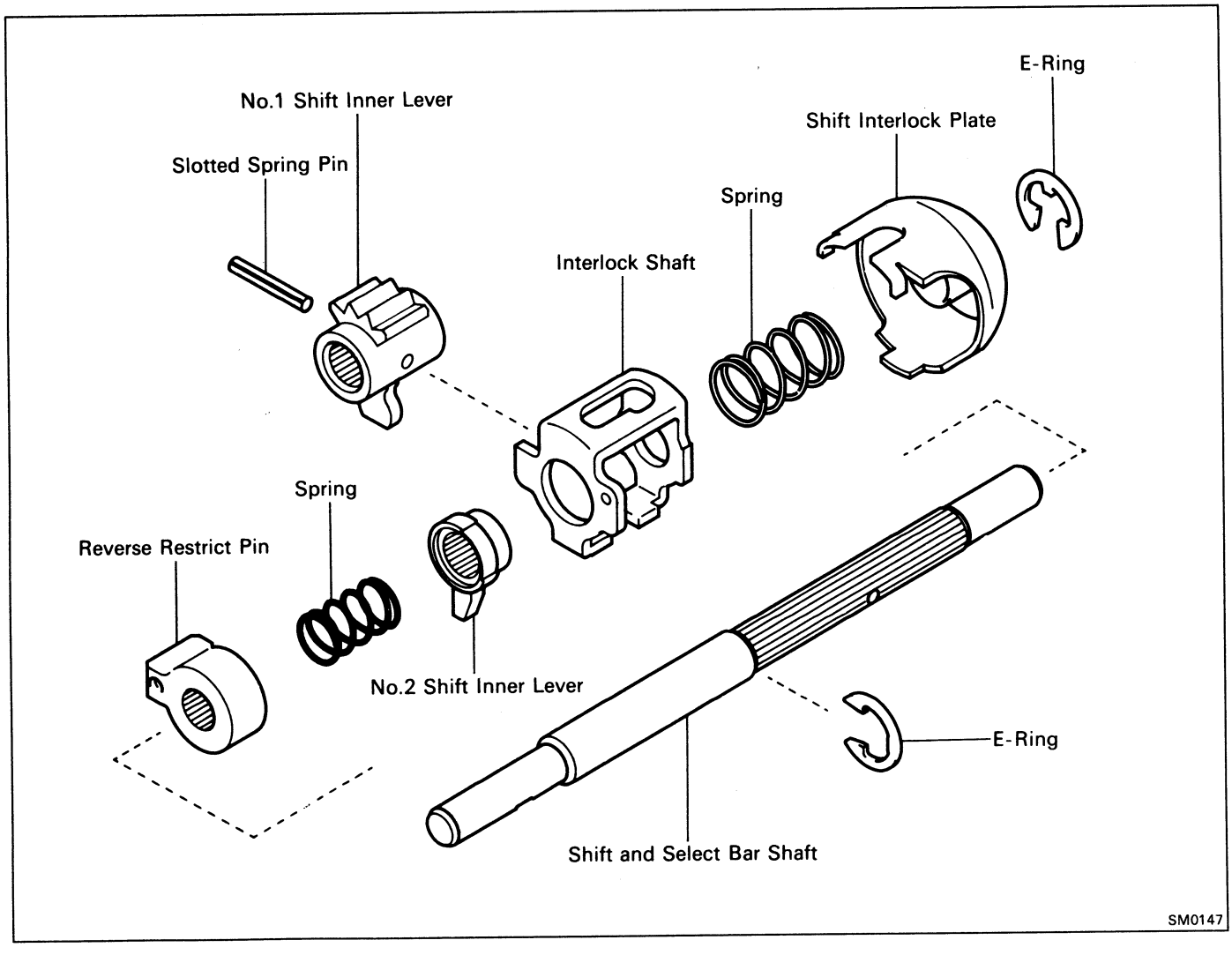


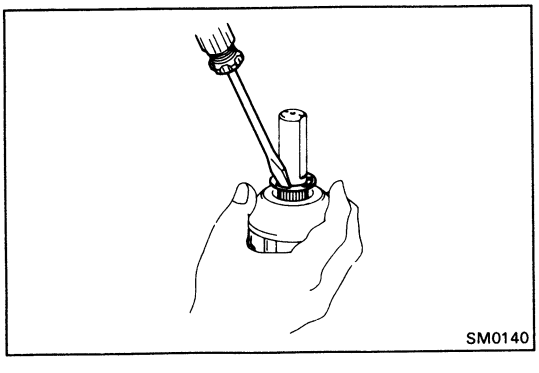
9. INSTALL OUTPUT SHAFT REAR BEARING

Using SST and a press, install the bearing.

SST 09515-10010

Shift and Select Lever Assembly

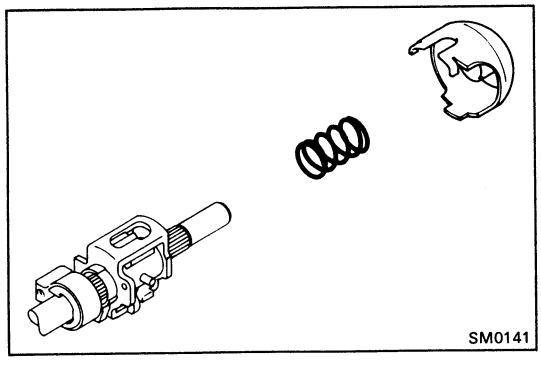




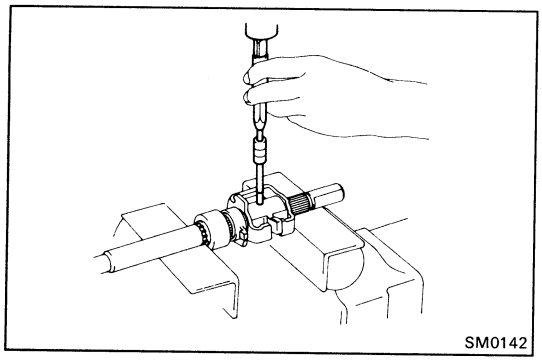
DISASSEMBLY OF SHIFT AND SELECT LEVER ASSEMBLY

1. REMOVE SHIFT INTERLOCK PLATE

(a) Remove the E-ring.

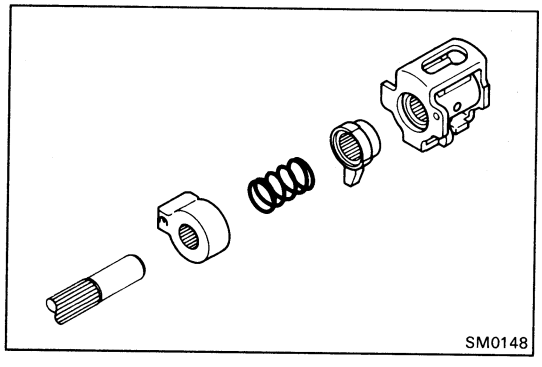


(b) Remove the interlock plate and spring.

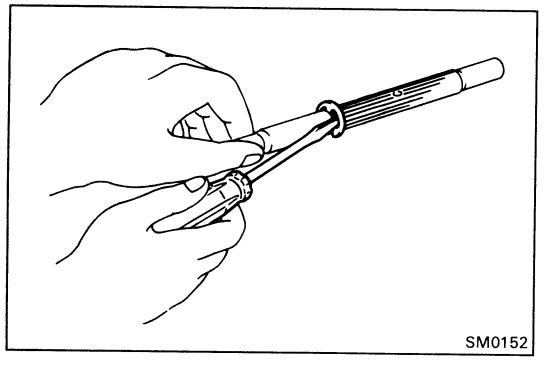


2. **REMOVE INTERLOCK SHAFT, NO. 1 SHIFT INNER LEVER, NO. 2 SHIFT INNER LEVER, SPRING AND REVERSE RESTRICT PIN**

(a) Using a pin punch and hammer, drive out the slotted spring pin.



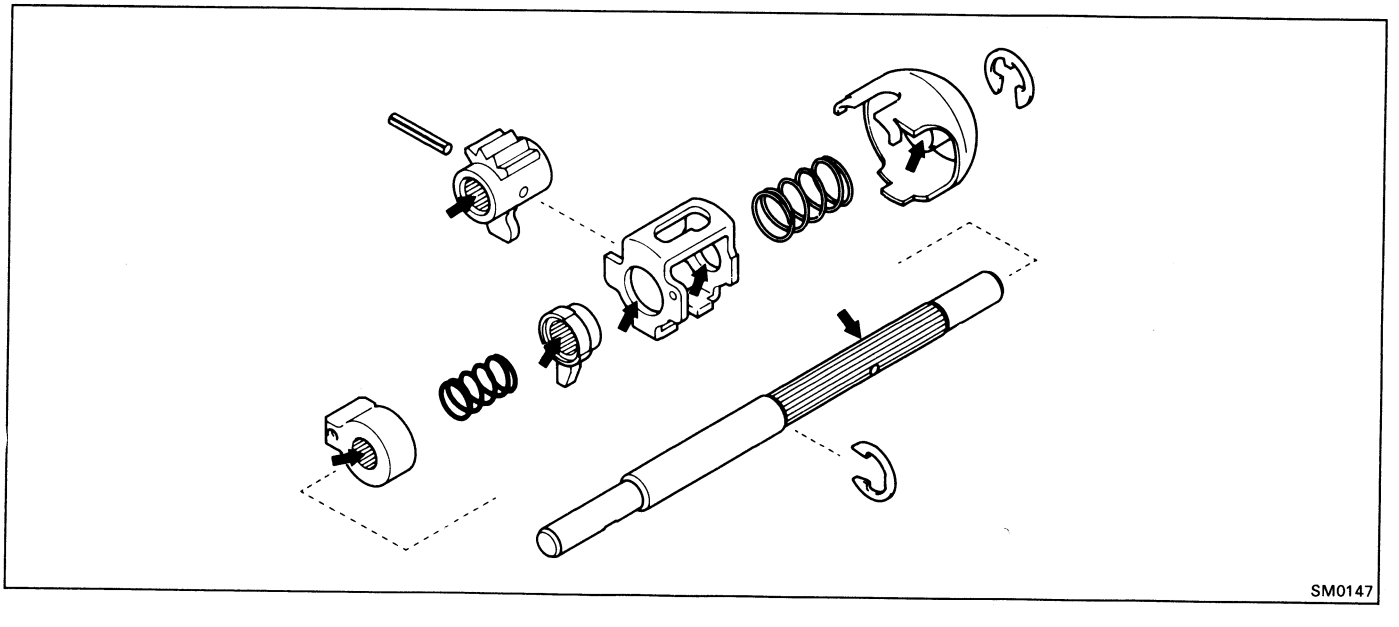
(b) Remove the interlock shaft, No. 1 shift inner lever, No. 2 shift inner lever, spring and reverse restrict pin.

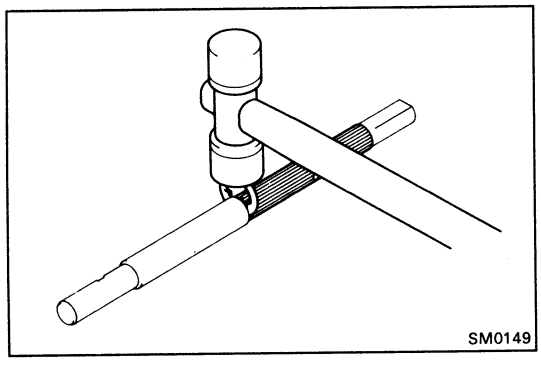


3. **REMOVE E-RING**

ASSEMBLY OF SHIFT AND SELECT LEVER ASSEMBLY

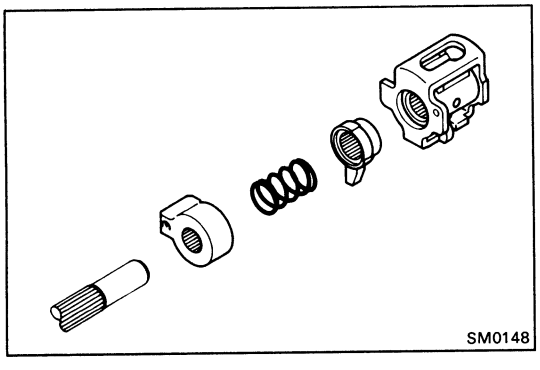
1. **APPLY MP GREASE TO PARTS, AS SHOWN**





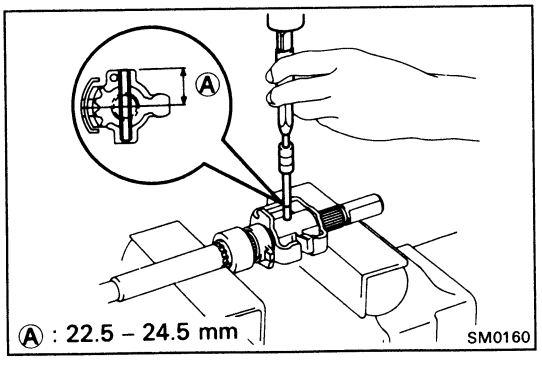
2. INSTALL E-RING

Using a plastic hammer, install the E-ring.

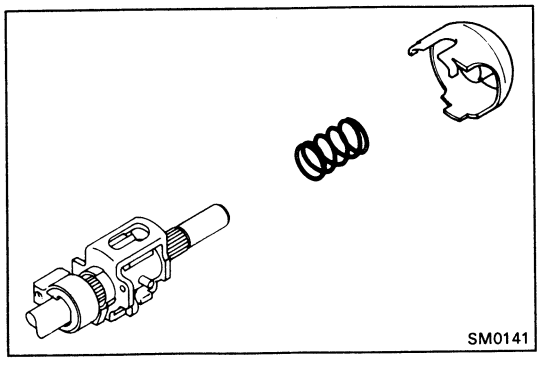


3. INSTALL REVERSE RESTRICT PIN, SPRING, NO. 2 SHIFT INNER LEVER, NO. 1 SHIFT INNER LEVER AND INTERLOCK SHAFT

(a) Install the reverse restrict pin, spring, No. 2 shift inner lever, No. 1 shift inner lever and interlock plate.

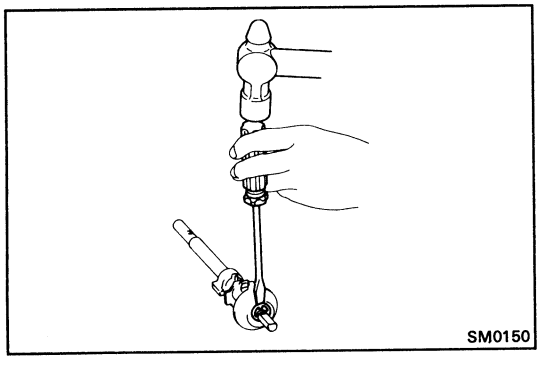


(b) Using a pin punch and hammer, drive in the slotted spring pin.



4. INSTALL SHIFT INTERLOCK PLATE

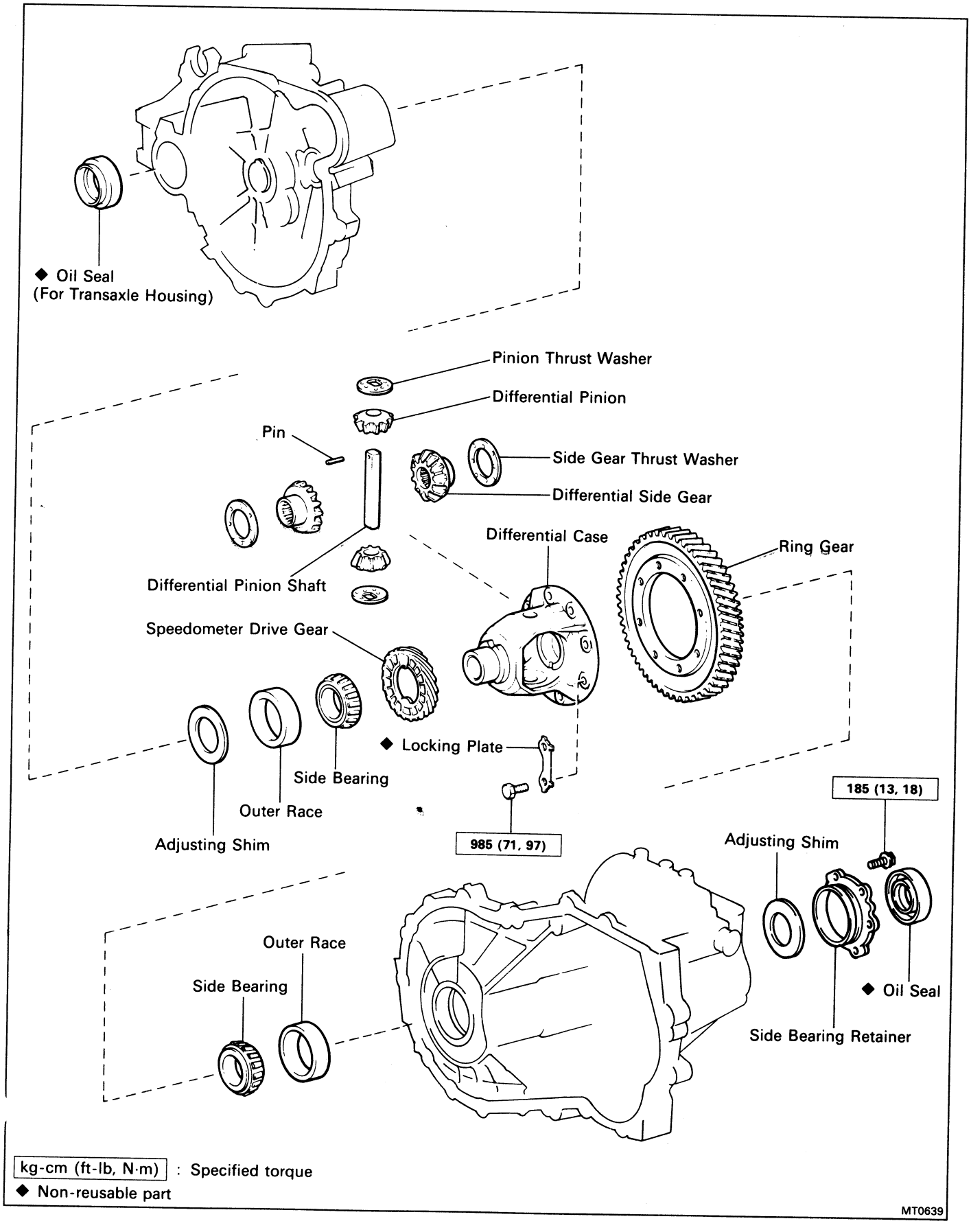
(a) Install the spring and interlock plate.



(b) Using a screwdriver and hammer, install the E-ring.

Differential

COMPONENTS

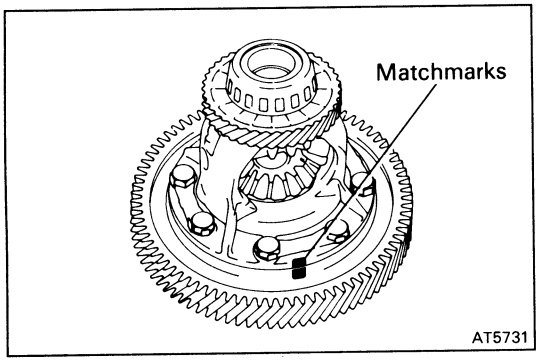


kg-cm (ft-lb, N·m) : Specified torque
◆ Non-reusable part

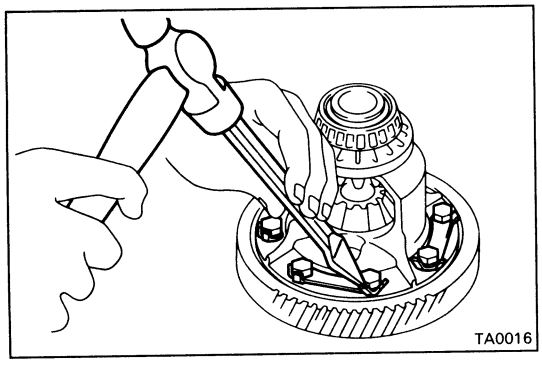
MT0639

DISASSEMBLY OF DIFFERENTIAL

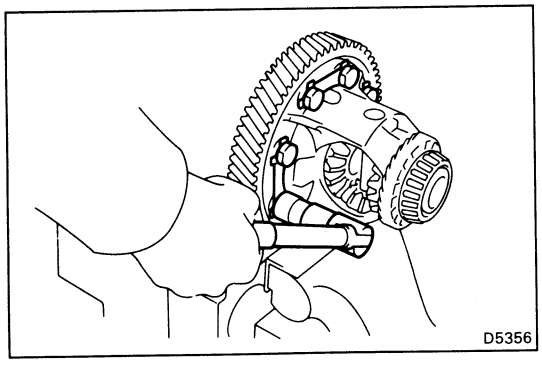
1. REMOVE RING GEAR



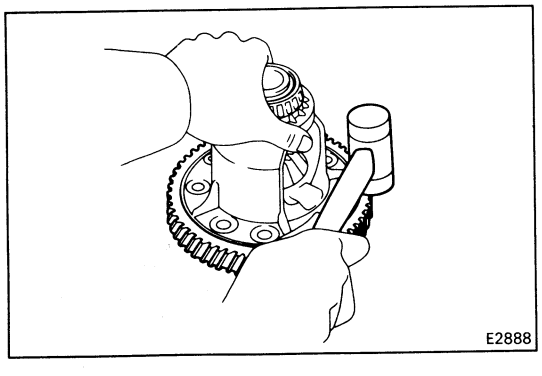
(a) Place the matchmarks on the ring gear and differential case.



(b) Loosen the staked part of the locking plate.

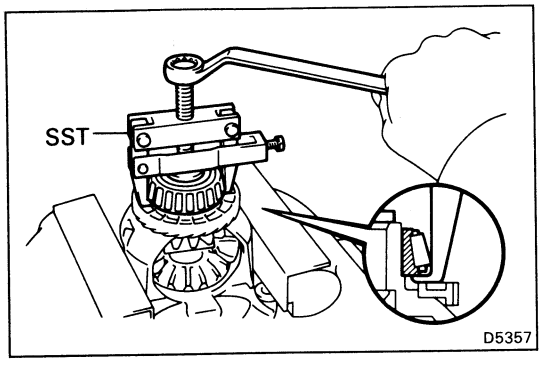


(c) Remove the eight bolts and four locking plates.



(d) Using a plastic hammer, tap on the ring gear to remove it from the case.

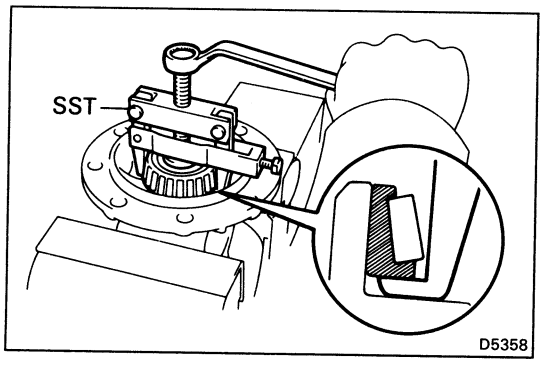
2. REMOVE SIDE BEARINGS FROM DIFFERENTIAL CASE



(a) Setting SST to the cut-out portion on the speedometer drive gear, remove the bearing from the differential case.

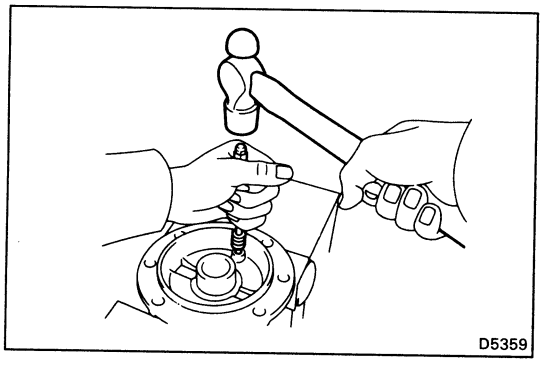
SST 09502-10012

(b) Remove the speedometer drive gear.



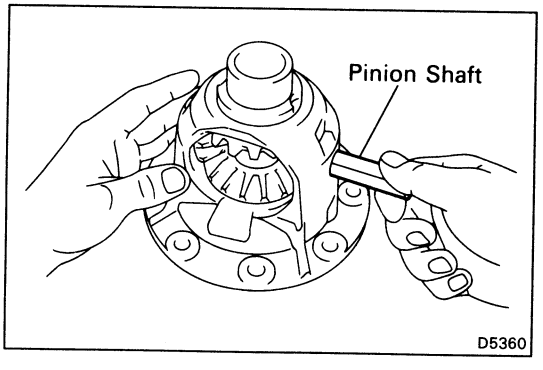
(c) Setting SST to the cut-out portion on the differential case, remove the bearing.

SST 09502-10012

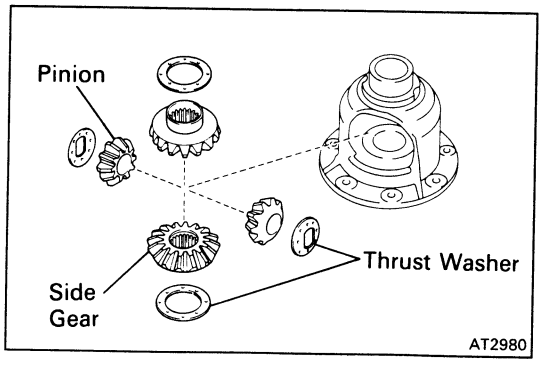


3. DISASSEMBLE DIFFERENTIAL CASE

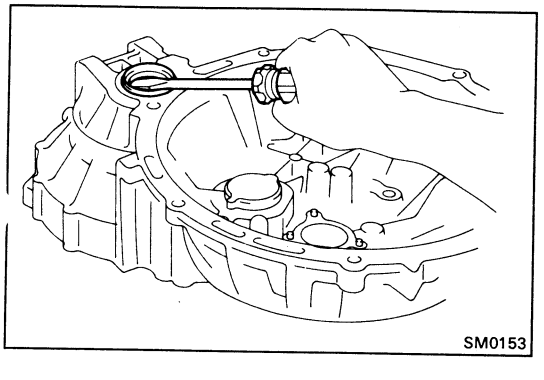
(a) Drive out the pinion shaft lock pin from the ring gear side.



(b) Remove the pinion shaft from the case.

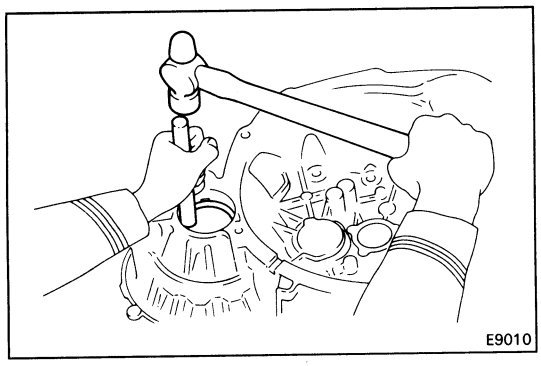


(c) Remove the two pinions, two side gears and four thrust washers.



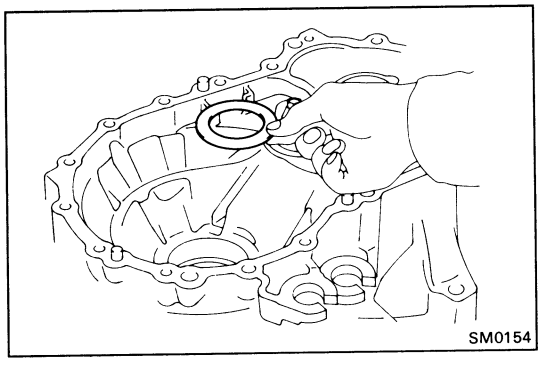
4. (Transaxle Case Side)
IF NECESSARY, REPLACE OIL SEAL AND TAPER ROLLER BEARING OUTER RACE

(a) Using a screwdriver, remove the oil seal.



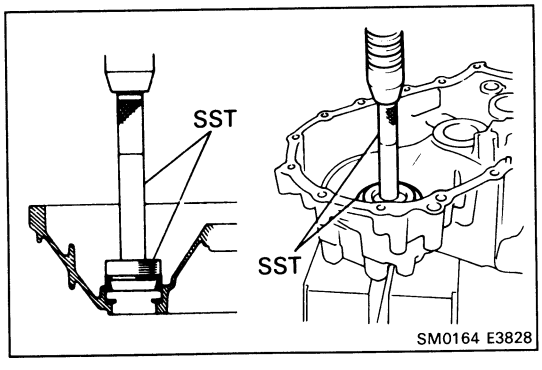
(b) Using a brass bar and hammer, drive out the bearing outer race lightly and evenly.

(c) Remove the shim.



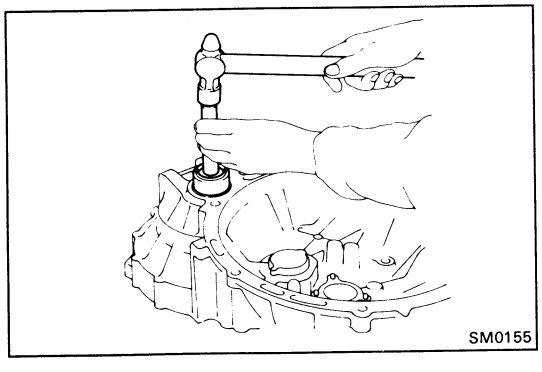
(d) Install the shim.

HINT: Shim thickness 2.4 mm (0.094 in.)



(e) Using SST and a press, install the taper roller bearing outer race.

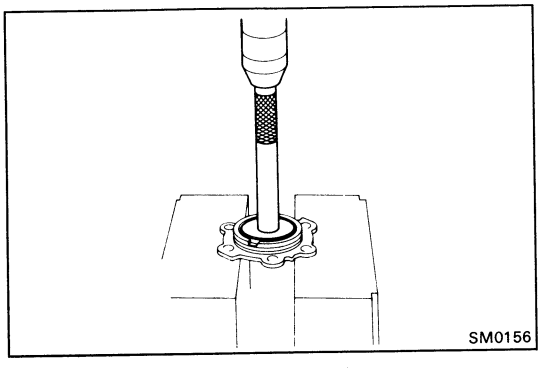
SST 09608-20012 (09608-03020, 09608-03060)



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

SST 09350-32014 (09351-32130, 09351-32150)

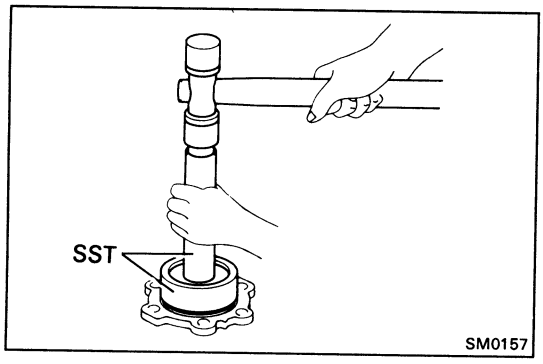
(g) Coat the lip of oil seal with MP grease.



5. (Transmission Case Side)
IF NECESSARY, REPLACE DIFFERENTIAL SIDE BEARING RETAINER OIL SEAL

(a) Using SST, press out the oil seal from the retainer.

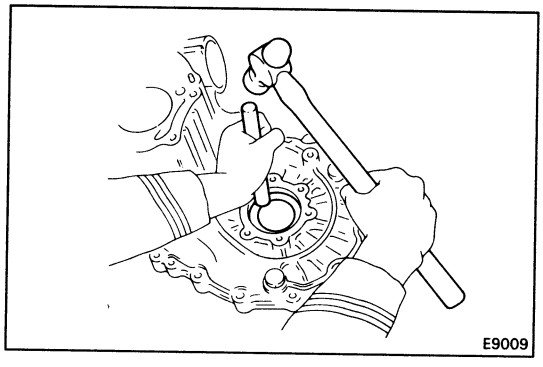
SST 09608-20012 (09608-00030, 09608-03020)



(b) Using SST, press in a new oil seal until its surface is flush with the case surface.

SST 09350-32014 (09351-32130, 09351-32150)

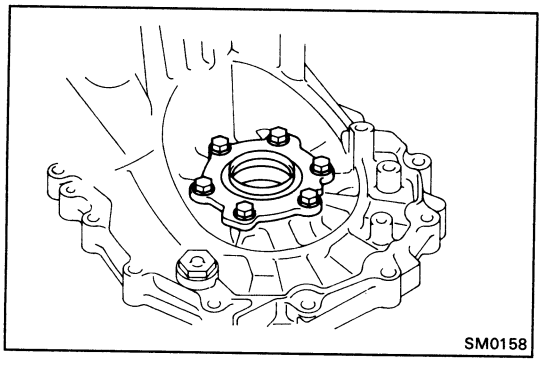
(c) Coat the lip of the oil seal with MP grease.



6. (Transmission Case Side)
IF NECESSARY, REPLACE TAPER ROLLER BEARING OUTER RACE

(a) Using a brass bar and hammer, drive out the bearing outer race tightly and evenly.

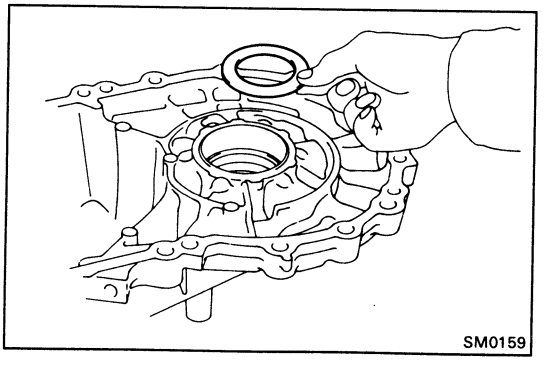
(b) Remove the shim.



(c) Install the differential side bearing retainer without an O-ring.

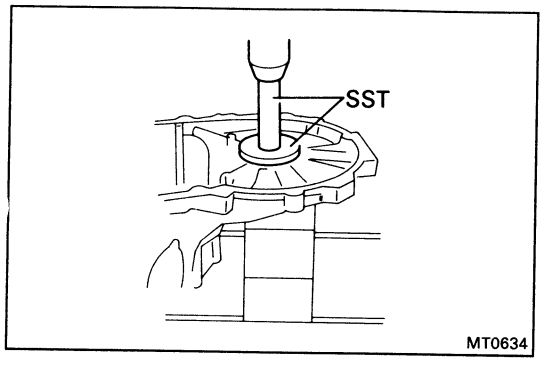
(d) Install and torque the six bolts.

Torque: 185 kg-cm (13 ft-lb, 18 N·m)



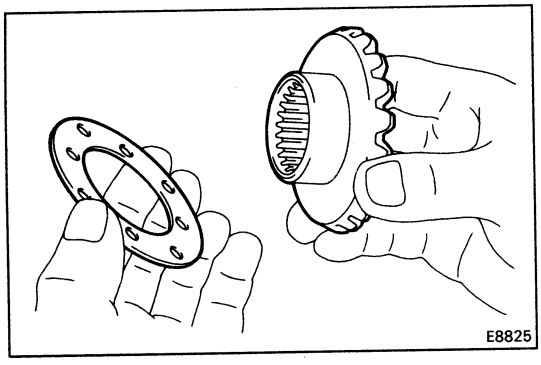
(e) Install the shim.
(See page MT-44)

HINT: First select and install a shim of lesser thickness than before.



(f) Using SST and a press, install the taper roller bearing outer race.

SST 09608-20012 (09608-03020, 09608-03060)

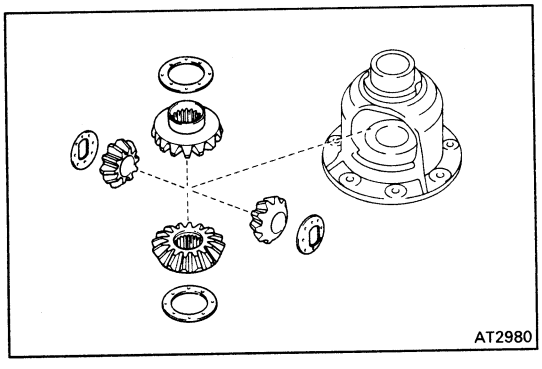


ASSEMBLY OF DIFFERENTIAL

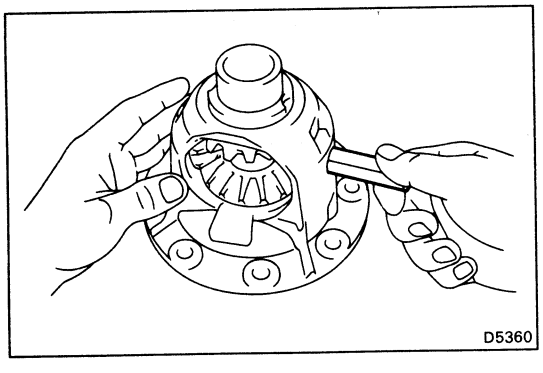
HINT: Coat all of the sliding and rotating surface with ATF before assembly.

1. ASSEMBLE DIFFERENTIAL CASE

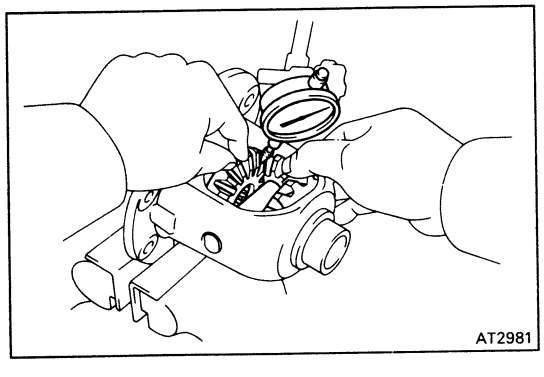
(a) Install the thrust washer to the side gear.



(b) Install the side gears with thrust washers, pinion gears and pinion thrust washers into the differential case.



(c) Install the pinion shaft so as to align the lock pin holes on the pinion shaft and differential case.



2. CHECK SIDE GEAR BACKLASH

(a) Measure the side gear backlash while holding one pinion gear toward the case.

Standard backlash: 0.05 – 0.20 mm (0.0020 – 0.0079 in.)

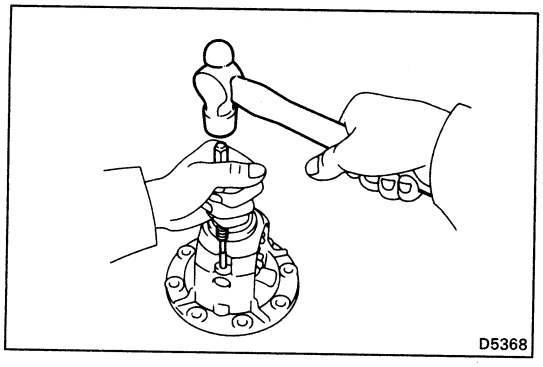
If the backlash is out of specification, install the correct thrust washer to the side gear.

(b) Referring to the table below, select thrust washers which will ensure that the backlash is within specification. Try to select washers of the same size of both sides.

Thrust washer thicknesses

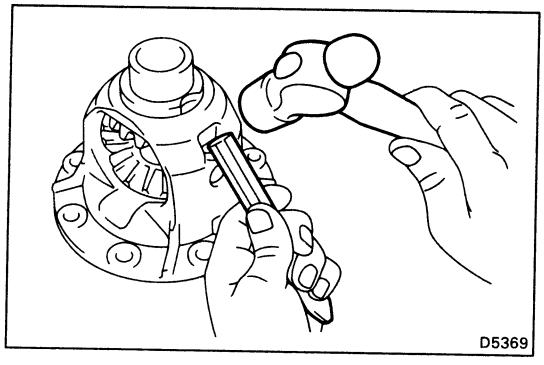
Thickness mm (in.)	Thickness mm (in.)
0.95 (0.0374)	1.10 (0.0433)
1.00 (0.0394)	1.15 (0.0453)
1.05 (0.0413)	1.20 (0.0472)

If the backlash is not within specification, install a thrust washer of a different thickness.

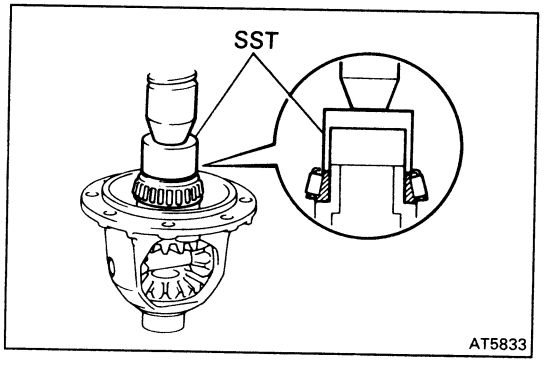


3. INSTALL LOCK PIN

(a) Using a hammer and punch, drive the lock pin through the case and hole in the pinion shaft.



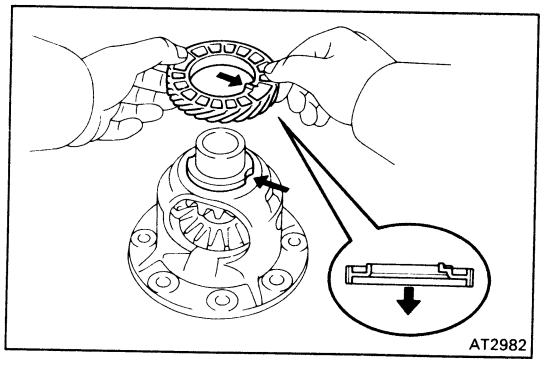
(b) Stake the differential case.



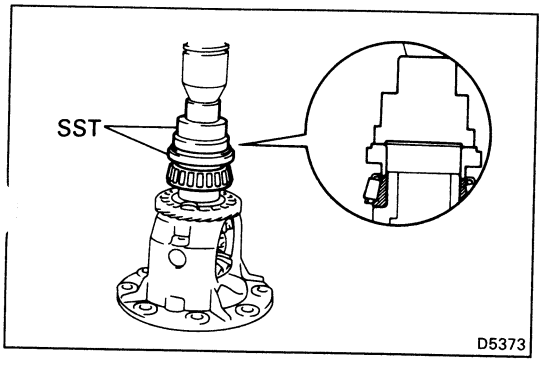
4. INSTALL SIDE BEARINGS TO DIFFERENTIAL CASE

(a) Using SST and press, press the side bearing into the differential case.

SST 09710-30030 (09710-03160)

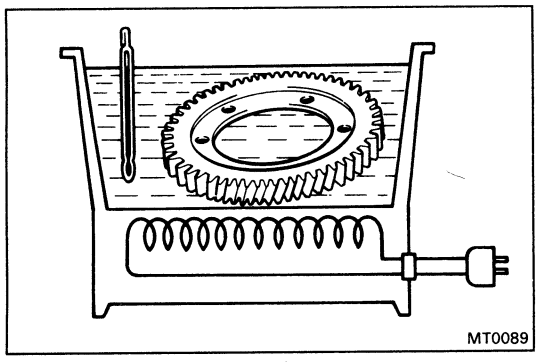


(b) Install the speedometer drive gear to the differential case.



(c) Using SST and press, press the side bearing into the differential case.

SST 09350-32014 (09351-32090, 09351-32120)


MT0089

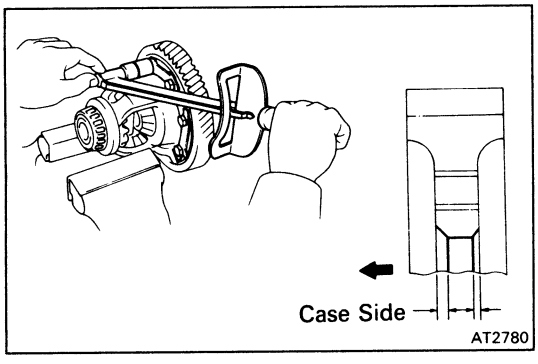
5. INSTALL RING GEAR TO DIFFERENTIAL

(a) Clean the contact surface of the differential case.

(b) Heat the ring gear to about 212°F (100°C) in an oil bath.

NOTICE: Do not heat the ring gear above 230°F (110°C).

(c) Clean the contact surface of the ring gear with cleaning solvent.



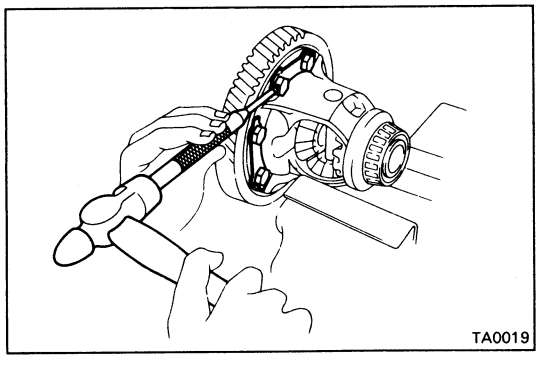
AT2780

(d) Quickly install the ring gear on the differential case.

(e) Install new locking plates and set bolts.

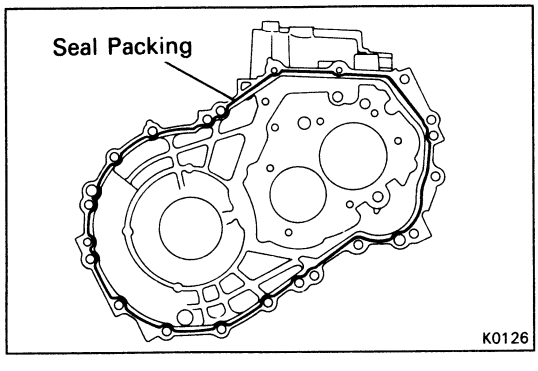
HINT: Tighten the set bolts uniformly and a little at a time. Torque the bolts.

Torque: 985 kg-cm (71 ft-lb, 97 N·m)


TA0019

(f) Using a hammer and drift punch, stake the locking plates.

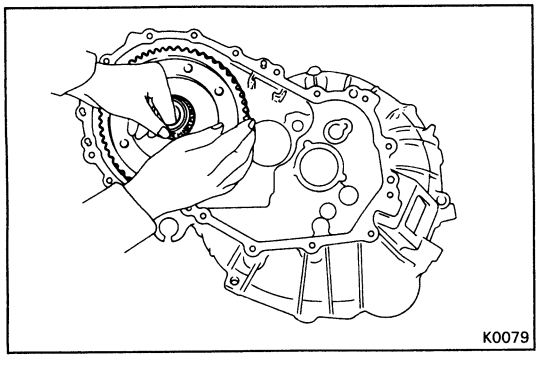
HINT: Stake one claw flush with the flat surface of the nut. For the claw contacting the protruding portion of the nut, stake only the half on the tightened side.



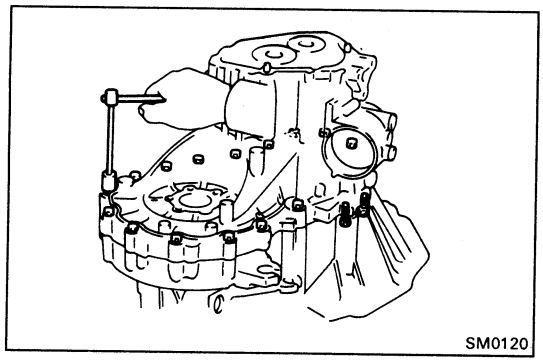
K0126

6. ADJUST SIDE BEARING PRELOAD

(a) Remove any packing material and be careful not to get oil on the contacting surfaces of the transaxle housing or transmission case.


K0079

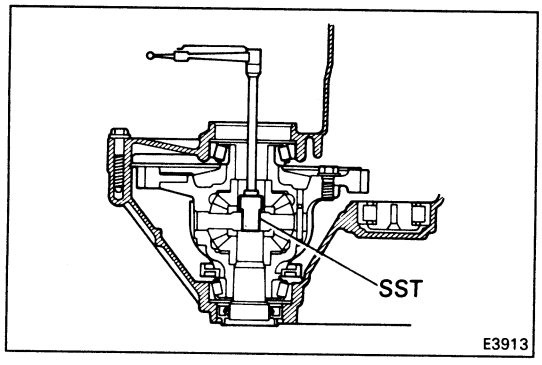
(b) Install the differential to the transaxle case.



(c) Install the transmission case to the transaxle case.

(d) Install and torque the seventeen bolts.

Torque: 300 kg-cm (22 ft-lb, 29 N·m)



(e) Using SST, rotate the differential in both directions to snug the bearing down.

SST 09564-32011

(f) Using SST and a torque meter, measure the preload of the side bearing.

SST 09564-32011

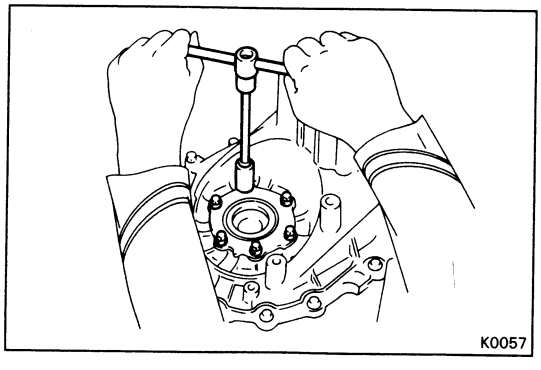
Preload (at starting):
8 – 16 kg-cm (6.9 – 13.9 in.-lb, 0.8 – 1.6 N·m)

If the preload is not within specification, remove the bearing retainer from the case. Re-select the transmission case side adjusting shim.

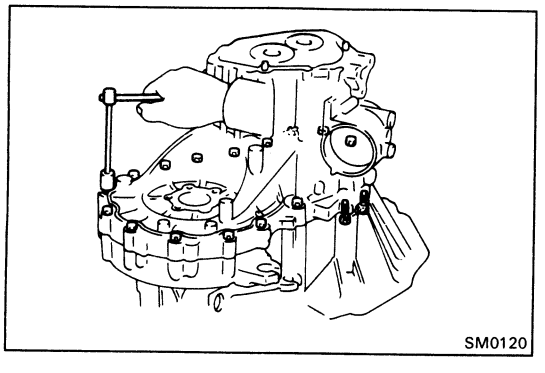
mm (in.)

Mark	Thickness	Mark	Thickness	Mark	Thickness	Mark	Thickness	Mark	Thickness
1	1.90 (0.0748)	5	2.10 (0.0827)	9	2.30 (0.0906)	13	2.50 (0.0984)	17	2.70 (0.1063)
2	1.95 (0.0768)	6	2.15 (0.0846)	10	2.35 (0.0925)	14	2.55 (0.1004)	18	2.75 (0.1083)
3	2.00 (0.0787)	7	2.20 (0.0866)	11	2.40 (0.0945)	15	2.60 (0.1024)	19	2.80 (0.1102)
4	2.05 (0.0807)	8	2.25 (0.0886)	12	2.45 (0.0965)	16	2.65 (0.1043)		

HINT: The preload will change about 3 – 4 kg-cm (2.6 – 3.5 in.-lb, 0.3 – 0.4 N·m) with each shim thickness.

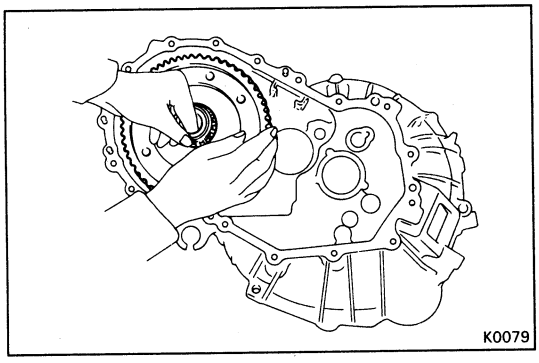


7. REMOVE DIFFERENTIAL SIDE BEARING RETAINER AND SHIM

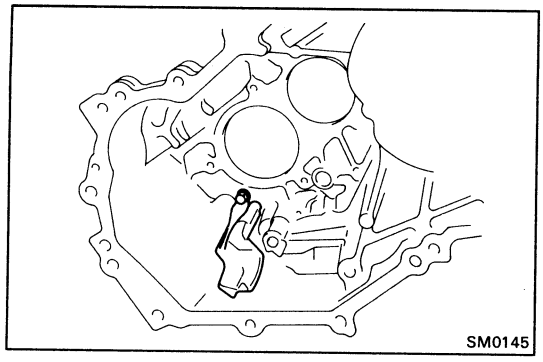


8. REMOVE TRANSMISSION CASE

Remove the seventeen bolts and tap off the case with plastic hammer.



9. REMOVE DIFFERENTIAL ASSEMBLY FROM TRANSAXLE CASE



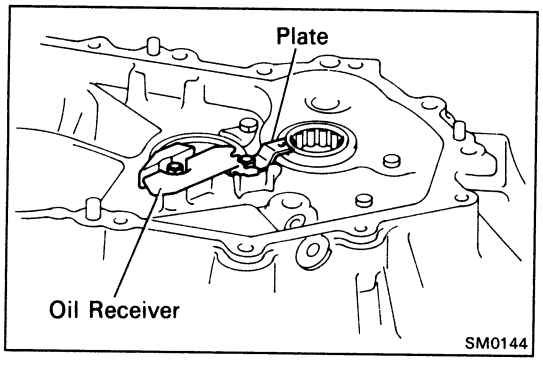
INSTALLATION OF COMPONENT PARTS

(See pages MT-7 to 9)

HINT: Coat all of the sliding and rotating surface with ATF before assembly.

1. INSTALL AND TORQUE NO. 1 OIL RECEIVER PIPE TO TRANSMISSION CASE

Torque: 75 kg-cm (65 in.-lb, 7.4 N·m)



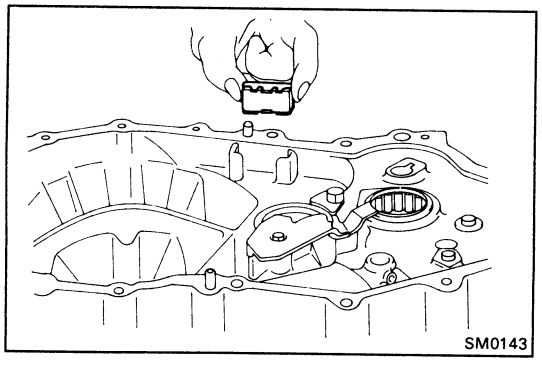
2. INSTALL TRANSAXLE OIL RECEIVER AND PLATE TO TRANSAXLE CASE

(a) Install and torque the oil receiver.

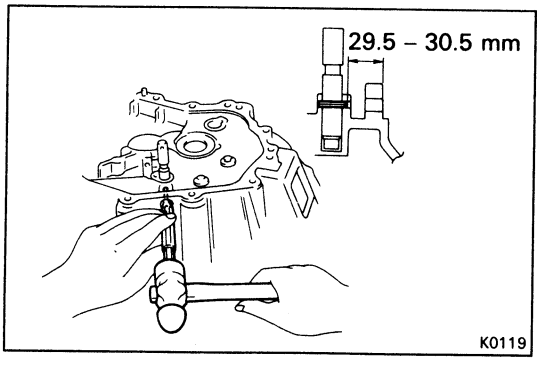
Torque: 75 kg-cm (65 in.-lb, 7.4 N·m)

(b) Install and torque the plate.

Torque: 185 kg-cm (13 ft-lb, 18 N·m)



3. INSTALL MAGNET

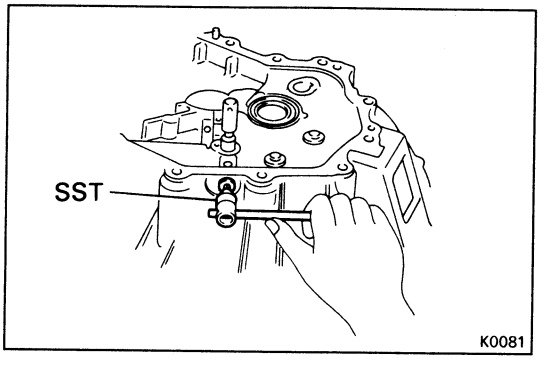


4. INSTALL NO. 2 FORK SHAFT

(a) Insert No. 2 fork shaft to the transaxle case and align the slotted spring pin hole.

(b) Using a pin punch and hammer, drive in a slotted spring pin.

Drive in depth: 29.5 – 30.5 mm (1.16 – 1.20 in.)



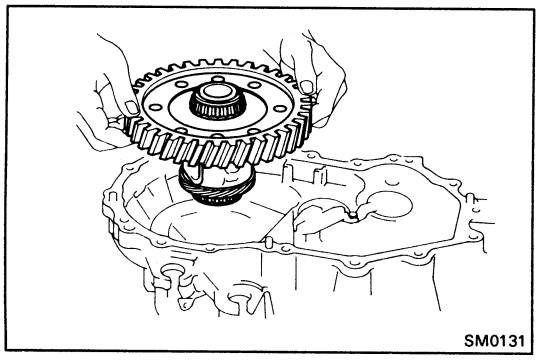
(c) Apply sealant to the plug threads.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(d) Using SST, install and torque the screw plug.

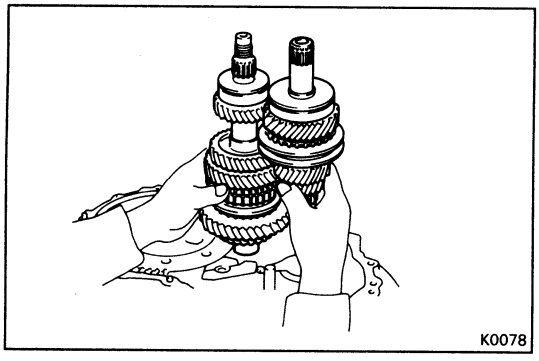
SST 09313-30021

Torque: 130 kg-cm (9 ft-lb, 13 N·m)


SM0131

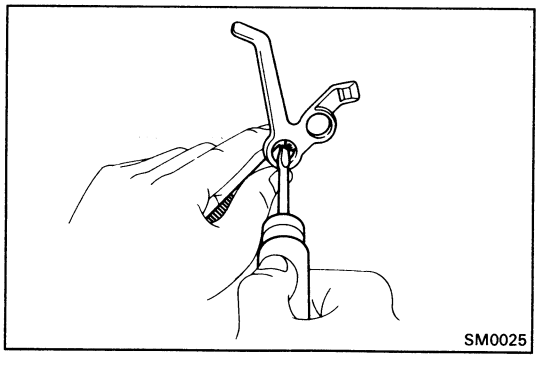
5. INSTALL DIFFERENTIAL ASSEMBLY

Install the differential assembly to the transaxle case.


K0078

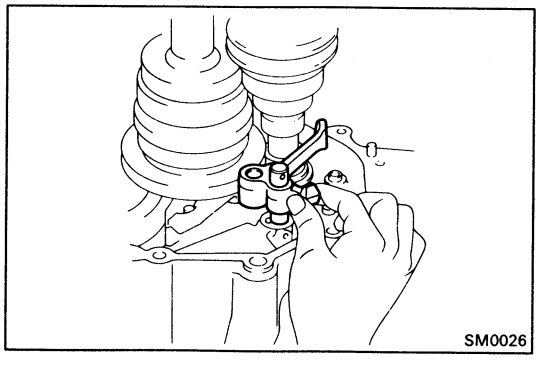
6. INSTALL INPUT AND OUTPUT SHAFTS ASSEMBLY

Install the input and output shafts together.

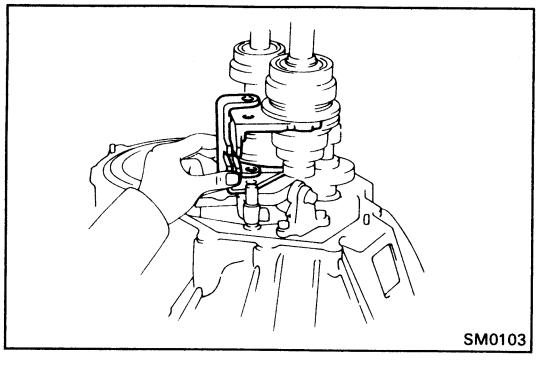

SM0025

7. INSTALL REVERSE SHIFT FORK AND INTERLOCK PIN

(a) Insert interlock pin into the reverse shift fork hole.

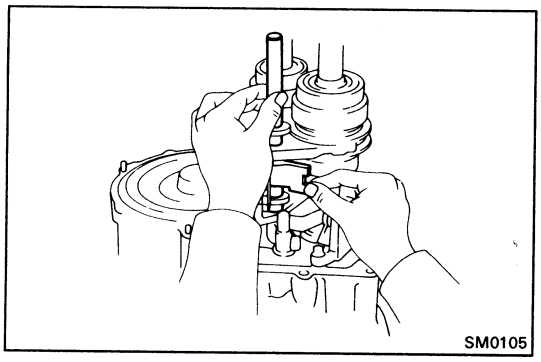

SM0026

(b) Install the reverse shift fork onto No. 2 fork shaft.

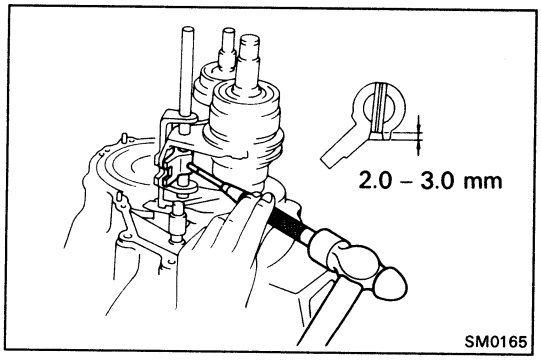

SM0103

8. INSTALL NO. 1 AND NO. 2 SHIFT FORKS, NO. 1 SHIFT HEAD AND NO. 1 FORK SHAFT

(a) Place No. 1 and No. 2 shift forks into the groove of No. 1 and No. 2 hub sleeves.

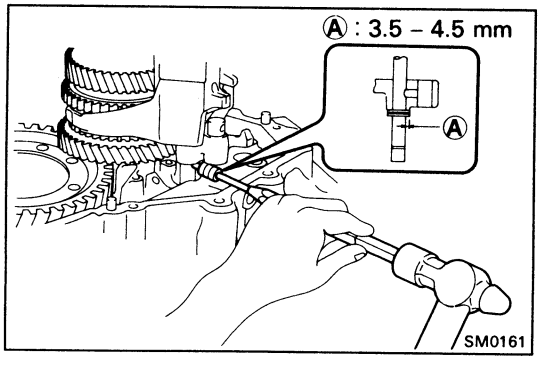


(b) Hold the No. 1 shift head and insert No. 1 fork shaft into the transaxle case through No. 1 and No. 2 shift fork, No. 1 shift head and reverse shift fork.



(c) Using a pin punch and hammer, drive the slotted spring pin into No. 1 shift head.

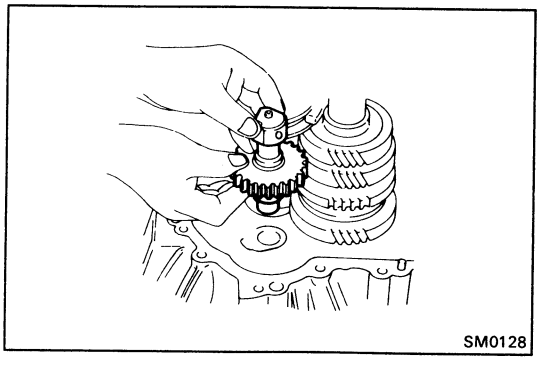
Drive in depth: 2.0 – 3.0 mm (0.08 – 0.12 in.)



(d) Shift the shift fork shaft into reverse.

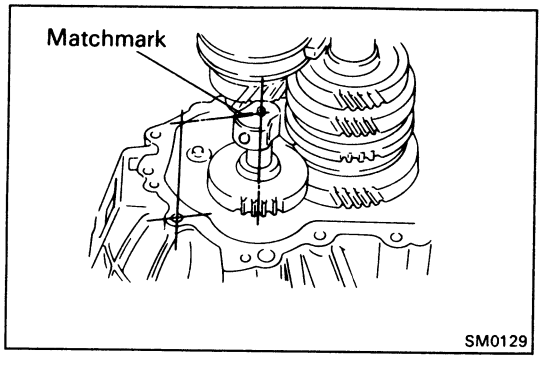
(e) Using a pin punch and hammer, drive the slotted spring pin into No. 1 fork shaft.

Drive in depth: 3.5 – 4.5 mm (0.14 – 0.18 in.)



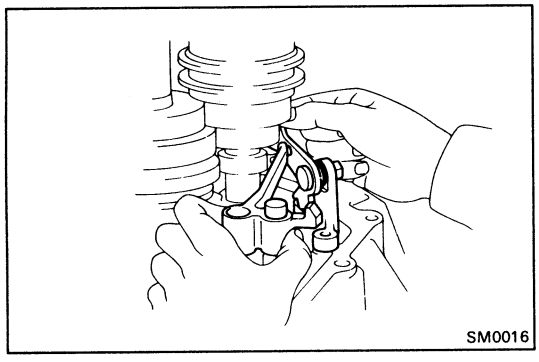
9. INSTALL REVERSE IDLER GEAR AND SHAFT

(a) Install the reverse idler gear shaft to the reverse idler gear.



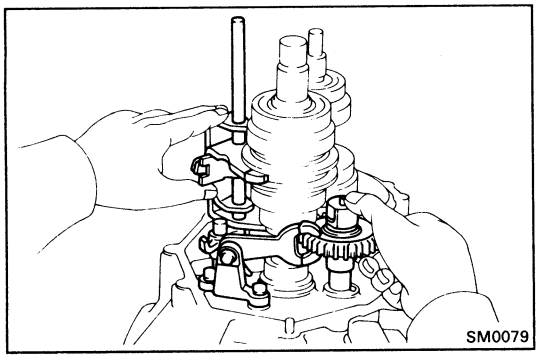
(b) Install the reverse idler gear and shaft to transaxle case.

(c) Align the matchmark on the shaft end with the bolt hole in the transaxle case, as shown in the illustration.


SM0016

10. INSTALL REVERSE SHIFT ARM

(a) Put the reverse shift arm pivot into the reverse shift fork and install the reverse shift arm to the transaxle case.

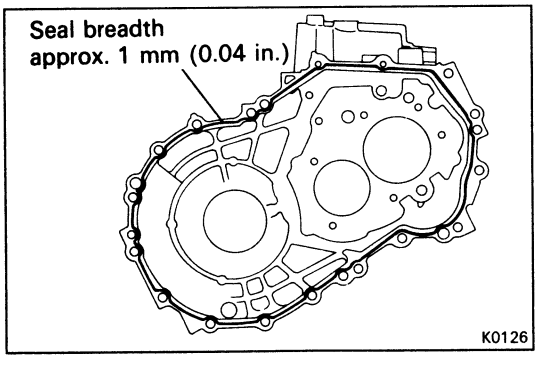

SM0079

(b) Shift the shift fork shaft into reverse.

(c) Install and torque the two bolts.

Torque: 185 kg-cm (13 ft-lb, 18 N·m)

(d) Shift the shift fork shaft into neutral position.



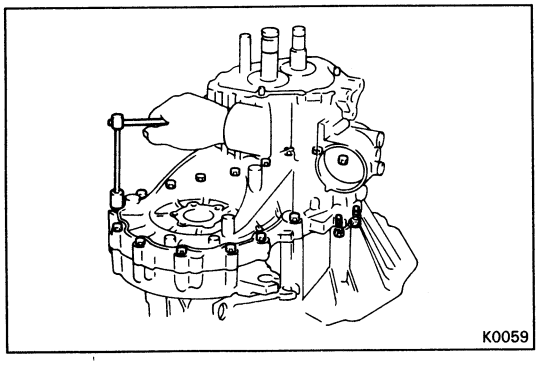
K0126

11. INSTALL TRANSMISSION CASE

(a) Remove any packing material and be careful not to drop oil on the contacting surface of the transmission case or transaxle case.

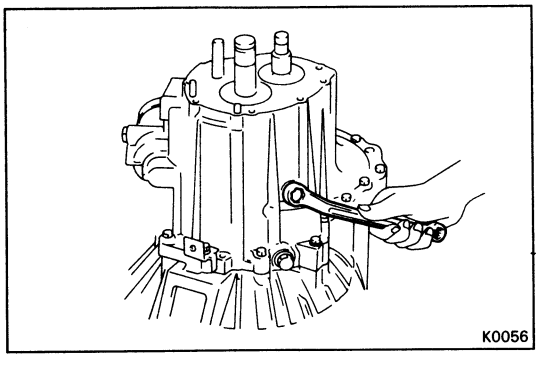
(b) Apply seal packing to the transmission case as shown in the figure.

Seal packing: Part No. 08826-00090, THREE BOND 1281 or equivalent


K0059

(c) Install and torque the seventeen bolts.

Torque: 300 kg-cm (22 ft-lb, 29 N·m)


K0056

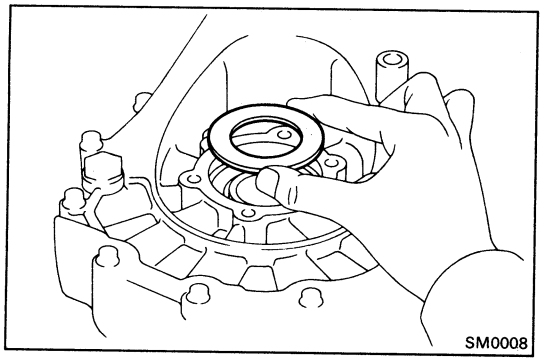
12. INSTALL REVERSE IDLER GEAR SHAFT LOCK BOLT

(a) Apply sealant to the bolt threads.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(b) Install and torque the bolt.

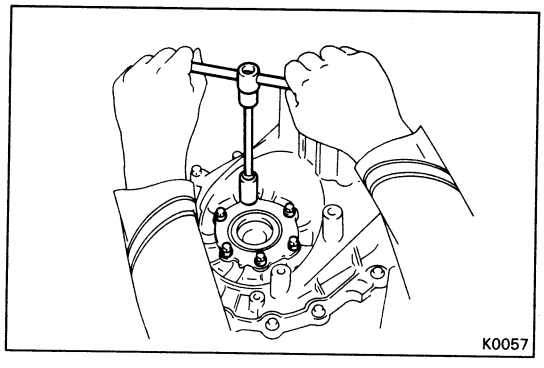
Torque: 300 kg-cm (22 ft-lb, 29 N·m)



13. INSTALL SIDE BEARING RETAINER

(a) Install the shim.

HINT: Install the previously selected shim.
(See page MT-45)



(b) Install a new O-ring on the side bearing retainer.

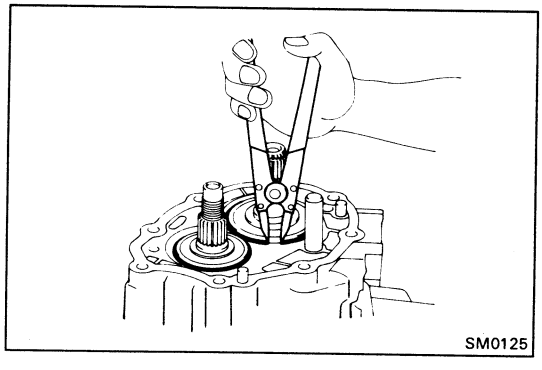
(c) Install the side bearing retainer.

(d) Apply sealant to the bolt threads.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

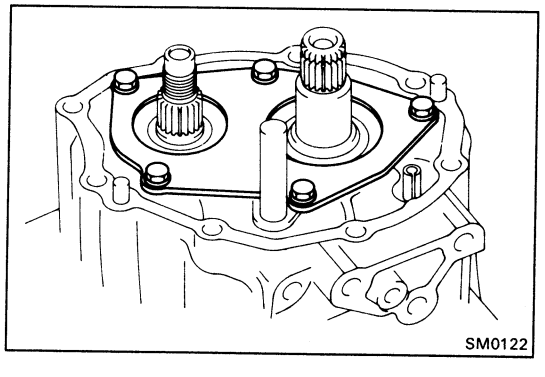
(e) Install and torque the six bolts.

Torque: 185 kg-cm (13 ft-lb, 18 N·m)



14. INSTALL SNAP RINGS

Using snap ring pliers, install the snap rings to the input and output shaft rear bearing.



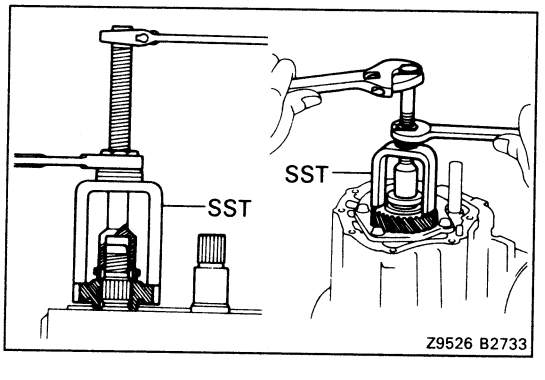
15. INSTALL REAR BEARING RETAINER

(a) Apply sealant to the bolt threads.

Sealant: Part No. 08833-00070, THREE BOND 1324 or equivalent

(b) Install and torque the five bolts.

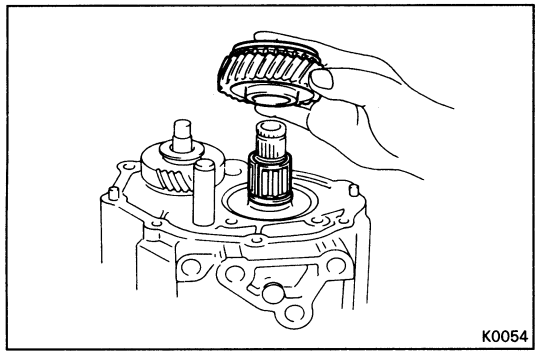
Torque: 210 kg-cm (15 ft-lb, 21 N·m)



16. INSTALL FIFTH DRIVEN GEAR

Using SST, install the fifth driven gear.

SST 09309-32050

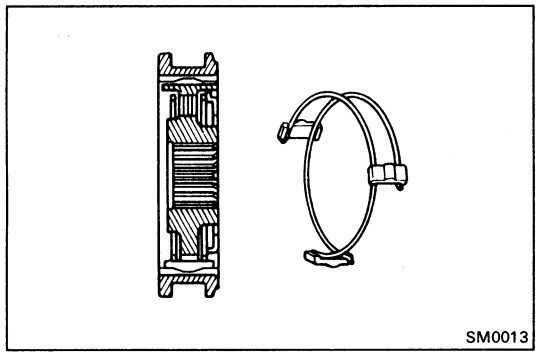

K0054

17. INSTALL SPACER, NEEDLE ROLLER BEARINGS, FIFTH GEAR AND SYNCHRONIZER RING

(a) Install the spacer.

(b) Install the needle roller bearings.

(c) Install the fifth gear with the synchronizer ring.

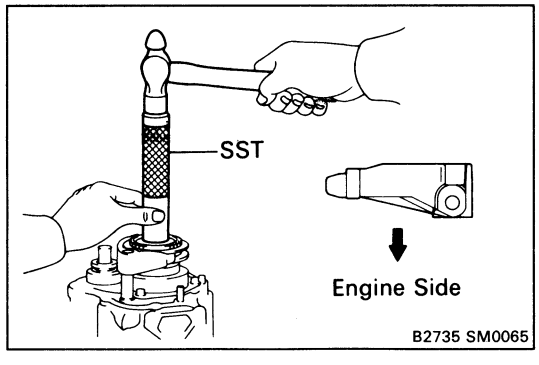

SM0013

18. INSERT NO. 3 CLUTCH HUB INTO HUB SLEEVE

(a) Install the clutch hub and shifting keys to the hub sleeve.

(b) Install the shifting key springs under the shifting keys.

NOTICE: Install the key springs positioned so that their end gaps are not in line.



B2735 SM0065

19. INSTALL NO. 3 HUB SLEEVE ASSEMBLY WITH NO. 3 SHIFT FORK

(a) Support the tip of the input shaft with a spacer or such to raise the transaxle assembly.

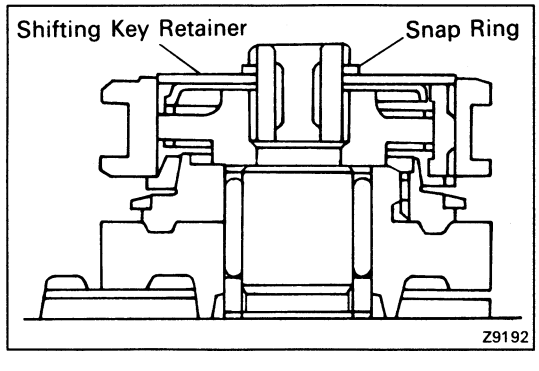
(b) Install the No. 3 shift fork set bolt.

Torque: 185 kg-cm (13 ft-lb, 18 N·m)

(c) Using SST, drive in No. 3 hub sleeve with shift fork.

SST 09612-22011

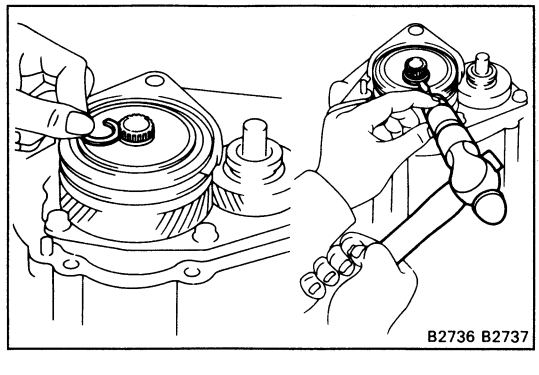
NOTICE: Align the synchronizer ring slots with the shifting keys.



Z9192

20. INSTALL SHIFTING KEY RETAINER

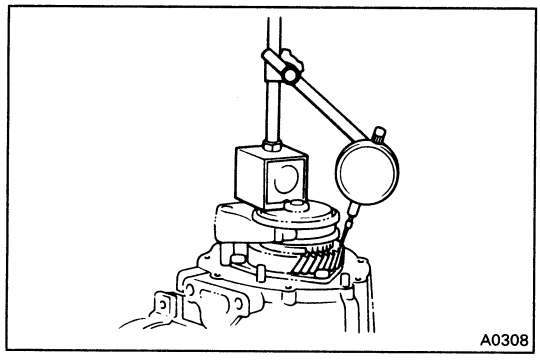
Install the shifting key retainer as shown in the figure.


B2736 B2737

21. INSTALL SNAP RING

Select a snap ring that will allow minimum axial play and install it on the shaft.

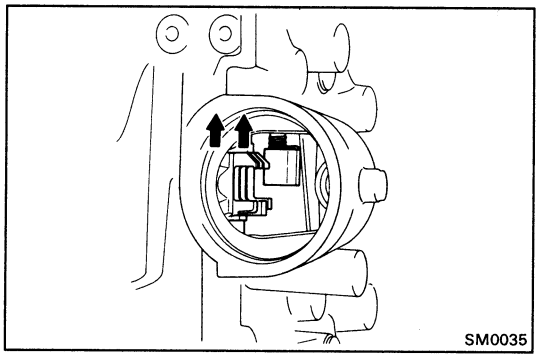
Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
1	1.60–1.65(0.0630–0.0650)	9	2.00–2.05(0.0787–0.0807)
2	1.65–1.70(0.0650–0.0669)	10	2.05–2.10(0.0807–0.0827)
3	1.70–1.75(0.0669–0.0689)	11	2.10–2.15(0.0827–0.0846)
4	1.75–1.80(0.0689–0.0709)	12	2.15–2.20(0.0846–0.0866)
5	1.80–1.85(0.0709–0.0728)	13	2.20–2.25(0.0866–0.0886)
6	1.85–1.90(0.0728–0.0748)	14	2.25–2.30(0.0886–0.0906)
7	1.90–1.95(0.0748–0.0768)	15	2.30–2.35(0.0906–0.0925)
8	1.95–2.00(0.0768–0.0787)		



22. MEASURE FIFTH GEAR THRUST CLEARANCE

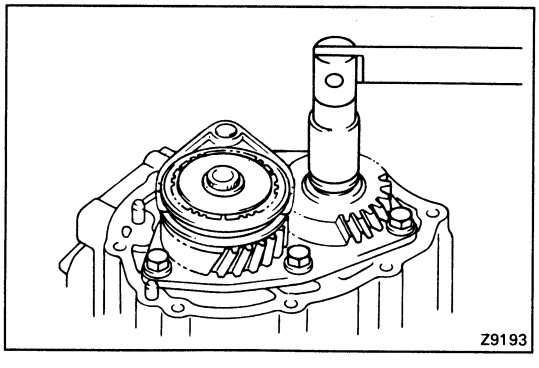
Using a dial indicator, measure the thrust clearance.

Standard clearance: 0.20 – 0.40 mm (0.0079 – 0.0157 in.)



23. INSTALL LOCK NUT

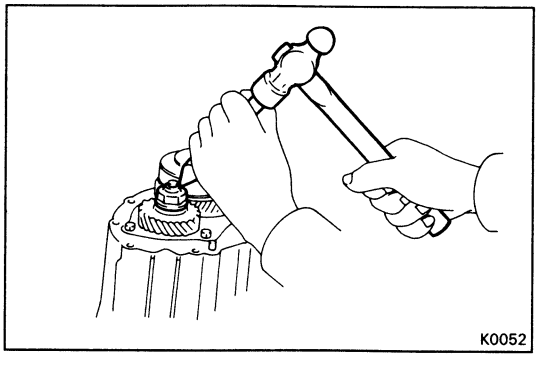
(a) Engage the gear double meshing.



(b) Install and torque the nut.

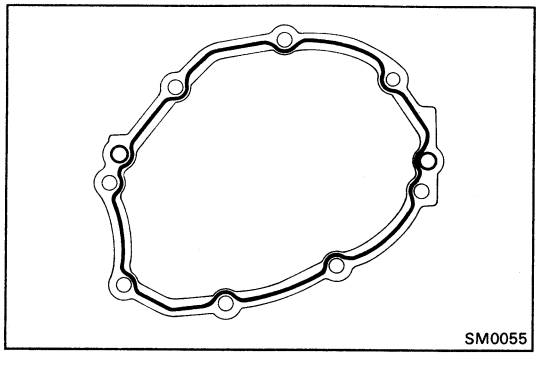
Torque: 1,250 kg-cm (90 ft-lb, 123 N·m)

HINT: The lock nut has LH threads.



(c) Stake the lock nut.

(d) Disengage the gear double meshing.



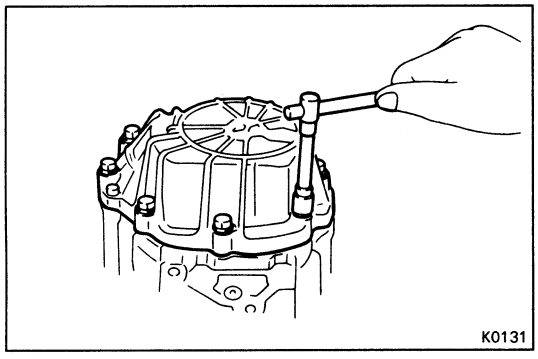
24. INSTALL TRANSMISSION CASE COVER

(a) Remove any packing material and be careful not to drop oil on the contacting surfaces of the transmission case cover.

(b) Apply seal packing to the transmission case as shown in the figure.

Seal packing: Part No. 08826-00090, THREE BOND 1281 or equivalent

HINT: Install the transmission case cover as soon as the seal packing is applied.

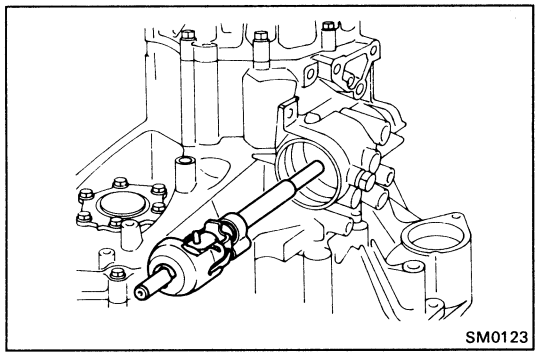

K0131

(c) Apply sealant to the bolt threads.

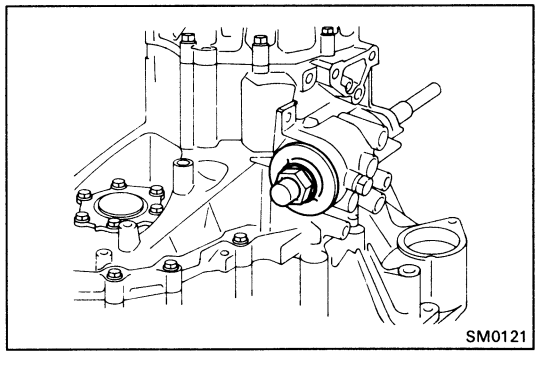
Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(d) Install and torque the eight bolts.

Torque: 300 kg-cm (22 ft-lb, 29 N·m)


SM0123

25. INSTALL SHIFT AND SELECT LEVER SHAFT ASSEMBLY

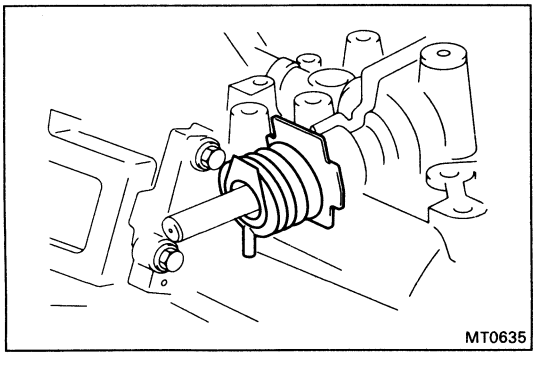

SM0121

26. INSTALL CONTROL SHAFT COVER

(a) Coat a new O-ring with ATF and install it to the control shaft cover.

(b) Install and torque the control shaft cover.

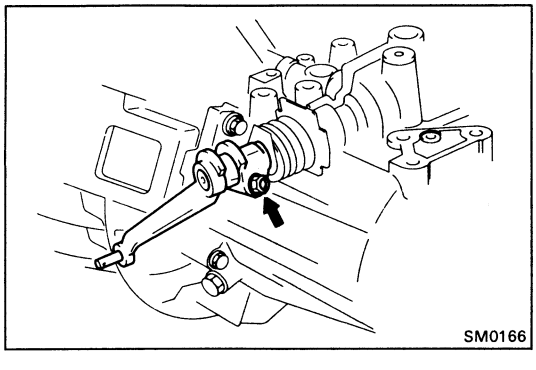
Torque: 335 kg-cm (24 ft-lb, 33 N·m)


MT0635

27. INSTALL SHIFT LEVER

(a) Install the boot to the control shaft oil seal.

HINT: Make sure to install the boot in the correct direction. Position the air bleed of the boot downward.

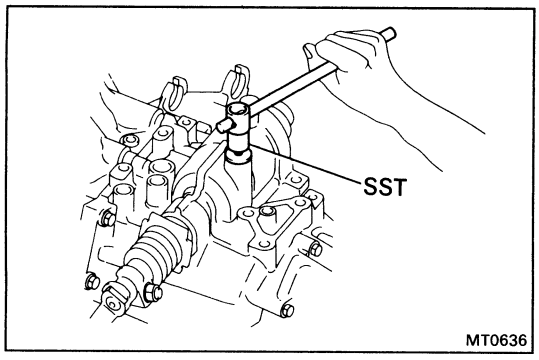

SM0166

(b) Fit the pin's groove into the shaft's notch and tap on with a hammer.

(c) Install and torque the nut.

Torque: 120 kg-cm (9 ft-lb, 12 N·m)

(d) Install the boot to the shift lever.



28. INSTALL NO. 2 LOCK BALL ASSEMBLY

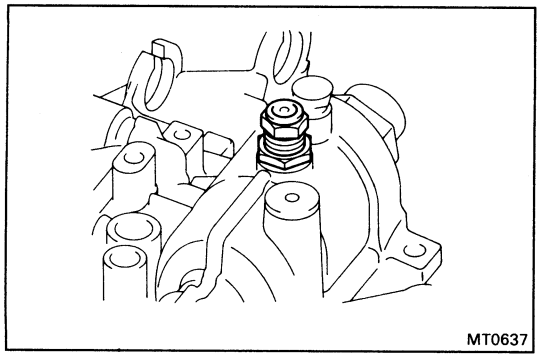
(a) Apply liquid sealant to the plug.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(b) Using SST, install and torque the plug.

SST 09313-30021

Torque: 230 kg-cm (17 ft-lb, 23 N·m)



29. INSTALL NO. 1 LOCK BALL ASSEMBLY

(a) Fully loosen the lock nut.

(b) Fully screw in the lock ball.

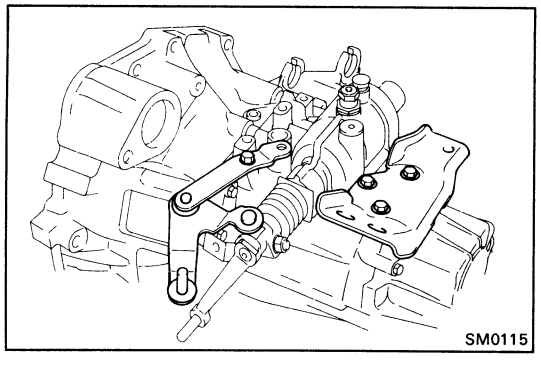
(c) Loosen the lock ball to where the play at the shift outer lever tip is 0.1 – 0.5 mm (0.004 – 0.020 in.)

(d) Hold the lock ball and tighten the lock nut.

Torque: 375 kg-cm (27 ft-lb, 37 N·m)

(e) Check the shift outer lever tip play.

Lever tip play: 0.1 – 0.5 mm (0.004 – 0.020 in.)



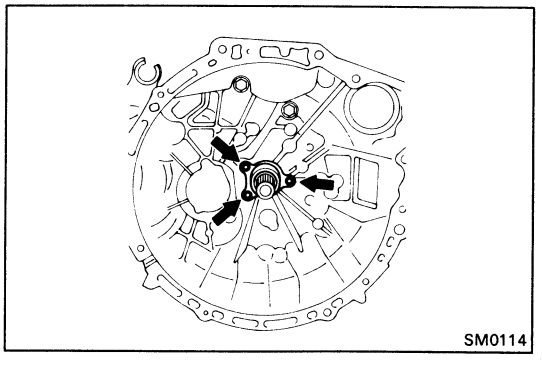
30. INSTALL SELECTING BELL CRANK ASSEMBLY AND ENGINE MOUNTING BRACKET

(a) Install and torque the selecting bell crank.

Torque: 200 kg-cm (14 ft-lb, 20 N·m)

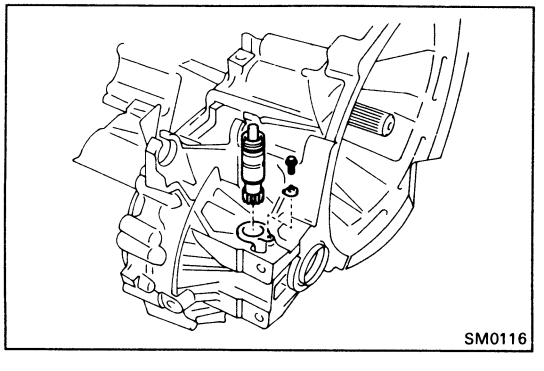
(b) Install and torque the engine mounting bracket.

Torque: 530 kg-cm (38 ft-lb, 52 N·m)

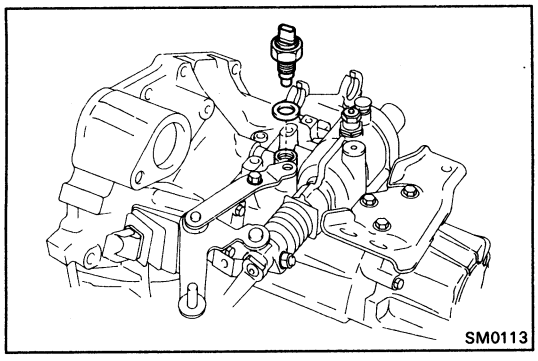


31. INSTALL RELEASE BEARING RETAINER

Torque: 75 kg-cm (65 in.-lb, 7.4 N·m)

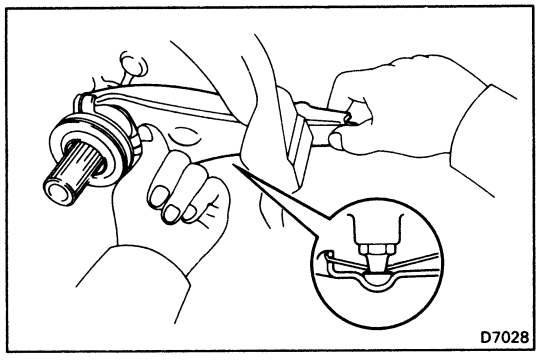


32. INSTALL SPEEDOMETER DRIVEN GEAR



33. INSTALL BACK-UP LIGHT SWITCH

Torque: 450 kg-cm (33 ft-lb, 44 N·m)

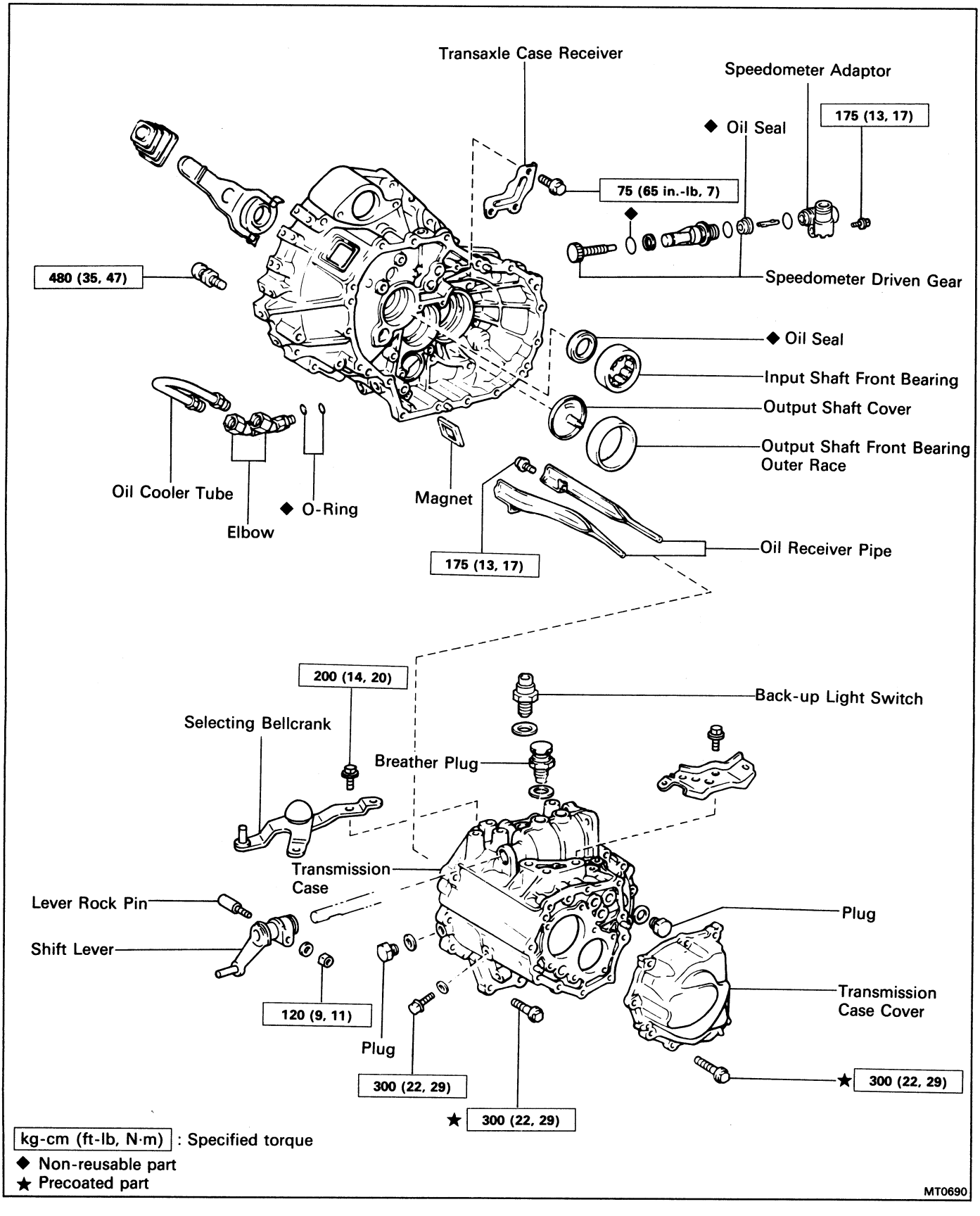


34. INSTALL RELEASE BEARING FORK AND BEARING

Apply molybdenum disulphide lithium base grease to the following parts:

- Input shaft spline
- Release fork contact surface

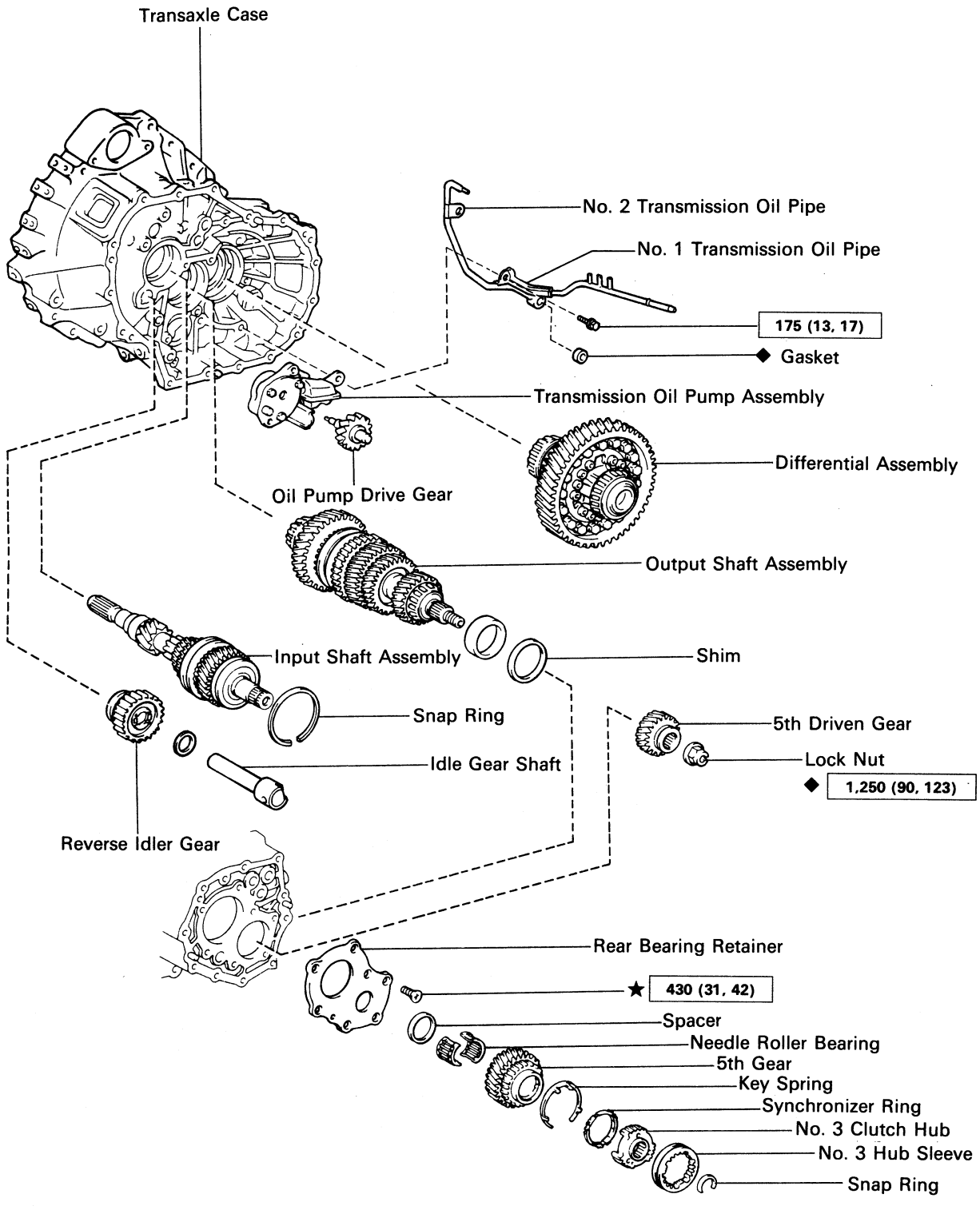
(E153 TRANSAXLE)
REMOVAL OF COMPONENT PARTS
COMPONENTS



kg-cm (ft-lb, N·m) : Specified torque
◆ Non-reusable part
★ Precoated part

MT0690

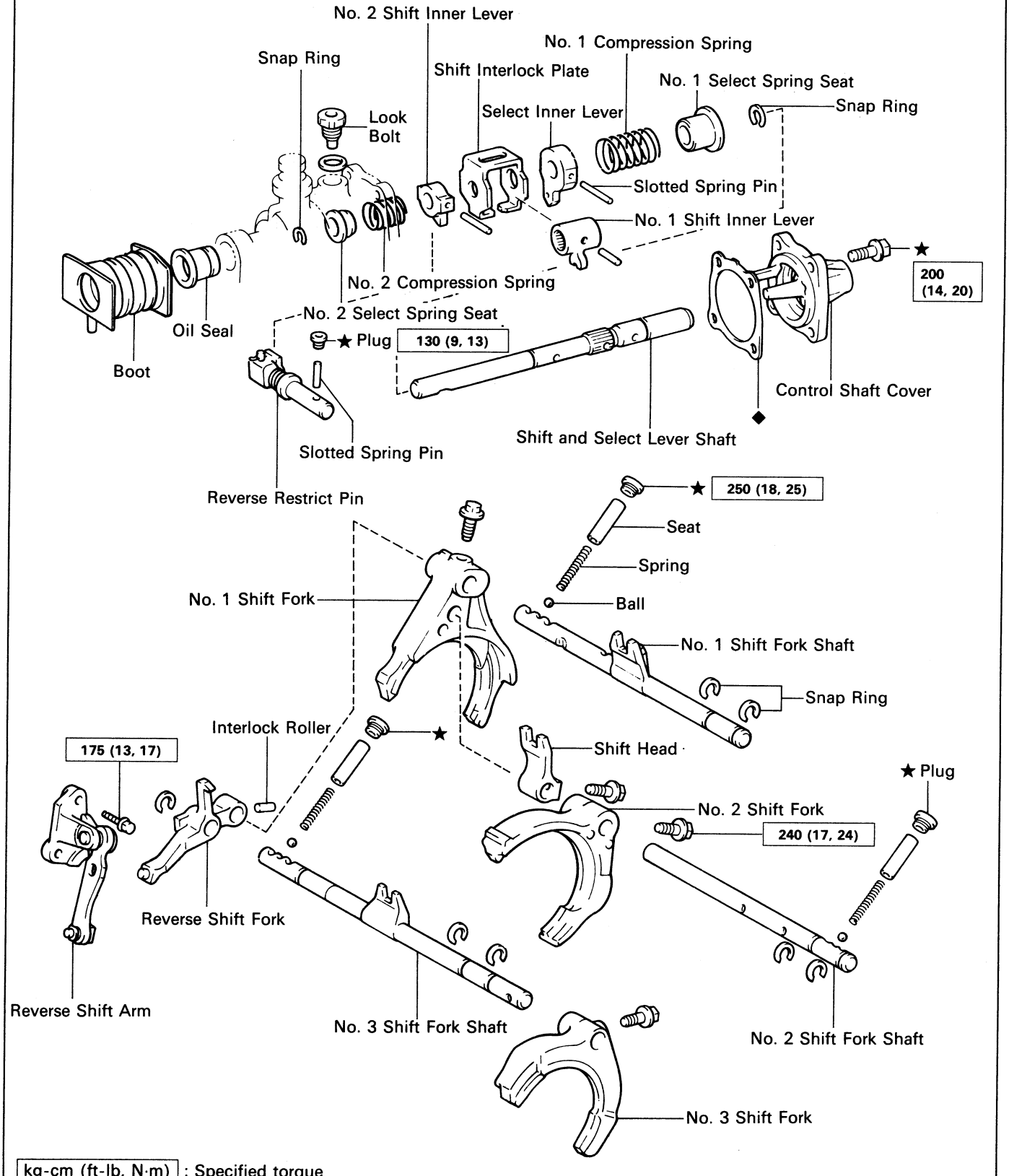
COMPONENTS (Cont'd)



kg-cm (ft-lb, N·m) : Specified torque
◆ Non-reusable part
★ Precoated part

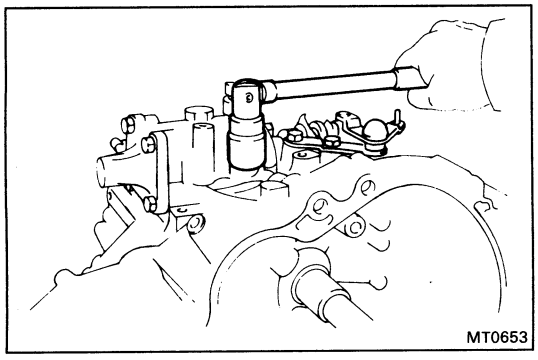
MT0691

COMPONENTS (Cont'd)



kg-cm (ft-lb, N·m) : Specified torque
◆ Non-reusable part
★ Precoated part

MT0652



REMOVAL OF COMPONENT PARTS

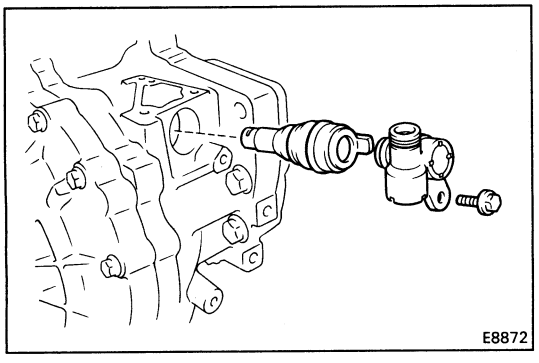
(See pages MT-57 to 59)

1. REMOVE RELEASE FORK AND BEARING

2. REMOVE BACK-UP LIGHT SWITCH

Using SST, remove the back-up light switch.

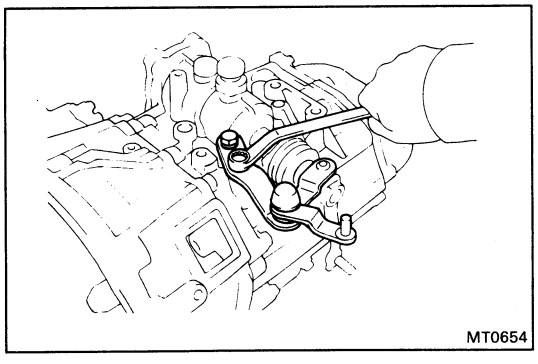
SST 09817-16011



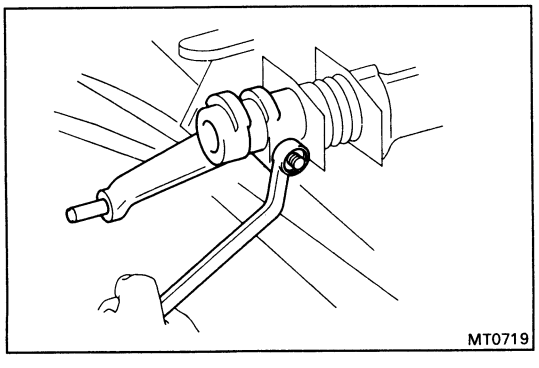
3. REMOVE SPEEDOMETER DRIVEN GEAR

(a) Remove the set bolt and speedometer adaptor.

(b) Remove the speedometer driven gear.

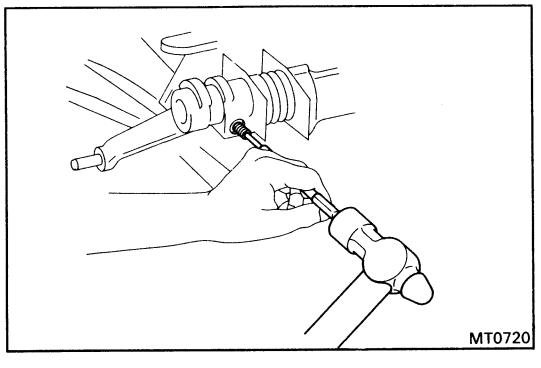


4. REMOVE SELECTING BELLCRANK ASSEMBLY

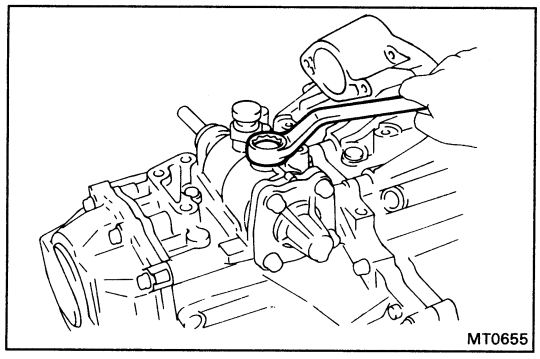


5. REMOVE SHIFT LEVER

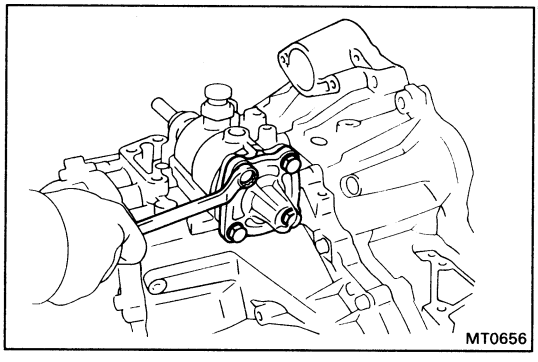
(a) Remove the shift lever set nut.



(b) Using a pin punch and hammer, tap out the lock pin.

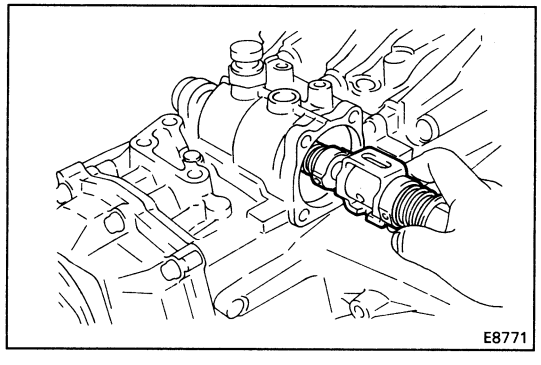


6. REMOVE LOCK BOLT

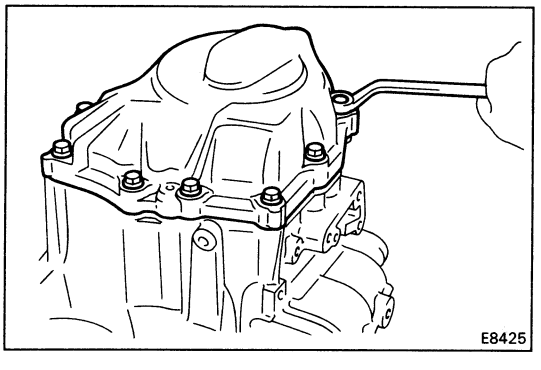


7. REMOVE CONTROL SHAFT COVER

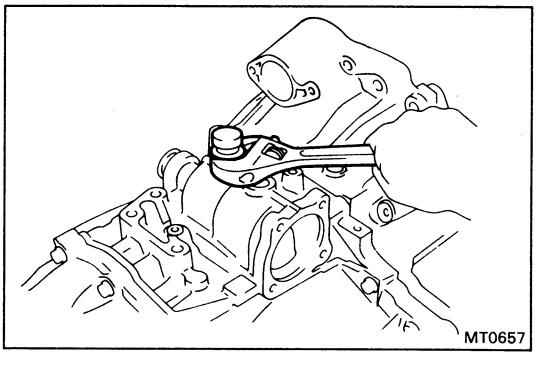
Remove the bolts holding the control shaft cover.



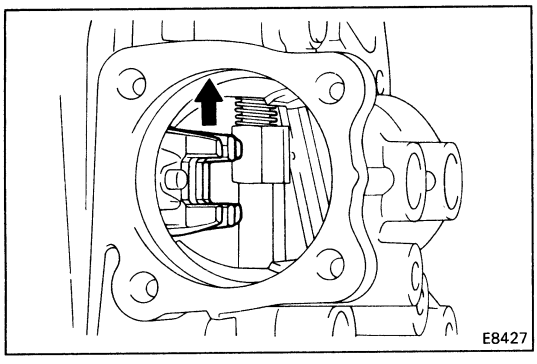
8. REMOVE SHIFT AND SELECT LEVER SHAFT ASSEMBLY



9. REMOVE TRANSMISSION CASE COVER



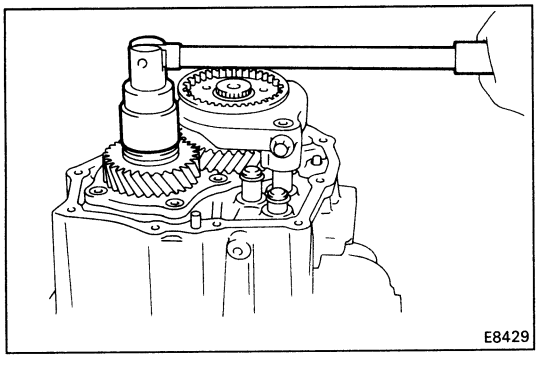
10. REMOVE BREATHER PLUG WITH GASKET



11. REMOVE LOCK NUT

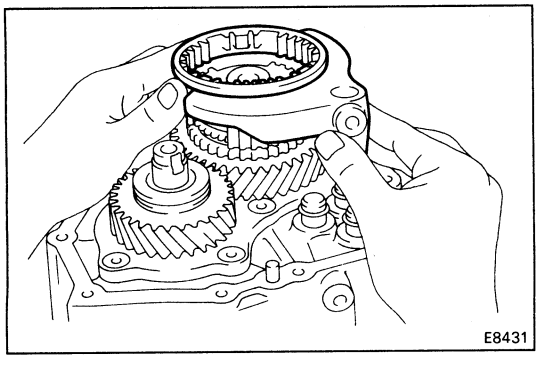
(a) Unstake the lock nut.

(b) Engage the gear double meshing.



(c) Remove the lock nut.

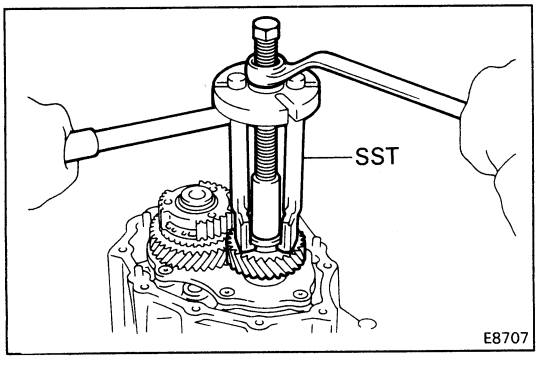
(d) Disengage the gear double meshing.



12. REMOVE NO. 3 HUB SLEEVE AND NO. 3 SHIFT FORK

(a) Remove the No. 3 shift fork set bolt.

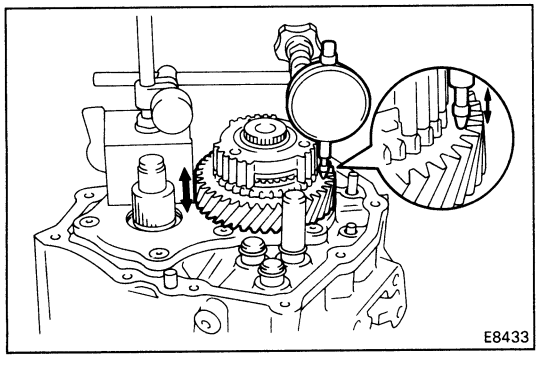
(b) Remove the No. 3 hub sleeve and No. 3 shift fork.



13. REMOVE FIFTH DRIVEN GEAR

Using SST, remove the 5th driven gear.

SST 09310-17010 (09310-07010, 09310-07020, 09310-07040, 09310-07050)

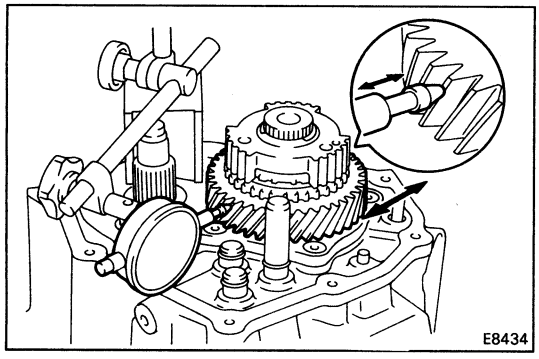


14. MEASURE FIFTH GEAR THRUST CLEARANCE AND OIL CLEARANCE

(a) Using a dial indicator, measure the thrust clearance.

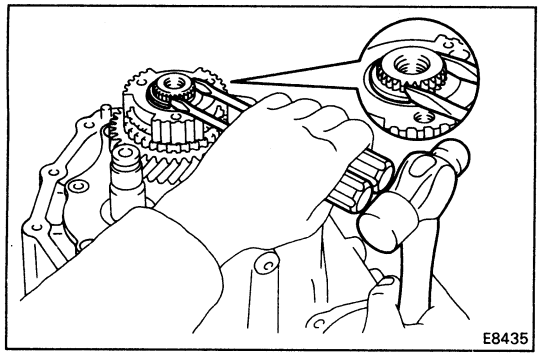
Standard clearance: 0.10 – 0.57 mm (0.0039 – 0.0224 in.)

Maximum clearance: 0.65 mm (0.0256 in.)



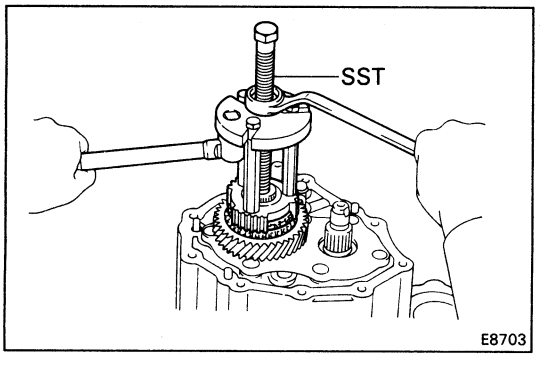
(b) Using a dial indicator, measure the oil clearance.

Standard clearance: **0.009 – 0.050 mm (0.0004 – 0.0020 in.)**
Maximum clearance: **0.070 mm (0.0028 in.)**



15. REMOVE NO. 3 CLUTCH HUB AND FIFTH GEAR

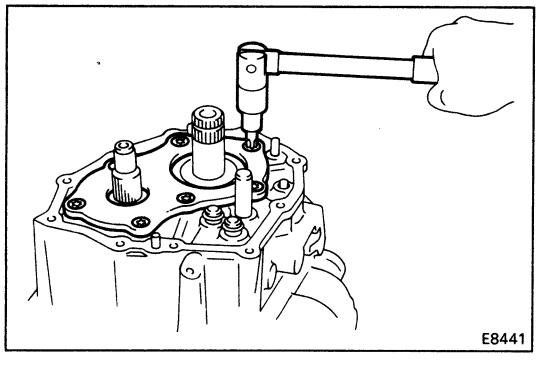
(a) Using two screwdrivers and a hammer, tap out the snap ring.



(b) Using SST, remove the No. 3 clutch hub with synchronizer ring and 5th gear.

SST 09310-17010 (09310-07010, 09310-07020, 09310-07040, 09310-07050)

16. REMOVE NEEDLE ROLLER BEARING AND SPACER

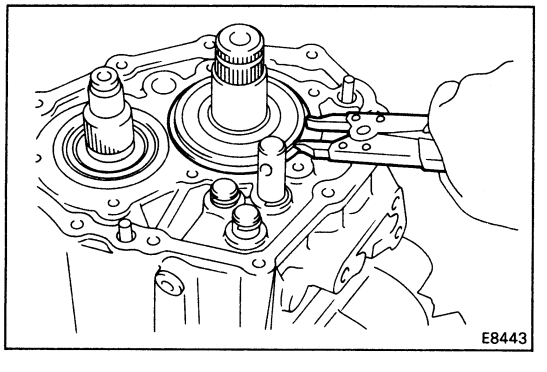


17. REMOVE REAR BEARING RETAINER

(a) Using a torx socket wrench, remove the seven torx screws and bearing retainer.

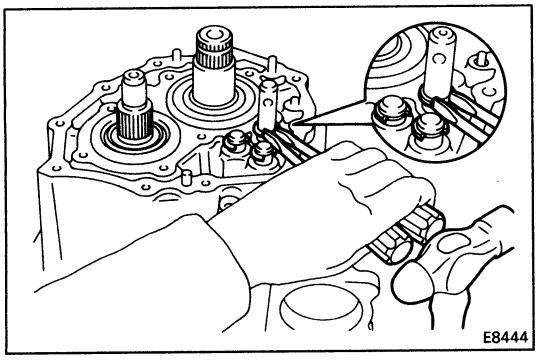
Torx wrench T45 09042-00050

(b) Remove the adjust shim.

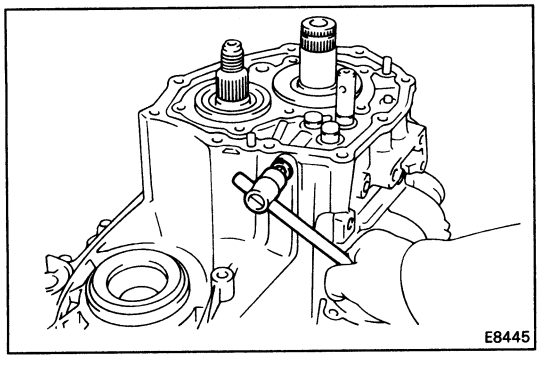


18. REMOVE SNAP RING

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



(b) Using two screwdrivers and a hammer, remove the three snap rings.

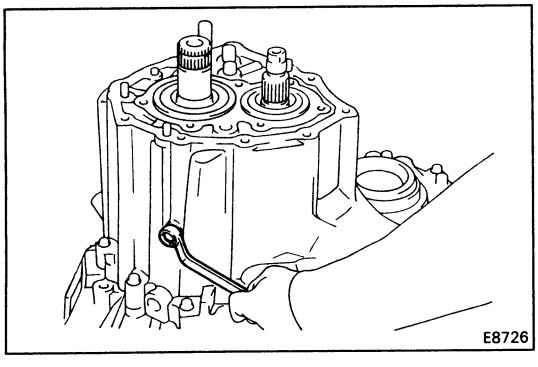


19. REMOVE PLUG, SEAT, SPRING AND LOCKING BALL

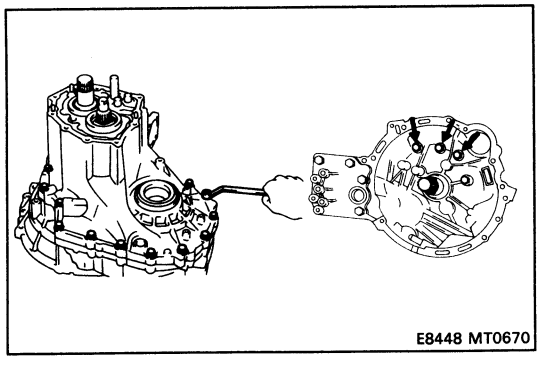
(a) Using SST, remove the plug.

SST 09313-30021

(b) Using a magnetic finger, remove the seat, spring and locking ball.



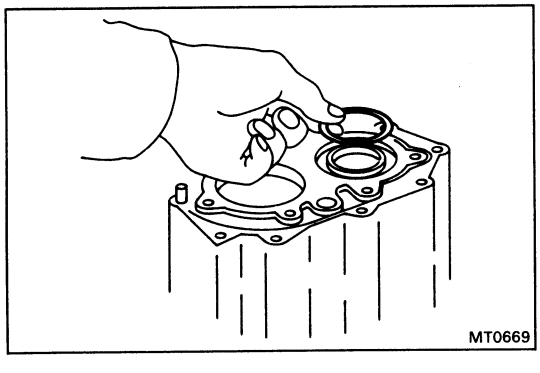
20. REMOVE REVERSE IDLER GEAR SHAFT RETAINING BOLT



21. REMOVE TRANSMISSION CASE

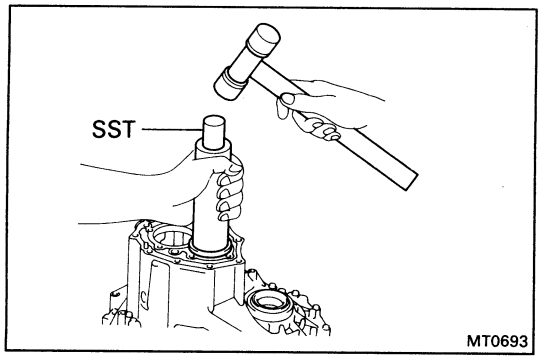
Remove the seventeen bolts and tap off the case with a plastic hammer.

Transmission case side:	fourteen bolts
Transaxle case side:	three bolts



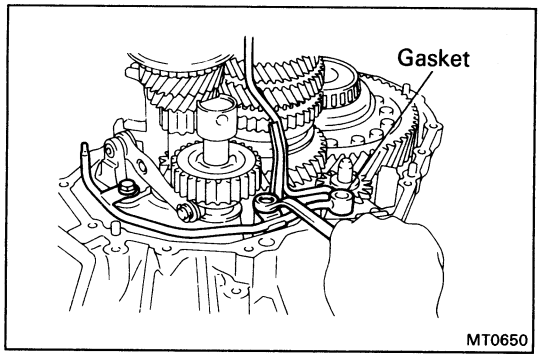
22. REMOVE OUTPUT SHAFT REAR TAPERED ROLLER BEARING OUTER RACE

(a) Remove the shim.



(b) Using SST and a hammer, remove the output shaft rear tapered roller bearing outer race.

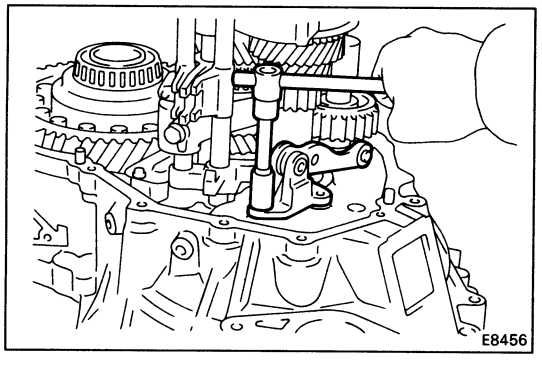
SST 09316-60010 (09316-00010)



23. REMOVE NO. 2 OIL PIPE

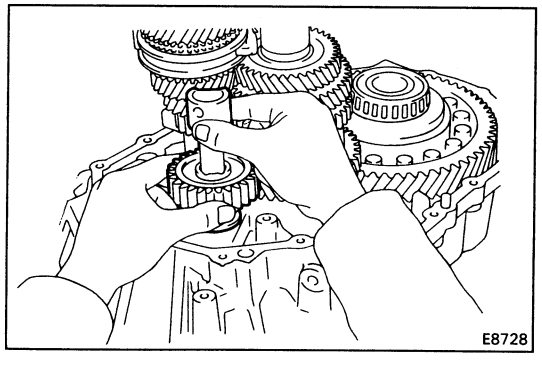
(a) Remove the gasket.

(b) Remove the two bolts and oil pipe.



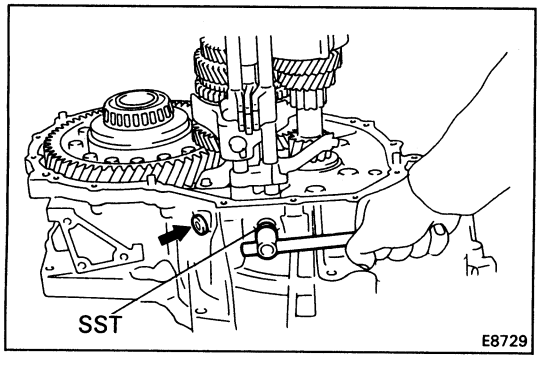
24. REMOVE REVERSE SHIFT ARM BRACKET

Remove the bolt and pull off the bracket.



25. REMOVE REVERSE IDLER GEAR AND SHIFT

Pull out the shift, remove the reverse idler gear.

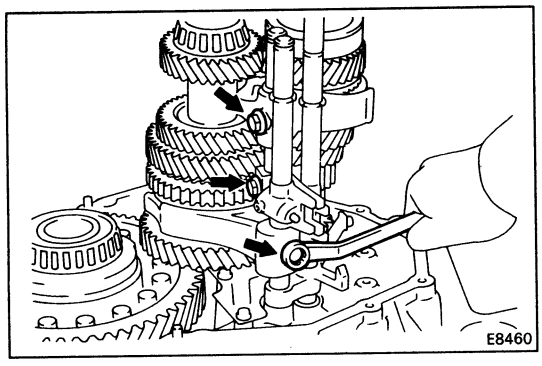


26. REMOVE STRAIGHT SCREW, LOCKING BALLS AND SPRINGS

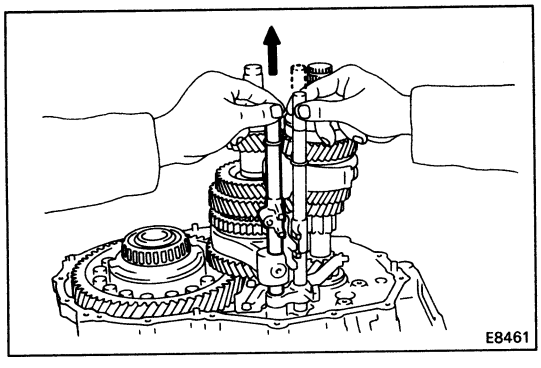
(a) Using SST, remove the two plugs.

SST 09313-30021

(b) Using a magnetic finger, remove the two spring seats, springs and balls.

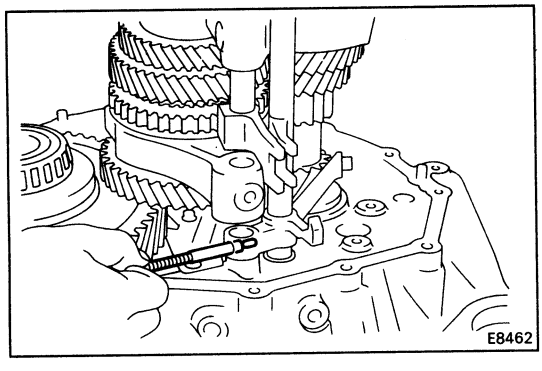


27. REMOVE THREE SET BOLTS



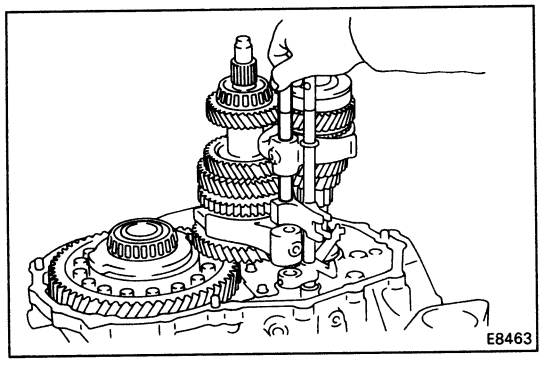
28. REMOVE NO. 1 SHIFT FORK SHAFT

Pull up No. 3 shift fork shaft, remove the No. 1 shift fork shaft.



29. REMOVE INTERLOCK ROLLER

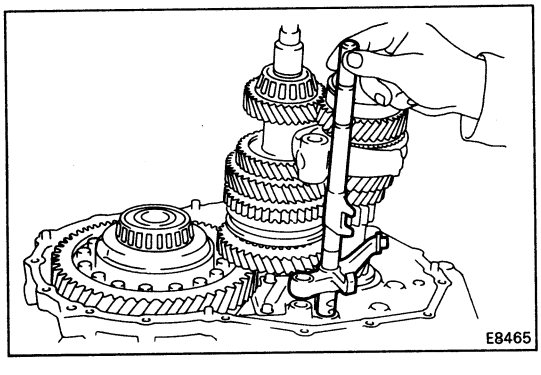
Using a magnetic finger, remove the interlock roller from the reverse shift fork.



30. REMOVE NO. 2 SHIFT FORK SHAFT, SHIFT HEAD AND NO. 1 SHIFT FORK

(a) Pull out the No. 2 shift fork shaft.

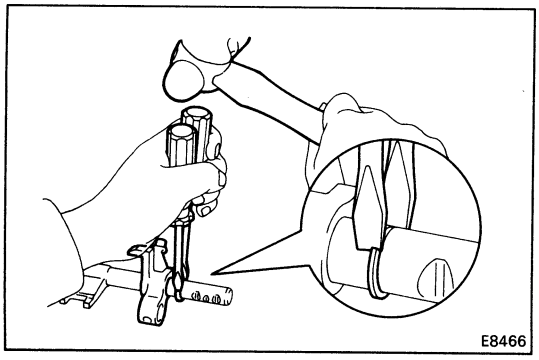
(b) Remove the shift head and No. 1 shift fork.



31. REMOVE NO. 3 SHIFT FORK SHAFT WITH REVERSE SHIFT FORK AND NO. 2 SHIFT FORK

(a) Pull out the No. 3 shift fork shaft with reverse shift fork.

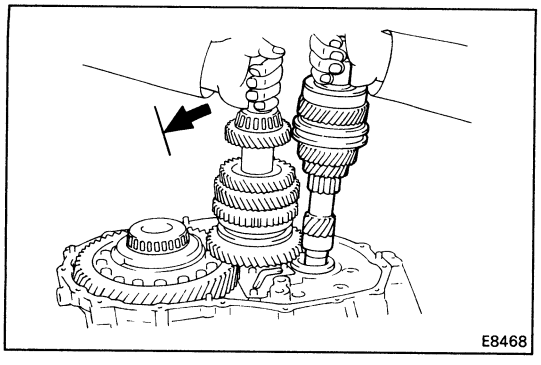
(b) Remove the No. 2 shift fork.



32. REMOVE SNAP RINGS

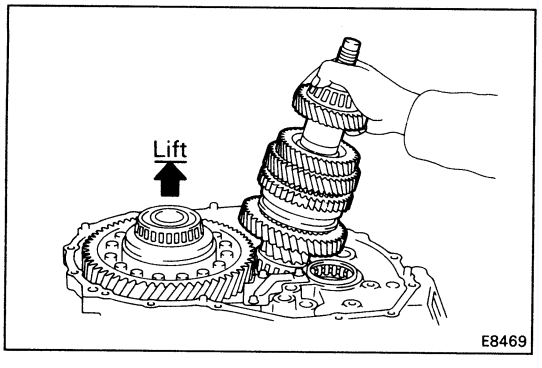
(a) Using two screwdrivers and a hammer, remove the snap ring and reverse shift fork from the No. 3 shift fork shaft.

(b) Using two screwdrivers and a hammer, remove the snap ring from the No. 1, No. 2 and No. 3 shift fork shafts.

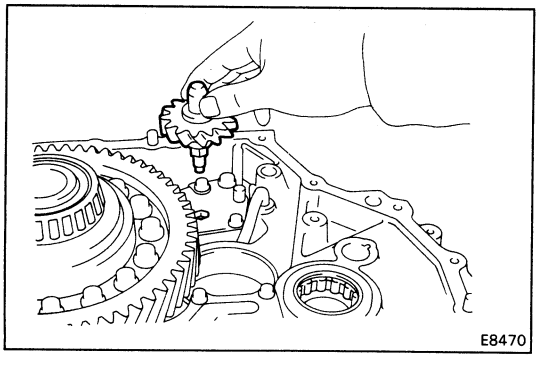


33. REMOVE INPUT AND OUTPUT SHAFT ASSEMBLY

(a) Leaning the output shaft to the differential side, remove the input shaft assembly.

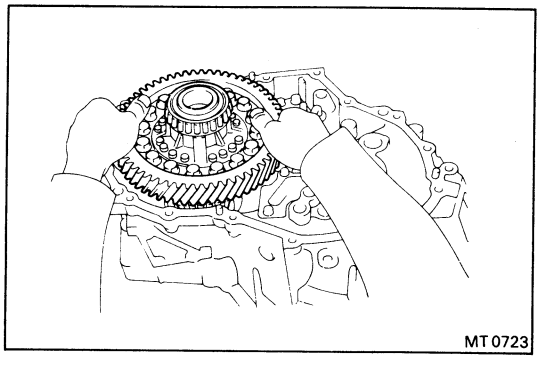


(b) Lift up the differential case assembly, remove the output shaft.

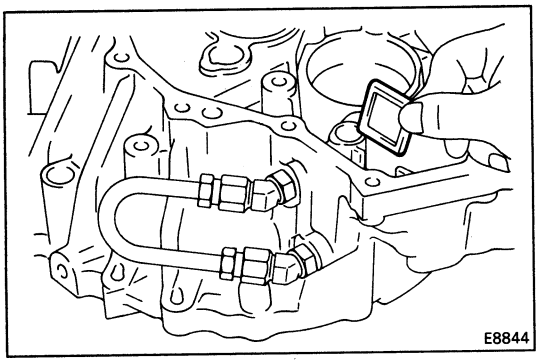


34. REMOVE DIFFERENTIAL ASSEMBLY

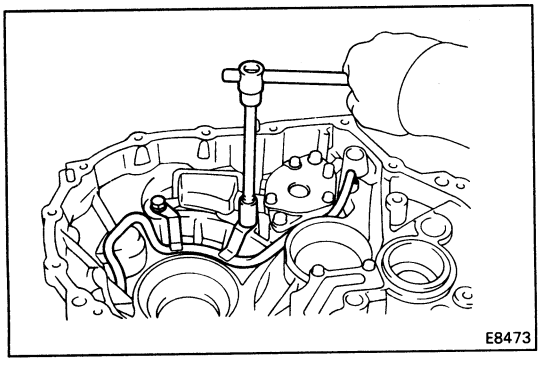
(a) Remove the oil pump drive gear.



(b) Remove the differential case assembly.

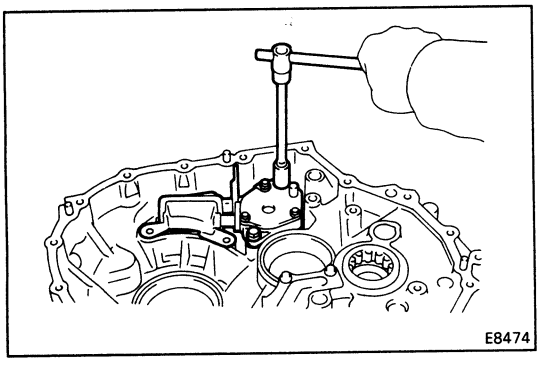


35. REMOVE MAGNET FROM TRANSAXLE CASE



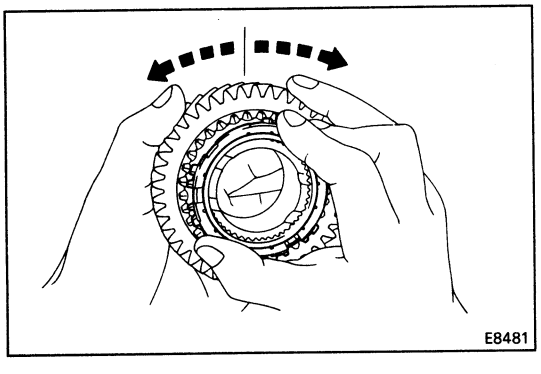
36. REMOVE OIL PUMP ASSEMBLY

(a) Remove the two bolts and oil pipe.



(b) Remove the two bolts and oil pump.

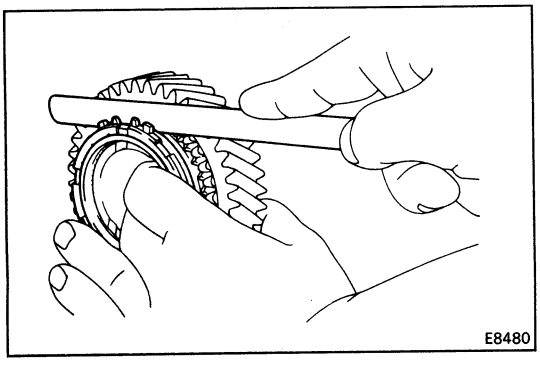
INSPECTION OF COMPONENT PARTS



1. INSPECT SYNCHRONIZER RING FOR FIFTH GEAR

(a) Check for wear or damage.

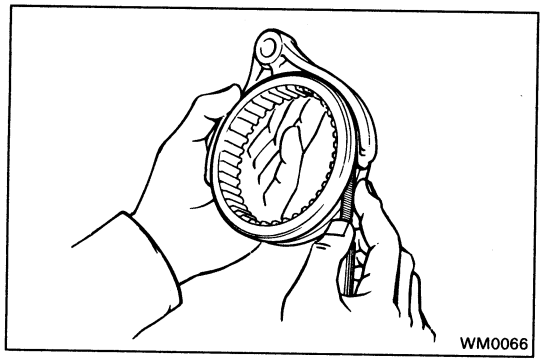
(b) Turn the ring and push it in to check the braking action.



(c) Measure the clearance between the synchronizer ring back and the gear spline end.

Minimum clearance: 0.6 mm (0.024 in.)

If the clearance is less than the limit, replace the synchronizer ring.

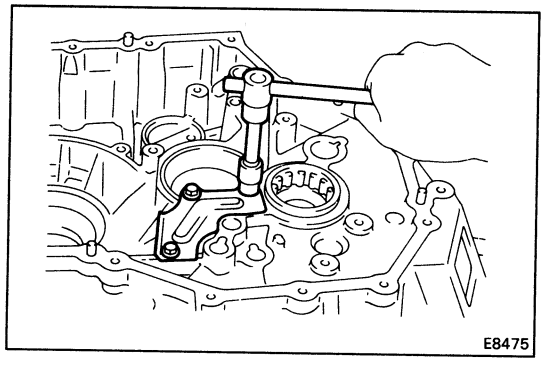


2. MEASURE CLEARANCE OF SHIFT FORKS AND HUB SLEEVE

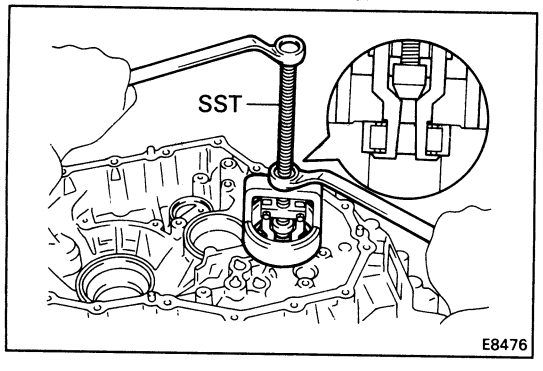
Using a feeler gauge, measure the clearance between the hub sleeve and shift fork.

Maximum clearance: 1.0 mm (0.039 in.)

If the clearance exceeds the limit, replace the shift fork or hub sleeve.



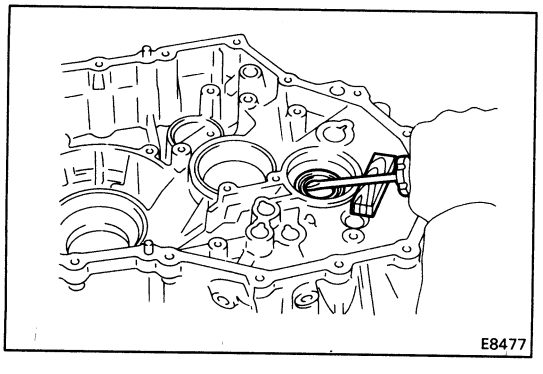
3. REMOVE TRANSAXLE CASE RECEIVER



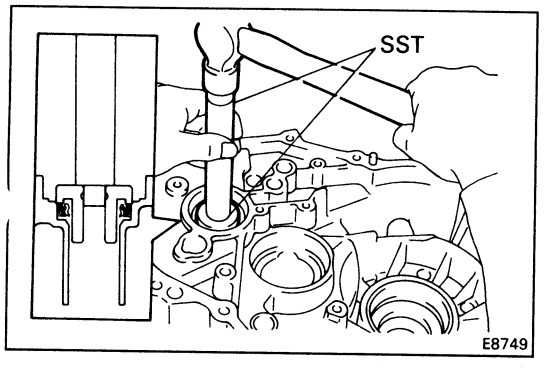
4. IF NECESSARY, REPLACE INPUT SHAFT BEARING AND OIL SEAL

(a) Using SST, pull out the bearing.

SST 09612-65014 (09612-01060)



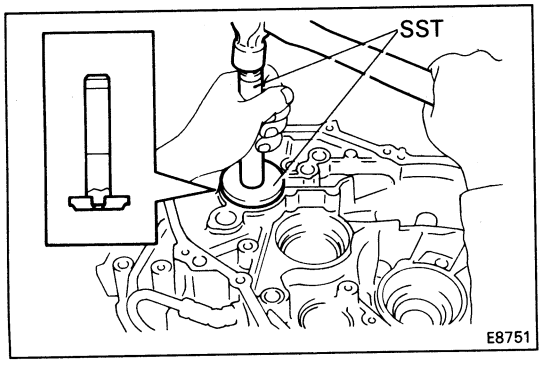
(b) Using a screwdriver, remove the oil seal.



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

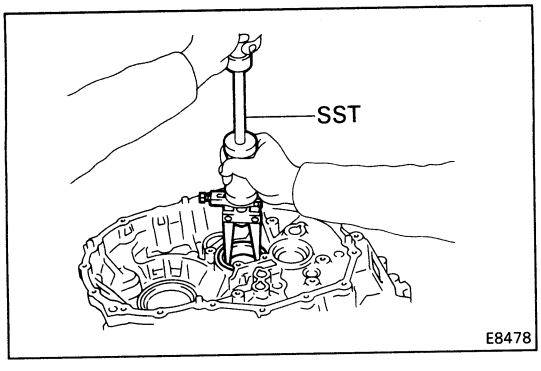
SST 09608-12010 (09608-00020, 09608-00080)

(d) Coat the lip of seal with MP grease.



(e) Using SST, drive in a new bearing.

SST 09608-12010 (09608-00020, 09608-00060)

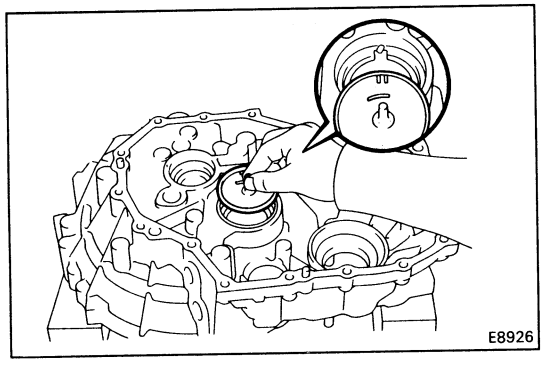


5. IF NECESSARY, REPLACE OUTPUT SHAFT FRONT OUTER RACE AND OUTPUT SHAFT COVER

(a) Using SST, pull out the outer race.

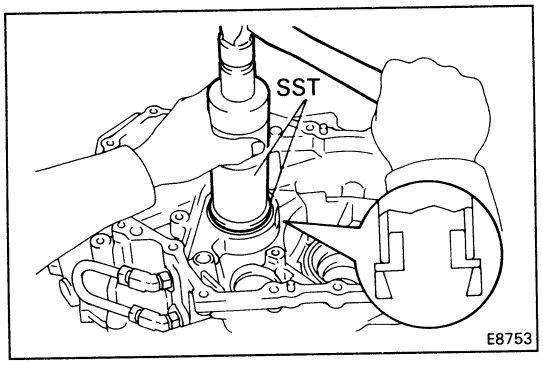
SST 09308-00010

(b) Remove the output shaft cover.



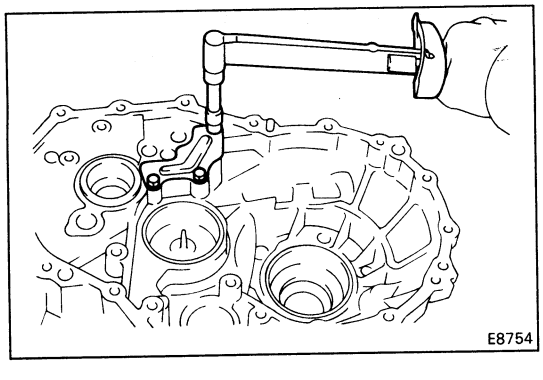
(c) Install the output shaft front cover.

HINT: Install the shaft cover projection into the case side groove.



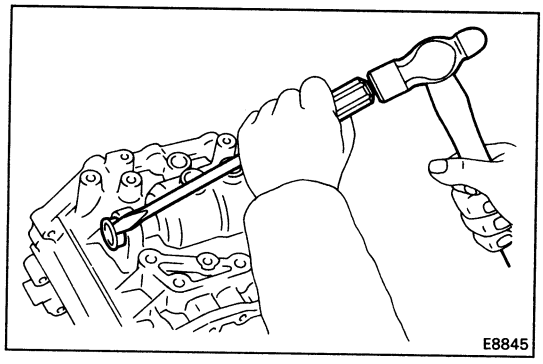
(d) Using SST, press in a new outer race.

SST 09316-60010 (09316-00010, 09316-00020)



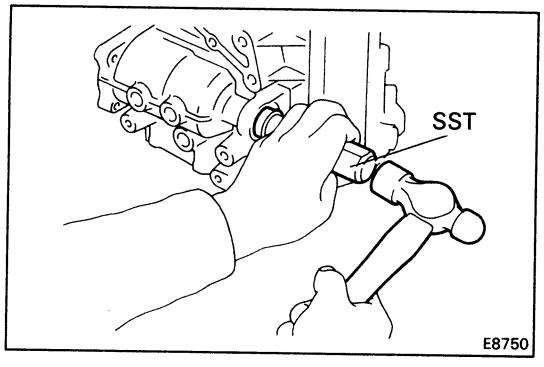
6. INSTALL AND TORQUE TRANSAXLE CASE RECEIVER

Torque: 75 kg-cm (65 in.-lb. 7.4 N·m)



7. IF NECESSARY, REPLACE SHIFT CONTROL SHAFT OIL SEAL

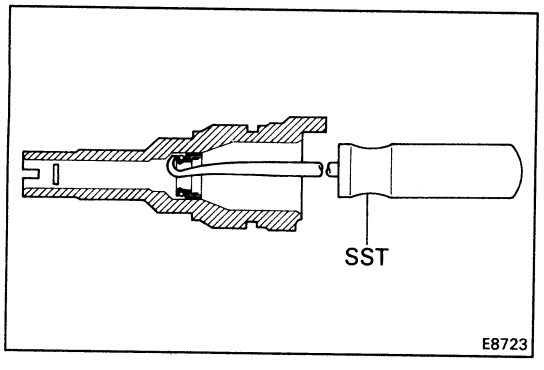
(a) Using a screwdriver and hammer, remove the oil seal.



(b) Using SST, drive in the new oil seal until it touches the bottom.

SST 09517-36010

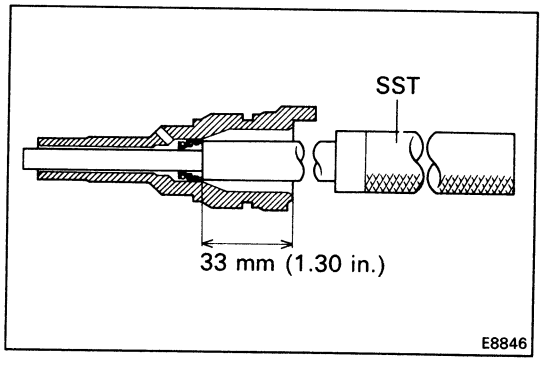
(c) Coat the lip of oil seal with MP grease.



8. IF NECESSARY, REPLACE SPEEDOMETER DRIVEN GEAR OIL SEAL

(a) Using SST, pull out the oil seal.

SST 09921-00010

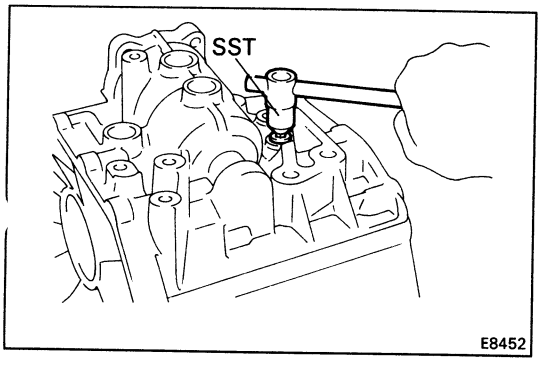


(b) Using SST, drive in a new oil seal.

SST 09201-60011

Drive in depth: 33 mm (1.30 in.)

(c) Coat the lip of oil seal with MP grease.

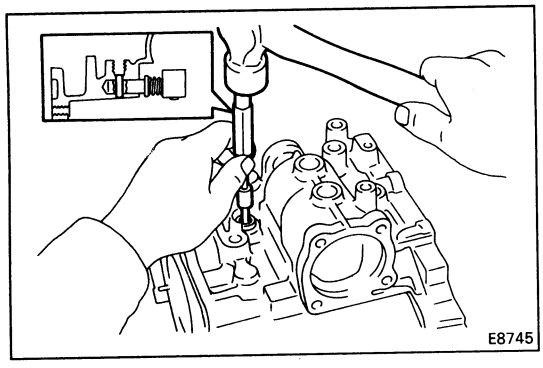


9. IF NECESSARY, REPLACE REVERSE RESTRICT PIN

(a) Using SST, remove the screw plug.

SST 09313-30021

(b) Using a pin punch and hammer, drive out the slotted spring pin.



(c) Replace the reverse restrict pin.

(d) Using a pin punch and hammer, drive in the slotted spring pin.

(e) Apply liquid sealant to the plug threads.

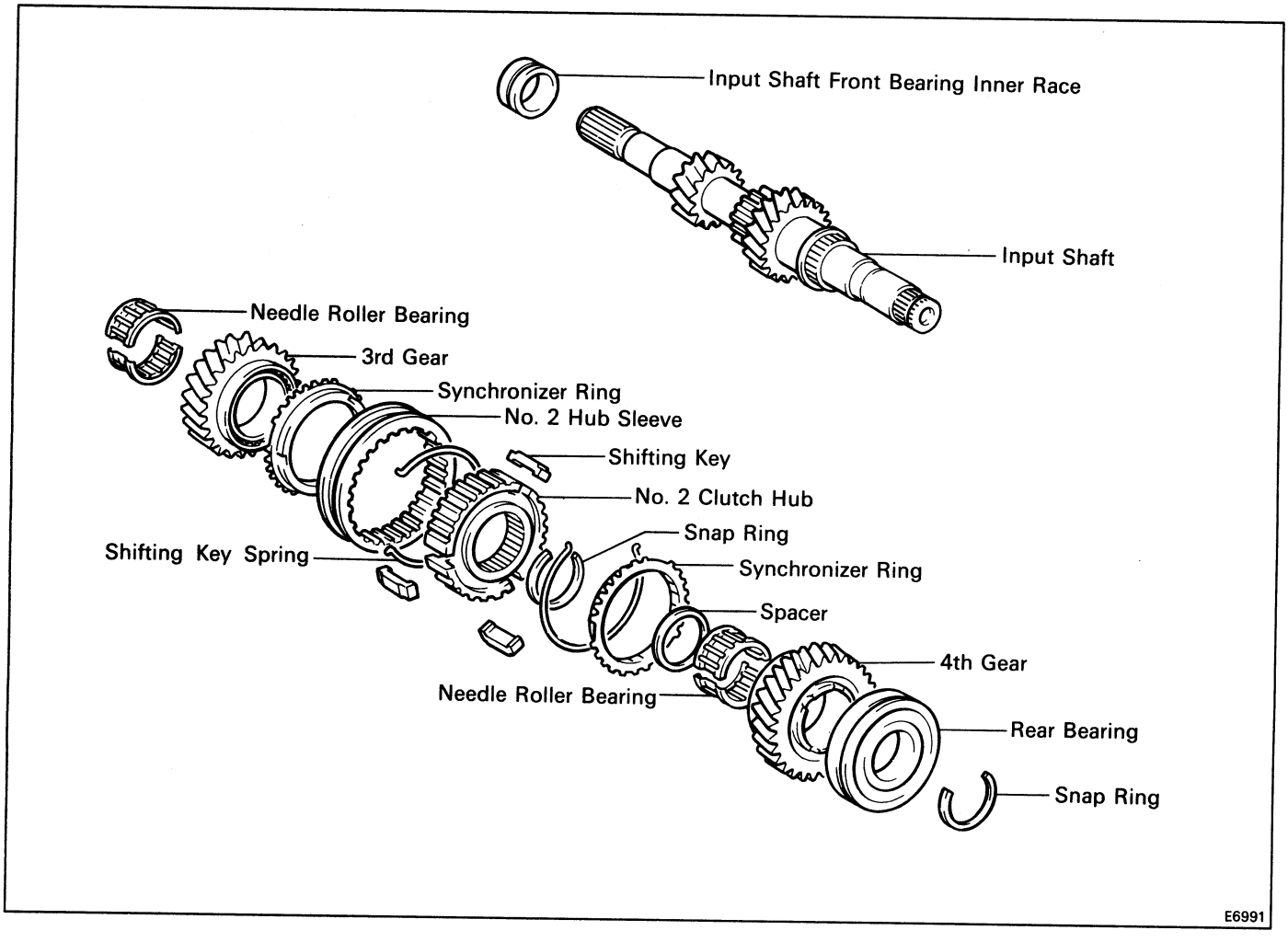
Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

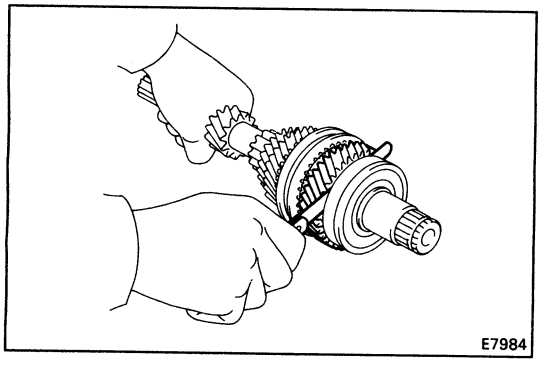
(f) Using SST, install the screw plug.

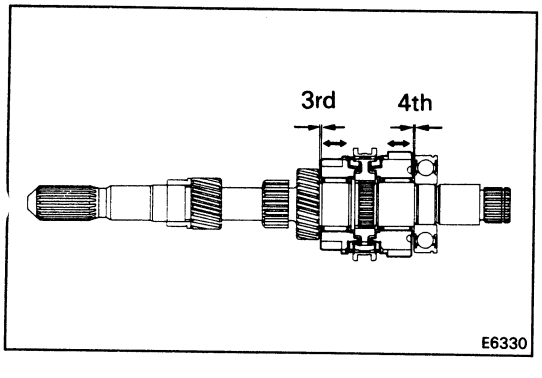
SST 09313-30021

COMPONENT PARTS

Input Shaft Assembly







DISASSEMBLY OF INPUT SHAFT ASSEMBLY

1. MEASURE THIRD AND FOURTH GEAR THRUST CLEARANCE

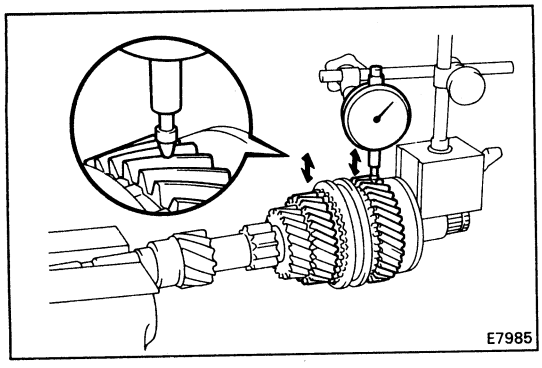
Using a feeler gauge, measure the thrust clearance.

Standard clearance:

3rd gear	**0.10 – 0.35 mm (0.0039 – 0.0138 in.)**
4th gear	**0.10 – 0.55 mm (0.0039 – 0.0217 in.)**

Maximum clearance:

3rd gear	**0.40 mm (0.0157 in.)**
4th gear	**0.60 mm (0.0236 in.)**



2. CHECK OIL CLEARANCE OF THIRD AND FOURTH GEAR

Using dial indicator, measure the oil clearance between the gear and shaft.

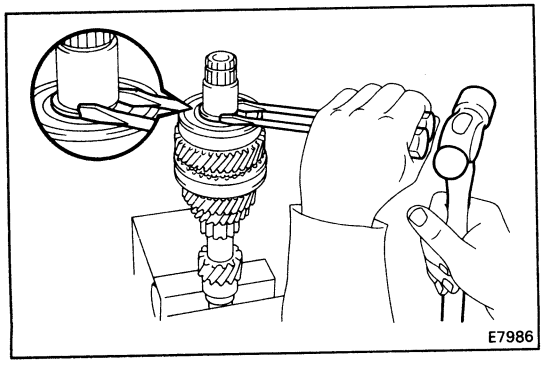
Standard clearance:

3rd gear	**0.009 – 0.053 mm (0.0004 – 0.0020 in.)**
4th gear	**0.009 – 0.051 mm (0.0004 – 0.0020 in.)**

Maximum clearance:

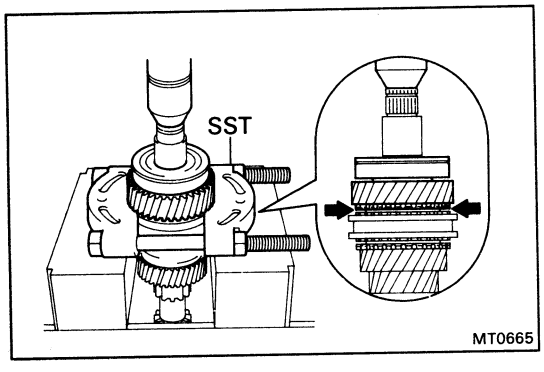
3rd and 4th gear 0.070 mm (0.0028 in.)

If clearance exceeds the limit, replace the gear, needle roller bearing or shaft.



3. REMOVE SNAP RING

Using two screwdrivers and a hammer, tap out the snap ring

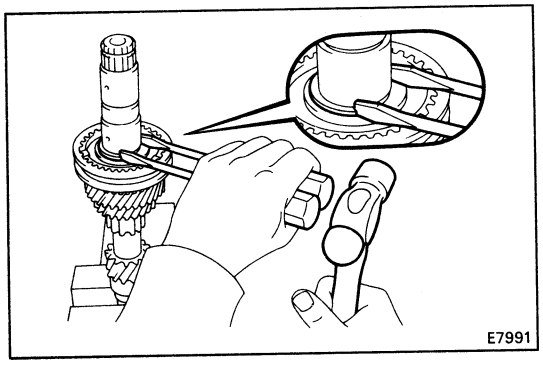


4. REMOVE RADIAL BALL BEARING AND FOURTH GEAR

Using SST and a press, remove the radial ball bearing.

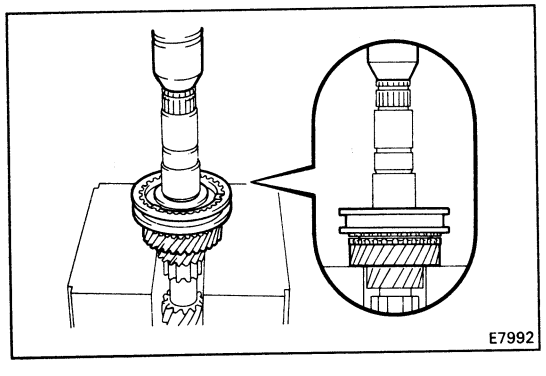
SST 09950-00020

5. REMOVE NEEDLE ROLLER BEARINGS, SPACER AND SYNCHRONIZER RING



6. REMOVE SNAP RING

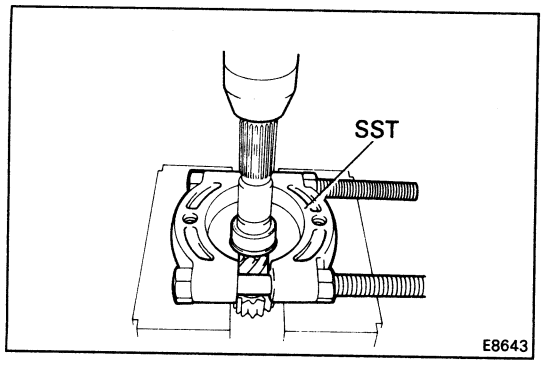
Using two screwdrivers and a hammer, tap out the snap ring.



7. REMOVE NO. 2 CLUTCH HUB ASSEMBLY, SYNCHRONIZER RING AND THIRD GEAR

Using a press, remove No. 2 hub sleeve, 3rd gear, synchronizer ring and needle roller bearings.

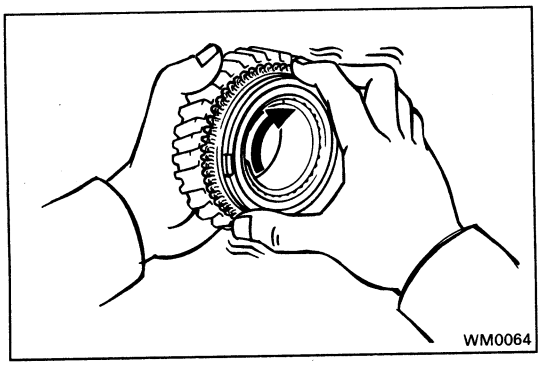
8. REMOVE NEEDLE ROLLER BEARING



9. REMOVE INPUT SHAFT FRONT BEARING INNER RACE

Using SST and a press, remove the inner race.

SST 09950-00020

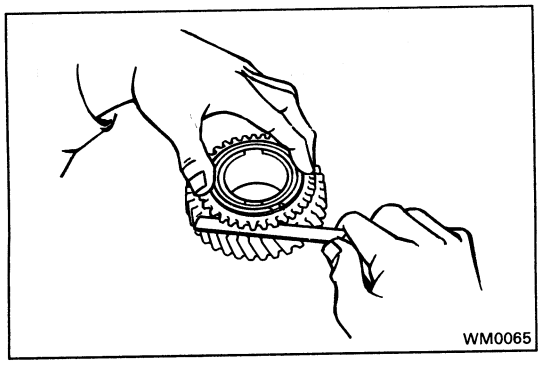


INSPECTION OF INPUT SHAFT COMPONENT PARTS

1. INSPECT SYNCHRONIZER RINGS

(a) Check for wear or damage.

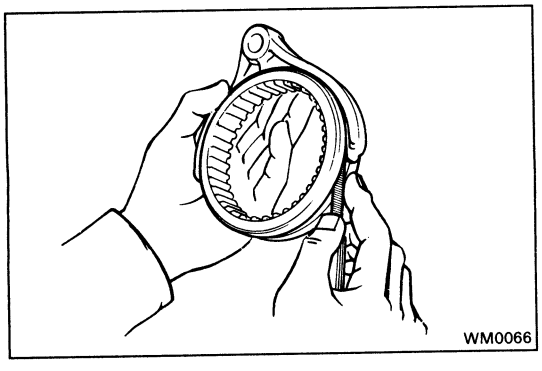
(b) Turn the ring and push it in to check the braking action.



(c) Measure the clearance between the synchronizer ring back and the gear spline end.

Minimum clearance: 0.6 mm (0.024 in.)

If the clearance is less than the limit, replace the synchronizer ring.

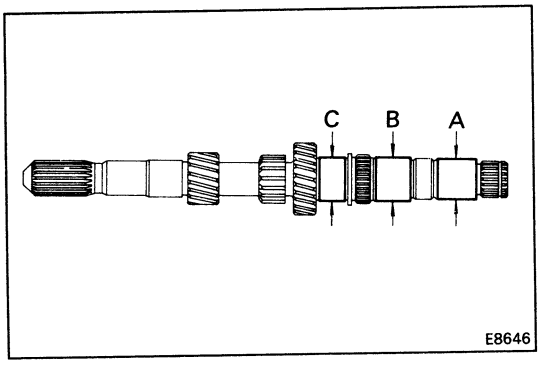


2. MEASURE CLEARANCE OF NO. 2 SHIFT FORK AND HUB SLEEVE

Using a feeler gauge, measure the clearance between the hub sleeve and shift fork.

Maximum clearance: 1.0 mm (0.039 in.)

If the clearance exceeds the limit, replace the shift fork or hub sleeve.



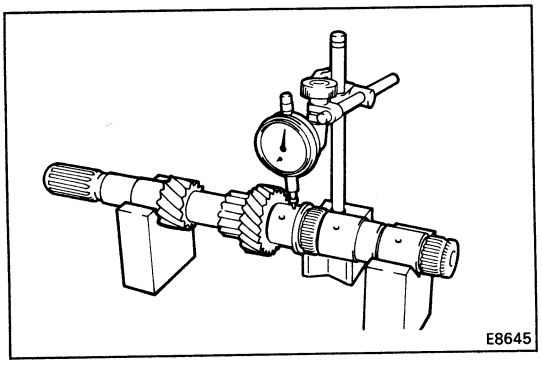
3. INSPECT INPUT SHAFT

(a) Check the input shaft for wear or damage.

(b) Using a micrometer measure the outer diameter of the input shaft journal surface.

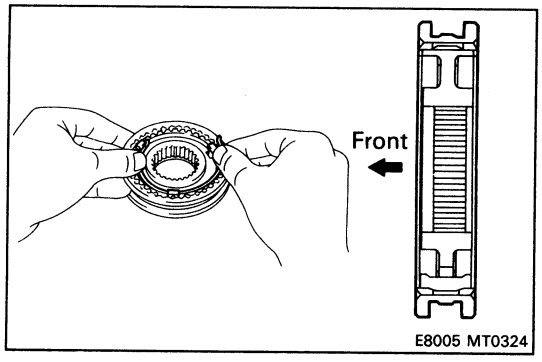
Minimum outer diameter:

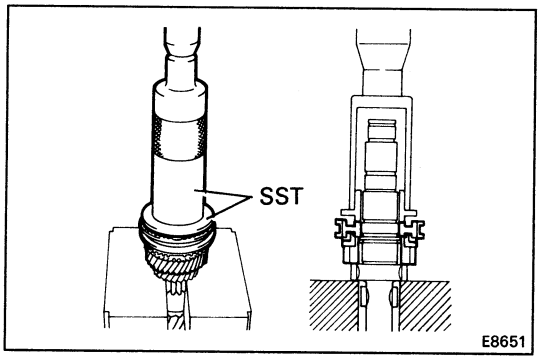
Part A	**32.930 mm (1.2965 in.)**
B and C	**35.950 mm (1.4154 in.)**

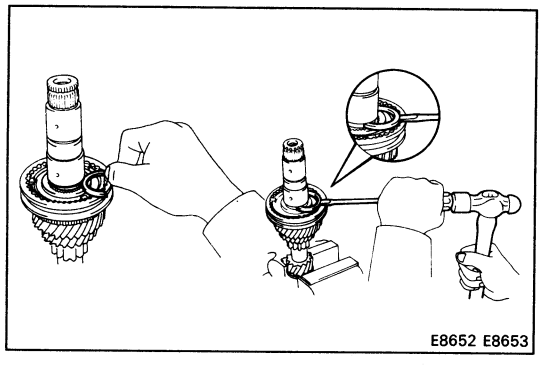


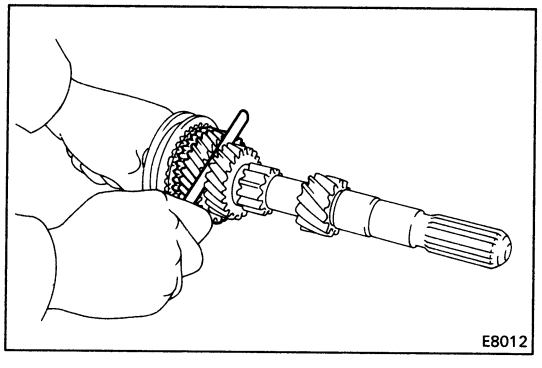
(c) Using a dial indicator, check the shaft runout.

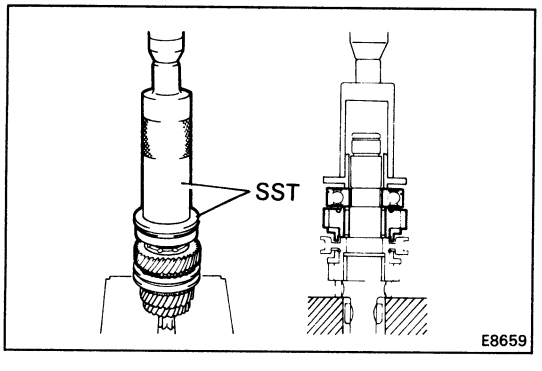
Maximum runout: 0.05 mm (0.0020 in.)











ASSEMBLY OF INPUT SHAFT ASSEMBLY

(See page MT-73)

HINT: Coat all of the sliding and rotating surface with gear oil before assembly.

1. INSERT NO. 2 CLUTCH HUB INTO 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 shifting key springs positioned so that their end gaps are not in line.

2. INSTALL NEEDLE ROLLER BEARING, THIRD GEAR, SYNCHRONIZER RING AND NO. 2 HUB SLEEVE ASSEMBLY TO INPUT SHIFT

(a) Apply MP grease to the needle roller bearings.

(b) Install the 3rd gear.

(c) Place the synchronizer ring on the gear and align the ring slots with the shifting keys.

(d) Using SST and a press, install the 3rd gear and No. 2 hub sleeve.

SST 09316-60010 (09316-00010, 09316-00050)

3. INSTALL SNAP RING

Select a snap ring that will allow minimum axial play and install it on the shaft.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
H	2.30 (0.0906)	M	2.50 (0.0984)
J	2.35 (0.0925)	N	2.55 (0.1004)
K	2.40 (0.0945)	P	2.60 (0.1024)
L	2.45 (0.0965)		

4. MEASURE THIRD GEAR THRUST CLEARANCE

Using a feeler gauge, measure the 3rd gear thrust clearance.

Standard clearance: 0.10 – 0.35 mm (0.0039 – 0.0138 in.)

5. INSTALL SPACER, SYNCHRONIZER RING, NEEDLE ROLLER BEARINGS, FOURTH GEAR AND RADIAL BALL BEARING

(a) Install the spacer.

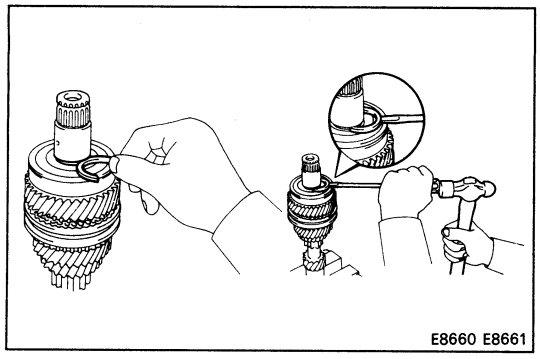
(b) Apply MP grease to the needle roller bearings.

(c) Place the synchronizer ring on the gear and align the ring slots with the shifting keys.

(d) Install the 4th gear.

(e) Using SST and a press, install the radial ball bearing.

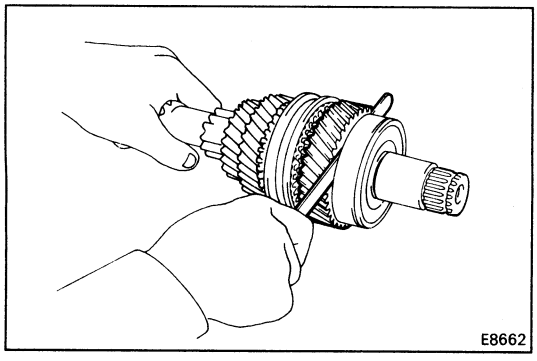
SST 09316-60010 (09316-00010, 09316-00020)


E8660 E8661

6. INSTALL SNAP RING

Select a snap ring that will allow minimum axial play and install it on the shaft.

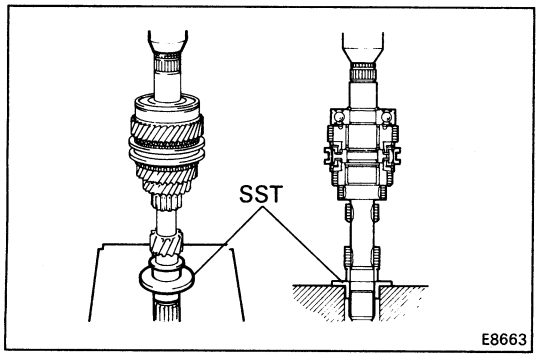
Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
1	2.35 (0.0925)	5	2.55 (0.1004)
2	2.40 (0.0945)	6	2.60 (0.1024)
3	2.45 (0.0965)	7	2.65 (0.1043)
4	2.50 (0.0984)	8	2.70 (0.1063)


E8662

7. MEASURE FOURTH GEAR THRUST CLEARANCE

Using a feeler gauge, measure the 4th gear thrust clearance.

Standard clearance: 0.10 – 0.55 mm (0.0039 – 0.0217 in.)



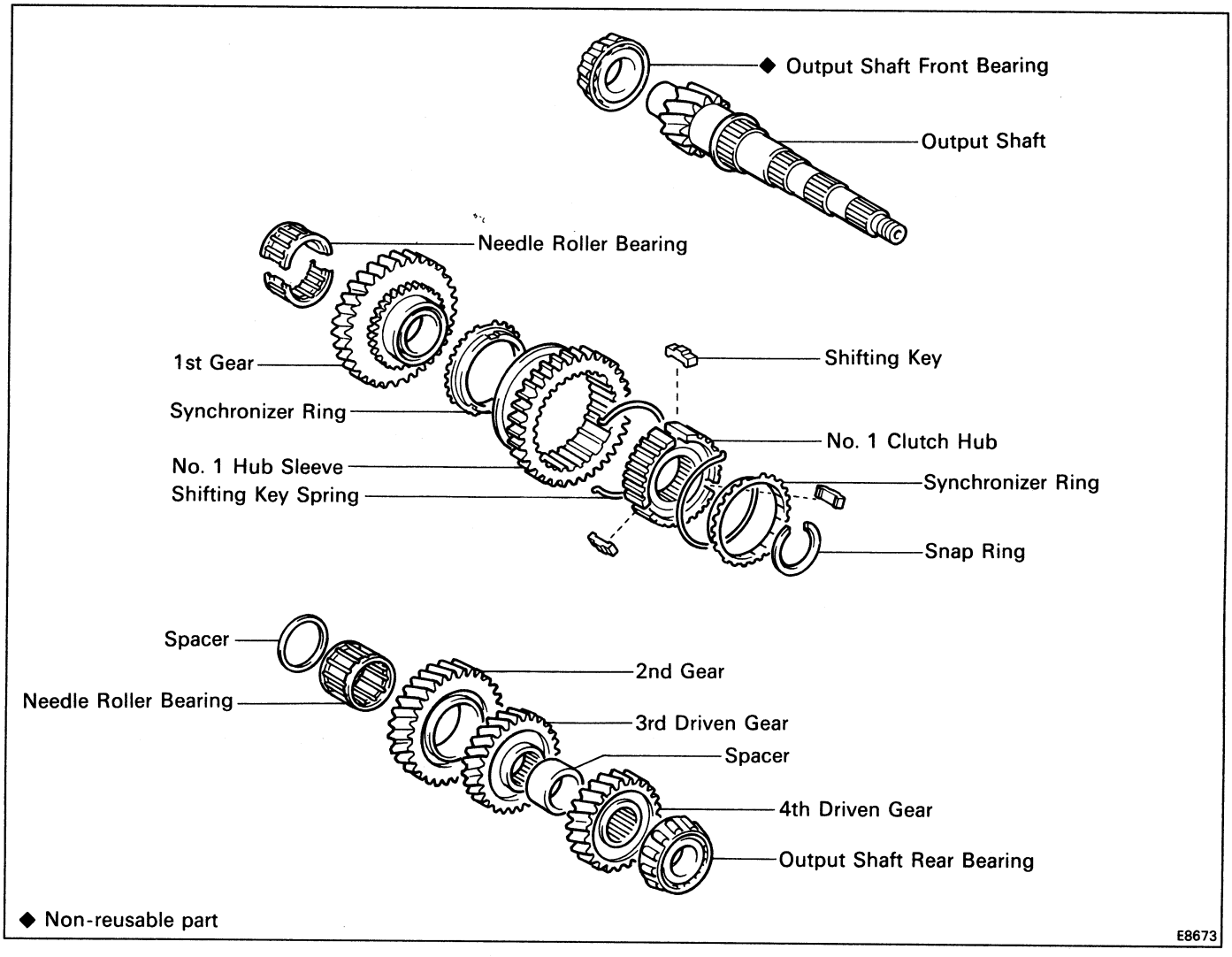
E8663

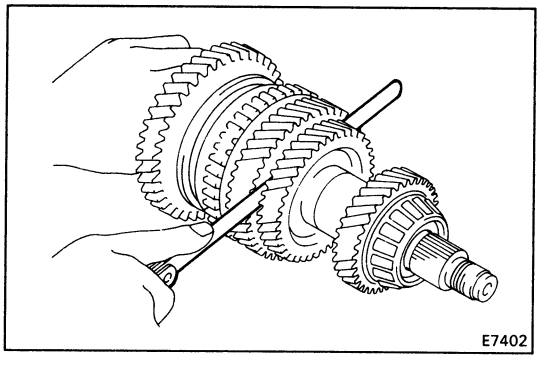
8. INSTALL INPUT SHAFT FRONT BEARING INNER RACE

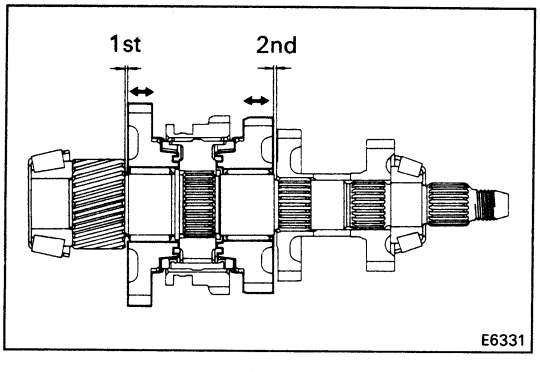
Using SST and a press, install the input shaft front bearing inner race.

SST 09316-60010 (09316-00020)

Output Shaft Assembly







DISASSEMBLY OF OUTPUT SHAFT ASSEMBLY

1. MEASURE FIRST AND SECOND GEAR THRUST CLEARANCE

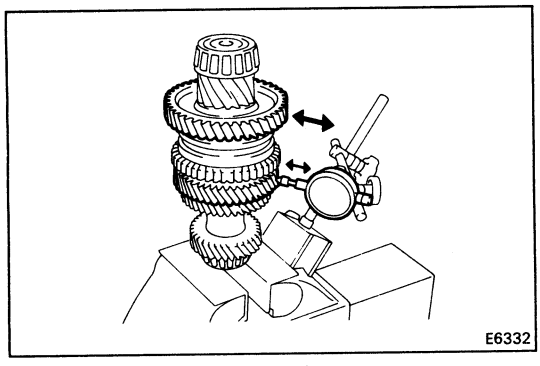
Using a feeler gauge, measure the thrust clearance.

Standard clearance:

1st gear	**0.10 – 0.35 mm (0.0039 – 0.0138 in.)**
2nd gear	**0.10 – 0.45 mm (0.0039 – 0.0177 in.)**

Maximum clearance:

1st gear	**0.40 mm (0.0157 in.)**
2nd gear	**0.50 mm (0.0197 in.)**


E6332

2. CHECK OIL CLEARANCE OF FIRST AND SECOND GEAR

Using dial indicator, measure the oil clearance between the gear and shaft.

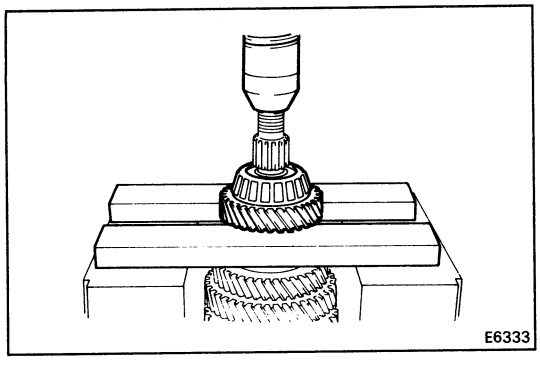
Standard clearance:

1st gear	**0.009 – 0.051 mm (0.0004 – 0.0020 in.)**
2nd gear	**0.009 – 0.053 mm (0.0004 – 0.0020 in.)**

Maximum clearance:

1st and 2nd gear 0.070 mm (0.0028 in.)

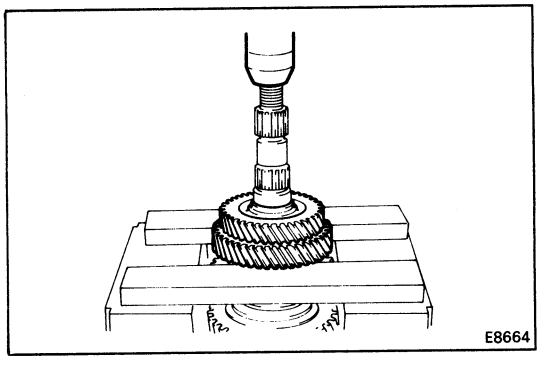
If the clearance exceeds the limit, replace the gear, needle roller bearing or shaft.


E6333

3. REMOVE OUTPUT SHAFT REAR BEARING, FOURTH DRIVEN GEAR AND SPACER

(a) Using a press, remove the bearing and 4th driven gear.

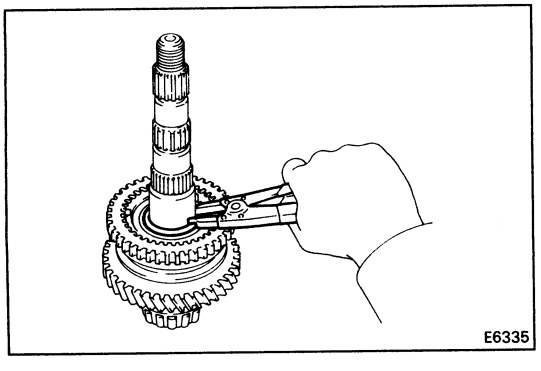
(b) Remove the spacer.


E8664

4. REMOVE THIRD DRIVEN GEAR AND SECOND GEAR

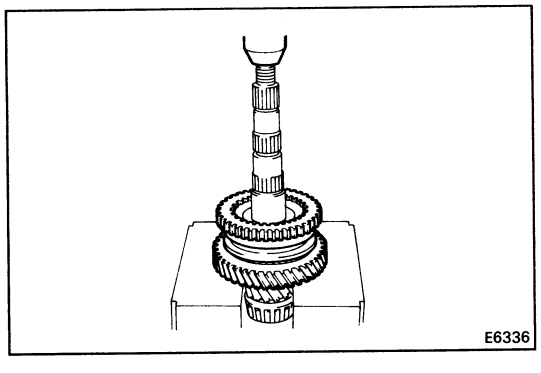
Using a press, remove the 3rd driven gear and 2nd gear.

5. REMOVE NEEDLE ROLLER BEARINGS, SPACER AND SYNCHRONIZER RING


E6335

6. REMOVE SNAP RING

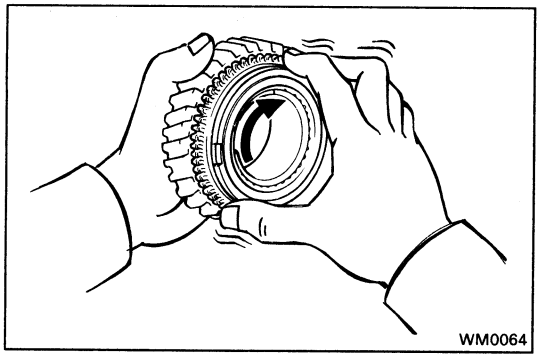
Using snap ring pliers, remove the snap ring.


E6336

7. REMOVE NO. 1 HUB SLEEVE ASSEMBLY AND FIRST GEAR

Using a press, remove No. 1 hub sleeve and 1st gear.

8. REMOVE SYNCHRONIZER RING AND NEEDLE ROLLER BEARING

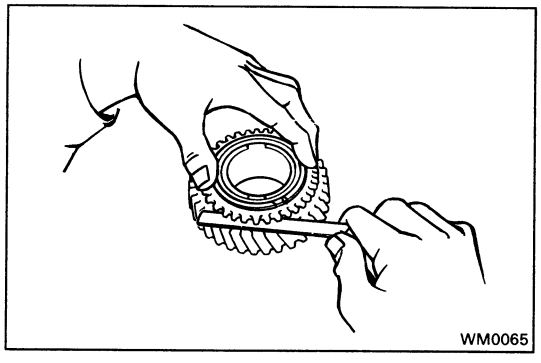


INSPECTION OF OUTPUT SHAFT COMPONENT PARTS

1. INSPECT SYNCHRONIZER RINGS

(a) Check for wear or damage.

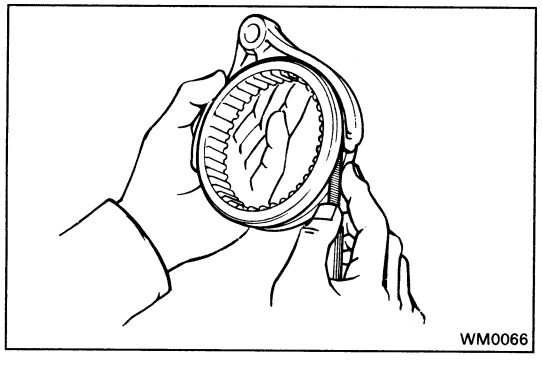
(b) Turn the ring and push it in to check the braking action.



(c) Measure the clearance between the synchronizer ring back and the gear spline end.

Maximum clearance: 0.6 mm (0.024 in.)

If the clearance is less than the limit, replace the synchronizer ring.

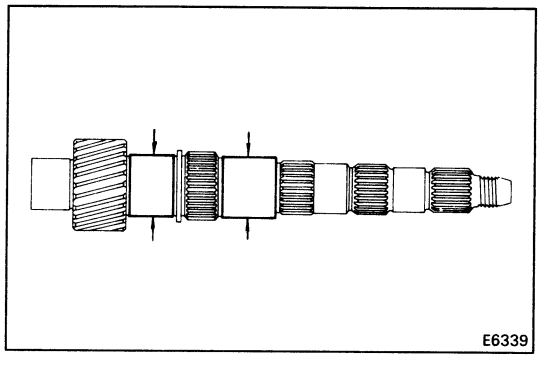


2. MEASURE CLEARANCE OF NO. 1 SHIFT FORK AND HUB SLEEVE

Using a feeler gauge, measure the clearance between the hub sleeve and shift fork.

Maximum clearance: 1.0 mm (0.039 in.)

If the clearance exceeds the limit, replace the shift fork or hub sleeve.

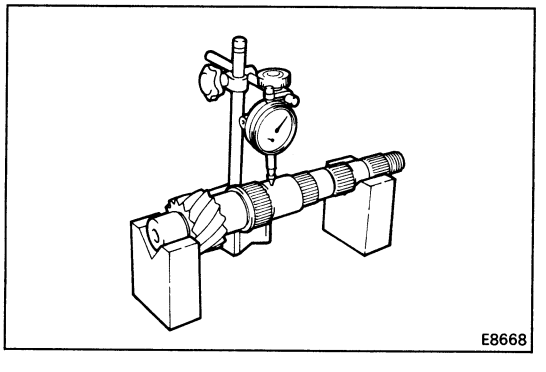


3. INSPECT OUTPUT SHAFT

(a) Check the output shaft for wear or damage.

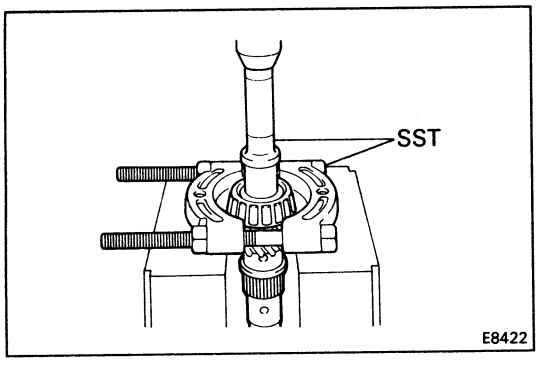
(b) Using a micrometer, measure the outer diameter of the output shaft journal surface.

Minimum outer diameter: 38.950 mm (1.5335 in.)



(c) Using a dial indicator, check the shaft runout.

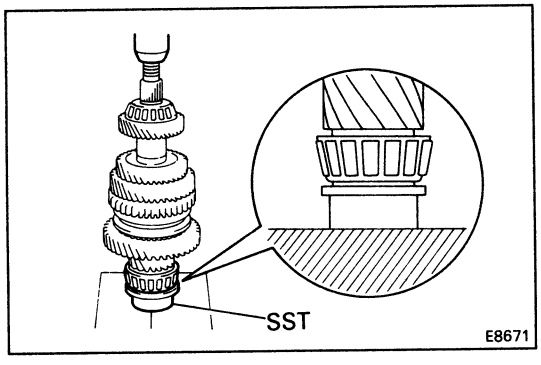
Maximum runout: 0.06 mm (0.0024 in.)



4. IF NECESSARY, REPLACE OUTPUT SHAFT FRONT BEARING

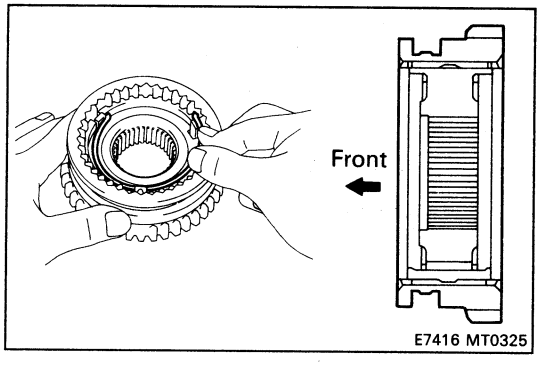
(a) Using SST and a press, remove the bearing.

SST 09307-12010, 09950-00020



(b) Using SST and a press, install the new bearing.

SST 09316-60010 (09316-00070)



ASSEMBLY OF OUTPUT SHAFT ASSEMBLY

(See page MT-79)

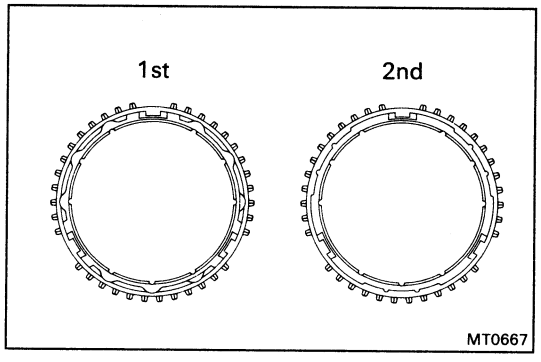
HINT: Coat all of the sliding and rotating surface with gear oil before assembly.

1. INSERT NO. 1 CLUTCH HUB INTO HUB SLEEVE

(a) Install the clutch hub and shifting keys to the hub sleeve.

(b) Install the shifting key springs under the shifting keys.

NOTICE: Install the key springs positioned so that their end gaps are not in line.



2. INSTALL NEEDLE ROLLER BEARING, FIRST GEAR, SYNCHRONIZER RING AND NO. 1 HUB SLEEVE TO OUTPUT SHAFT

(a) Apply MP grease to the needle roller bearings.

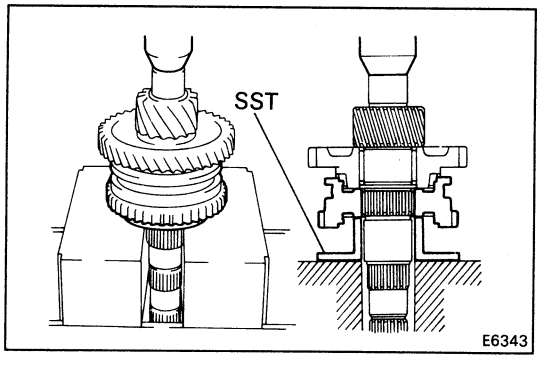
(b) Install the 1st gear.

(c) Place the synchronizer ring on the gear and align the ring slots with the shifting keys.

NOTICE: Don't exchange the 1st synchronizer ring and the 2nd synchronizer ring.

(d) Using SST and a press, install the 1st gear and No. 1 hub sleeve.

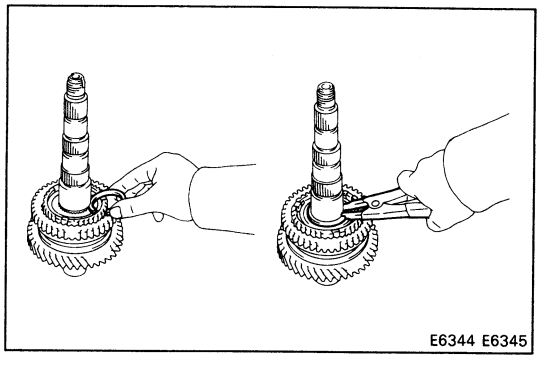
SST 09316-60010 (09316-00040)



3. INSTALL SNAP RING

Select a snap ring that will allow minimum axial play and install it on the shaft.

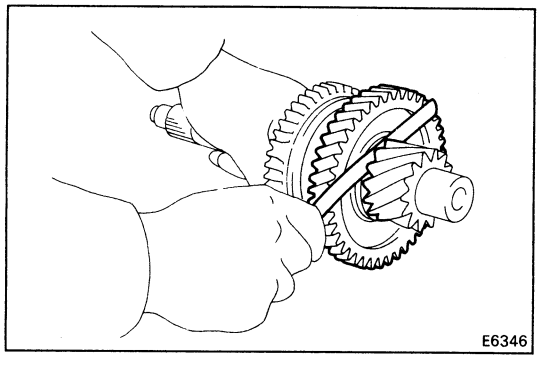
Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
A	2.80 (0.1102)	E	3.00 (0.1181)
B	2.85 (0.1122)	F	3.05 (0.1201)
C	2.90 (0.1142)	G	3.10 (0.1220)
D	2.95 (0.1161)		

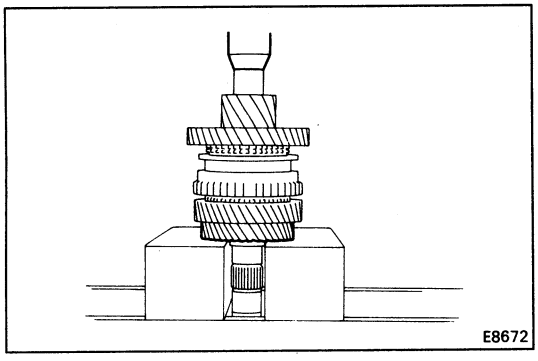


4. MEASURE FIRST GEAR THRUST CLEARANCE

Using a feeler gauge, measure the 1st gear thrust clearance.

Standard clearance: 0.10 – 0.35 mm (0.0039 – 0.0138 in.)





5. INSTALL SPACER, NEEDLE ROLLER BEARING, SYNCHRONIZER RING, SECOND GEAR AND THIRD DRIVEN GEAR

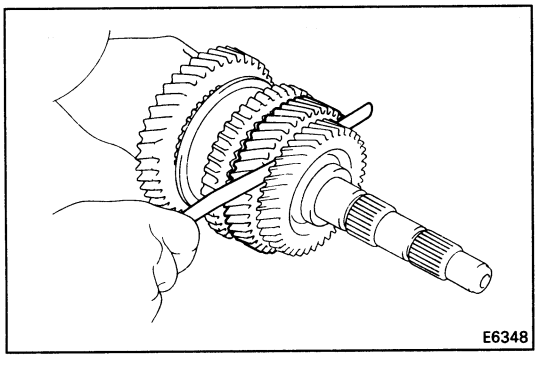
(a) Install the spacer.

(b) Apply MP grease to the needle roller bearing.

(c) Place the synchronizer ring on the gear and aligh the ring slots with the shifting keys.

(d) Install the 2nd gear.

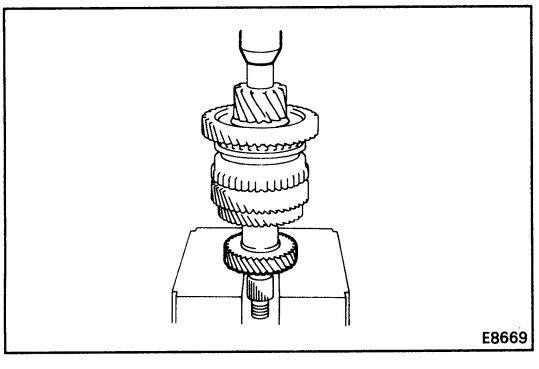
(e) Using a press, install the 3rd driven gear.



6. MEASURE SECOND GEAR THRUST CLEARANCE

Using a feeler gauge, measure the 2nd gear thrust clearance.

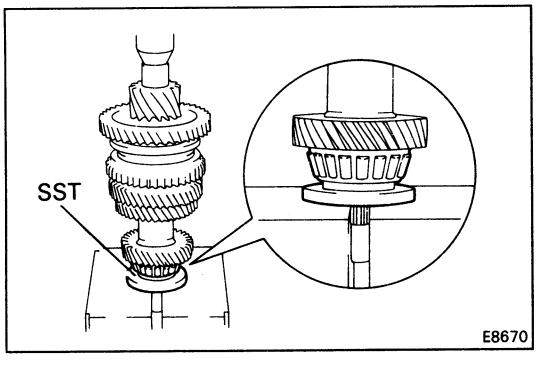
Standard clearance: 0.10 – 0.45 mm (0.0039 – 0.0177 in.)



7. INSTALL SPACER AND FOURTH DRIVEN GEAR

(a) Install the spacer.

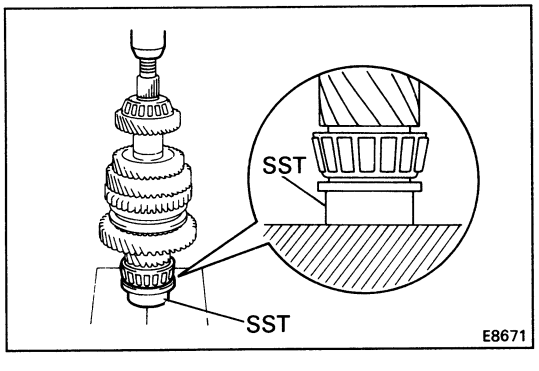
(b) Using a press, install the 4th driven gear.



8. INSTALL OUTPUT SHAFT REAR BEARING

Using SST and a press, install the bearing.

SST 09506-30012

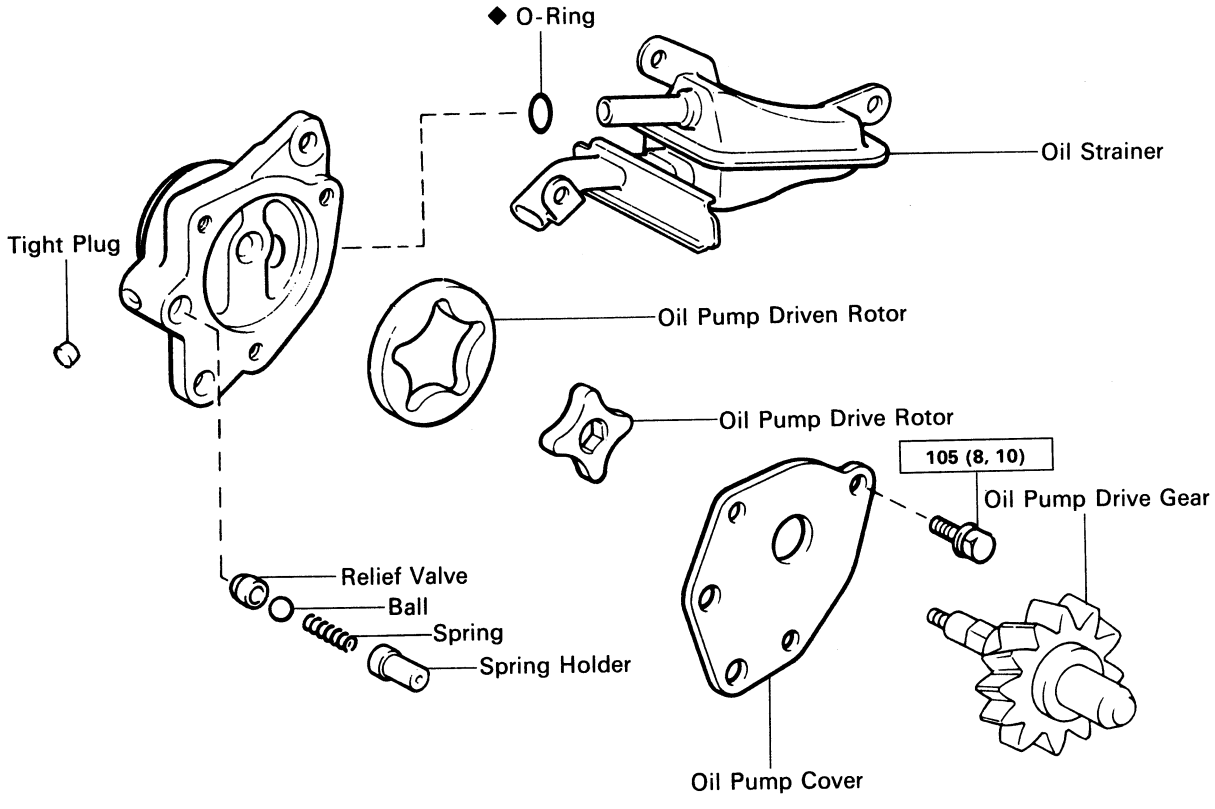


9. INSTALL OUTPUT SHAFT FRONT BEARING

Using SST and a press, install the bearing.

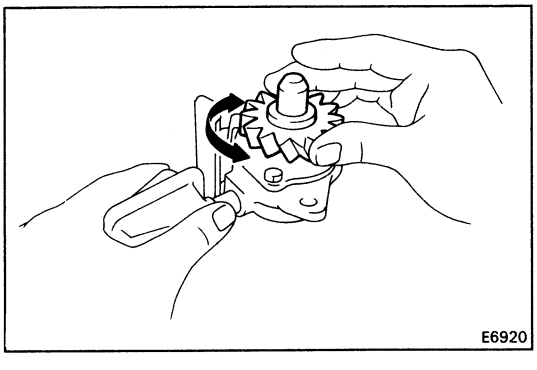
SST 09316-60010 (09316-00070)

Oil Pump Assembly



kg-cm (ft-lb, N·m) : Specified torque
◆ Non-reusable part

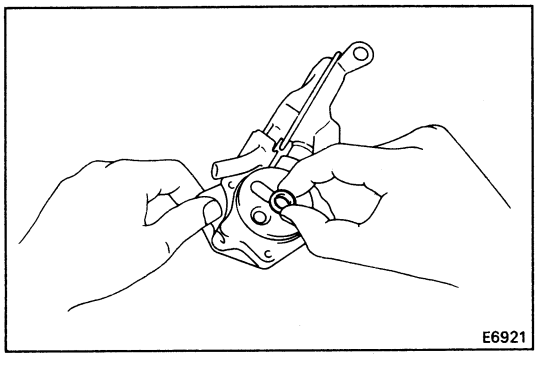
MT0643



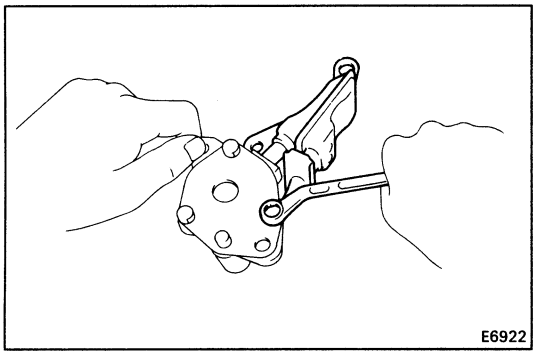
DISASSEMBLY OF OIL PUMP

1. CHECK OPERATION OF OIL PUMP

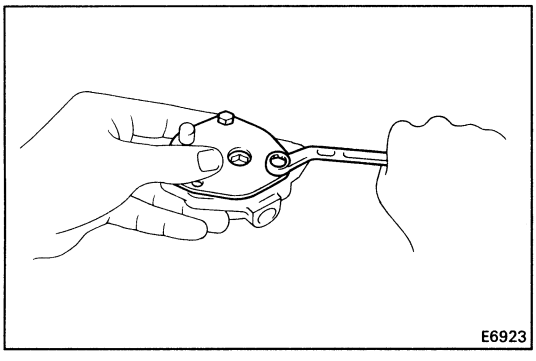
Install the oil pump drive gear to the drive rotor, check that the drive rotor turn smoothly.



2. REMOVE GASKET TO OIL PUMP CASE

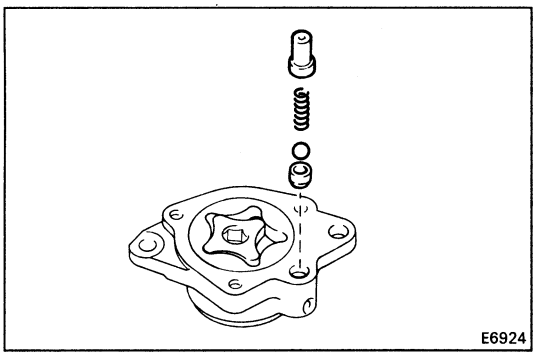


3. **REMOVE BOLT AND OIL STRAINER**

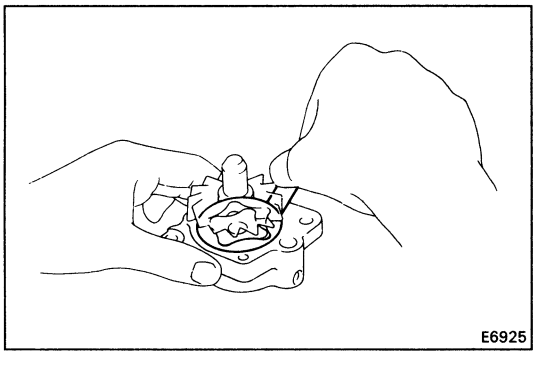


4. **REMOVE OIL PUMP COVER**

(a) Hold the oil pump cover, remove the two bolts and a cover.



(b) Remove the spring holder, spring, ball and relief valve seat.

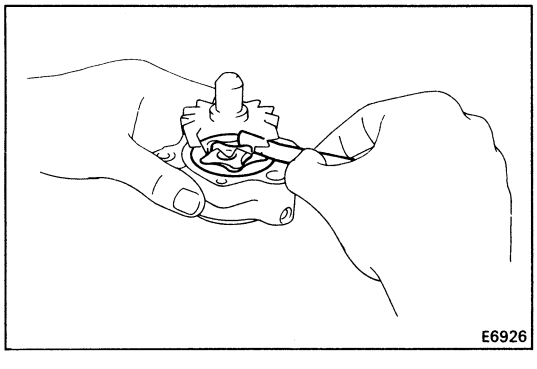


5. **CHECK ROTOR BODY CLEARANCE**

(a) Install the oil pump drive gear to the drive rotor.

(b) Using a feeler gauge, measure the body clearance between the drive rotor and oil pump case.

Standard clearance: **0.10 – 0.16 mm (0.004 – 0.006 in.)**
Maximum clearance: **0.30 mm (0.012 in.)**

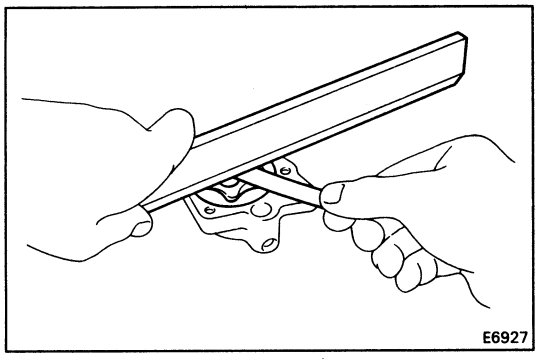


6. **CHECK ROTOR TIP CLEARANCE**

(a) Install the oil pump drive gear to the drive rotor.

(b) Using a feeler gauge, measure the tip clearance between the drive and driven rotors.

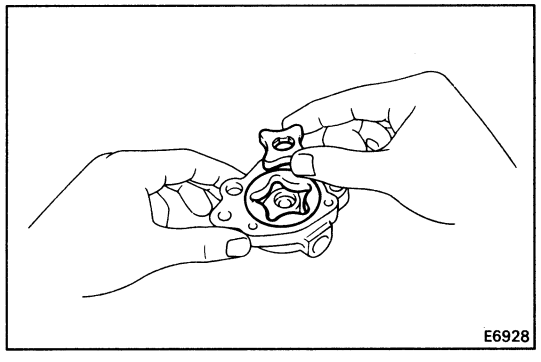
Standard clearance: **0.08 – 0.15 mm (0.003 – 0.006 in.)**
Maximum clearance: **0.30 mm (0.012 in.)**



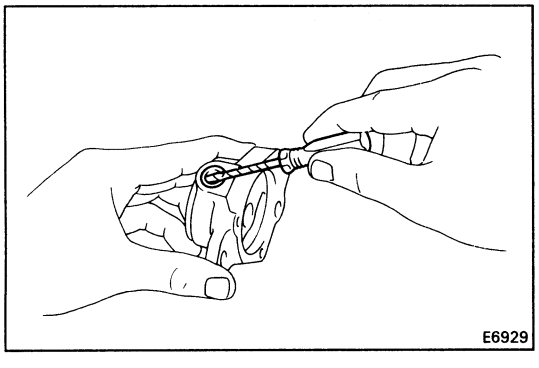
7. CHECK SIDE CLEARANCE

Using a precision straight edge and feeler gauge, measure the side clearance of both rotors.

Standard clearance: **0.03 – 0.08 mm (0.001 – 0.003 in.)**
Maximum clearance: **0.15 mm (0.006 in.)**

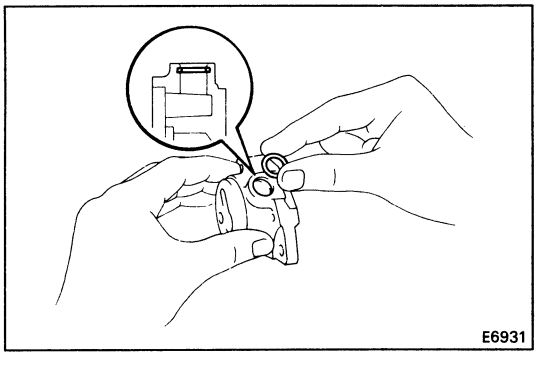


8. REMOVE OIL PUMP DRIVE ROTOR AND DRIVEN ROTOR

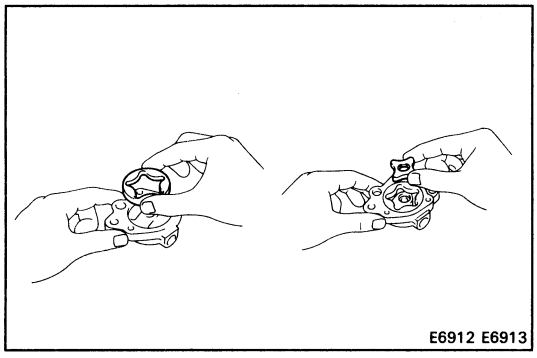


9. IF NECESSARY, REPLACE O-RING

(a) Using a screwdriver, remove the o-ring.



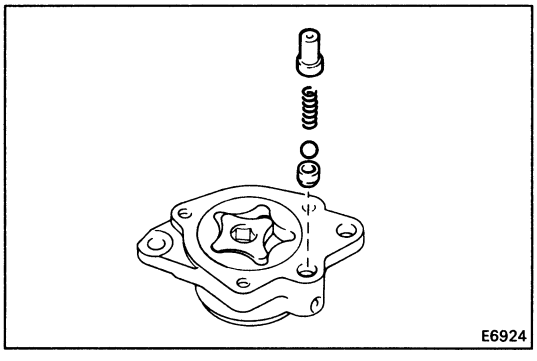
(b) Apply gear oil to the o-ring.
(c) Install the o-ring.


E6912 E6913

ASSEMBLY OF OIL PUMP

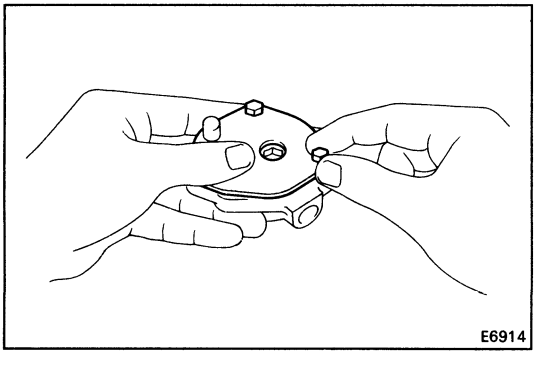
(See page MT-85)

1. INSTALL DRIVEN ROTOR AND DRIVE ROTOR

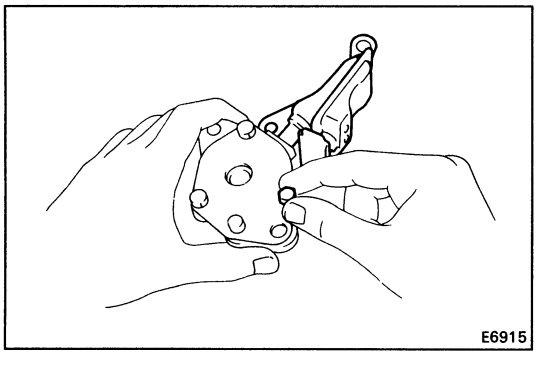

E6924

2. INSTALL OIL PUMP COVER

(a) Install the relief valve, ball, spring and spring holder to the oil pump case.

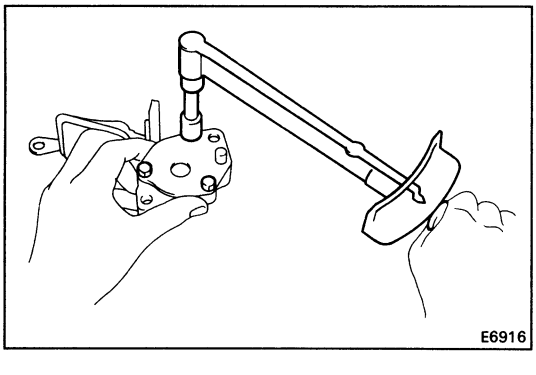

E6914

(b) Hold the oil pump cover, temporarily install the two bolts.


E6915

3. INSTALL OIL STRAINER

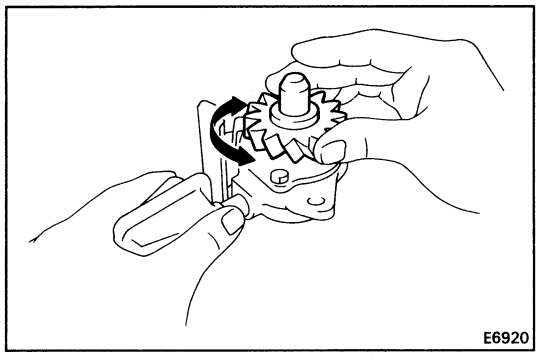
Install the oil strainer to the oil pump case, temporarily install the bolt.


E6916

4. TORQUE OIL PUMP COVER BOLTS

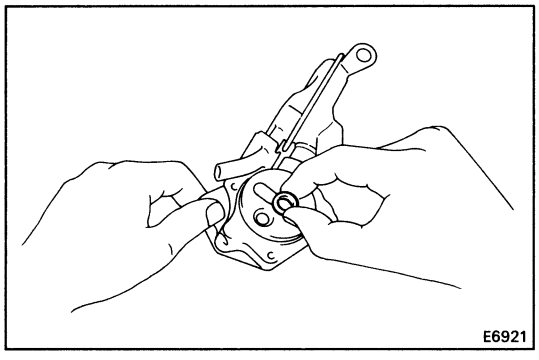
Torque the three bolts evenly.

Torque: 105 kg-cm (8 ft-lb, 10 N·m)



5. CHECK OPERATION OF OIL PUMP

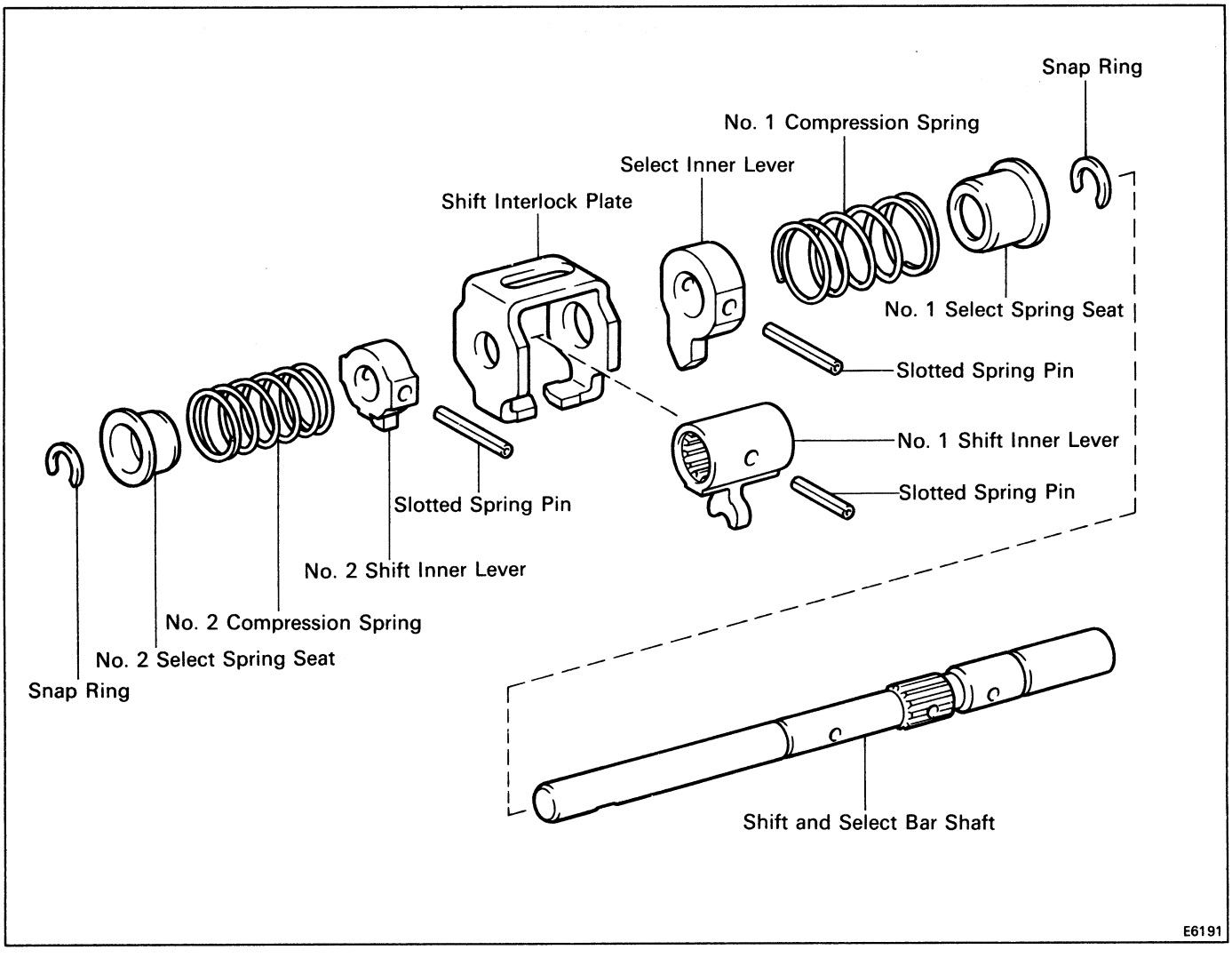
Insert the oil pump drive gear to the drive rotor, check that the drive rotor turn smoothly.

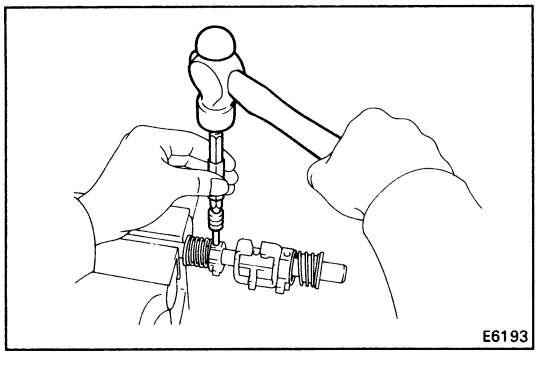


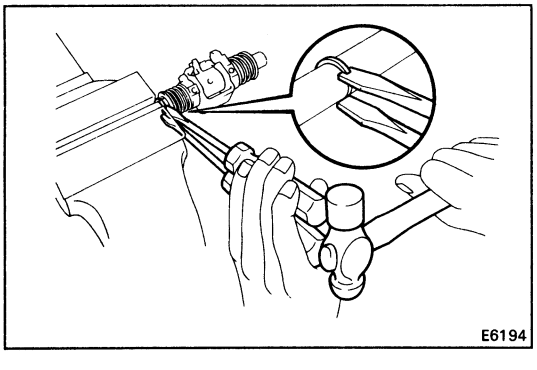
6. INSTALL GASKET

Install the new gasket to the oil pump case.

Shift and Select Lever Assembly







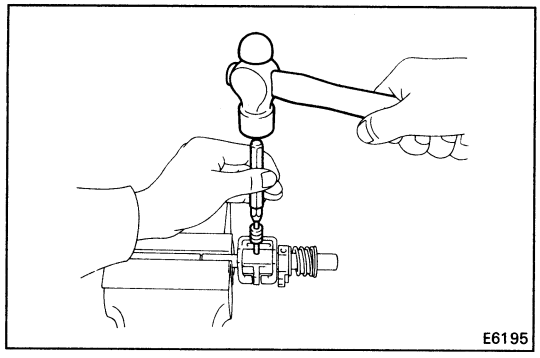
DISASSEMBLY OF SHIFT AND SELECT LEVER ASSEMBLY

1. REMOVE NO. 2 SHIFT INNER LEVER

(a) Using a pin punch and hammer, drive out the slotted spring pin.

(b) Using two screwdrivers and a hammer, remove the snap ring.

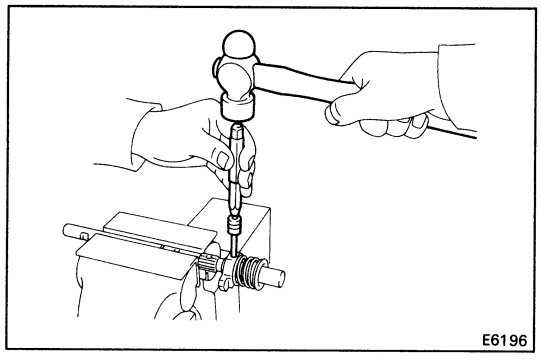
(c) Remove the No. 2 select spring seat, No. 2 compression spring and No. 2 shift inner lever.



2. REMOVE SHIFT INTER PLATE AND NO. 1 SHIFT INNER LEVER

(a) Using a pin punch and hammer, drive out the slotted spring pin.

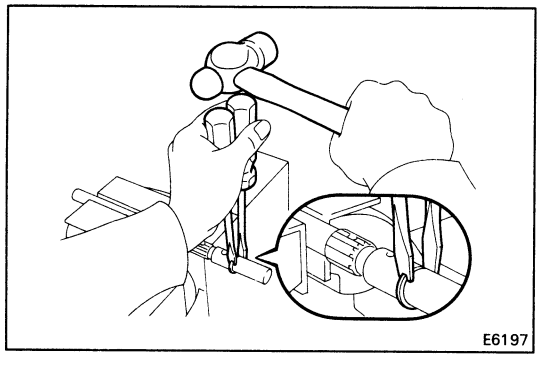
(b) Remove the shift inter plate and No. 1 shift inner lever.



3. REMOVE SELECT INNER LEVER

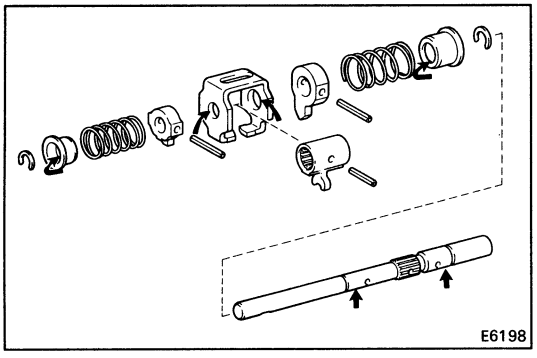
(a) Using a pin punch and hammer, drive out the slotted spring pin.

(b) Remove the select inner lever, No. 1 compression spring and No. 1 select spring seat.



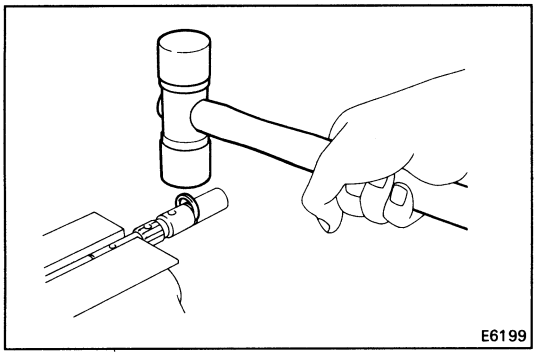
4. REMOVE SNAP RING

Using two screwdrivers and a hammer, remove the snap ring.



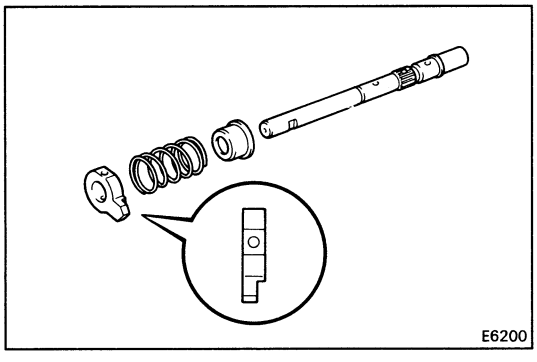
ASSEMBLY OF SHIFT AND SELECT LEVER ASSEMBLY

1. COAT SHAFT WITH MP GREASE, AS SHOWN



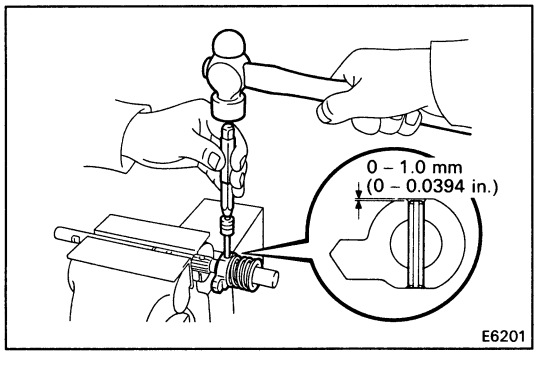
2. INSTALL SNAP RING

Using a plastic hammer, install the snap ring.

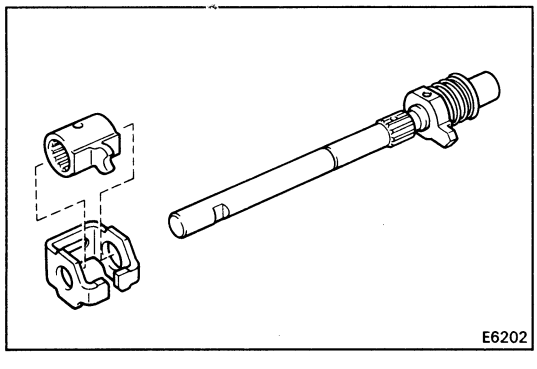


3. INSTALL SELECT INNER LEVER

(a) Install the No. 1 select spring seat, No. 1 compression spring and select inner lever.

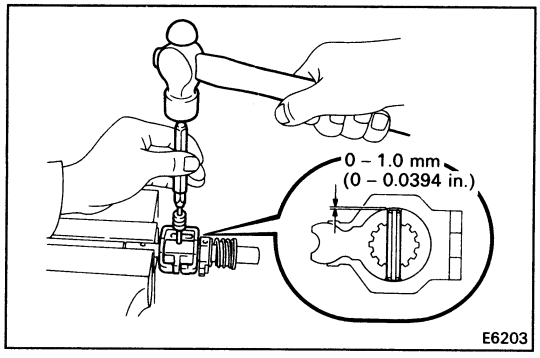


(b) Using a pin punch hammer, drive in the slotted spring pin.



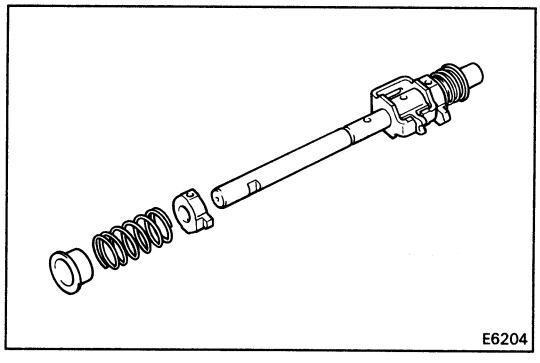
4. INSTALL SHIFT INTERLOCK PLATE AND NO. 1 SHIFT INNER LEVER

(a) Install the shift interlock plate No. 1 shift inner lever.



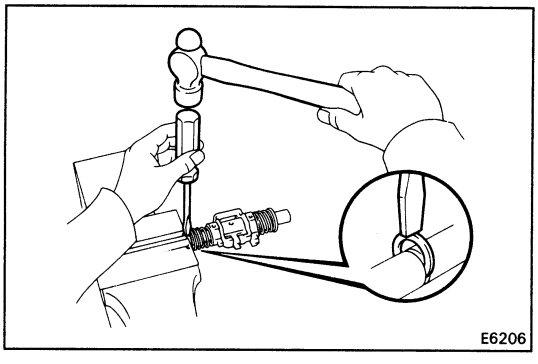
(b) Using a pin punch and hammer, drive in the slotted spring pin.

(c) Check that the shift interlock plate turn smoothly.

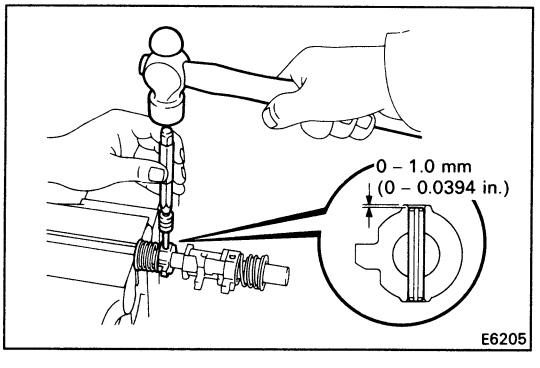


5. INSTALL NO. 2 SHIFT INNER LEVER

(a) Install the No. 2 shift inner lever, No. 2 compression spring and No. 2 select spring seat.

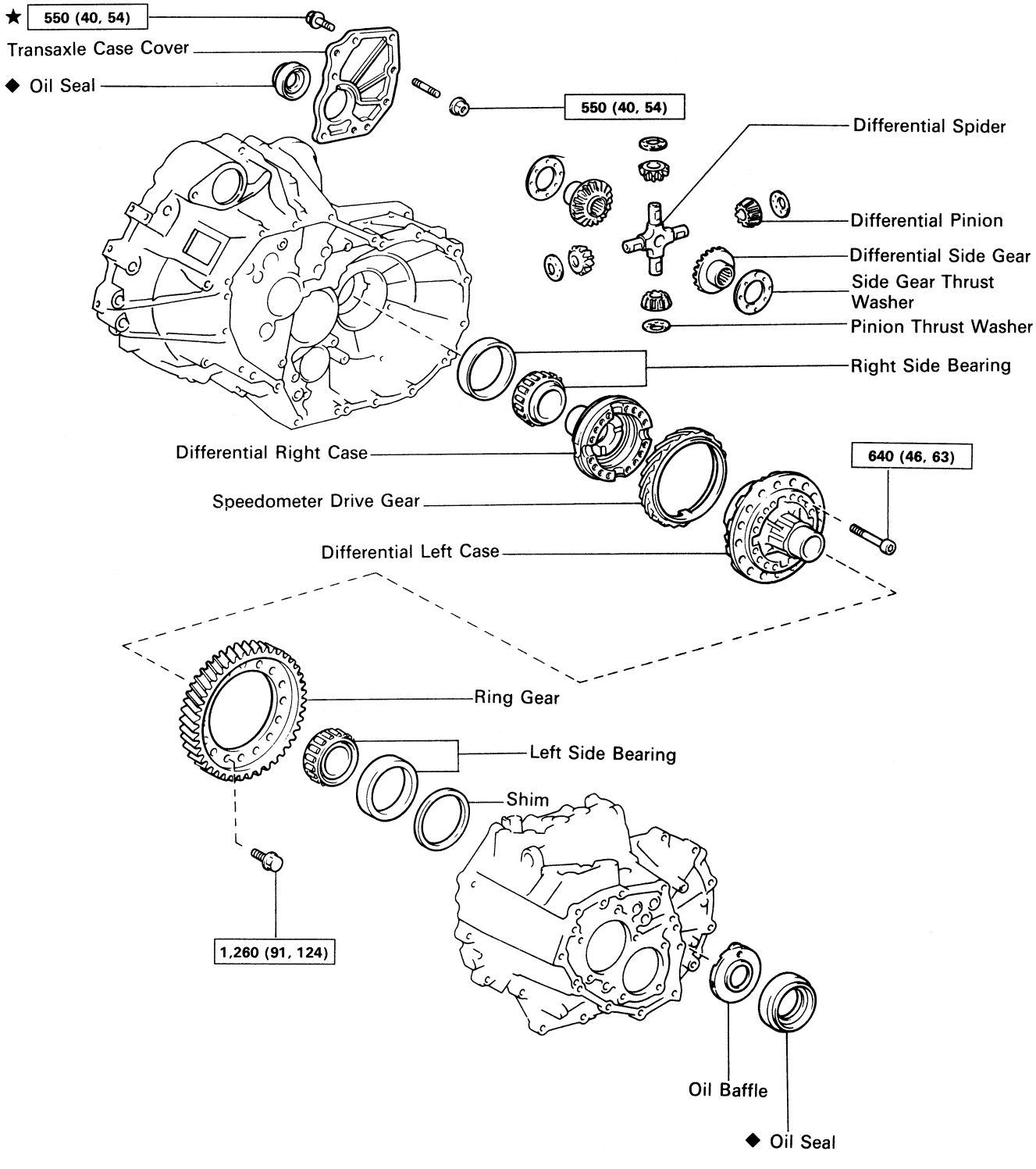


(b) Using a screwdriver and hammer, install the snap ring.



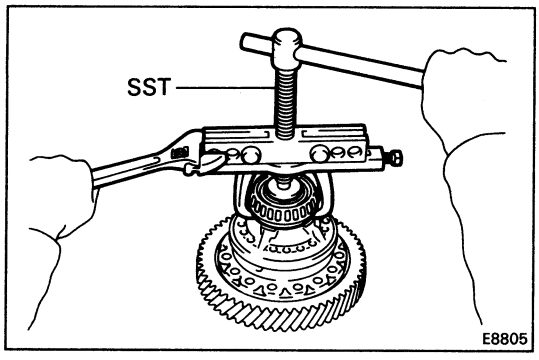
(c) Using a pin punch and hammer, drive in the slotted spring pin.

Differential



kg-cm (ft-lb, N·m) : Specified torque
◆ Non-reusable part
★ Precoated part

MT0721

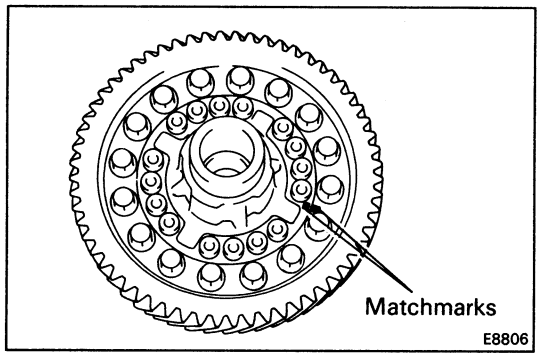


DISASSEMBLY OF DIFFERENTIAL CASE

1. REMOVE SIDE BEARING

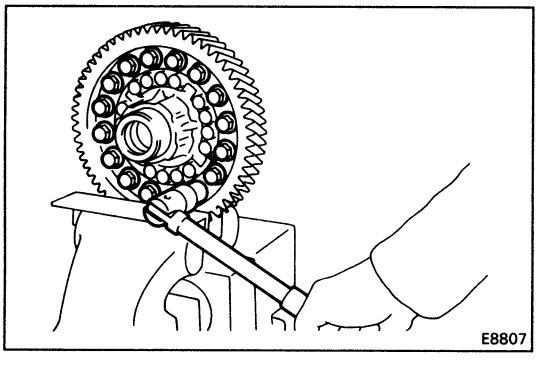
Using SST, remove the two side bearings.

SST 09950-20017

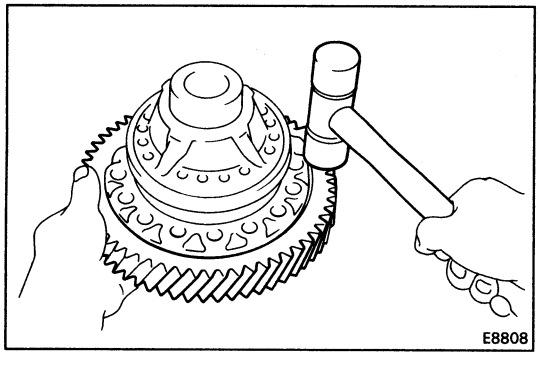


2. REMOVE RING GEAR

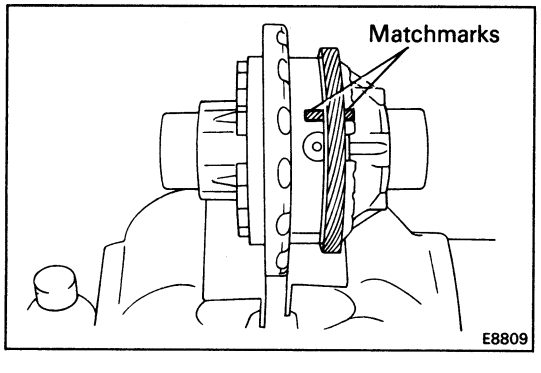
(a) Place the matchmarks on both the differential case and ring gear.



(b) Remove the sixteen bolts.

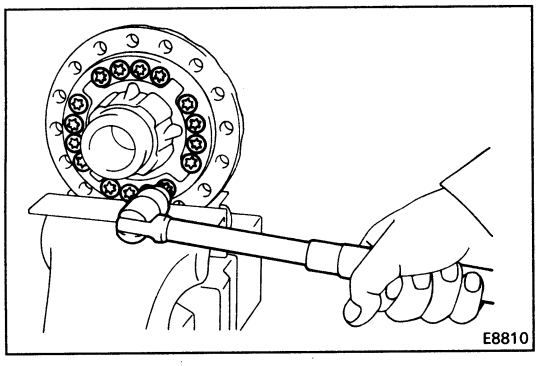


(c) Using a plastic hammer, tap out the ring gear.



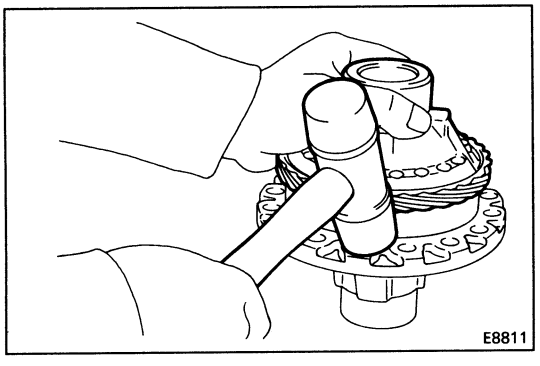
3. DISASSEMBLE OF DIFFERENTIAL CASE

(a) Place the matchmarks on the differential right and left case.



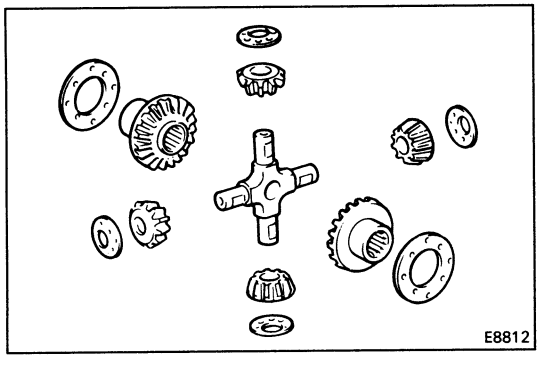
(b) Using a torx wrench, remove the sixteen torx screws.

Torx wrench T50 09042-00040

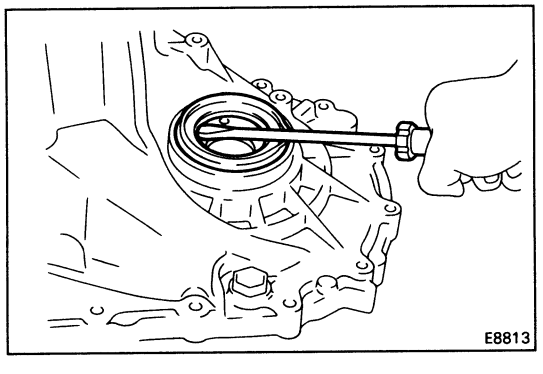


(c) Using a plastic hammer, tap out the differential left case.

(d) Remove the speedometer drive gear from the differential right case.



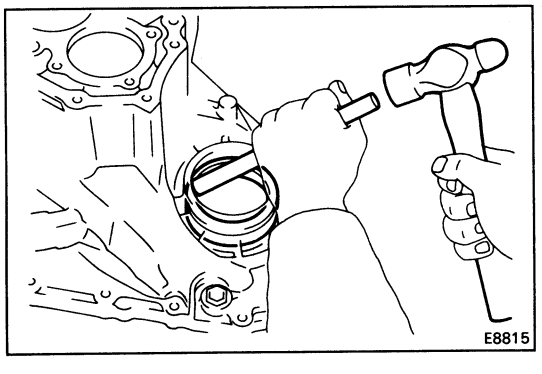
(e) Remove the two differential side gears, two side thrust washers, differential spider, four differential pinions and four pinion washers from the differential left case.



4. **(Transmission Case Side)**
IF NECESSARY, REPLACE OIL SEAL AND TAPER ROLLER BEARING OUTER RACE

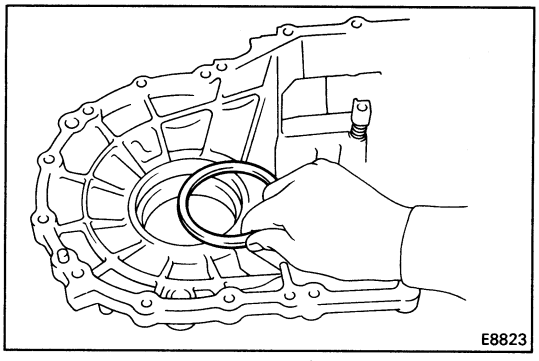
(a) Using a screwdriver, remove the oil seal.

(b) Remove the transmission oil baffle.



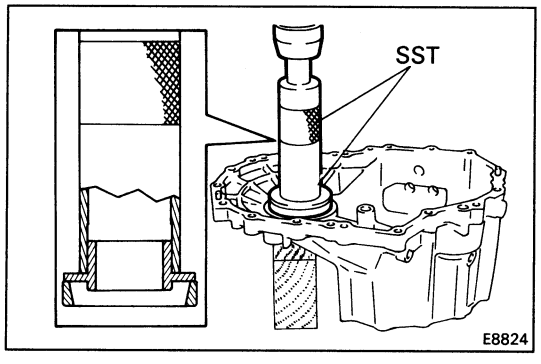
(c) Using a brass bar and hammer, drive out the bearing outer race lightly and evenly.

(d) Remove the shim.



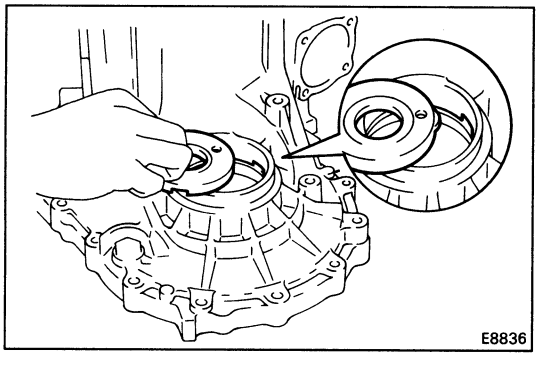
(e) Install the shim.
(See page MT-94)

HINT: First select and install a shim of lesser thickness than before.



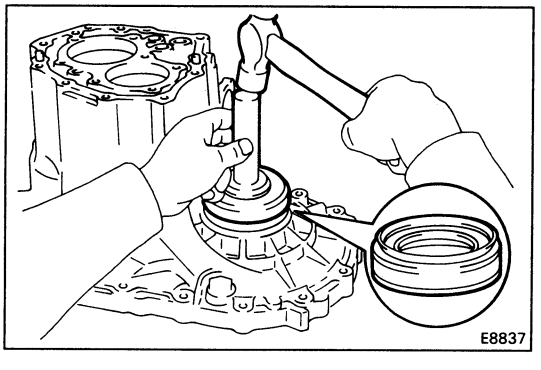
(f) Using SST and a press, install the taper roller bearing outer race.

SST 09316-60010 (09316-00010, 09316-00040)



(g) Install the transmission oil baffle.

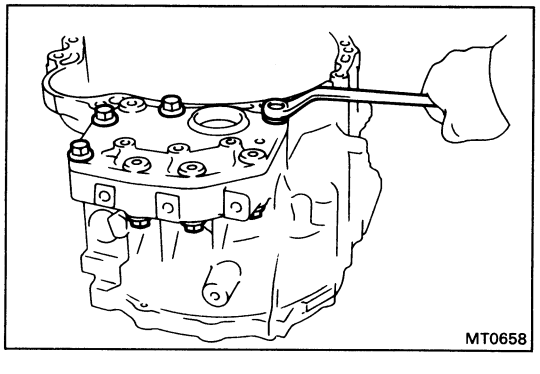
HINT: Install the transmission oil baffle projection into the case side cutout.



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

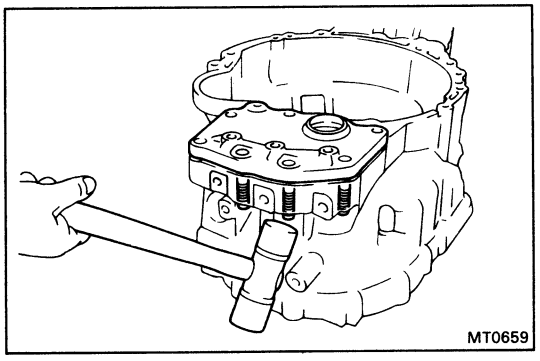
SST 09223-15010

(i) Coat the lip of oil seal with MP grease.

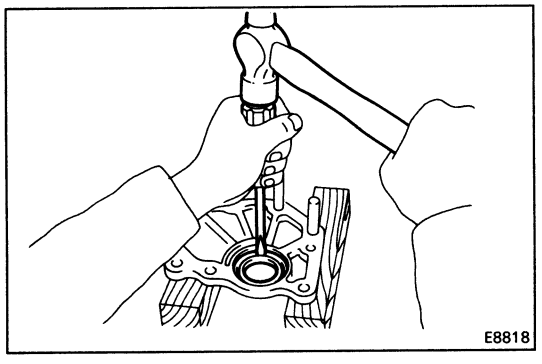


5. (Transaxle Case Side)
IF NECESSARY, REPLACE OIL SEAL AND TAPER ROLLER BEARING OUTER RACE

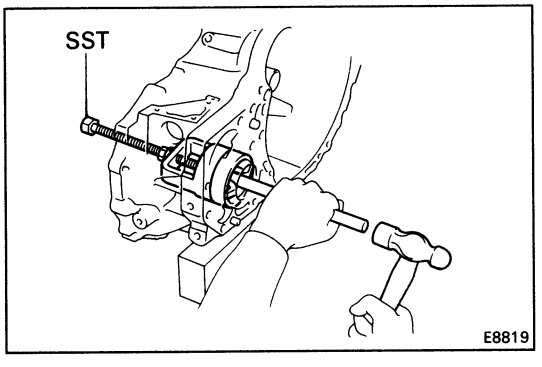
(a) Remove the four bolts and three nuts.



(b) Using a plastic hammer, tap the stud bolts and remove the transaxle case cover.

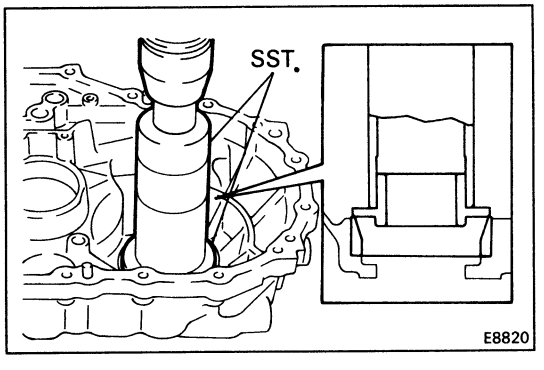


(c) Using a screwdriver and hammer, drive out the oil seal.



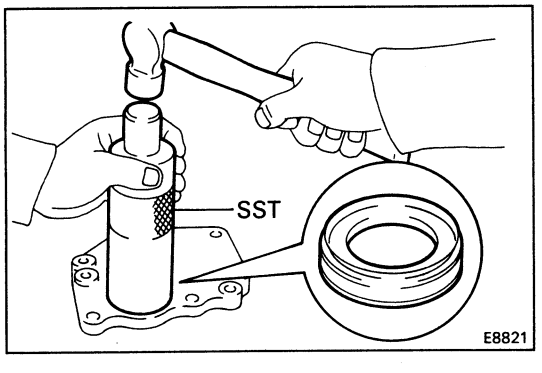
(d) Using SST, brass bar and hammer, remove the taper roller bearing outer race.

SST 09612-65014 (09612-01020)



(e) Using SST and a hammer, install the taper roller bearing.

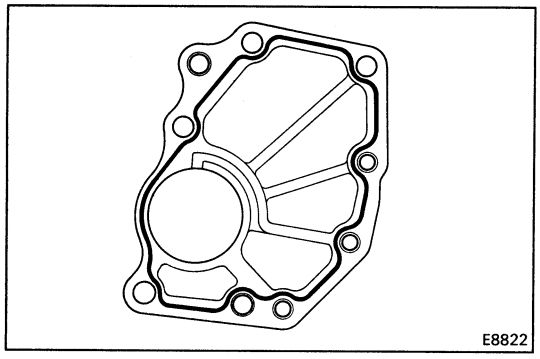
SST 09316-60010 (09316-00010, 09316-00040)



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

SST 09316-60010 (09316-00010)

(g) Coat the lip of oil seal with MP grease.


E8822

(h) Remove any packing material and be careful not to drop oil on the contacting surfaces of the transaxle case or case cover.

(i) Apply seal packing to the transaxle case cover as shown in the figure.

Seal packing: Part No. 08826-00090, THREE BOND 1281 or equivalent

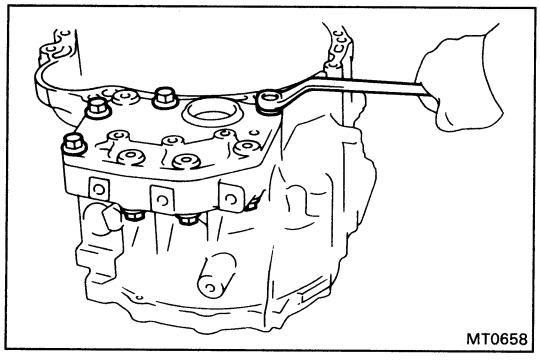
HINT: Install the transaxle case cover as soon as the seal packing is applied.

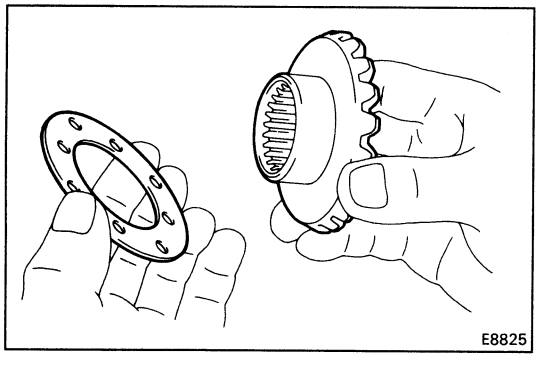
(j) Apply liquid sealant to the bolt threads.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(k) Install and torque the four bolts and three nuts.

Torque: 550 kg-cm (40 ft-lb, 54 N·m)

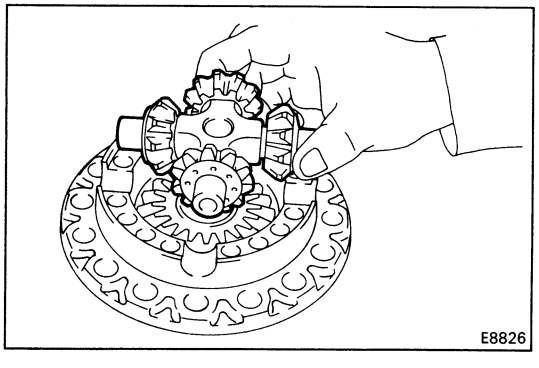

MT0658


E8825

6. ASSEMBLE OF DIFFERENTIAL CASE

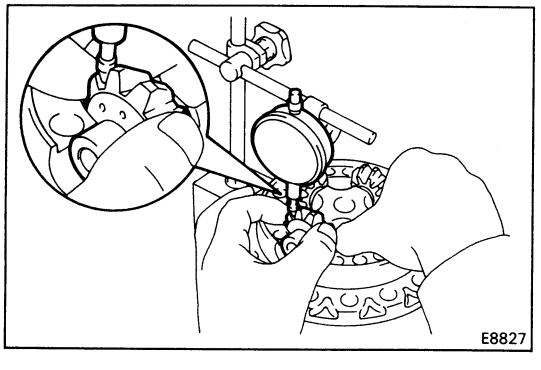
HINT: Coat all of the sliding and rotating surface with gear oil before assembly.

(a) Install the thrust washer to the side gear.


E8826

(b) Install the four pinions and thrust washers to the spider.

(c) Install the side gear and spider with four pinions to the differential left case.


E8827

(d) Using a dial indicator, measure the backlash of one pinion gear while holding the No. 2 differential case.

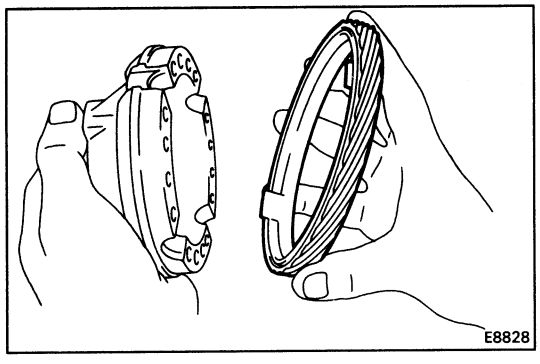
Standard backlash: 0.05 – 0.20 mm (0.0020 – 0.0079 in.)

HINT: Push the pinion gear of the left side of the differential case.

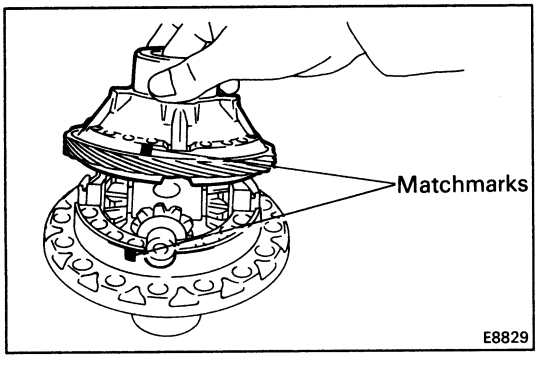
(e) Install the side gear and spider with four pinions to the right side of the differential case.
And check the side gear backlash.

(f) Referring to the table below, select the thrust washer which will ensure that the backlash is within specification. Try to select a washer of the same size.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
–	0.80 (0.0315)	–	1.20 (0.0472)
–	0.90 (0.0354)	–	1.30 (0.0512)
–	1.00 (0.0394)	–	1.40 (0.0551)
–	1.10 (0.0433)		

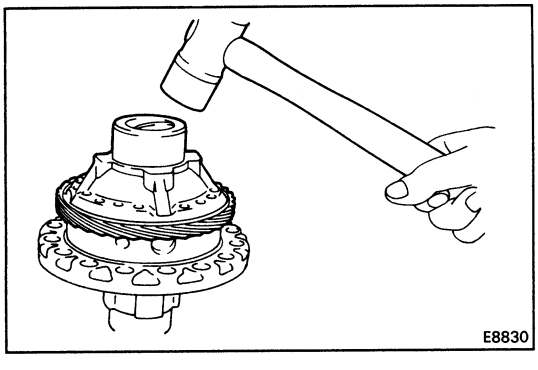

E8828

(g) Install the speedometer driven gear.

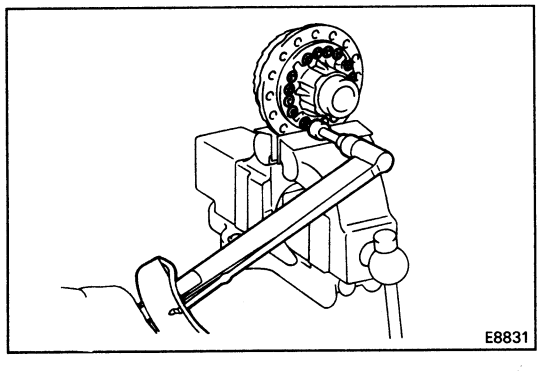


E8829

(h) Align the matchmarks on the differential cases.


E8830

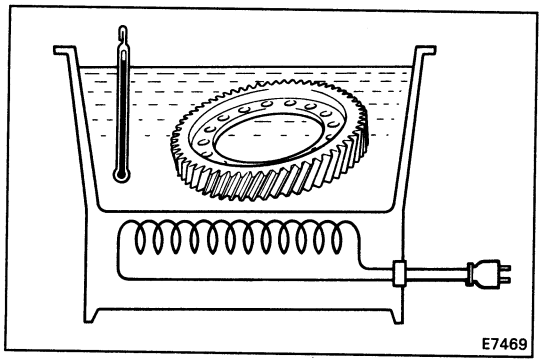
(i) Using plastic hammer, carefully tap the differential case.


E8831

(j) Using a torx wrench, install and torque the sixteen torx screws.

Torx wrench T50 09042-00040

Torque: 640 kg-cm (46 ft-lb, 63 N·m)



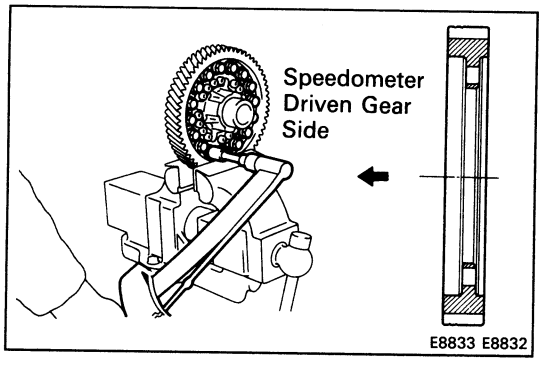
7. INSTALL RING GEAR

(a) Clean the contact surface of the differential case.

(b) Heat the ring gear to about 100°C (212°F) in an oil bath.

NOTICE: Do not heat the ring gear above 110°C (230°F)

(c) Clean the contact surface of the ring gear with cleaning solvent.

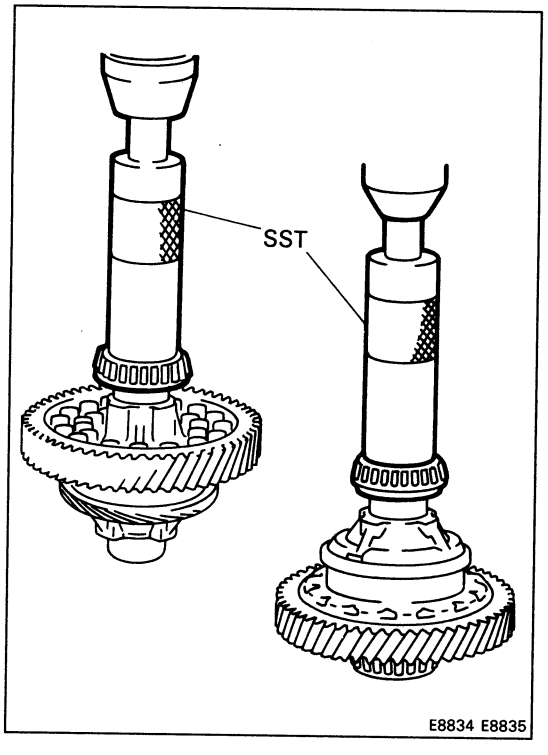


(d) Quickly install the ring gear on the differential case. Install the sixteen bolts.

HINT: Align the matchmarks on the differential left case and contact the ring gear.

(e) Tighten the set bolts uniformly and a little at a time. Torque the bolts.

Torque: 1,260 kg-cm (91 ft-lb, 124 N·m)



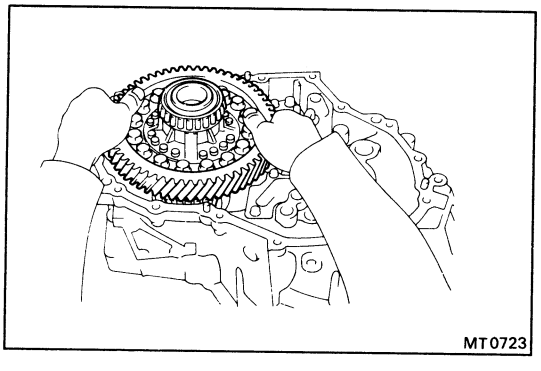
8. INSTALL SIDE BEARING

Using SST and a press, install the side bearings onto the differential case.

SST 09316-60010 (09316-00010)

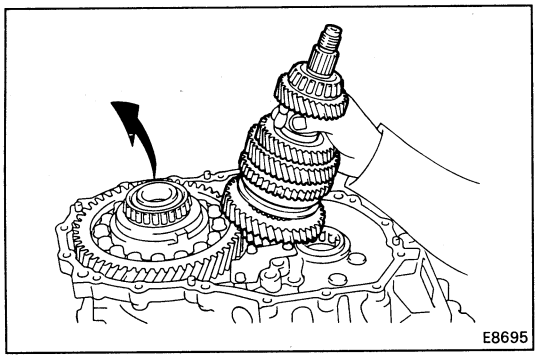
HINT: Press the bearing on the ring gear side first.

9. ADJUST OUTPUT SHAFT ASSEMBLY PRELOAD
(See pages MT-104 and 105)



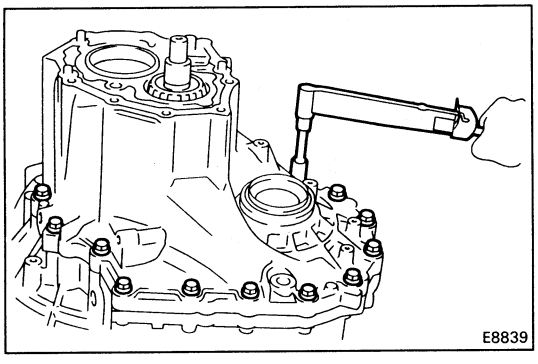
10. INSTALL DIFFERENTIAL CASE ASSEMBLY

Install the differential case assembly to the transaxle case.



11. INSTALL OUTPUT SHAFT ASSEMBLY

Lift up the differential case, install the input shaft assembly.



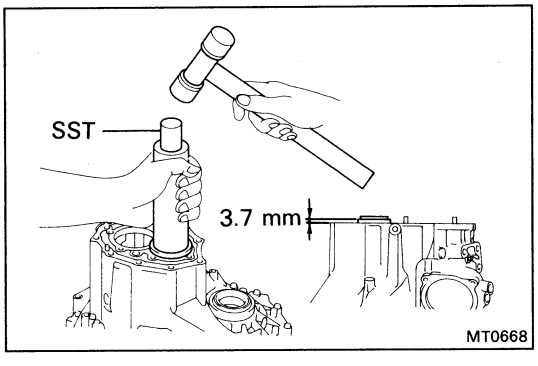
12. INSTALL TRANSMISSION CASE

(a) Install the transmission case.

HINT: If necessary, tap on the case with a plastic hammer.

(b) Install and torque the seventeen bolts.

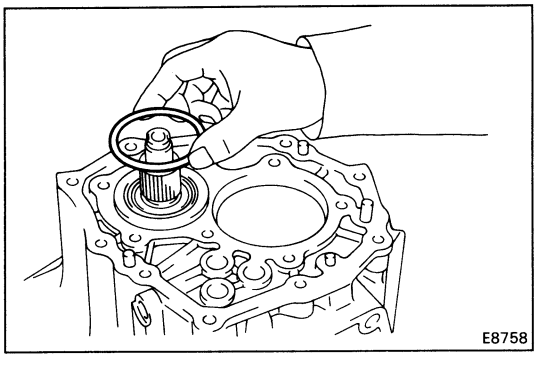
Torque: 300 kg-cm (22 ft-lb, 29 N·m)



13. INSTALL OUTPUT SHAFT REAR TAPERED ROLLER BEARING OUTER RACE

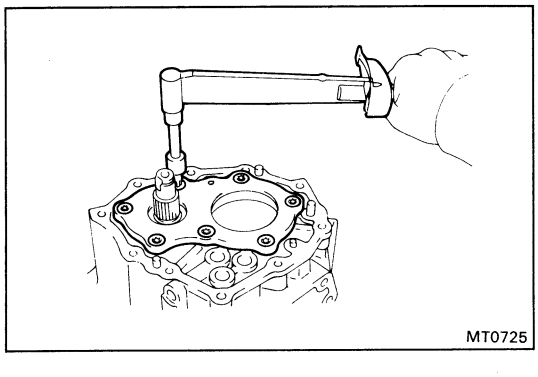
Using SST and a hammer, install the output shaft rear tapered roller bearing outer race.

SST 09316-60010 (09316-00010)



14. INSTALL SHIM
(See page MT-105)

HINT: Install the previously selected shim.

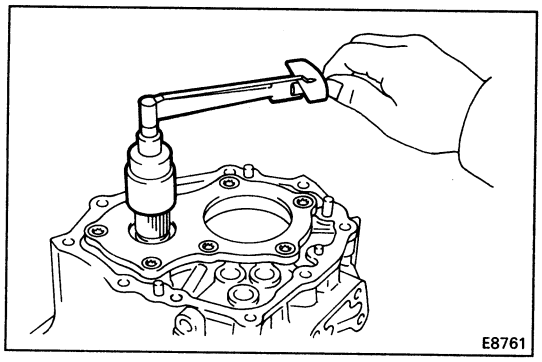


15. INSTALL REAR BEARING RETAINER

Using a torx wrench, install and torque the seven torx screws.

Torx wrench T45 09042-00050

Torque: 430 kg-cm (31 ft-lb, 42 N·m)



16. ADJUST DIFFERENTIAL CASE PRELOAD

(a) Install the new lock nut to the output shaft.

(b) Turn the output shaft right and left two or three times to allow the bearings to settle.

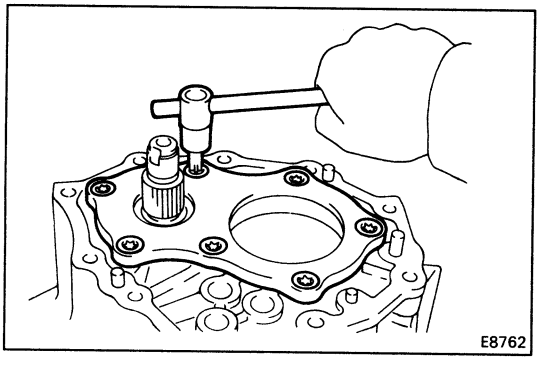
(c) Using a torque wrench, measure the preload.

Preload (at starting):
New bearing
Add output shaft preload
1.9 – 3.7 kg-cm (1.6 – 3.2 in.-lb, 0.2 – 0.4 N·m)
Reused bearing
Add output shaft preload
1.2 – 2.3 kg-cm (1.0 – 2.0 in.-lb, 0.1 – 0.2 N·m)

If the preload is not within specification, select the thrust washers.

HINT: The total preload will change about 1 – 2 kg-cm (0.9 – 1.7 in.-lb, 0.1 – 0.2 N·m) with each shim thickness.

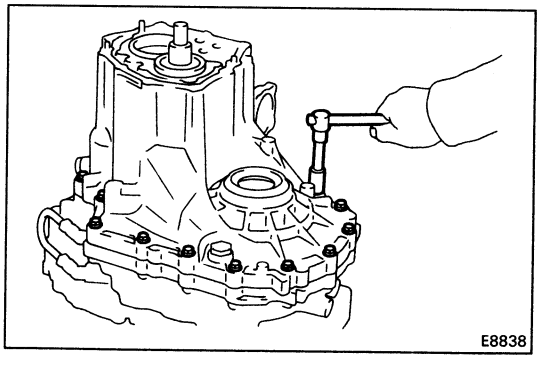
Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
0	2.00 (0.0787)	9	2.45 (0.0965)
1	2.05 (0.0807)	A	2.50 (0.0984)
2	2.10 (0.0827)	B	2.55 (0.1004)
3	2.15 (0.0846)	C	2.60 (0.1024)
4	2.20 (0.0866)	D	2.65 (0.1043)
5	2.25 (0.0886)	E	2.70 (0.1063)
6	2.30 (0.0906)	F	2.75 (0.1083)
7	2.35 (0.0925)	G	2.80 (0.1102)
8	2.40 (0.0945)	H	2.85 (0.1122)



17. REMOVE REAR BEARING RETAINER

Using torx wrench, remove the seven torx screws and rear bearing retainer.

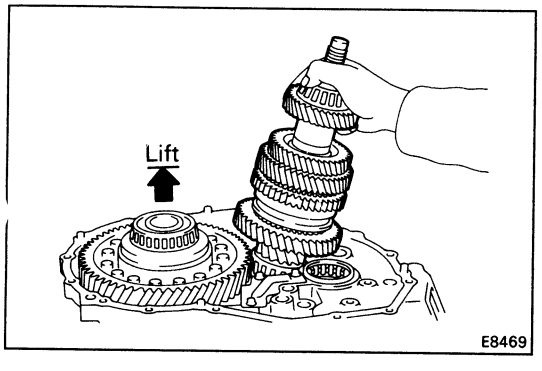
Torx wrench T45 09042 -00050



18. REMOVE SHIM

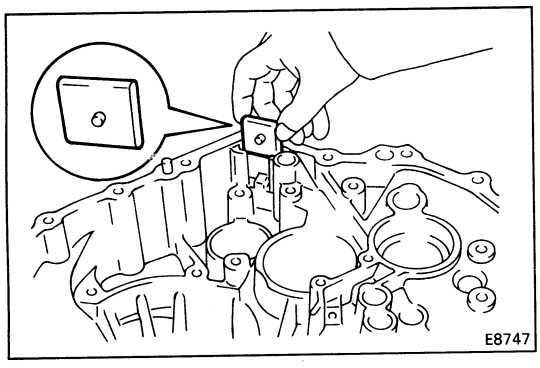
19. REMOVE TRANSMISSION CASE

Remove the seventeen bolts and tap off the case with a plastic hammer.



20. REMOVE OUTPUT SHAFT ASSEMBLY

21. REMOVE DIFFERENTIAL CASE ASSEMBLY

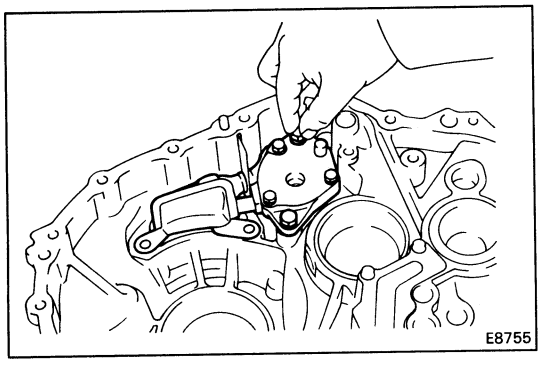


INSTALLATION OF COMPONENT PARTS

(See pages MT-57 to 59)

HINT: Coat all of the sliding and rotating surface with gear oil before assembly.

1. INSTALL MAGNET TO TRANSAXLE CASE

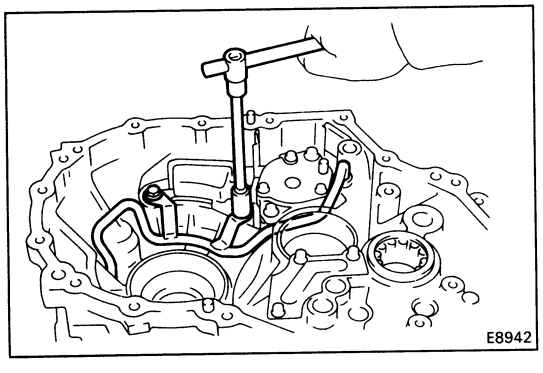


2. INSTAL OIL PUMP ASSEMBLY AND OIL PIPE

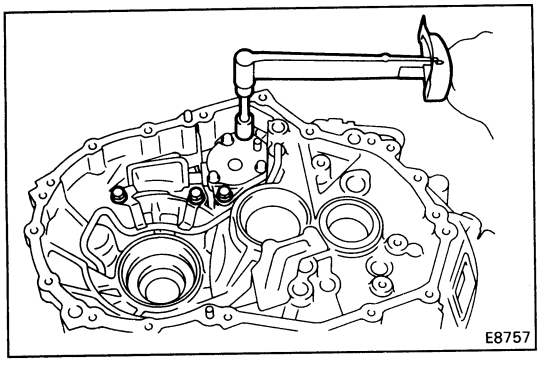
(a) Install the oil pump assembly.

(b) Install the two bolts.

HINT: Be careful not to drop the oil pump gasket.

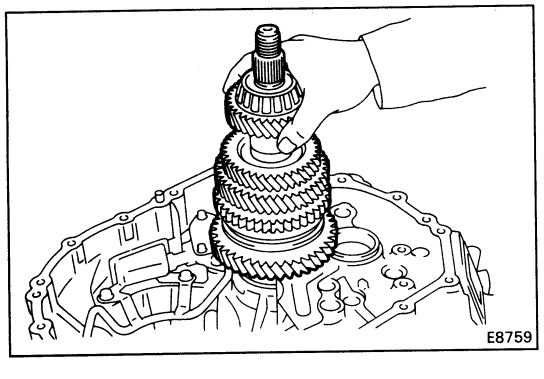


(c) Install the oil pipe and two bolts.



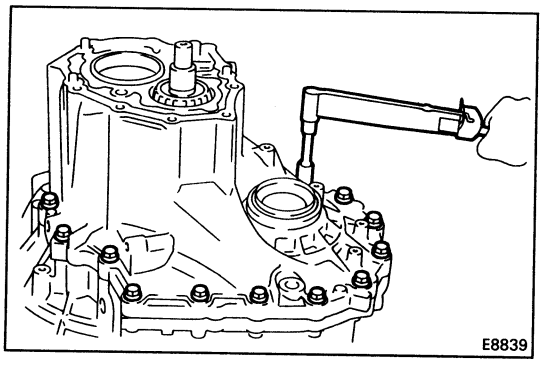
(d) Torque the four bolts.

Torque: 175kg-cm (13 ft-lb, 17 N·m)



3. ADJUST OUTPUT SHAFT PRELOAD

(a) Install the output shaft assembly.



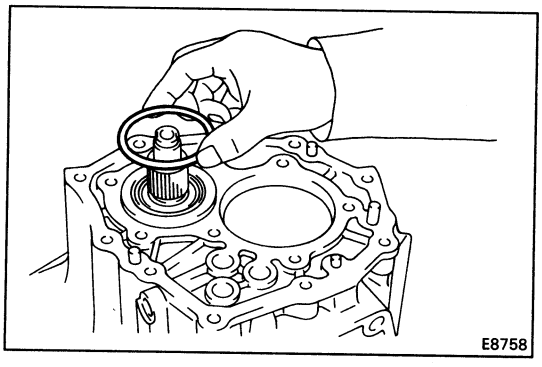
(b) Install the transmission case.

HINT: If necessary, tap on the case with a plastic hammer.

(c) Install and torque the seventeen bolts.

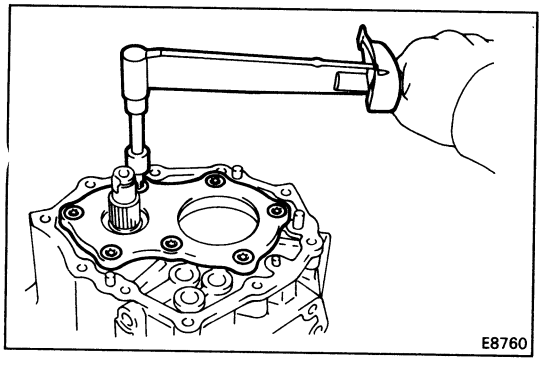
Torque: 300 kg-cm (22 ft-lb, 29 N·m)

(d) Install the output shaft rear taper roller bearing outer race.



(e) Install the adjust shim.

HINT: When re-using the output shaft bearing, first install a shim of the same thickness as before. If installing a new tapered roller bearing, first select and install a shim of lesser thickness than before.



(f) Install the bearing retainer.

(g) Using a torx wrench, install and torque the seven bolts.

Torx wrench T45 09042-00050

Torque: 430kg-cm (31 ft-lb, 42 N·m)

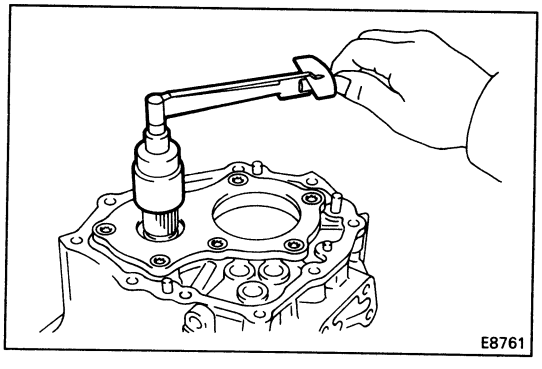
(h) Install the new lock nut to the output shaft.

(i) Turn the output shaft right and left two or three times to allow the bearings to settle.

(j) Using a torque wrench, measure the preload.

Preload (at starting):

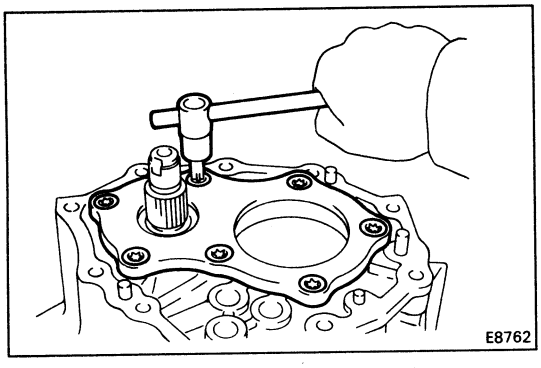
New bearing	**8 – 16 kg-cm (6.9 – 13.9 in.-lb, 0.8 – 1.6 N·m)**
Reused bearing	**5 – 10 kg-cm (4.3 – 8.7 in.-lb, 0.1 – 0.2 N·m)**



If the preload is not within specification, select the thrust washers.

HINT: The preload will change about 4 – 5 kg-cm (3.5 – 4.3 in.-lb, 0.4 – 0.5 N·m) with each shim thickness.

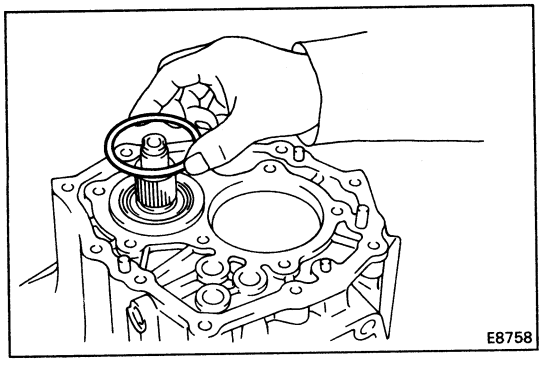
Mark	Thickness mm (in.)	Mark	Thickness mm (in.)	Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
0	1.30 (0.0512)	7	1.65 (0.0650)	E	2.00 (0.0787)	M	2.35 (0.0925)
1	1.35 (0.0513)	8	1.70 (0.0669)	F	2.05 (0.0807)	N	2.40 (0.0945)
2	1.40 (0.0551)	9	1.75 (0.0689)	G	2.10 (0.0827)	P	2.45 (0.0965)
3	1.45 (0.0571)	A	1.80 (0.0709)	H	2.15 (0.0846)	Q	2.50 (0.0984)
4	1.50 (0.0591)	B	1.85 (0.0728)	J	2.20 (0.0866)		
5	1.55 (0.0610)	C	1.90 (0.0748)	K	2.25 (0.0886)		
6	1.60 (0.0630)	D	1.95 (0.0768)	L	2.30 (0.0906)		



(k) Remove the lock nut.

(i) Using a torx wrench, remove the seven torx screws and rear bearing retainer.

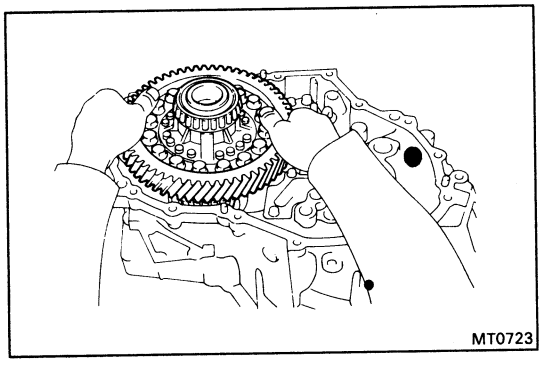
Torx wrench T45 09042-00050



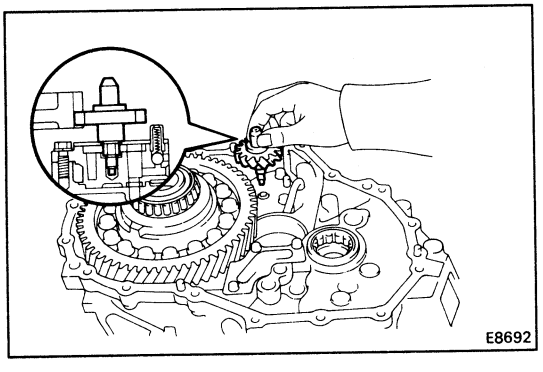
(m) Remove the shim.

(n) Remove the seventeen bolts and transmission case.

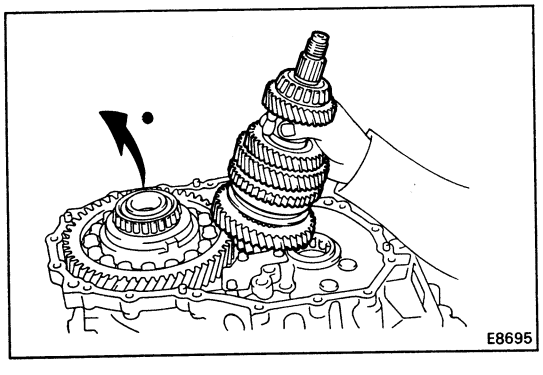
(o) Remove the output shaft assembly.



4. INSTALL DIFFERENTIAL CASE ASSEMBLY

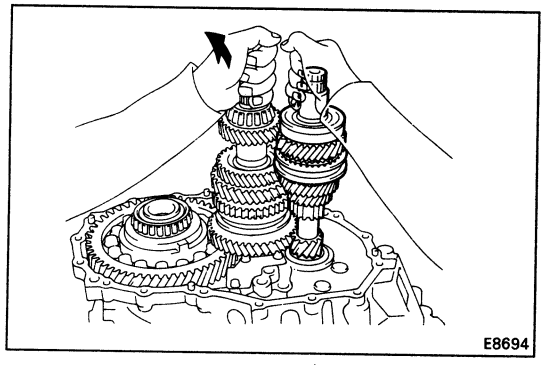


5. INSTALL OIL PUMP DRIVE GEAR

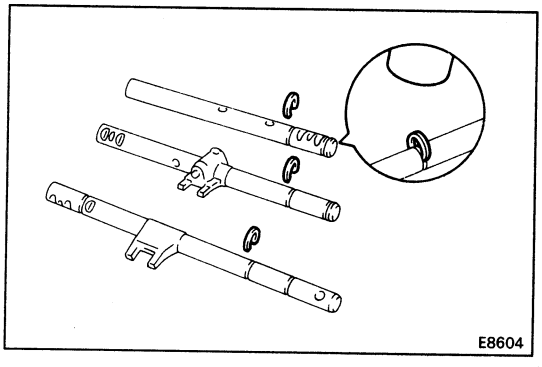


6. INSTALL OUTPUT SHAFT ASSEMBLY

(a) Lift up the differential case, install the input shaft assembly.

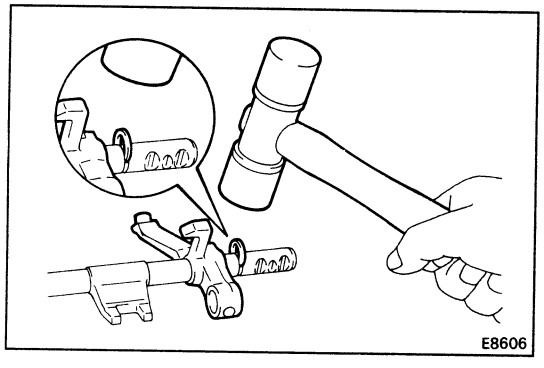


(b) Leaning the output shaft to the differential side, install the input shaft assembly.

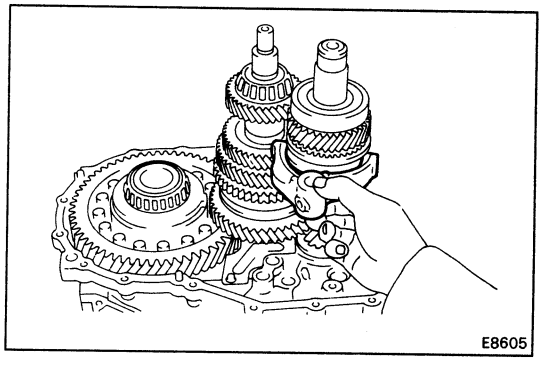


7. INSTALL SNAP RINGS

(a) Using a plastic hammer, install the snap rings to the No. 1, No. 2 and No. 3 shift fork shafts.

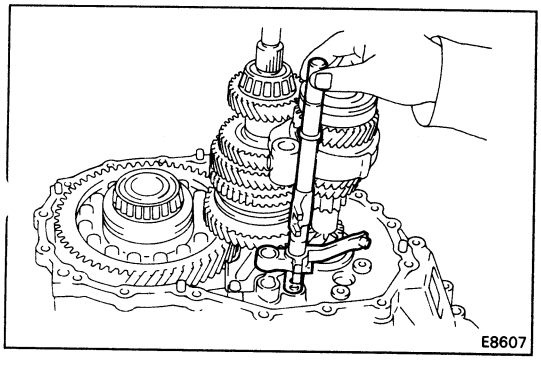


(b) Using a plastic hammer, install the reverse shift fork and snap ring to the No. 3 shift fork shaft.

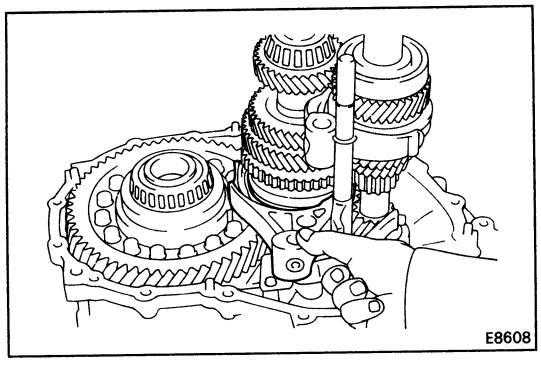


8. INSTALL NO. 2 SHIFT FORK AND NO. 3 SHIFT FORK SHAFT WITH REVERSE SHIFT FORK

(a) Install the No. 2 shift fork to the No. 2 hub sleeve.

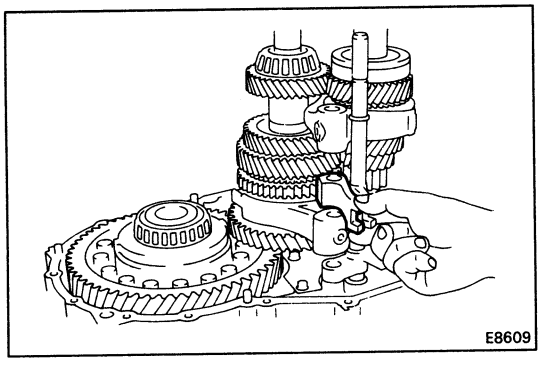


(b) Install the No. 3 shift fork shaft with reverse shift fork.

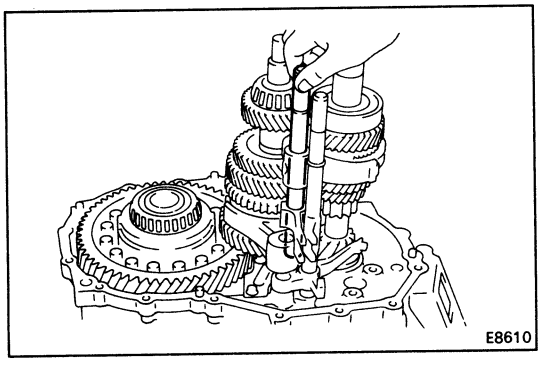


9. INSTALL NO. 1 SHIFT FORK, SHIFT HEAD AND NO. 2 SHIFT FORK SHAFT

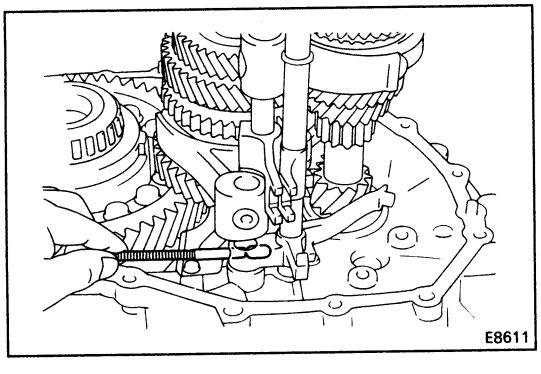
(a) Install the No. 1 shift fork to the No. 1 hub sleeve.



(b) Put shift head onto the No. 1 shift fork.

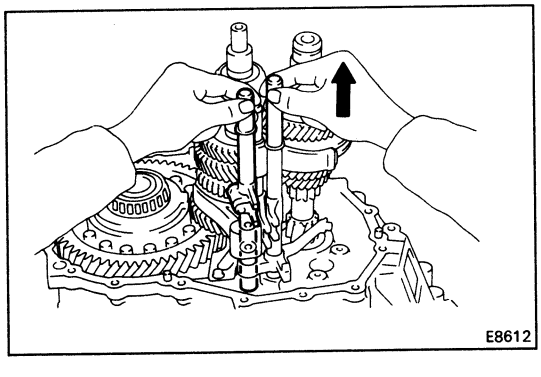


(c) Install the No. 2 shift fork shaft to the transaxle case, through the shift head and No. 1 shift fork.



10. INSTALL INTERLOCK ROLLER

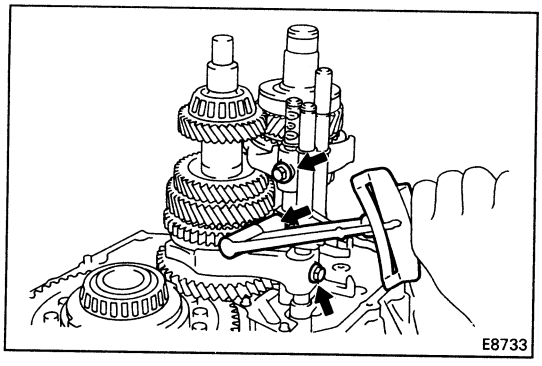
Using a magnetic finger, install the interlock roller to the reverse shift fork.



11. INSTALL NO. 1 SHIFT FORK SHAFT

Install the No. 1 shift fork shaft to the case, through the No. 1 shift fork and reverse shift fork.

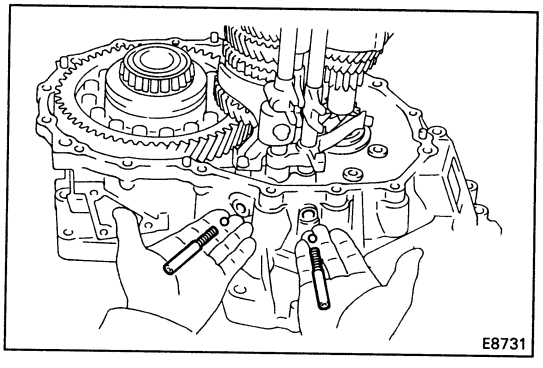
HINT: When it is difficult to install the fork shaft through the reverse shift fork, pull up the No. 3 shift fork shaft.



12. INSTALL SET BOLTS

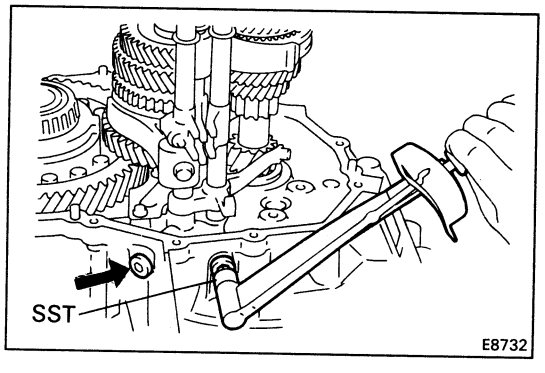
Install and torque the three set bolts.

Torque: 240 kg-cm (17 ft-lb, 24 N·m)



13. INSTALL LOCKING BALLS, SPRINGS, SEATS AND PLUGS

(a) Install the two locking balls, springs and seats.



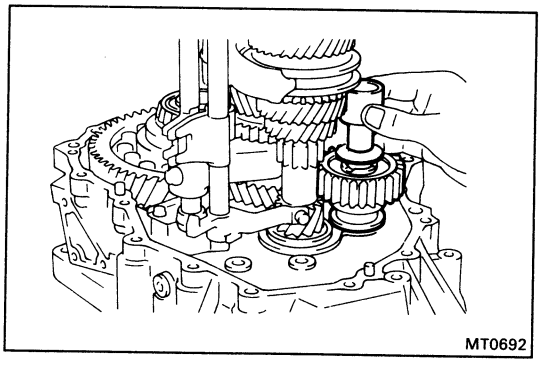
(b) Apply liquid sealant to the two plugs.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(c) Using SST, install and torque two plugs.

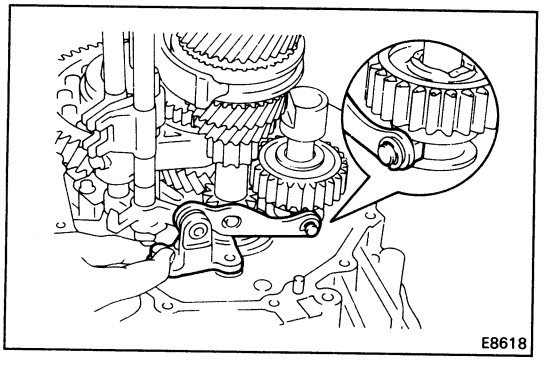
SST 09313-30021

Torque: 250 kg-cm (18 ft-lb, 25 N·m)



14. INSTALL REVERSE IDLER GEAR AND SHAFT

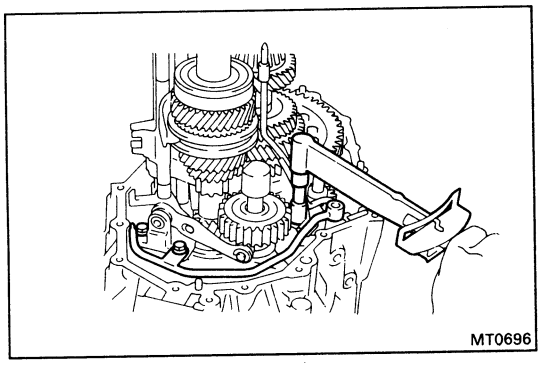
Install the reverse idler gear and shaft as shown.



15. INSTALL REVERSE SHIFT ARM BRACKET AND NO. 2 OIL PIPE

(a) Put the reverse shift fork pivot into the reverse shift arm and install the reverse shift arm bracket to the transaxle case.

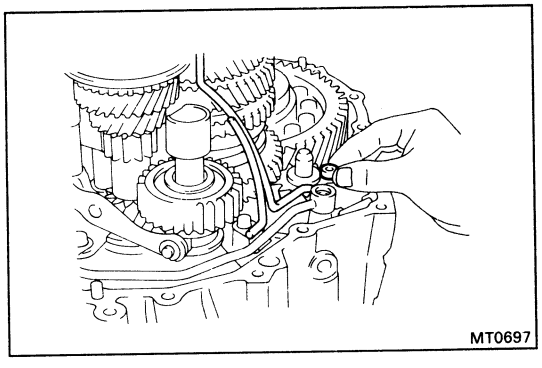
(b) Install the bolt.


MT0696

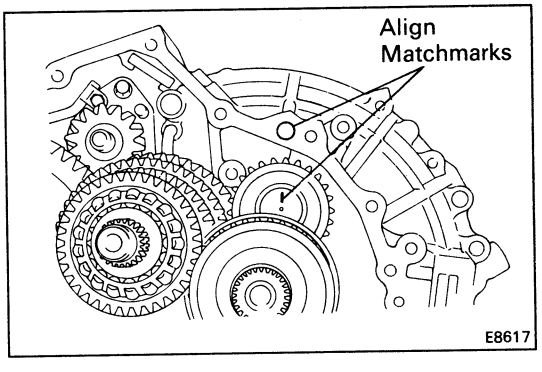
(c) Install the No. 2 oil pipe and two bolts.

(d) Torque the reverse shift arm bracket and oil pipe bolts.

Torque: 175 kg-cm (13 ft-lb, 17 N·m)

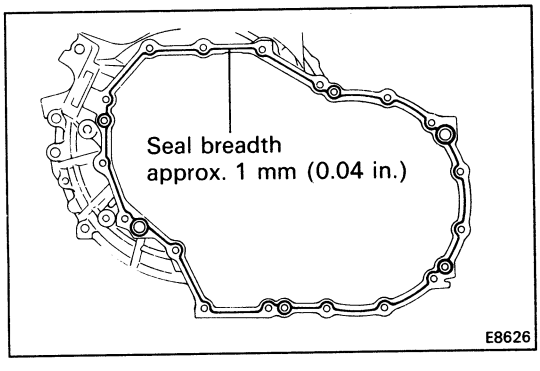

MT0697

(e) Install the new gasket to the No. 2 oil pipe.



E8617

16. ALIGN MATCHMARKS



E8626

17. INSTALL TRANSMISSION CASE

(a) Remove any packing material and be careful not to drop oil on the contacting surfaces of the transmission case or transaxle case.

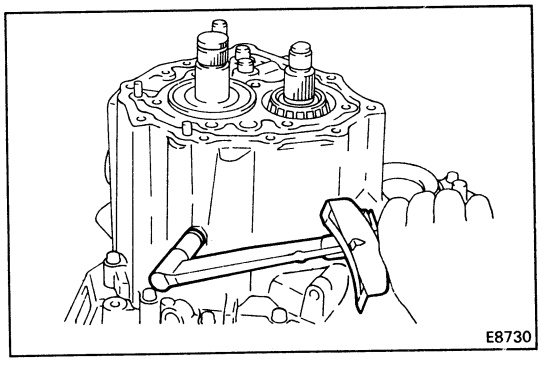
(b) Apply seal packing to the transmission case as shown in the figure.

Seal packing: Part No. 08826-00090, THREE BOND 1281 or equivalent

HINT: Install the transmission case as shown as the seal packing is applied.

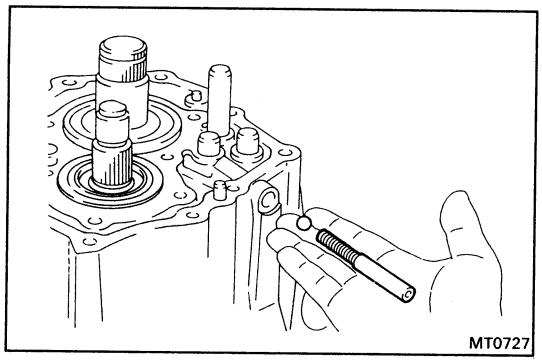
(c) Install and torque the seventeen bolts.

Torque: 300 kg-cm (22 ft-lb, 29 N·m)


E8730

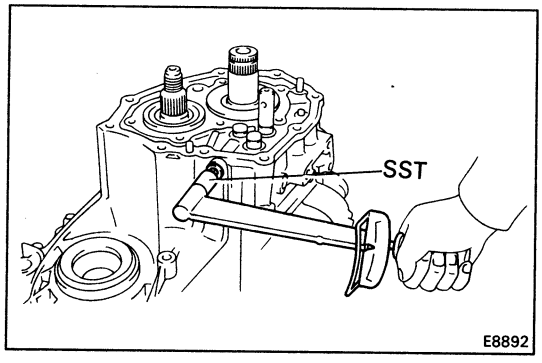
18. INSTALL AND TORQUE REVERS IDLER GEAR SHAFT RETAINING BOLT

Torque: 300 kg-cm (22 ft-lb, 29 N·m)



19. INSTALL LOCKING BALL, SPRING, SEAT AND PLUG

(a) Install the locking ball, spring and seat.



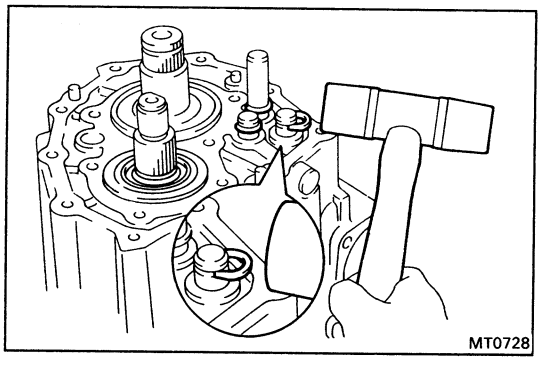
(b) Apply liquid sealant to the plug.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(c) Using SST, install and torque the plug.

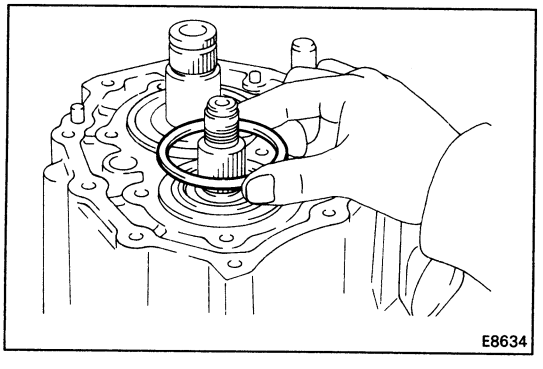
SST 09313-30021

Torque: 250 kg-cm (18 ft-lb, 25 N·m)



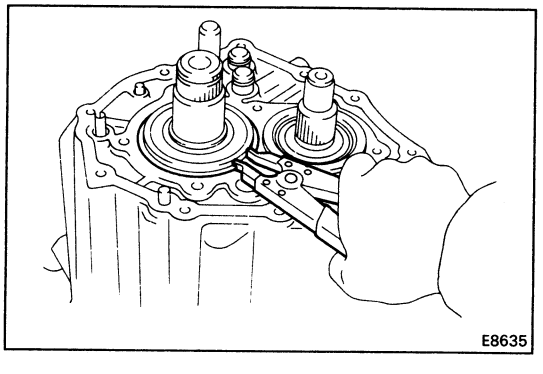
20. INSTALL SNAP RINGS

Using a plastic hammer, install the three snap rings.



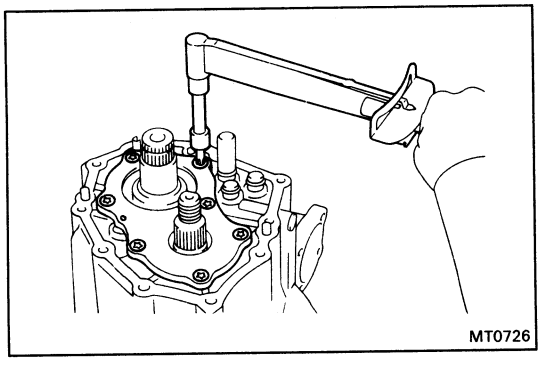
21. INSTALL SHIM

HINT: Install the previously selected shim.
(See page MT-105)



22. INSTALL SNAP RING

Using a snap ring pliers, install the snap ring to the input shaft rear bearing.


MT0726

23. INSTALL REAR BEARING RETAINER

(a) Clean the threads of the torx screws.

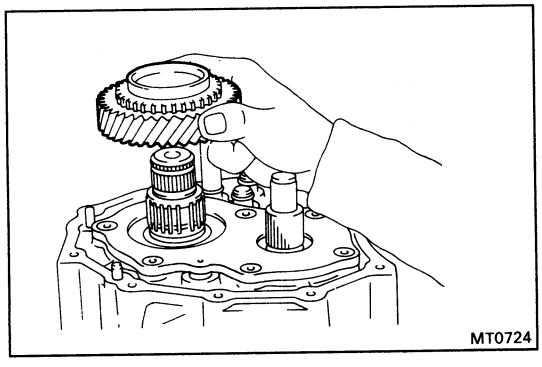
(b) Apply liquid sealant to the screw threads.

Sealant: Part No. 08833-00070, THREE BOND 1324, LOCTITE 242 or equivalent

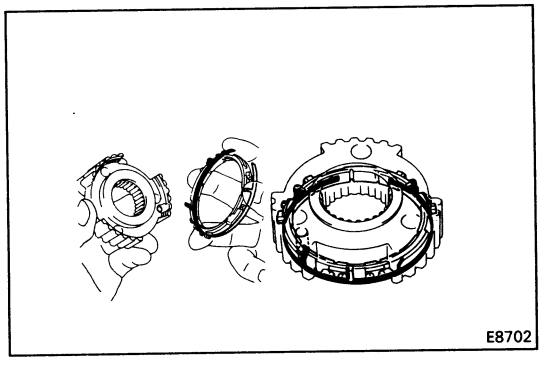
(c) Using a torx wrench, install and torque the seven torx screws.

Torx wrench T45 09042-00050

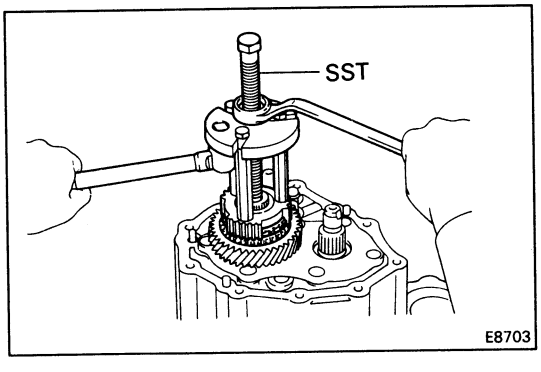
Torque: 430 kg-cm (31 ft-lb, 42 N·m)


MT0724

24. INSTALL SPACER, NEEDLE ROLLER BEARING AND FIFTH GEAR


E8702

25. INSTALL SYNCHRONIZER RING WITH KEY SPRING TO NO. 3 CLUTCH HUB

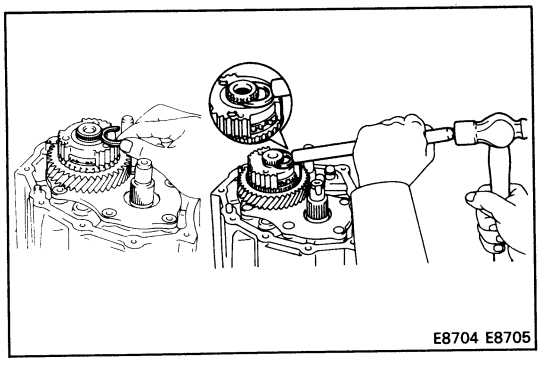


E8703

26. INSTALL NO. 3 CLUTCH HUB

Using SST, install the No. 3 clutch hub with synchronizer ring and key spring.

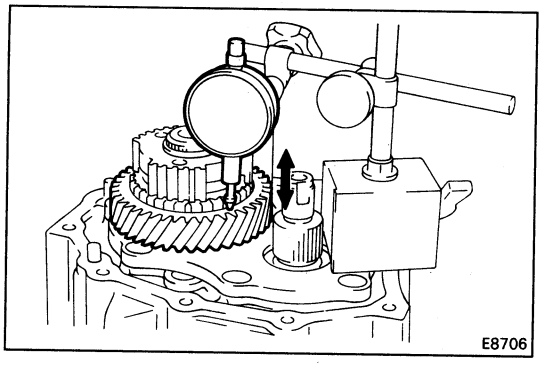
SST 09310-17010 (09310-07010, 09310-07020, 09310-07030)


E8704 E8705

27. INSTALL SNAP RING

Select a snap ring that will allow minimum axial play and install it on the shaft.

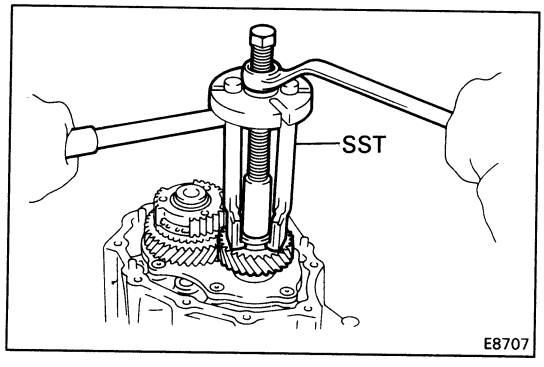
Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
Q	2.25 (0.0886)	V	2.50 (0.0984)
R	2.30 (0.0906)	W	2.55 (0.1004)
S	2.35 (0.0925)	X	2.60 (0.1024)
T	2.40 (0.0945)	Y	2.65 (0.1043)
U	2.45 (0.0965)		



28. MEASURE FIFTH GEAR THRUST CLEARANCE

Using a dial indicator measure the 5th gear thrust clearance.

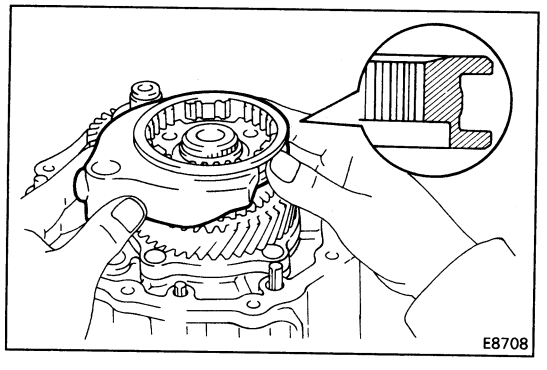
Standard clearance: 0.10 – 0.57 mm (0.0039 – 0.0224 in.)



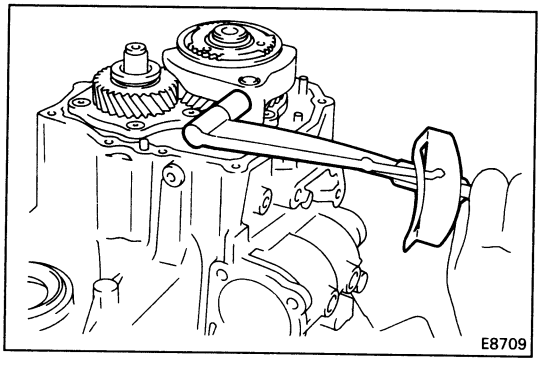
29. INSTALL FIFTH DRIVEN GEAR

Using SST, install the 5th driven gear.

SST 09310-17010 (09310-07010, 09310-07020, 09310-07040, 09310-07050)



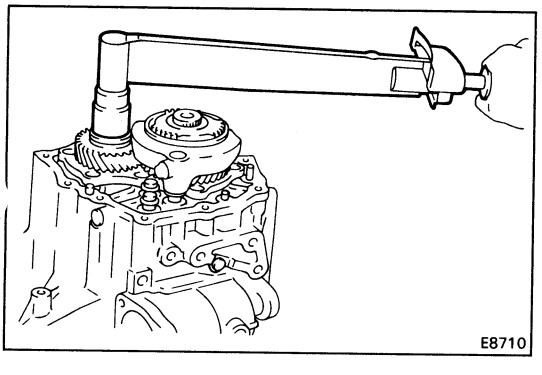
30. INSTALL NO. 3 HUB SLEEVE WITH NO. 3 SHIFT FORK



31. INSTALL SET BOLT

Install and torque the set bolt.

Torque: 240 kg-cm (17 ft-lb, 24 N·m)



32. INSTALL LOCK NUT

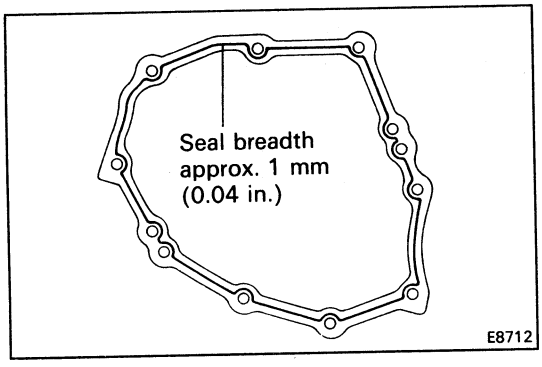
(a) Engage the gear double meshing.

(b) Install and torque the lock nut.

Torque: 1,250 kg-cm (90 ft-lb, 123 N·m)

(c) Disengage the gear double meshing.

(d) Stake the lock nut.



33. INSTALL TRANSMISSION CASE COVER

(a) Remove any packing material and be careful not to drop oil on the contacting surfaces of the transmission case cover.

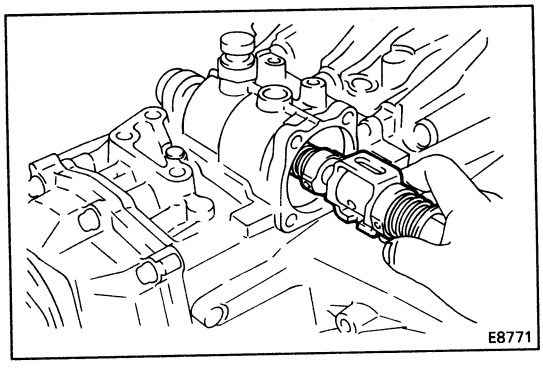
(b) Apply seal packing to the transmission case as shown in the figure.

Seal packing: Part No. 08826-00090, THREE BOND 1281 or equivalent

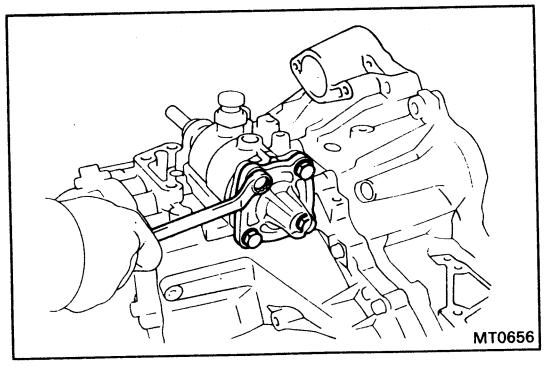
HINT: Install the transmission case cover as soon as the seal packing is applied.

(c) Install and torque the ten bolts.

Torque: 300 kg-cm (22 ft-lb, 29 N·m)



34. INSTALL SHIFT AND SELECT LEVER SHAFT ASSEMBLY



35. INSTALL CONTROL SHAFT COVER

(a) Place a new gasket in position on the control shaft cover.

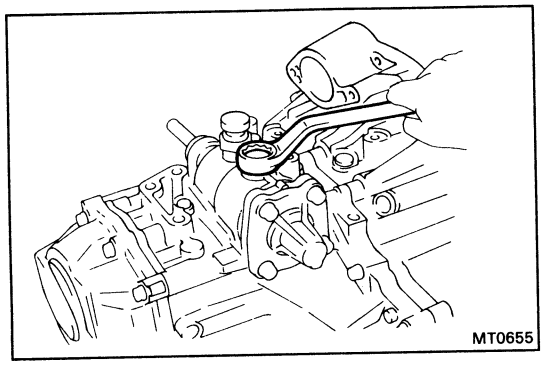
(b) Install the control shaft cover.

(c) Apply liquid sealant to the bolt threads.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

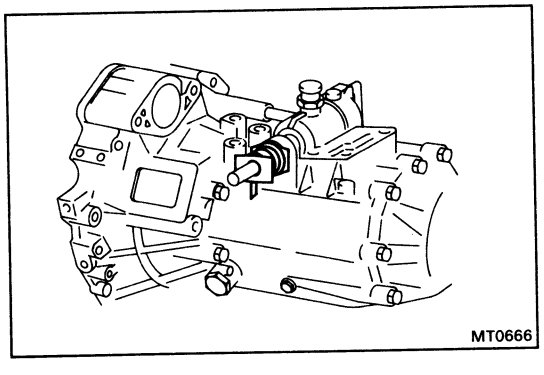
(d) Install and torque the bolts.

Torque: 200 kg-cm (14 ft-lb, 20 N·m)



36. INSTALL AND TORQUE LOCK BOLT

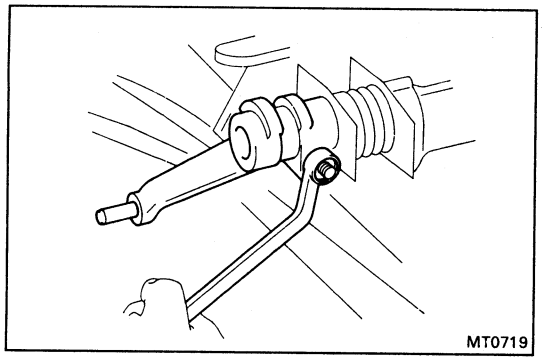
Torque: 500 kg-cm (36 ft-lb, 49 N·m)



37. INSTALL SHIFT LEVER

(a) Install the boot to the control shaft oil seal.

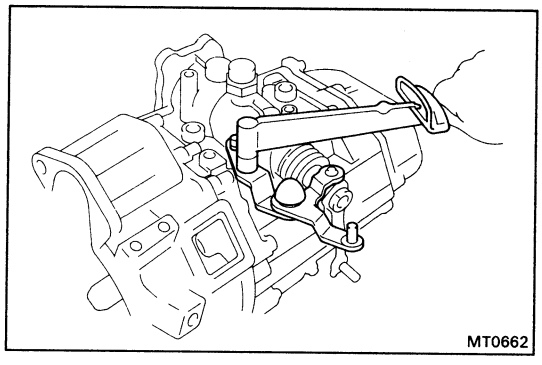
HINT: Make sure to install the boot in the correct direction. Position the air bleed of the boot downward.



(b) Fit the pin's groove into the shaft's notch and tap on with a hammer.

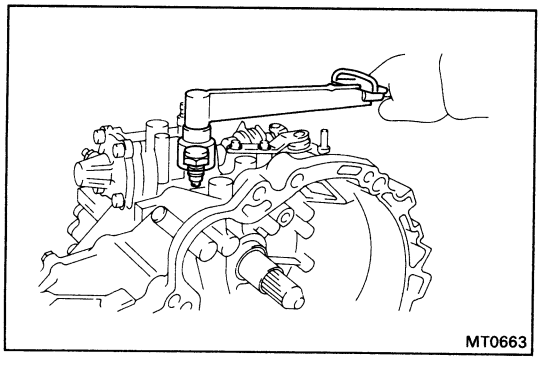
(c) Install and torque the nut.

Torque: 120 kg-cm (9 ft-lb, 12 N·m)



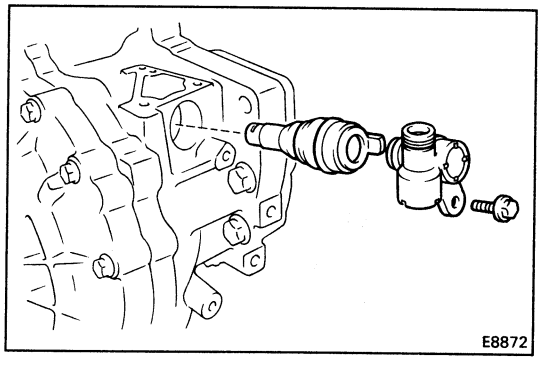
38. INSTALL AND TORQUE SELECTING BELLCRANK ASSEMBLY

Torque: 200 kg-cm (14 ft-lb, 20 N·m)

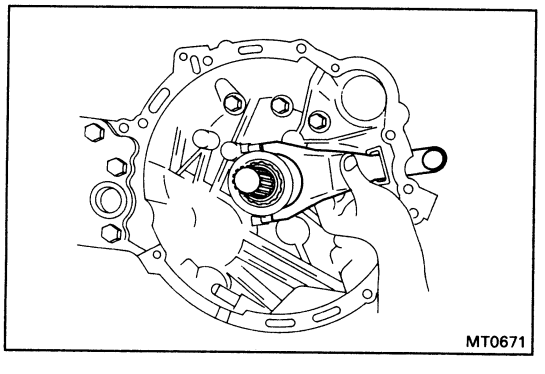


39. INSTALL BACK-UP LIGHT SWITCH WITH GASKET

Torque: 410 kg-cm (30 ft-lb, 40 N·m)



40. INSTALL SPEEDOMETER DRIVEN GEAR



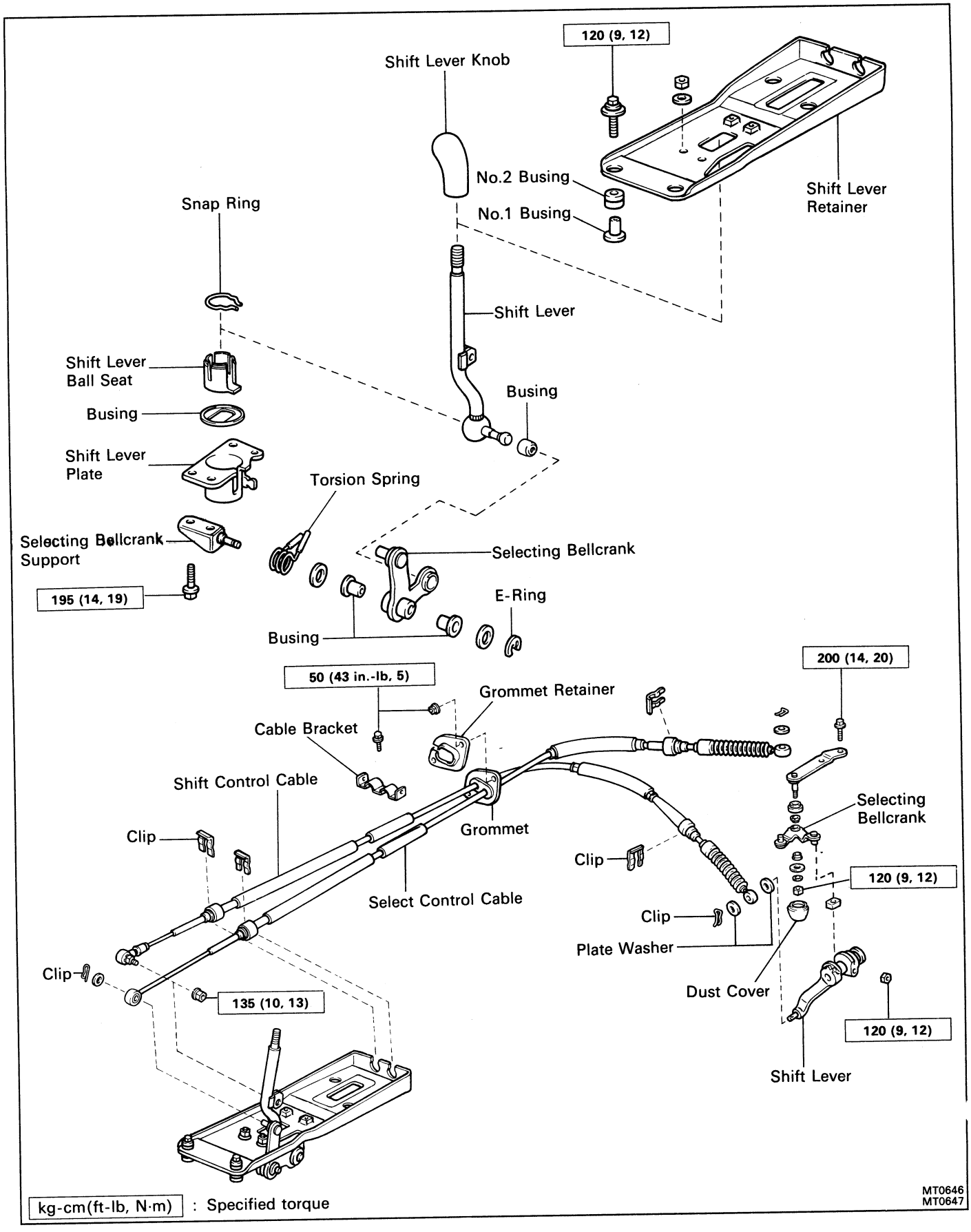
41. INSTALL RELEASE FORK AND BEARING

Apply molybdenum disulphide lithium base grease to the following parts:

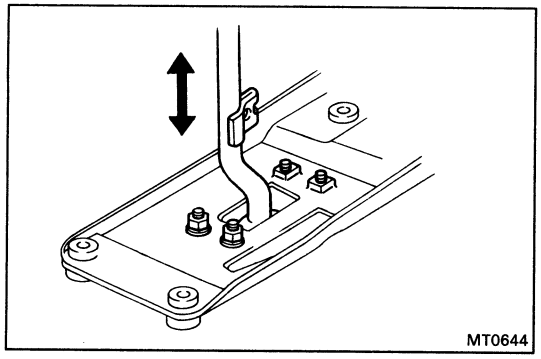
- Input shaft spline
- Release fork contact surface

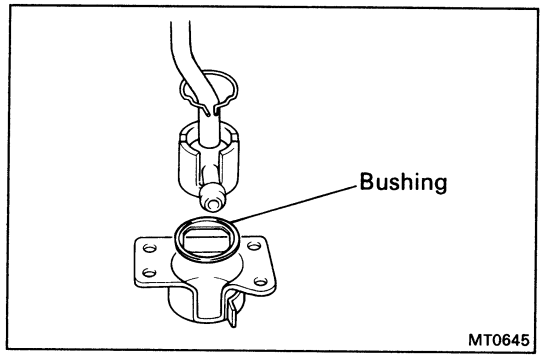
SHIFT LEVER AND CONTROL CABLE

COMPONENTS



kg-cm(ft-lb, N·m) : Specified torque


MT0644



MT0645

INSPECTION OF SHIFT LEVER

INSPECT SHIFT LEVER PLAY

Check that there is no vertical play in the shift lever.

If there is any play, replace bushing.

A241E AUTOMATIC TRANSAXLE

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DESCRIPTION

General

The A241E automatic transaxle is a 4-speed Electronically Controlled Transaxle (hereafter called ECT) with a lock-up mechanism developed exclusively for the new MR2.

The A241E automatic transaxle is already in use in the Celica (ST184 series.)

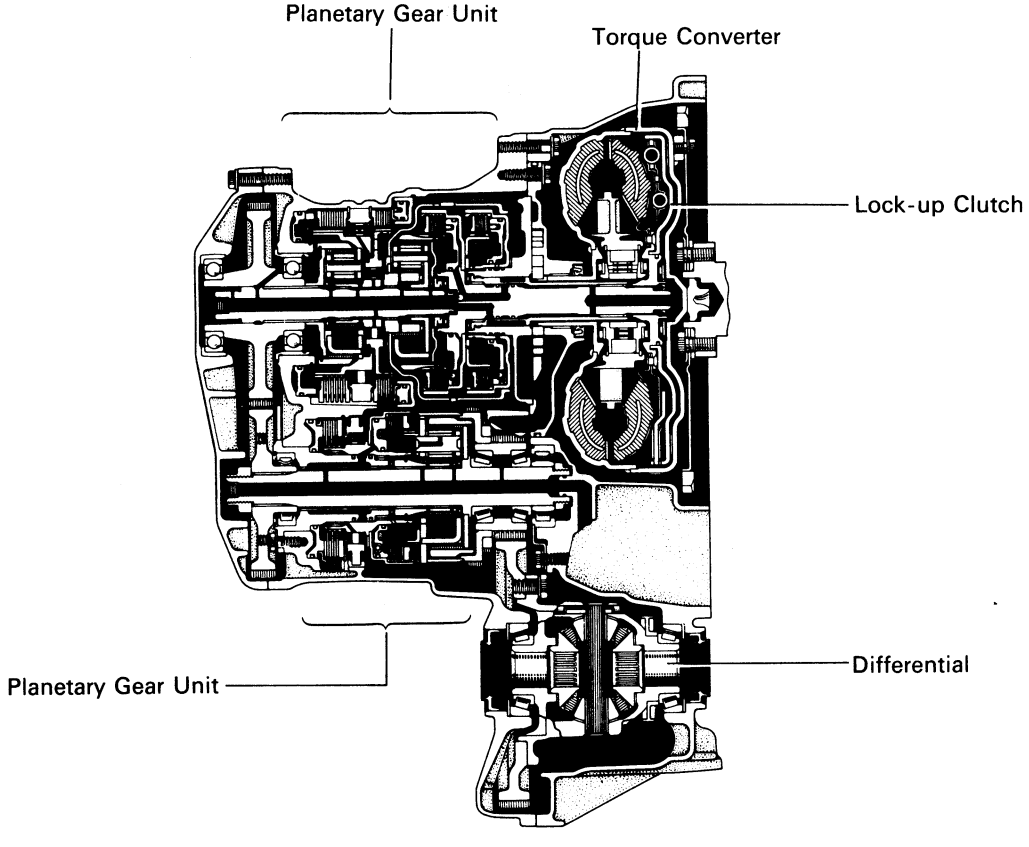
This automatic transaxle has the following features.

- ▶ The "Super-Flow" torque converter is used to improve the transmission efficiency.
- ▶ When shifting the transmission, the engine torque is controlled and the clutch hydraulic pressure in the transmission is electronically controlled to reduce transmission shift shock.
- ▶ Transaxle control ECU has been integrated with the Engine ECU.

This automatic transaxle are mainly composed of the torque converter with lock-up clutch, 4-speed planetary gear unit, the hydraulic control system and the electronic control system.

To minimize the possibility of incorrect operation of the automatic transaxle, a shift lock mechanism has also been added.

Sectional View



A241E

AT5715

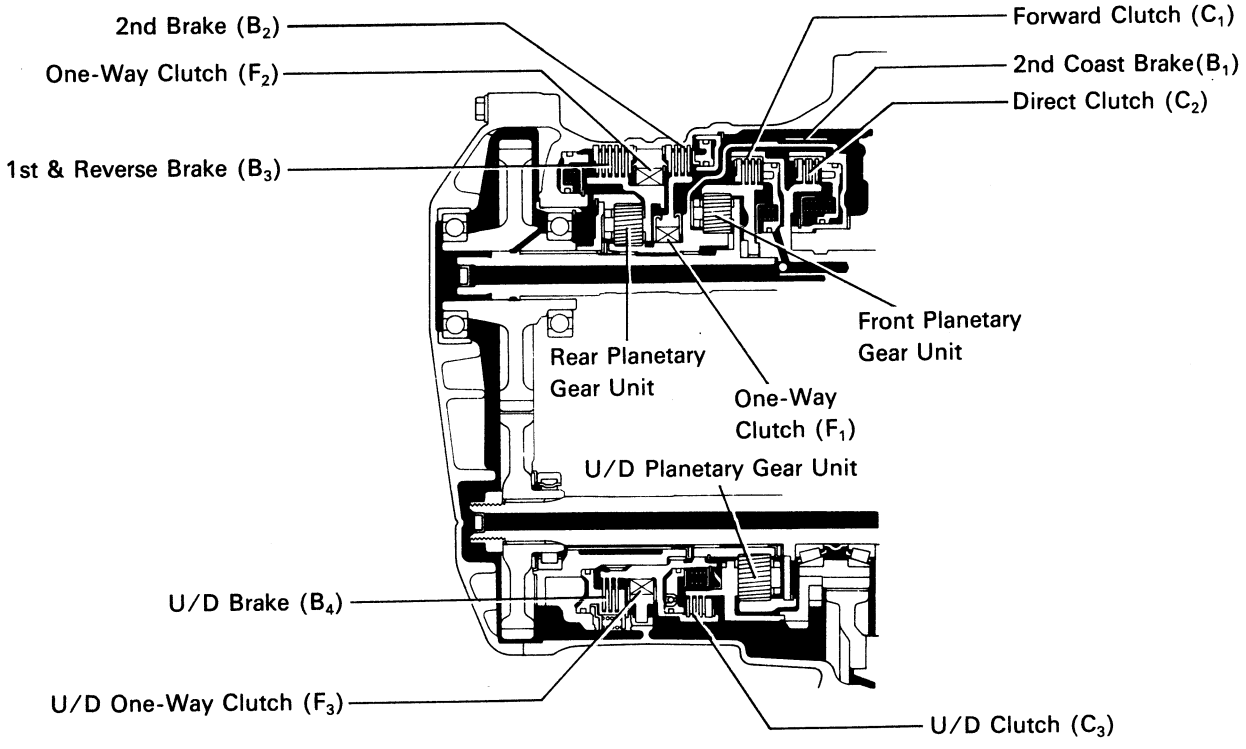
General Specifications

Type of Transaxle			A241E
Type of Engine			5S-FE
Torque Converter	Stall Torque Ratio		2.1 : 1
	Lock-Up Mechanism		Equipped
Gear Ratio	1st Gear		3.643
	2nd Gear		2.008
	3rd Gear		1.296
	O/D Gear		0.892
	Reverse Gear		2.977
Number of Discs and Plates (Disc/Plate)	C_1	Forward Clutch	4/4
	C_2	Direct Clutch	3/3
	C_3	Underdrive Clutch	3/5
	B_2	2nd Brake	3/3
	B_3	1st & Reverse Brake	6/5
	B_4	Underdrive Brake	3/3
2nd Coast Brake (B_1) Band Width mm(in.)			25 (0.98)
Number of Sprags	F_1	No. 1 One-Way Clutch	18
	F_2	No. 2 One-Way Clutch	30
	F_3	Underdrive One-Way Clutch	30
Front Planetary Gear	No. of Sun Gear Teeth		39
	No. of Pinion Gear Teeth		16
	No. of Ring Gear Teeth		71
Rear Planetary Gear	No. of Sun Gear Teeth		27
	No. of Pinion Gear Teeth		18
	No. of Ring Gear Teeth		62
Underdrive Planetary Gear	No. of Sun Gear Teeth		33
	No. of Pinion Gear Teeth		20
	No. of Ring Gear Teeth		73
ATF	Type		ATF DEXRON® II
	Capacity liter (US qts, Imp. qts)	Total	8.0 (8.5, 7.0)
		Drain & Refill	3.3 (3.5, 2.9)

OPERATION

Mechanical Operation

OPERATING CONDITIONS



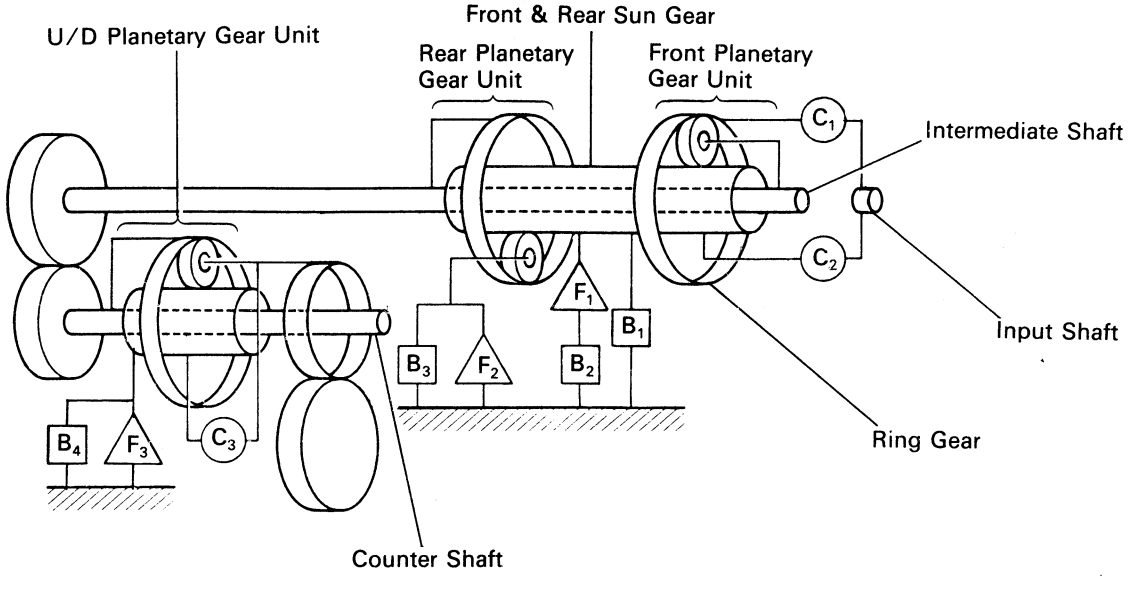
B5342

Range (i.e, Shift Lever Position)	Gear	No.1 Solenoid Valve	No.2 Solenoid Valve	C_1	C_2	C_3	B_1	B_2	B_3	B_4	F_1	F_2	F_3
P	Park	ON	OFF							●			
R	Reverse	ON	OFF		●				●	●			
N	Neutral	ON	OFF							●			
D	1st	ON	OFF	●						●		●	●
	2nd	ON	ON	●				●		●	●		●
	3rd	OFF	ON	●	●			●		●			●
	O/D	OFF	OFF	●	●	●		●					
2	1st	ON	OFF	●						●		●	●
	2nd	ON	ON	●			●	●		●	●		●
	3rd*1	OFF	ON	●	●			●		●			●
L	1st	ON	OFF	●					●	●		●	●
	2nd*1	ON	ON	●			●	●		●	●		●

●: Operating
*1 : Down-shift only in the 3rd gear for the 2 range and 2nd gear for the L range – no up-shift

FUNCTION OF COMPONENTS

Component		Function
C_1	Forward Clutch	Connects input shaft and front planetary ring gear.
C_2	Direct Clutch	Connects input shaft and front & rear planetary sun gear.
C_3	U/D Clutch	Connects underdrive sun gear and underdrive planetary carrier.
B_1	2nd Coast Brake	Prevents front & rear planetary sun gear from turning either clockwise or counterclockwise.
B_2	2nd Brake	Prevents outer race of F_1 from turning either clockwise or counterclockwise, thus preventing the front & rear planetary sun gear from turning counterclockwise.
B_3	1st & Reverse Brake	Prevents rear planetary carrier from turning either clockwise or counterclockwise.
B_4	U/D Brake	Prevents underdrive sun gear from turning either clockwise or counterclockwise.
F_1	No. 1 One-Way Clutch	When B_2 is operating, this clutch prevents the front & rear planetary gear from turning counterclockwise.
F_2	No. 2 One-Way Clutch	Prevents rear planetary carrier from turning counterclockwise.
F_3	U/D One-Way Clutch	Prevents underdrive planetary sun gear from turning clockwise.
Planetary Gears		These gears change the route through which driving force is transmitted, in accordance with the operation of each clutch and brake, in order to increase or reduce the input and output speed.

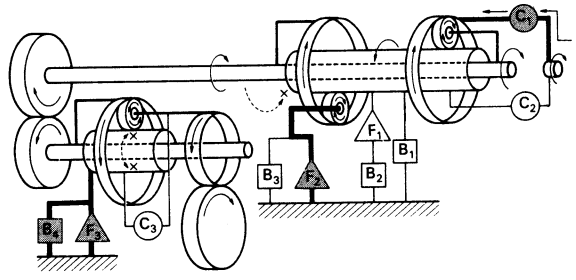


AT2690

FUNCTION OF COMPONENTS (Cont'd)

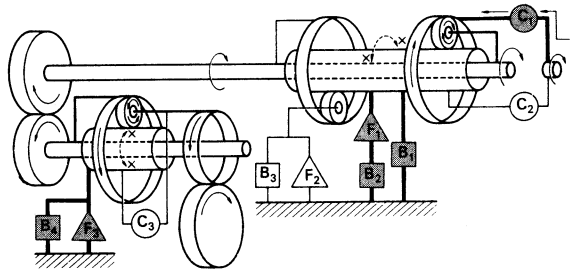
The conditions of operation for each gear position are shown on the following illustrations:

D or 2 Range 1st Gear



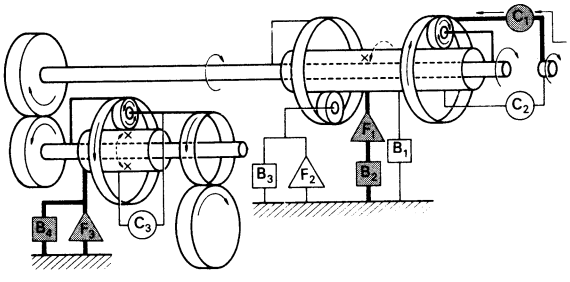
AT3216

2 Range 2nd Gear



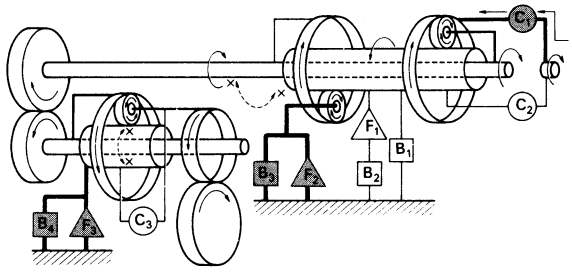
AT3220

D Range 2nd Gear



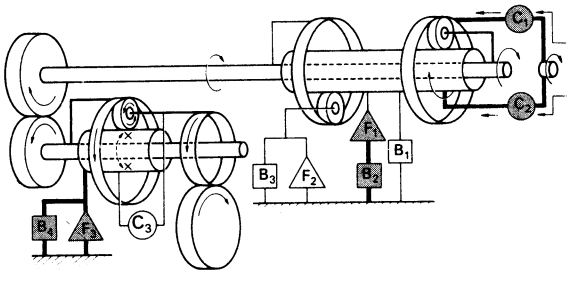
AT3217

L Range 1st Gear



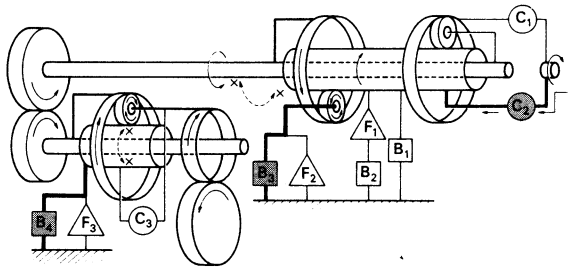
AT3221

D Range 3rd Gear



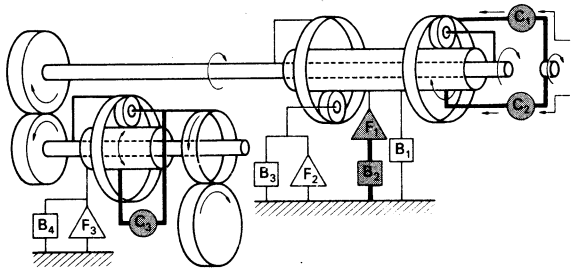
AT3218

R Range Reverse Gear



AT3222

D Range O/D



AT3219

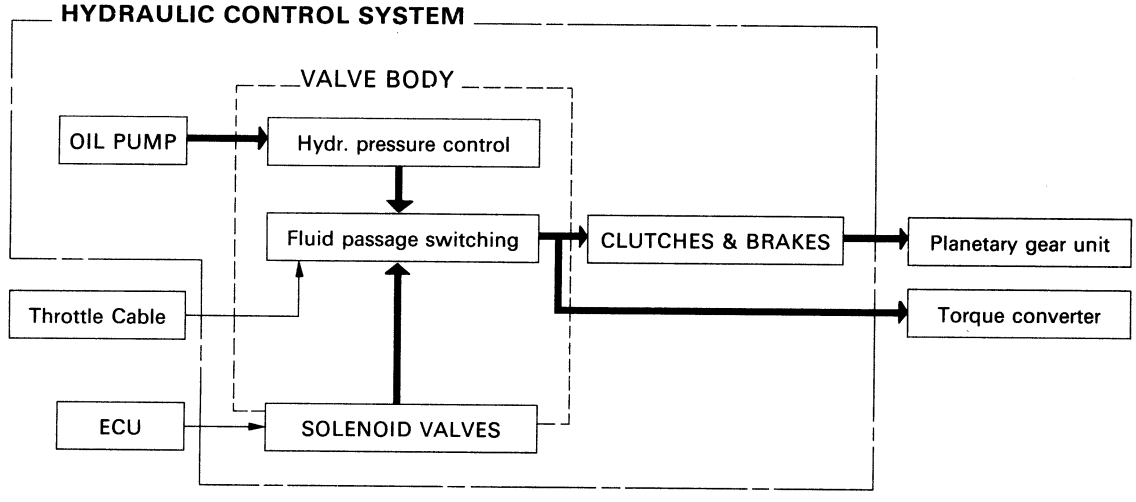
Hydraulic Control System

The hydraulic control system is composed of the oil pump, the valve body, the solenoid valves, the accumulators, the clutches and brakes, and the governor valve as well as the fluid passages which connect all of these components.

Based on the hydraulic pressure created by the oil pump, the hydraulic control system governs the hydraulic pressure acting on the torque converter, clutches and brakes in accordance with the vehicle driving conditions.

There are three solenoid valves on the valve body.
The No. 1 and No. 2 solenoid valves are turned on and off by signals from the ECU to operate the shift valves and change the gear shift position.
The No. 3 solenoid valve is operated by signals from the ECU to engage or disengage the lock-up clutch of the torque converter.

► A241E



A241E Electronic Control System (See page AT-20)

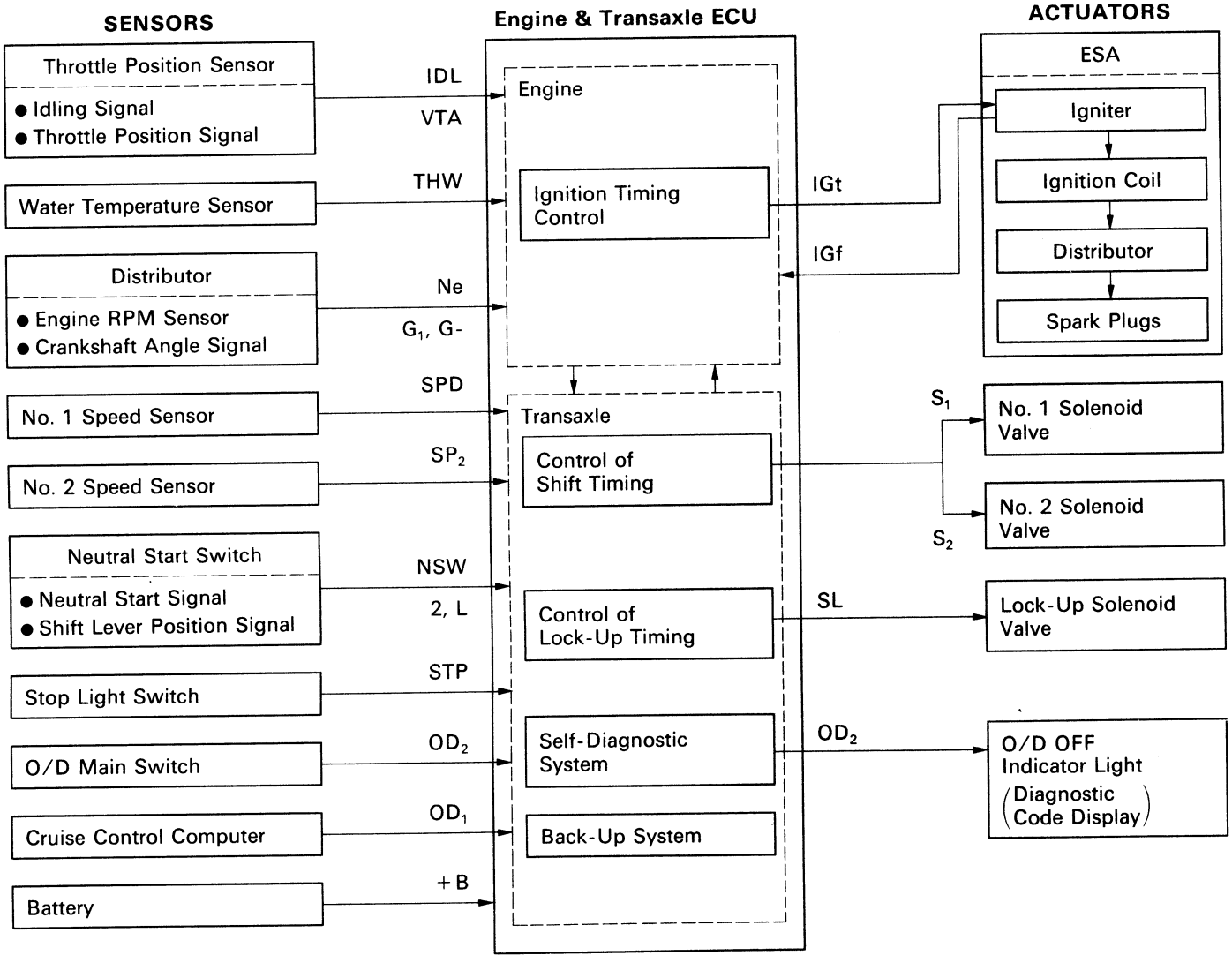
GENERAL

The electronic control system for the A241E automatic transaxle provides extremely precise control of the gear shift timing and lock-up timing in response to driving conditions as sensed by various sensors located throughout the vehicle and in response to the engine's running condition.

At the same time, the ECU control reduces vehicle squat when the vehicle starts out the gear shift shock. The electronic control system is also equipped with a self diagnosis system which diagnoses malfunctions of electronically controlled components and warns the driver, and a fail-safe which makes it possible for the vehicle to continue functioning when a malfunction occurs.

CONSTRUCTION

The electronic control system can be broadly divided into three groups; the sensors, ECU and actuators.



ELECTRONIC CONTROL CIRCUIT (See page AT-20)

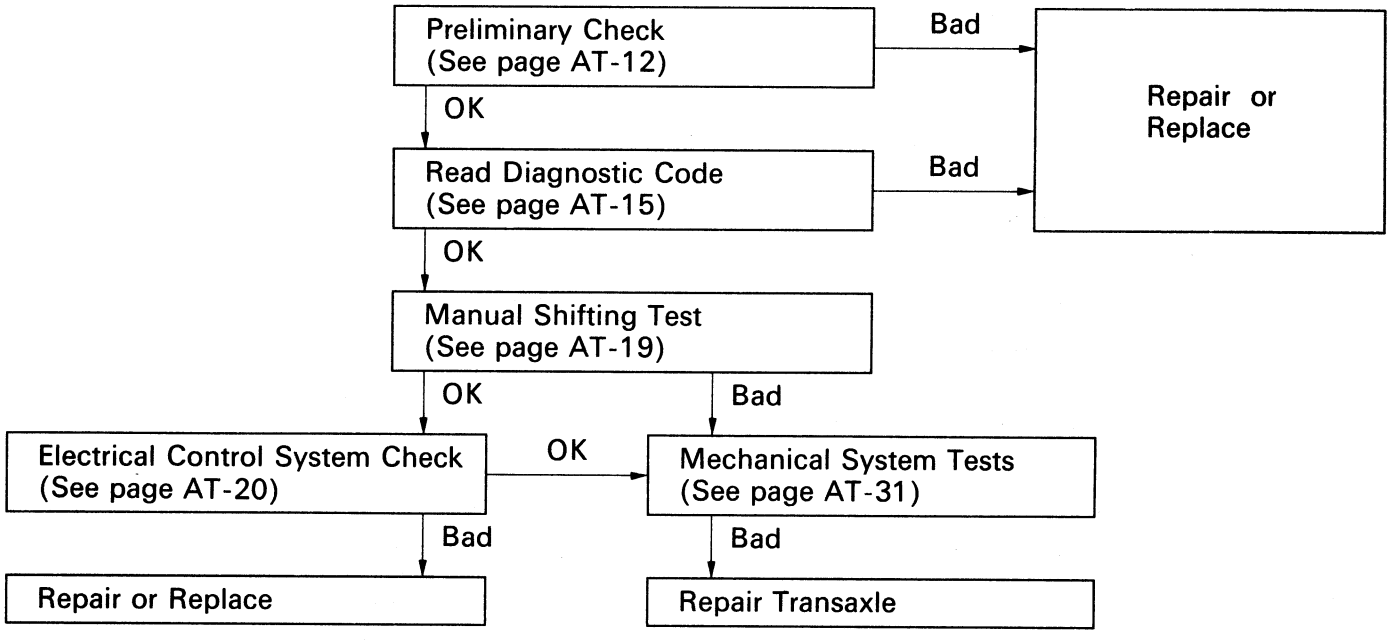
ELECTRONIC CONTROL COMPONENTS (See page AT-21)

TROUBLESHOOTING

Trouble occurring in the ECT can stem from one of three sources: the engine, the ECT electronic control unit or the transaxle itself. Before troubleshooting, determine in which these three sources the problem lies, and begin troubleshooting with the simplist operation, gradually working up in order of difficulty.

Basic Troubleshooting

Before troubleshooting and ECT, first determine whether the problem is electrical or mechanical. To do this, just refer to the basic troubleshooting flow-chart provided below.
If the cause is already known, using the basic troubleshooting chart below along with the general troubleshooting chart on the following page should speed the procedure.

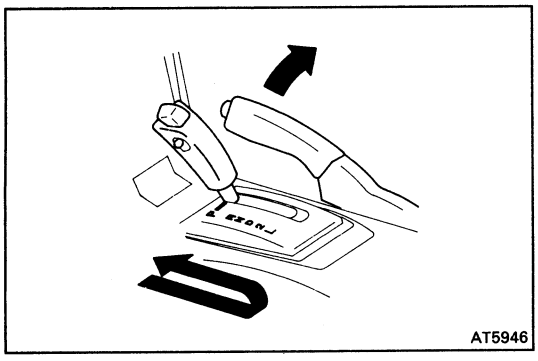


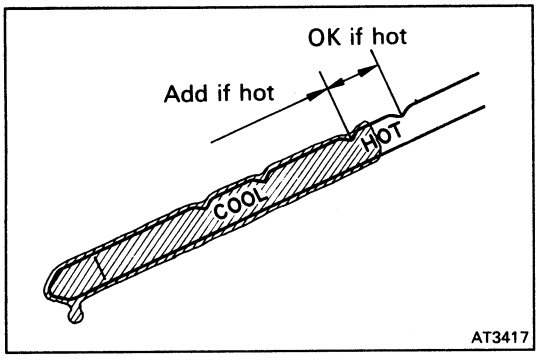
General Troubleshooting

Problem	Possible cause	Remedy	Page A241E
Fluid discolored or smells burnt	Fluid contaminated	Replace fluid	AT-12
	Torque converter faulty	Replace torque converter	AT-43
	Transaxle faulty	Disassemble and inspect transaxle	AT-44
Vehicle does not move in any forward range or reverse	Shift cable out of adjustment	Adjust shift cable	AT-13
	Valve body or primary regulator faulty	Inspect valve body	AT-112
	Parking lock pawl faulty	Inspect parking lock pawl	AT-66
	Torque converter faulty	Replace torque converter	AT-43
	Converter drive plate broken	Replace drive plate	AT-43
	Oil strainer intake screen blocked	Clean screen	AT-49
	Transaxle faulty	Disassemble and inspect transaxle	AT-44
Shift lever position incorrect	Shift cable out of adjustment	Adjust shift cable	AT-13
	Manual valve and lever faulty	Inspect valve body	AT-112
	Transaxle faulty	Disassemble and inspect transaxle	AT-44
Harsh engagement into any drive range	Throttle cable out of adjustment	Adjust throttle cable	AT-12
	Valve body or primary regulator faulty	Inspect valve body	AT-112
	Accumulator pistons faulty	Inspect accumulator pistons	AT-156
	Transaxle faulty	Disassemble and inspect transaxle	AT-44
Delayed 1-2, 2-3 or 3-O/D up-shift, or down-shifts from O/D-3 or 3-2 and shift back to O/D or 3	Electronic control faulty	Inspect electronic control	AT-20
	Valve body faulty	Inspect valve body	AT-112
	Solenoid valve faulty	Inspect solenoid valve	AT-28
	Throttle cable out of adjustment	Adjust throttle cable	AT-12
Slips on 1-2, 2-3 or 3-O/D up-shift, or slips or shudders on acceleration	Shift cable out of adjustment	Adjust shift cable	AT-13
	Throttle cable out of adjustment	Adjust throttle cable	AT-12
	Valve body faulty	Inspect valve body	AT-112
	Solenoid valve faulty	Inspect solenoid valve	AT-28
	Transaxle faulty	Disassemble and inspect transaxle	AT-44
Drag, binding or tie-up on 1-2, 2-3, or 3-O/D up-shift	Shift cable out of adjustment	Adjust shift cable	AT-13
	Valve body faulty	Inspect valve body	AT-112
	Transaxle faulty	Disassemble and inspect transaxle	AT-44

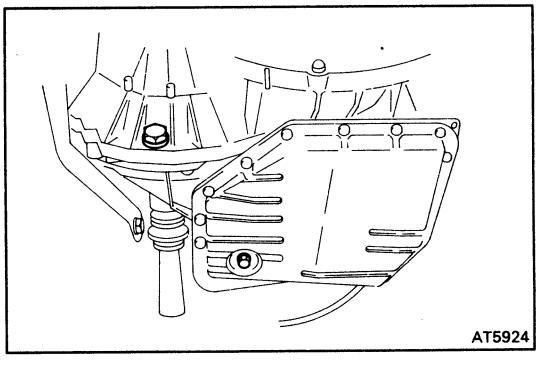
General Troubleshooting (Cont'd)

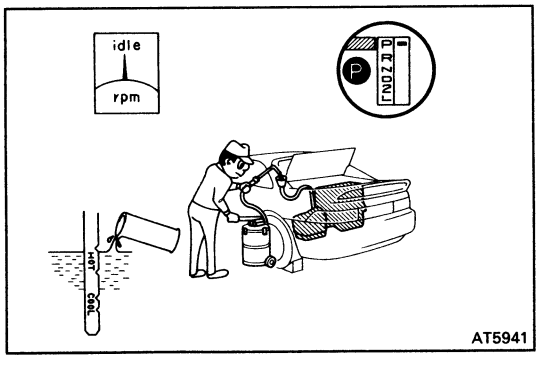
Problem	Possible cause	Remedy	Page A241E
No lock-up in 2nd, 3rd or O/D	Electronic control faulty	Inspect electronic control	AT-20
	Valve body faulty	Inspect valve body	AT-112
	Solenoid valve faulty	Inspect solenoid valve	AT-28
	Transaxle faulty	Disassemble and inspect transaxle	AT-44
Harsh down-shift	Throttle cable out of adjustment	Adjust throttle cable	AT-13
	Throttle cable and cam faulty	Inspect throttle cable and cam	AT-50
	Accumulator pistons faulty	Inspect accumulator pistons	AT-156
	Valve body faulty	Inspect valve body	AT-112
	Transaxle faulty	Disassemble and inspect transaxle	AT-44
No down-shift when coasting	Valve body faulty	Inspect valve body	AT-112
	Solenoid valve faulty	Inspect solenoid valve	AT-28
	Electronic control faulty	Inspect electronic control	AT-20
Down-shift occurs too quickly or too late while coasting	Throttle cable faulty	Inspect throttle cable	AT-12
	Valve body faulty	Inspect valve body	AT-112
	Transaxle faulty	Disassemble and inspect transaxle	AT-44
	Solenoid valve faulty	Inspect solenoid valve	AT-28
	Electronic control faulty	Inspect electronic control	AT-20
No O/D-3, 3-2 or 2-1 kick-down	Solenoid valve faulty	Inspect solenoid valve	AT-28
	Electronic control faulty	Inspect electronic control	AT-20
	Valve body faulty	Inspect valve body	AT-112
	Throttle cable out of adjustment	Adjust throttle cable	AT-12
No engine braking in 2 or L range	Solenoid valve faulty	Inspect solenoid valve	AT-28
	Electronic control faulty	Inspect electronic control	AT-20
	Valve body faulty	Inspect valve body	AT-112
	Transaxle faulty	Disassemble and inspect transaxle	AT-44
Vehicle does not hold in P range	Shift cable out of adjustment	Adjust shift cable	AT-13
	Parking lock pawl and spring faulty	Inspect cam and spring	AT-66


AT5946

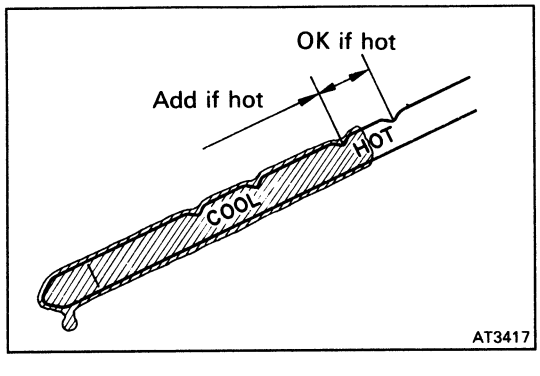


AT3417


AT5924



AT5941



AT3417

Preliminary Check

1. CHECK FLUID LEVEL

HINT: The vehicle must have been driven so that the engine and transmission are at normal operating temperature.
(Fluid temperature: 70 – 80 °C or 158 – 176 °F)

(a) Park the vehicle on a level surface, set the parking brake.

(b) With the engine idling, shift the selector into each gear from P range to L range and return to P range.

HINT: Depress the brake pedal.

(c) Pull out the transmission dipstick and wipe it clean.

(d) Push it back fully into the tube.

(e) Pull it out and check that the fluid level is in the HOT range. If the level is at the low side of the hot range, and fluid.

Fluid type: ATF DEXRON®II

NOTICE: Do not overfill.

2. CHECK FLUID CONDITION

If the fluid smells burnt or is black, replace it.

3. REPLACE ATF

NOTICE: Do not overfill.

(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.

Fluid: ATF DEXRON®II

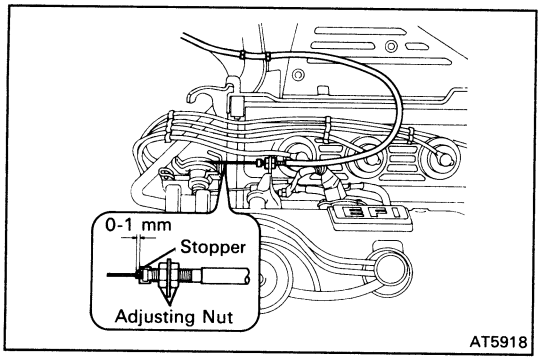
Capacity:
8.0 liters (8.5 US qts, 7.0 Imp. qts)
Drain and refill (Reference):
3.3 liters (3.5 US qts, 8.9 Imp. qts)

(d) Start the engine and shift the selector into all 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.

(f) Check the fluid level at the normal fluid temperature (70 – 80 °C or 158 – 176 °F) and add as necessary.

NOTICE: Do not overfill.



4. INSPECT AND ADJUST THROTTLE CABLE

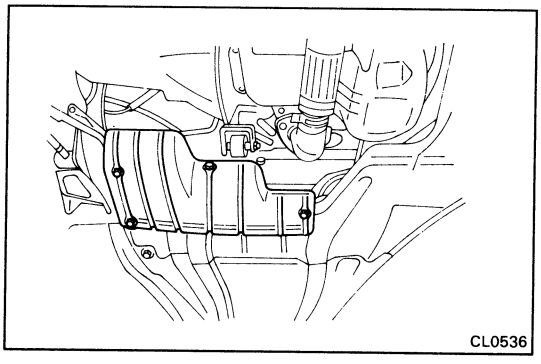
(a) Check that the throttle valve is fully closed.

(b) Check that the inner cable is not slack.

(c) Measure the distance between the outer cable end and stopper on the cable.

Standard distance: 0 – 1 mm (0 – 0.04 in.)

If the distance is not standard, adjust the cable by the adjusting nuts.

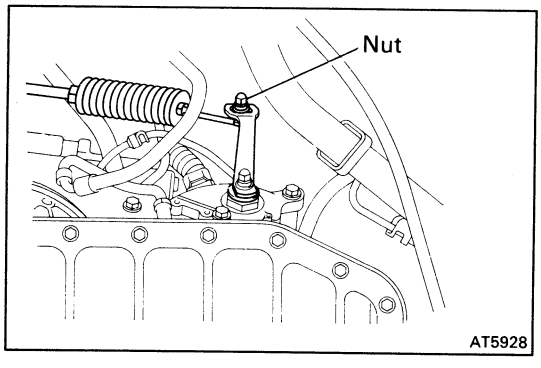


5. INSPECT AND ADJUST SHIFT CABLE

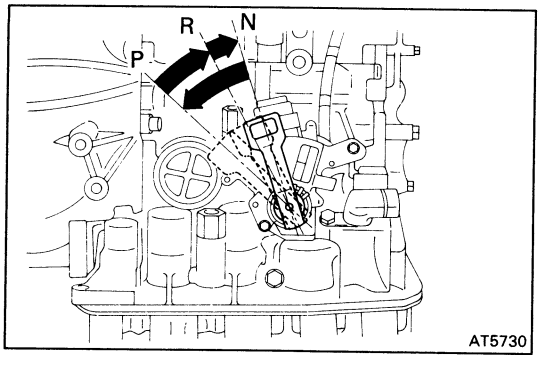
When shifting the shift lever from the N position to other positions, check that the lever can be shifted smoothly and accurately to each position and that the position indicator correctly indicates the position.

If the indicator is not aligned with the correct position, carry out the following adjustment procedure.

(a) Remove the No. 1 engine under cover.



(b) Loosen the swivel nut on manual shift lever.



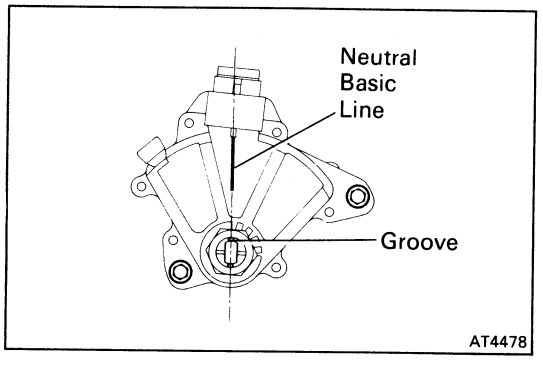
(c) Push the manual shift lever fully toward the right side of the vehicle.

(d) Return the lever two notches to NEUTRAL position.

(e) Set the shift lever to N.

(f) While holding the lever lightly toward the R range side, tighten the swivel nut.

(g) Install the No. 1 engine under cover.



6. ADJUST NEUTRAL START SWITCH

If the engine will start with the shift selector in any range other than N or P range, adjustment is required.

(a) Loosen the neutral start switch bolts and set the shift selector to the N range.

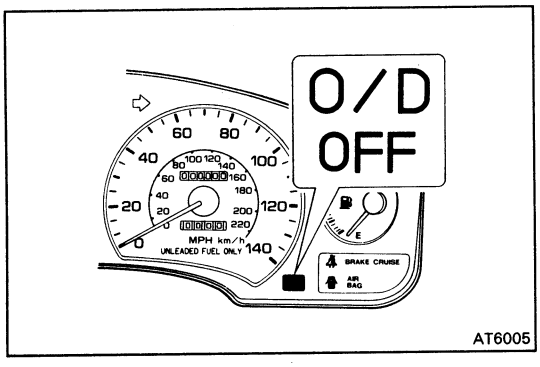
(b) Align the groove and neutral basic line.

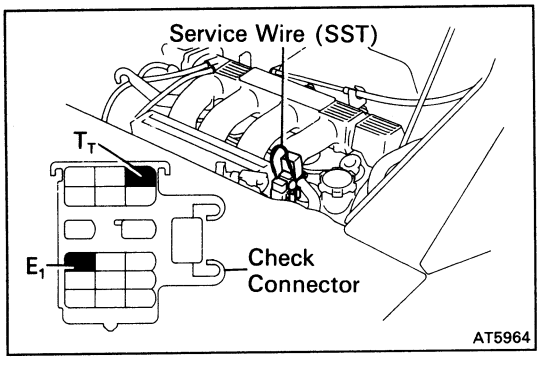
(c) Hold in position and tighten the bolts.

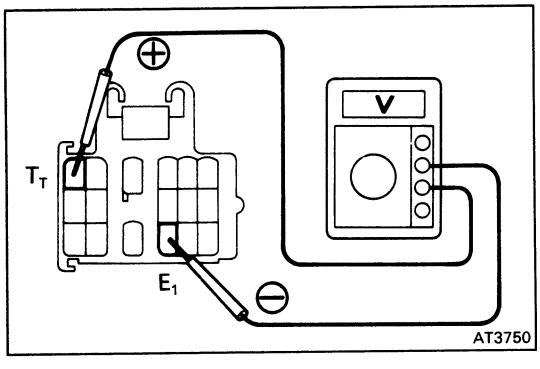
Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)

7. INSPECT IDLE SPEED (N RANGE)

Idle speed: 700 ± 50 rpm







Diagnosis System

DESCRIPTION

1. A self-diagnosis function is built into the electrical control system. Warning is indicated by the overdrive OFF indicator.

   HINT: Warning and diagnostic codes can be read only when the overdrive switch is ON. If OFF, the overdrive OFF indicator is lit continuously and will not blink.

   (a) If a malfunction occurs within the speed sensors or solenoids, the overdrive OFF light will not blink to warn the driver.
   However, there will be no warning of a malfunction with lock-up solenoid.

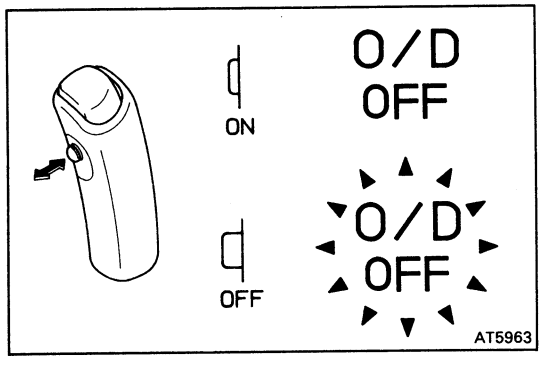
   (b) The diagnostic code can be read by the number of blinks of the overdrive OFF indicator when terminals T_T and E_1 are short-circuited. (See page AT-15)

   (c) The throttle position sensor or brake signal are not indicated, but inspection can be made by checking the voltage at terminal T_T of the check connector.

   (d) The signals to each gear can be checked by measuring the voltage at terminal T_T of the check connector while driving.

2. The diagnostic (malfunction) code is retained in memory by the ECU and due to back-up voltage, is not canceled out when the engine is turned off. Consequently, after repair, it is necessary to turn the ignition switch off and remove the fuse EFI (15A) or disconnect the ENGINE and ECT ECU connector to cancel out the diagnostic (malfunction) code. (See page AT-16)

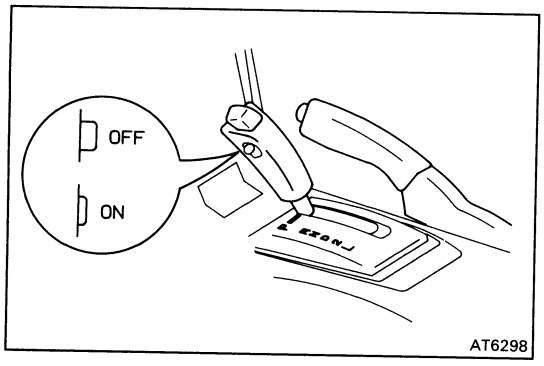
   HINT:
   - Low battery voltage will cause faulty operation of the diagnosis system. Therefore, always check the battery first.
   - Use a voltmeter and ohmmeter that have an impedance of at least 10 kΩ/V.



CHECK O/D OFF INDICATOR LIGHT

1. Turn the ignition switch ON.
2. The O/D OFF light will come on when the O/D switch is placed at OFF.
3. When the O/D switch is set to ON, the O/D OFF light should go out.

   If the O/D OFF light flashes when the O/D switch is set to ON, the electronic control system is faulty.

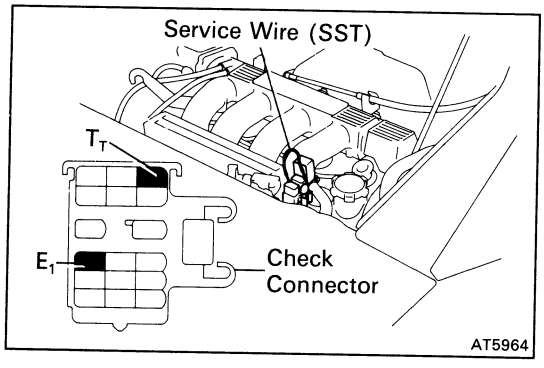


READ DIAGNOSTIC CODE

1. TURN IGNITION SWITCH AND O/D SWITCH TO ON

Do not start the engine.

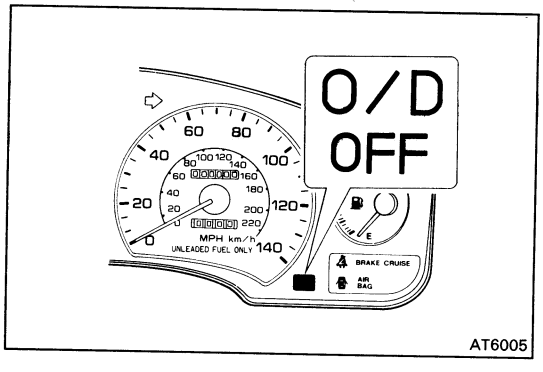
HINT: Warning and diagnostic codes can be read only when the overdrive switch is ON. If OFF, the overdrive OFF light will light continuously and will not blink.



2. SHORT T_T TERMINAL CIRCUIT OF CHECK CONNECTOR

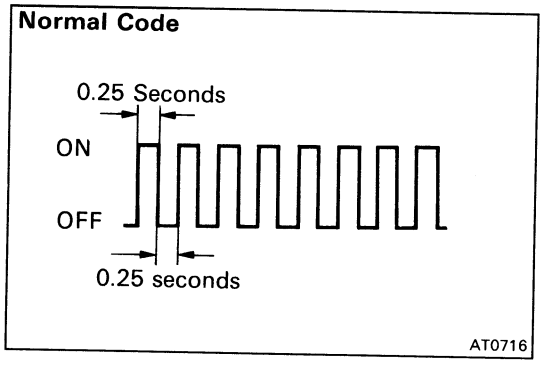
Using SST, short terminals T_T and E_1 of the check connector.

SST 09843-18020



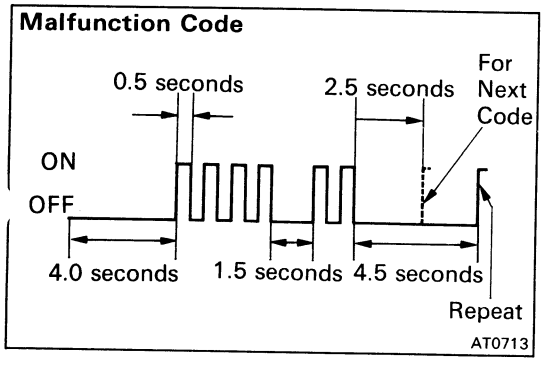
3. READ DIAGNOSTIC CODE

Read the diagnostic code as indicated by the number of times the O/D OFF indicator flashes.



(Diagnostic Code Indication)

- If the system is operating normally, the light will blink once every 0.25 seconds.



- In the event of a malfunction, the light will blink once every 0.5 seconds. The number of blinks will equal the first number and, after 1.5 seconds pause, the second number of the two digit diagnostic code. If there are two or more codes, there will be a 2.5 seconds pause between each.

HINT: In the event of several trouble codes occurring simultaneously, indication will begin from the smaller value and continue to the larger.

4. REMOVE SST

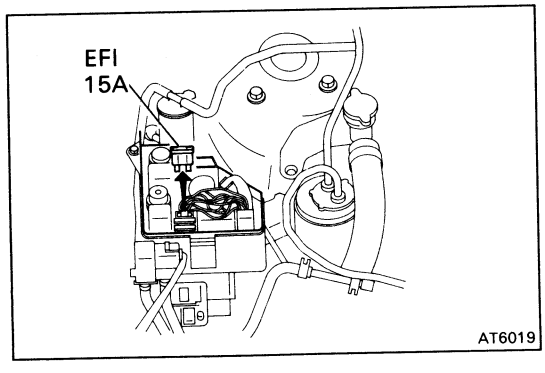
SST 09843-18020

DIAGNOSTIC CODES

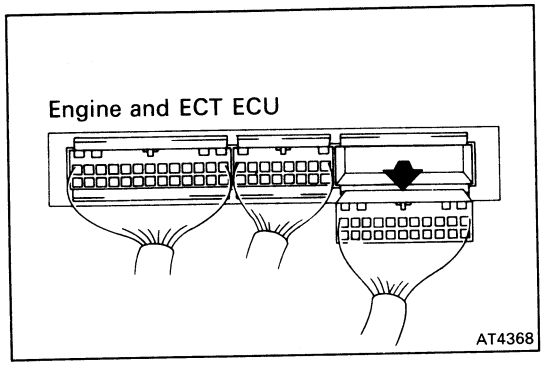
Code No.	Light Pattern	Diagnosis System
—		Normal
42		Defective No. 1 speed sensor (in combination meter) – severed wire harness or short circuit
61		Defective No. 2 speed sensor (in ATM) – severed wire harness or short circuit
62		Severed No. 1 solenoid or short circuit – severed wire harness or short circuit
63		Severed No. 2 solenoid or short circuit – severed wire harness or short circuit
64		Severed lock-up solenoid or short circuit – severed wire harness or short circuit

AT2020

HINT: If codes 62, 63 or 64 appear, there is an electrical malfunction in the solenoid.
Causes due to mechanical failure, such as a stuck valve, will not appear.



AT6019



AT4368

CANCEL OUT DIAGNOSTIC CODE

1. After repair of the trouble area, the diagnostic code retained in memory by the Engine an ECT ECU must be canceled by removing the fuse EFI (15A) for 10 seconds or more, depending on ambient temperature (the lower the temperature, the longer the fuse must be left out) with the ignition switch OFF.

   HINT:
   - Cancellation can be also done by removing the battery negative (–) terminal, but in this case other memory systems will be also canceled out.
   - The diagnostic code can be also canceled out by disconnecting the Engine and ECT ECU connector.
   - If the diagnostic code is not canceled out, it will be retained by the Engine and ECT ECU and appear along with a new code in event of future trouble.

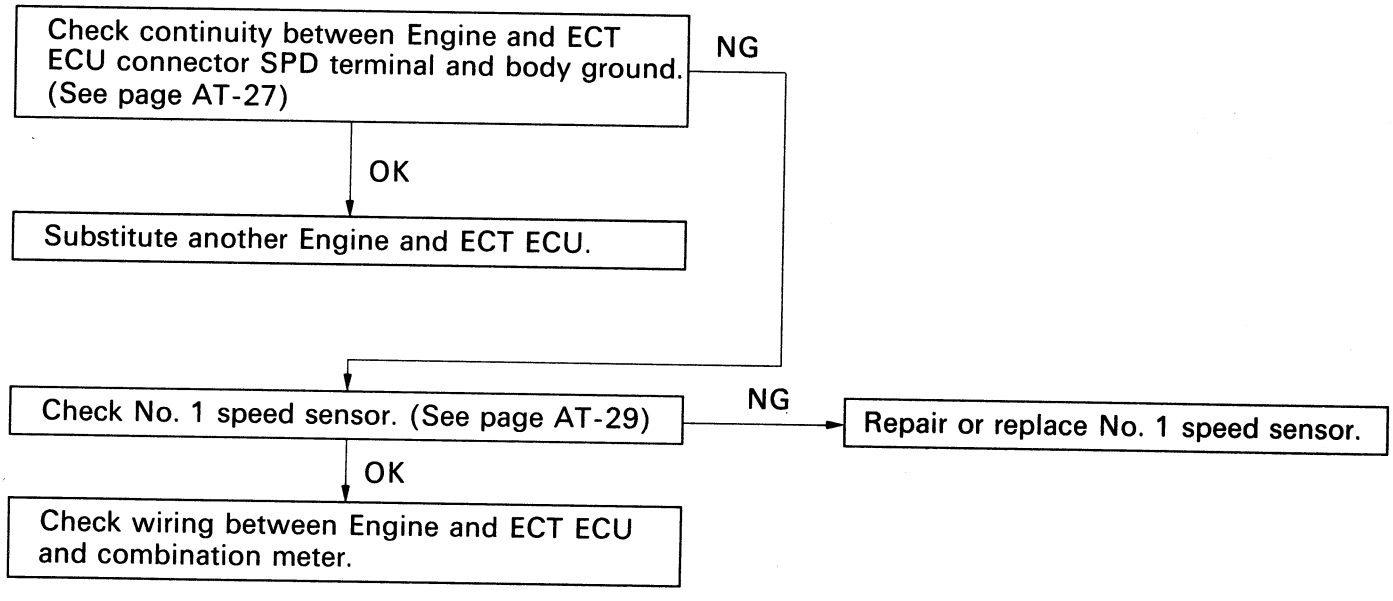
2. After cancellation, perform a road test to confirm that a "normal code" is now read on the O/D OFF light.

TROUBLESHOOTING FLOW-CHART

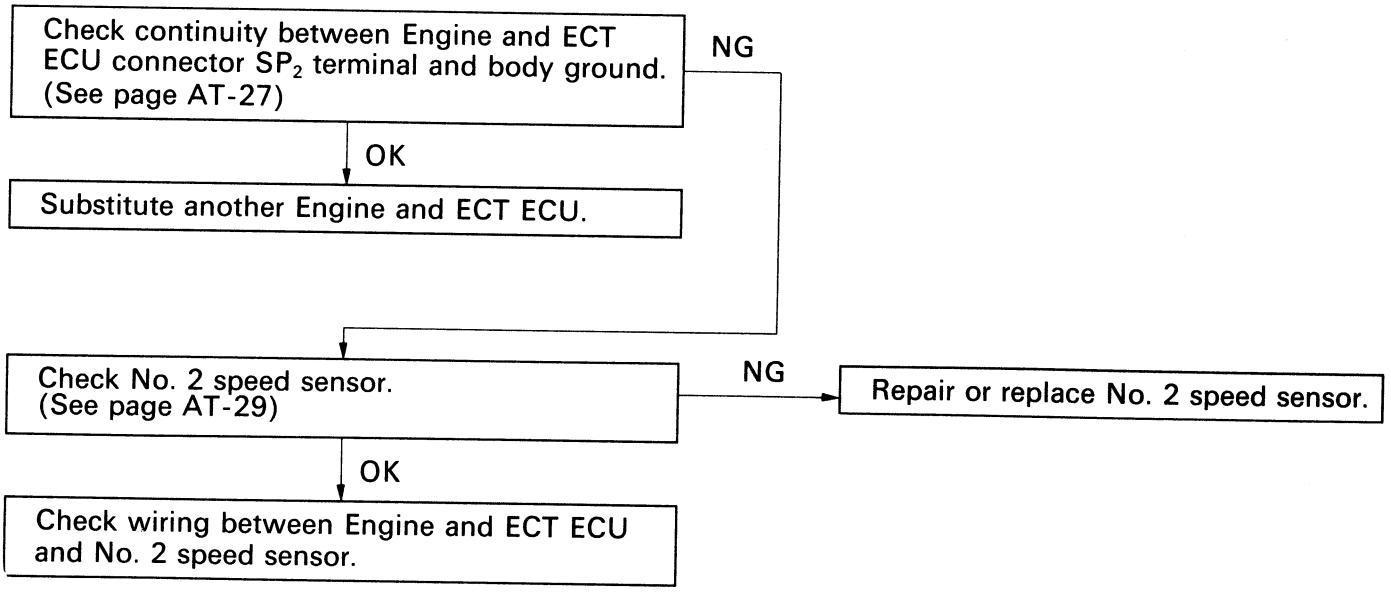
HINT:

- If diagnostic code Nos. 42, 61, 62 or 63 are output, the overdrive OFF indicator light will begin to blink immediately to warn the driver. However, an impact or shock may cause the blinking to stop; but the code will still be retained in the Engine and ECT ECU memory until canceled out.
- There is no warning for diagnostic code No. 64.
- In the event of a simultaneous malfunction of both No. 1 and No.2 speed sensors, no diagnostic code will appear and the fail-safe system will not function. However, when driving in the D range, the transaxle will not up-shift from first gear, regardless of the vehicle speed.

1. Diagnostic code 42 (No. 1 speed sensor circuitry)



2. Diagnostic code 61 (No. 2 speed sensor circuitry)



3. Diagnostic code 62 (No. 1 solenoid valve circuitry)

Check resistance of No. 1 solenoid valve at Engine and ECT ECU connector. (See page AT-28)

NG

OK

Substitute another Engine at ECT ECU.

Remove the oil pan and check resistance of No. 1 solenoid valve connector and body ground.
Resistance: 11 – 15 Ω

NG → Replace No. 1 solenoid valve.

OK

Check wiring between No. 1 solenoid valve and Engine and ECT ECU.

4. Diagnostic code 63 (No. 2 solenoid valve circuitry)

Check resistance of No. 2 solenoid valve at Engine and ECT ECU connector. (See page AT-28)

NG

OK

Substitute another Engine and ECT ECU.

Remove the oil pan and check resistance of No. 2 solenoid valve connector and body ground.
Resistance: 11 – 15 Ω

NG → Replace No. 2 solenoid valve.

OK

Check wiring between No. 2 solenoid valve and Engine and ECT ECU.

5. Diagnostic code 64 (Lock-up solenoid valve circuitry)

Check resistance of lock-up solenoid valve at Engine and ECT ECU connector. (See page AT-28)

NG

OK

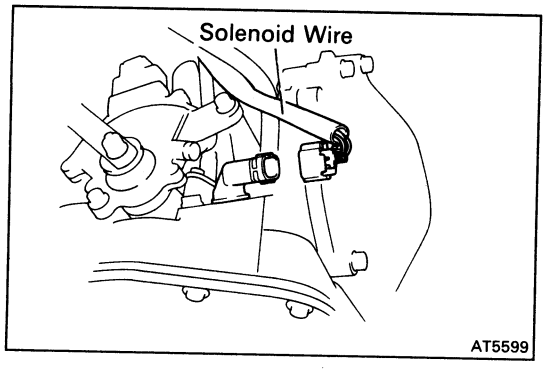
Substitute another Engine and ECT ECU.

Remove the oil pan and check resistance of lock-up solenoid valve connector and body ground.
Resistance: 11 – 15 Ω

NG → Replace lock-up solenoid valve.

OK

Check wiring between lock-up solenoid valve and Engine and ECT ECU.



Manual Shifting Test

HINT: With this test, it can be determined whether the trouble lies within the electrical circuit or is a mechanical problem in the transaxle.

1. **DISCONNECT SOLENOID WIRE**

2. **INSPECT MANUAL DRIVING OPERATION**

Check that the shift and gear positions correspond with the table below.

Shift position	D range	2 range	L range	R range	P range
Gear position	O/D	3rd	1st	Reverse	Pawl Lock

HINT: If the L, 2 and D range gear positions are difficult to distinguish, perform the following road test.

- While driving, shift through the L, 2 and D ranges. Check that the gear change corresponds to the shift position.

If any abnormality is found in the above test, the problem lies in transaxle itself.

3. **CONNECT SOLENOID WIRE**

4. **CANCEL OUT DIAGNOSTIC CODE**
(See page AT-16)

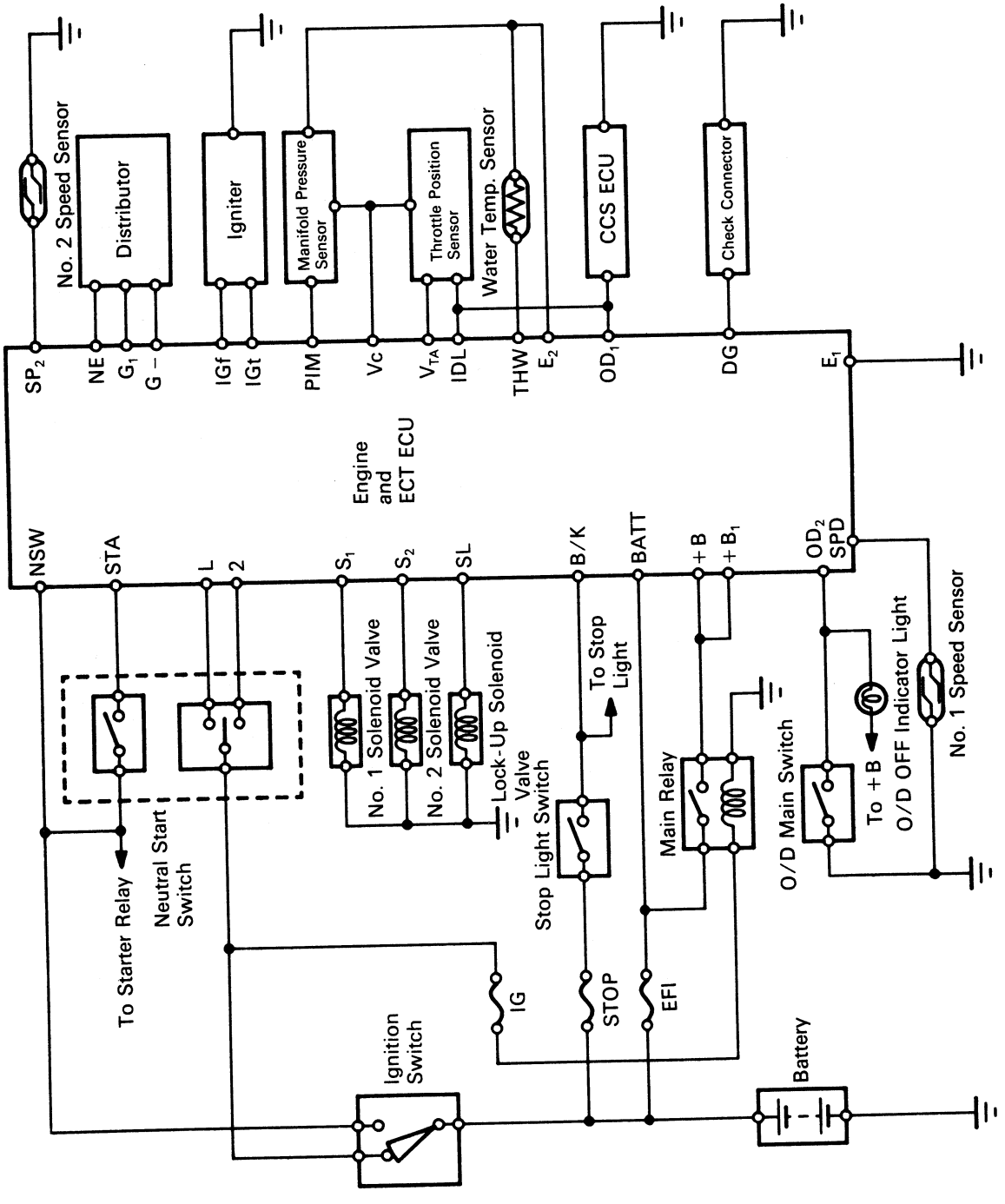
REFERENCE: Possible gear positions in accordance with solenoid operating conditions.

Range	NORMAL			No. 1 SOLENOID MALFUNCTIONING			No. 2 SOLENOID MALFUNCTIONING			BOTH SOLENOIDS MALFUNCTIONING		
	Solenoid Valve		Gear Position	Solenoid Valve		Gear Position	Solenoid Valve		Gear Position	Solenoid Valve		Gear Position
	No. 1	No. 2		No. 1	No. 2		No. 1	No. 2		No. 1	No. 2	
D range	ON	OFF	1st	X	ON	3rd	ON	X	1st	X	X	O/D
	ON	ON	2nd	X	ON	3rd	OFF	X	O/D	X	X	O/D
	OFF	ON	3rd	X	ON	3rd	OFF	X	O/D	X	X	O/D
	OFF	OFF	O/D	X	OFF	O/D	OFF	X	O/D	X	X	O/D
2 range	ON	OFF	1st	X	ON	3rd	ON	X	1st	X	X	3rd
	ON	ON	2nd	X	ON	3rd	OFF	X	3rd	X	X	3rd
	OFF	ON	3rd	X	ON	3rd	OFF	X	3rd	X	X	3rd
L range	ON	OFF	1st	X	OFF	1st	ON	X	1st	X	X	1st
	ON	ON	2nd	X	ON	2nd	ON	X	1st	X	X	1st

X: Malfunctions

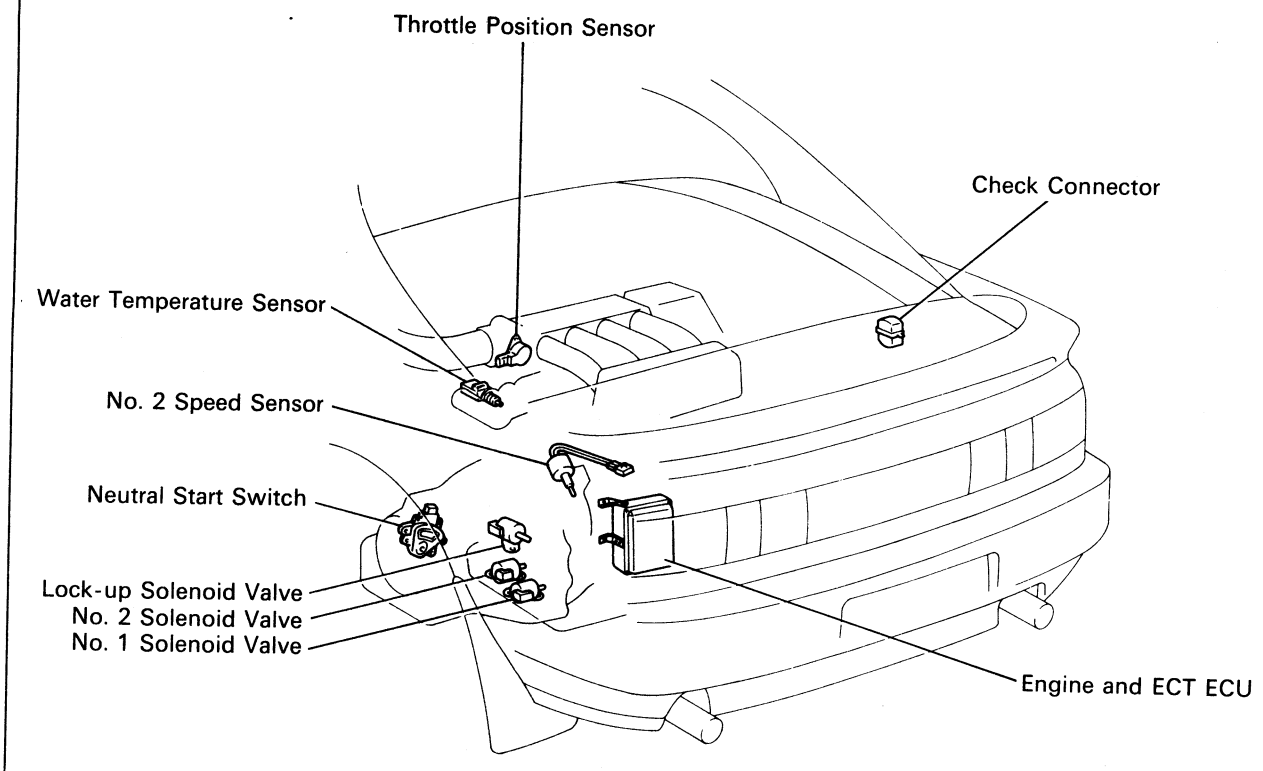
Electronic Control System

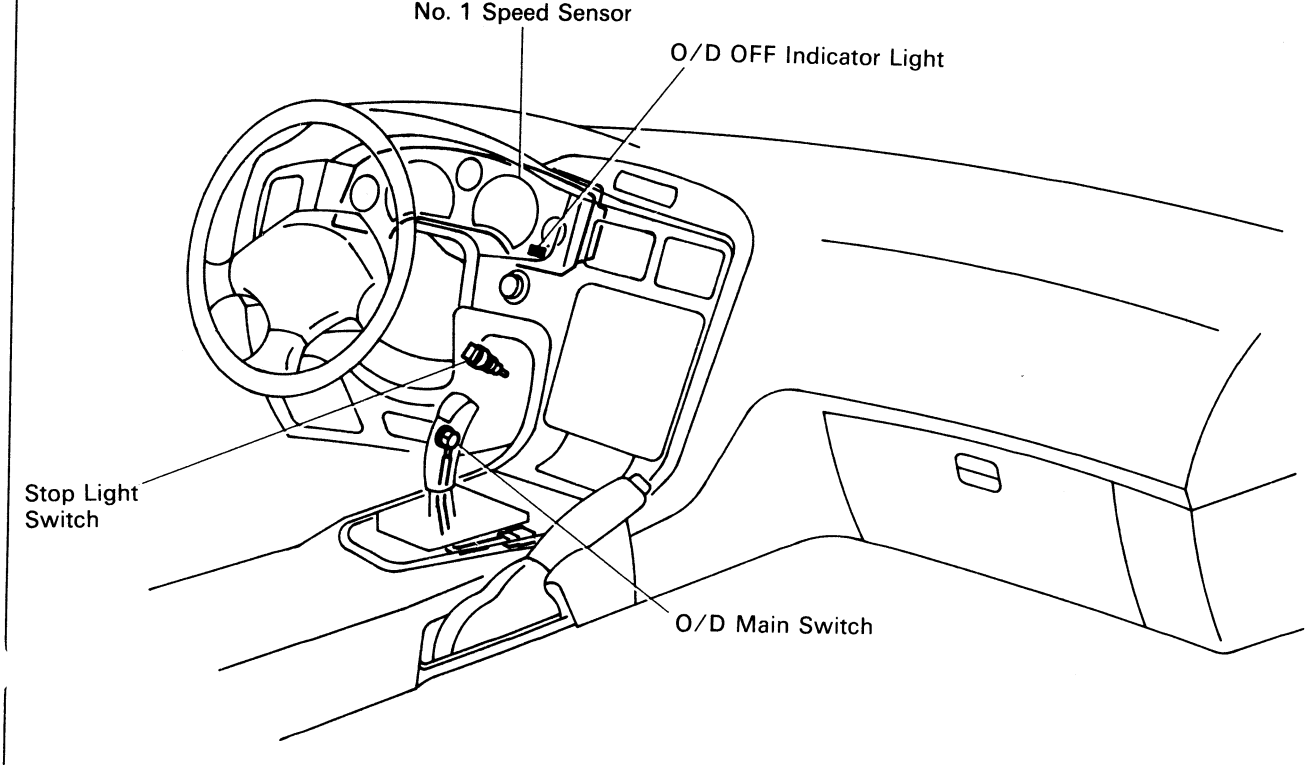
ELECTRONIC CONTROL CIRCUIT



AT6299

ELECTRONIC CONTROL COMPONENTS

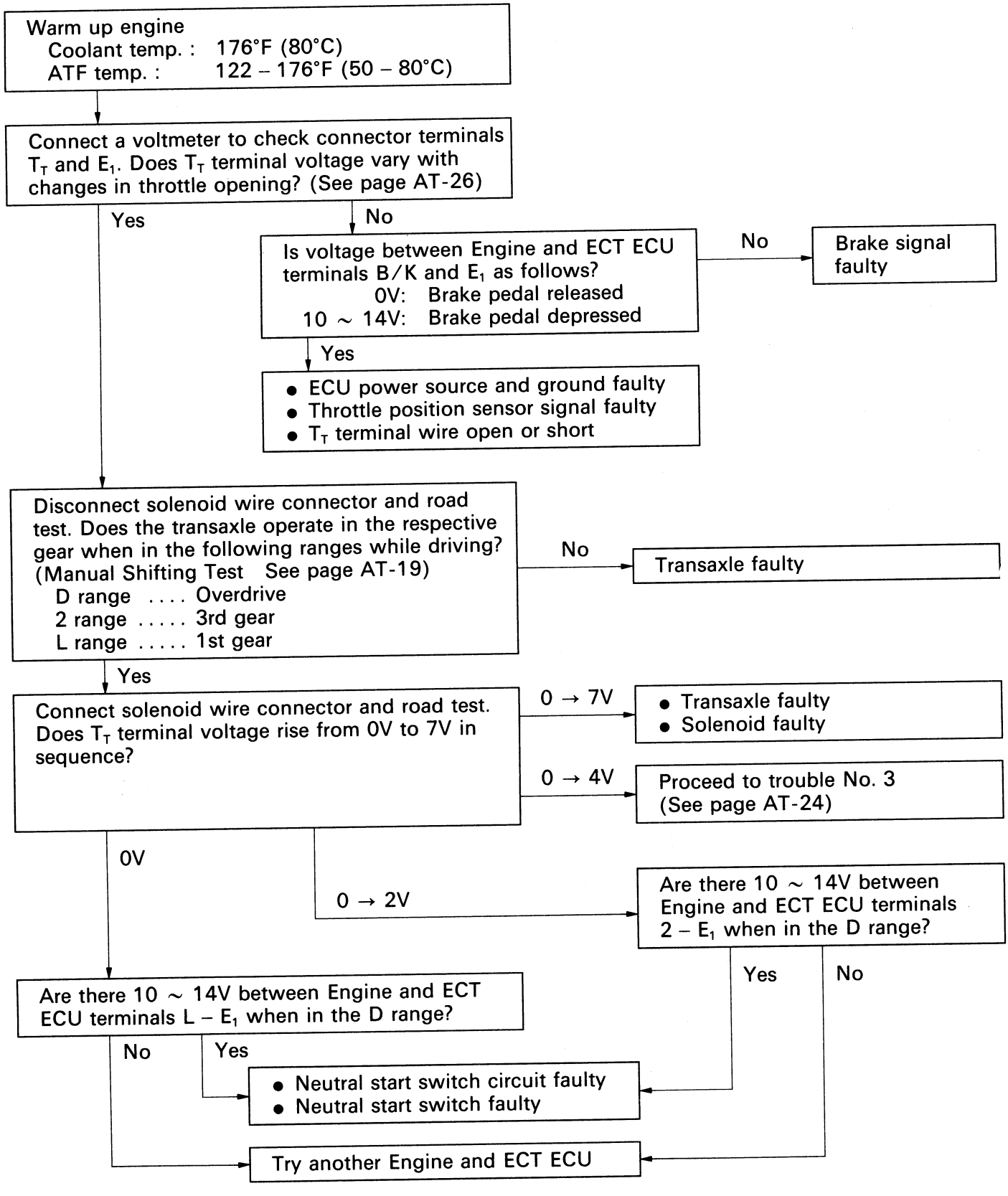




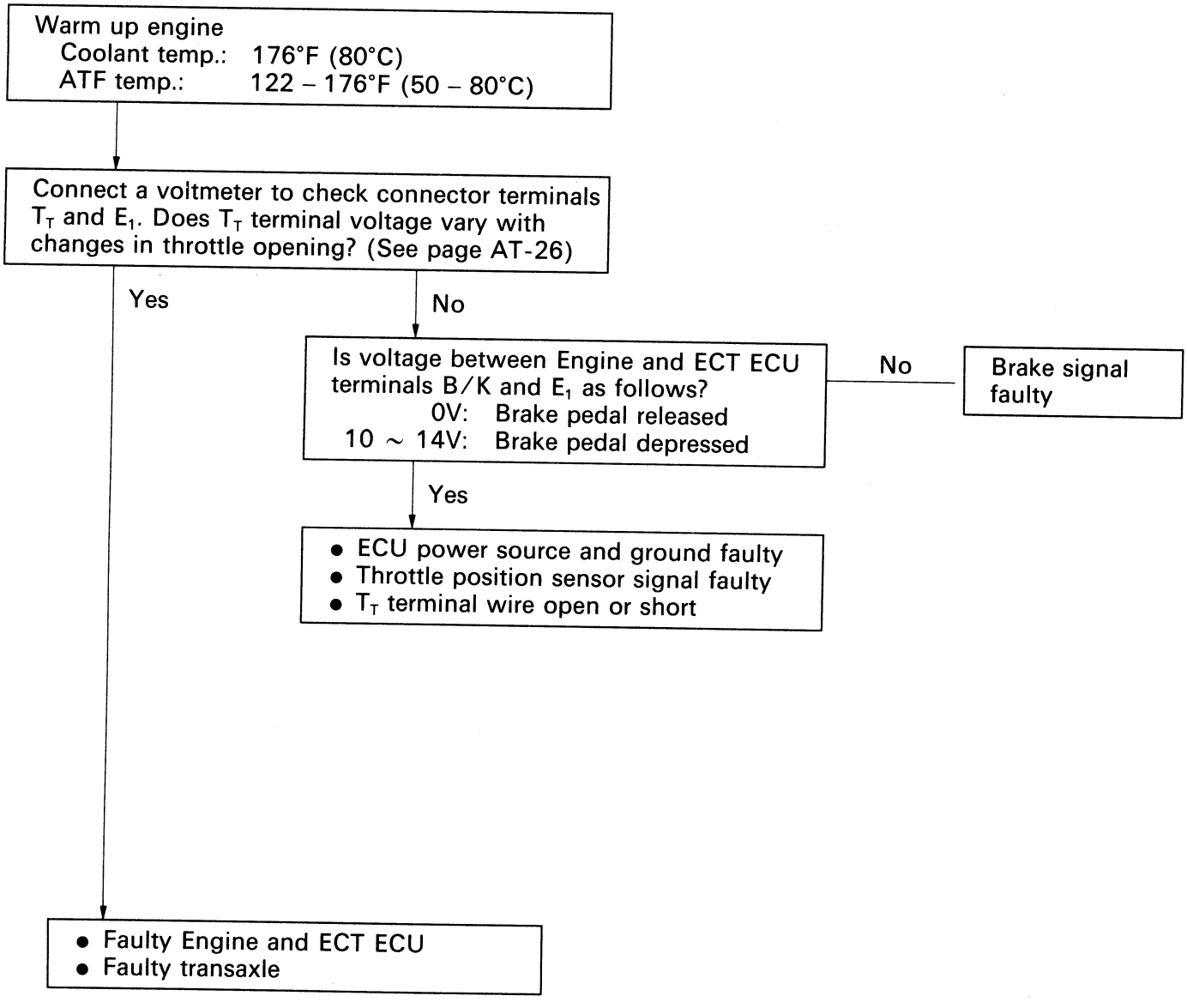
AT6013
AT6295

TROUBLESHOOTING FLOW-CHART

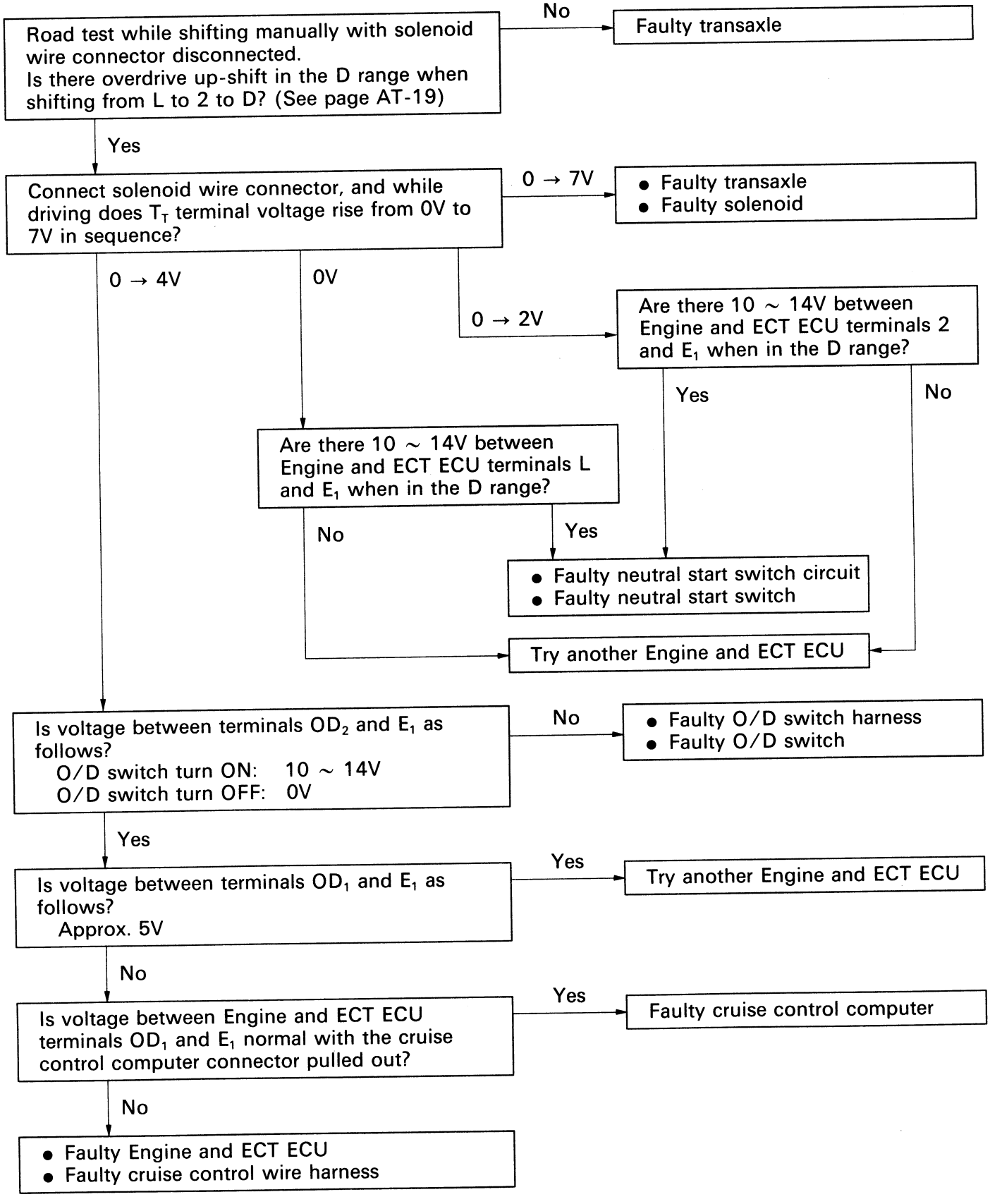
Trouble No. 1 No shifting



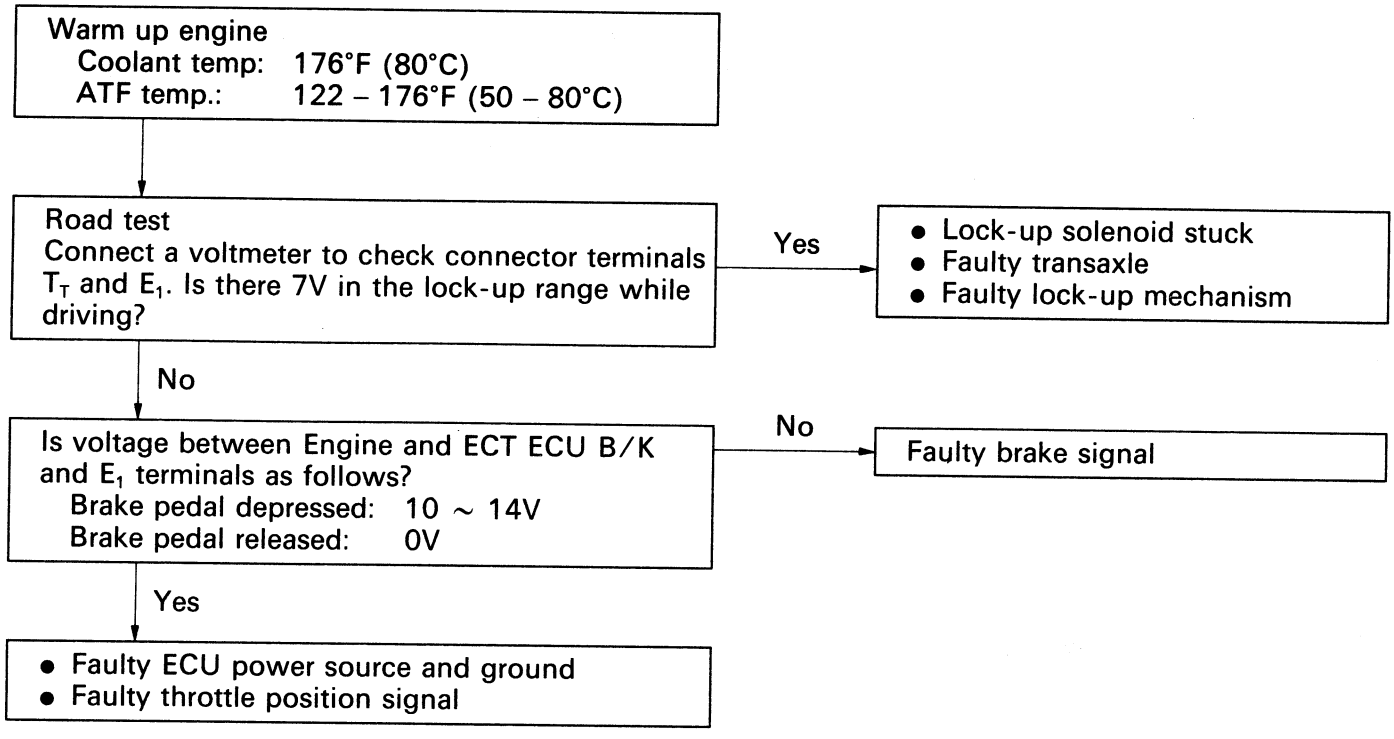
Trouble No. 2 Shift point too high or too low

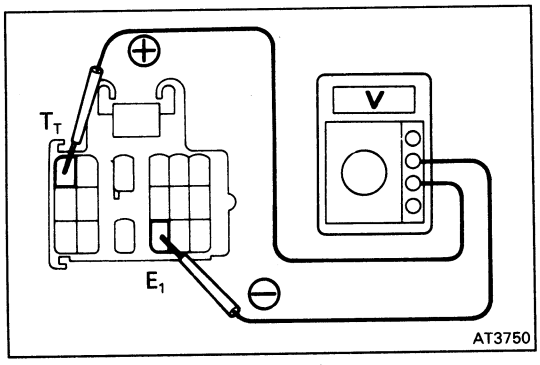


Trouble No. 3 No up-shift to overdrive (After warm-up)



Trouble No. 4 No lock-up (After warm-up)



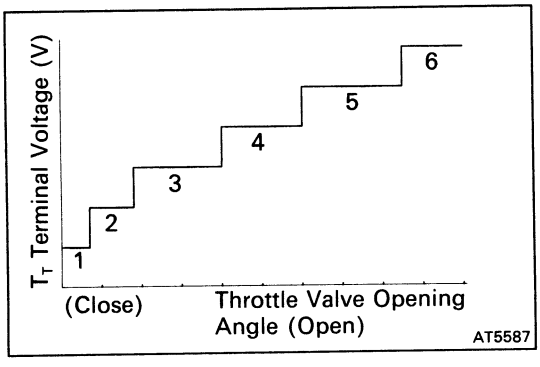


INSPECTION OF T_T TERMINAL VOLTAGE

1. INSPECT THROTTLE POSITION SENSOR SIGNAL

(a) Turn the ignition switch to ON. Do not start the engine.

(b) Connect a voltmeter to terminals T_T and E_1.



(c) While slowly depressing the accelerator pedal, check that T_T terminal voltage rises in sequence.

If the voltage does not change in proportion to the throttle opening angle, there is a malfunction in the throttle position sensor or circuit.

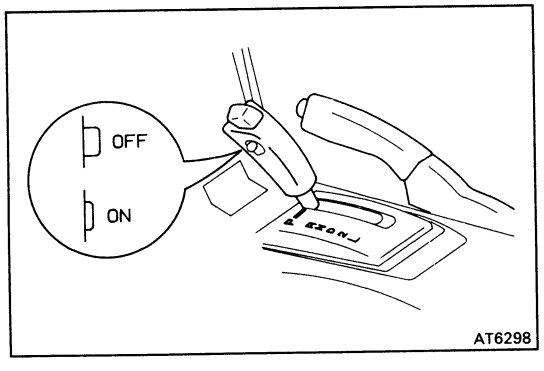
2. INSPECT BRAKE SIGNAL

(a) Depress the accelerator pedal until the T_T terminal indicates 6V.

(b) Depress the brake pedal and check the voltage reading from the T_T terminal.

Brake pedal depressed 0V
Brake pedal released 6V

If not as indicated, there is a malfunction in either the stop light switch or circuit.



T_T Terminal (V)	Gear position
0	1st
2	2nd
4	3rd
6	O/D
7	O/D Lock up

3. INSPECT EACH UP-SHIFT POSITION

(a) Warm up the engine.

Coolant temperature: 176°F (80°C)

(b) Turn the O/D switch to "ON".

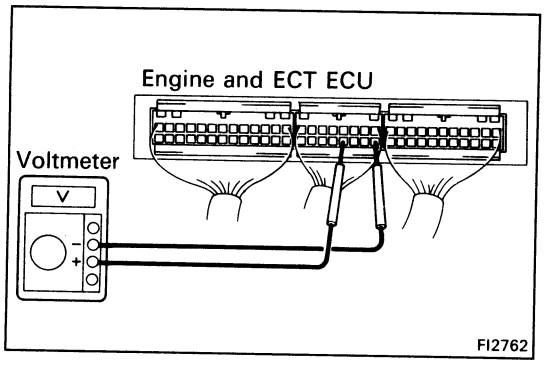
(c) Place the pattern select switch in "NORMAL" and the shift level into the D range.

(d) During a road test (above 10 km/h or 6 mph) check that voltage at the T_T terminal is as indicated below for each up-shift position.

If the voltage rises from 0V to 7V in the sequence shown, the control system is okay.

The chart on the left shows the voltmeter reading and corresponding gears.

HINT: Determine the gear position by a light shock or change in engine rpm when shifting.

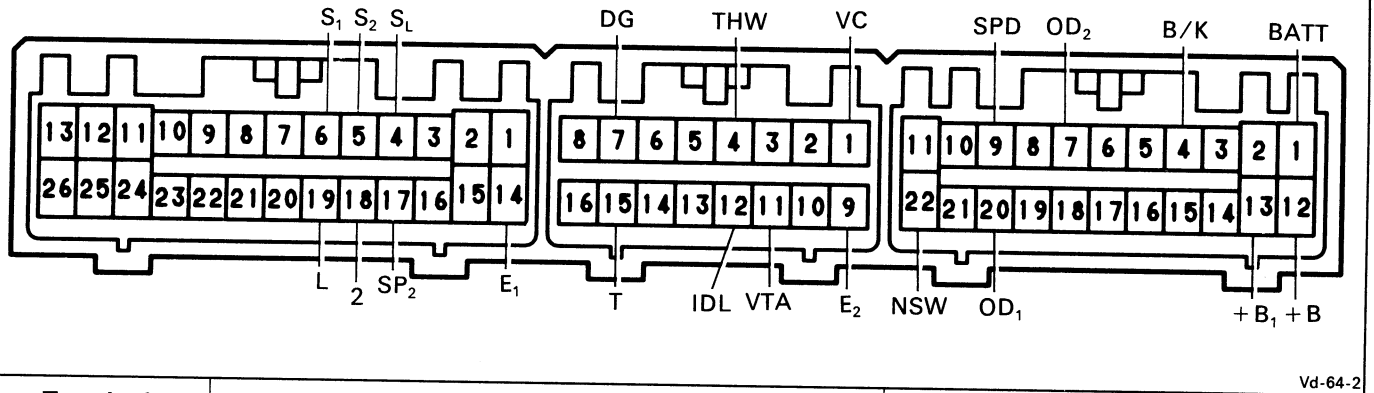


INSPECTION OF ELECTRONIC CONTROL COMPONENTS

1. INSPECT VOLTAGE OF ENGINE AND ECT ECU CONNECTOR

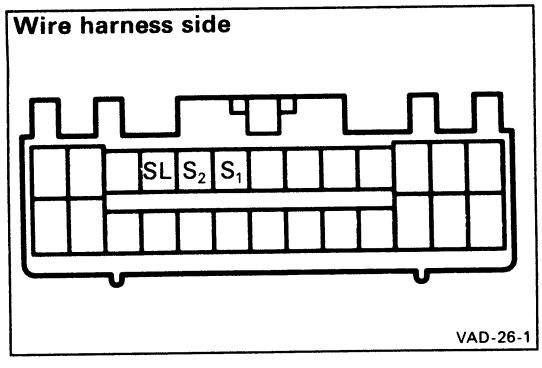
(a) Turn on the ignition switch.

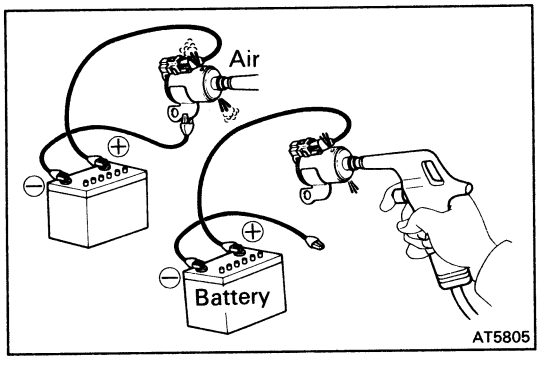
(b) Do not disconnect Engine and ECT ECU connector. Measure the voltage at each terminal.



Terminal	Measuring condition		Voltage (V)
$S_1 - E_1$	Ignition switch turned ON		10 – 14
S_2, $S_L - E_1$	Ignition switch turned ON		1 or less
STP – E_1	Brake pedal is depressed		10 – 14
	Brake pedal is released		1 or less
THW – E_2	Coolant temp. 176°F (80°C)		0.1 – 0.8
IDL – E_2	Throttle valve fully closed		1 or less
	Throttle valve open		4.5 – 5.5
VTA – E_2	Thottle valve fully closed		0.1 – 0.8
	Throttle valve open		4.5 – 5.5
VC – E_2	———		4.5 – 5.5
$OD_1 - E_1$	———		10 – 14
$OD_2 - E_1$	O/D main switch turned ON		10 – 14
	O/D main switch turned OFF		1 or less
SPD – E_1	Cruise control main switch OFF	Standing still	1 or less
		Vehicle moving	Repeat : 0 ↔ 10 – 4
$SP_2 - E_1$	Standing still		1 or less
	Vehicle moving		Repeat : 0 ↔ 4.5 – 5.5

Terminal	Measuring condition	Voltage (V)
NSW – E_1	P, N range	10 – 14
	R, D, 2, L range	1 or less
2 – E_1	2 range	10 – 14
	Except 2 range	1 or less
L – E_1	L range	10 – 14
	Except L range	1 or less
+B, +B – E_1	Ignition switch turned ON	10 – 14
BATT– E_1	All conditions	10 – 14





2. INSPECT SOLENOIDS

(a) Disconnect the connector from Engine and ECT ECU.

(b) Measure the resistance between S_1, S_2, S_L and body ground.

Resistance: 11 – 15 Ω

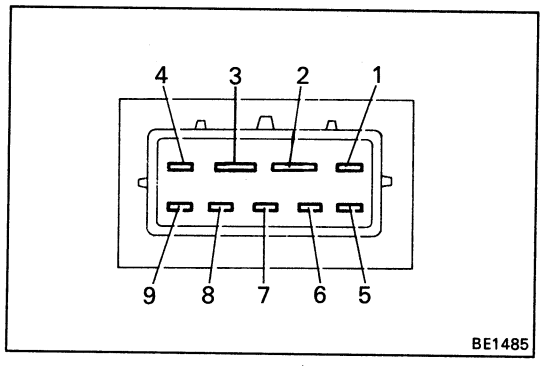
(c) Apply battery voltage to each terminal.
Check that an operation noise can be heard from the solenoid.

3. CHECK SOLENOID SEALS

If there is foreign material in the solenoid valve, there will be no fluid control even with solenoid operation.

Check No. 1, No. 2 and lock-up solenoid valves.

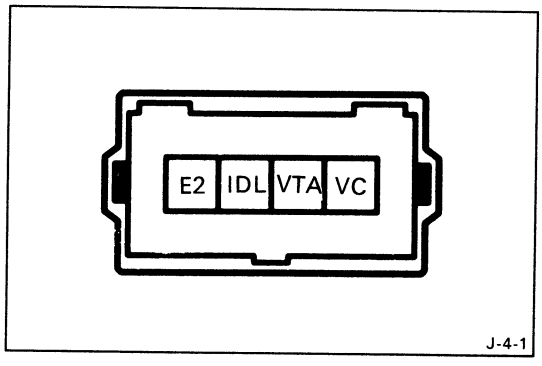
- Applying 5 kg/cm² (71 psi, 490 kPa) of compressed air, check that the solenoid valves do not leak the air.
- When battery voltage is supplied to the solenoids, check that the solenoid valves open.



4. INSPECT NEUTRAL START SWITCH

Using an ohmmeter, check the continuity of the terminals for each switch position shown in the table below.

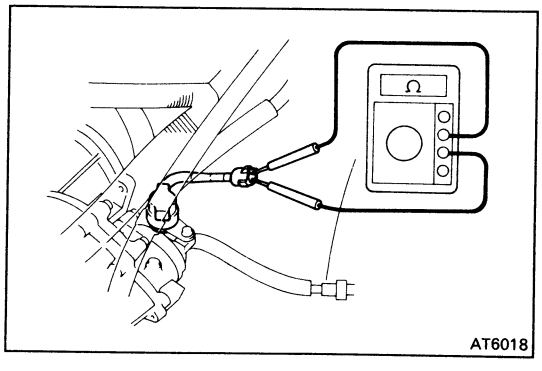
Range \ Terminal	2	3	6	1	5	7	8	9	4
P	○	○	○	○					
R			○		○				
N	○	○	○			○			
D			○				○		
2			○					○	
L			○						○



5. INSPECT THROTTLE POSITION SENSOR

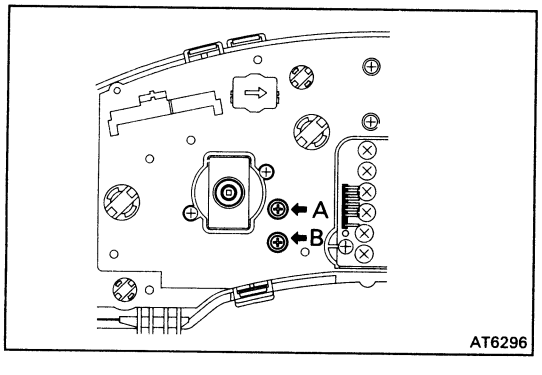
Using an ohmmeter, check the resistance between each terminal.

Terminal	Throttle valve condition	Resistance (kΩ)
IDL – E_2	Fully closed	0 – 0.1
	Open	Infinity
Vc – E_2	–	3 – 7
V_{TA} – E_2	Fully closed	0.2 – 0.8
	Fully open	3.2 – 10



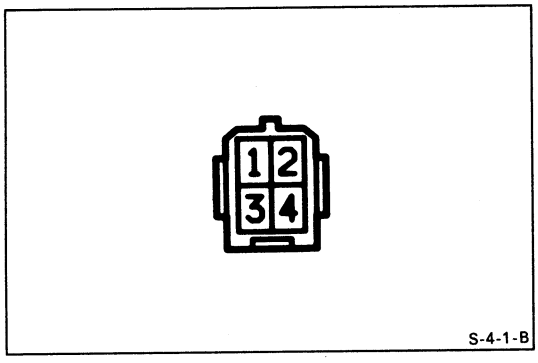
6. INSPECT NO. 2 SPEED SENSOR

(a) Remove the air cleaner assembly.
(b) Jack up a front wheel on one side.
(c) Connect an ohmmeter between the terminals.
(d) Spin the wheel and check that the meter needle deflects from 0 to ∞ Ω.



7. INSPECT NO. 1 SPEED SENSOR IN COMBINATION METER

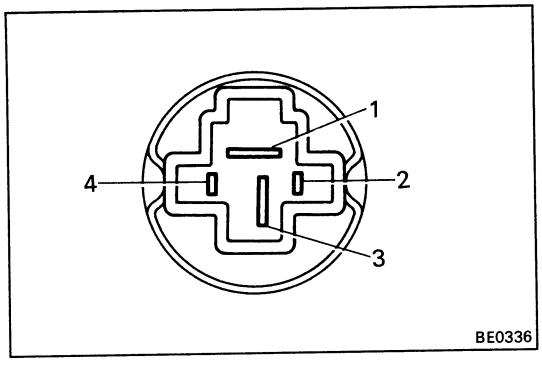
(a) Remove the combination meter.
(b) Connect an ohmmeter between terminals A and B.
(c) Revolve the meter shaft and check that the meter needle repeatedly deflects from 0 Ω to ∞ Ω.



8. INSPECT O/D MAIN SWITCH

Inspect that there is continuity between terminals 1 and 3.

S/W position \ Terminal	1	3
ON		
OFF	O	O



9. INSPECT STOP LIGHT SWITCH

Inspect that there is continuity between terminals 1 and 3.

S/W position \ Terminal	1	3
OFF (Release brake pedal)		
ON (Depress brake pedal)	O	O

Mechanical System Tests

STALL TEST

The object of this test is to check the overall performance of the transaxle and engine by measuring the stall speeds in the D and R ranges.

NOTICE:

- **Perform the test at normal operation fluid temperature (50 – 80°C or 122 – 176°F).**
- **Do not continuously run this test longer than 5 seconds.**
- **To ensure safety, conduct this test in a wide, clear, level area which provides good traction.**
- **The stall test should always be carried out in pairs. One should observe the condition of wheels or wheel stoppers outside the vehicle while the other is performing the test.**

MEASURE STALL SPEED

(a) Chock the front and rear wheels.

(b) Connect a tachometer to the engine.

(c) Fully apply the parking brake.

(d) Keep your left foot pressed firmly on the brake pedal.

(e) Start the engine.

(f) Shift into the D range. Step all the way down on the accelerator pedal with your right foot. Quickly read the stall speed at this time.

Stall speed: 2,550 ± 150 rpm

(g) Perform the same test in R range.

EVALUATION

(a) If the stall speed is the same for both ranges without the rear wheels rotating but lower than specified value:

- Engine output may be insufficient
- Stator one-way clutch is not operating properly

(b) If the stall speed in D range is higher than specified:

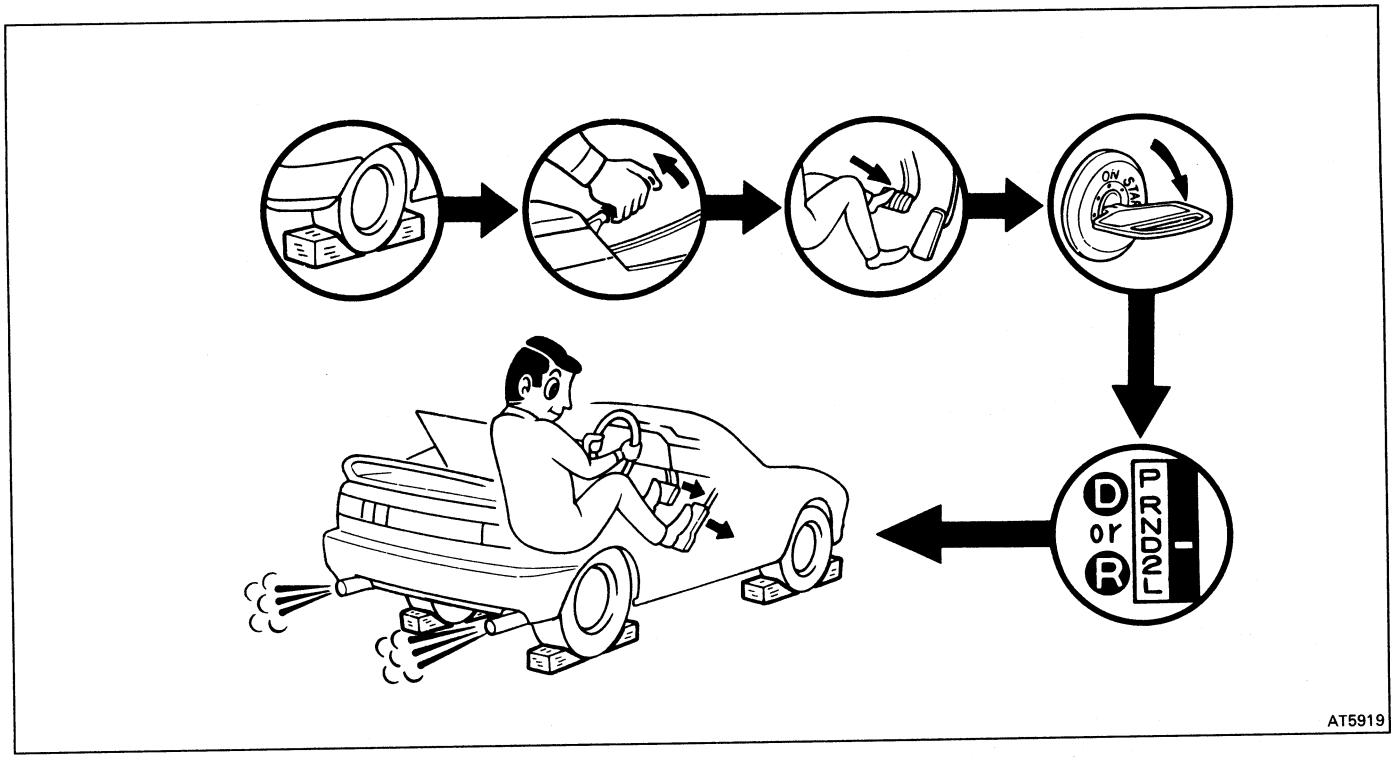
- Line pressure too low
- Forward clutch slipping
- No. 2 one-way clutch not operating properly
- Underdrive one-way clutch not operating properly

(c) If the stall speed in R range is higher than specified:

- Line pressure too low
- Direct clutch slipping
- First and reverse brake slipping
- Underdrive brake slipping

(d) If the stall speed in both R and D ranges are higher than specified:

- Line pressure too low
- Improper fluid level
- Underdrive brake slipping



TIME LAG TEST

When the shift lever is shifted while the engine is idling, there will be a certain time lapse or lag before the shock can be felt. This is used for checking the condition of the underdrive clutch, forward clutch, direct clutch and first and reverse brake.

NOTICE:

- **Perform the test at normal operating fluid temperature (50 – 80°C or 122 – 176°F).**
- **Be sure to allow one minute interval between tests.**
- **Make three measurements and take the average value.**

MEASURE TIME LAG

(a) Fully apply the parking brake.

(b) Start the engine and check the idle speed.

Idle speed (N range): 700 ± 150 rpm

(c) Shift the shift lever from N to D position. 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

(d) In the same manner, measure the time lag for N to R.

Time lag: Less than 1.5 seconds

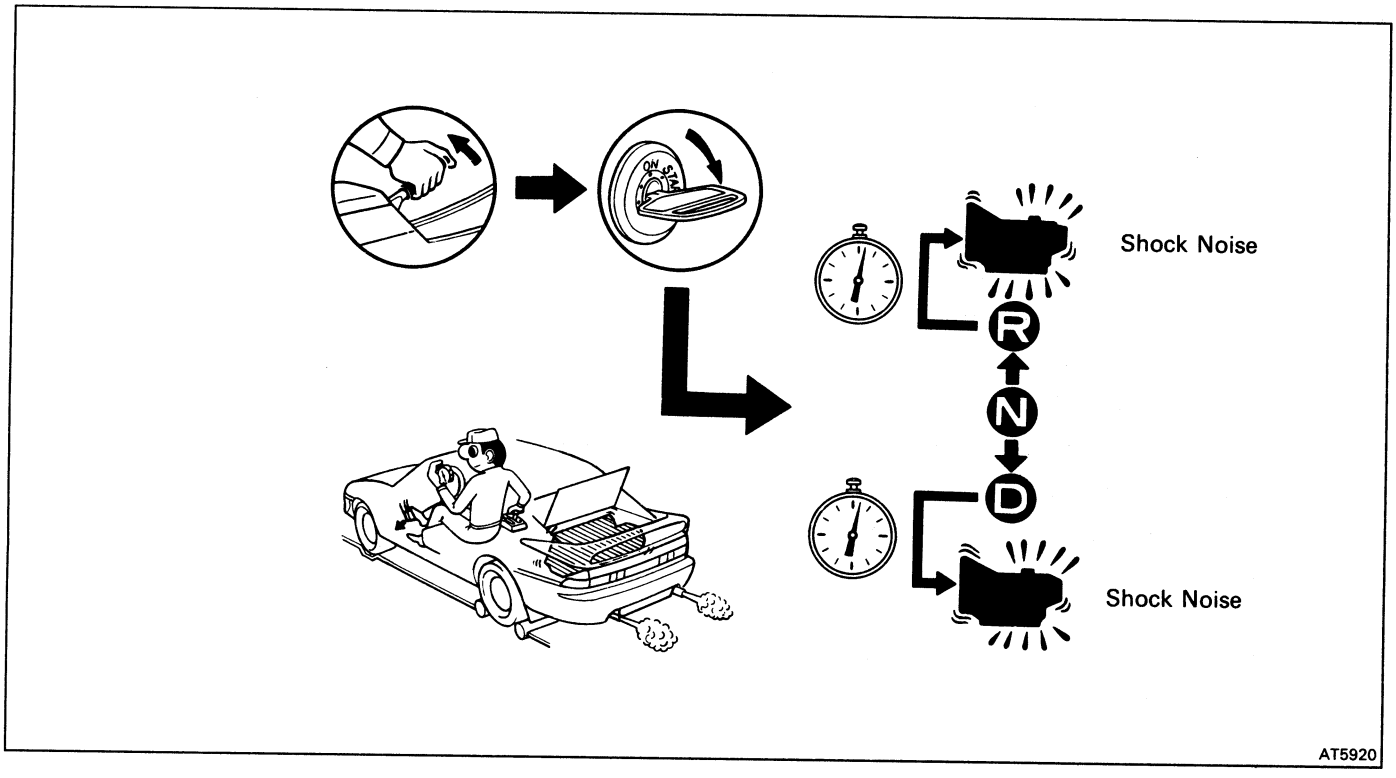
EVALUATION

(a) If N → D time lag is longer than specified:

- Line pressure too low
- Forward clutch worn
- No. 2 and underdrive one-way clutch not operating properly

(b) If N → R time lag is longer than specified:

- Line pressure too low
- Direct clutch worn
- First and reverse brake worn
- Underdrive brake worn



HYDRAULIC TEST

PREPARATION

(a) Warm up the transaxle fluid.

(b) Remove the transaxle case test plug and connect the hydraulic pressure gauge.

SST 09992-00094 (Oil pressure gauge)

CAUTION:

- **Perform the test at normal operating fluid temperature (50 – 80°C or 122 – 176°F).**
- **The line pressure test should always be carried out in pairs. One should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is performing the test.**

MEASURE LINE PRESSURE

(a) Fully apply the parking brake and chock the front wheels.

(b) Start the engine and check idling rpm.

(c) Step down strongly on the brake pedal with your left foot an shift into D range.

(d) Measure the line pressure when the engine is idling.

(e) Press the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.

(f) In the same manner, perform the test in R range.

ATM Type	Line pressure kg/cm² (psi, kPa)			
	D range		R range	
	Idling	Stall	Idling	Stall
A241E	3.8 – 4.3 (54 – 61, 373 – 422)	7.3 – 8.8 (104 – 125, 716 – 863)	6.5 – 8.1 (92 – 115, 637 – 794)	13.6 – 16.1 (193 – 229, 1,334 – 1,579)

If the measured pressures are not up to specified values, recheck the throttle cable adjustment and perform a retest.

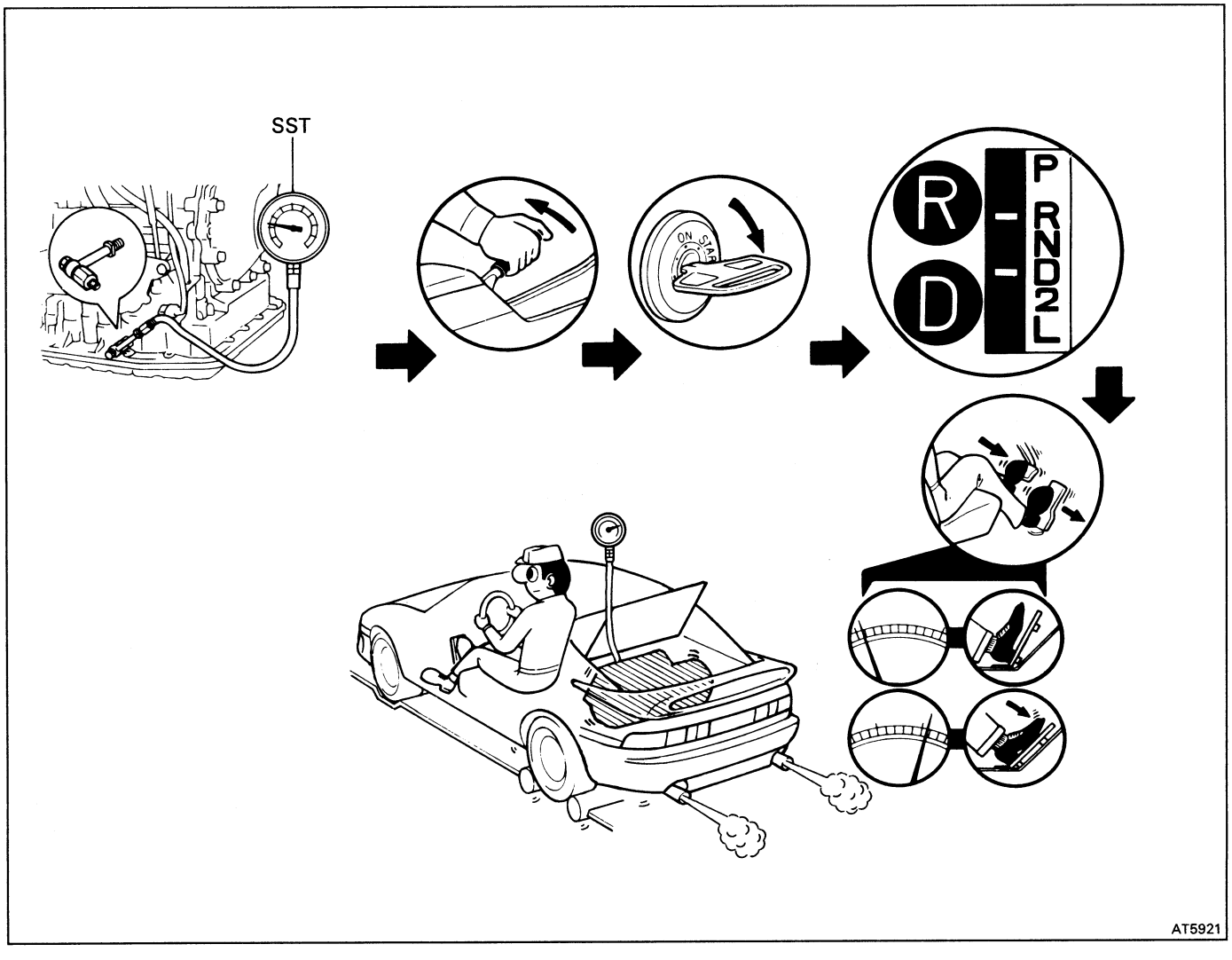
EVALUATION

(a) If the measured values at all ranges are higher than specified:
- Throttle cable out of adjustment
- Throttle valve defective
- Regulator valve defective

(b) If the measured values at all ranges are lower than specified:
- Throttle cable out of adjustment
- Throttle valve defective
- Regulator valve defective
- Oil pump defective
- Underdrive one-way clutch not operating properly

(c) If pressure is low in the D range only:
- D range circuit fluid leakage
- Forward clutch defective
- Underdrive one-way clutch not operating properly

(d) If pressure is low in the R range only:
- R range circuit fluid leakage
- Direct clutch defective
- First and reverse brake defective
- Underdrive one-way clutch not operating properly



Road Test

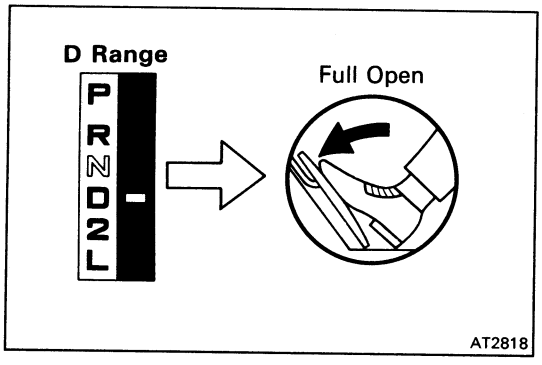
NOTICE: Perform the test at normal operating fluid temperature (50 – 80°C or 122 – 176°F).

1. D RANGE TEST IN NORM AND PWR PATTERN RANGES

Shift into the D range and hold the accelerator pedal constant at the full throttle valve opening position.

Check the following:

(a) 1-2, 2-3 and 3-O/D up-shifts should take place, and shift points should conform to those shown in the automatic shift schedule. (See page AT-38)



HINT:

- There is no O/D up-shift and lock-up when the coolant temp. is below 53°C (127°F).
- When the coolant temp. is below 60°C (140°F), the shift point is lower than specified in the automatic shift schedule.

EVALUATION

(1) If there is no 1 → 2 up-shift:
- No. 2 solenoid is stuck
- 1-2 shift valve is stuck

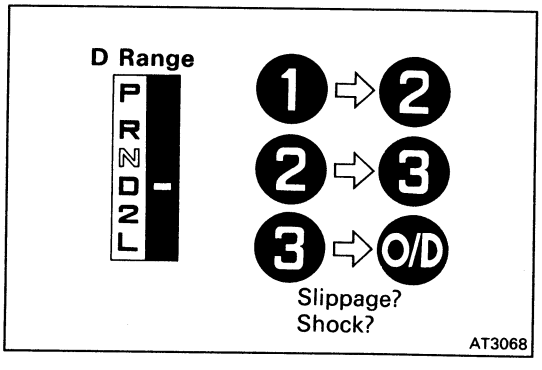
(2) If there is no 2 → 3 up-shift:
- No. 1 solenoid is stuck
- 2-3 shift valve is stuck

(3) If there is no 3 → O/D up-shift:
- 3-4 shift valve is stuck

(4) If the shift point is defective:
- Throttle valve, 1-2 shift valve, 2-3 shift valve, 3-4 shift valve etc., are defective

(5) If the lock-up is defective:
- Lock-up solenoid is stuck
- Lock-up relay valve is stuck

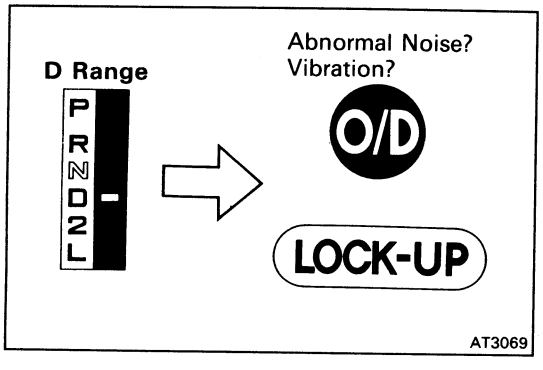
(b) In the same manner, check the shock and slip at the 1 → 2, 2 → 3 and 3 → O/D up-shifts.



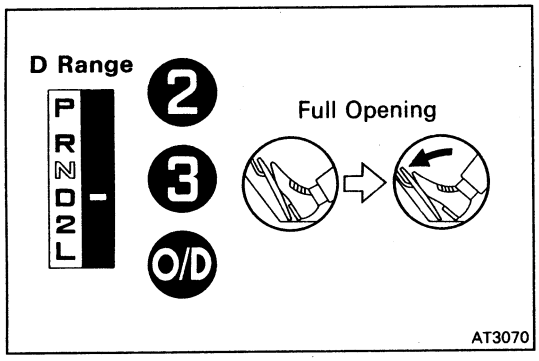
EVALUATION

If the shock is excessive:
- Line pressure is too high
- Accumulator is defective
- Check ball is defective

(c) Run at the D range lock-up or O/D gear and check for abnormal noise and vibration.

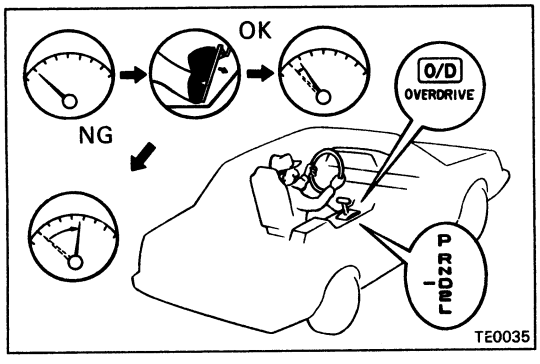


HINT: The check for the cause of abnormal noise and vibration must be made with extreme care as it could also be due to loss of balance in the drive shaft, tire torque converter, etc.



(d) While running in the D range, 2nd, 3rd and O/D gears, check to see that the possible kick-down vehicle speed limits for 2 → 1, 3 → 2 and O/D → 3 kick-downs conform to those indicated on the automatic shift schedule. (See page AT-38)

(e) Check for abnormal shock and slip at kick-down.

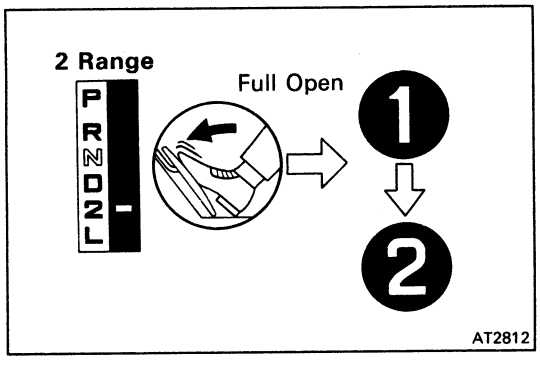


(f) Check for the lock-up mechanism.

(1) Drive in D range, O/D gear, at a steady speed (lock-up ON) of about 80 – 87 km/h (50 – 54 mph).

(2) Lightly depress the accelerator pedal and check that the engine rpm does not change abruptly.

If there is a big jump in engine rpm, there is no lock-up.



2. 2 RANGE TEST

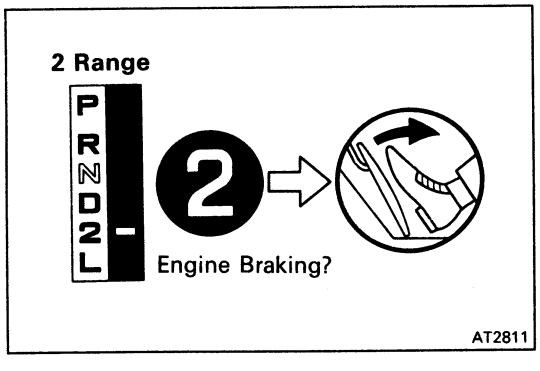
Shift into the 2 range and, while driving with the accelerator pedal held constantly at the full throttle valve opening position, push in one of the pattern selectors and check on the following points.

(a) Check to see that the 1 → 2 up-shift takes place and that the shift point conforms to it shown on the automatic shift schedule. (See page AT-38)

HINT:

- To prevent overrun, the transmission shifts up into 3rd gear at around 112 km/h (70 mph).
- In range 2, there will be no lock-up to 2nd gear.

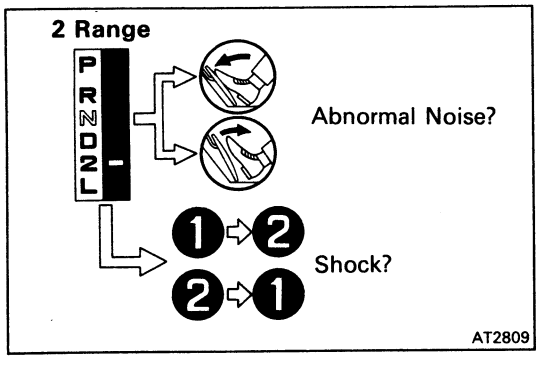
(b) While running in the 2 range and 2nd gear, release the accelerator pedal and check the engine braking effect.



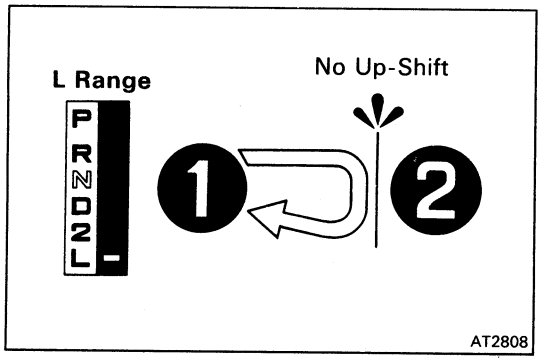
EVALUATION

If there is no engine braking effect:

- Second coast brake is defective



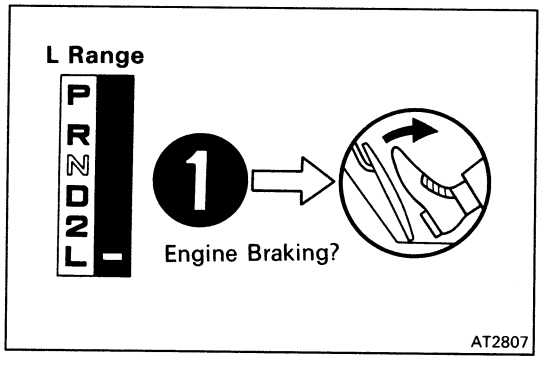
(c) Check for abnormal noise at acceleration and deceleration, and for shock at up-shift and down-shift.



3. L RANGE TEST

(a) While running in the L range, check to see that there is no up-shift to 2nd gear.

HINT: To prevent overrun, the transmission up-shifts into 2nd gear at around 59 km/h (37 mph).

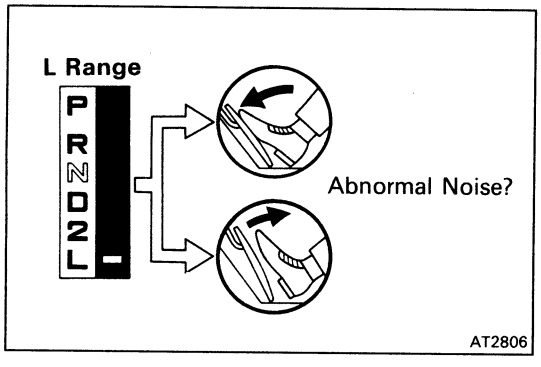


(b) While running in the L range, release the accelerator pedal and check the engine braking effect.

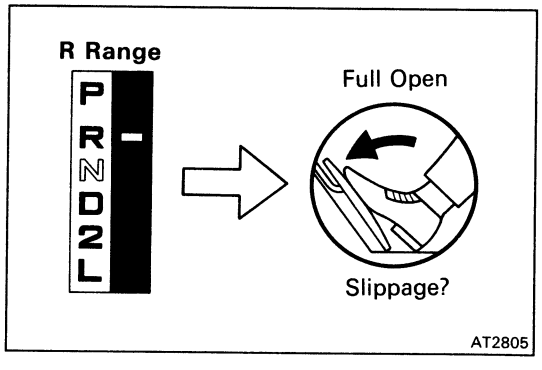
EVALUATION

If there is no engine braking effect:

- First and reverse brake is defective

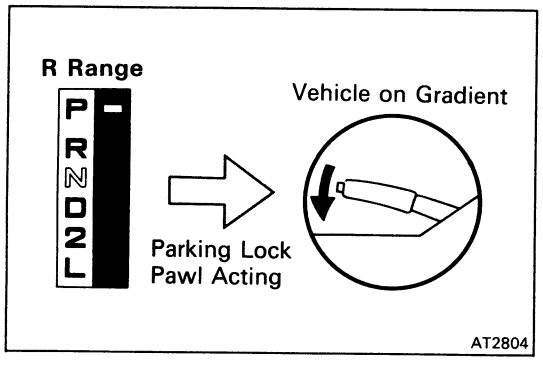


(c) Check for abnormal noise during acceleration and deceleration.



4. R RANGE TEST

Shift into R range and, while starting at full throttle, check for slipping.



5. P RANGE TEST

Stop the vehicle on a gradient (more than 5°) and after shifting into the P range, release the parking brake.

Then check to see that the parking lock pawl holds the vehicle in place.

Automatic Shift Schedule

	Throttle valve fully open [ ] Fully closed km/h (mph)							
	1 → 2	2 → 3	3 → O/D	[3 → O/D]	[O/D → 3]	O/D → 3	3 → 2	2 → 1
D range	53 – 59 (33 – 37)	102 – 112 (63 – 70)	137 – 149 (85 – 93)	46 – 52 (29 – 32)	19 – 24 (12 – 15)	131 – 143 (81 – 89)	98 – 108 (61 – 67)	44 – 50 (27 – 31)
2 range	53 – 59 (33 – 37)	—	—	—	—	—	—	44 – 50 (27 – 31)
L range	—	—	—	—	—	—	—	34 – 40 (21 – 25)

	Throttle valve opening 5 % km/h (mph)	
	Lock-up ON	Lock-up OFF
	O/D	O/D
D range	80 – 87 (50 – 54)	74 – 80 (46 – 50)

HINT:

(1) In the 2 and L ranges, all stages lock-up is OFF.

(2) In the following cases, the lock-up will be released regardless of the lock-up pattern.

- When the throttle is completely closed.
- When the brake switch is ON.

(3) Shift up to O/D will not occur when the engine coolant temp. is below 53°C (127°F).

ON-VEHICLE REPAIR

CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.

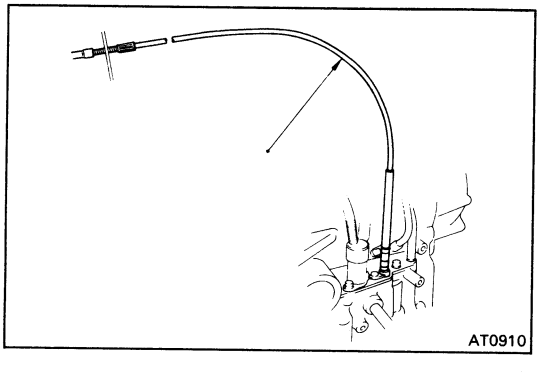
HINT: The components mentioned below can be replaced on the vehicle without any necessity for removal of the transmission. For the respective operating procedures refer to the following pages:

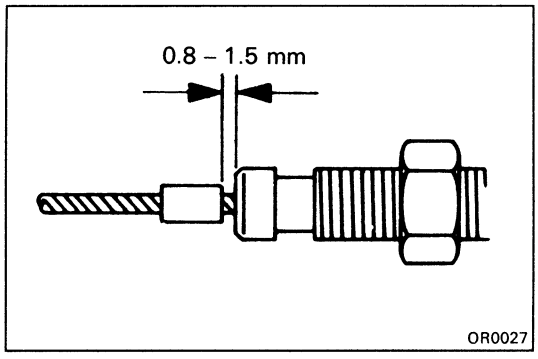
Components	Removal	Installation	Remarks
Valve body	AT-49 to AT-51	AT-157 to AT-160	
Throttle cable	AT-39	AT-39 and AT-40	

THROTTLE CABLE

REPLACEMENT OF THROTTLE CABLE

1. **DISCONNECT THROTTLE CABLE FROM ENGINE**
2. **REMOVE NEUTRAL START SWITCH**
   (See page AT-47)
3. **REMOVE THROTTLE CABLE RETAINING PLATE**
   (See page AT-47)
4. **REMOVE VALVE BODY**
   (See pages AT-49 to AT-51)
5. **REMOVE THROTTLE CABLE FROM CASE**
   (See page AT-51)
6. **INSTALL THROTTLE CABLE IN CASE**
   (See page AT-157)
7. **INSTALL VALVE BODY**
   (See pages AT-157 to AT-160)
8. **IF THROTTLE CABLE IS NEW, STAKE STOPPER ON INNER CABLE**
   (a) Bend the cable so there is a radius of about 200 mm (7.87 in.).





(b) Pull the inner cable lightly until a slight resistance is felt, and hold it.

(c) Stake the stopper 0.8 – 1.5 mm (0.031 – 0.059 in.) from the surface of outer cable as shown.

9. **INSTALL THROTTLE CABLE RETAINING PLATE**
(See page AT-161)

10. **INSTALL NEUTRAL START SWITCH**
(See page AT-161)

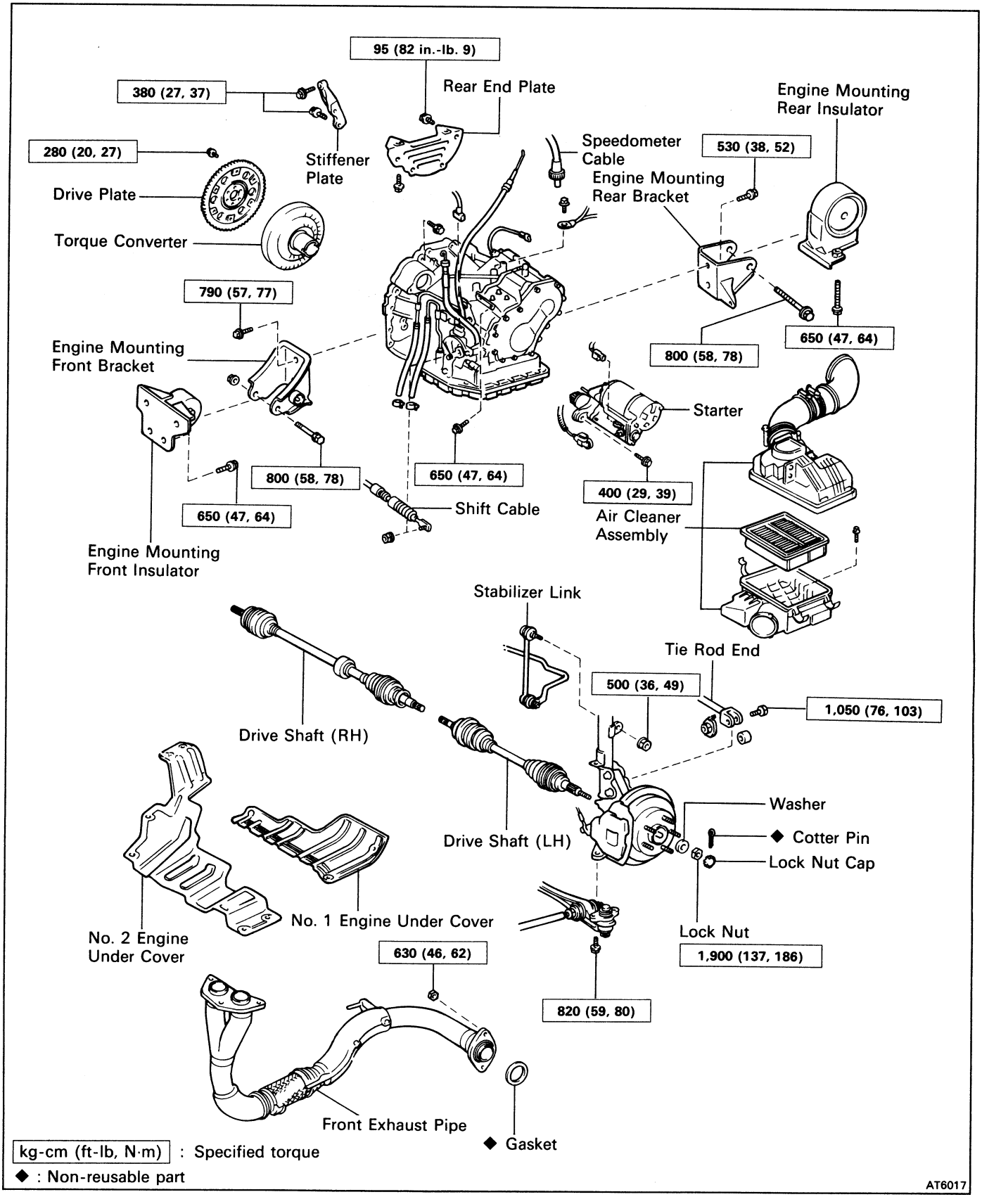
11. **CONNECT THROTTLE CABLE TO ENGINE**

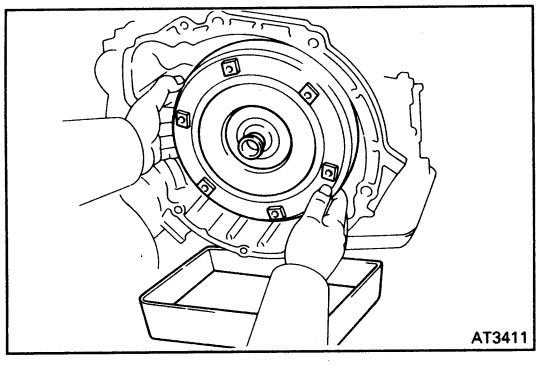
12. **ADJUST THROTTLE CABLE**
(See page AT-13)

REMOVAL AND INSTALLATION OF TRANSAXLE

Remove and install the parts as shown.

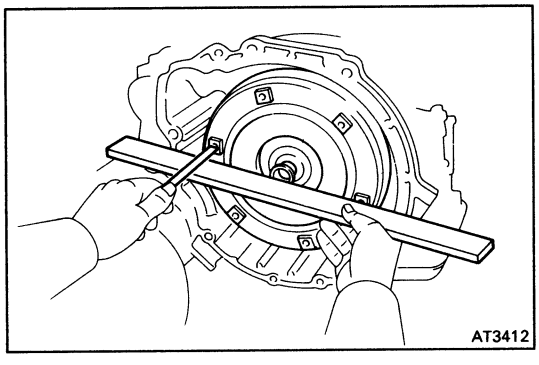
CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.





(MAIN POINT OF INSTALLATION)

1. INSTALL TORQUE CONVERTER IN TRANSAXLE



2. CHECK TORQUE CONVERTER INSTALLATION

Using a scale and a straight edge, measure from the installed surface to the front surface of the transaxle housing.

Correct distance: 13 mm (0.51 in.) or more

3. INSTALL TORQUE CONVERTER MOUNTING BOLTS

(a) Clean the threads of the bolts with the gasoline.

(b) Coat the threads of the bolts with sealer.

Sealer: Part No.08833-00070, THREE BOND 1324 or equivalent.

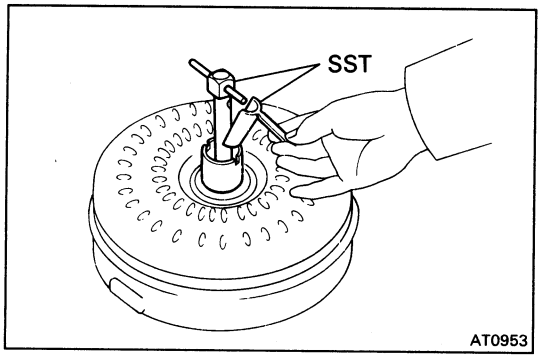
(c) Tighten the bolts evenly.

Torque: 280 kg-cm (20 ft-lb, 27 N·m)

TORQUE CONVERTER

CLEAN TORQUE CONVERTER

If the transmission is contaminated, the torque converter and transmission cooler should be thoroughly flushed with ATF.



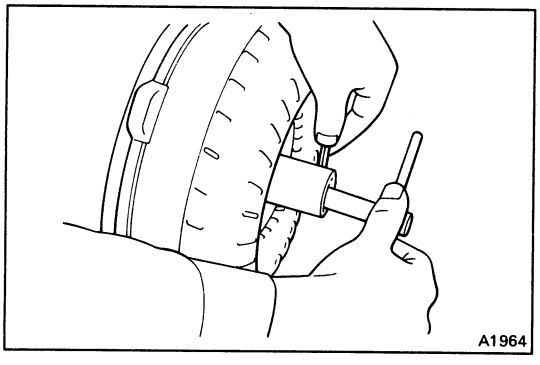
INSPECTION OF TORQUE CONVERTER

1. INSERT SST IN END OF TORQUE CONVERTER

(a) Insert a turning tool in the inner race of the one-way clutch.

(b) Install the stopper so that it fits in the notch of the converter hub and outer race of the one-way clutch.

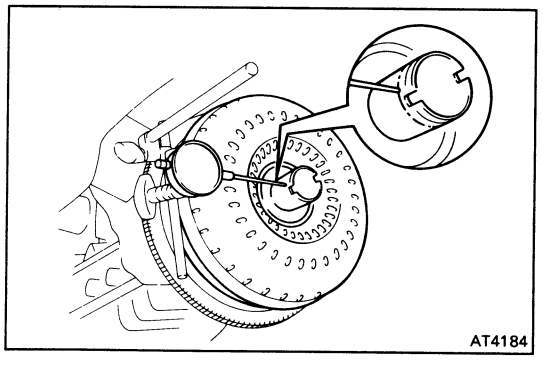
SST 09350-32014 (09351-32010, 09351-32020)



2. TEST ONE-WAY CLUTCH

With the torque converter standing on its side, the clutch should lock when turned counterclockwise, and rotate freely and smoothly clockwise.

If necessary, clean the converter and retest the clutch. Replace the converter if the clutch still fails the test.



3. MEASURE TORQUE CONVERTER SLEEVE RUNOUT

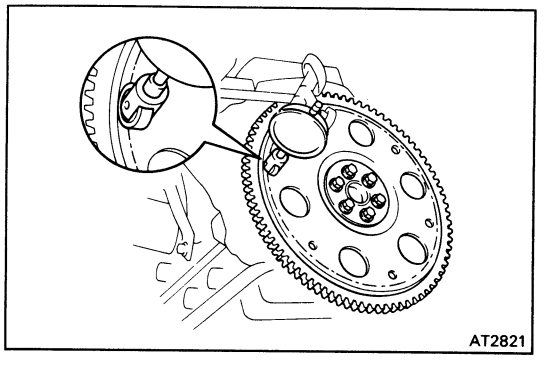
(a) Temporarily mount the torque converter to the drive plate. Set up a dial indicator.

Torque: 280 kg-cm (20 ft-lb, 27 N·m)
Runout: 0.30 mm (0.0118 in.)

If runout exceeds 0.30 mm (0.0118 in.), try to correct it by reorienting the installation of the converter. If excessive runout cannot be corrected, replace the torque converter.

HINT: Mark the position of the converter to ensure correct installation.

(b) Remove the torque converter.



4. MEASURE DRIVE PLATE RUNOUT AND INSPECT RING GEAR

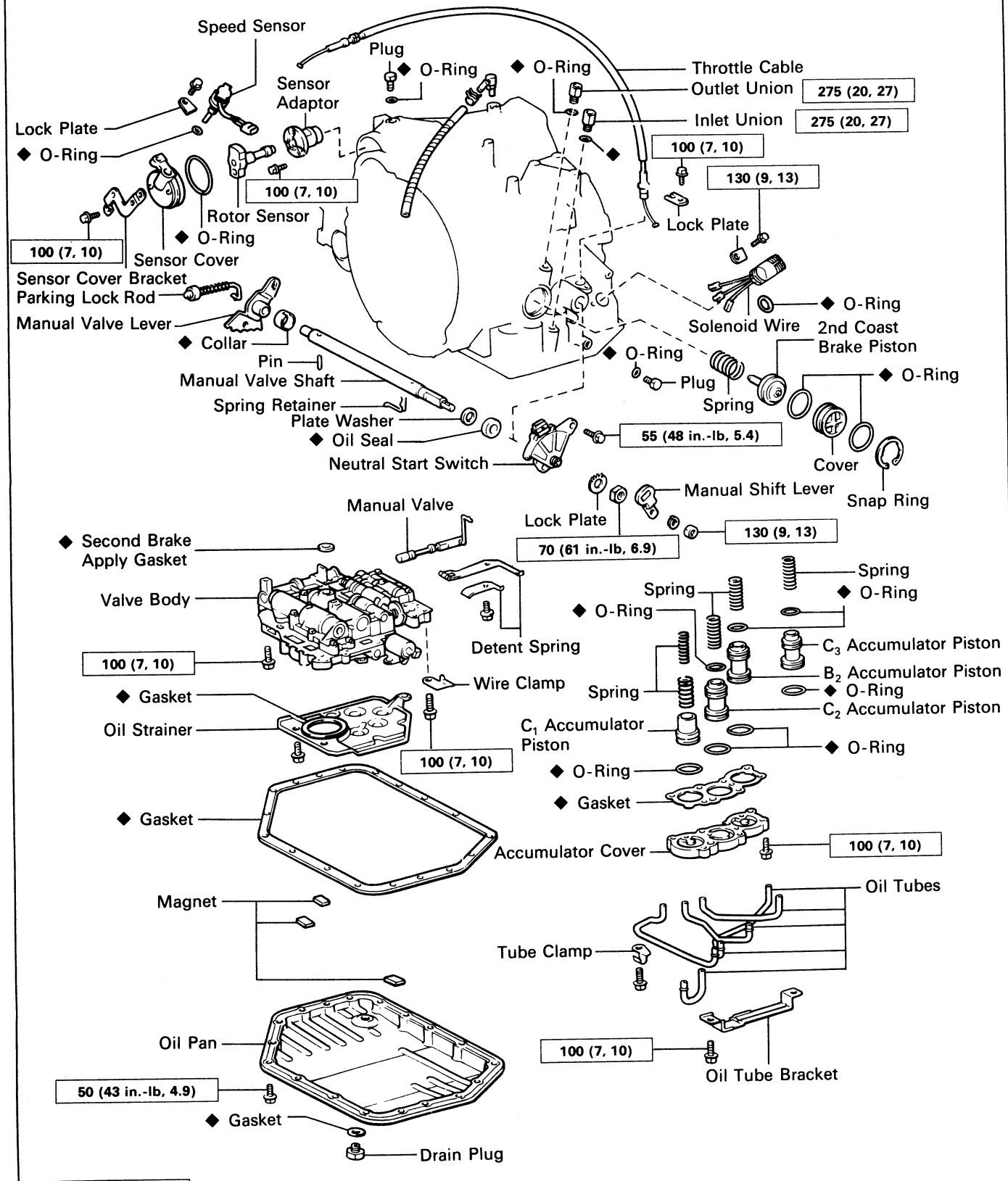
Set up a dial indicator and measure the drive plate runout.

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 the spacers and tighten the bolts.

Torque: 850 kg-cm (61 ft-lb, 83 N·m)
Runout: 0.20 mm (0.0079 in.)

REMOVAL OF COMPONENT PARTS

COMPONENTS

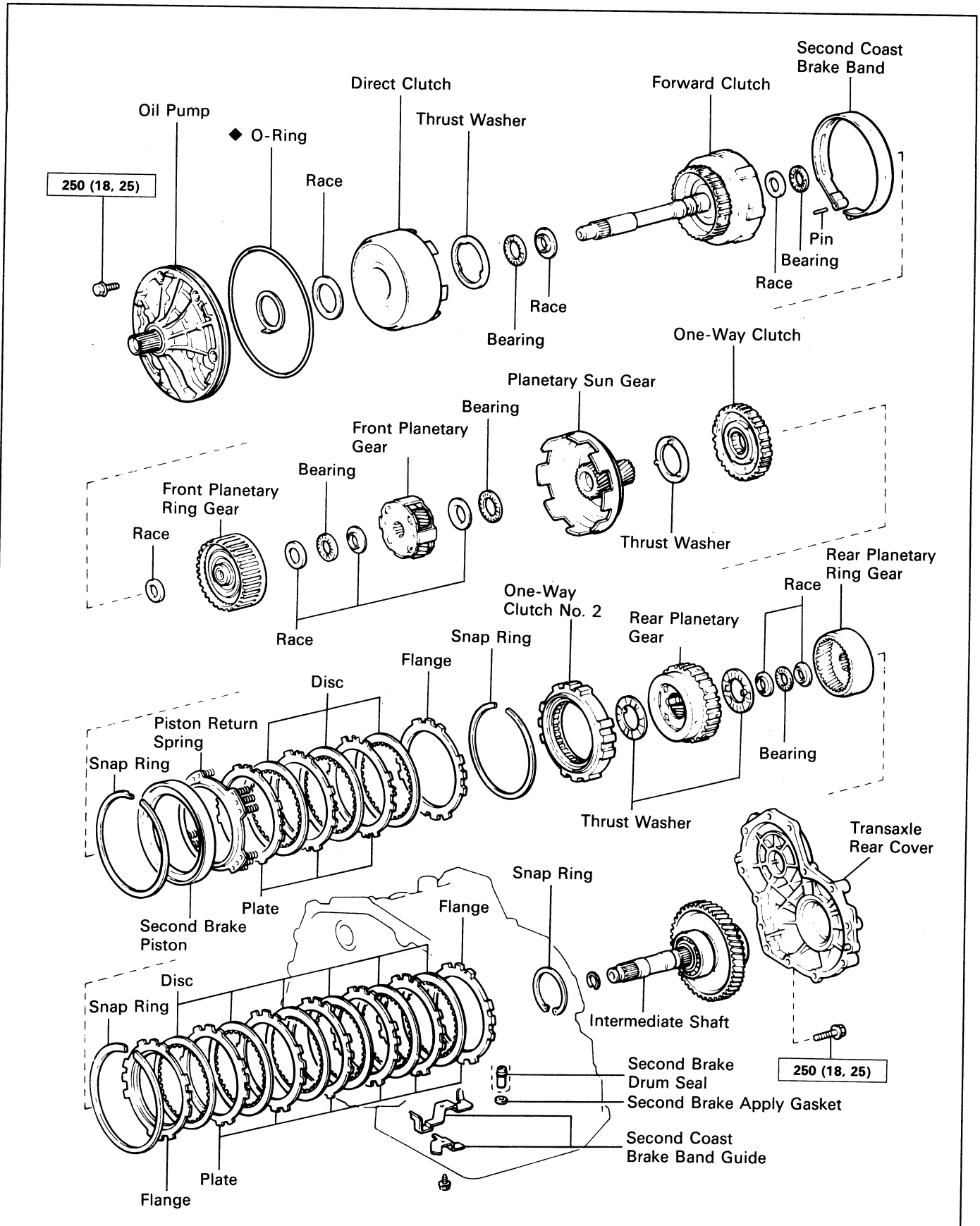


kg-cm (ft-lb, N·m) : Specified torque

◆ Non-reusable part

AT6007

COMPONENTS (Cont'd)

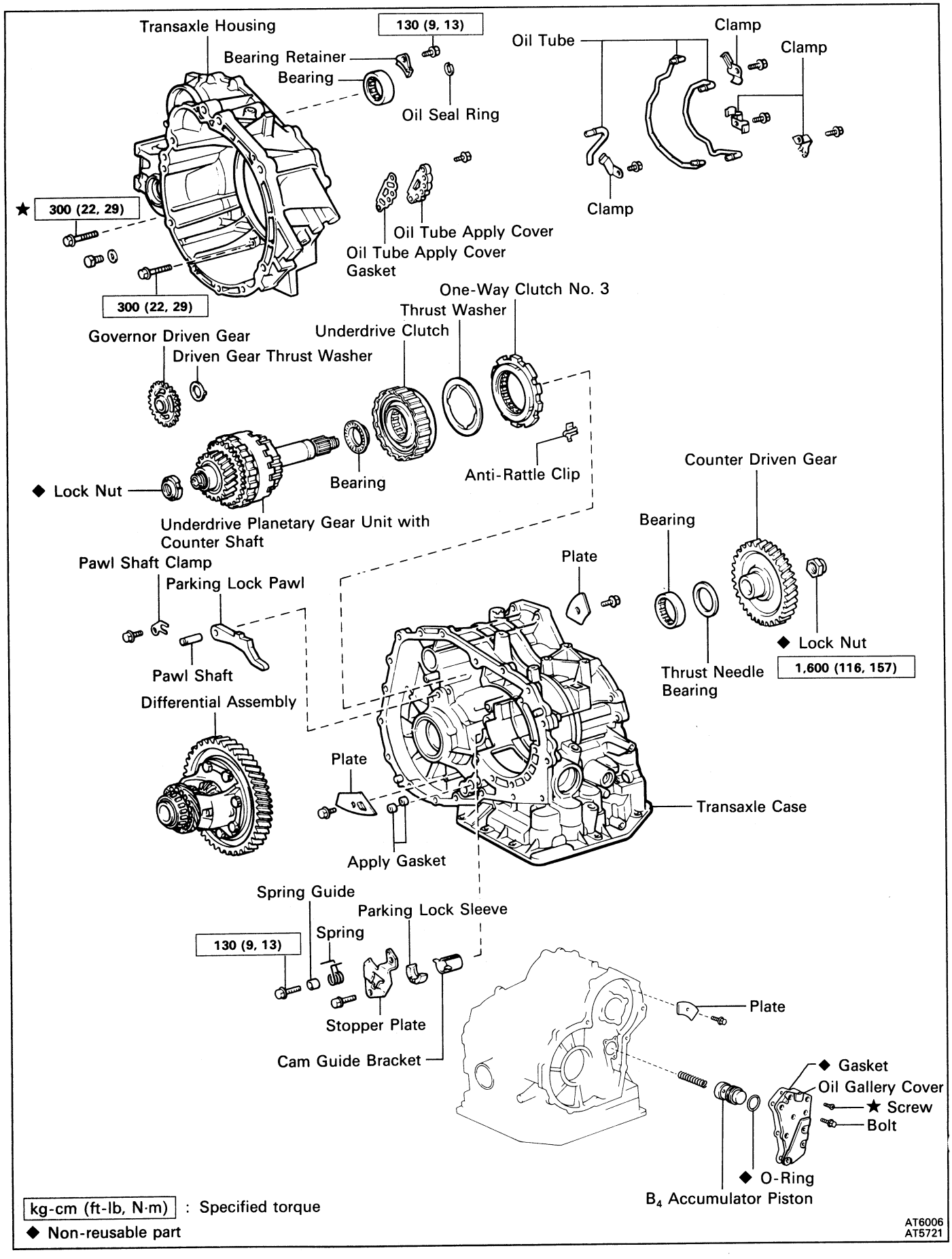


kg-cm (ft-lb, N·m) : Specified torque

◆ Non-reusable part

AT3368

COMPONENTS (Cont'd)



kg-cm (ft-lb, N·m) : Specified torque

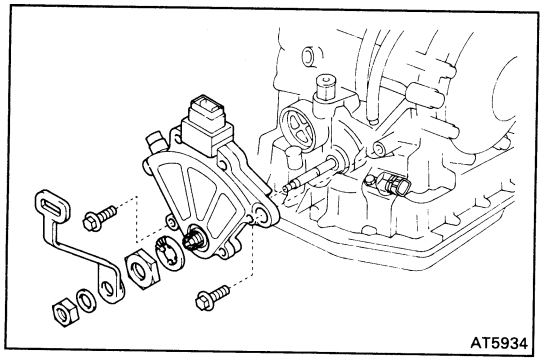
◆ Non-reusable part

AT6006
AT5721

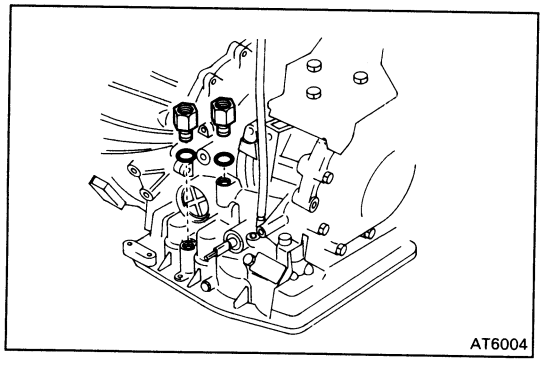
SEPARATE BASIC SUBASSEMBLY

1. **REMOVE TWO OIL COOLER PIPES**

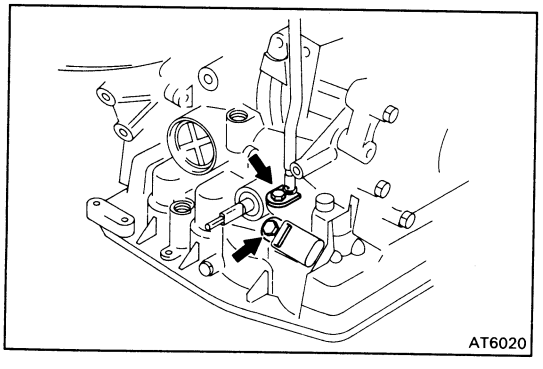
2. **REMOVE TRANSMISSION DIPSTICK AND FILLER TUBE**



3. **REMOVE NEUTRAL START SWITCH**
   (a) Remove the manual shift lever.
   (b) Pry off the lock washer and remove the manual valve shaft nut.
   (c) Remove the two bolts and pull out the neutral start switch.

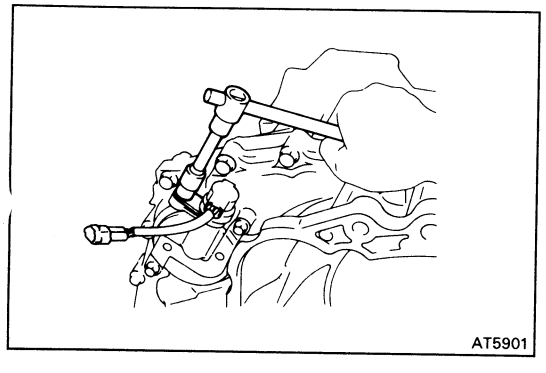


4. **REMOVE UNION**
   (a) Using the open end wrench, remove the union.
   (b) Remove the O-ring from union.

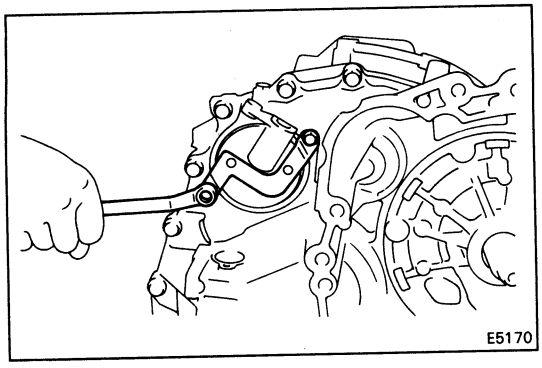


5. **REMOVE THROTTLE CABLE RETAINING BOLT AND PLATE**

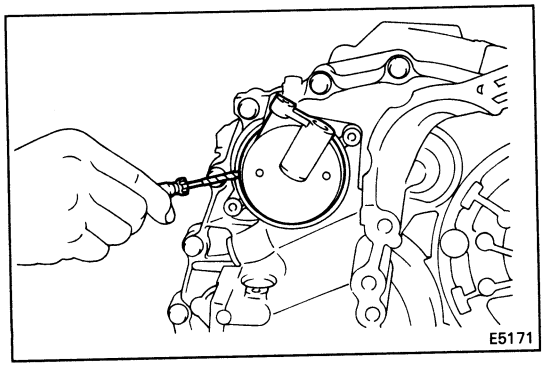
6. **REMOVE SOLENOID WIRE RETAINING BOLT AND PLATE**



7. **REMOVE SPEED SENSOR AND SENSOR ROTOR**
   (a) Remove the retaining plate and pull out the speed sensor.
   (b) Remove the O-ring from speed sensor.

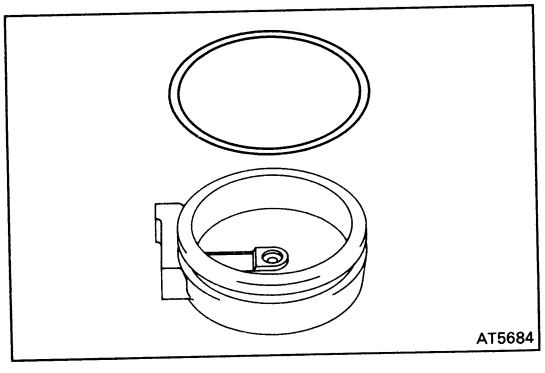


(c) Remove the two bolts and sensor cover bracket.

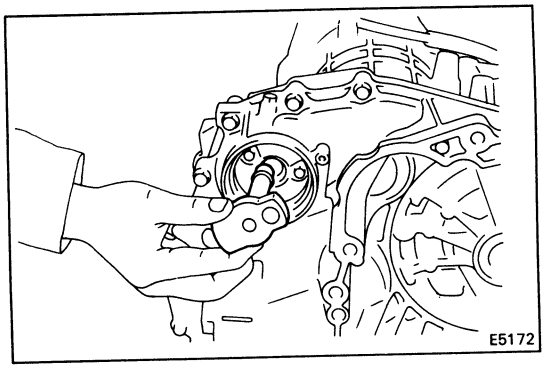


(d) Using a screwdriver, remove the sensor cover.

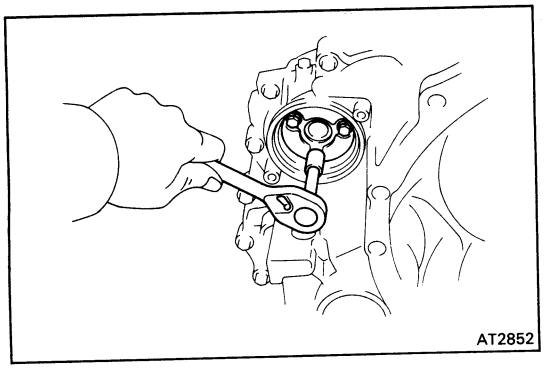
HINT: Tape the screwdriver tip before use so as not to damage the cover or transaxle.



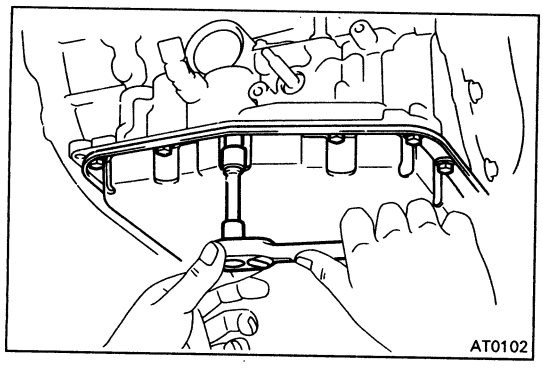
(e) Remove the O-ring from the sensor cover.



(f) Remove the sensor rotor.



(g) Remove the three bolts and sensor adaptor.



8. REMOVE PAN AND GASKET

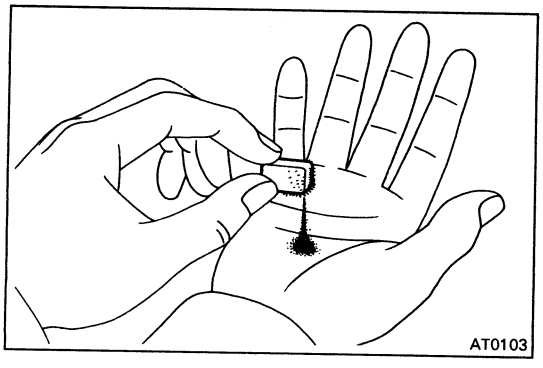
(a) Remove the eighteen bolts.

(b) Remove the pan by lifting the transmission case.

NOTICE: Do not turn the transmission over as it will contaminate the valve body with the foreign materials in the bottom of the pan.

(c) Remove the gasket.

(d) Place the transmission on wooden blocks to prevent damage to the pipes.

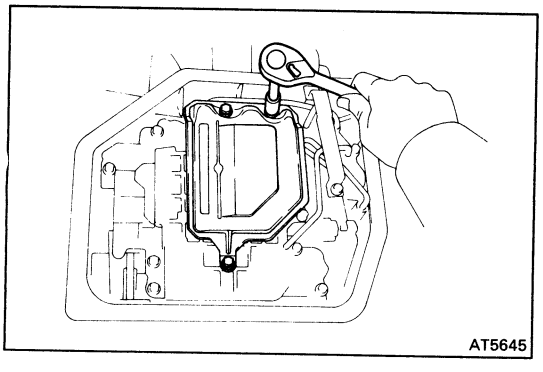


9. EXAMINE PARTICLES IN PAN

Remove the magnets and use them to collect any steel chips. Lock 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:

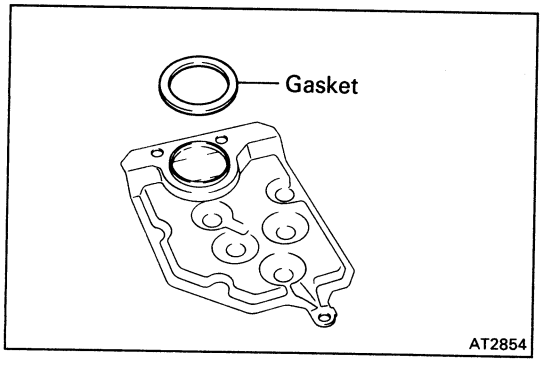
Steel (magnetic) .. bearing, gear and plate wear
Brass (non-magnetic) .. bushing wear

10. TURN TRANSMISSION OVER

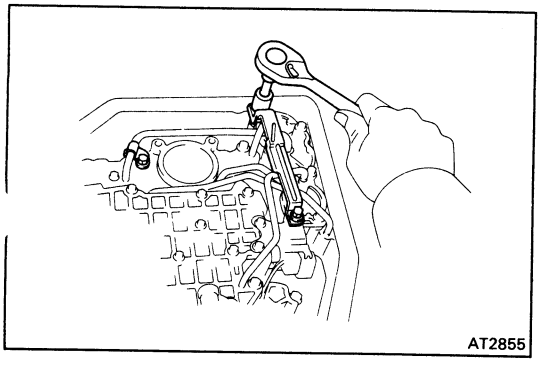


11. REMOVE OIL STRAINER

(a) Remove the three bolts and oil strainer.



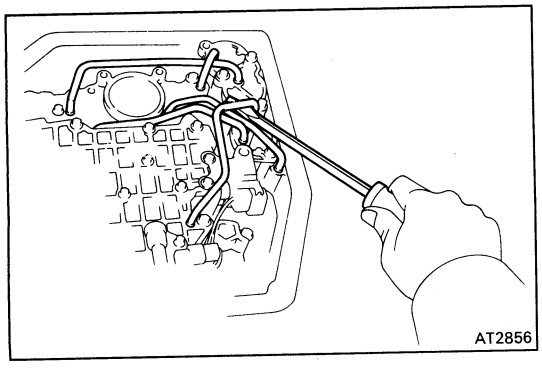
(b) Remove the gasket.



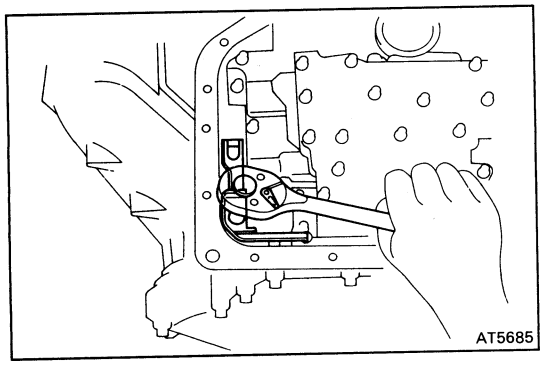
12. REMOVE OIL TUBES

(a) Remove the two bolts and tube bracket.

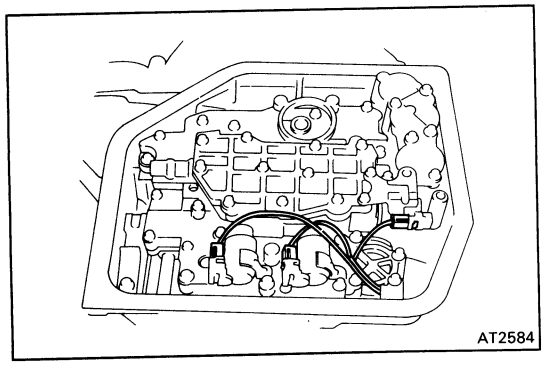
(b) Remove the tube clamp bolt and clamp.



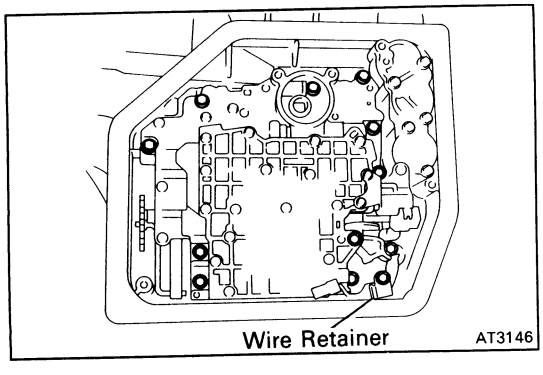
(c) Pry up both ends with a large screwdriver and remove the five tubes.



13. REMOVE MANUAL DETENT SPRING

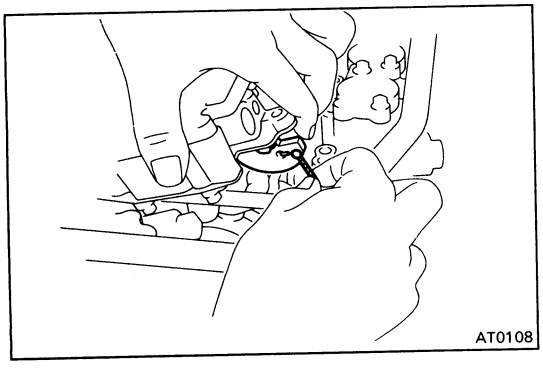


14. DISCONNECT SOLENOID CONNECTORS

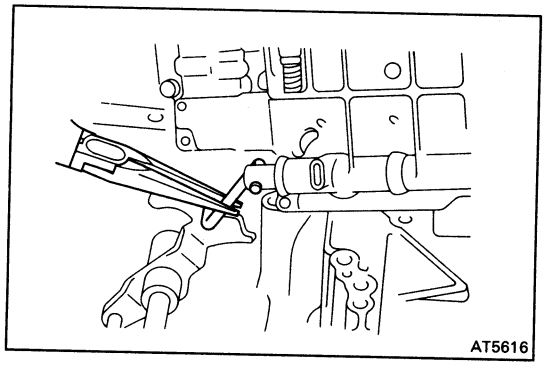


15. REMOVE VALVE BODY

(a) Remove the twelve bolts and wire retainer as shown.

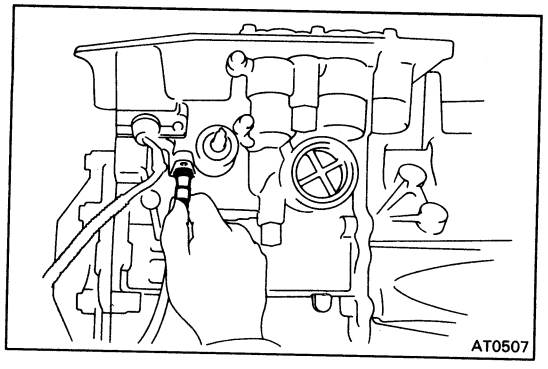


(b) Disconnect the throttle cable from the cam.



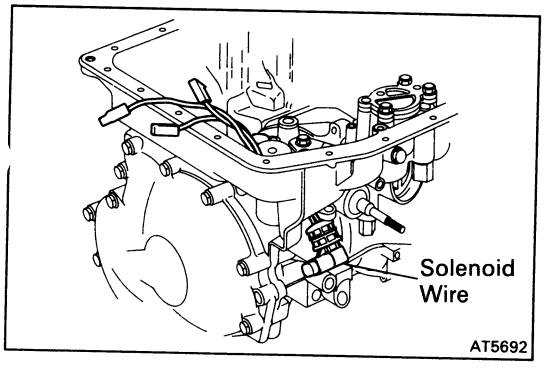
(c) While disconnecting the manual valve connecting rod from the manual valve lever, remove the valve body.

(d) Remove the manual valve from the valve body.

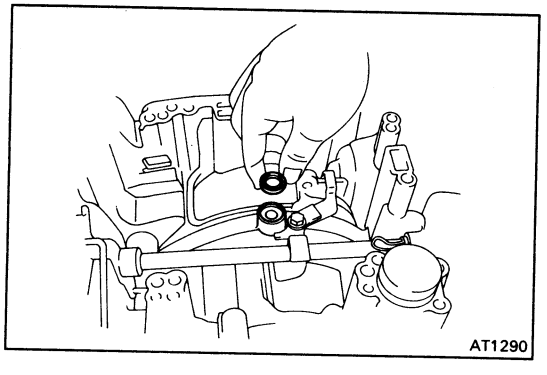


16. REMOVE THROTTLE CABLE FROM CASE

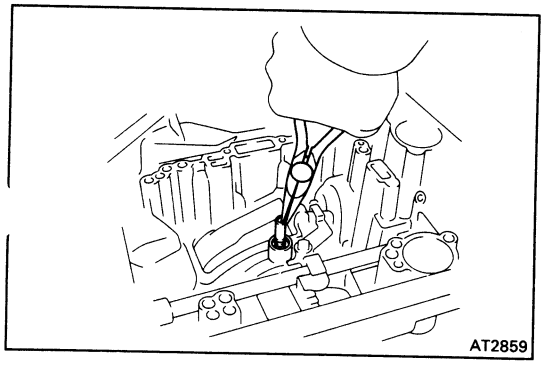
Pull out the throttle cable.



17. REMOVE SOLENOID WIRE

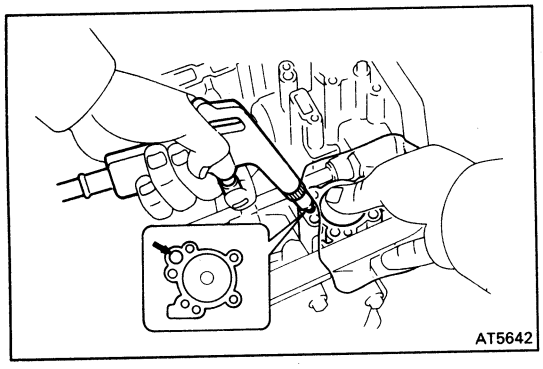


18. REMOVE SECOND BRAKE APPLY GASKET



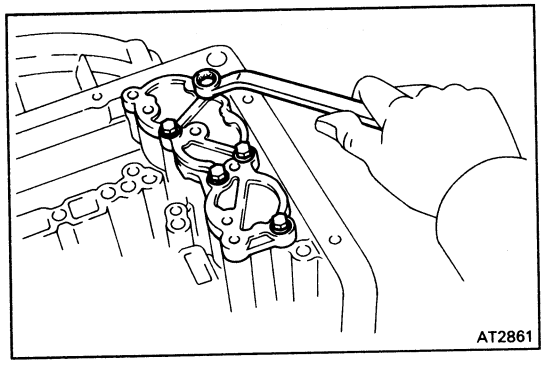
19. REMOVE SECOND BRAKE DRUM SEAL

Using a needle nose pliers, pull out the second brake drum seal.



20. REMOVE C_3 ACCUMULATOR PISTON AND SPRING

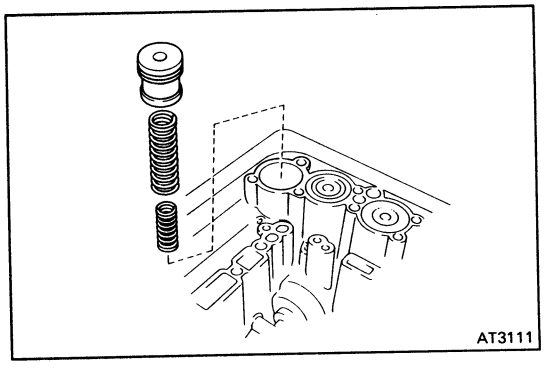
Using low-pressure compressed air (1 kg/cm², 14 psi or 98 kPa) pop out the piston into a rag. Force air into the hole shown and remove the piston and spring.



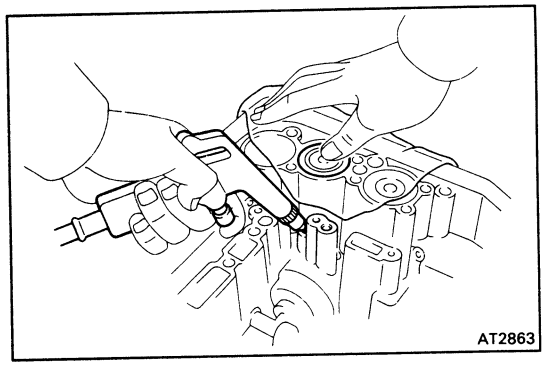
21. REMOVE ACCUMULATOR PISTONS AND SPRINGS

(a) Loosen the five bolts one turn at a time until the spring tension is released.

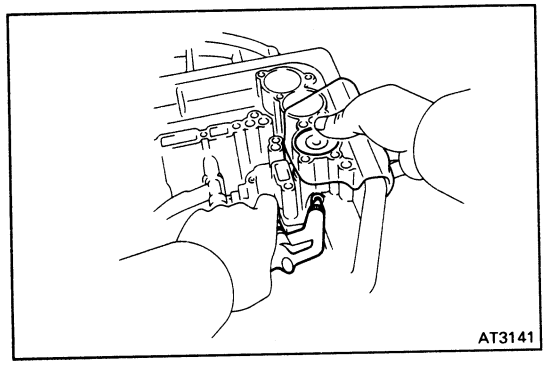
(b) Remove the cover and gasket.



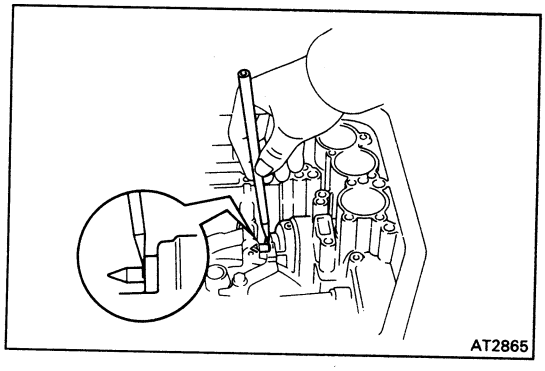
(c) Remove the C_1 piston and two springs.



(d) Using low-pressure compressed air (1 kg/cm², 14 psi, 98 kPa), pop out the C_2 piston into a rag. Force air into the hole shown and remove the piston and spring.

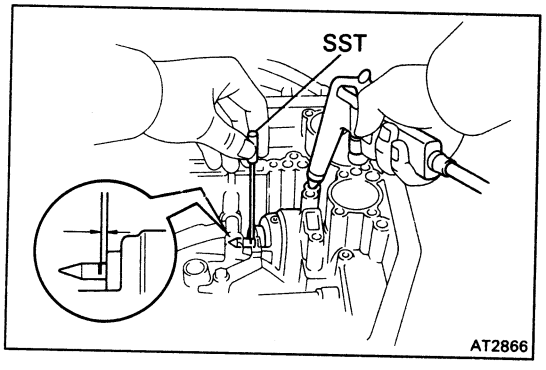


(e) Using low-pressure compressed air (1 kg/cm², 14 psi, 98 kPa), pop out the B_2 piston into a rag. Force air into the hole shown and remove the piston and spring.



22. MEASURE PISTON STROKE OF SECOND COAST BRAKE

(a) Apply a small amount of paint to the piston rod at the point it meets the case as shown in the illustration.

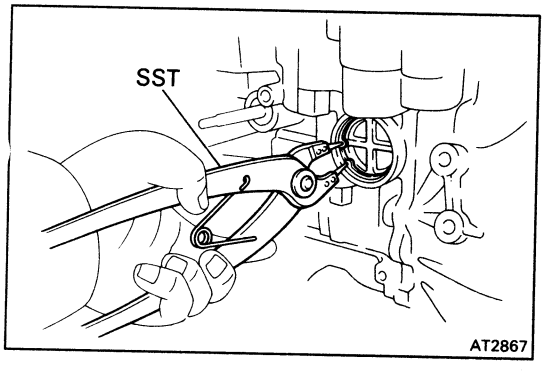


(b) Using SST, measure the piston stroke applying and releasing the compressed air (4 – 8 kg/cm², 57 – 114 psi, 392 – 785 kPa) as shown.

SST 09240-00020

Piston stroke: 1.5 – 3.0 mm (0.059 – 0.118 in.)

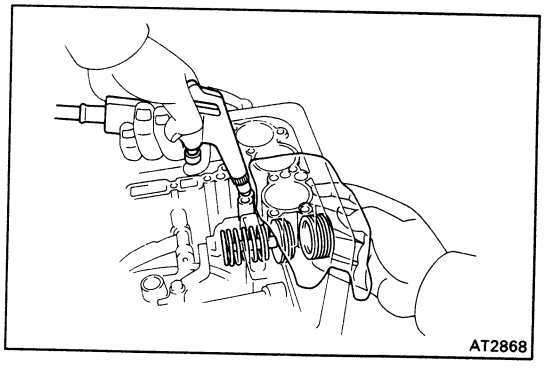
If the piston stroke exceeds the limit, inspect the brake band.



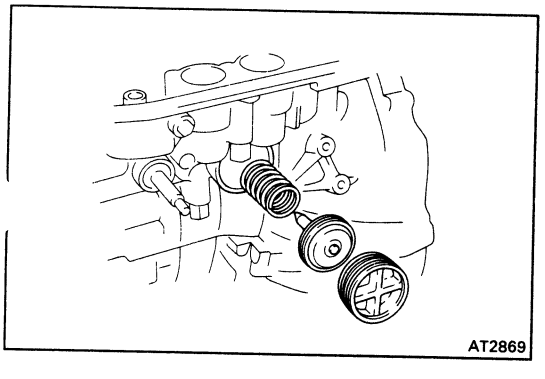
23. REMOVE SECOND COAST BRAKE PISTON

(a) Using SST, remove the snap ring.

SST 09350-32014 (09351-32050)

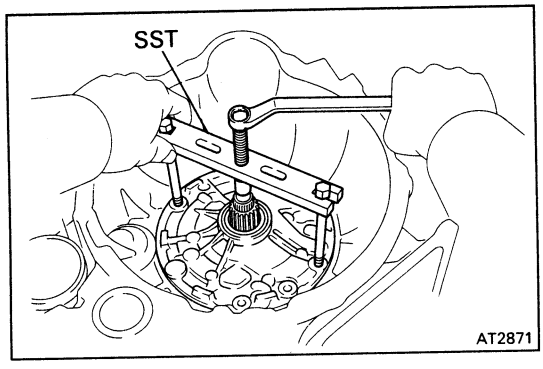


(b) Using low-pressure compressed air (1 kg/cm², 14 psi, 98 kPa), pop out the cover into a rag. Force air into the hole shown.



(c) Remove the cover, piston and spring.

(d) Remove the two O-rings from the cover.

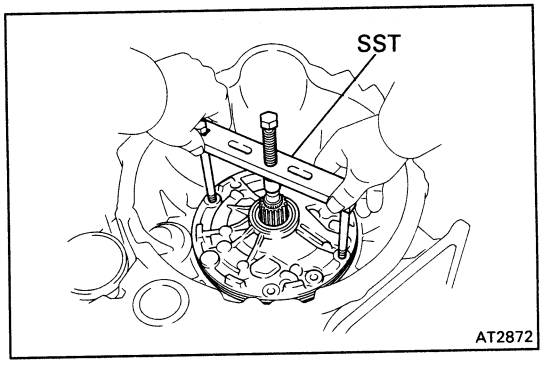


24. REMOVE OIL PUMP

(a) Remove the six bolts holding the oil pump to the transmission case.

(b) Using SST, pull the oil pump free from the transmission case.

SST 09350-32014 (09351-32061)

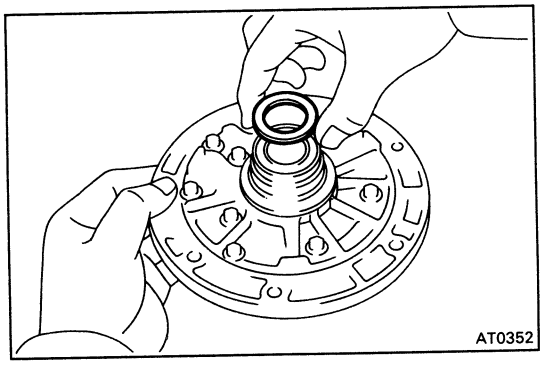


(c) Remove the oil pump with SST.

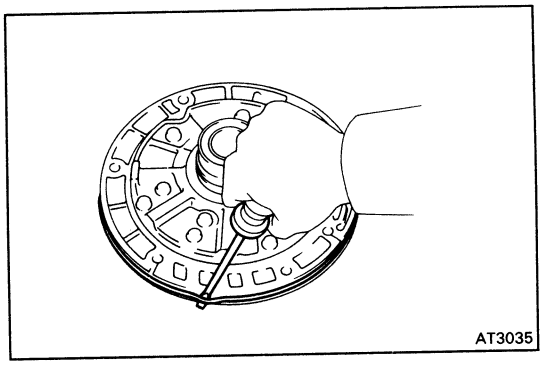
SST 09350-32014 (09351-32061)

NOTICE: Be careful not to drop or damage the races and bearing behind oil pump.

(d) Remove SST from the oil pump.

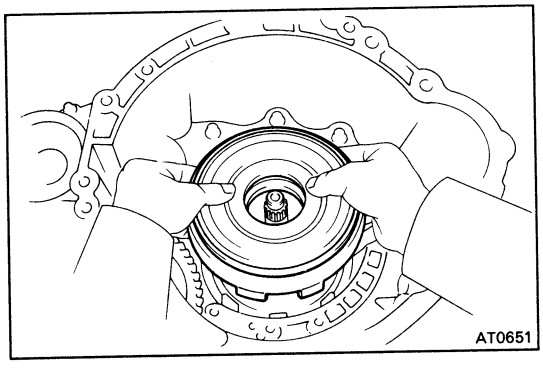


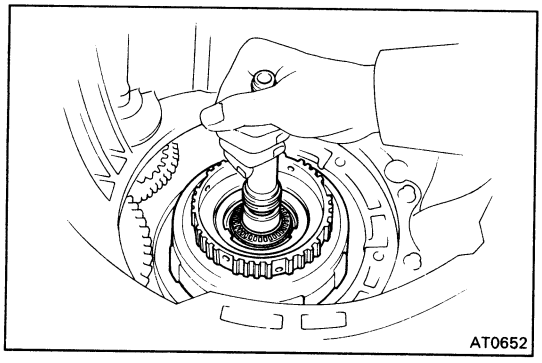
(e) Remove the race from the oil pump.



(f) Remove the O-ring from the oil pump.

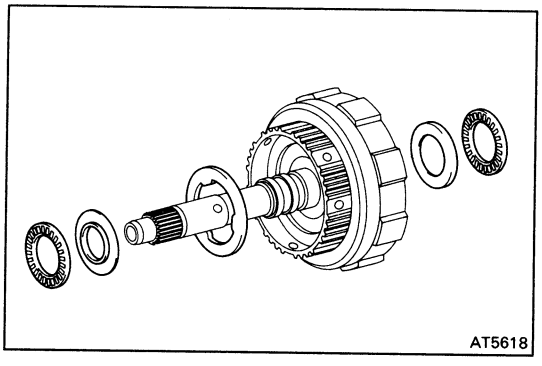
25. REMOVE DIRECT CLUTCH



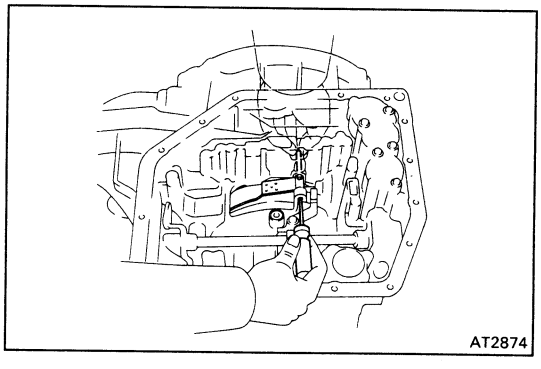

AT0652

26. REMOVE FORWARD CLUTCH

(a) Remove the forward clutch with bearing and race.


AT5618

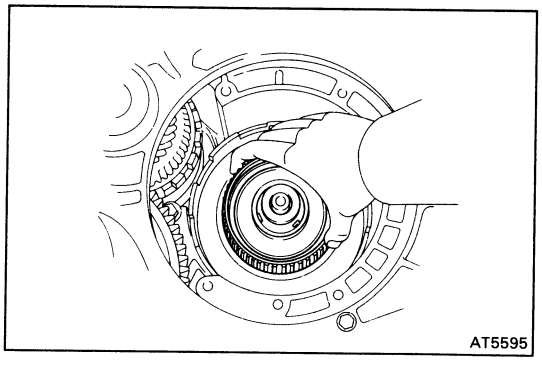
(b) Remove the thrust washer, bearings and races from the forward clutch.


AT2874

27. REMOVE SECOND COAST BRAKE BAND

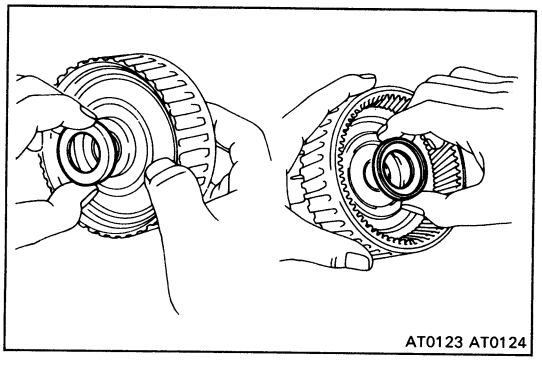
(a) Push the pin with a small screwdriver and remove it from the bolt hole of the oil pump mounting.

(b) Remove the brake band.

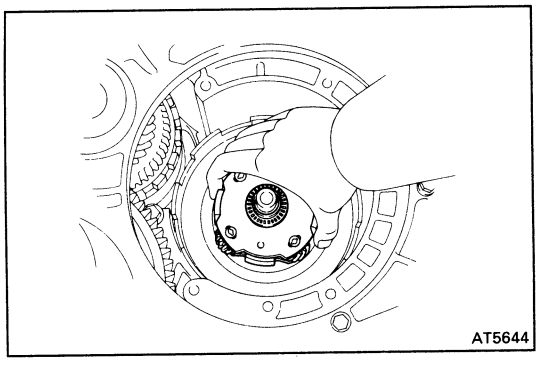

AT5595

28. REMOVE FRONT PLANETARY RING GEAR

(a) Remove the front planetary ring gear with race.

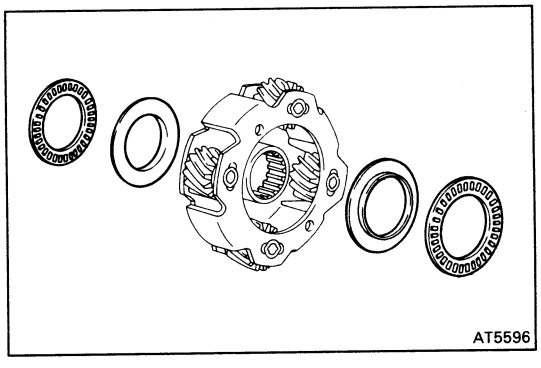

AT0123 AT0124

(b) Remove the races from the ring gear.

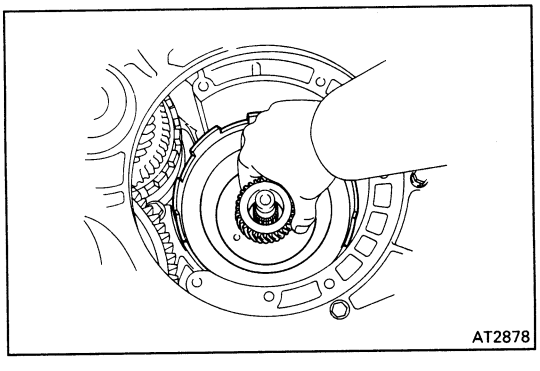


29. REMOVE FRONT PLANETARY GEAR

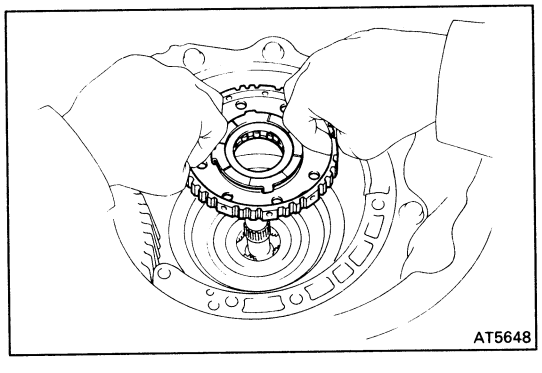
(a) Remove the front planetary gear with bearing and race.



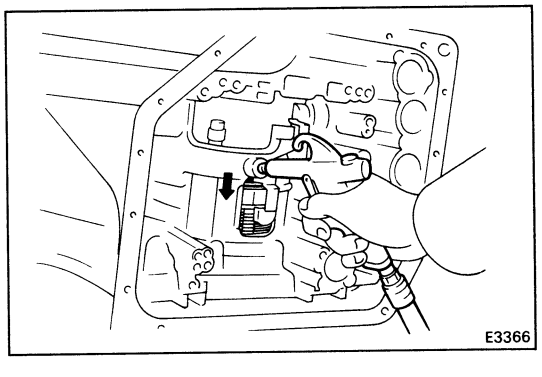
(b) Remove the races and bearings from the planetary gear.



30. REMOVE SUN GEAR, SUN GEAR INPUT DRUM AND THRUST WASHER

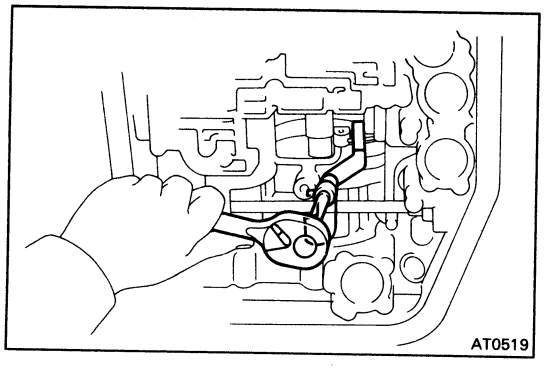


31. REMOVE SECOND BRAKE HUB AND NO. 1 ONE-WAY CLUTCH

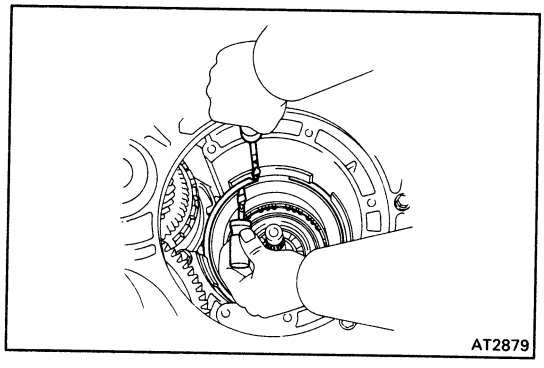


32. CONFIRM THAT SECOND BRAKE PISTON MOVES

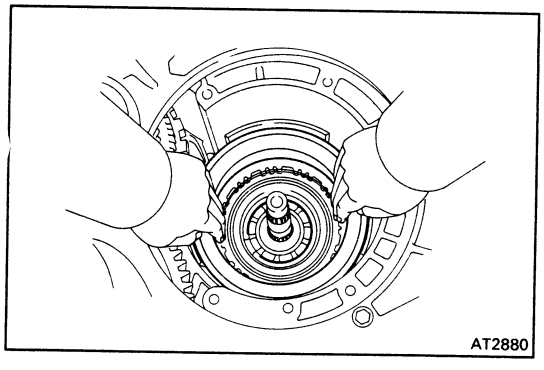
Using compressed air, confirm that the second brake piston moves smoothly.



33. REMOVE SECOND COAST BRAKE BAND GUIDE

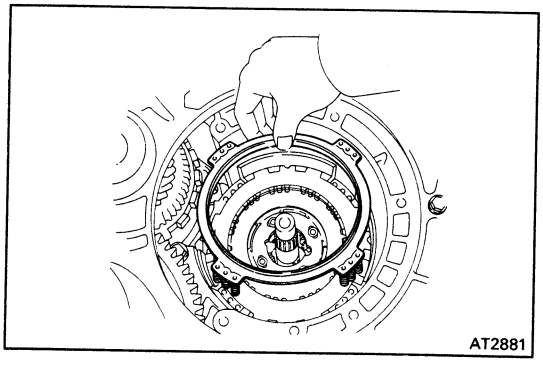


34. REMOVE SNAP RING HOLDING SECOND BRAKE DRUM TO CASE



35. REMOVE SECOND BRAKE DRUM

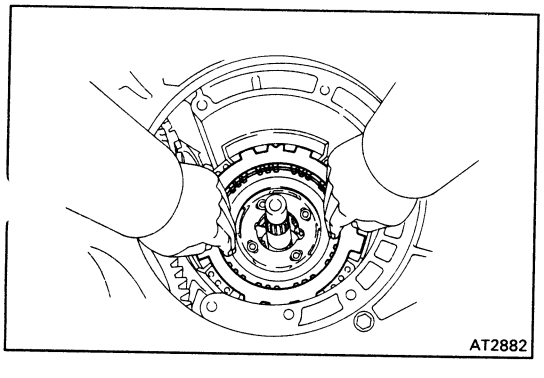
HINT: If the brake drum is difficult to remove, lightly tap it with a wooden block.



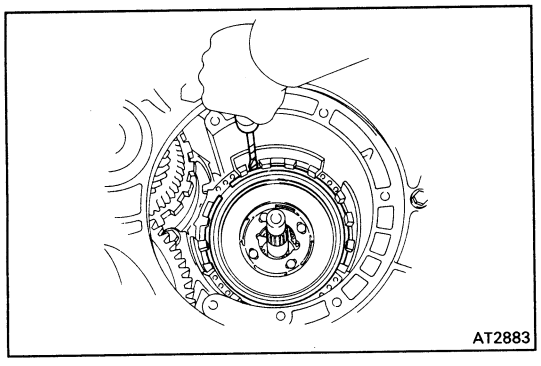
36. REMOVE SECOND BRAKE PISTON RETURN SPRING

(a) Remove the thrust washer.

(b) Remove the return spring.

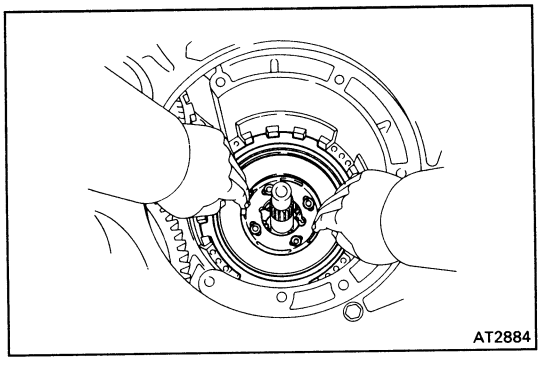


37. REMOVE PLATES, DISCS AND FLANGE



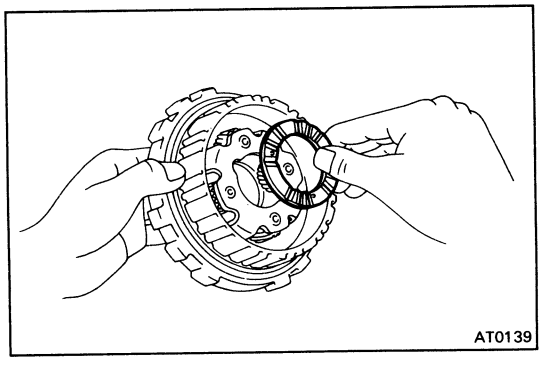
38. REMOVE SNAP RING HOLDING NO. 2 ONE-WAY CLUTCH OUTER RACE TO CASE

Using a screwdriver, remove the snap ring.

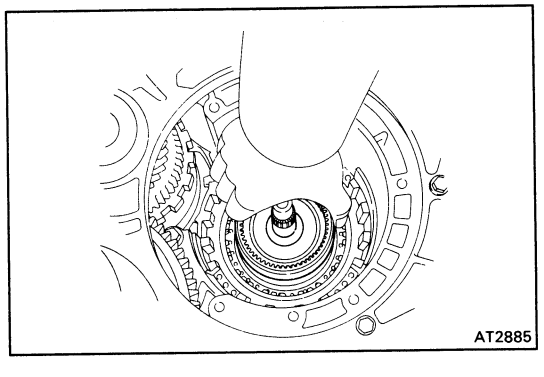


39. REMOVE NO. 2 ONE-WAY CLUTCH AND REAR PLANETARY GEAR

(a) Remove the No. 2 one-way clutch and rear planetary gear with thrust washer.

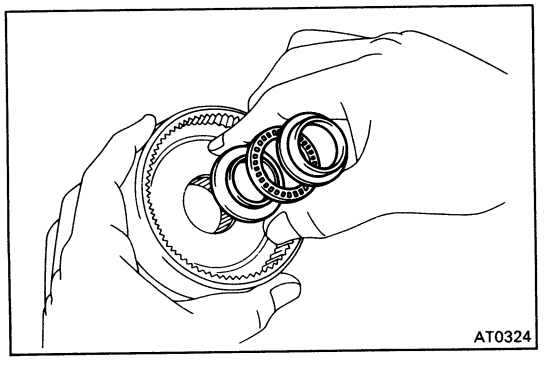


(b) Remove the thrust washer from the gear.

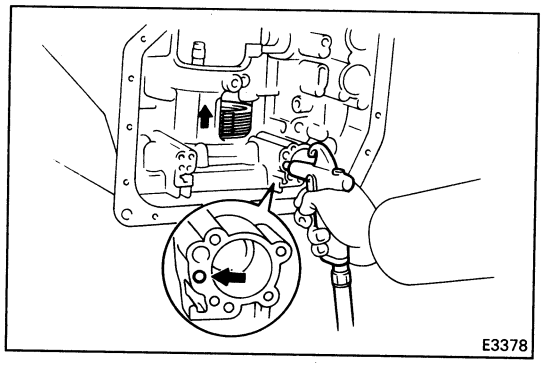


40. REMOVE REAR PLANETARY RING GEAR

(a) Remove the rear planetary ring gear with bearing and races.

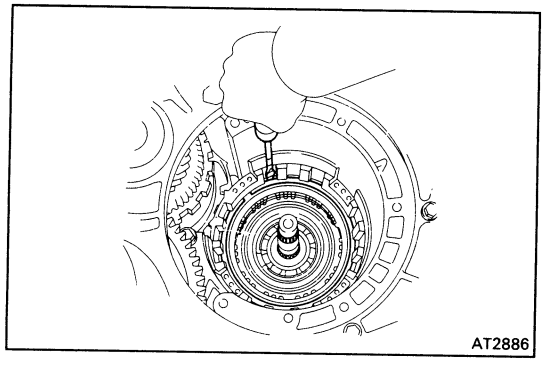


(b) Remove the bearing and races from the ring gear.



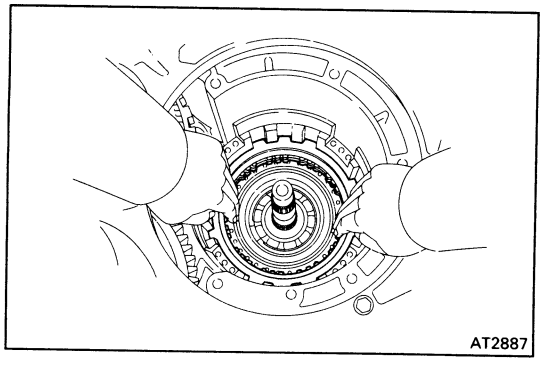
41. CONFIRM THAT FIRST AND REVERSE BRAKE PISTON MOVES

Using compressed air, confirm that the first and reverse brake piston moves smoothly.

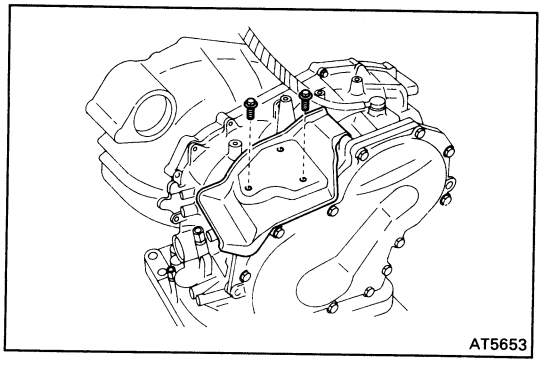


42. REMOVE SNAP RING HOLDING FLANGE TO CASE

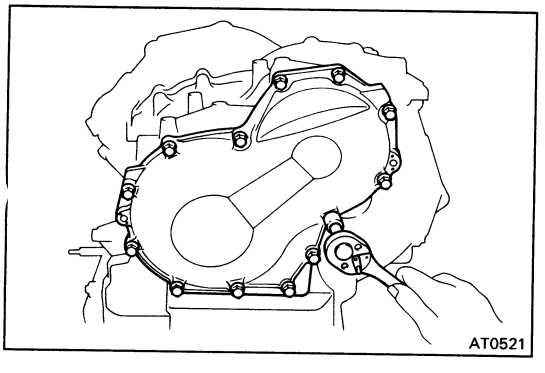
Using a screwdriver, remove the snap ring.



43. REMOVE FLANGES, PLATES AND DISCS

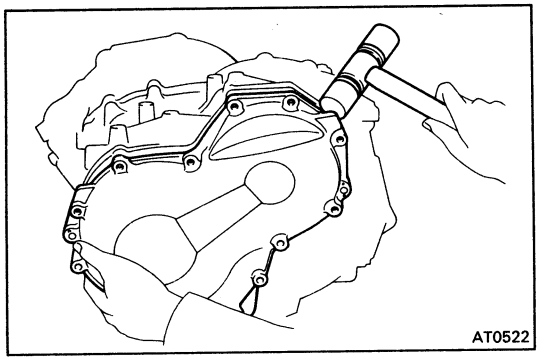


44. REMOVE ENGINE MOUNTING LEFT BRACKET

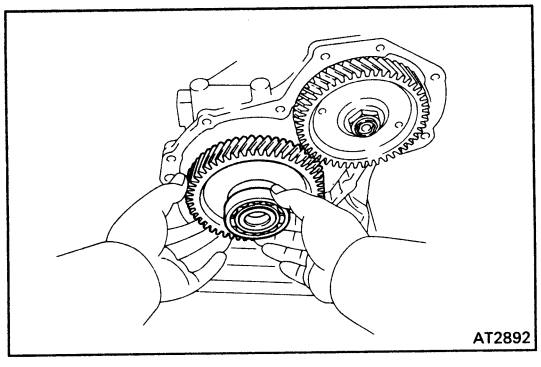


45. REMOVE TRANSAXLE REAR COVER

(a) Remove the thirteen bolts.

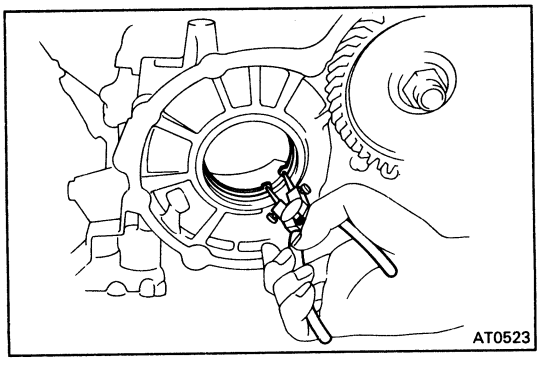


(b) Tap off the circumference of the cover with a plastic hammer to remove the cover from the transmission case, and remove the cover.



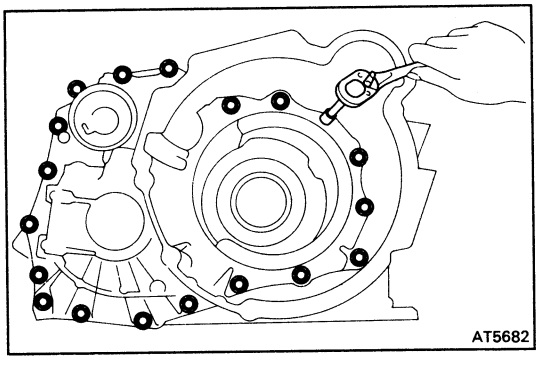
46. REMOVE INTERMEDIATE SHAFT

Remove the intermediate shaft from the transmission case.



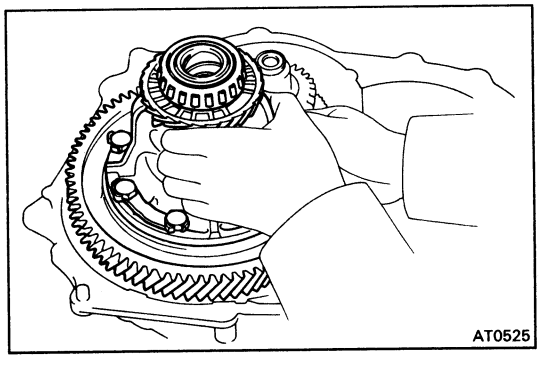
47. REMOVE SNAP RING

Using snap ring pliers, remove the snap ring.

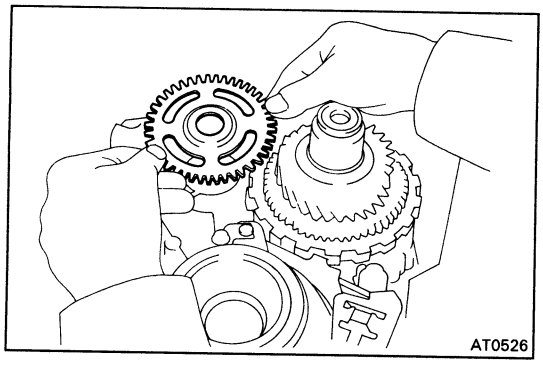


48. REMOVE TRANSAXLE HOUSING

Remove the nineteen bolts and transaxle housing.

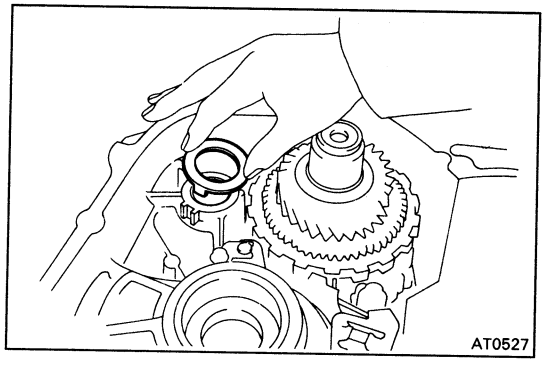


49. REMOVE DIFFERENTIAL

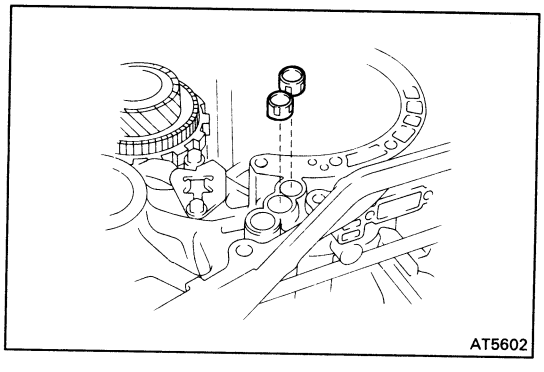


50. REMOVE GOVERNOR DRIVEN GEAR

(a) Remove the governor driven gear.

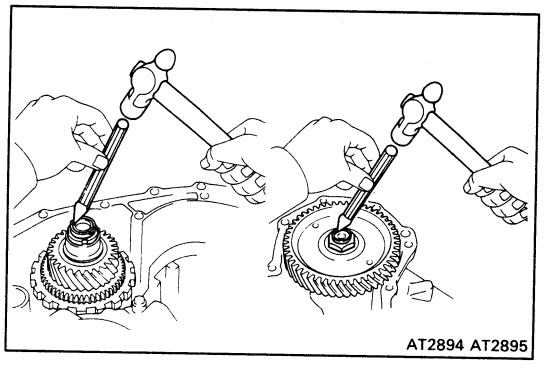


(b) Remove the thrust washer.



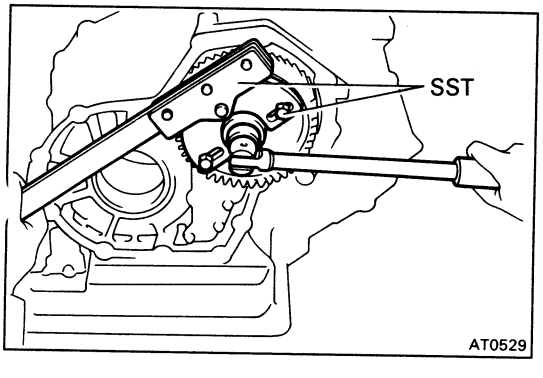
51. REMOVE APPLY GASKETS

Remove the two gaskets.



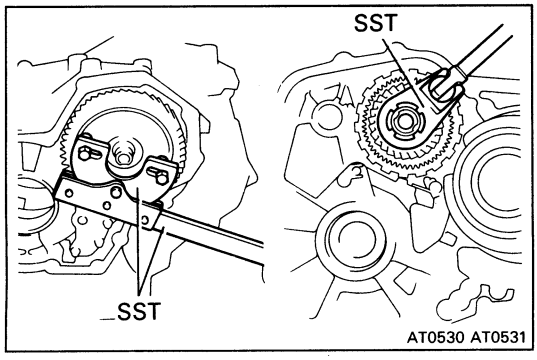
52. REMOVE COUNTER SHAFT LOCK NUTS

(a) Using a chisel and hammer, unstake the counter shaft lock nut on both sides.



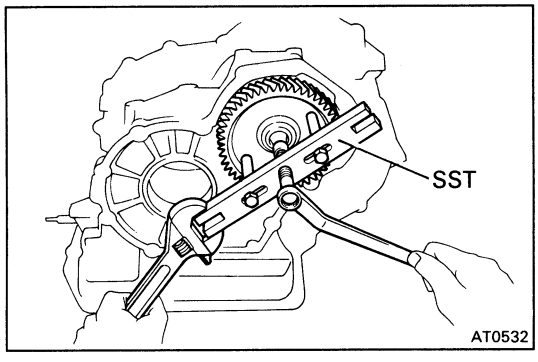
(b) Using SST, remove the lock nut of the driven gear side.

SST 09330-00021, 09350-32014 (09351-32032)



(c) Using SST to hold the driven gear, remove the lock nut of the another side.

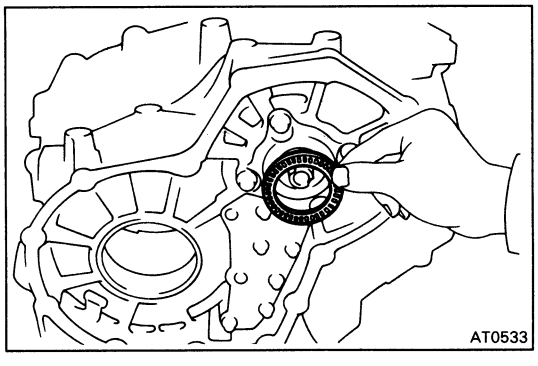
SST 09330-00021 and
09350-32014 (09351-32032, 09351-32170)



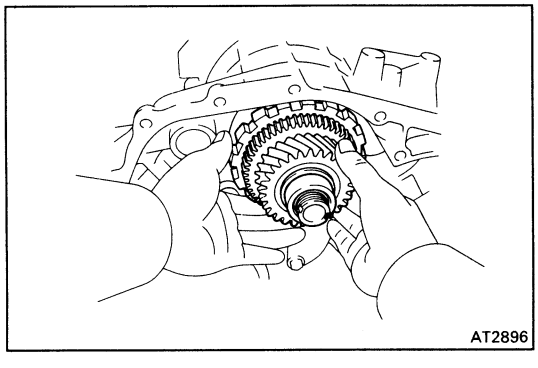
53. REMOVE COUNTER DRIVEN GEAR

Using SST, remove the driven gear.

SST 09350-32014 (09351-32061)

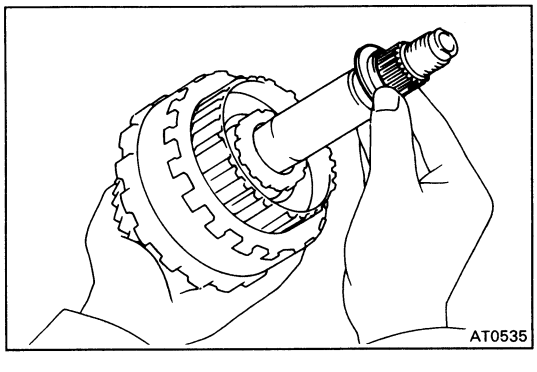


54. REMOVE THRUST NEEDLE BEARING



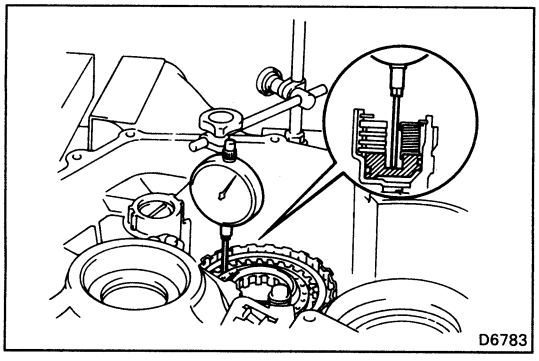
55. REMOVE COUNTER SHAFT ASSEMBLY

Pull out the counter shaft assembly.



56. REMOVE THRUST BEARING WITH RACE

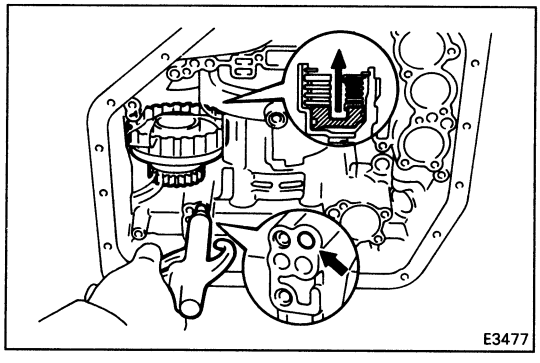
Remove the thrust bearing with race from the counter shaft assembly.



57. CHECK PISTON STROKE OF UNDERDRIVE CLUTCH

(a) Set a dial indicator (long type pick or SST) as shown.

SST 09350-32014 (09351-32190)



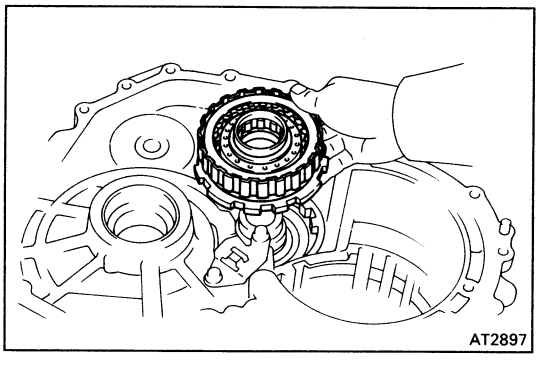
(b) Applying and releasing the compressed air (4 – 8 kg/cm², 57 – 114 psi, 392 – 785 kPa), measure the underdrive clutch piston stroke.

Piston stroke: 1.22 – 1.54 mm (0.0480 – 0.0606 in.)

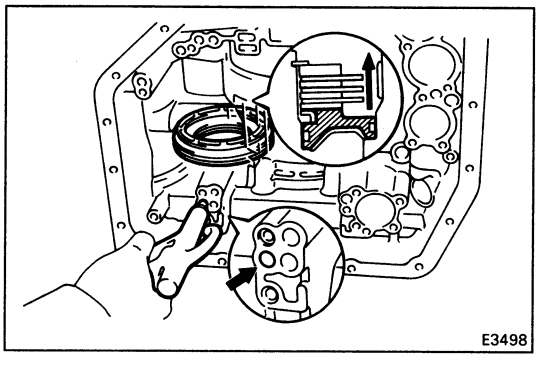
If the piston stroke is nonstandard, select another flange.

HINT: There are two different flange thickness.

Flange thickness: 2.30 mm (0.0906 in.)
2.50 mm (0.0984 in.)
2.70 mm (0.1063 in.)

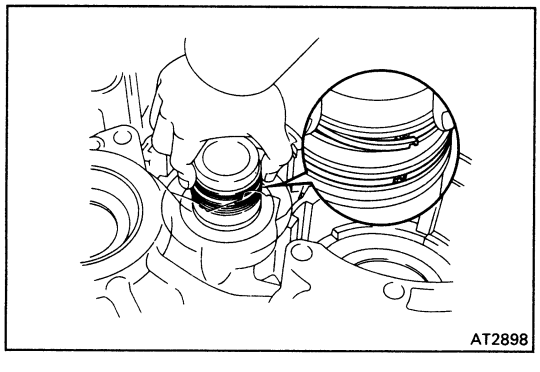


58. REMOVE UNDERDRIVE CLUTCH DRUM AND ANTI-RATTLE CLIP



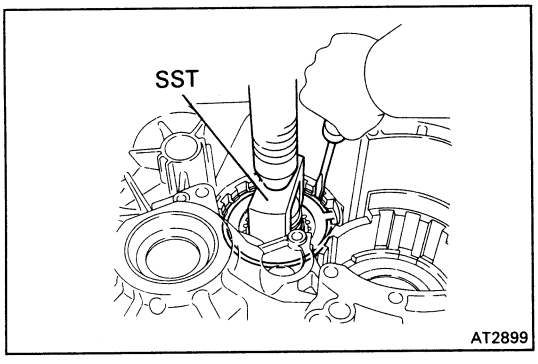
59. CONFIRM THAT UNDERDRIVE BRAKE PISTON MOVES

Using compressed air, confirm that the underdrive brake piston moves smoothly.



60. REMOVE OIL SEAL RINGS

Remove the two oil seal rings.

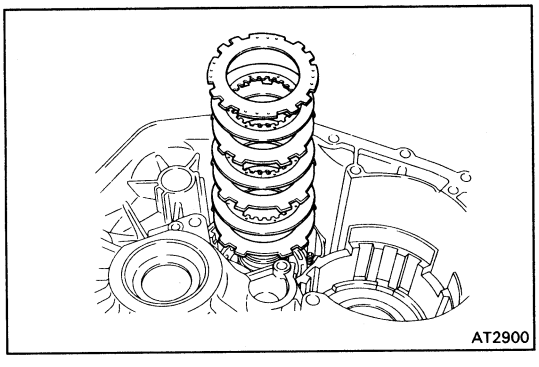


61. REMOVE FLANGE, PLATES AND DISCS

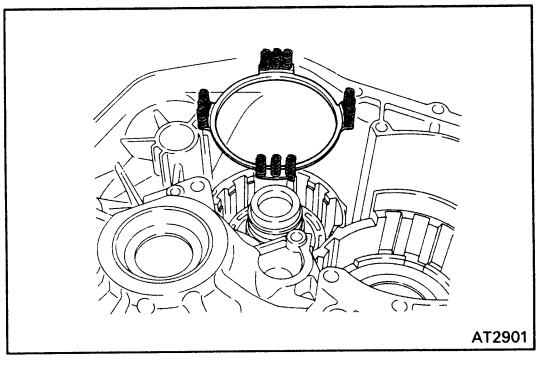
(a) Using SST and press, press in the flange until the snap ring is free from the flange.

SST 09350-32014 (09351-32070)

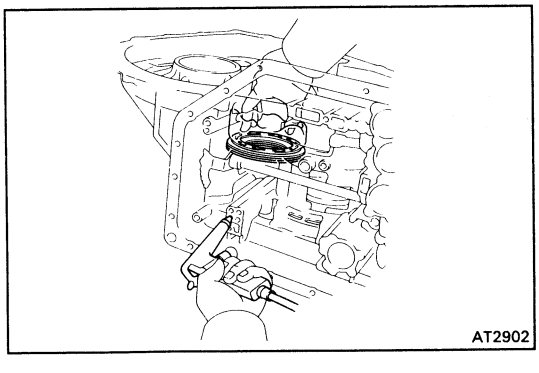
(b) Using a screwdriver, remove the snap ring.



(c) Remove the flange, three plates and discs.

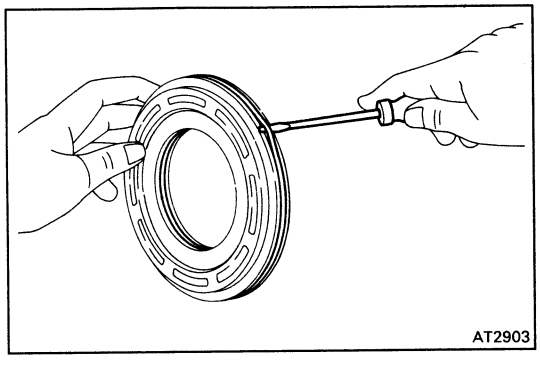


62. REMOVE RETURN SPRING



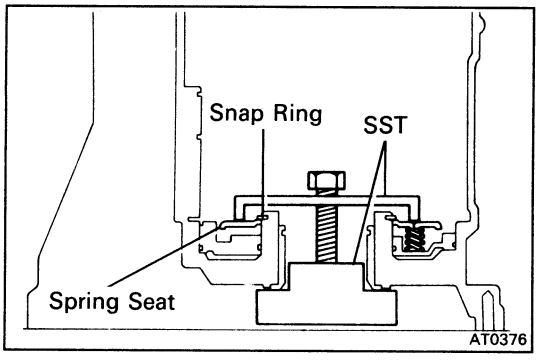
63. REMOVE UNDERDRIVE BRAKE PISTON

Using low-pressure compressed air (1 kg/cm^2, 14 psi, 98 kPa), pop out the brake piston into a rag. Force air into the hole shown and remove the brake piston.



64. REMOVE O-RINGS FROM PISTON

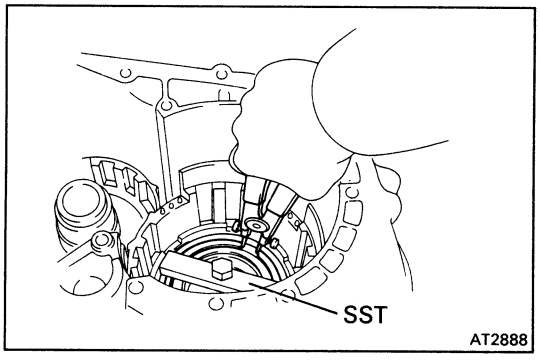
Remove the two O-rings from the piston.



65. REMOVE SNAP RING

(a) Set SST, and tighten the bolt gradually to compress the springs until the snap ring is free from the spring seat.

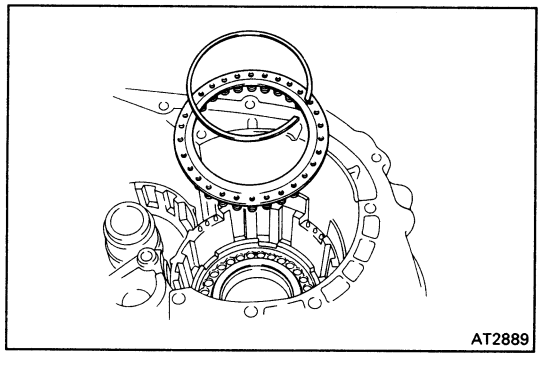
SST 09350-32014 (09351-32040)



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

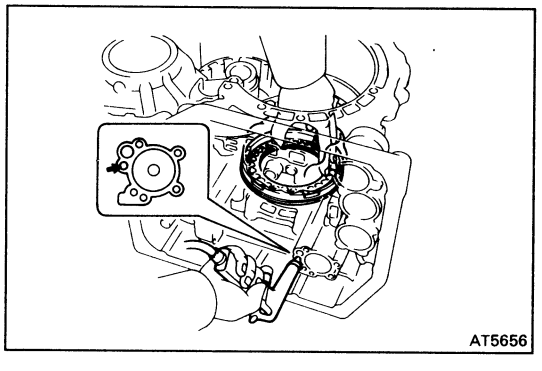
(c) Remove SST.

SST 09350-32014 (09351-32040)



66. REMOVE RETURN SPRING

Remove the return spring and snap ring.

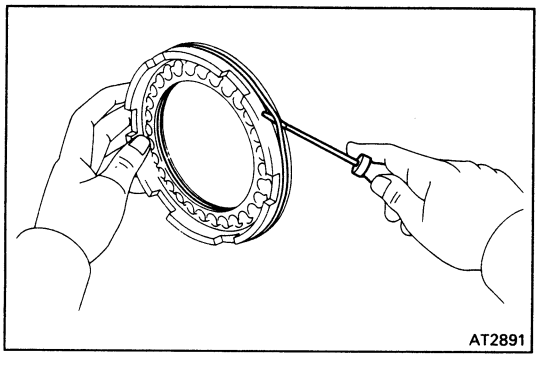


67. REMOVE PISTON FROM TRANSMISSION CASE WITH COMPRESSED AIR

(a) Apply compressed air into the oil passage of the case to remove the piston.

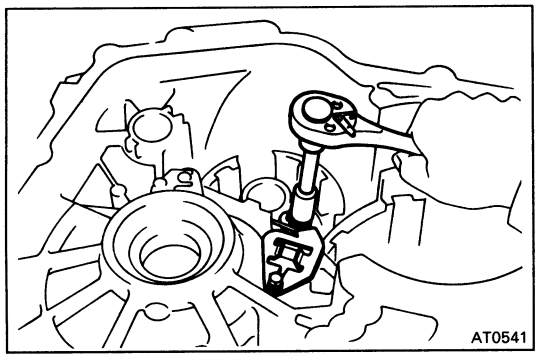
HINT: Hold the piston so it is not slanted and blow with the gun slightly away from the oil hole.

(b) If the piston does not pop out with compressed air, use needle-nose pliers to remove it.

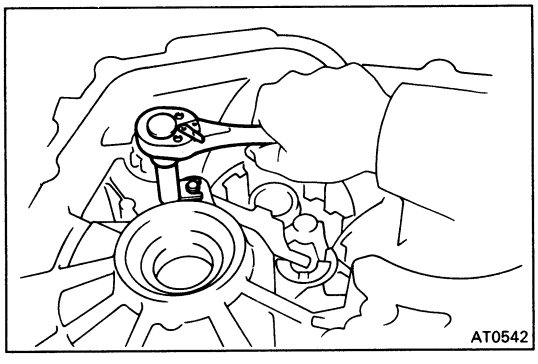


68. REMOVE O-RINGS FROM PISTON

Remove the two O-rings from the piston.

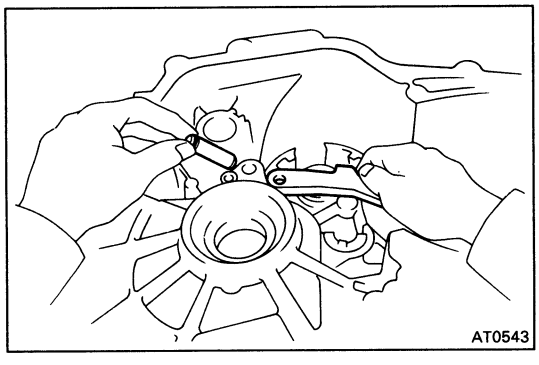


69. REMOVE PARKING LOCK PAWL STOPPER PLATE, TORSION SPRING AND SPRING GUIDE

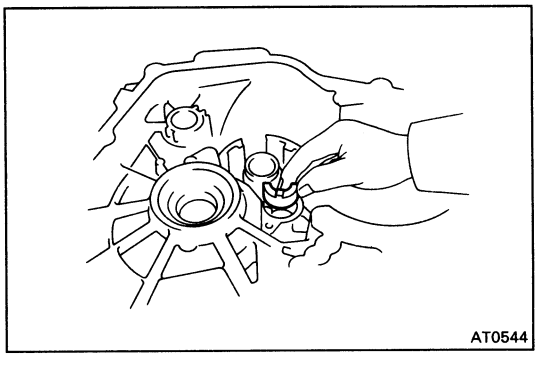


70. REMOVE PAWL SHAFT CLAMP

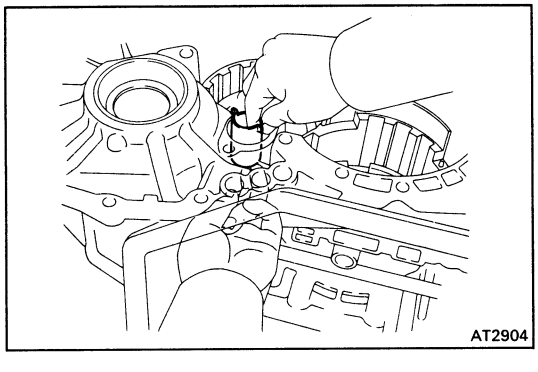
Remove the bolt and pawl shaft clamp.



71. REMOVE PARKING LOCK PAWL SHAFT AND LOCK PAWL

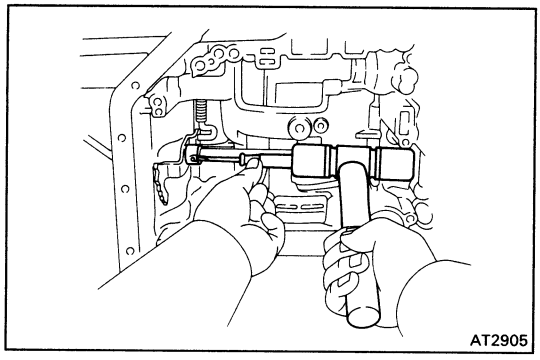


72. REMOVE PARKING LOCK SLEEVE



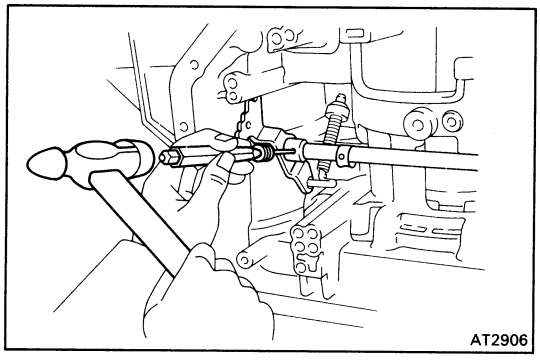
73. REMOVE CAM GUIDE BRACKET

Remove the cam guide bracket as shown.



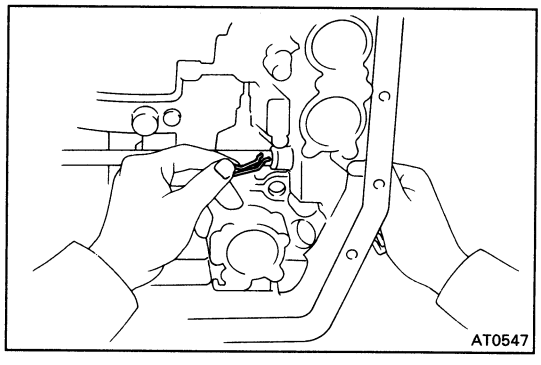
74. REMOVE MANUAL VALVE SHAFT SPACER

Using a screwdriver and hammer, unstake the spacer and remove it.



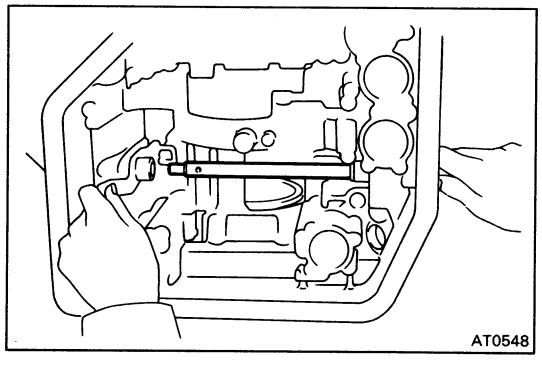
75. REMOVE PIN

Using a punch and hammer, drive out the pin.

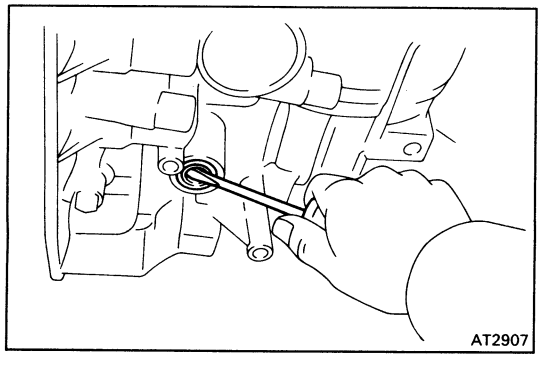


76. REMOVE MANUAL VALVE SHAFT AND LEVER

(a) Remove the retaining spring.

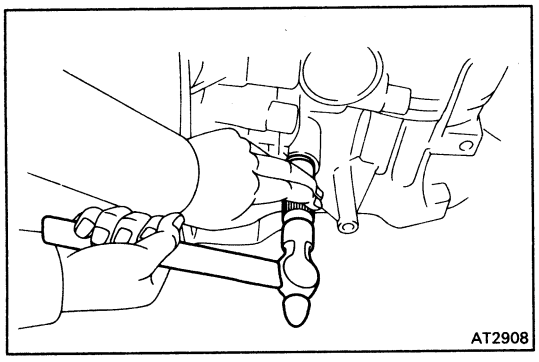


(b) Slide out the manual valve shaft and remove the manual valve lever and washer.



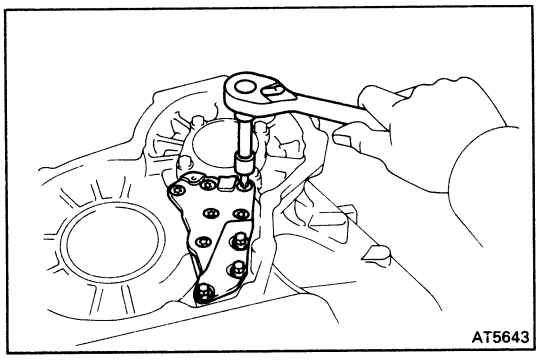
77. IF NECESSARY, REPLACE OIL SEAL OF MANUAL SHAFT

(a) Using a screwdriver, remove the oil seal.



(b) Using a 14 mm socket wrench and hammer, drive in a new oil seal.

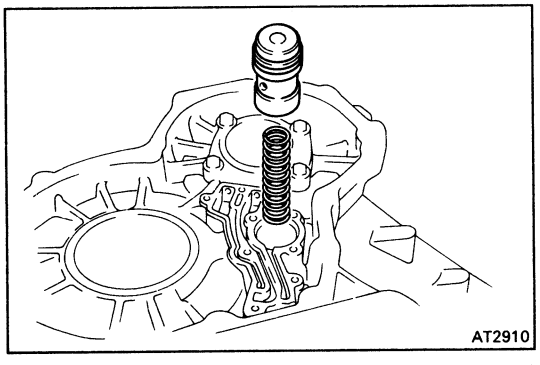
(c) Apply MP grease to the oil seal lip.



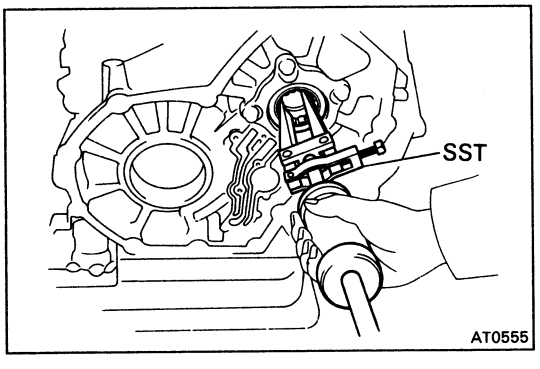
78. REMOVE OIL GALLERY COVER AND GASKET

(a) Remove the three bolts.

(b) Using a torx wrench, remove the six screws. Remove the gallery cover and gasket.



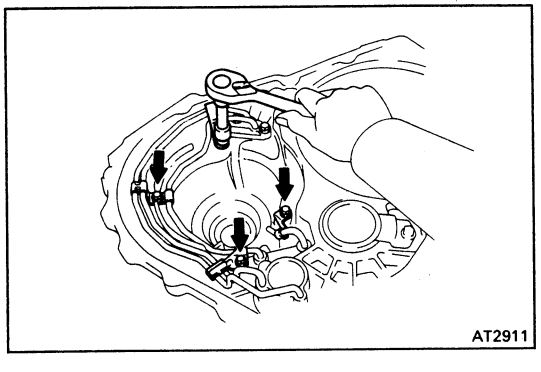
79. REMOVE B_4 ACCUMULATOR PISTON AND SPRING



80. REMOVE BEARING

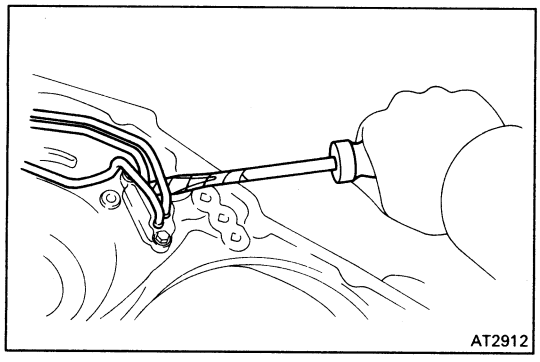
Using SST, remove the bearing.

SST 09308-00010

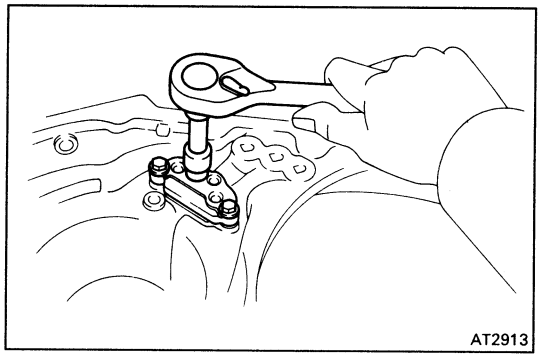


81. REMOVE OIL TUBES

(a) Remove the four tube clamps from transaxle housing.

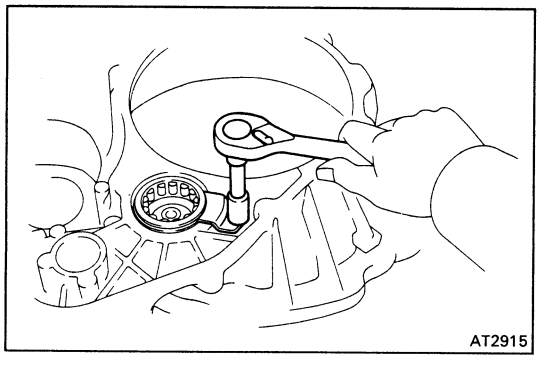


(b) Using a screwdriver, remove the three oil tubes.



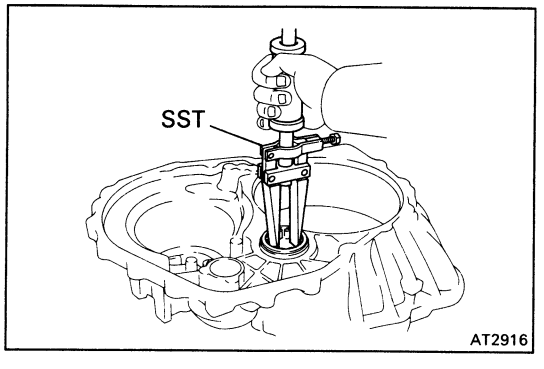
82. REMOVE OIL TUBE APPLY COVER AND GASKET

Remove the three bolts, and remove the cover and gasket.



83. REMOVE BEARING

(a) Remove the bolt and retainer.



(b) Using SST, remove the bearing.

SST 09308-00010

COMPONENT PARTS

General Notes

The instructions here are organized so that you work on only one component group at a time. This will help avoid confusion from similar-looking parts of different subassemblies being on your workbench at the same time.
The component groups are inspected and repaired from the converter housing side.
As much as possible, complete the inspection, repair and assembly before proceeding to the next component group. If a component group can not 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 for other component groups.

GENERAL CLEANING NOTES:

1. All disassembled parts should be washed clean with any fluid passages and holes blown through with compressed air.
2. When using compressed air to dry parts, always aim away from yourself to prevent accidentally spraying automatic transmission fluid or kerosene in your face.
3. The recommended automatic transmission fluid kerosene should be used for cleaning.

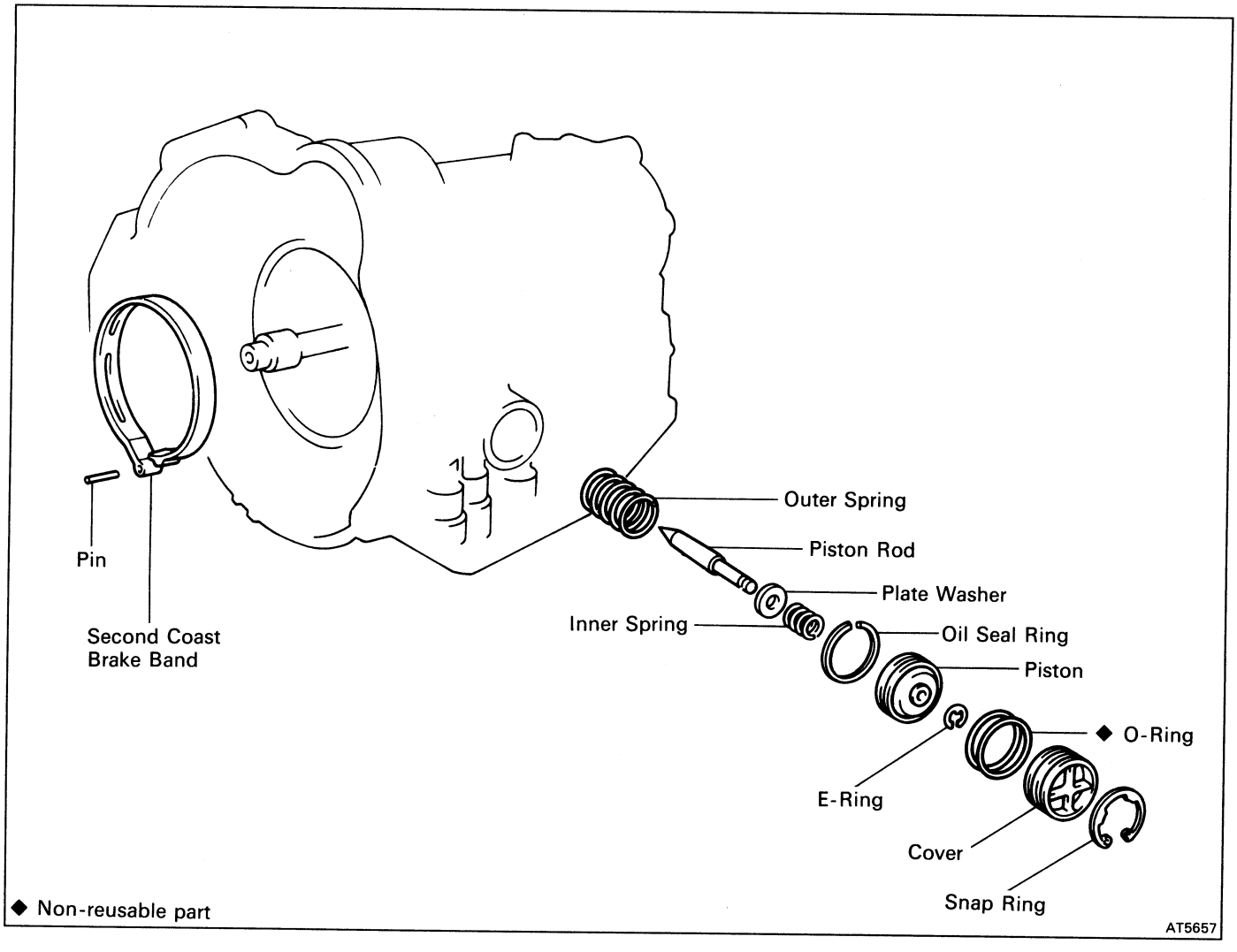
PARTS ARRANGEMENT:

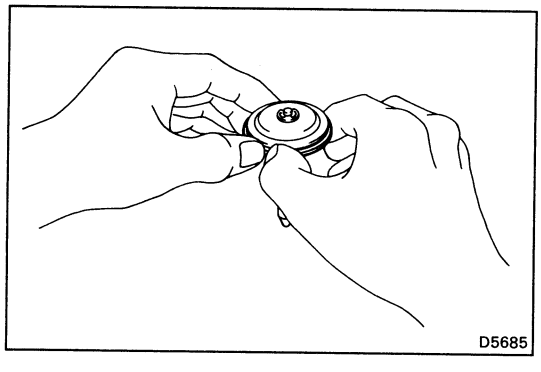
1. After cleaning, the parts should be arranged in proper order to allow efficient inspection, repairs, and reassembly.
2. When disassembling a valve body, be sure to keep each valve together with the corresponding spring.
3. New brakes and clutches that are to be used for replacement must be soaked 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 subassembly containing that bushing must be replaced.
5. Check thrust bearings and races for wear or damage. Replace if necessary.
6. Use petroleum jelly to keep parts in place.

Second Coast Brake

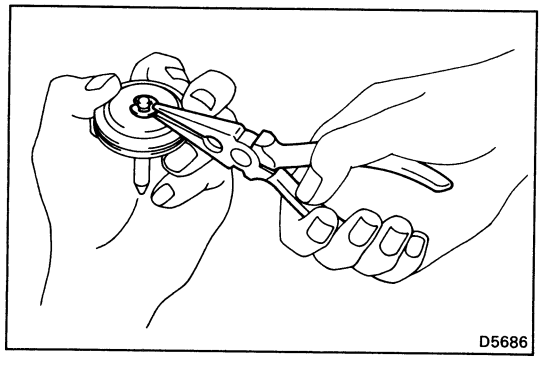




DISASSEMBLY OF SECOND COAST BRAKE PISTON

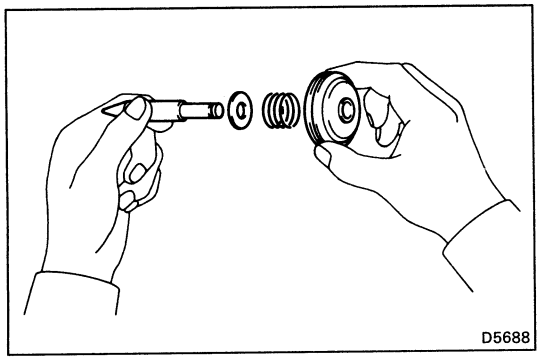
1. **REMOVE OIL SEAL RING**

   Remove the oil seal ring from the piston.

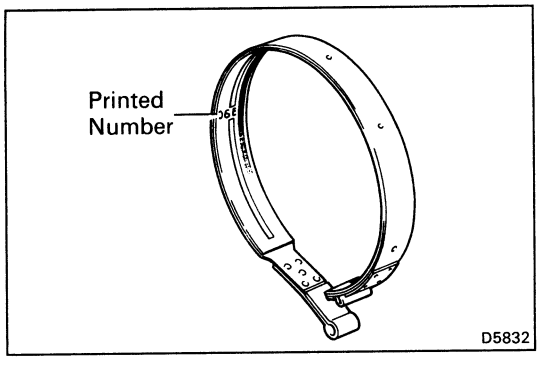


2. **REMOVE PISTON ROD**

   (a) Remove the E-ring while pushing the piston with needle-nose pliers.



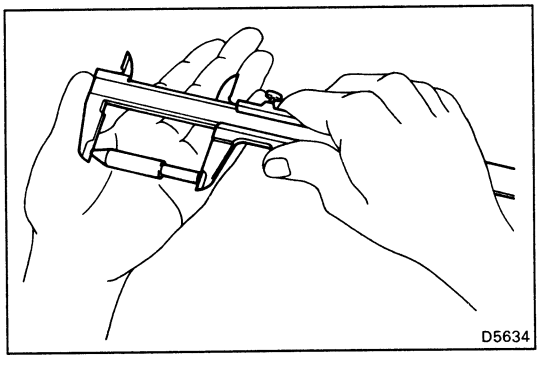
(b) Remove the spring, washer and piston rod.



INSPECTION OF SECOND COAST BRAKE COMPONENT

INSPECT BRAKE BAND

If the lining of the brake band is exfoliated or discolored, or even part of the printed numbers are defaced, replace the brake band.



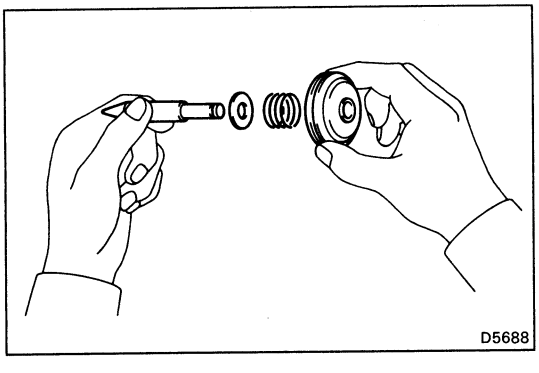
ASSEMBLY OF SECOND COAST BRAKE PISTON

1. **SELECT PISTON ROD**

If the band is OK with piston stroke not within the standard value, select the piston rod.

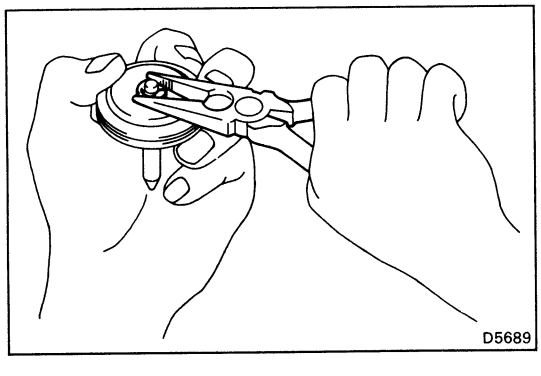
There are two lengths of piston rod.

Piston rod length: 72.9 mm (2.870 in.)
71.4 mm (2.811 in.)

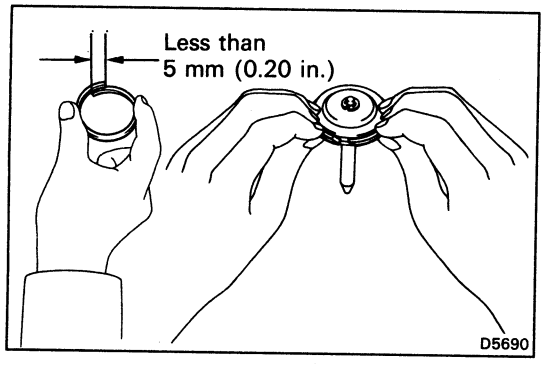


2. **INSTALL PISTON ROD**

(a) Install the washer and spring to the piston rod.



(b) Install an E-ring while pushing the piston.



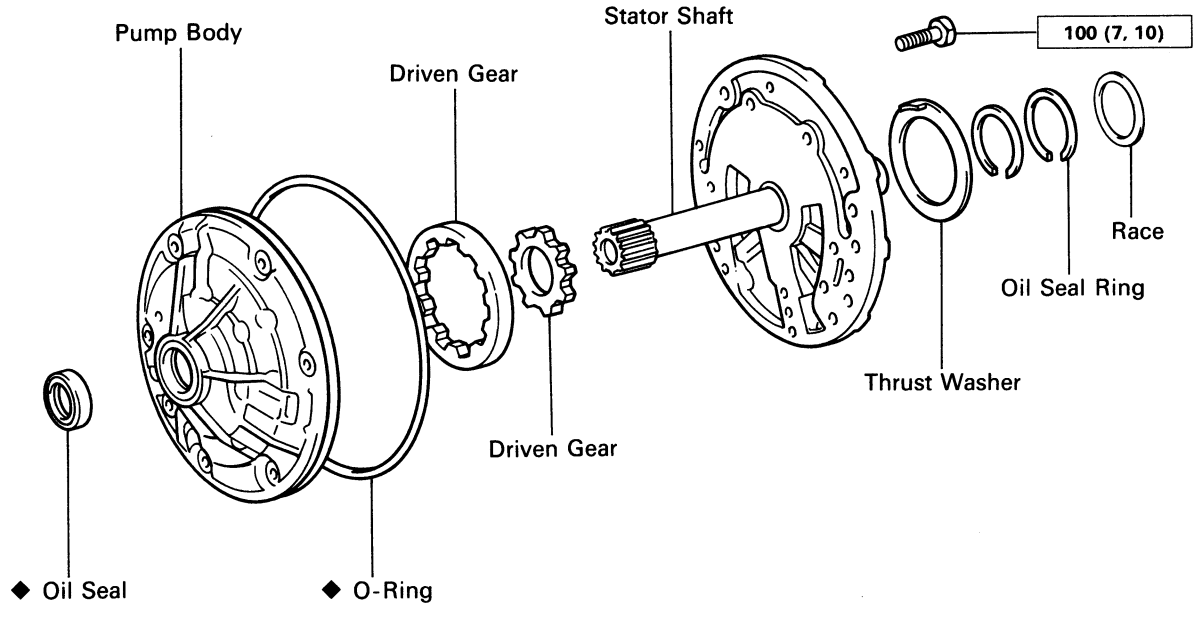
3. **INSTALL OIL SEAL RING**

(a) Apply ATF to the oil seal ring.

(b) Install the oil seal ring to the piston.

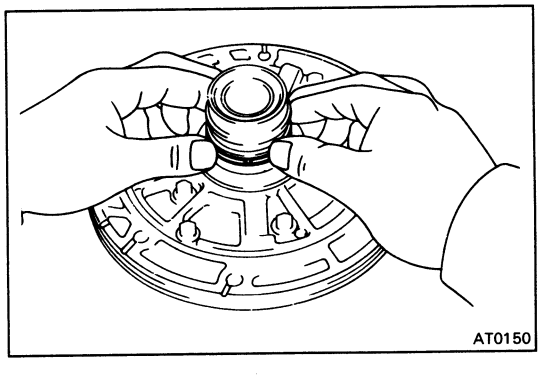
NOTICE: Do not spread the ring ends more than necessary.

Oil Pump



kg-cm (ft-lb, N·m) : Specified torque
◆ Non-reusable part

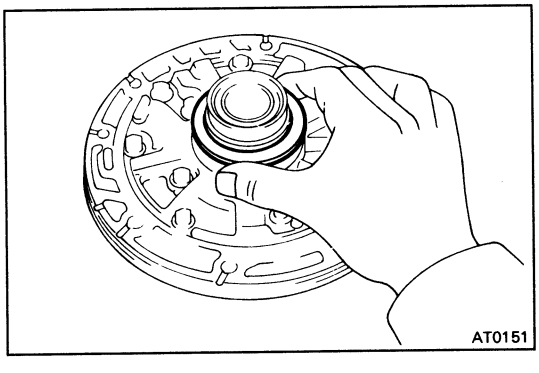
D5765



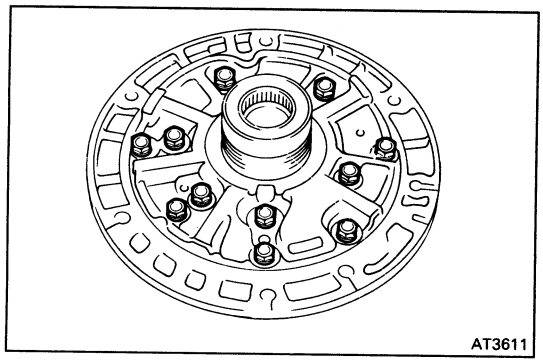
DISASSEMBLY OF OIL PUMP

1. **REMOVE OIL SEAL RINGS**

   Remove the two oil seal rings from the stator shaft back side.

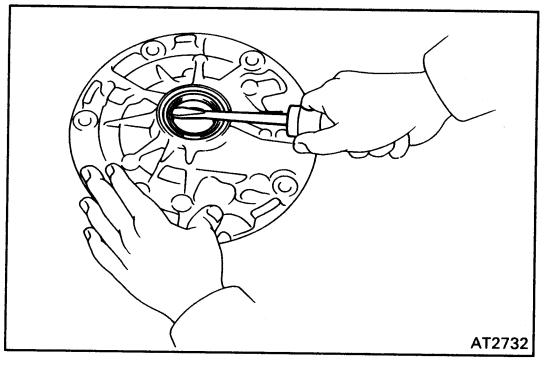


2. **REMOVE THRUST WASHER FROM STATOR SHAFT BACK SIDE**



3. REMOVE STATOR SHAFT

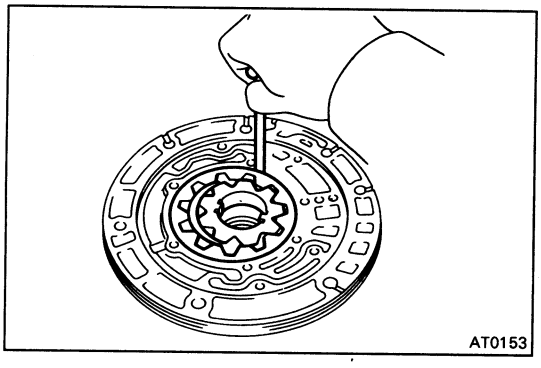
Remove the eleven bolts and stator shaft. Keep the gears in assembly order.



4. REMOVE FRONT OIL SEAL

Pry off the oil seal with a screwdriver.

INSPECTION OF OIL PUMP



1. CHECK BODY CLEARANCE OF DRIVEN GEAR

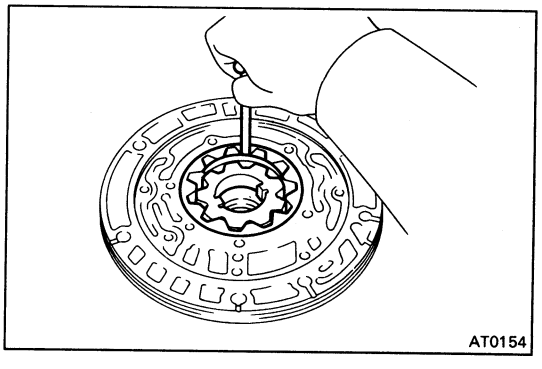
Push the driven gear to one side of the body.

Using a feeler gauge, measure the clearance.

Standard body clearance: **0.07 – 0.15 mm (0.0028 – 0.0059 in.)**

Maximum body clearance: **0.3 mm (0.012 in.)**

If the body clearance is greater than the maximum, replace the oil pump body subassembly.



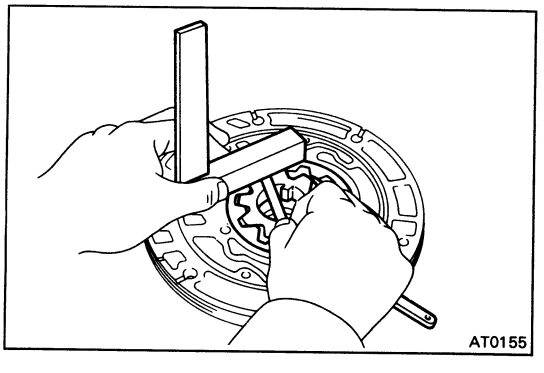
2. CHECK TIP CLEARANCE OF DRIVEN GEAR

Measure between the driven gear teeth and the crescentshaped part of the pump body.

Standard tip clearance: **0.11 – 0.14 mm (0.0043 – 0.0055 in.)**

Maximum tip clearance: **0.3 mm (0.012 in.)**

If the tip clearance is greater than the maximum, replace the oil pump body subassembly.



3. CHECK SIDE CLEARANCE OF BOTH GEARS

Using a steel straightedge and a feeler gauge, measure the side clearance of both gears.

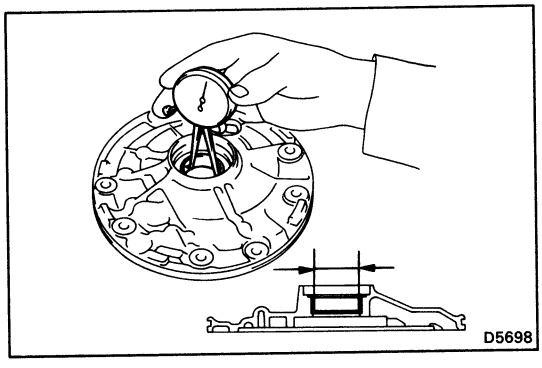
Standard side clearance: **0.02 – 0.05 mm (0.0008 – 0.0020 in.)**

Maximum side clearance: **0.1 mm (0.004 in.)**

There are different thicknesses for drive and driven gears.

Drive and driven gear thickness:
10.715 mm (0.4219 in.)

If the thickest gear can not make the side clearance within standard specification, replace the oil pump body subassembly.

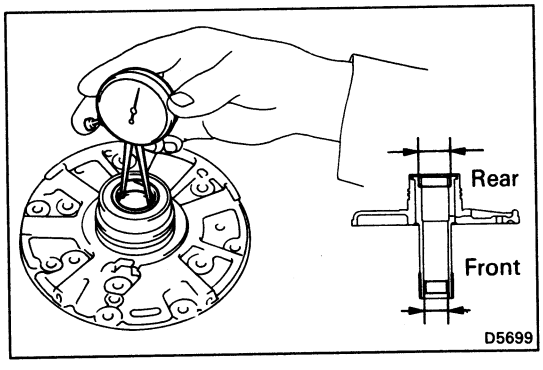


4. CHECK OIL PUMP BODY BUSHING

Using a dial indicator, measure the inside diameter of the oil pump body bushing.

Maximum inside diameter: 38.18 mm (1.5031 in.)

If the inside diameter is greater than the maximum, replace the oil pump body subassembly.



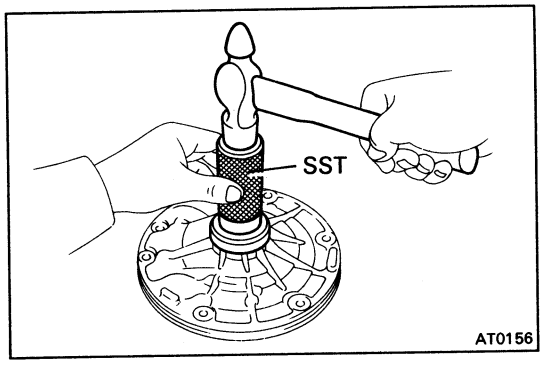
5. CHECK STATOR SHAFT BUSHINGS

Using a dial indicator, measure the inside diameter of the stator shaft bushings.

Maximum inside diameter:
Front side 21.57 mm (0.8492 in.)
Rear side 27.07 mm (1.0657 in.)

If the inside diameter is greater than the maximum, replace the stator shaft.

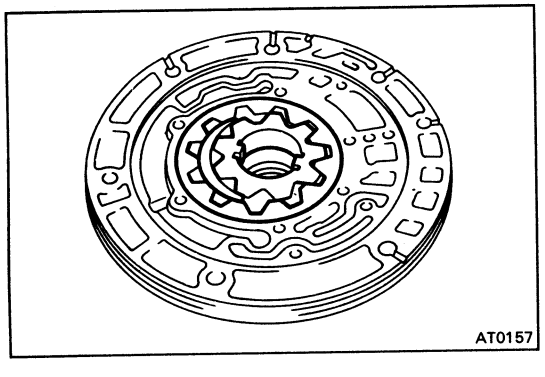
ASSEMBLY OF OIL PUMP



1. INSTALL FRONT OIL SEAL

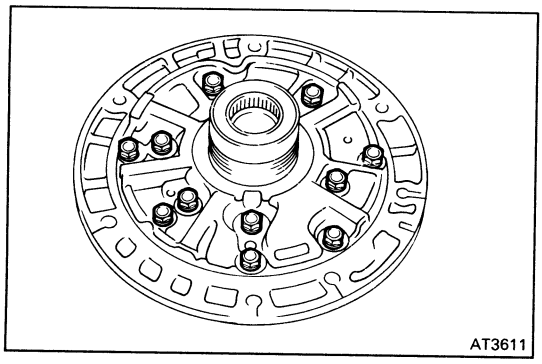
Using SST and a hammer, install a new oil seal. The seal end should be flush with the outer edge of the pump body.

SST 09350-32014 (09351-32140)



2. INSTALL DRIVEN GEAR AND DRIVE GEAR

Make sure the top of the gears are facing upward.

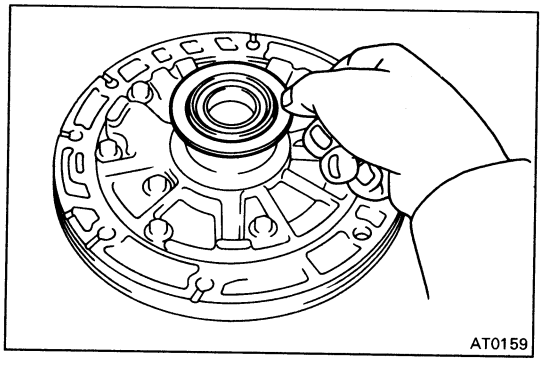


3. INSTALL STATOR SHAFT TO PUMP BODY

(a) Align the stator shaft with each bolt hole.

(b) Torque the eleven bolts.

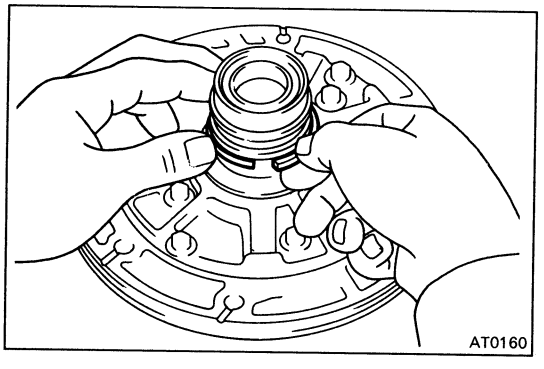
Torque: 100 kg-cm (7 ft-lb, 10 N·m)



4. INSTALL THRUST WASHER

(a) Coat the thrust washer with petroleum jelly.

(b) Align the tab of the washer with the hollow of the pump body.

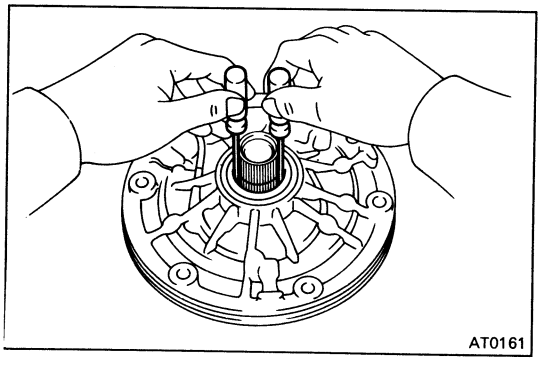


5. INSTALL OIL SEAL RINGS

Install the two oil seal rings to the stator shaft back side.

NOTICE: Do not spread the ring ends more than necessary.

HINT: After installing the oil seal rings, check that they move smoothly.

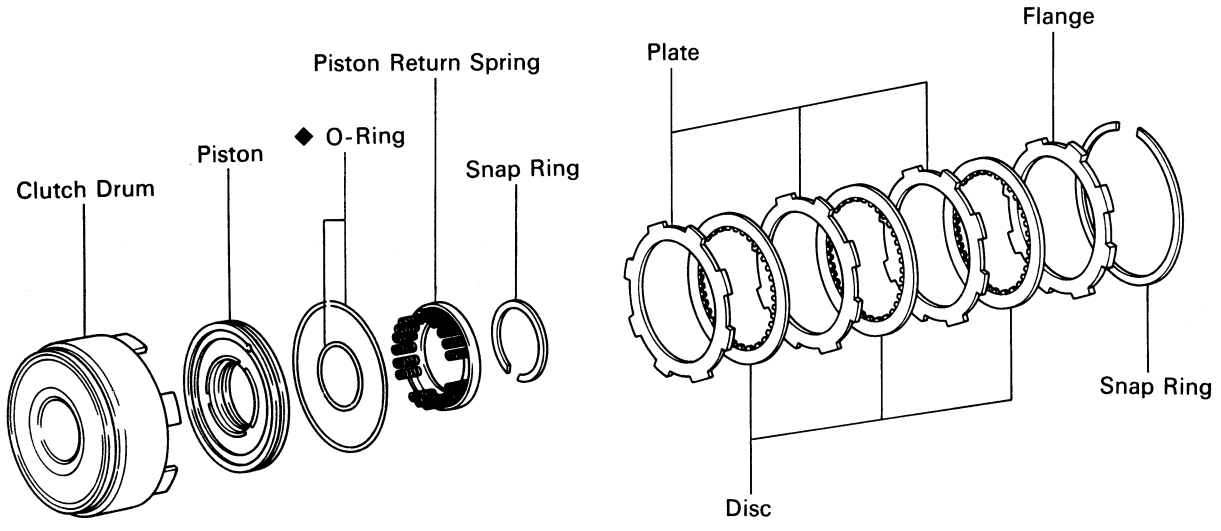


6. CHECK PUMP DRIVE GEAR ROTATION

Turn the drive gear with two screwdrivers and make sure it rotates smoothly.

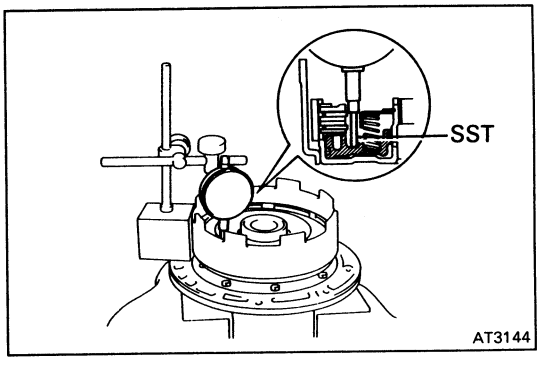
NOTICE: Be careful not to damage the oil seal lip.

Direct Clutch

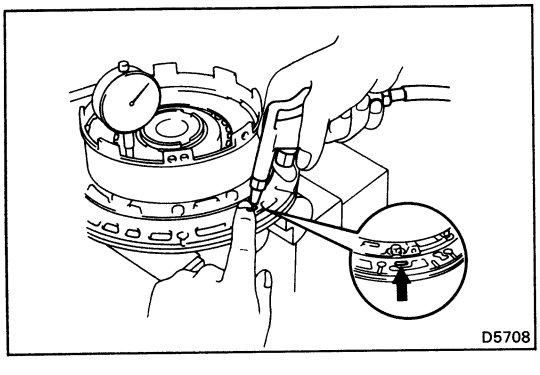


◆ Non-reusable part

AT5893



AT3144



D5708

DISASSEMBLY OF DIRECT CLUTCH

1. CHECK PISTON STROKE OF DIRECT CLUTCH

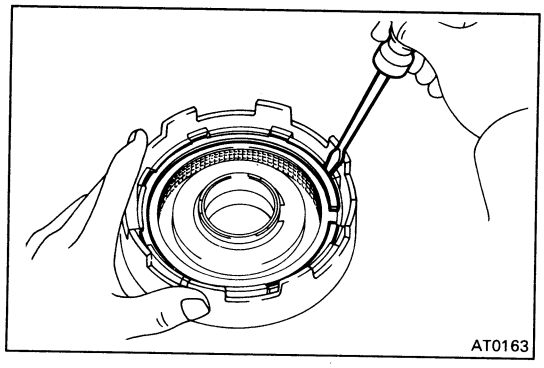
(a) Install the direct clutch on the oil pump.

(b) Using a dial indicator (long type pick or SST), measure the direct clutch piston stroke applying and releasing the compressed air (4 – 8 kg/cm^2, 57 – 114 psi, 392 – 785 kPa) as shown.

SST 09350-32014 (09351-32190)

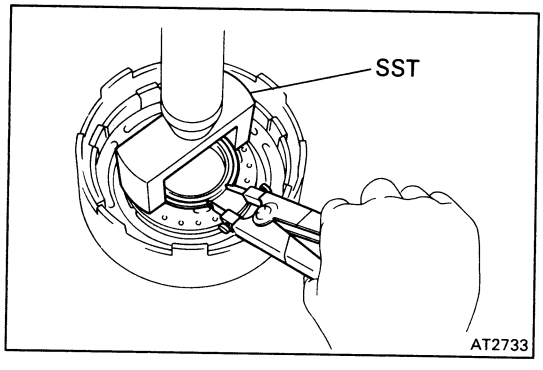
Piston stroke: 1.11 – 1.47 mm (0.0437 – 0.0579 in.)

If the piston stroke is greater than the maximum inspect the each component.



2. **REMOVE SNAP RING FROM CLUTCH DRUM**

3. **REMOVE FLANGE, DISCS AND PLATES**

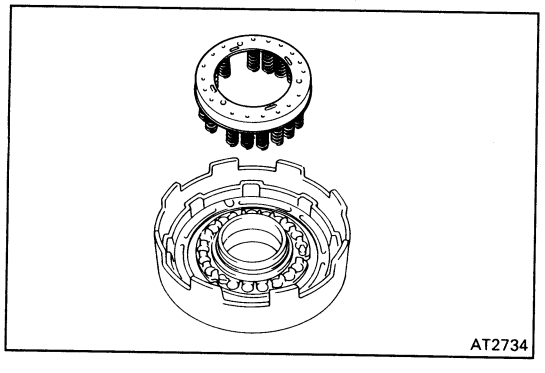


4. **REMOVE PISTON RETURN SPRING**

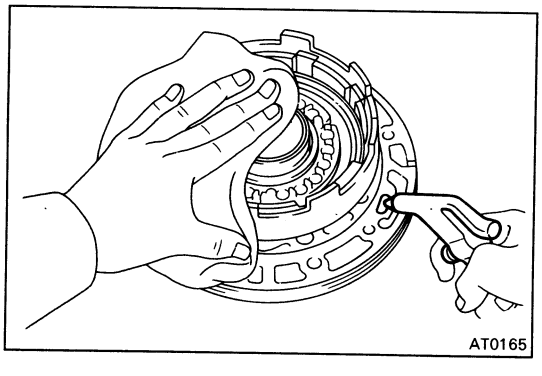
(a) Place SST on the spring retainer and compress the springs with a shop press.

SST 09350-32014 (09351-32070)

(b) Remove the snap ring with the snap ring pliers.



(c) Remove the piston return spring.

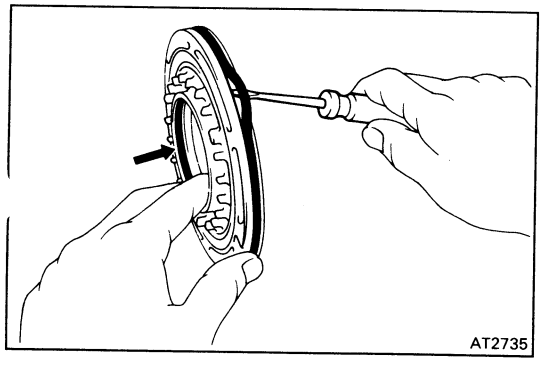


5. **REMOVE CLUTCH PISTON**

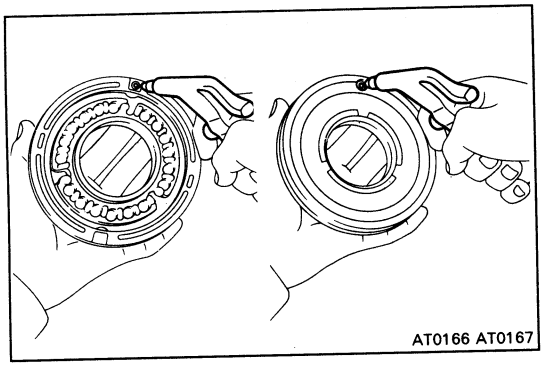
(a) Install the direct clutch onto the oil pump.

(b) Apply compressed air to the oil pump to remove the piston. (If the piston does not come out completely, use needle-nose pliers to remove it.)

(c) Remove the direct clutch from the oil pump.



(d) Remove the two O-rings from the piston.

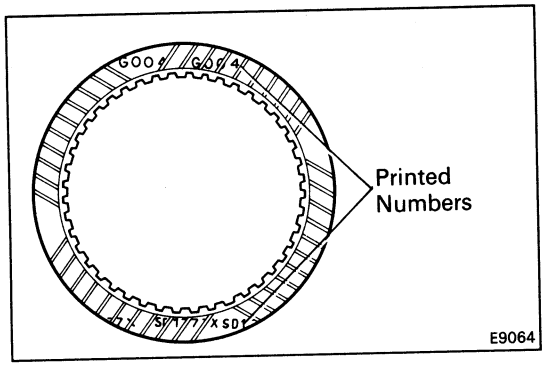

AT0166 AT0167

INSPECTION OF DIRECT CLUTCH

1. INSPECT CLUTCH PISTON

(a) Check that the check ball is free by shaking the piston.

(b) Check that the valve does not leak by applying low-pressure compressed air.



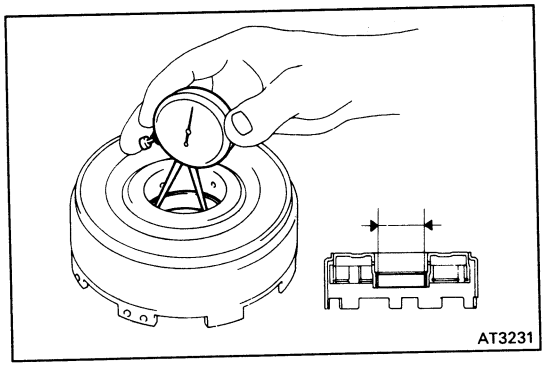
E9064

2. INSPECT DISC, PLATE AND FLANGE

Check if the sliding surface of the discs, plates and flanges are worn or burnt. If necessary, replace them.

HINT:

- If the lining of the disc is exfoliated or discolored, or even a part of the printed number is defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least two hours.

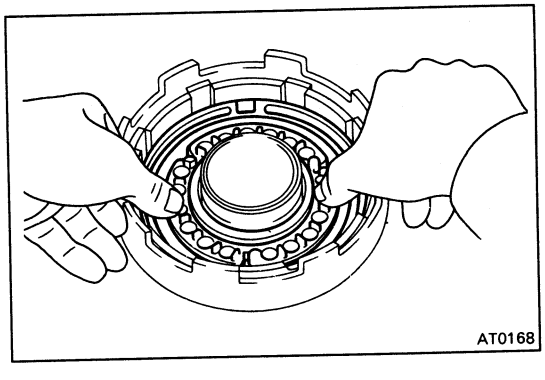

AT3231

3. CHECK DIRECT CLUTCH BUSHING

Using a dial indicator, measure the inside diameter of the direct clutch bushing.

Maximum inside diameter: 47.07 mm (1.8531 in.)

If the inside diameter is greater than the maximum, replace the direct clutch.

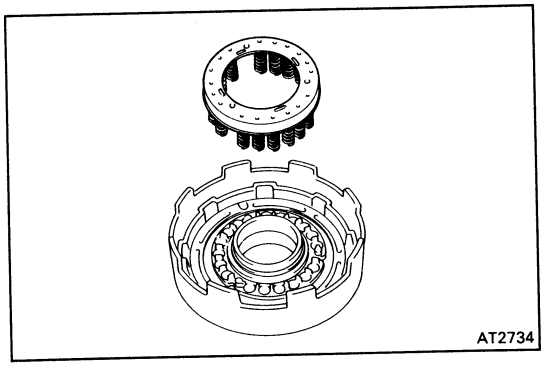

AT0168

ASSEMBLY OF DIRECT CLUTCH

1. INSTALL CLUTCH PISTON IN DIRECT CLUTCH DRUM

(a) Install new O-rings to the piston. Coat the O-rings with ATF.

(b) Being careful not to damage the O-rings, press the piston into the drum with the cup side up.


AT2734

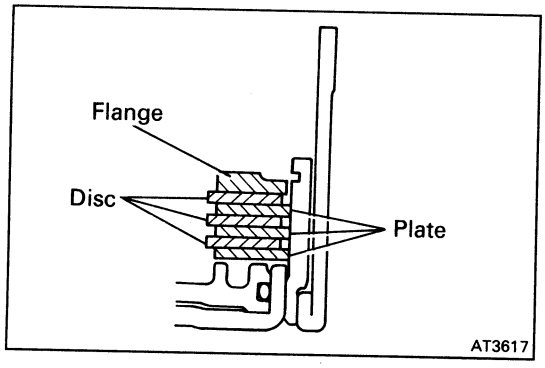
2. INSTALL PISTON RETURN SPRING

(a) Place the return spring and snap ring onto the piston.

(b) Place SST on the return spring, and compress the return spring with a shop press.

SST 09350-32014 (09351-32070)

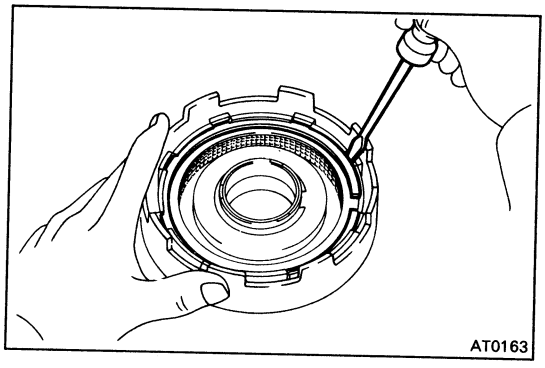
(c) Install the snap ring with the snap ring pliers. Be sure the end gap of snap ring is not aligned with the spring retainer claw.



3. INSTALL PLATES, DISCS AND FLANGE

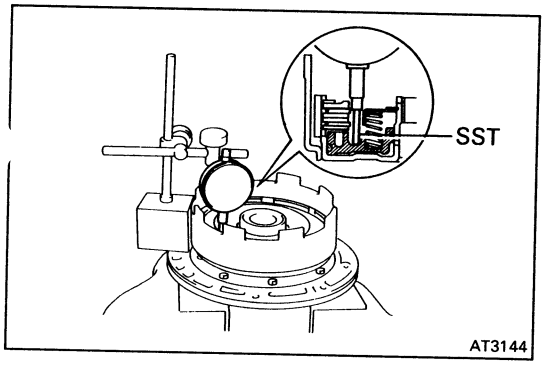
(a) Install plates and discs.
Install in order: P = Plate D = Disc
P – D – P – D – P – D

(b) Install the flange with the flat end facing downward.



4. INSTALL SNAP RING

Check that the end gap of the snap ring is not aligned with one of the cutouts.



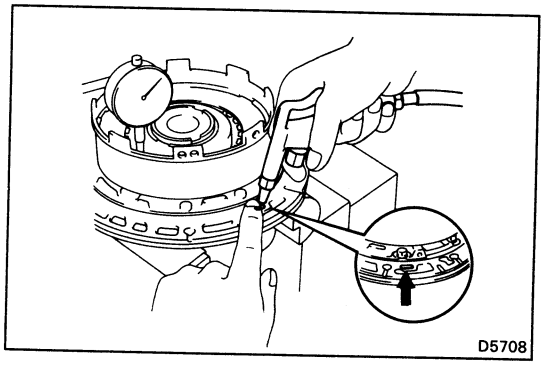
5. RECHECK PISTON STROKE OF DIRECT CLUTCH

(a) Install the direct clutch on the oil pump.

(b) Using a dial indicator (long type pick or SST), measure the direct clutch piston stroke applying and releasing the compressed air (4 – 8 kg/cm^2, 57 – 114 psi, 392 – 785 kPa) as shown.

SST 09350-32014 (09351-32190)

Piston stroke: 1.11 – 1.47 mm (0.0437 – 0.0579 in.)

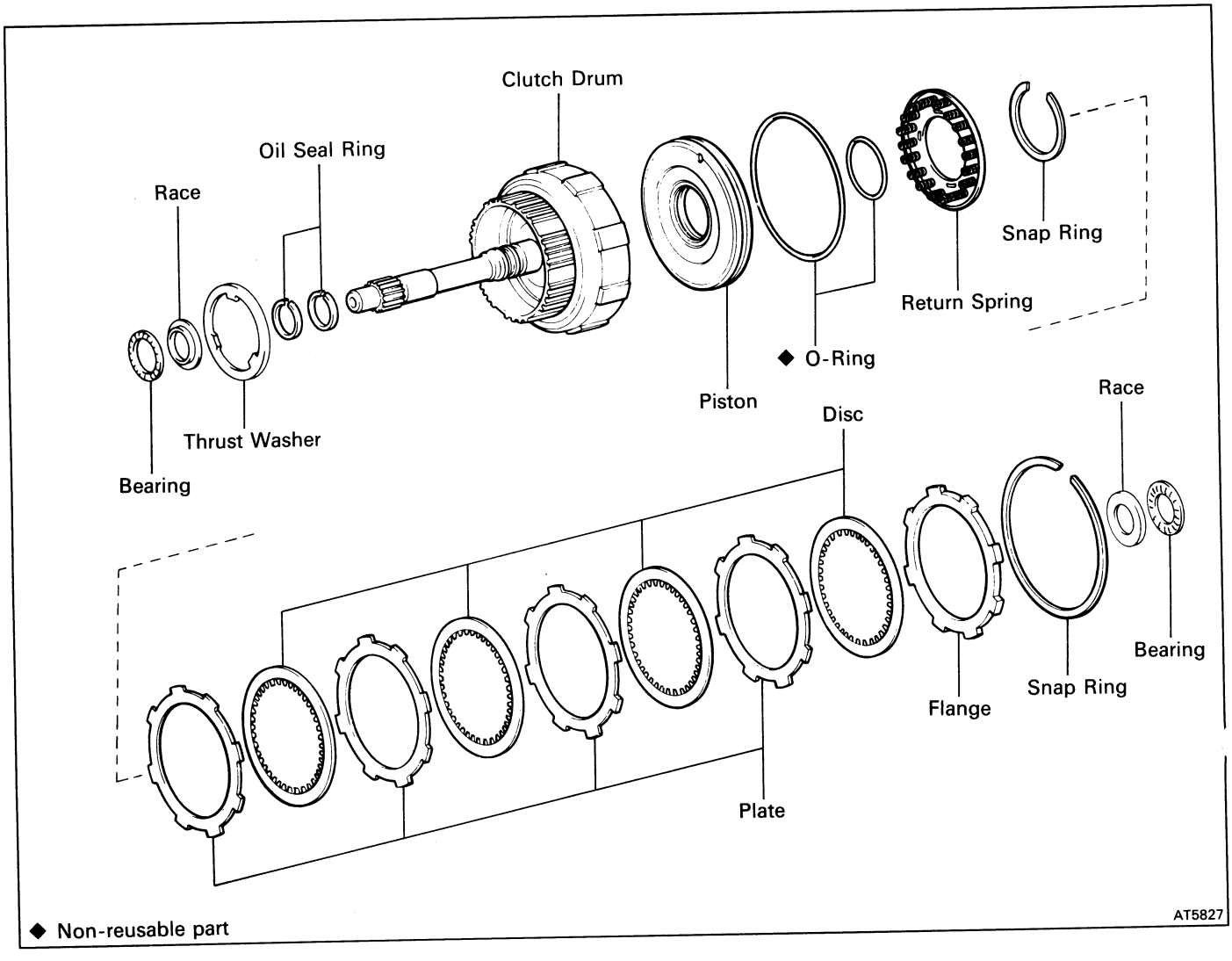


If the piston stroke is nonstandard, select another flange.

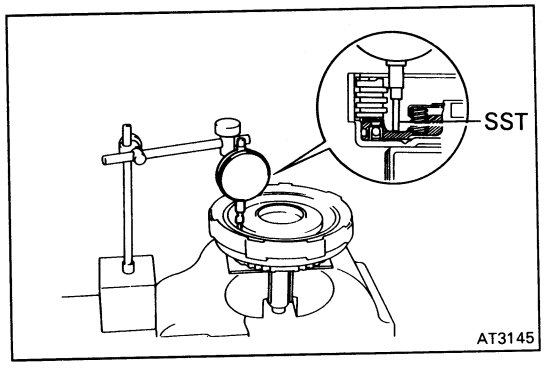
HINT: There are two different thicknesses for the flange.

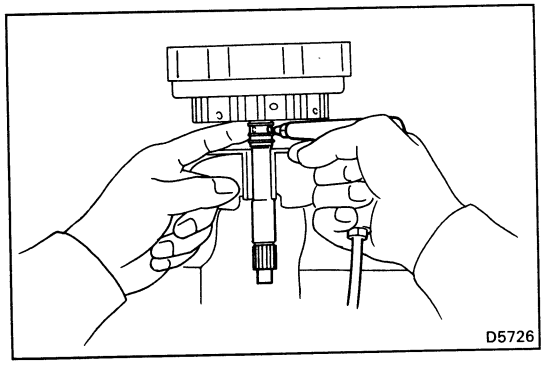
Flange thicknesses: 2.6 mm (0.102 in.)
3.0 mm (0.118 in.)

Forward Clutch



◆ Non-reusable part





DISASSEMBLY OF FORWARD CLUTCH

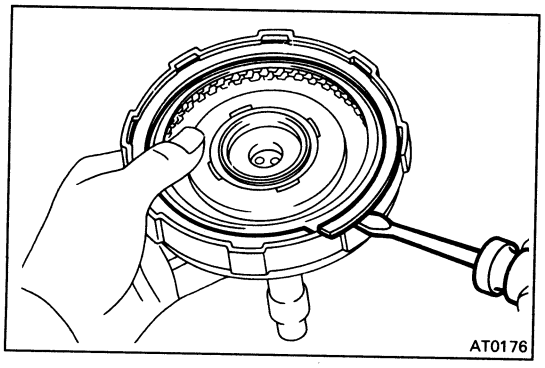
1. CHECK PISTON STROKE OF FORWARD CLUTCH

Using a dial indicator (long type pick or SST), measure the forward clutch piston stroke applying and releasing the compressed air (4 – 8 kg/cm^2, 57 – 114 psi, 392 – 785 kPa) as shown.

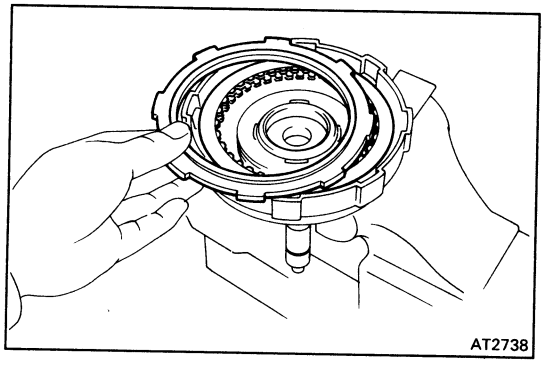
SST 09350-32014 (09351-32190)

Piston stroke: 1.42 – 1.81 mm (0.0559 – 0.0713 in.)

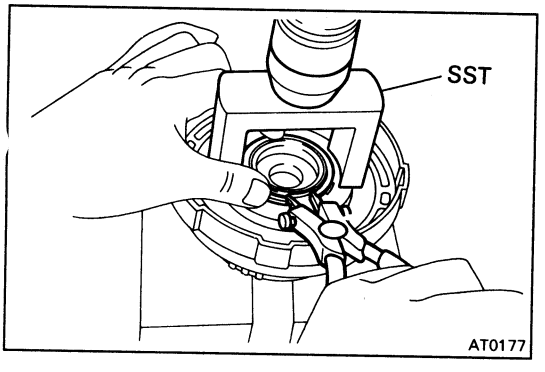
If the piston stroke is greater than the maximum inspect the each component.



2. **REMOVE SNAP RING FROM CLUTCH DRUM**



3. **REMOVE FLANGE, DISCS AND PLATES**

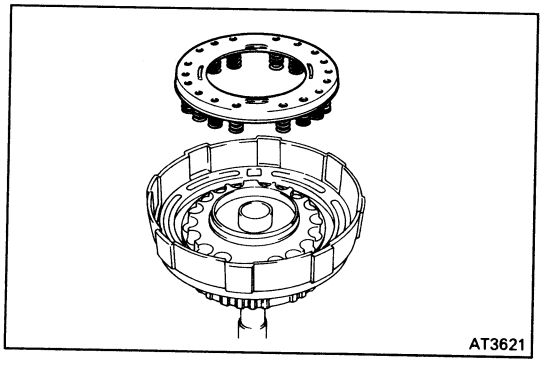


4. **REMOVE RETURN SPRINGS**

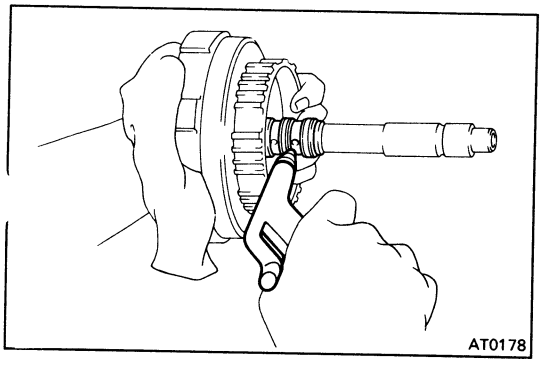
(a) Place SST on the spring retainer and compress the springs with a shop press.

SST 09350-32014 (09351-32070)

(b) Remove the snap ring with the snap ring pliers.



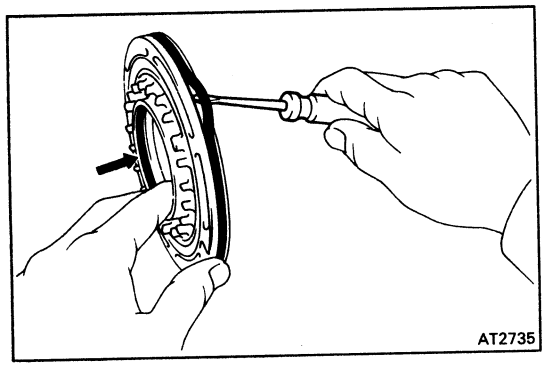
(c) Remove the return spring.



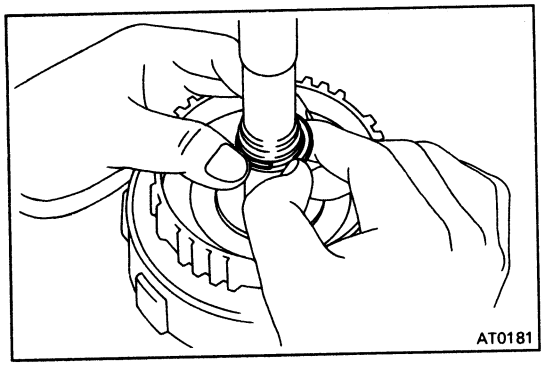
5. **REMOVE CLUTCH PISTON**

(a) Apply compressed air into the oil passage to remove the piston.

If the piston does not come out, use needle-nose pliers to remove it.



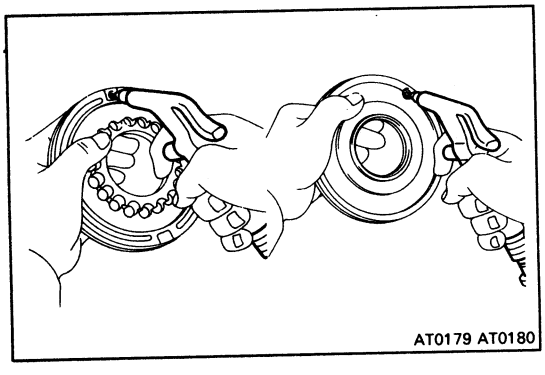
(b) Remove the two O-rings from the piston.



6. IF NECESSARY, REMOVE OIL SEAL RINGS

Remove the two oil seal rings from the shaft.

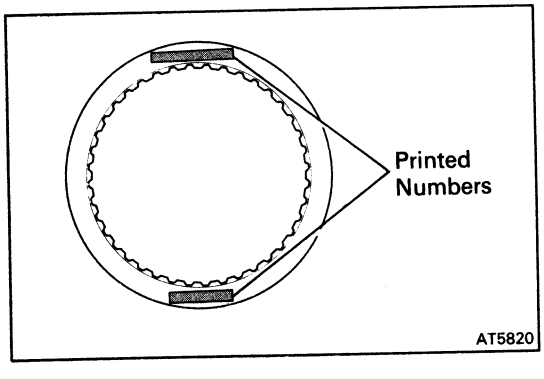
INSPECTION OF FORWARD CLUTCH



1. INSPECT CLUTCH PISTON

(a) Check that the check ball is free by shaking the piston.

(b) Check that the valve does not leak by applying low-pressure compressed air.

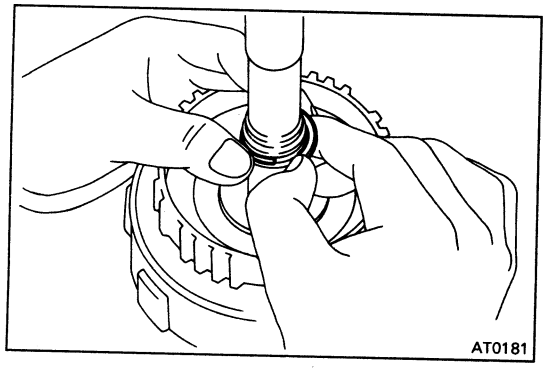


2. INSPECT DISC, PLATE AND FLANGE

Check if the sliding surface of the discs, plates and flanges are worn or burnt. If necessary, replace them.

HINT:

- If the lining of the disc is exfoliated or discolored, or even a part of the printed numbers are defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least two hours.



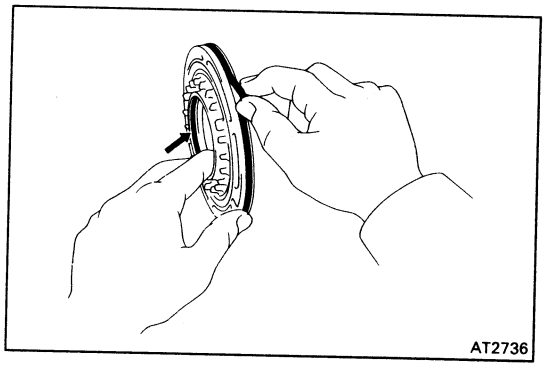
ASSEMBLY OF FORWARD CLUTCH

1. INSTALL OIL SEAL RINGS

Install the two oil seal rings to the shaft.

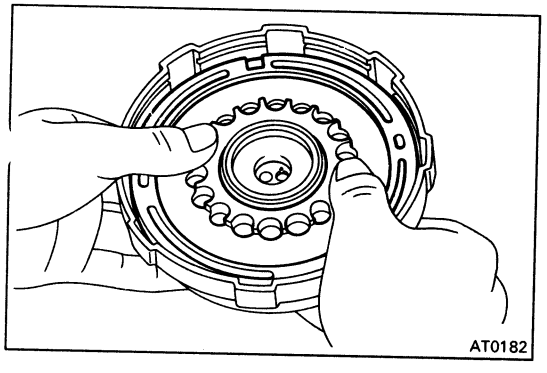
NOTICE: Do not spread the ring ends more than necessary.

HINT: After installing the oil seal rings, check that they move smoothly.



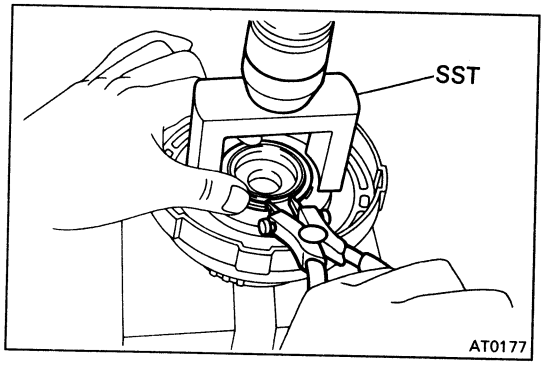
2. INSTALL CLUTCH PISTON TO CLUTCH DRUM

(a) Install the two new O-rings to the piston.



(b) Coat the O-rings with ATF.

(c) Press the piston into the drum with the cup side up, being careful not to damage the O-ring.



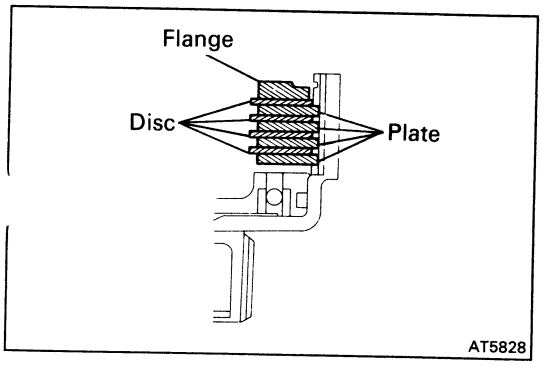
3. INSTALL PISTON RETURN SPRINGS

(a) Place the eighteen springs, spring retainer and snap ring onto the piston.

(b) Place SST on the spring retainer, and compress the springs with a shop press.

SST 09350-32014 (09351-32070)

(c) Install the snap ring with snap ring pliers.
Be sure the end gap of the snap ring is not aligned with the spring retainer claw.

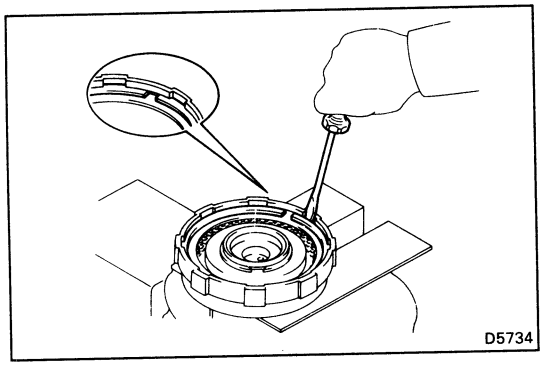


4. INSTALL PLATES, DISCS AND FLANGE

(a) Install the plates and discs.

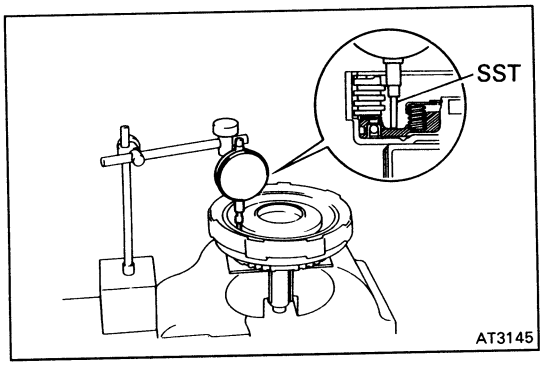
Install in order: P = Plate D = Disc
P – D – P – D – P – D – P – D

(b) Install the flange with the flat end facing downward.



5. INSTALL SNAP RING

Check that the end gap of snap ring is not aligned with one of the cutouts.



6. RECHECK PISTON STROKE OF FORWARD CLUTCH

Using a dial indicator (long type pick or SST), measure the forward clutch piston stroke applying and releasing the compressed air (4 – 8 kg/cm^2, 57 – 114 pis, 392 – 785 kPa) as shown.

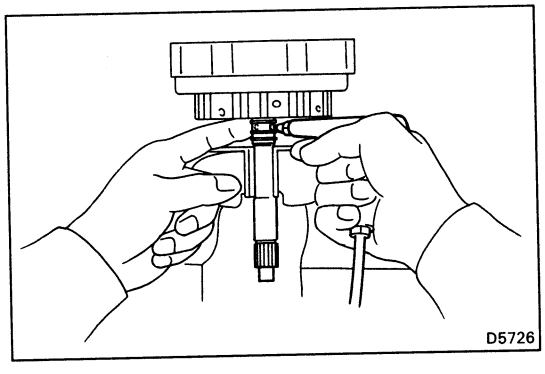
SST 09350-32014 (09351-32190)

Piston stroke: 1.42 – 1.81 mm (0.0559 – 0.0713 in.)

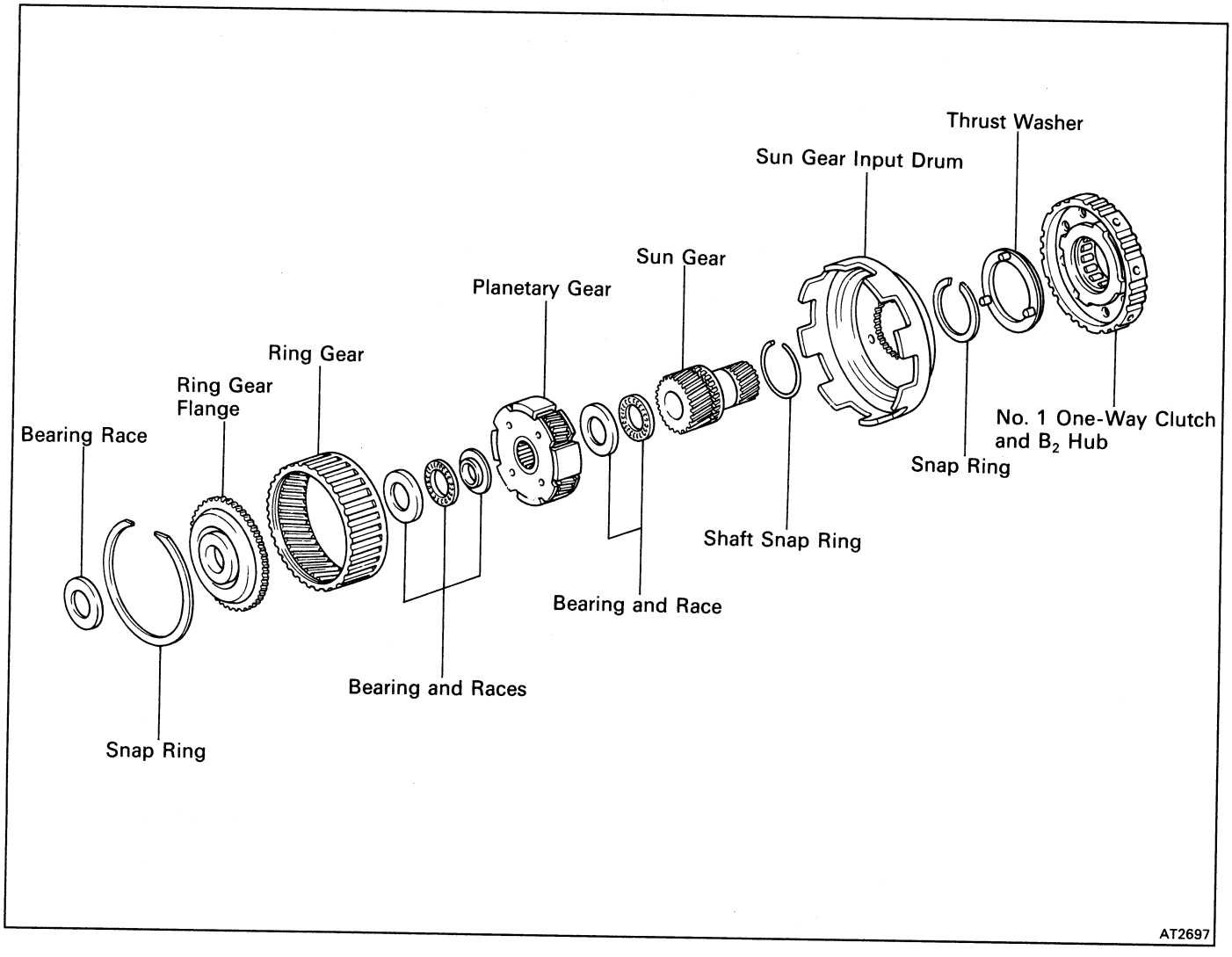
If the piston stroke is nonstandard, select another flange.

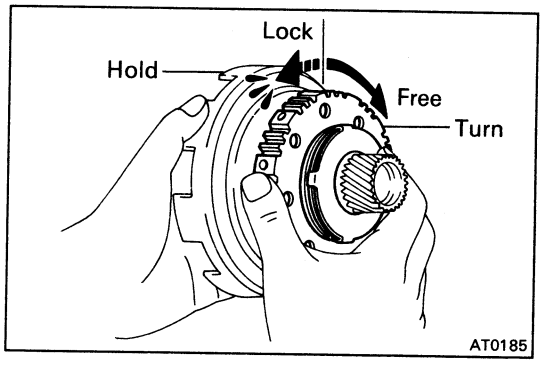
HINT: There are two different thicknesses for the flange.

Flange thickness: 3.00 mm (0.1181 in.)
3.37 mm (0.1327 in.)



Front Planetary Gear

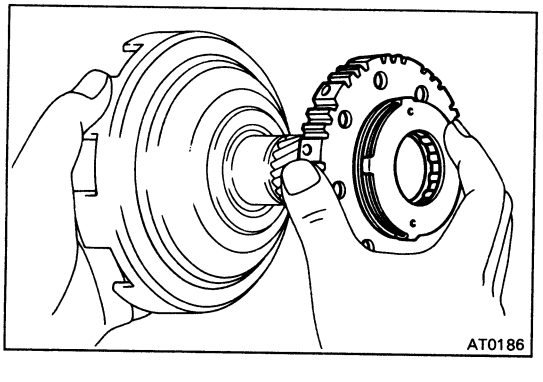




DISASSEMBLY OF ONE-WAY CLUTCH AND SUN GEAR

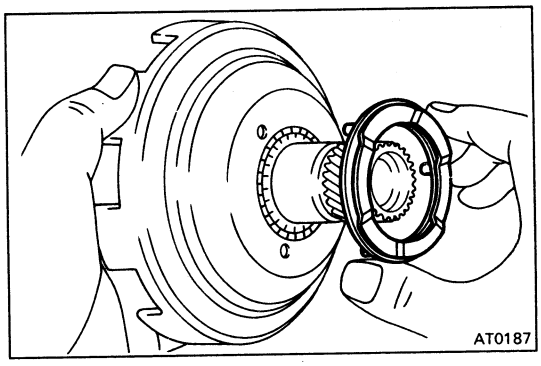
1. **CHECK OPERATION OF ONE-WAY CLUTCH**

   Hold the sun gear and turn the hub. The hub should turn freely clockwise and should lock counterclockwise.



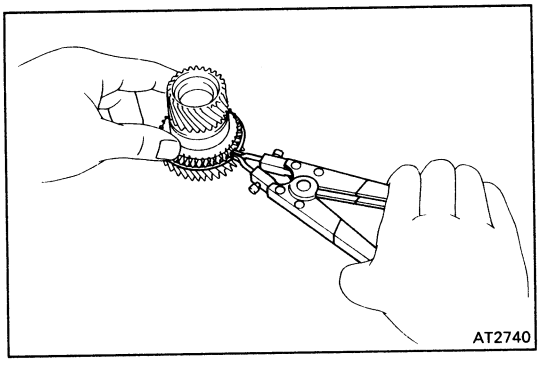
2. **REMOVE SECOND BRAKE HUB AND ONE-WAY CLUTCH FROM SUN GEAR**

   While turning the hub clockwise, remove the one-way clutch from the sun gear.



3. **REMOVE THRUST WASHER FROM SUN GEAR INPUT DRUM**

4. **REMOVE SUN GEAR FROM DRUM**
   (a) Using the snap ring pliers, remove the snap ring from the drum.
   (b) Remove the sun gear from the drum.



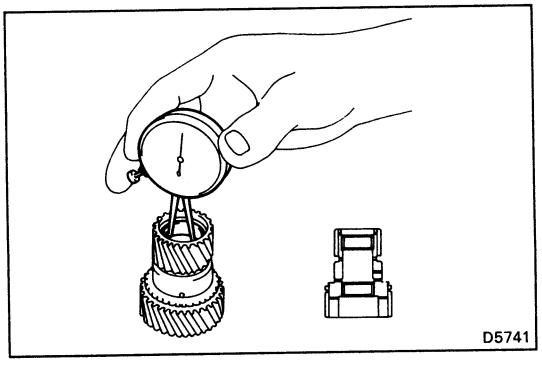
5. **REMOVE SHAFT SNAP RING**
   Using the snap ring pliers, remove the shaft snap ring from the sun gear.

INSPECTION OF SUN GEAR

INSPECT SUN GEAR FLANGE BUSHING

Using a dial indicator, measure the inside diameter of the sun gear.

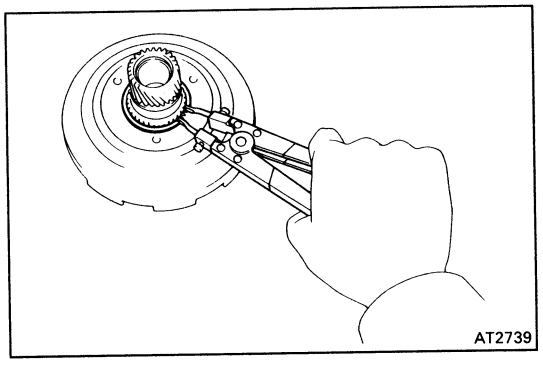
Standard inside diameter:	**22.025 – 22.046 mm (0.8671 – 0.8680 in.)**
Maximum diameter:	**22.096 mm (0.8699 in.)**



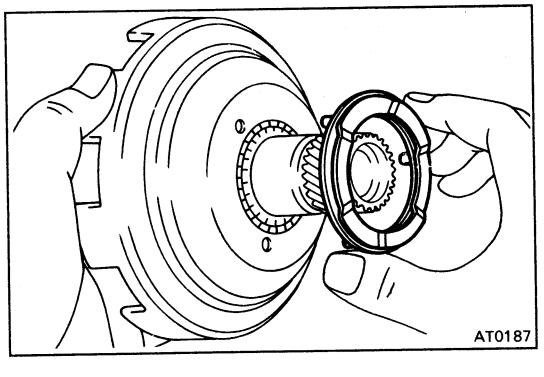
ASSEMBLY OF ONE-WAY CLUTCH AND SUN GEAR

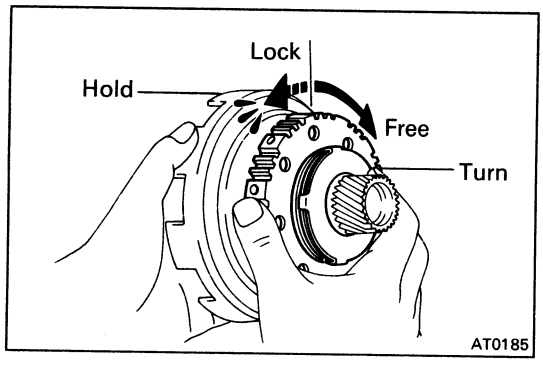
1. **INSTALL SHAFT SNAP RING TO SUN GEAR**

2. **INSTALL SUN GEAR TO DRUM**
   (a) Install the sun gear to the drum.
   (b) Using the snap ring pliers, install the snap ring to the drum.



3. **INSTALL THRUST WASHER TO SUN GEAR INPUT DRUM**

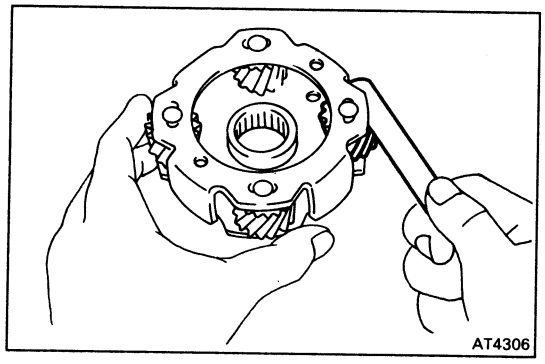




4. **INSTALL ONE-WAY CLUTCH AND SECOND BRAKE HUB ON SUN GEAR**

While turning the hub clockwise, slide the one-way clutch onto the sun gear.

5. **RECHECK OPERATION OF ONE-WAY CLUTCH**



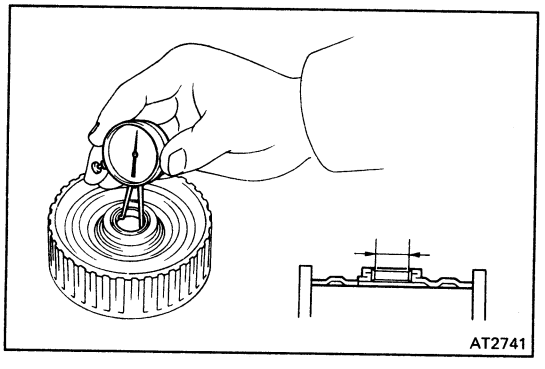
INSPECTION OF FRONT PLANETARY GEAR

MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

Using a feeler gauge, measure the planetary pinion gear thrust clearance.

Standard clearance: 0.2 – 0.5 mm (0.008 – 0.020 in.)
Maximum clearance: 0.5 mm (0.020 in.)

If the clearance is greater than the maximum, replace the planetary gear assembly.



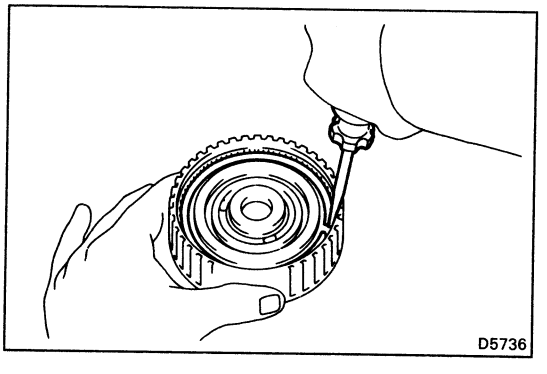
INSPECTION OF PLANETARY RING GEAR

1. **INSPECT RING GEAR FLANGE BUSHING**

Using a dial indicator, measure the inside diameter of the flange bushing.

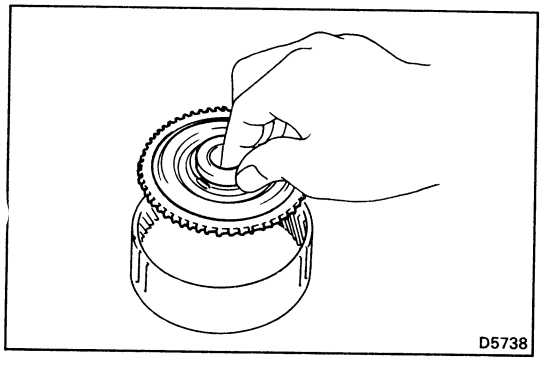
Standard inside diameter: 19.025 – 19.050 mm (0.7490 – 0.7500 in.)

If the inside diameter is greater than maximum, replace the flange.



2. **REMOVE RING GEAR FLANGE**

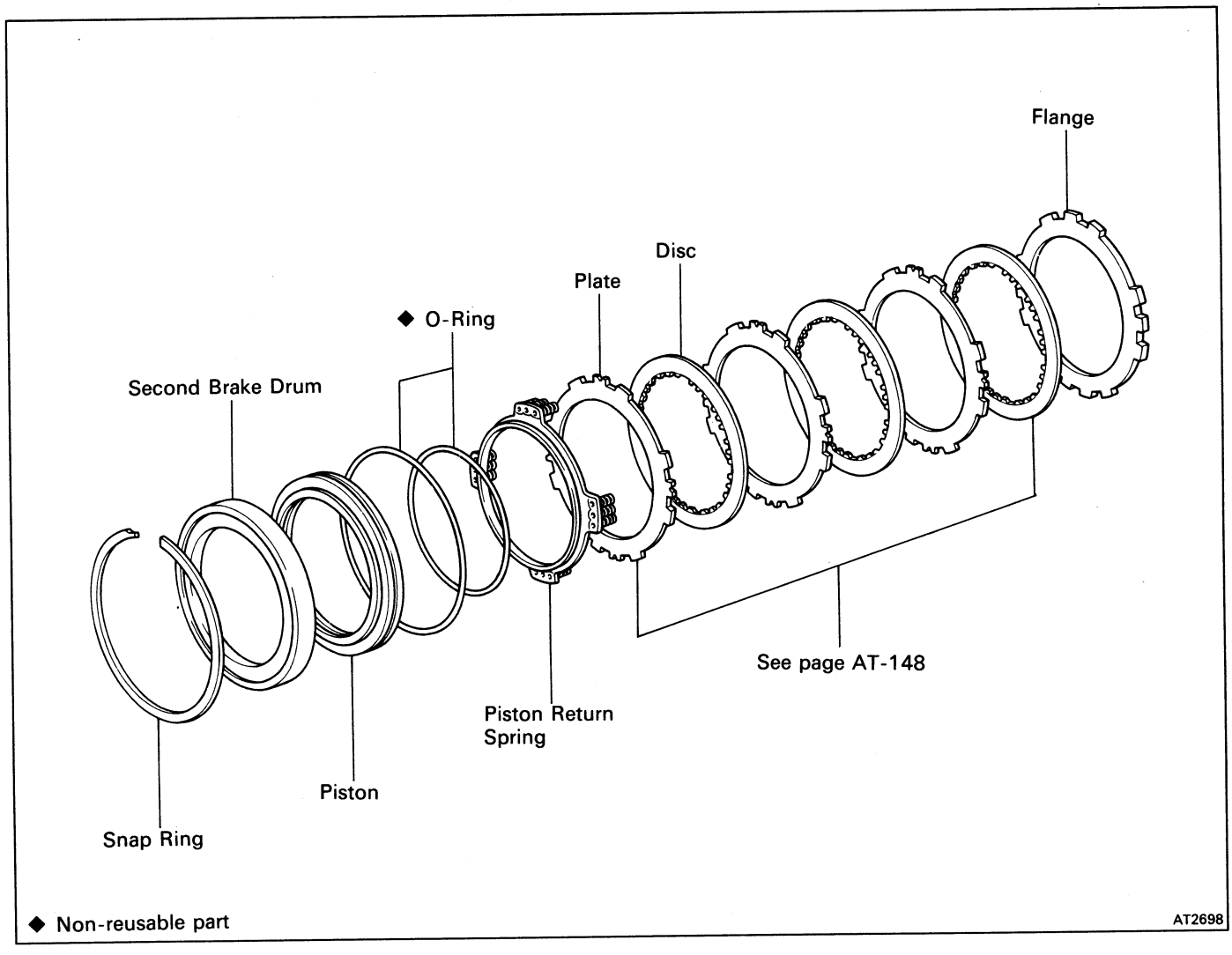
(a) Using a screwdriver, remove the snap ring.
(b) Remove the flange from the ring gear.

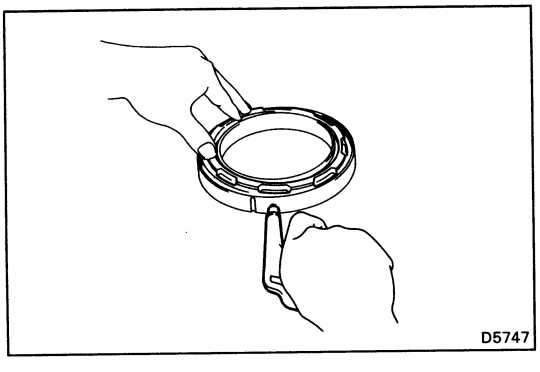


3. **INSTALL RING GEAR FLANGE**

(a) Position the flange onto the ring gear.
(b) Using a screwdriver, install the snap ring.

Second Brake

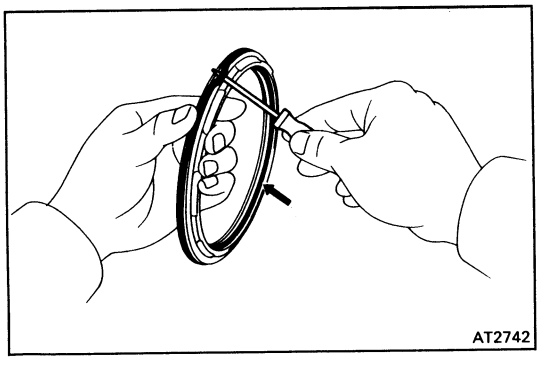




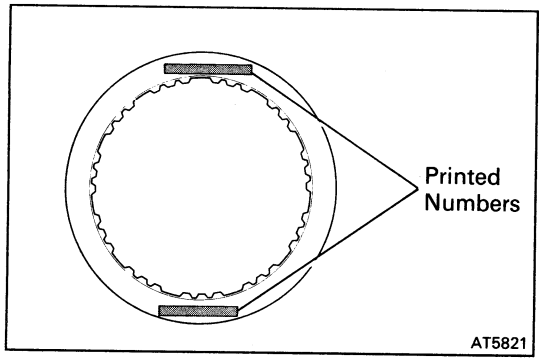
DISASSEMBLY OF SECOND BRAKE PISTON

REMOVE SECOND BRAKE PISTON

(a) Apply compressed air to the oil hole to remove the piston.



(b) Remove the two O-rings from the piston.



INSPECTION OF SECOND BRAKE COMPONENT

INSPECT DISCS, PLATES AND FLANGE

Check if the sliding surface of the discs, plates and flanges are worn or burnt. If necessary, replace them.

HINT:

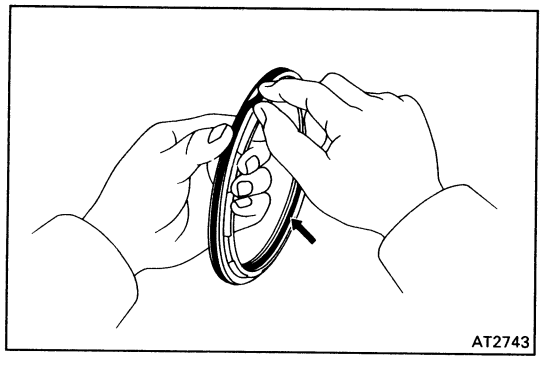
- If the lining of the disc is exfoliated or discolored, or even a part of the printed numbers are defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least two hours.

ASSEMBLY OF SECOND BRAKE PISTON

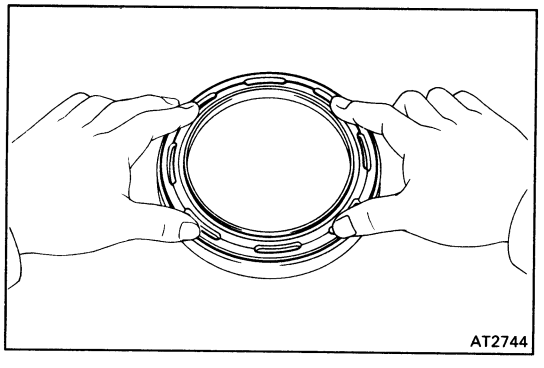
INSTALL PISTON

(a) Coat a new O-ring with ATF.

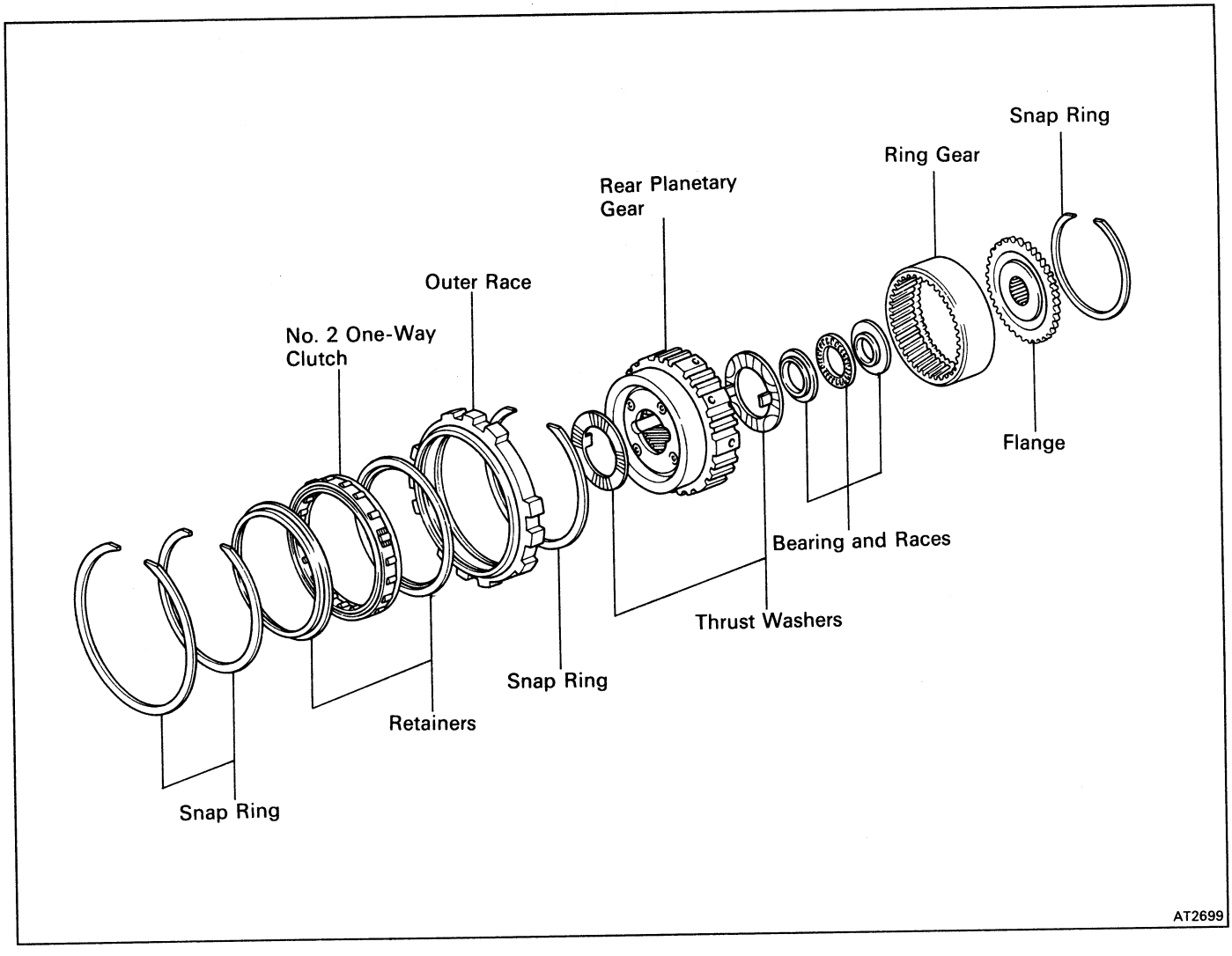
(b) Install the two O-rings on the piston.

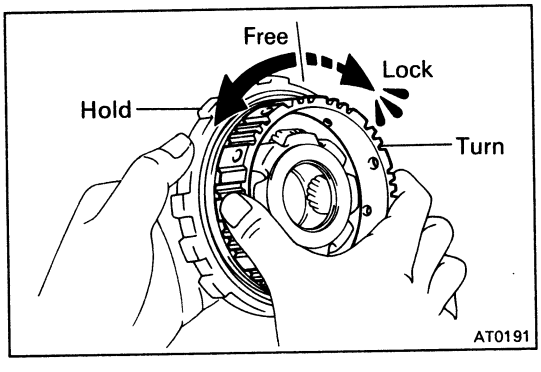


(c) Press the piston into the drum, being careful not to damage the O-rings.



Rear Planetary Gear

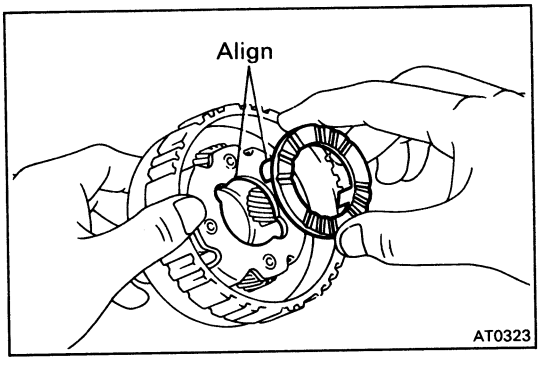




DISASSEMBLY OF ONE-WAY CLUTCH

1. **CHECK OPERATION OF ONE-WAY CLUTCH**

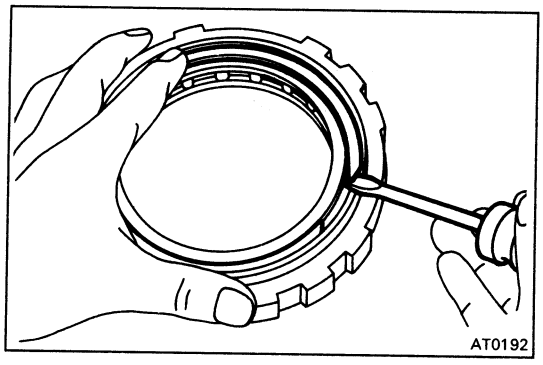
   Hold the outer race and turn the hub. The hub should turn freely counterclockwise and should lock clockwise.



2. **REMOVE THRUST WASHERS**

   Remove the two thrust washers from the both sides of planetary gear.

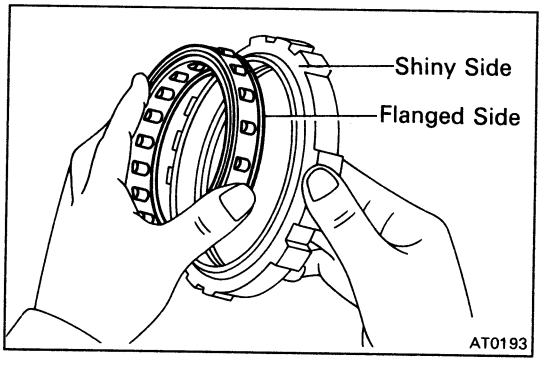
3. **SEPARATE ONE-WAY CLUTCH AND PLANETARY GEAR**



4. REMOVE ONE-WAY CLUTCH FROM OUTER RACE

(a) Remove the two snap rings and retainers from the both sides.

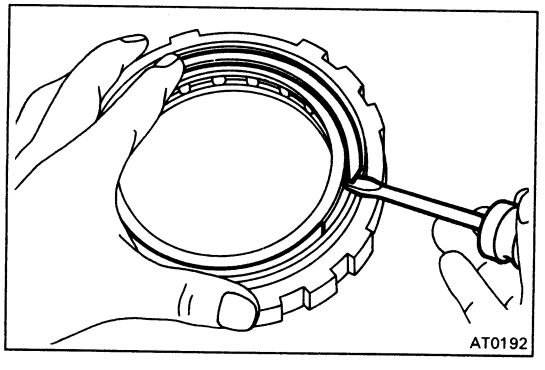
(b) Remove the one-way clutch from the outer race.



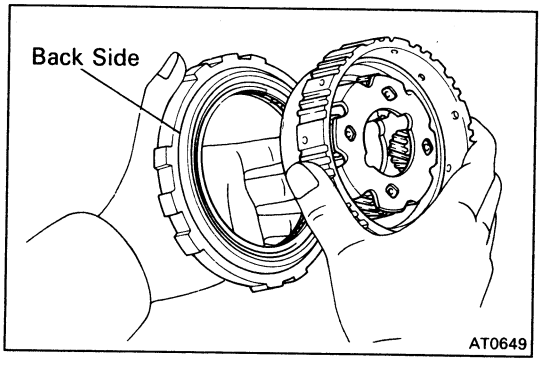
ASSEMBLY OF ONE-WAY CLUTCH

1. INSTALL ONE-WAY CLUTCH

(a) Install the one-way clutch into the outer race, facing the flanged side of the one-way clutch toward the shiny side of the outer race.

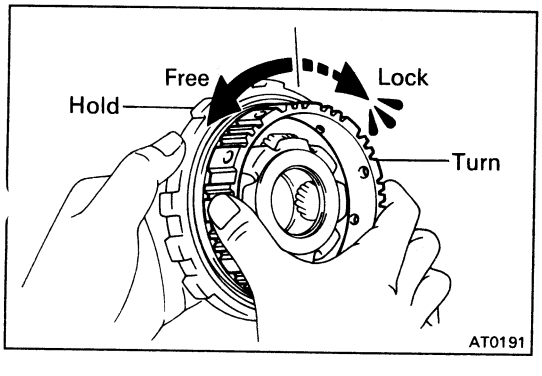


(b) Install the two retainers and snap rings to the both sides.

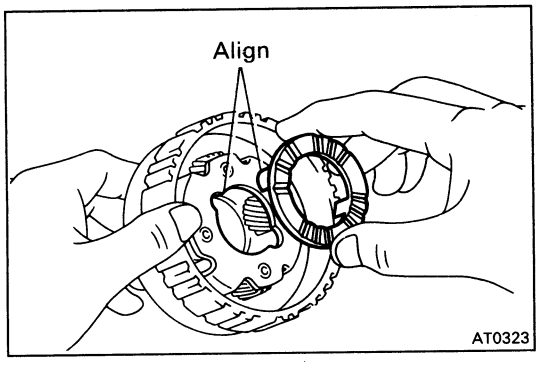


2. INSTALL PLANETARY GEAR INTO ONE-WAY CLUTCH

Install the planetary gear into the one-way clutch facing the inner race of the planetary gear toward the back side of the one-way clutch outer race.



3. CHECK OPERATION OF ONE-WAY CLUTCH

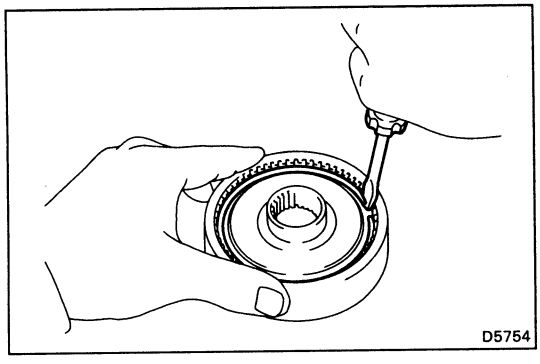


4. INSTALL THRUST WASHERS

(a) Coat the two thrust washers with petroleum jelly.

(b) Align the tab of the washers with the hollow of the carrier.

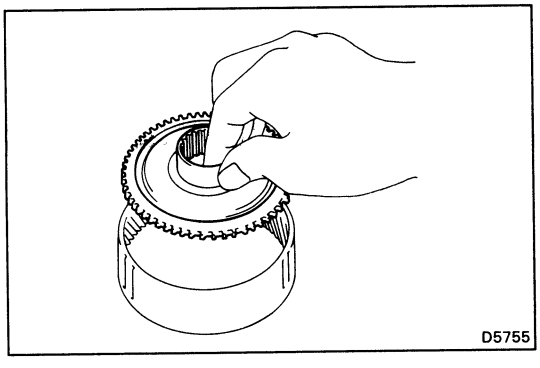
REPLACEMENT OF RING GEAR FLANGE



1. REMOVE RING GEAR FLANGE

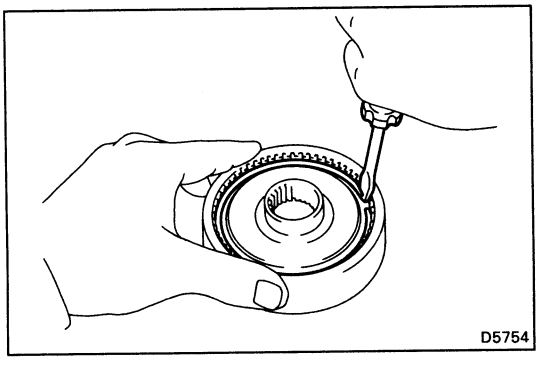
(a) Using a screwdriver, remove the snap ring.

(b) Remove the flange from the ring gear.

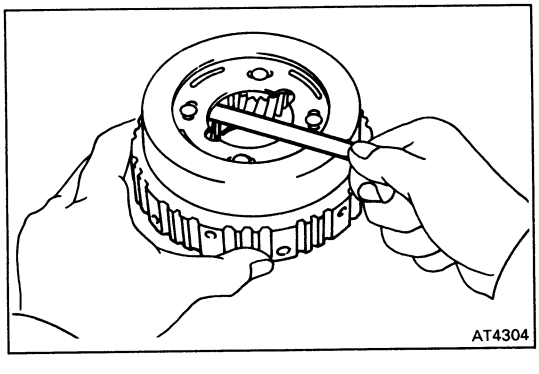


2. INSTALL RING GEAR FLANGE

(a) Position the flange into the ring gear.



(b) Using a screwdriver, install the snap ring.



INSPECTION OF REAR PLANETARY GEAR

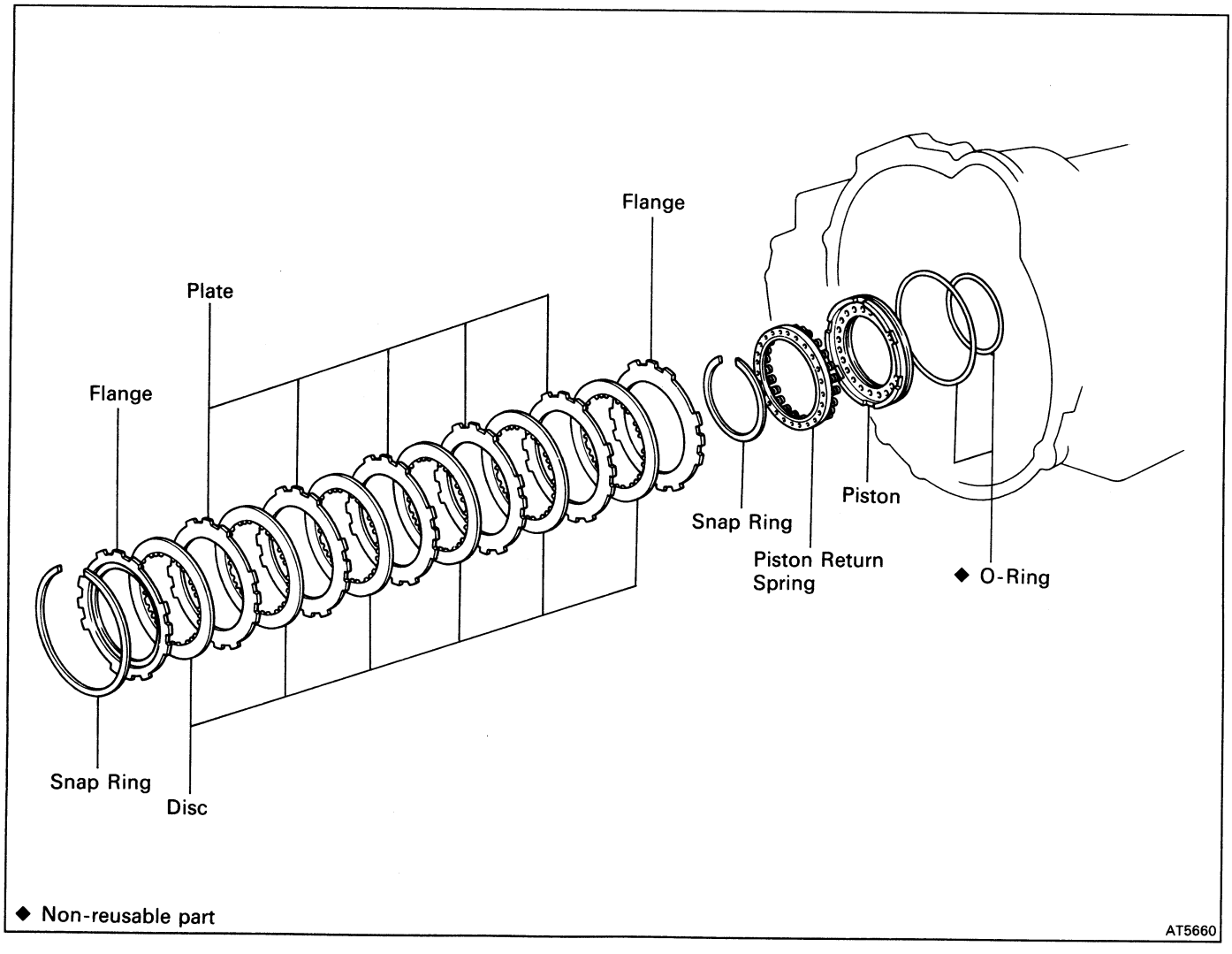
MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

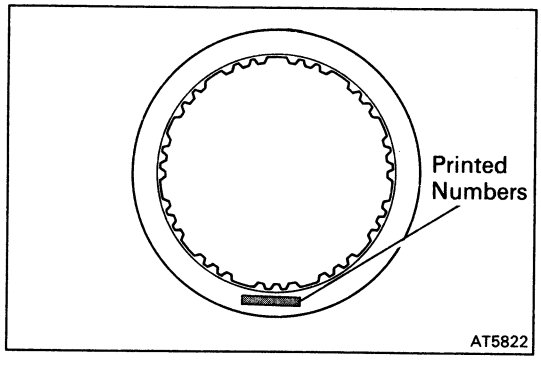
Using a feeler gauge, measure the planetary pinion gear thrust clearance.

Standard clearance: 0.2 – 0.5 mm (0.008 – 0.020 in.)
Maximum clearance: 0.5 mm (0.020 in.)

If the clearance is greater than maximum, replace the planetary gear assembly.

First and Reverse Brake





INSPECTION OF FIRST AND REVERSE BRAKE COMPONENT

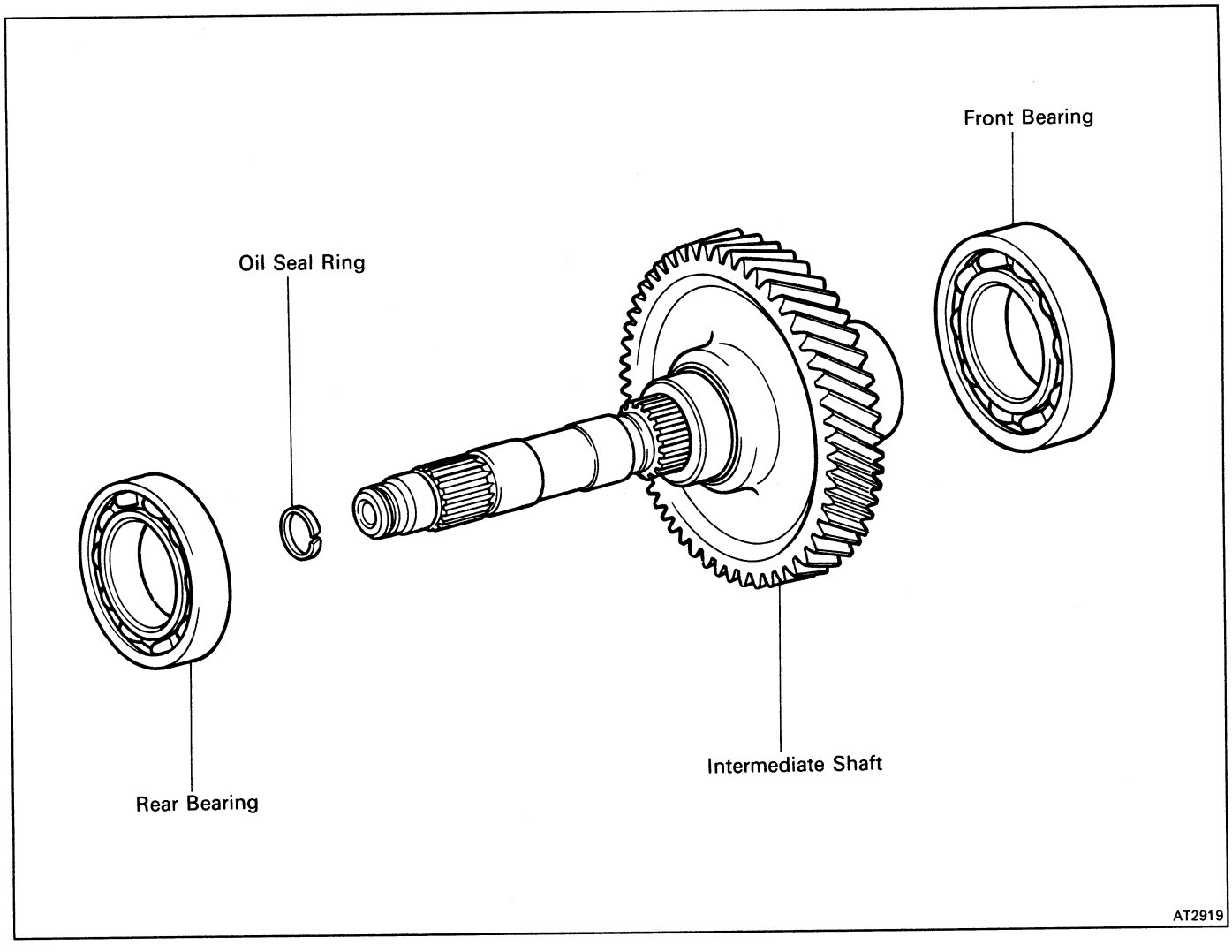
INSPECT DISCS, PLATE AND FLANGE

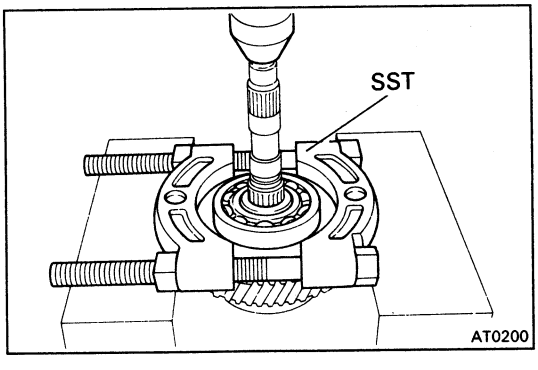
Check if the sliding surface of the discs, plates and flanges are worn or burnt. If necessary, replace them.

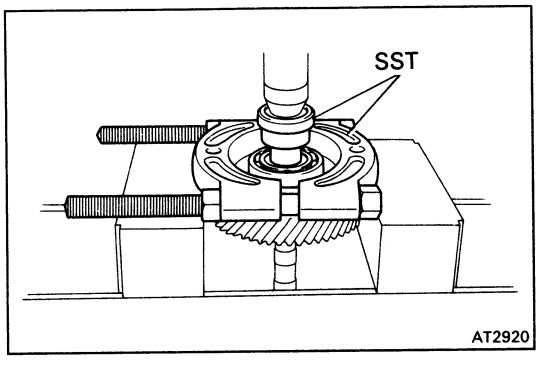
HINT:

- If the lining of the disc is exfoliated or discolored, or even a part of the printed number is defaced, replace all discs.
- Before assembling new discs, soak them in ATF for at least two hours.

Intermediate Shaft



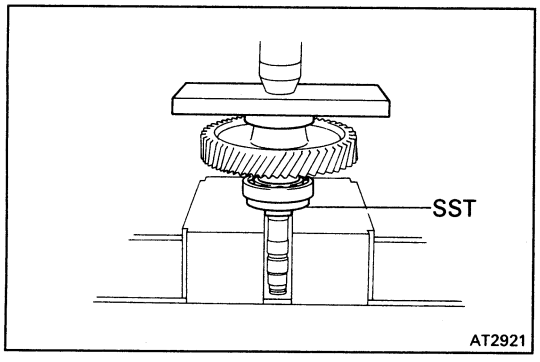




DISASSEMBLY OF INTERMEDIATE SHAFT

1. **REMOVE INTERMEDIATE SHAFT FRONT BEARING**
   Using SST and press, press out the bearing.
   SST 09555-55010

2. **REMOVE INTERMEDIATE REAR BEARING**
   Using SST and press, press out the bearing.
   SST 09350-32014 (09351-32090) and
   09555-55010

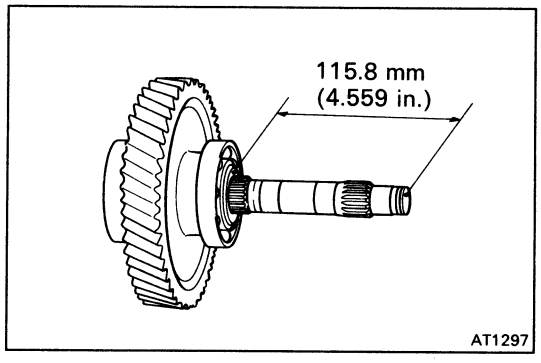


ASSEMBLY OF INTERMEDIATE SHAFT

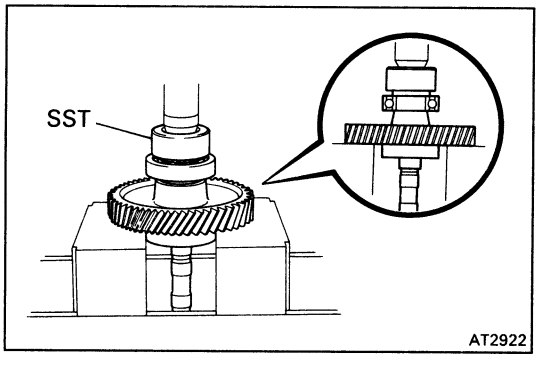
1. INSTALL INTERMEDIATE SHAFT FRONT BEARING

(a) Using SST and press, press in a new bearing.

SST 09350-32014 (09351-32120)



(b) Check that the distance from the gear flange end to the intermediate shaft end is 115.8 mm (4.559 in.).

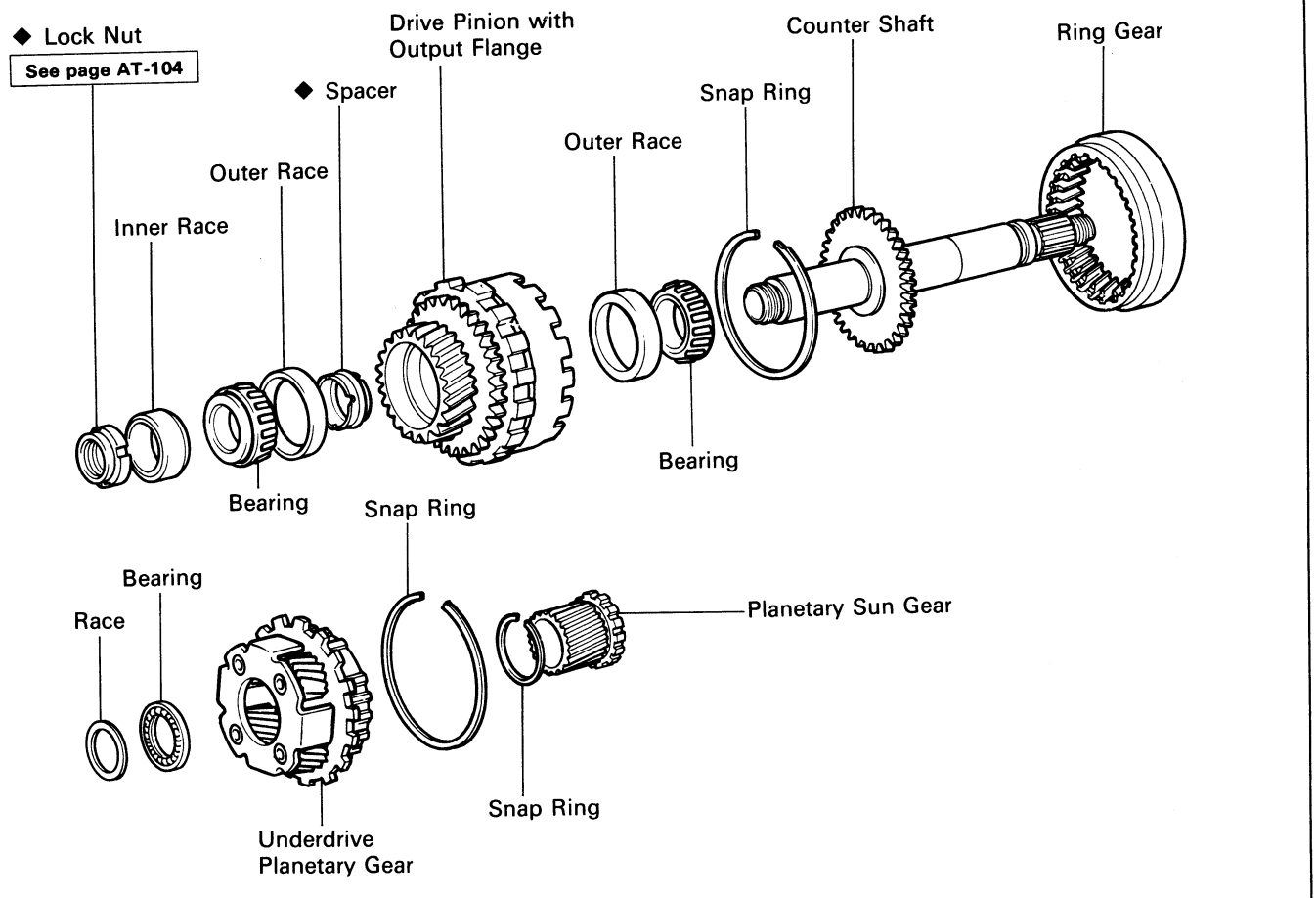


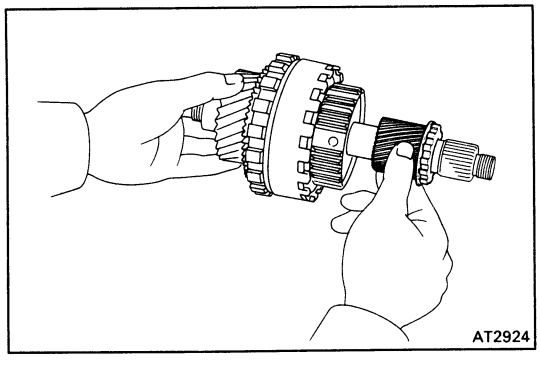
2. INSTALL INTERMEDIATE SHAFT REAR BEARING

Using SST and press, press in a new bearing.

SST 09350-32014 (09351-32150)

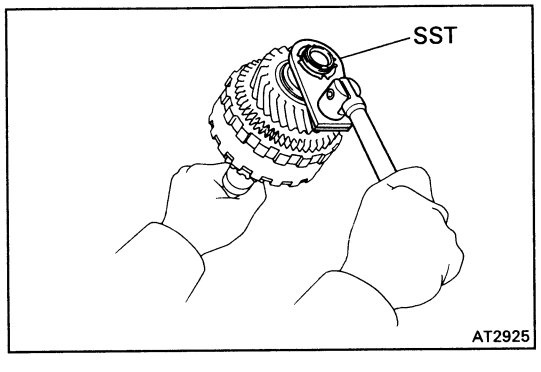
Counter Shaft





DISASSEMBLY OF COUNTER SHAFT

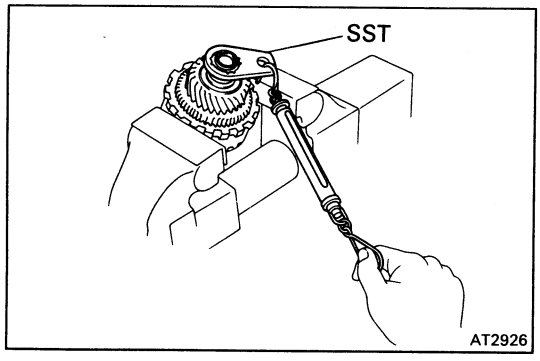
1. REMOVE UNDERDRIVE PLANETARY SUN GEAR FROM COUNTER SHAFT



2. MEASURE STARTING TORQUE OF COUNTER SHAFT

(a) Using SST, temporarily tighten the lock nut.

SST 09350-32014 (09351-32170)



(b) Using soft jaws, hold the drive pinion in a vise.

(c) Using SST and spring tension gauge, measure the starting torque of the counter shaft.

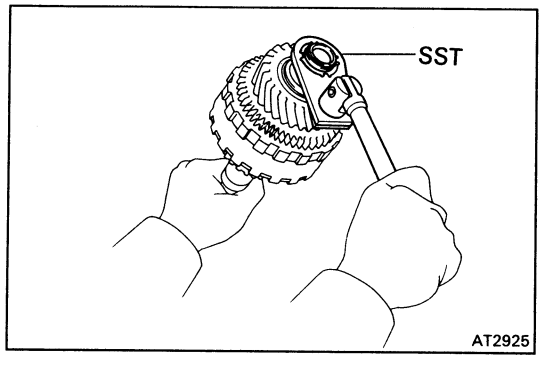
SST 09350-32014 (09351-32170)

Starting torque: **with spring tension gauge**
1.2 – 2.0 kg (2.6 – 4.4 lb)
with torque gauge
(hexagon nut side)
New bearing 6 – 10 kg-cm
(5.2 – 8.7 in.-lb, 0.6 – 1.0 N·m)
Reused bearing 3 – 5 kg-cm
(2.6 – 4.3 in.-lb, 0.3 – 0.5 N·m)

If the torque is exceeded, replace the spacer.

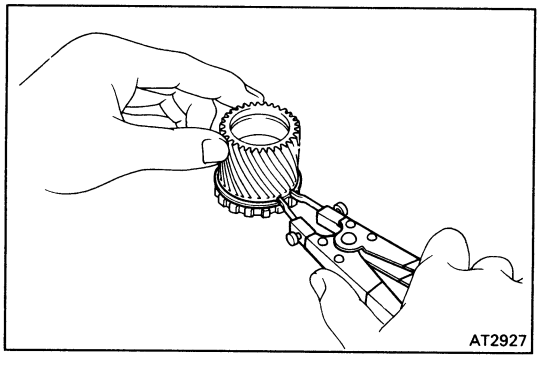
(d) Using SST, remove the lock nut.

SST 09350-32014 (09351-32170)



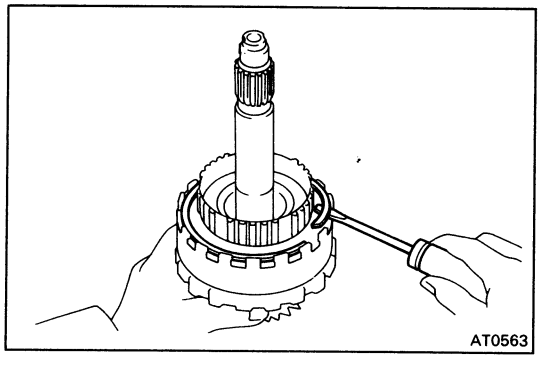
3. REMOVE SNAP RING FROM SUN GEAR

Using snap ring pliers, remove the snap ring from the sun gear.

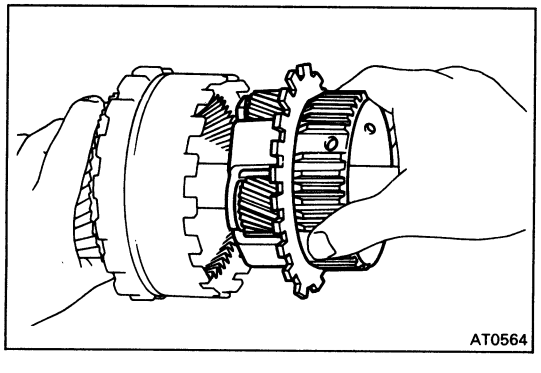


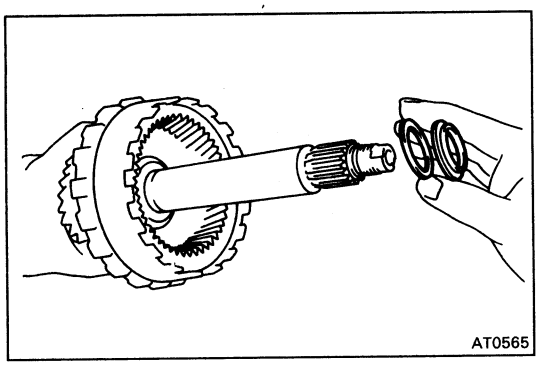
4. REMOVE SNAP RING FROM COUNTER SHAFT ASSEMBLY

Using a screwdriver, remove the snap ring from the counter shaft assembly.

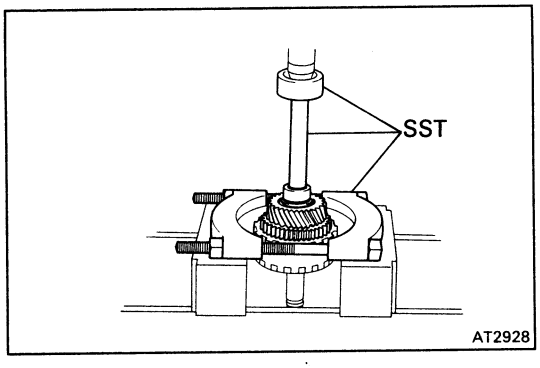


5. REMOVE UNDERDRIVE PLANETARY GEAR





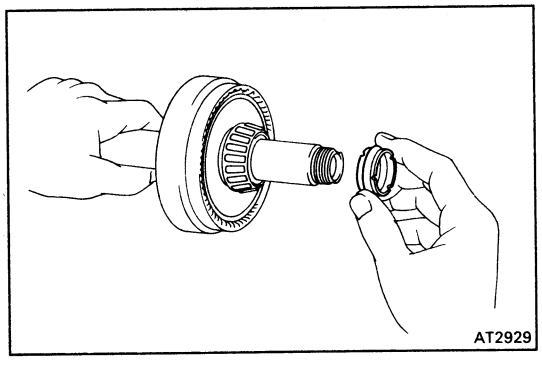
6. REMOVE THRUST NEEDLE ROLLER BEARING AND RACE



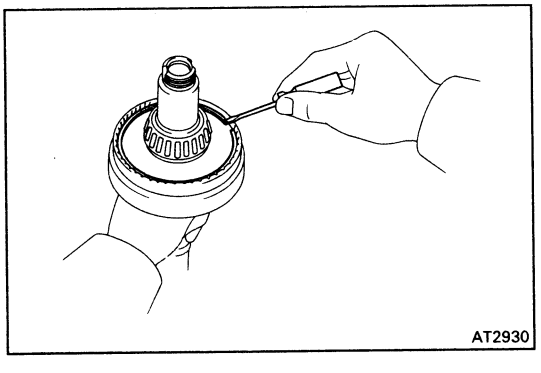
7. REMOVE DRIVE PINION WITH OUTPUT FLANGE, BEARING, INNER RACE AND SPACER

(a) Using SST and press, remove the drive pinion with output flange, bearing and inner race.

SST 09350-32014 (09351-32150, 09351-32130), 09555-55010

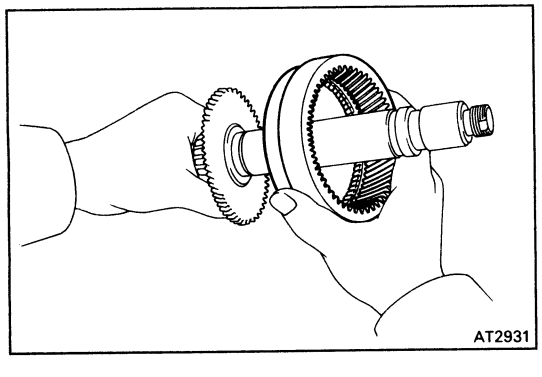


(b) Remove the spacer from the counter shaft.

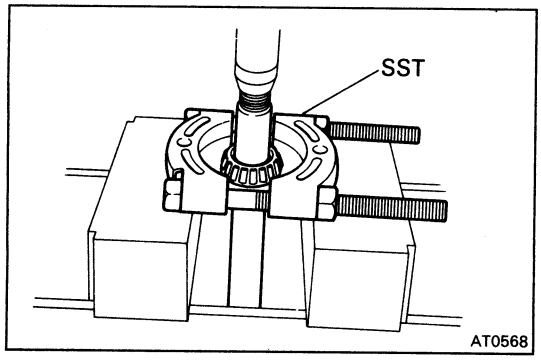


8. REMOVE RING GEAR

(a) Using a screwdriver, remove the snap ring from the counter shaft.



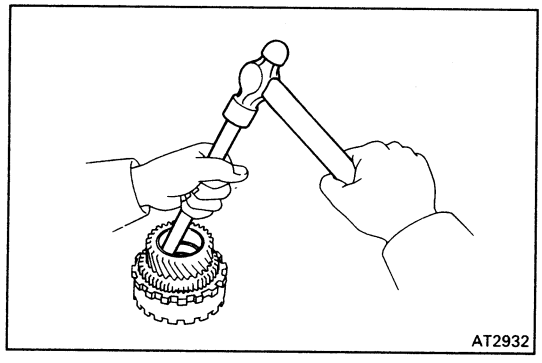
(b) Remove the ring gear from the counter shaft.



9. REMOVE BEARING

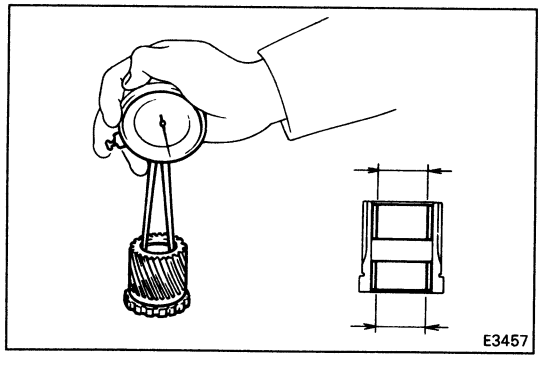
Using SST and press, remove the bearing

SST 09950-00020



10. REMOVE BEARING OUTER RACES

Using a brass bar and hammer, tap out both bearing outer races.

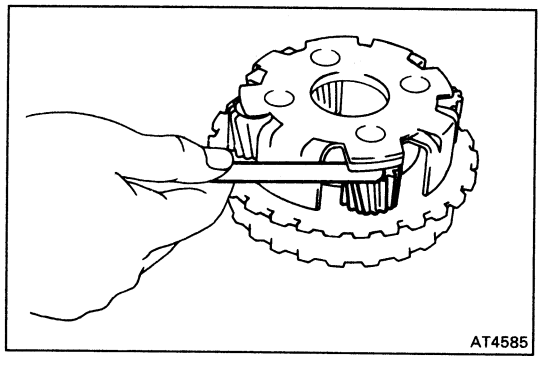


INSPECTION OF COUNTER SHAFT COMPONENTS

1. MEASURE PLANETARY SUN GEAR BUSHING INSIDE DIAMETER

Using a caliper gauge, measure the bushing inside diameter of the planetary sun gear as shown.

Standard inside diameter: 29.800 – 29.825 mm (1.1732 – 1.1742 in.)
Maximum inside diameter: 29.870 mm (1.1760 in.)

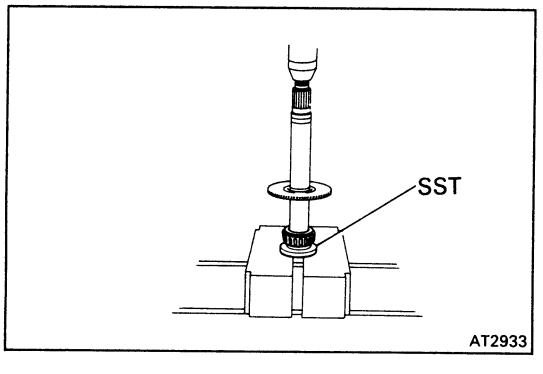


2. MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

Using a feeler gauge, measure the planetary pinion gear thrust clearance.

Standard clearance: 0.2 – 0.5 mm (0.008 – 0.020 in.)
Maximum clearance: 0.5 mm (0.020 in.)

If the clearance is greater than the maximum, replace the planetary gear assembly.



ASSEMBLY OF COUNTER SHAFT

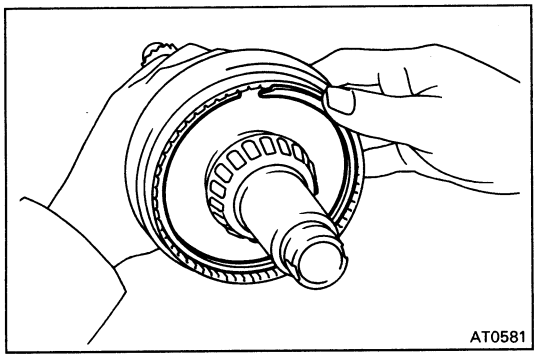
1. INSTALL BEARING TO COUNTER SHAFT

Using SST and press, press in the bearing of the thick inner race side.

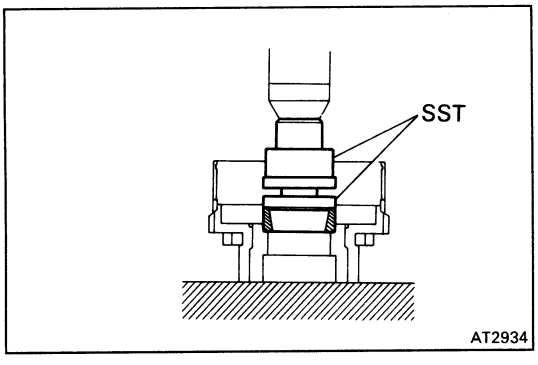
SST 09350-32014 (09351-32180)

2. INSTALL RING GEAR

(a) Install the ring gear to the counter shaft.



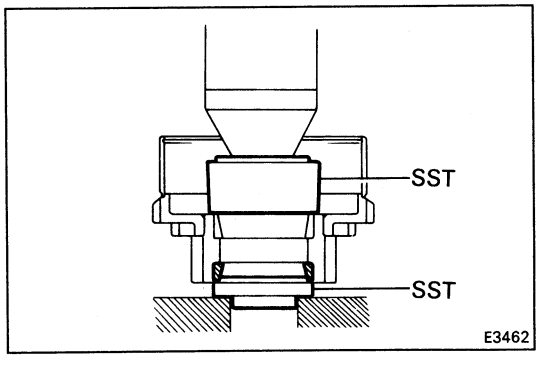
(b) Install the snap ring.



3. INSTALL BEARING OUTER RACES TO DRIVE PINION

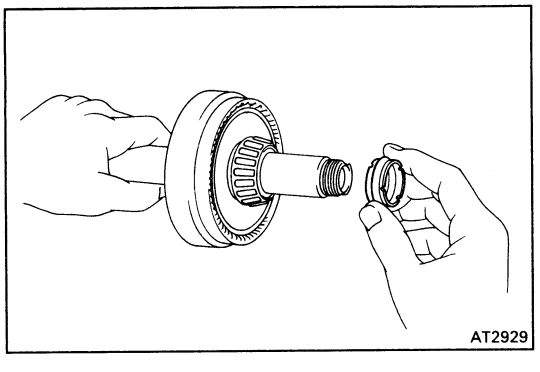
(a) Using SST and press, press in the thick race to the flange side of the drive pinion.

SST 09350-32014 (09351-32090, 09351-32180)



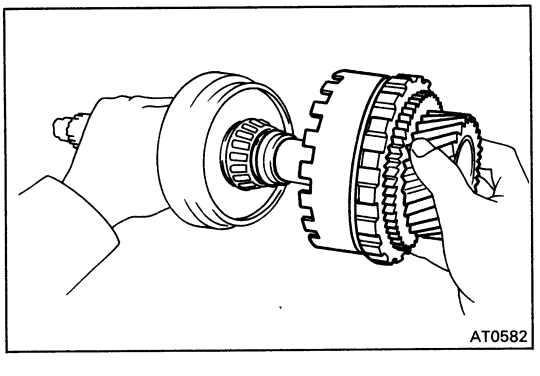
(b) Using SST and press, press in the thin race to the other side.

SST 09350-32014 (09351-32150, 09351-32180)

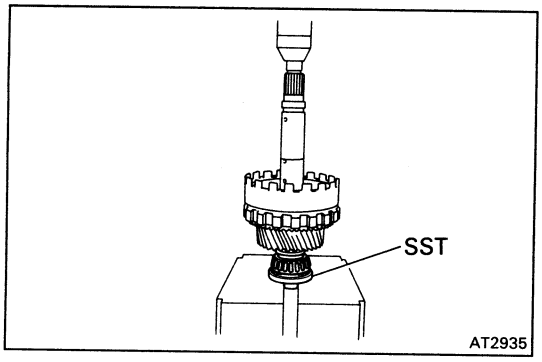


4. INSTALL DRIVE PINION TO COUNTER SHAFT

(a) Install the new spacer to the counter shaft.



(b) Install the drive pinion to the counter shaft.

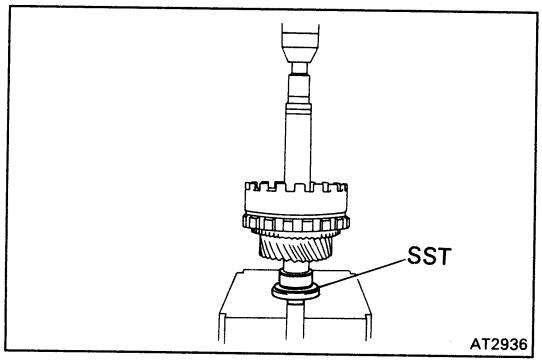


5. INSTALL ANOTHER BEARING TO COUNTER SHAFT

Using SST and press, press in the another bearing.

SST 09350-32014 (09351-32180)

NOTICE: Be sure there is some clearance between the output flange and bearing

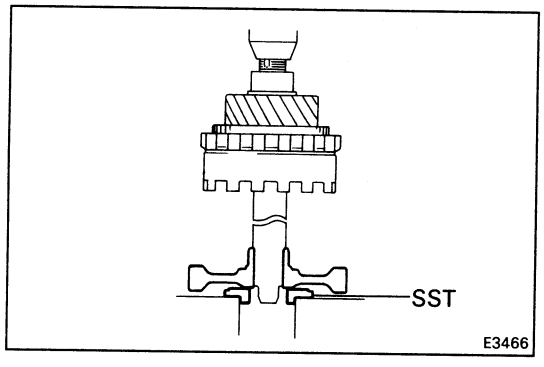


6. INSTALL BEARING INNER RACE

Using SST and press, press in the inner race.

SST 09350-32014 (09351-32180)

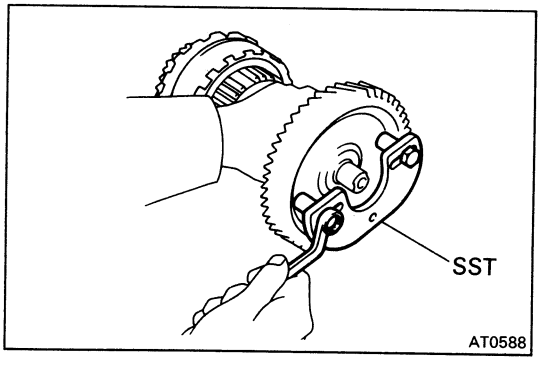
NOTICE: Be sure there is some clearance.



7. ADJUST COUNTER SHAFT STARTING TORQUE

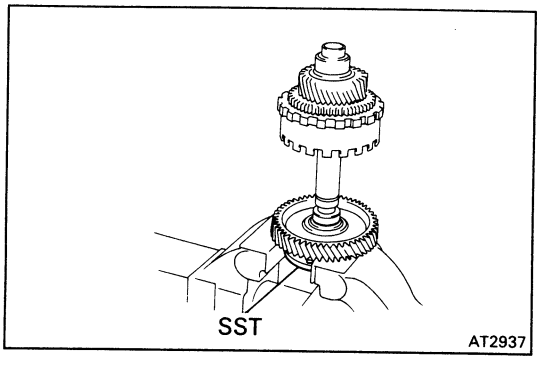
(a) Using SST and press, press in the counter driven gear to the counter shaft.

SST 09350-32014 (09351-32100)



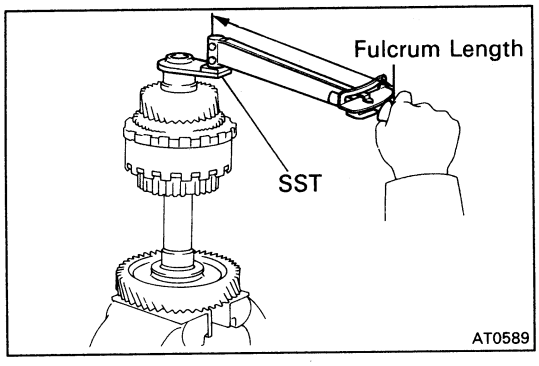
(b) Install SST to the driven gear.

SST 09350-32014 (09351-32032)



(c) Secure the counter shaft by holding the SST in a vise.

SST 09350-32014 (09351-32032)

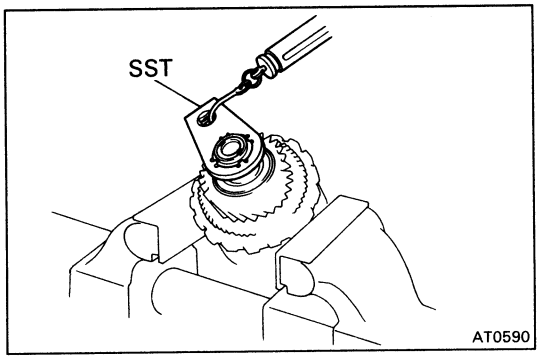


(d) Temporarily install the new lock nut, and using SST, tighten the lock nut until the counter shaft starting torque is in specification.

SST 09350-32014 (09351-32170)

Torque (Reference): 1,800 – 2,200 kg-cm (130 – 159 ft-lb, 177 – 216 N·m)

HINT: Use a torque wrench with a fulcrum length of 42 cm (16.54 in.).



(e) Using soft jaws, hold the drive pinion in a vise.

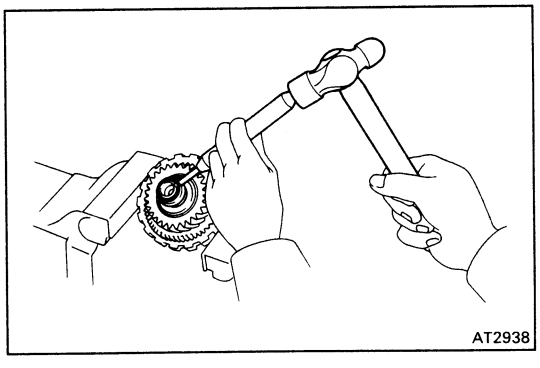
(f) Using SST and spring tension gauge, measure the starting torque of the counter shaft.

SST 09350-32014 (09351-32170)

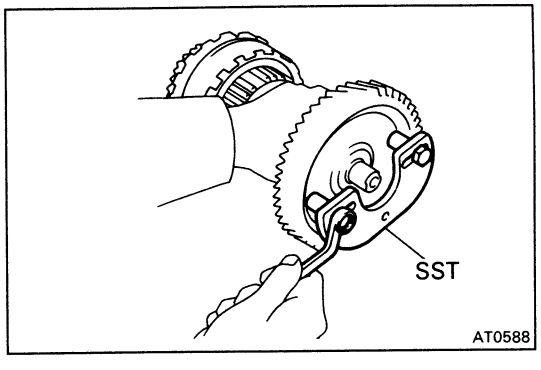
Starting torque: with tension gauge
1.2 – 2.0 kg (2.6 – 4.4 lb)
with torque gauge
(hexagon nut side)
New bearing 6 – 10 kg-cm
(5.2 – 8.7 in.-lb, 0.6 – 1.0 N·m)
Reused bearing 3 – 5 kg-cm
(2.6 – 4.3 in.-lb, 0.3 – 0.5 N·m)

If the starting torque is exceeded, replace the spacer and retorque.

HINT: Before measuring the starting torque, snug down the bearing by turning the counter shaft.

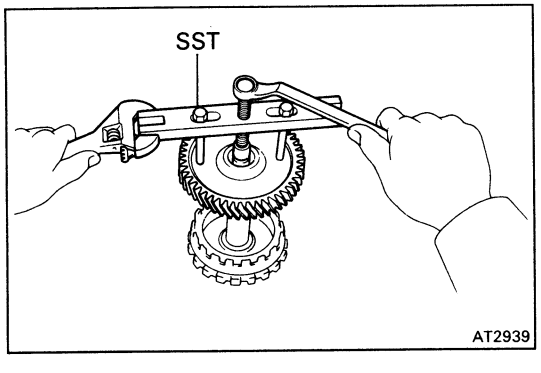


(g) Using a punch and hammer, stake the lock nut.



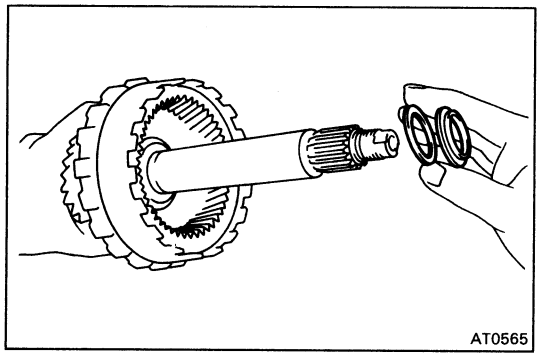
(h) Remove the SST from the counter driven gear.

SST 09350-32014 (09351-32032)



(i) Using SST, remove the counter driven gear.

SST 09350-32014 (09351-32061)



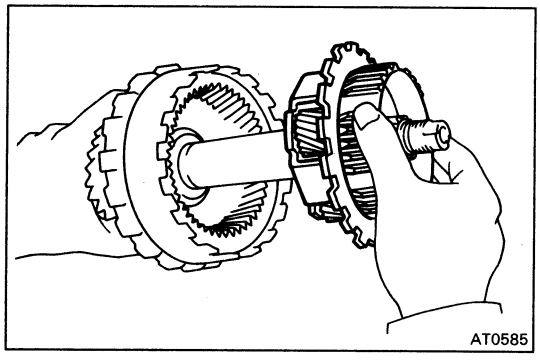
8. INSTALL RACE AND BEARING

Coat the race and bearing with petroleum jelly and install them to the counter shaft.

Bearing and race

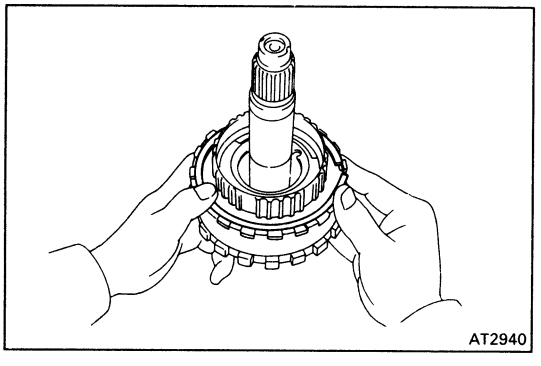
mm (in.)

	Outer Diameter	Inner Diameter
Race	41.8 (1.646)	30.0 (1.181)
Bearing	43.85 (1.726)	31.0 (1.220)

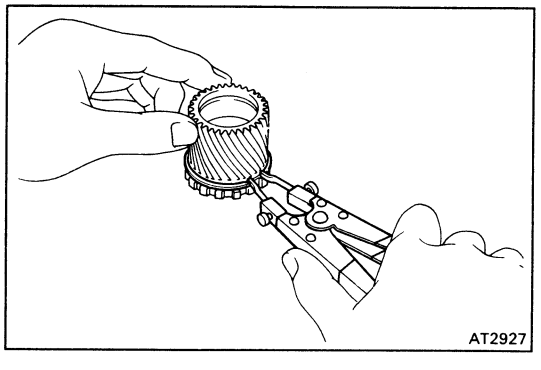


9. INSTALL UNDERDRIVE PLANETARY GEAR

(a) Install the underdrive planetary gear to the counter shaft.

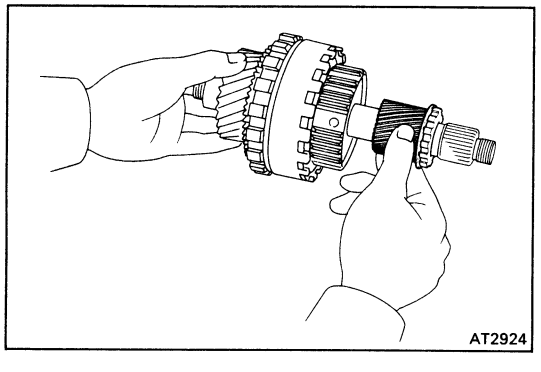


(b) Install the snap ring.



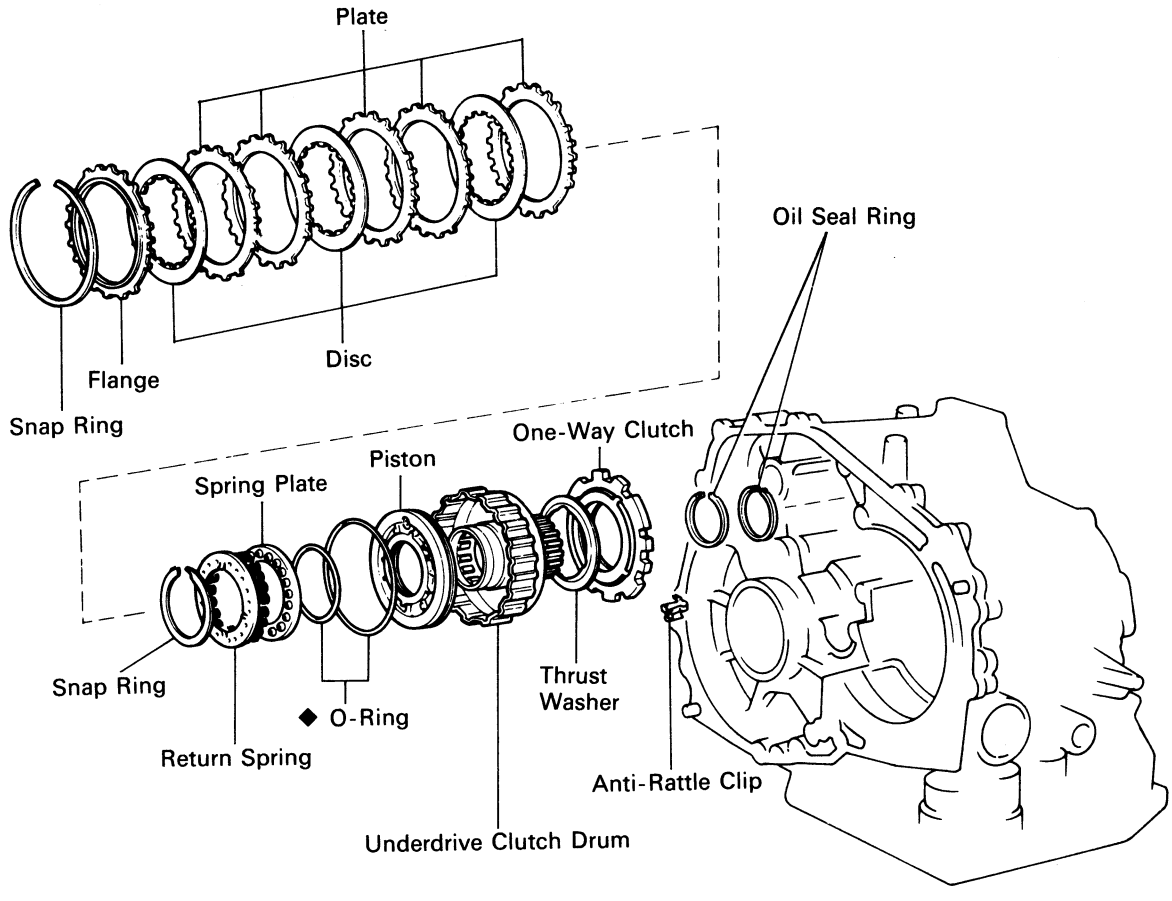
10. INSTALL UNDERDRIVE PLANETARY SUN GEAR

(a) Using snap ring pliers, install the snap ring to the sun gear.

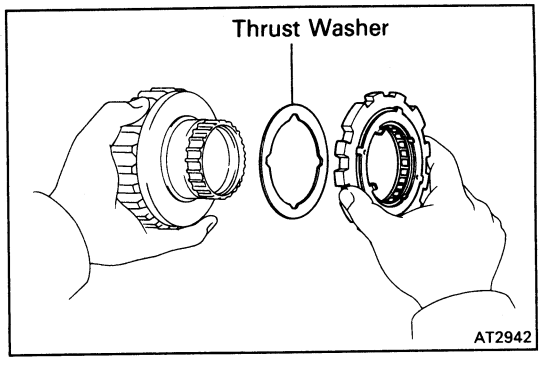


(b) Install the underdrive planetary sun gear to the counter shaft as shown.

Underdrive Clutch and One-Way Clutch No. 3



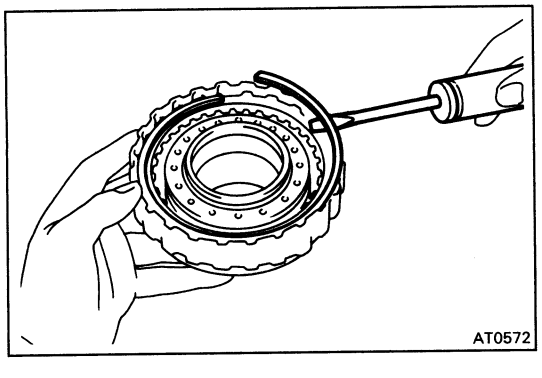
◆ Non-reusable part



DISASSEMBLY OF UNDERDRIVE CLUTCH

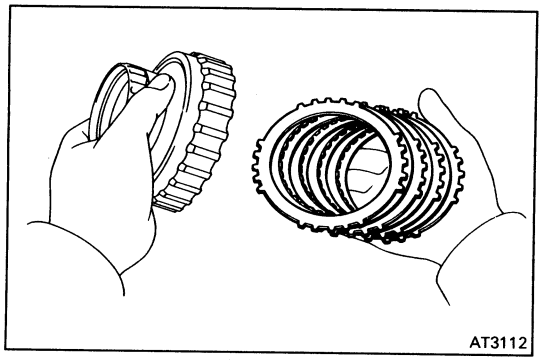
1. REMOVE ONE-WAY CLUTCH FROM CLUTCH DRUM

Remove the one-way clutch and thrust washer from the underdrive clutch drum.



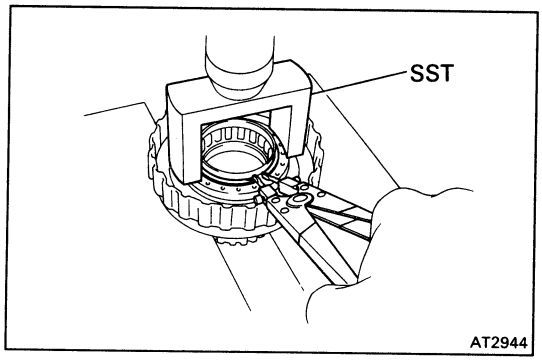
2. REMOVE SNAP RING

Using a screwdriver, remove the snap ring.



3. REMOVE FLANGE, DISCS AND PLATES

Remove the flange, discs and plates from the clutch drum.



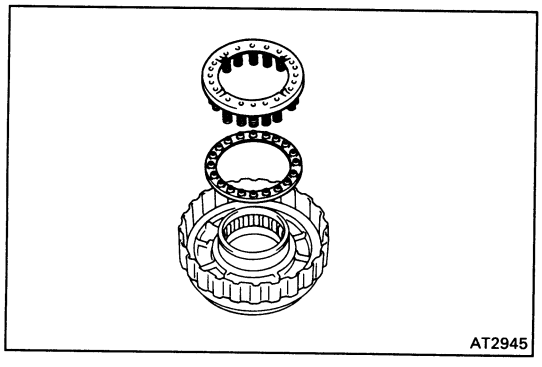
4. REMOVE RETURN SPRING AND SPRING PLATE

(a) Using SST and press, compress the return spring retainer.

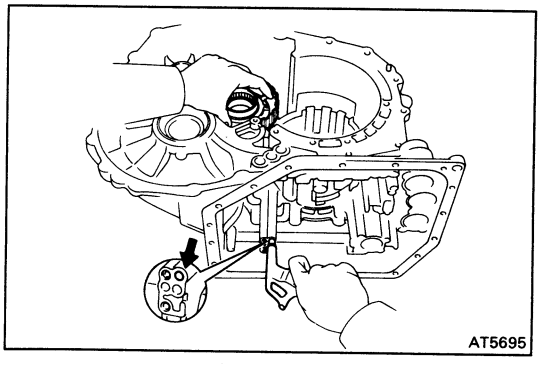
SST 09350-32014 (09351-32070)

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

(c) Remove SST.



(d) Remove the return spring and spring plate.



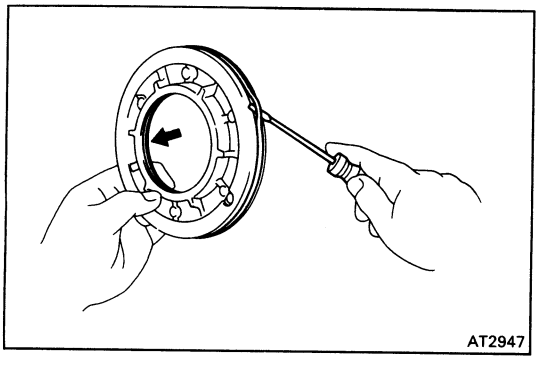
5. REMOVE UNDERDRIVE CLUTCH PISTON

(a) Install the underdrive clutch to the transaxle case.

HINT: Before installing the clutch, install the oil seal rings to the transaxle case.

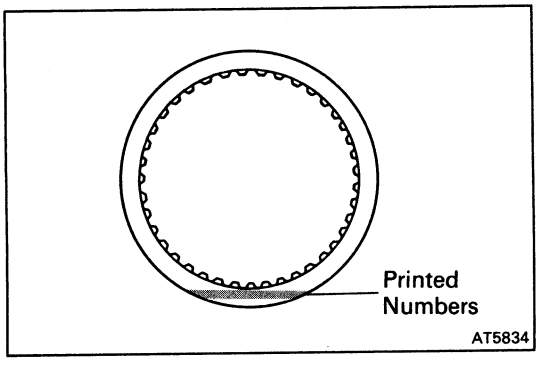
(b) Apply compressed air into the oil passage of the case, and remove the piston from the clutch drum.

(c) If the piston does not pop out with compressed air, use needle-nose pliers to remove it.



6. REMOVE O-RINGS FROM PISTON

Using a screwdriver, remove the two O-rings from the underdrive clutch piston.



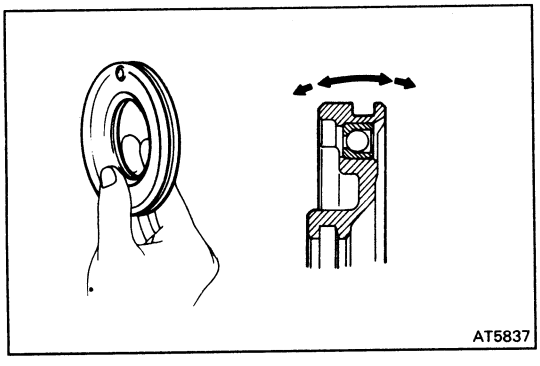
INSPECTION OF UNDERDRIVE CLUTCH COMPONENTS

1. INSPECT DISCS, PLATES AND FLANGES

Check if the sliding surface of the discs, plates and flanges are worn or burnt. If necessary, replace them.

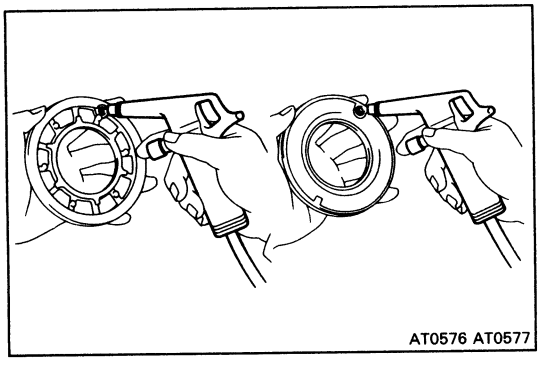
HINT:

- If the lining of the disc is exfoliated or discolored, or even a part of the printed numbers are defaced, replace the disc.
- Before assembling new discs, soak them in ATF for at least two hours.

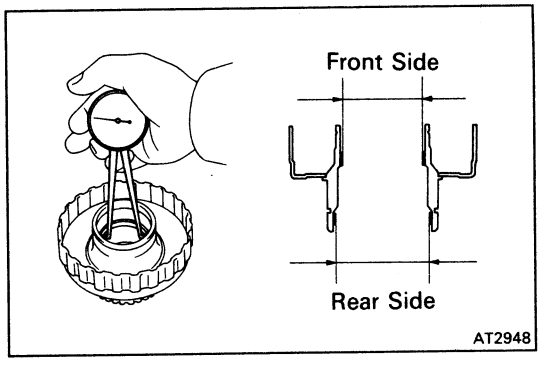


2. INSPECT UNDERDRIVE CLUTCH PISTON

(a) Check that the check ball is free by shaking the piston.



(b) Check that the valve does not leak by applying low-pressure compressed air.



3. INSPECT UNDERDRIVE CLUTCH DRUM

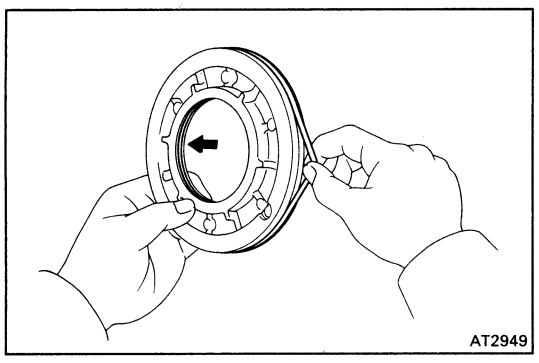
Using a caliper gauge, measure the bushing inside diameter of the underdrive clutch drum as shown.

Standard inside diameter:

Front side	**46.500 – 46.525 mm (1.83071 – 1.83169 in.)**
Rear side	**55.000 – 55.030 mm (2.16535 – 2.16653 in.)**

Maximum inside diameter:

Front side	**46.570 mm (1.83346 in.)**
Rear side	**55.080 mm (2.16850 in.)**

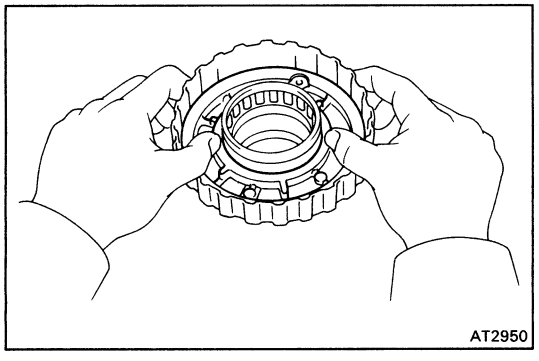


ASSEMBLY OF UNDERDRIVE CLUTCH

1. INSTALL UNDERDRIVE CLUTCH PISTON INTO CLUTCH DRUM

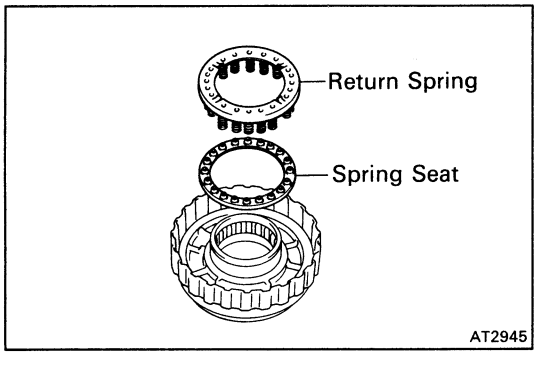
(a) Install the two new O-rings to the piston.

HINT: Before installing, coat the O-rings with ATF.



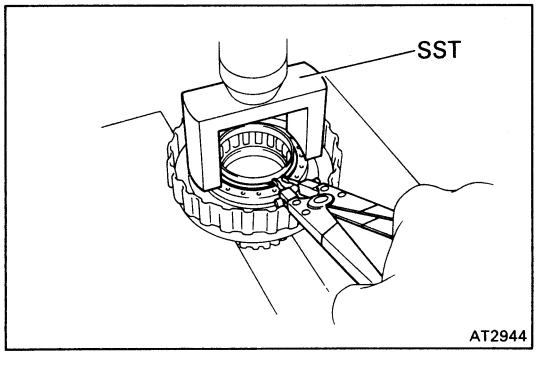
(b) Install the underdrive clutch piston into the clutch drum.

HINT: Be careful not to damage the O-rings.



2. INSTALL SPRING SEAT AND RETURN SPRING

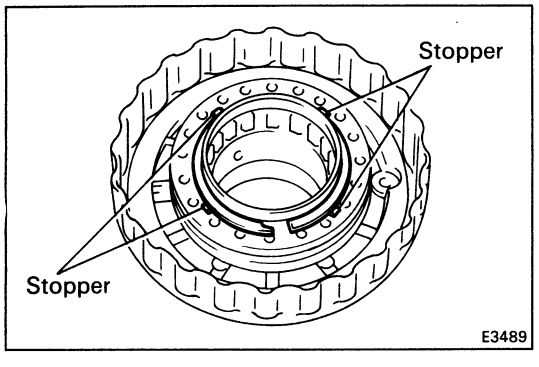
(a) Install the spring seat and return spring to the underdrive clutch as shown.



(b) Using SST and press, compress the return spring retainer.

SST 09350-32014 (09351-32070)

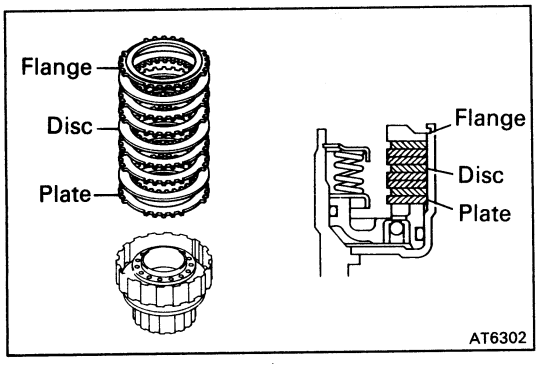
(c) Using snap ring pliers, install the snap ring.



HINT: Install the snap ring as shown.

(d) Remove SST.

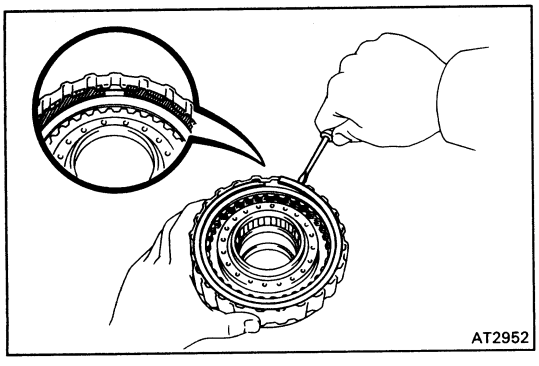
SST 09350-32014 (09351-32070)



3. INSTALL PLATES, DISCS AND FLANGE

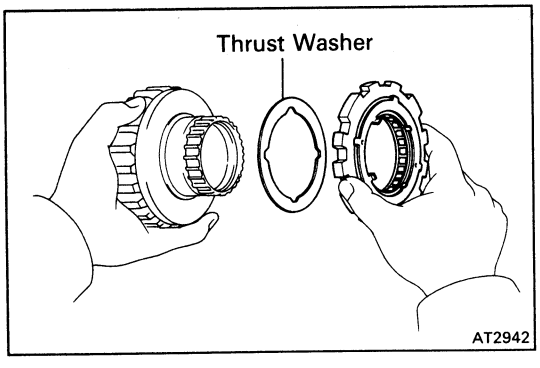
Install in order: D = Disc P = Plate F = Flange
F – D – P – P – D – P – P – D – P

HINT: Install the flange the flat end facing downward.



4. INSTALL SNAP RING

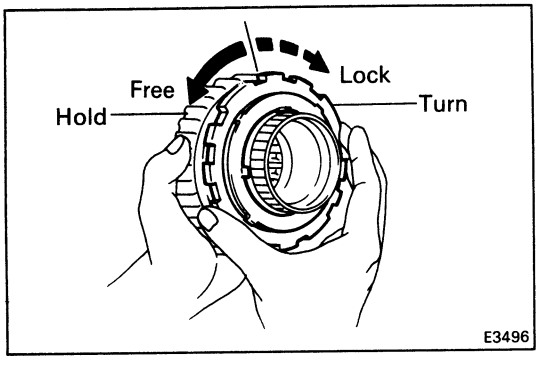
Install the snap ring to the underdrive clutch.



5. INSTALL ONE-WAY CLUTCH TO CLUTCH DRUM

(a) Install the thrust washer to clutch drum.

(b) Install the one-way clutch with the claw of retainer up.

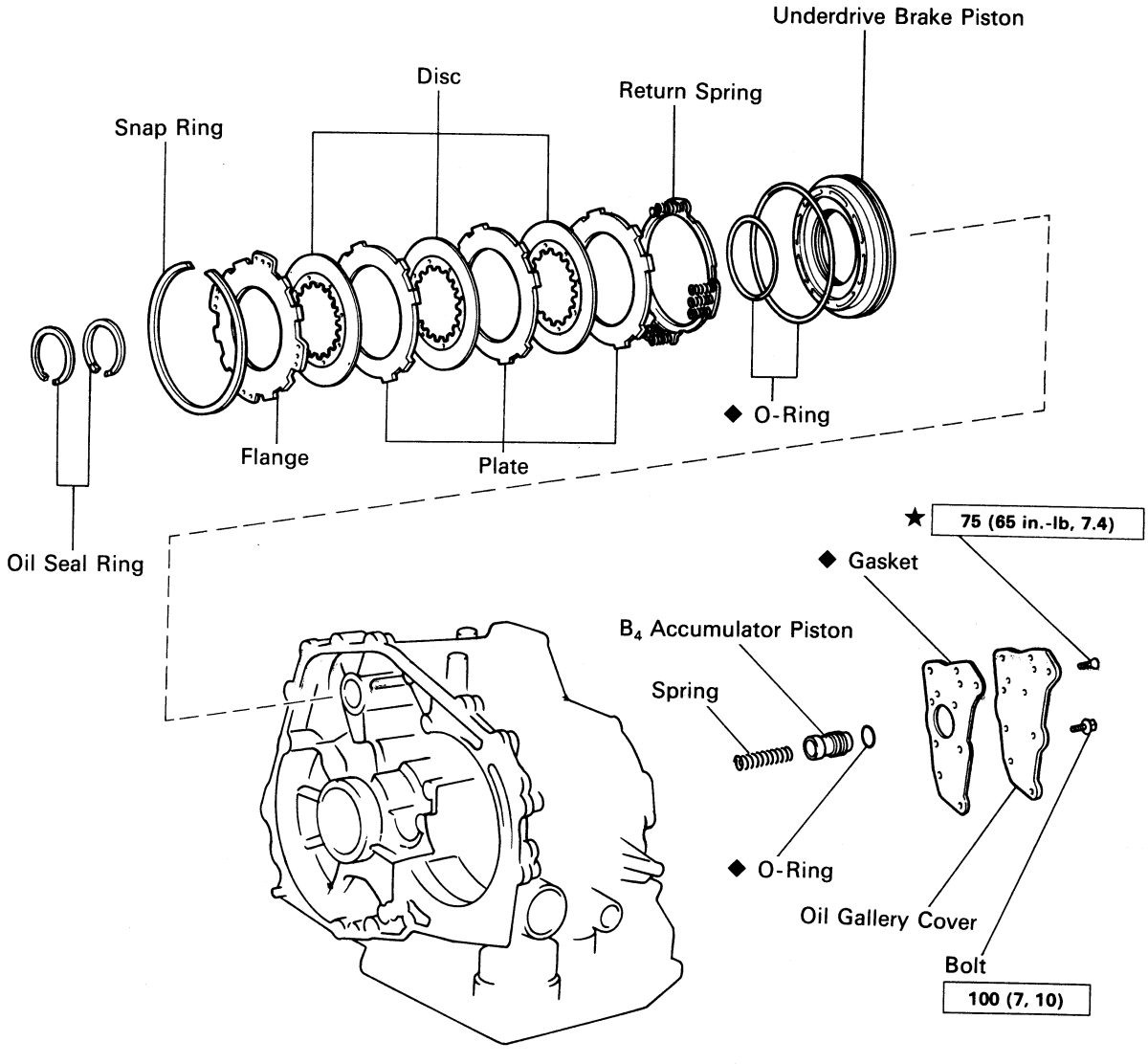


6. CHECK OPERATION OF ONE-WAY CLUTCH

Hold the one-way clutch drum and turn the one-way clutch.

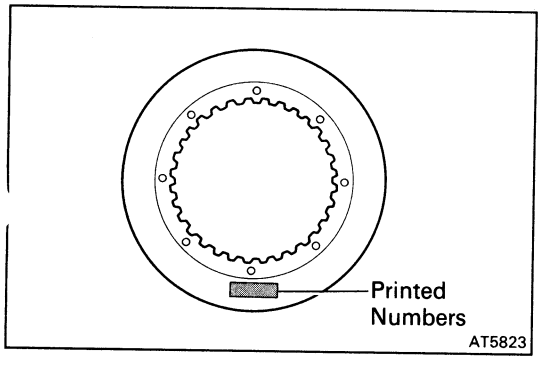
Check that the one-way clutch turns freely counterclockwise and lock clockwise.

Underdrive Brake and B_4 Accumulator Piston



kg-cm (ft-lb, N·m) : Specified torque
◆ Non-reusable part
★ Precoated part

AT2953



AT5823

INSPECTION OF UNDERDRIVE BRAKE COMPONENTS

INSPECT DISCS, PLATES AND FLANGES

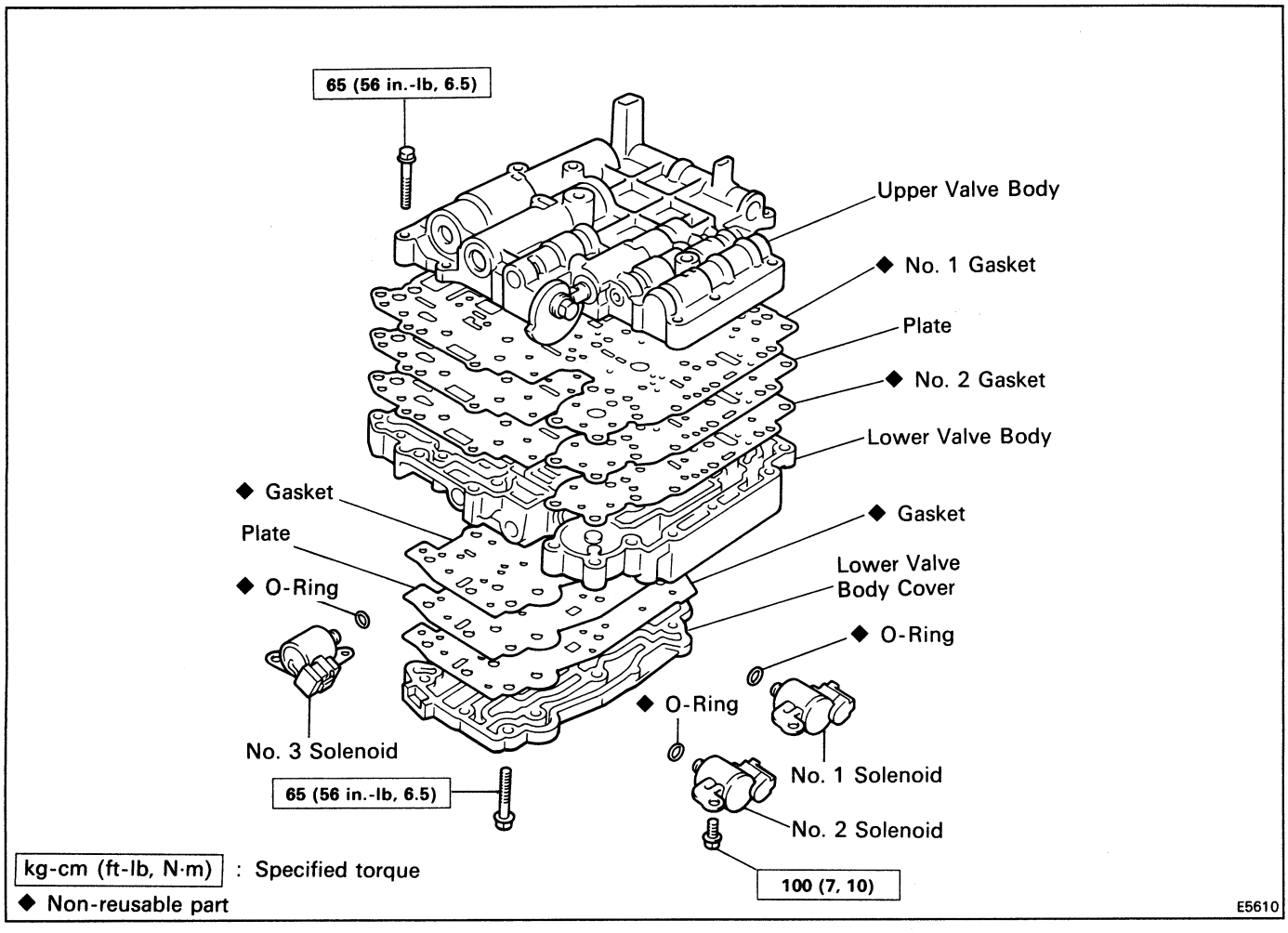
Check if the sliding surface of the discs, plates and flanges are worn or burnt. If necessary, replace them.

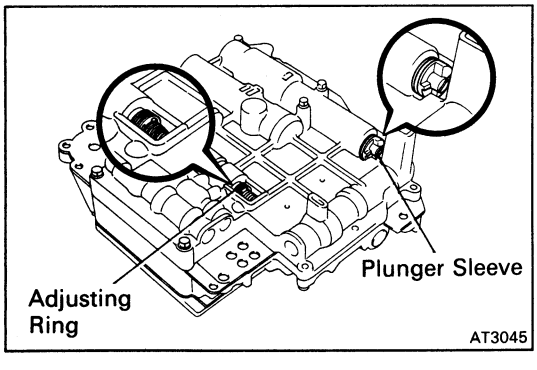
HINT:

- If the lining of the disc is exfoliated or discolored, or even a part of the printed numbers are defaced, replace the disc.
- Before assembling new discs, soak them in ATF for at least two hours.

Valve Body

COMPONENTS





(Disassembly of Valve Body)

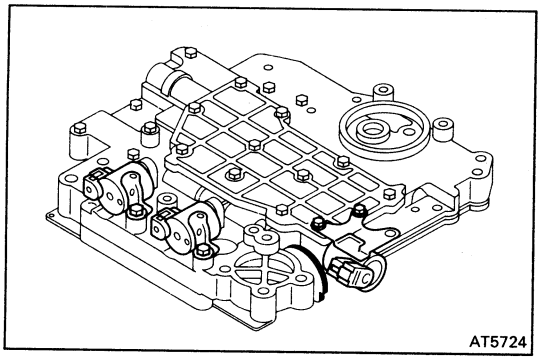
1. **NOTE THE NUMBERS OF ADJUSTING RINGS**

   HINT: Count the number of adjusting rings before disassembly of the valve body because the throttle pressure is changed according to the number. (Some of the valve bodies do not have any adjusting rings.)

2. **NOTE THE POSITION OF PLUNGER SLEEVE**

   Note which step at the end of the plunger sleeve is in contact with the valve body.

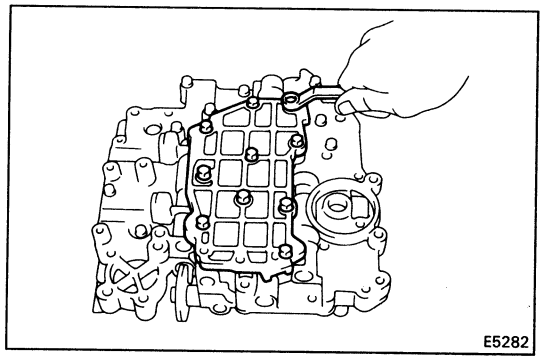
   HINT: Be certain to check this before disassembly because the line pressure changes according to the part of the plunger sleeve which comes into contact with the valve body.



3. REMOVE SOLENOID

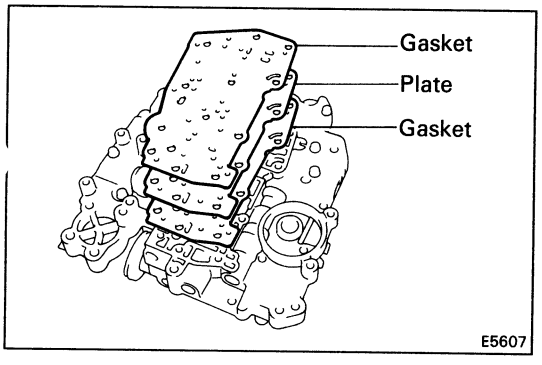
(a) Remove the solenoids.

(b) Remove the O-rings from the each solenoids.



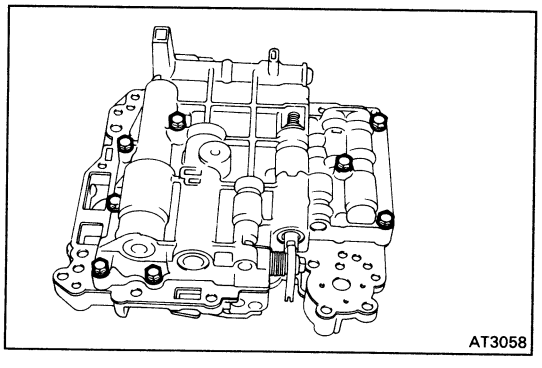
4. REMOVE LOWER VALVE BODY COVER

Remove the ten bolts and the lower valve body cover.



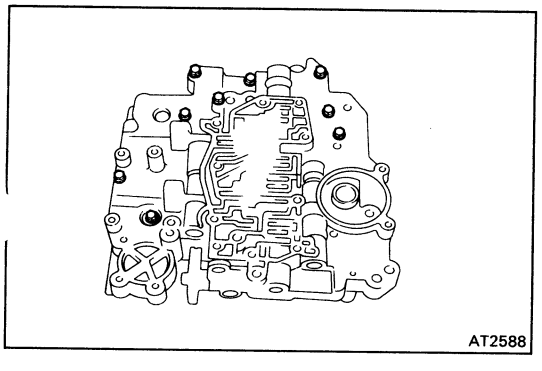
5. REMOVE GASKETS, PLATE AND STRAINER

Remove the two gaskets and plate.



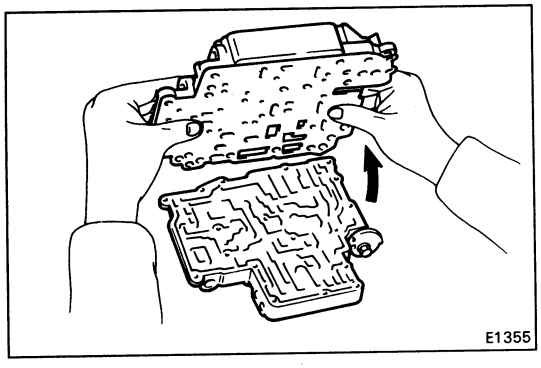
6. REMOVE BOLTS FROM UPPER VALVE BODY

Remove the eight bolts from the upper valve body.



7. REMOVE BOLTS FROM LOWER VALVE BODY

Remove the nine bolts from the lower valve body.



8. **LIFT OFF LOWER VALVE BODY AND PLATE AS SINGLE UNIT**

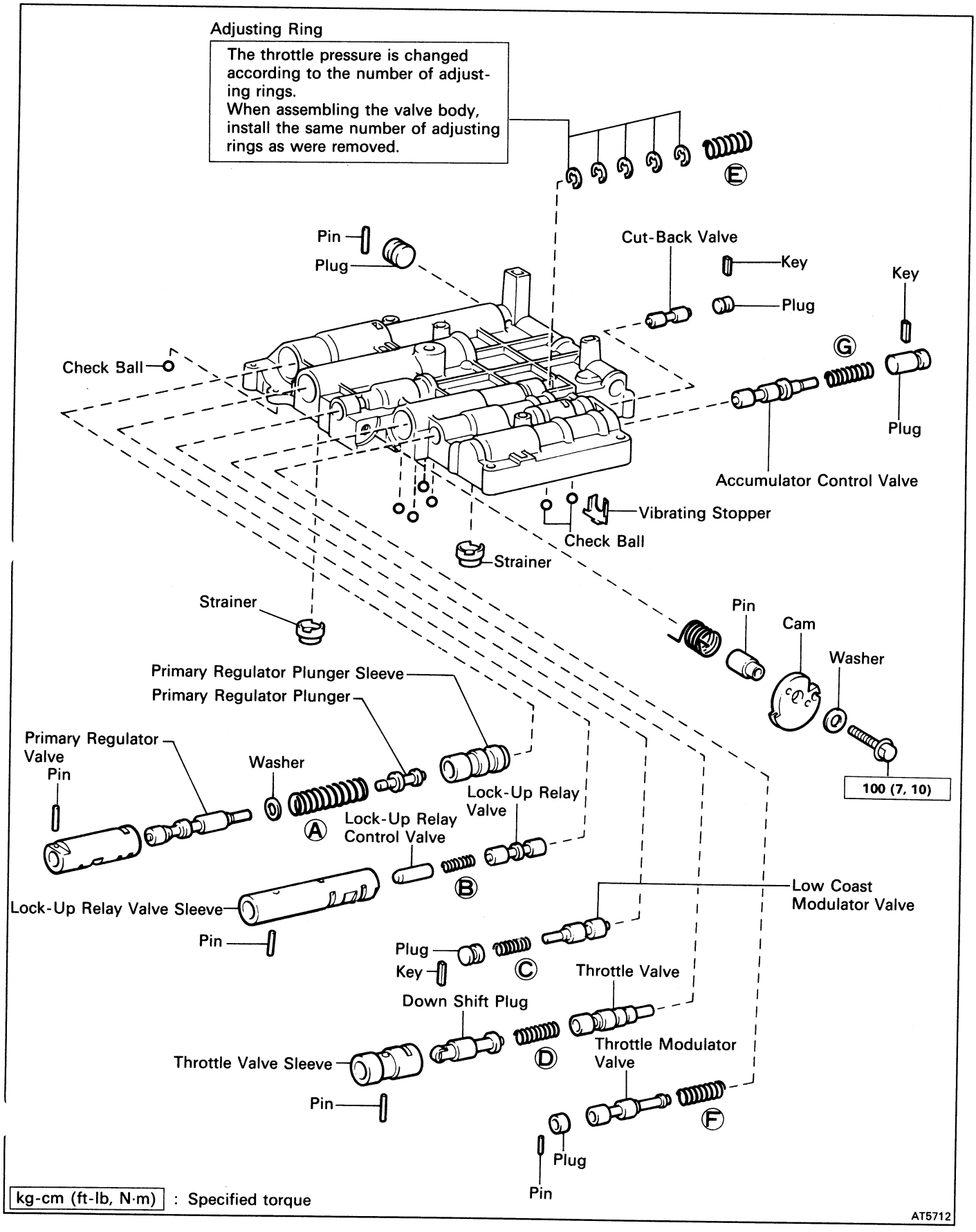
Hold the plate to the lower valve body and lift off the lower valve body.

HINT: Be careful that the valves, springs and strainer do not fall out.

9. **REMOVE PLATE AND GASKETS FROM LOWER VALVE BODY**

(Upper Valve Body)

COMPONENTS

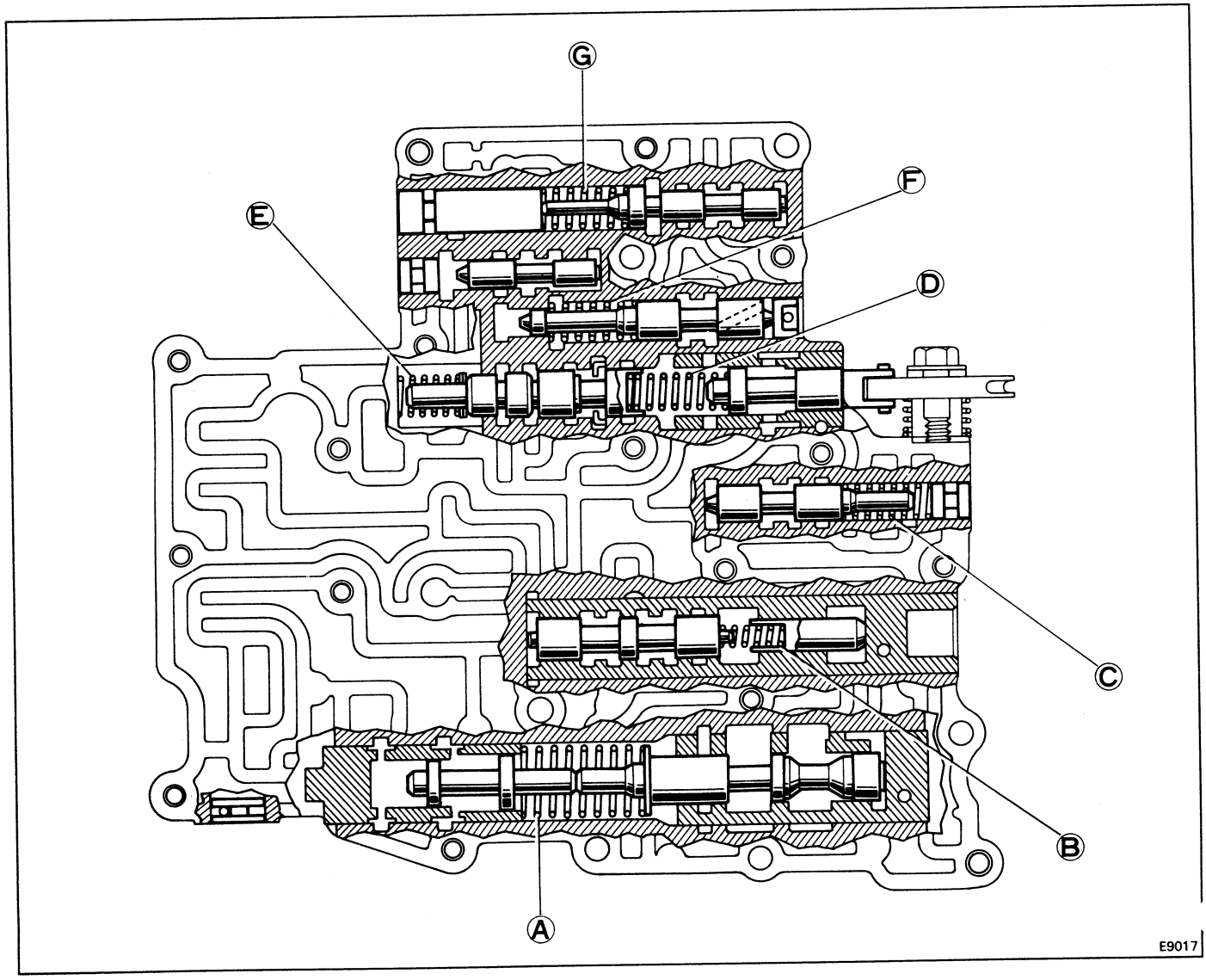


SPECIFICATIONS OF VALVE BODY SPRING

Spring		Free Length mm (in.)	Coil Outer Diameter mm (in.)	Number of Coils	Color
Ⓐ	Primary Regulator Valve Spring	66.7 (2.626)	18.6 (0.732)	12.5	Purple
Ⓑ	Lock-up Relay Valve Spring	18.8 (0.740)	5.1 (0.201)	14.5	None
Ⓒ	Low Coast Modulator Valve Spring	27.5 (1.083)	8.3 (0.327)	12.5	Yellow
Ⓓ	Down Shift Plug Spring	30.0 (1.181)	8.7 (0.343)	12.5	Red
Ⓔ	Throttle Valve Spring	29.2 (1.150)	9.2 (0.362)	9.5	Light Green
Ⓕ	Throttle Modulator Valve Spring	29.9 (1.177)	9.0 (0.354)	15.5	Green
Ⓖ	Accumulator Control Valve Spring	33.2 (1.307)	10.0 (0.394)	11.5	Orange

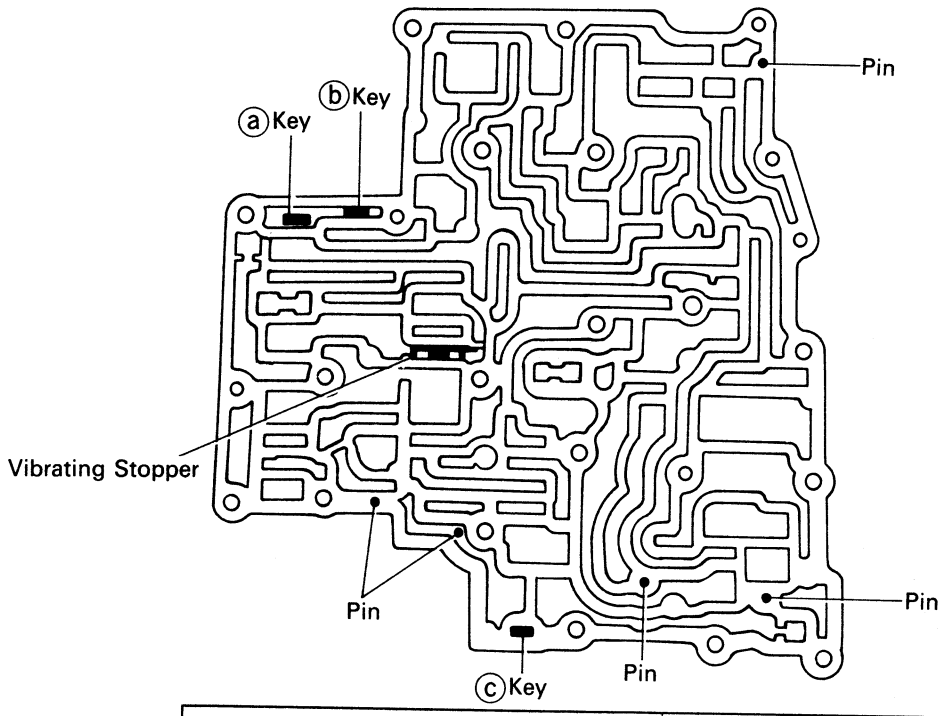
HINT: During re-assembly please refer to the spring specifications above to help discriminate between the different springs.

SECTIONAL VIEW OF VALVE BODY



LOCATION OF KEYS, PINS, VIBRATING STOPPER AND CHECK BALLS

1. KEY, STOPPER AND PIN

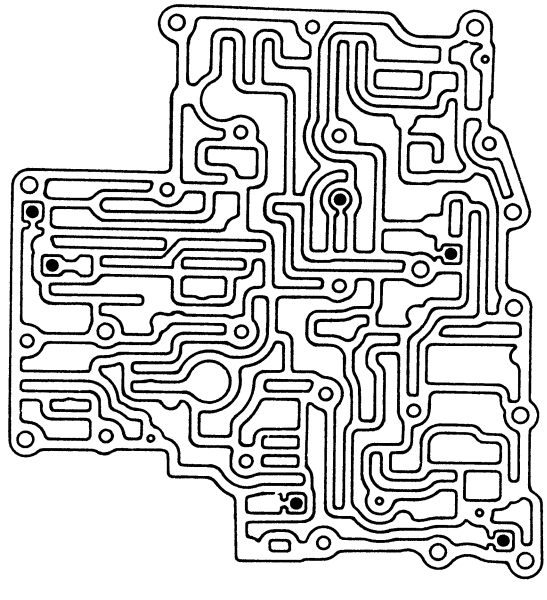


mm (in.)

Key		Height	Width	Thickness
ⓐ	Accumulator Control Valve	15.0 (0.591)	5.0 (0.197)	3.2 (0.126)
ⓑ	Cut-back Valve	16.0 (0.630)	5.0 (0.197)	3.2 (0.126)
ⓒ	Low Coast Modulator Valve	21.2 (0.835)	5.0 (0.197)	3.2 (0.126)

AT5689

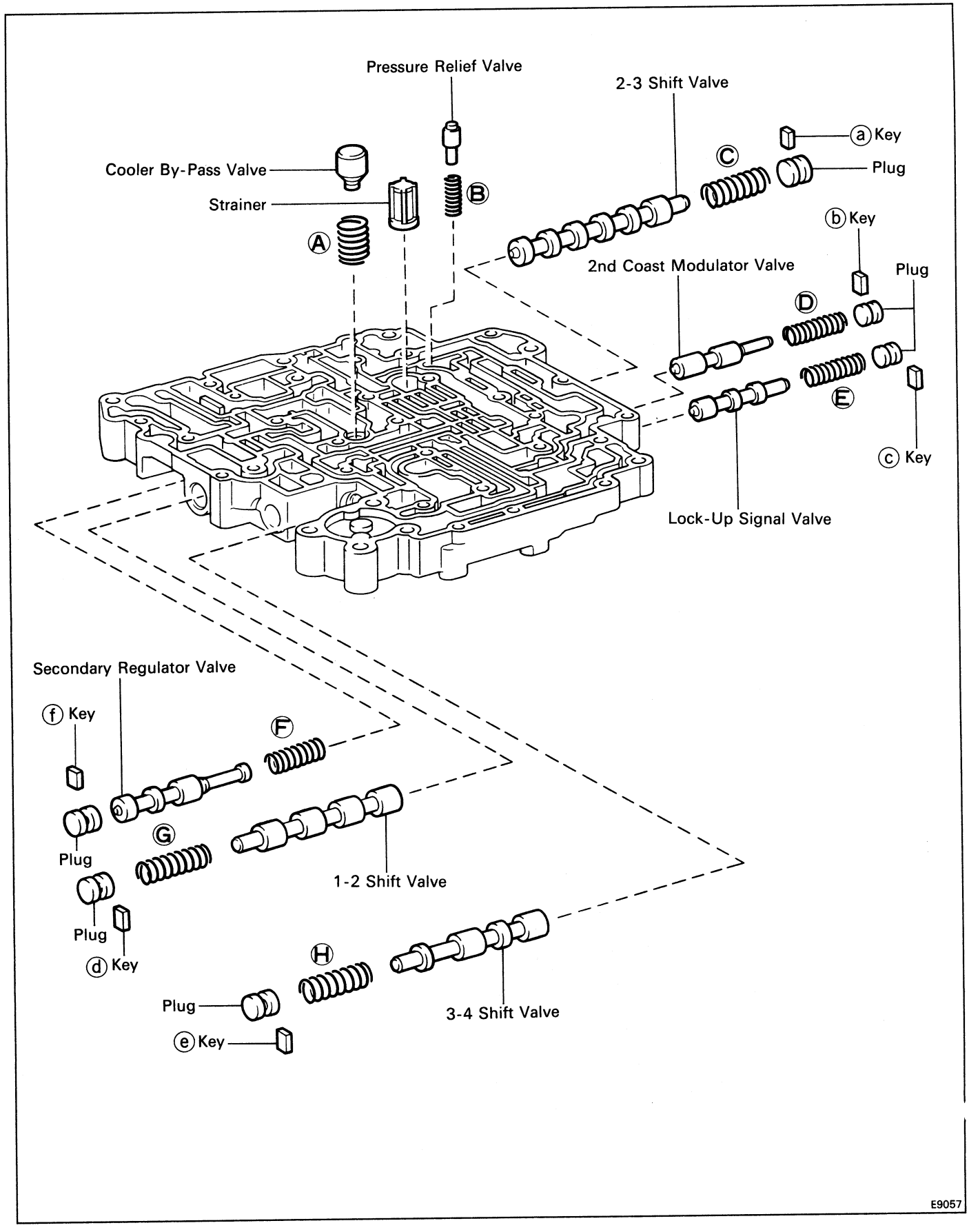
2. CHECK BALL



AT5678

(Lower Valve Body)

COMPONENTS

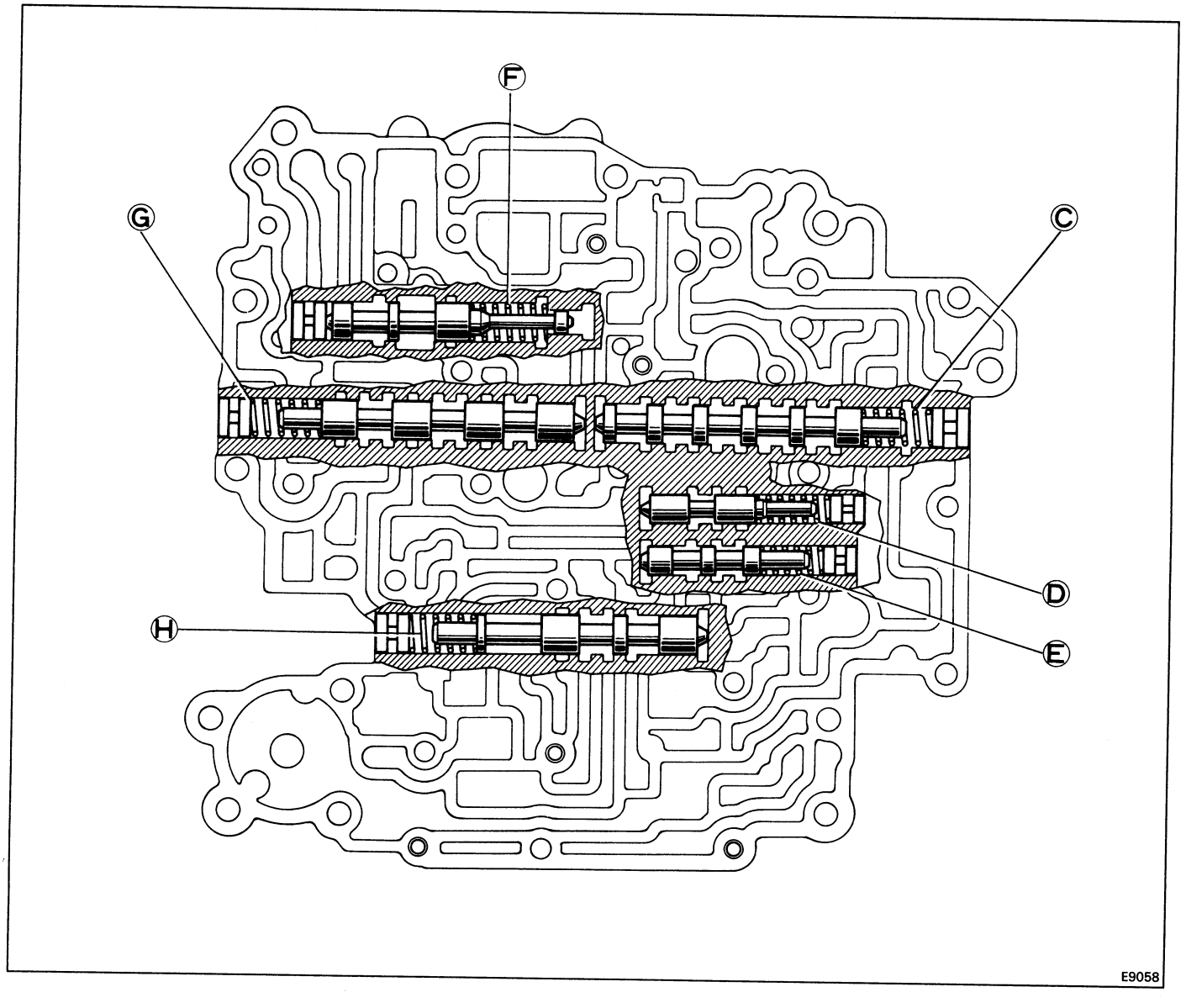


SPECIFICATIONS OF VALVE BODY SPRINGS

	Spring	Free Length mm (in.)	Coil Outer Diameter mm (in.)	Number of Coils	Color
Ⓐ	Cooler By-pass Valve Spring	18.3 (0.720)	12.0 (0.472)	6.5	Yellow
Ⓑ	Pressure Relief Valve Spring	11.2 (0.441)	6.4 (0.252)	7.5	None
Ⓒ	2-3 Shift Valve Spring	30.7 (1.209)	9.7 (0.382)	10.5	Purple
Ⓓ	2nd Coast Modulator Valve Spring	29.6 (1.165)	8.3 (0.327)	12.5	Red
Ⓔ	Lock-up Signal Valve Spring	30.0 (1.181)	8.2 (0.323)	11.5	Orange
Ⓕ	Secondary Regulator Valve Spring	27.4 (1.079)	11.0 (0.433)	11.5	Blue
Ⓖ	1-2 Shift Valve Spring	30.8 (1.213)	9.7 (0.382)	10.5	Purple
Ⓗ	3-4 Shift Valve Spring	30.8 (1.213)	9.7 (0.382)	10.5	Purple

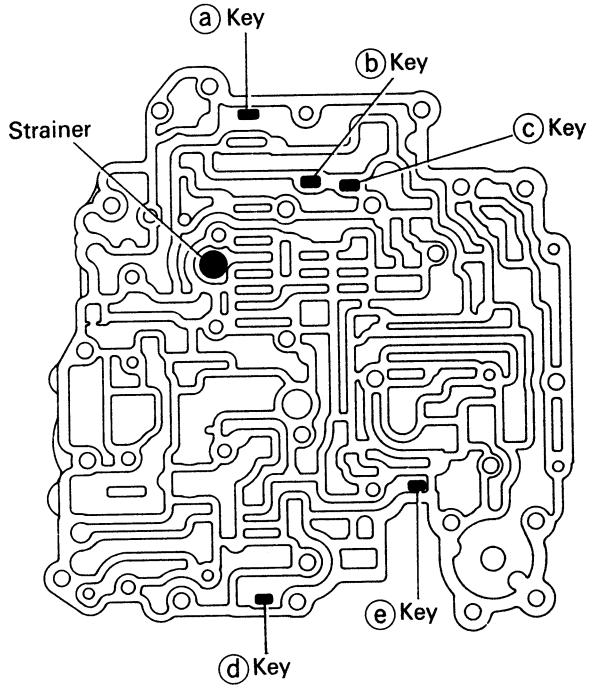
HINT: During re-assembly please refer to the spring specifications above to help discriminate between the different springs.

SECTIONAL VIEW OF VALVE BODY

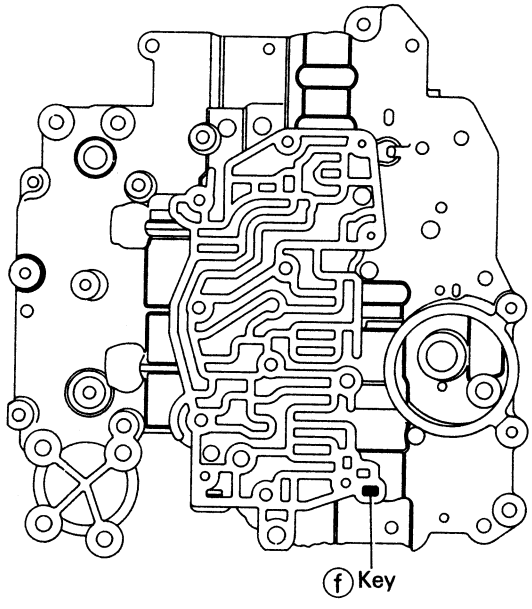


LOCATION OF KEYS AND STRAINER

(Upper Side)



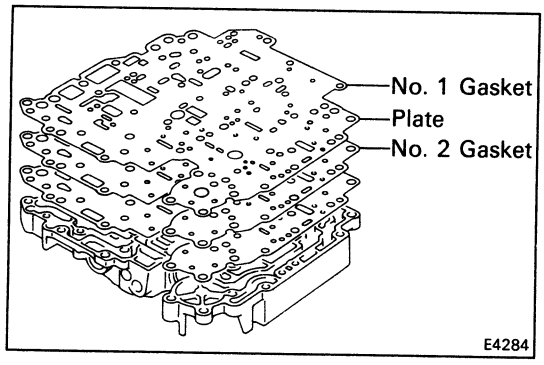
(Lower Side)



mm (in.)

Key		Height	Width	Thickness
ⓐ	2-3 Switch Valve	11.5 (0.453)	5.0 (0.197)	3.2 (0.126)
ⓑ	2nd Coast Modulator Valve	11.5 (0.453)	5.0 (0.197)	3.2 (0.126)
ⓒ	Lock-up Signal Valve	11.5 (0.453)	5.0 (0.197)	3.2 (0.126)
ⓓ	1-2 Shift Valve	11.5 (0.453)	5.0 (0.197)	3.2 (0.126)
ⓔ	3-4 Shift Valve	11.5 (0.453)	5.0 (0.197)	3.2 (0.126)
ⓕ	Secondary Regulator Valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)

AT5726 AT5727



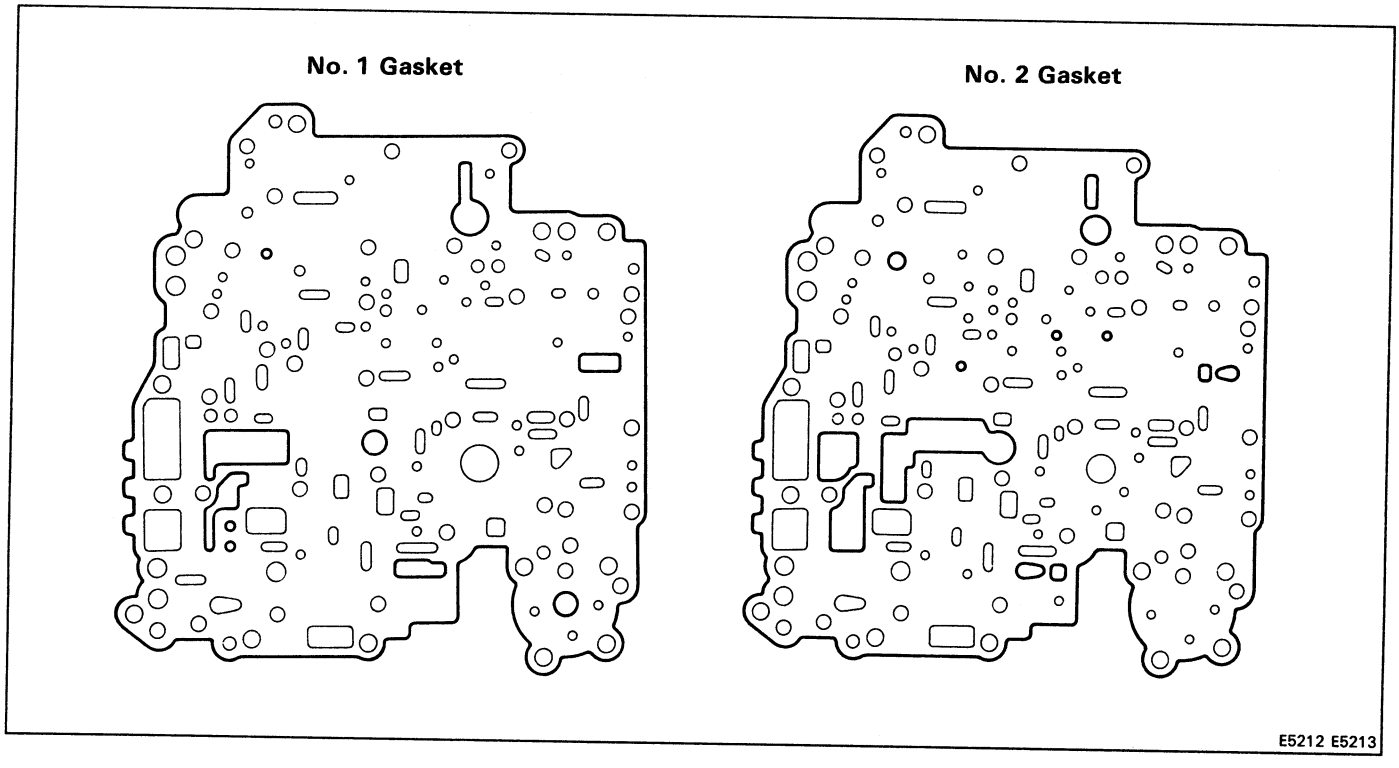
(Assembly of Valve Body)

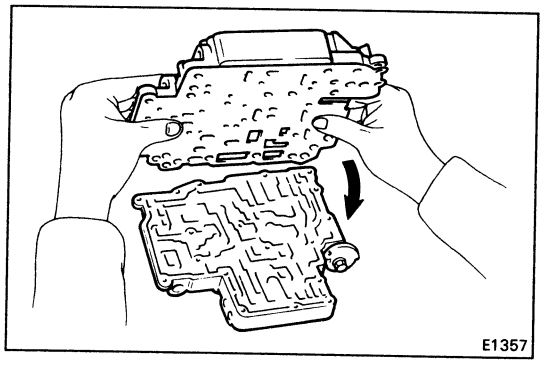
(See page AT-112)

1. POSITION PLATE AND NEW GASKETS ON LOWER VALVE BODY

Position the new No.2 gasket, the plate and then the new No.1 gasket on the lower valve body.

HINT: Since the No.1 gasket and No.2 gasket are similar use the illustration below to discriminate between them.

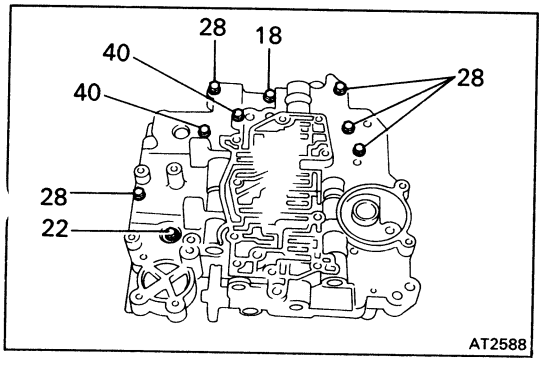




2. PLACE LOWER VALVE BODY WITH PLATE AND GASKETS ON UPPER VALVE BODY

HINT: Hold the lower valve body, gaskets and plate securely so they do not separate.

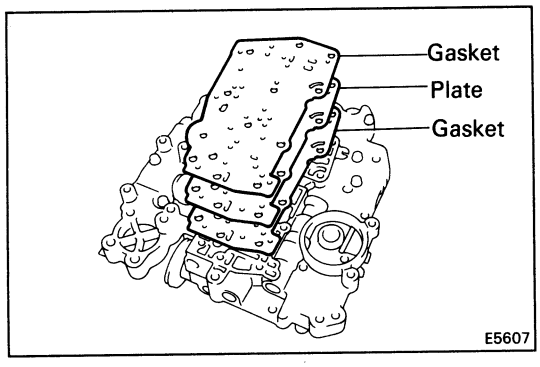
Align each bolt hole in the valve bodies with the gaskets and plate.



3. INSTALL AND FINGER TIGHTEN BOLTS IN LOWER VALVE BODY TO SECURE UPPER VALVE BODY

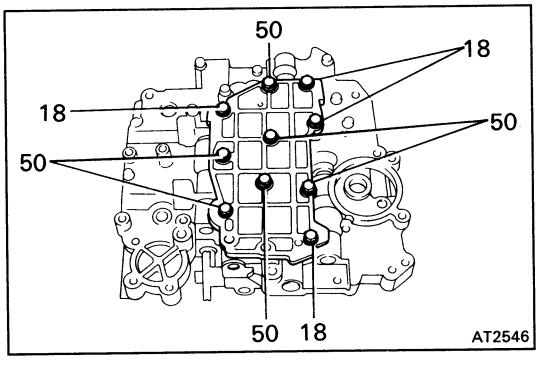
Install and finger tighten the nine bolts.

HINT: Each bolt length (mm) is indicated in the figure.



4. INSTALL LOWER VALVE BODY COVER

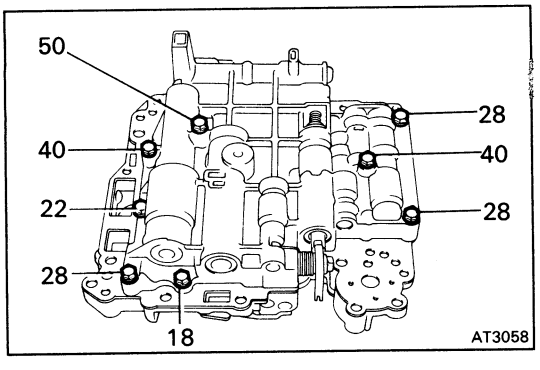
(a) Position a new gasket and plate and then another new gasket.



(b) Position the lower valve body cover.

(c) Install and finger tighten the ten bolts.

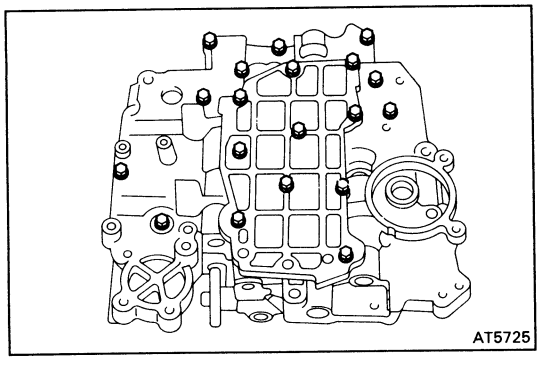
HINT: Each bolt length (mm) is indicated in the figure.



5. INSTALL AND FINGER TIGHTEN BOLTS IN UPPER VALVE BODY

Install and finger tighten the eight bolts.

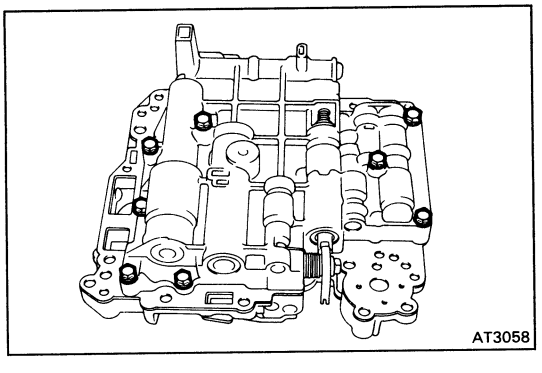
HINT: Each bolt length (mm) is indicated in the figure.



6. TIGHTEN BOLTS OF UPPER AND LOWER VALVE BODIES

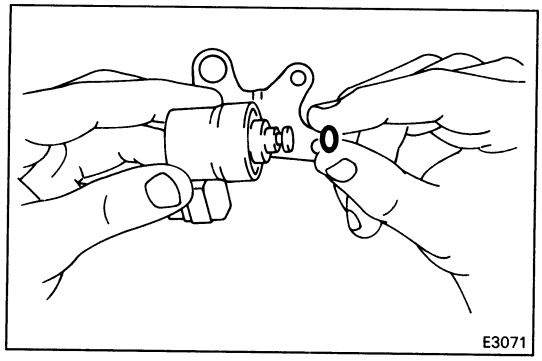
(a) Tighten the nineteen bolts in the lower valve body.

Torque: 65 kg-cm (56 in.-lb, 6.4 N·m)



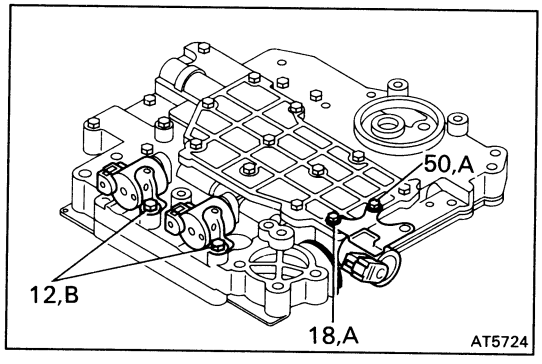
(b) Tighten the eight bolts in the upper valve body.

Torque: 65 kg-cm (56 in.-lb, 6.4 N·m)



7. INSTALL SOLENOID

(a) Install the new O-rings on the each solenoids.



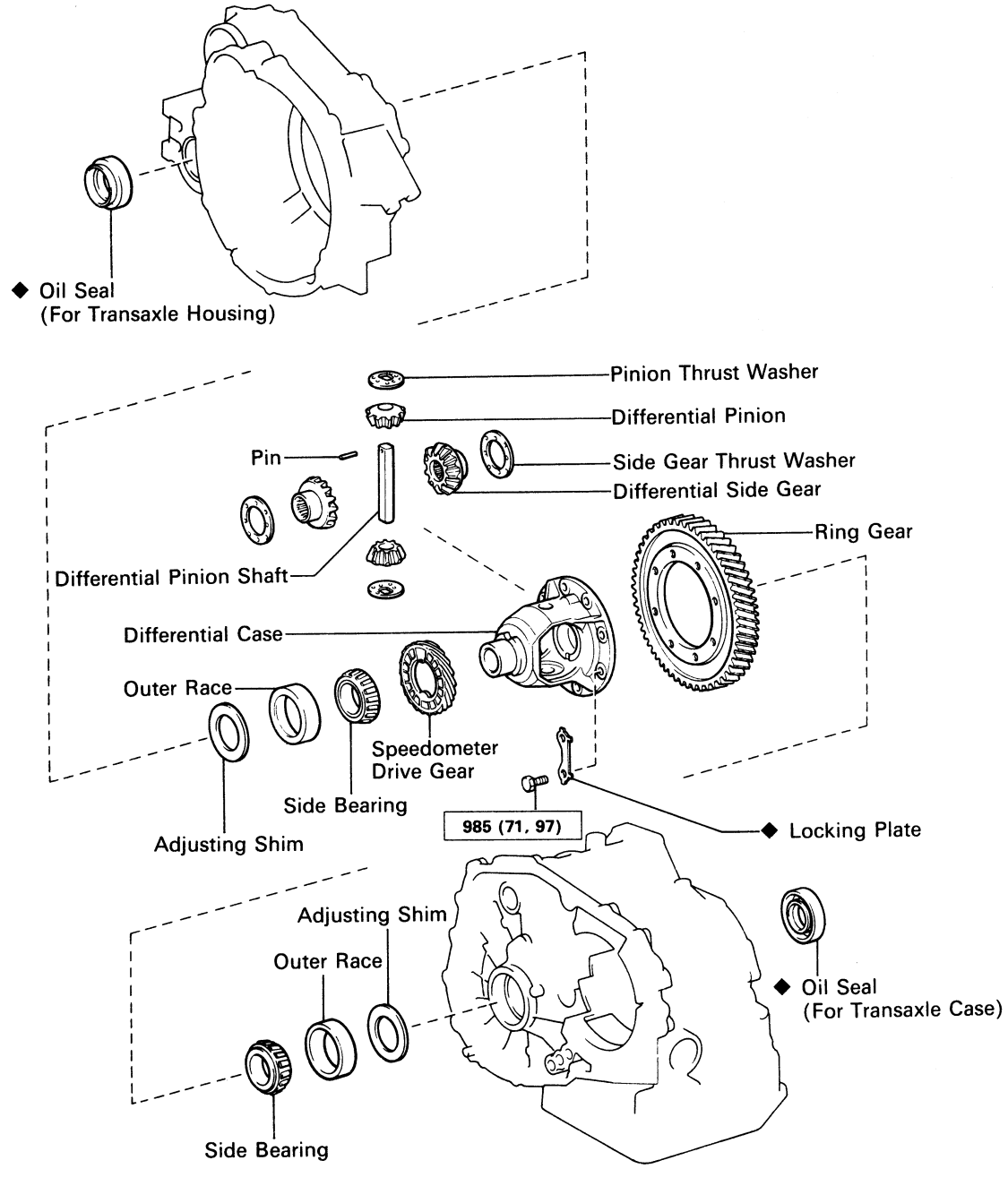
(b) Install the solenoids.

HINT: Each bolt length (mm) is indicated in the figure.

Torque: A 65 kg-cm (56 in.-lb, 6.4 N·m)
B 100 kg-cm (7 ft-lb, 10 N·m)

Differential

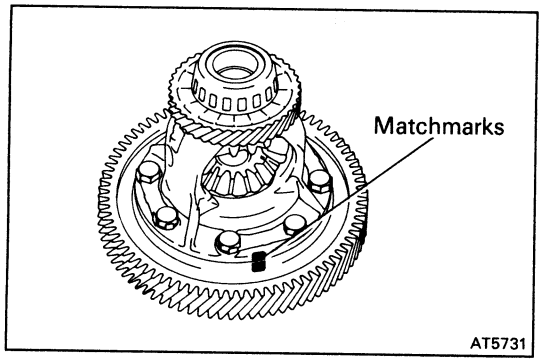
COMPONENTS



kg-cm (ft-lb, N·m) : Specified torque

◆ Non-reusable part

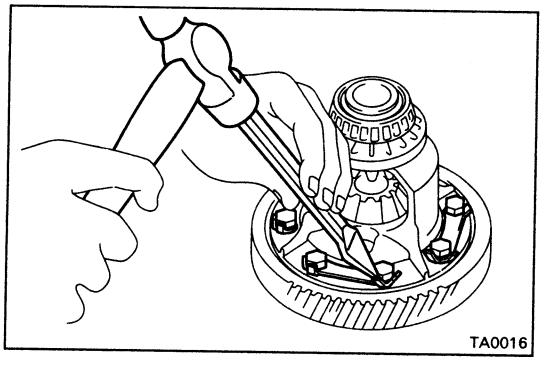
E9120



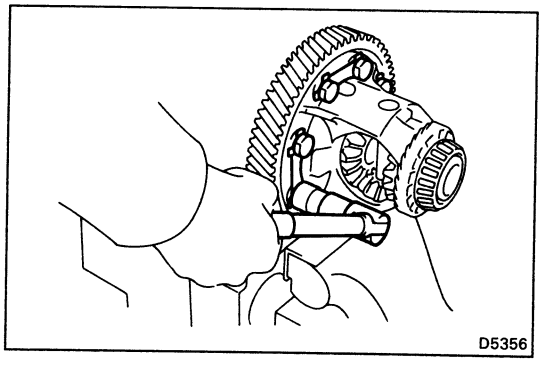
DISASSEMBLY OF DIFFERENTIAL

1. REMOVE RING GEAR

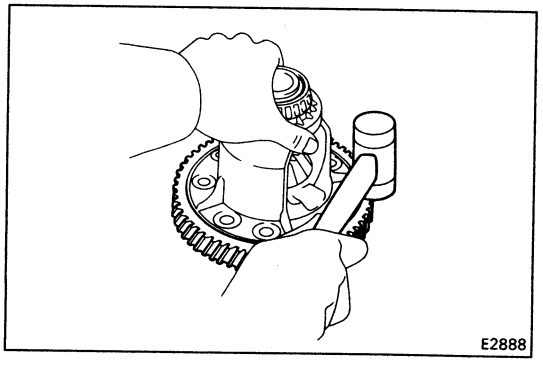
(a) Place the matchmarks on the ring gear and differential case.



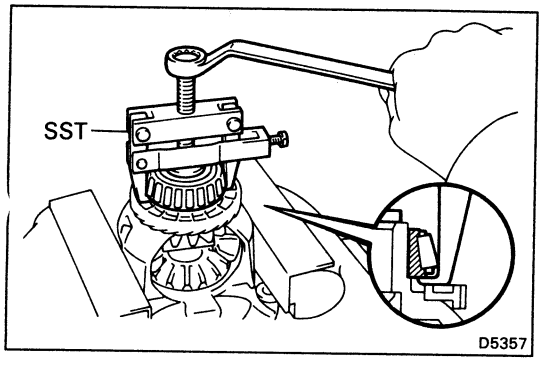
(b) Loosen the staked part of the locking plate.



(c) Remove the eight bolts and four locking plates.



(d) Using a plastic hammer, tap on the ring gear to remove it from the case.

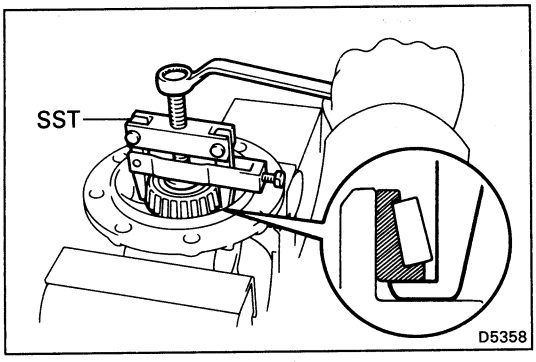


2. REMOVE SIDE BEARINGS FROM DIFFERENTIAL CASE

(a) Setting SST to the cut-out portion on the speedometer drive gear, remove the bearing from the differential case.

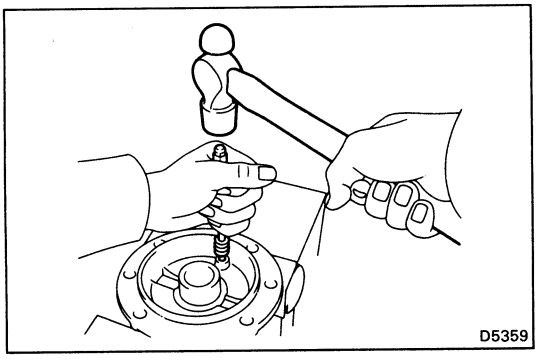
SST 09502-10012

(b) Remove the speedometer drive gear.



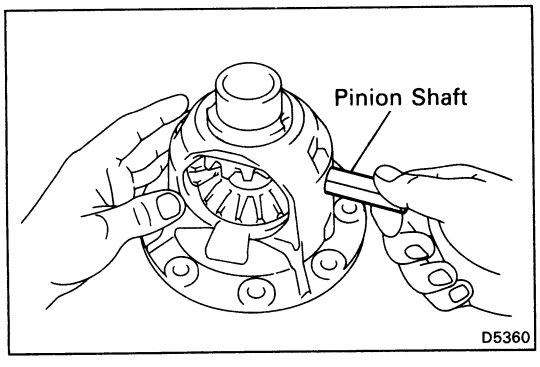
(c) Setting SST to the cut-out portion on the differential case, remove the bearing.

SST 09502-10012

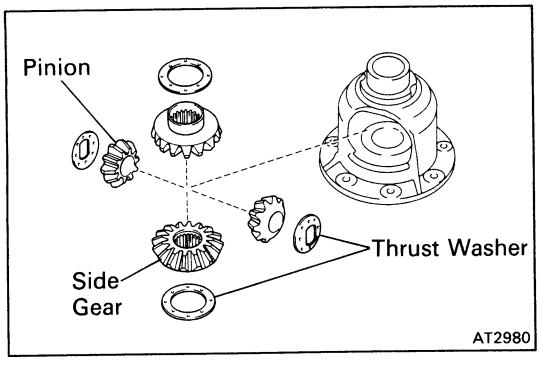


3. DISASSEMBLE DIFFERENTIAL CASE

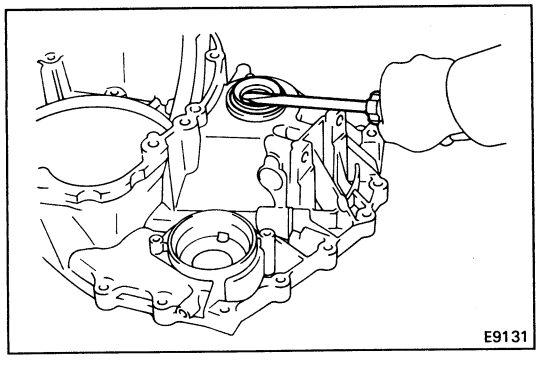
(a) Drive out the pinion shaft lock pin from the ring gear side.



(b) Remove the pinion shaft from the case.

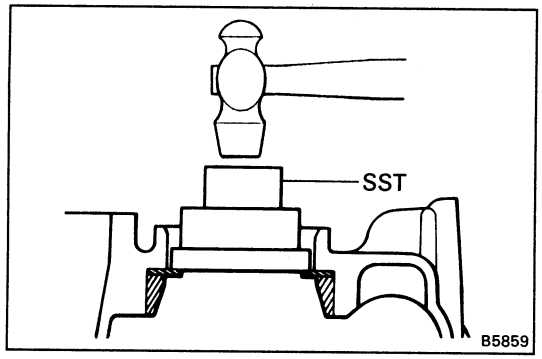


(c) Remove the two pinions, two side gears and four thrust washers.



4. REMOVE OIL SEAL OF TRANSAXLE HOUSING

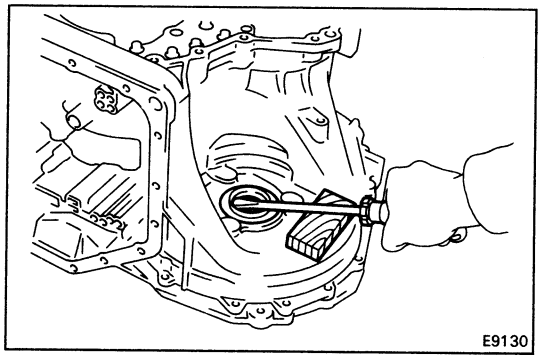
Using a screwdriver, remove the oil seal.



5. REMOVE SIDE BEARING OUTER RACE OF TRANSAXLE HOUSING

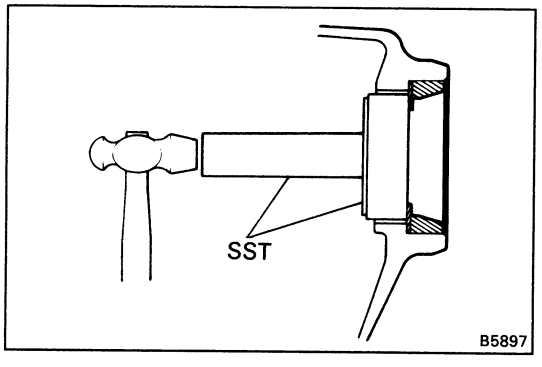
Using SST and a hammer, drive out the outer race and shim.

SST 09350-32014 (09351-32090)



6. REMOVE OIL SEAL OF TRANSAXLE CASE

Using a screwdriver, remove the oil seal.

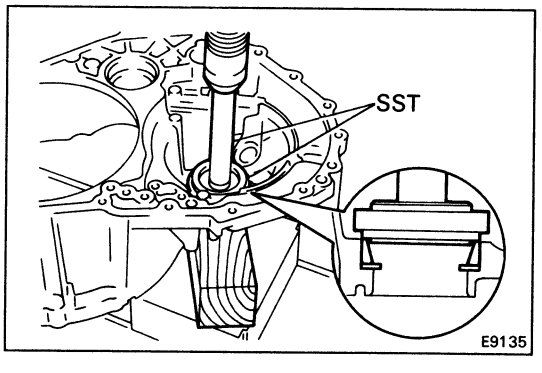


7. REMOVE SIDE BEARING OUTER RACE OF TRANSAXLE CASE

Using SST and a hammer, drive out the outer race and adjusting shim.

SST 09350-32014 (09351-32130, 09351-32150)

ASSEMBLY OF DIFFERENTIAL

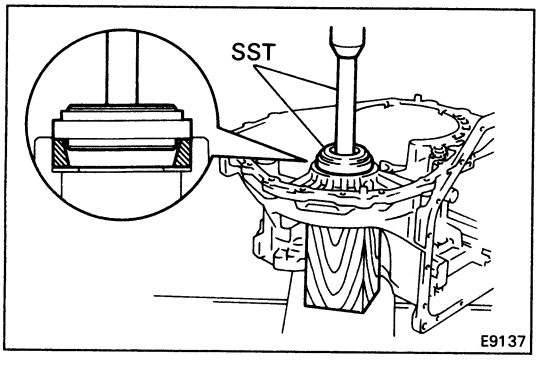


1. INSTALL SIDE BEARING OUTER RACE OF TRANSAXLE HOUSING

(a) Place the shim onto the transaxle housing.

(b) Using SST and press, press a new outer race into the transaxle housing.

SST 09350-32014 (09351-32111, 09351-32130)

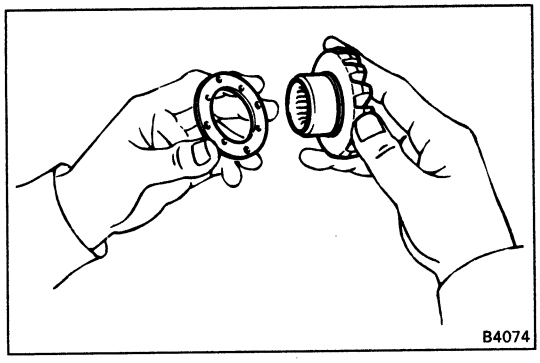


2. INSTALL SIDE BEARING OUTER RACE OF TRANSAXLE CASE

(a) Place the adjusting shim onto the transaxle case.

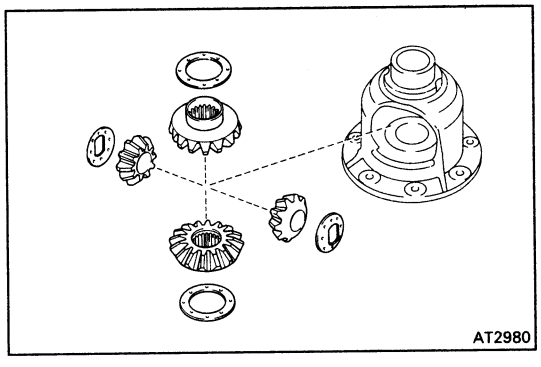
(b) Using SST and press, press a new outer race into the transaxle case.

SST 09350-32014 (09351-32111, 09351-32130)

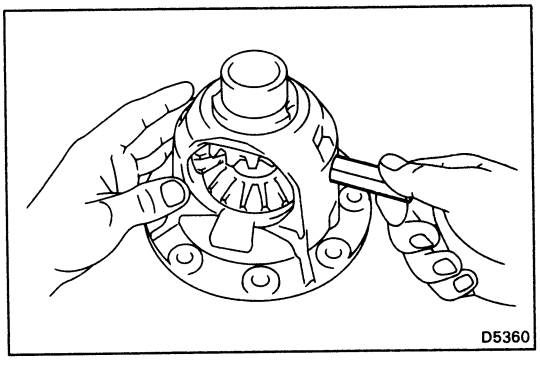


3. ASSEMBLE DIFFERENTIAL CASE

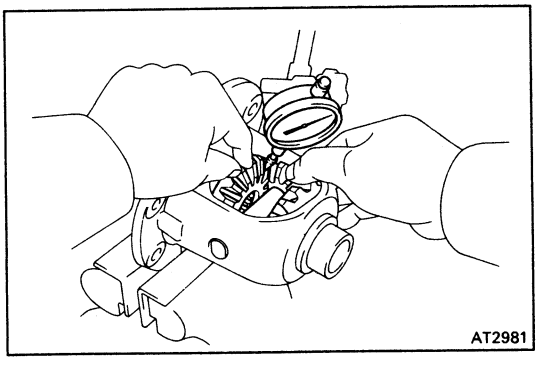
(a) Install the thrust washers to the side gears.



(b) Install the side gears with thrust washers, pinion gears and pinion thrust washers into the differential case.



(c) Install the pinion shaft so as to align the lock pin holes on the pinion shaft and differential case.



4. CHECK SIDE GEAR BACKLASH

(a) Measure the side gear backlash while holding one pinion gear toward the case.

Standard backlash: 0.05 – 0.20 mm (0.0020 – 0.0079 in.)

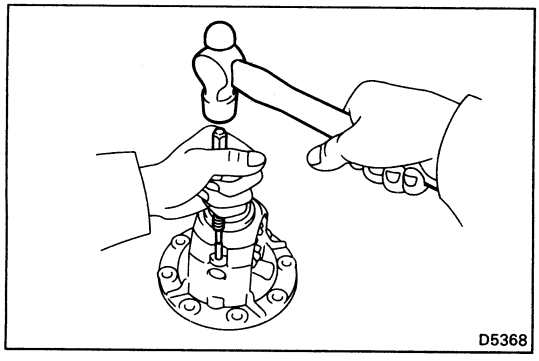
If the backlash is out of specification, install the correct thrust washer to the side gear.

(b) Referring to the table below, select thrust washers which will ensure that the backlash is within specification. Try to select washers of the same size of both sides.

Thrust washer thicknesses

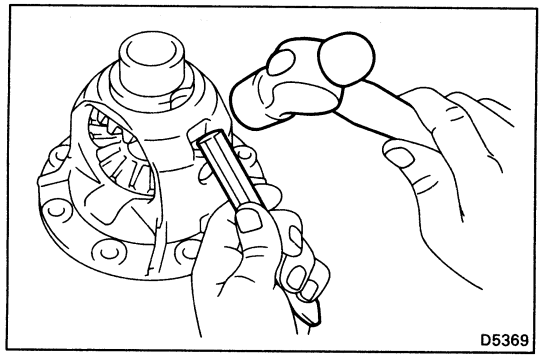
Thickness mm (in.)	Thickness mm (in.)
0.95 (0.0374)	1.10 (0.0433)
1.00 (0.0394)	1.15 (0.0453)
1.05 (0.0413)	1.20 (0.0472)

If the backlash is not within specification, install a thrust washer of a different thickness.

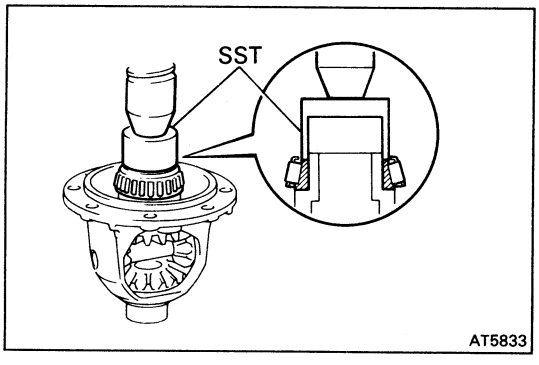


5. INSTALL LOCK PIN

(a) Using a hammer and punch, drive the lock pin through the case and hole in the pinion shaft.



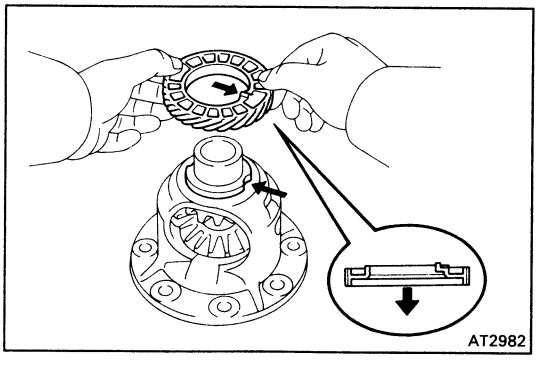
(b) Stake the differential case.



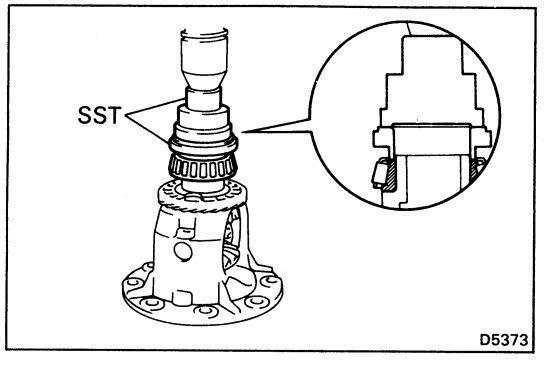
6. INSTALL SIDE BEARINGS TO DIFFERENTIAL CASE

(a) Using SST and press, press the side bearing into the differential case.

SST 09710-30030 (09710-03160)

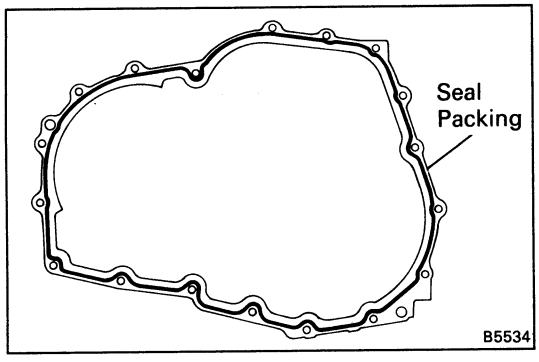


(b) Install the speedometer drive gear to the differential case.



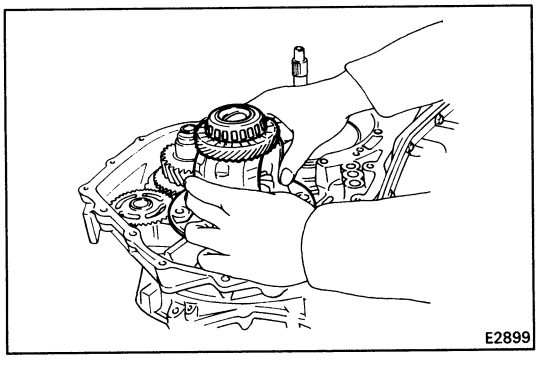
(c) Using SST and press, press the side bearing into the differential case.

SST 09350-32014 (09351-32090, 09351-32120)

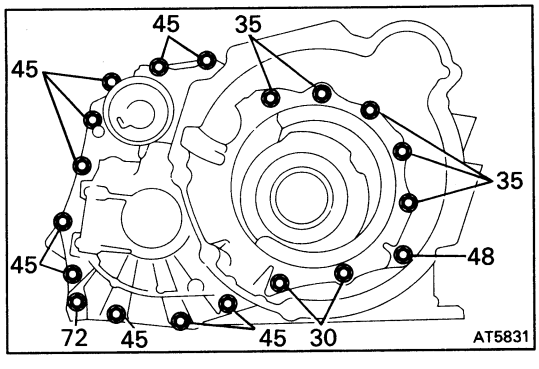


7. ADJUST SIDE BEARING PRELOAD

(a) Remove any packing material and be careful not to get oil on the contacting surfaces of the transaxle housing or transmission case.



(b) Install the differential to the transaxle case.

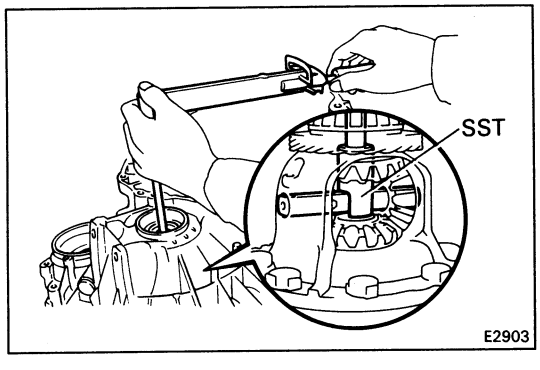


(c) Install the transaxle housing to the transaxle case.

(b) Install and tighten the bolts.

Torque: 300 kg-cm (22 ft-lb, 29 N·m)

HINT: Each bolt length (mm) is indicated in the illustration.



(e) Using SST, rotate the differential in both directions to snug the bearing down.

SST 09564-32011

(f) Using SST and a torque meter, measure the preload of the side bearing.

SST 09564-32011

Preload (at starting):

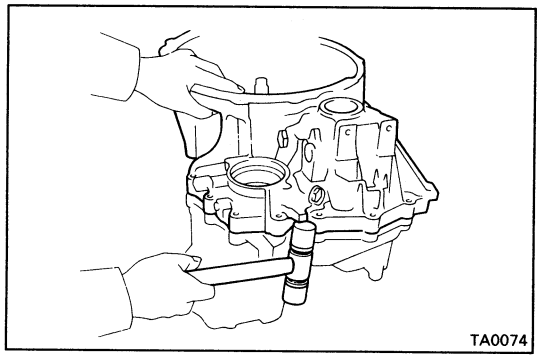
New bearing 8 – 14 kg-cm (6.9 – 12.2 in.-lb, 0.8 – 1.4 N·m)

Used bearing 4 – 7 kg-cm (3.5 – 6.1 in.-lb, 0.4 – 0.7 N·m)

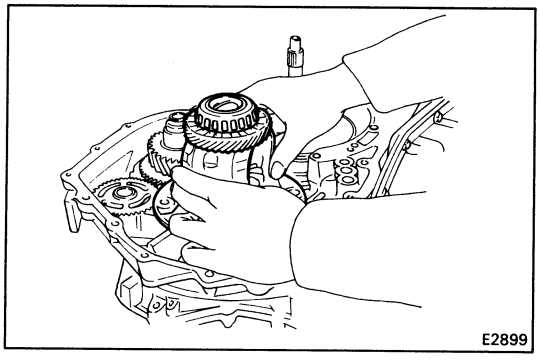
If the preload is not within specification, remove the differential from the transaxle case. Re-select the transaxle case side adjusting shim.

Thickness				mm (in.)
2.00 (0.0787)	2.20 (0.0866)	2.40 (0.0945)	2.60 (0.1024)	2.80 (0.1102)
2.05 (0.0807)	2.25 (0.0886)	2.45 (0.0965)	2.65 (0.1043)	2.85 (0.1122)
2.10 (0.0827)	2.30 (0.0906)	2.50 (0.0984)	2.70 (0.1063)	2.90 (0.1142)
2.15 (0.0846)	2.35 (0.0925)	2.55 (0.1004)	2.75 (0.1083)	

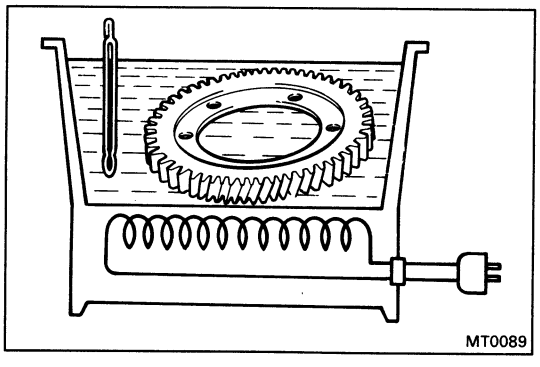
HINT: The preload will change about 3 – 4 kg-cm (2.6 – 3.5 in.-lb, 0.3 – 0.4 N·m) with each shim thickness.



(g) Remove the bolts and transaxle housing.



(h) Remove the differential from the transaxle case.



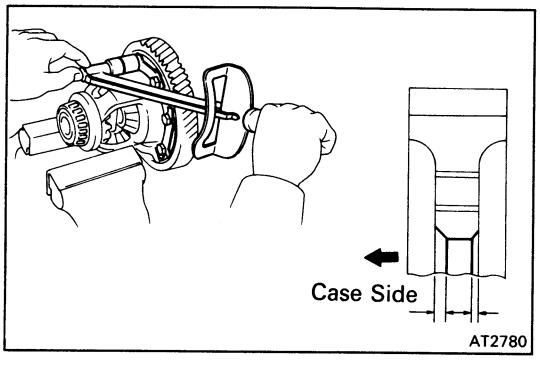
8. INSTALL RING GEAR TO DIFFERENTIAL

(a) Clean the contact surface of the differential case.

(b) Heat the ring gear to about 100°C (212°F) in an oil bath.

NOTICE: Do not heat the ring gear above 110°C (230°F)

(c) Clean the contact surface of the ring gear with cleaning solvent.

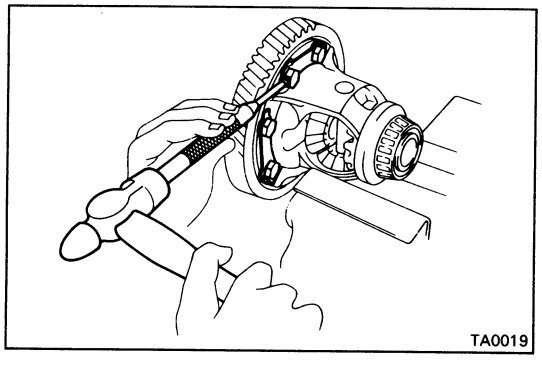


(d) Quickly install the ring gear on the differential case.

(e) Install new locking plates and set bolts.

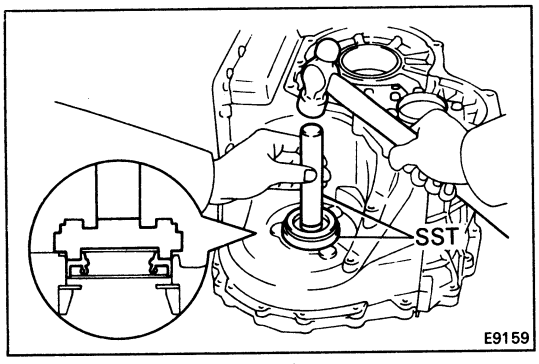
HINT: Tighten the set bolts uniformly and a little at a time. Torque the bolts.

Torque: 985 kg-cm (71 ft-lb, 97 N·m)



(f) Using a hammer and drift punch, stake the locking plates.

HINT: Stake one claw flush with the flat surface of the nut. For the claw contacting the protruding portion of the nut, stake only the half on the tightened side.

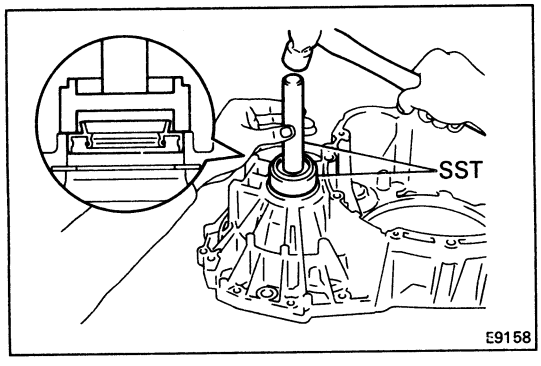


9. INSTALL OIL SEAL OF TRANSAXLE CASE

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

SST 09350-32014 (09351-32130, 09351-32111)

(b) Coat the lip of oil seal with MP grease.



10. INSTALL OIL SEAL OF TRANSAXLE HOUSING

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

SST 09350-32014 (09351-32130, 09351-32150)

(b) Coat the lip of oil seal with MP grease.

INSTALLATION OF COMPONENT PARTS

(See pages AT-52 to 54)

Disassembly, inspection and assembly of each component group have been indicated in the preceding chapter. Before assembly, make sure again that all component groups are assembled correctly.

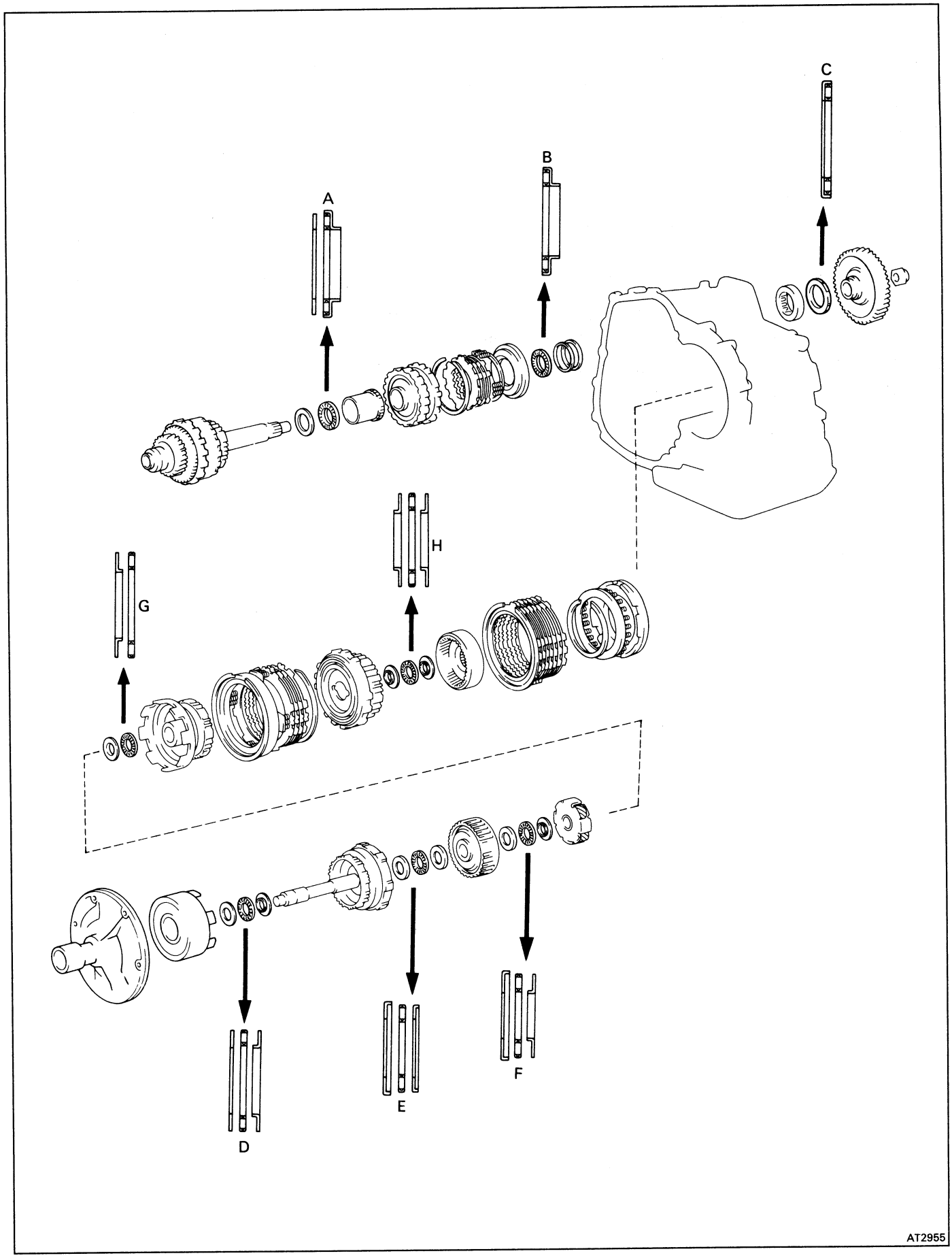
If something wrong is found in a certain component group during assembly, inspect and repair this group immediately.

Recommended ATF: DEXRON® II

GENERAL NOTES:

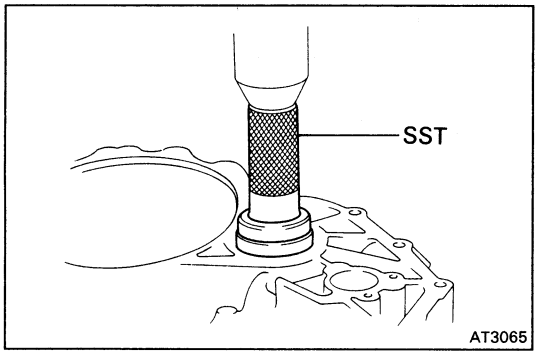
1. The automatic transmission is composed of highly precision-finished parts, necessitating careful inspection before assembly because even a small nick could cause fluid leakage or affect performance.
2. Before assembling new clutch discs, soak them in automatic transmission fluid for at least two hours.
3. Apply automatic transmission fluid on sliding or rotating surfaces of parts before assembly.
4. Use petroleum jelly to keep small parts in their place.
5. Do not use adhesive cements on gaskets and similar parts.
6. When assembling the transmission, sure to use new gaskets and O-rings.
7. Dry all parts with compressed air – never use shop rags.

8. Be sure to install the thrust bearings and races in the correct direction and position.



mm (in.)

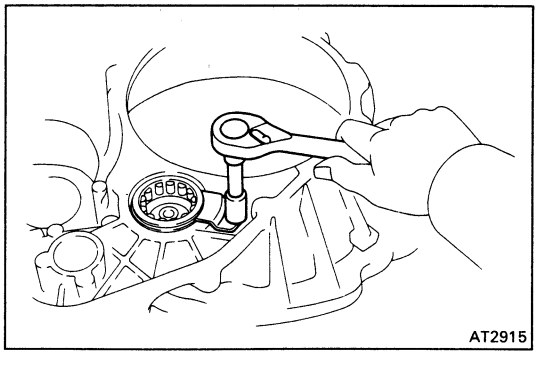
		A	B	C	D	E	F	G	H
Front Bearing Race	Outer Diameter	41.8 (1.646)	–	–	43.0 (1.693)	37.9 (1.492)	←	45.0 (1.772)	37.3 (1.469)
	Inner Diameter	30.0 (1.181)	–	–	30.5 (1.201)	22.0 (0.866)	←	28.0 (1.102)	24.1 (0.949)
Thrust Bearing	Outer Diameter	43.7 (1.720)	45.2 (1.780)	57.7 (2.272)	42.0 (1.654)	36.1 (1.421)	←	45.0 (1.772)	37.6 (1.480)
	Inner Diameter	31.0 (1.220)	←	41.0 (1.614)	28.9 (1.138)	22.2 (0.874)	←	30.0 (1.181)	24.0 (0.945)
Rear Bearing Race	Outer Diameter	–	–	–	42.0 (1.654)	35.7 (1.406)	35.0 (1.378)	–	37.6 (1.480)
	Inner Diameter	–	–	–	27.1 (1.067)	23.0 (0.906)	19.0 (0.748)	–	22.2 (0.874)



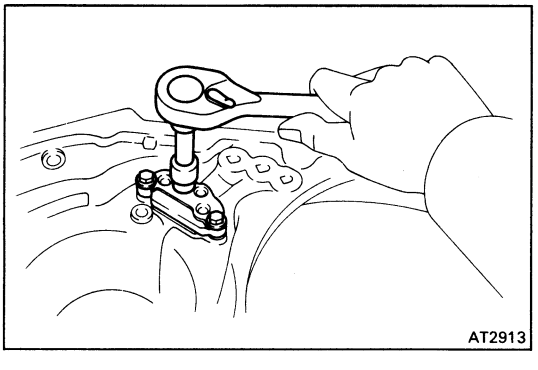
1. INSTALL BEARING TO TRANSAXLE HOUSING

(a) Using SST and a press, press the bearing into the transaxle housing.

SST 09350-32014 (09351-32140)

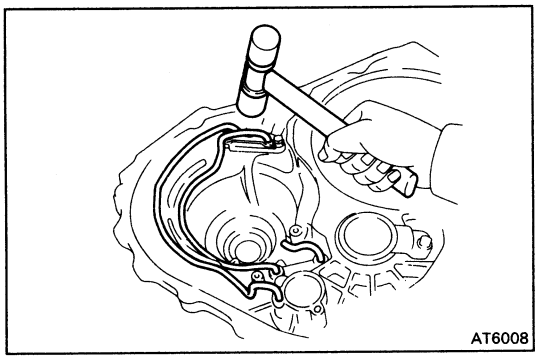


(b) Install the bearing stopper with a bolt.



2. INSTALL NEW GASKET AND OIL TUBE APPLY COVER

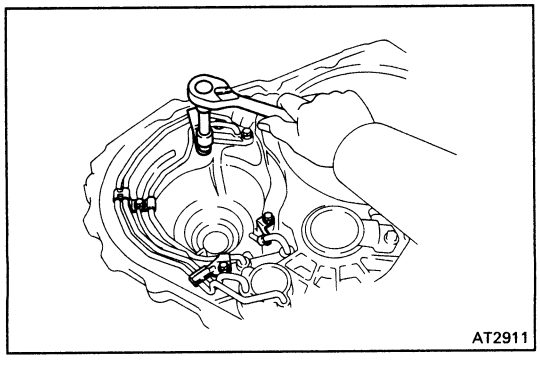
Install the new gasket and oil tube apply cover, and tighten the three bolts.



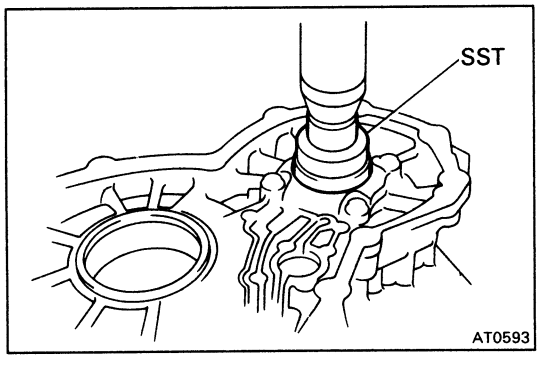
3. INSTALL OIL TUBES

(a) Using a plastic hammer, install the three oil tubes.

NOTICE: Be careful not to bend or damage the tubes.



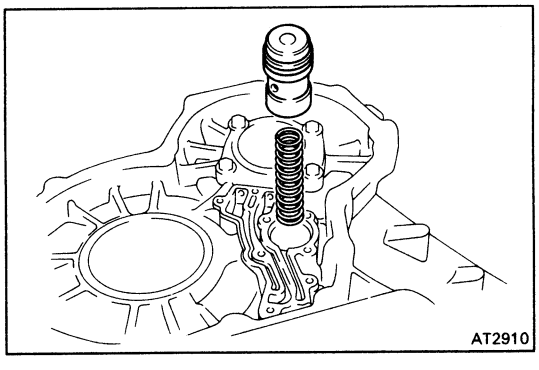
(b) Install the four tube clamps.



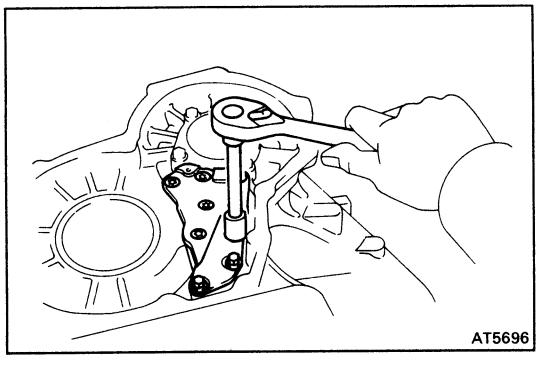
4. INSTALL BEARING TO TRANSMISSION CASE

Using SST and a press, press the bearing into the transmission case.

SST 09350-32014 (09351-32090)



5. INSTALL B_4 ACCUMULATOR PISTON AND SPRING

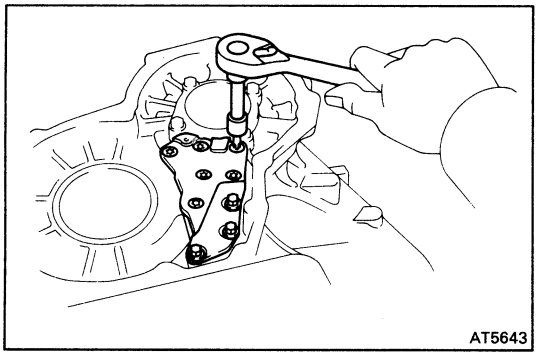


6. INSTALL OIL GALLERY COVER AND GASKET

(a) Clean the threads of the screws and case with white gasoline.

(b) Install the new gasket and oil gallery cover in place.

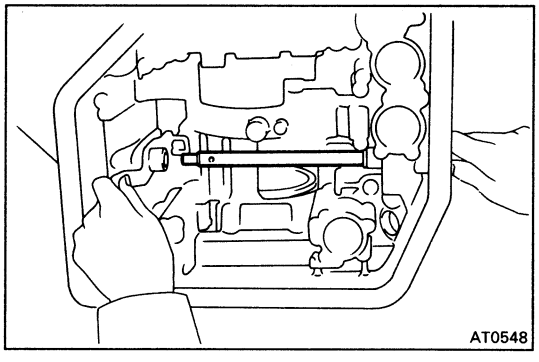
(c) Install and tighten the three bolts.



(d) Apply seal packing or equivalent to the six screws.

Seal packing: Part No. 08833-00070, THREE BOND 1324 or equivalent

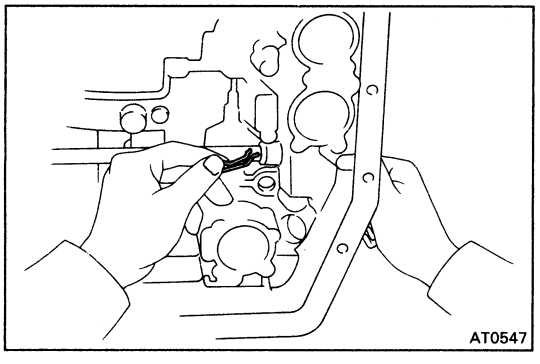
(e) Using a torx wrench, install and tighten the three screws.



7. INSTALL MANUAL VALVE SHAFT AND LEVER

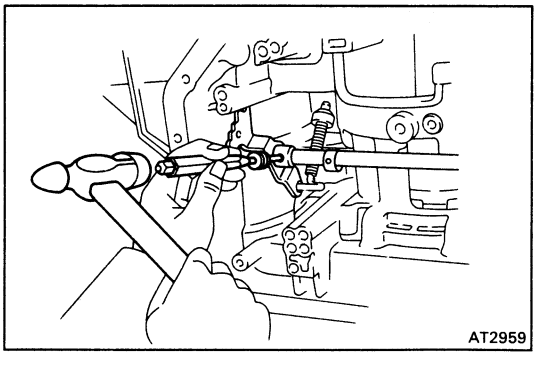
(a) Install the parking lock rod to the manual valve lever.

(b) Slide in the shaft and install the washer, new spacer and manual lever.



(c) Install the retaining spring.

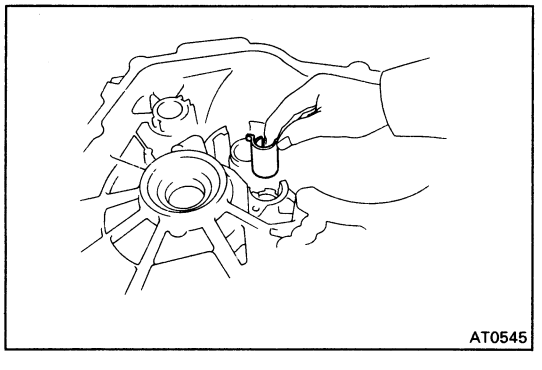
HINT: Make sure there is a washer between the retaining spring and case.



8. INSTALL PIN

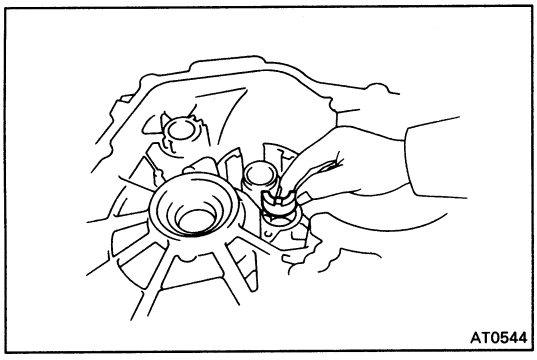
(a) Using a punch and hammer, drive in the pin.

(b) Position the spacer and stake it.



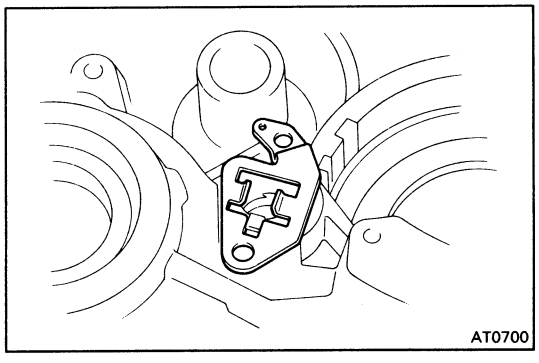
9. INSTALL CAM GUIDE BRACKET

Install the cam guide bracket and then insert the parking lock rod into the guide bracket.



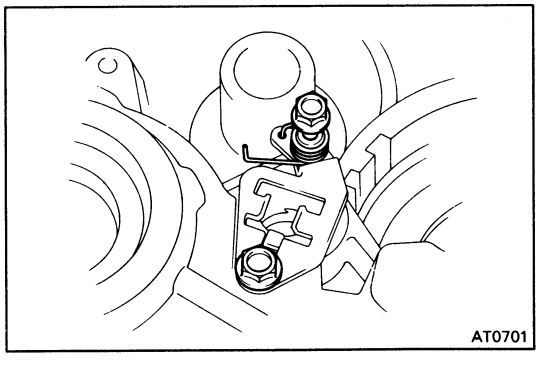
10. INSTALL PARKING LOCK SLEEVE

Install the parking lock sleeve protruding portion upward.

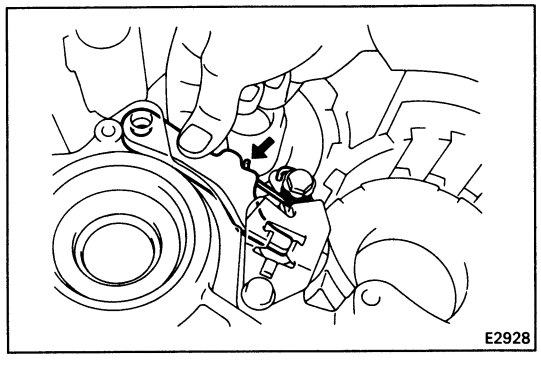


11. PLACE STOPPER PLATE

Place the stopper plate on the protruding portion of lock sleeve.

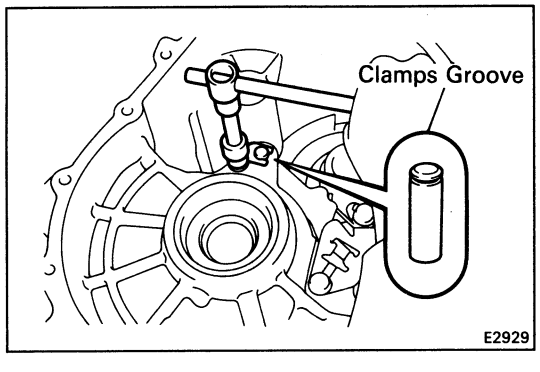


12. INSTALL GUIDE SLEEVE AND SPRING

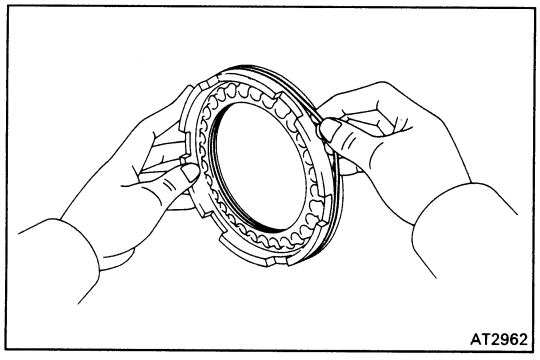


13. INSTALL PARKING LOCK PAWL, PAWL SHAFT AND SHAFT CLAMP

(a) Install the parking lock pawl.



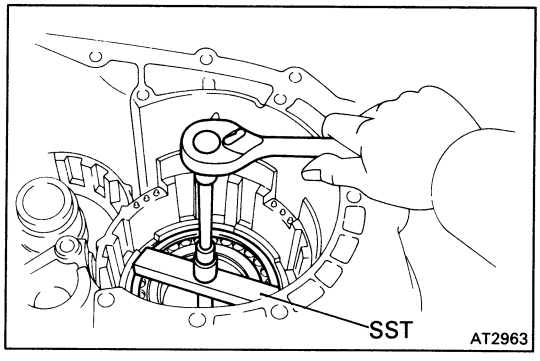
(b) Insert the parking lock pawl shaft and install the shaft clamp.



14. INSTALL FIRST AND REVERSE BRAKE PISTON

(a) Install the two new O-rings to the piston.

(b) Coat the O-rings with ATF.



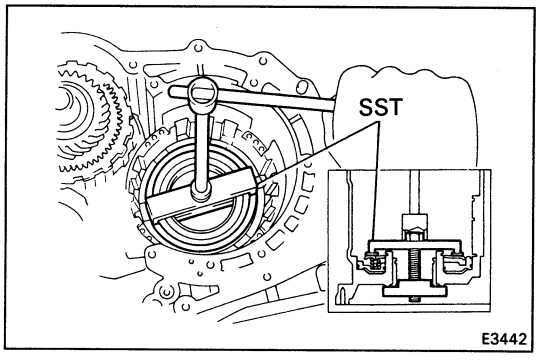
(c) Place the piston into the bore of the case, facing the spring seats upward.

(d) Using SST, press in the piston.

SST 09350-32014 (09351-32040)

HINT: Be careful not to damage the O-rings.

(e) Remove SST.



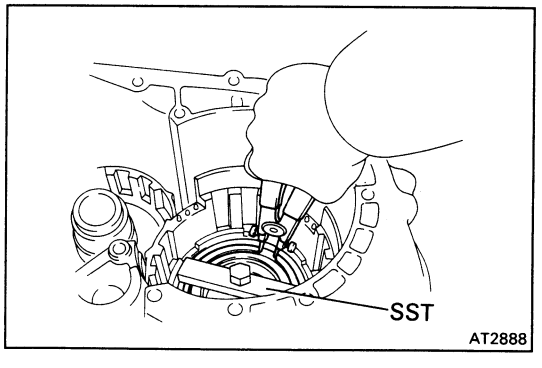
15. INSTALL PISTON RETURN SPRING AND SNAP RING

(a) Install the piston return spring assembly and snap ring in place.

(b) Set SST, and tighten the bolt gradually to compress the springs.

SST 09350-32014 (09351-32040)

NOTICE: Avoid bending the spring retainer by over-tightening the bolt.



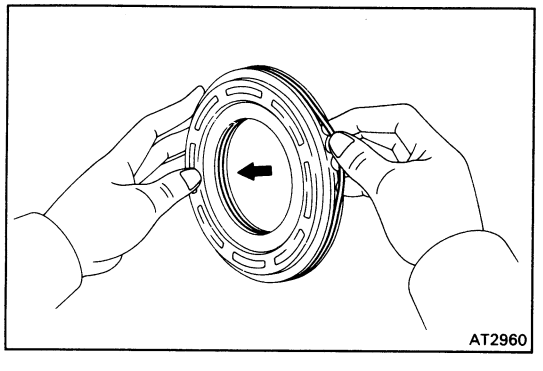
(c) Using snap ring pliers, install the snap ring.

HINT: Visually check to make sure it is fully seated and centered by the three lugs on the spring retainer.

Be sure the end gap of snap ring is not aligned with the spring retainer claw.

(b) Remove SST.

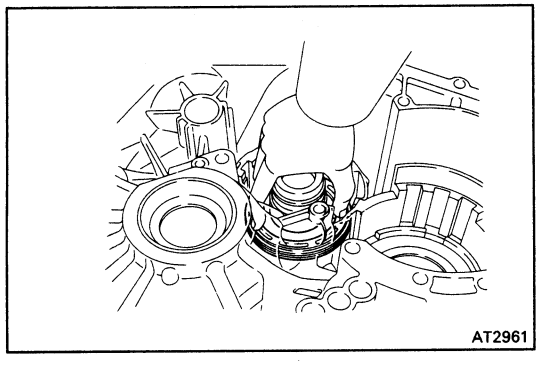
SST 09350-32014 (09351-32040)



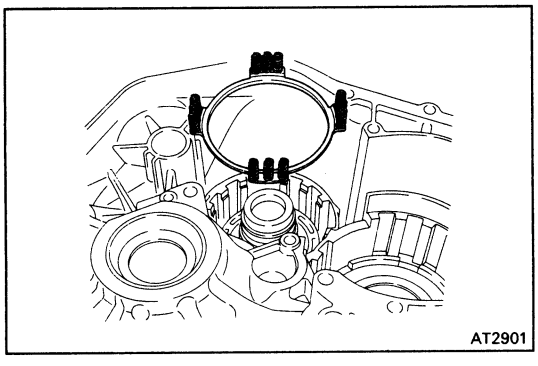
16. INSTALL UNDERDRIVE BRAKE PISTON

(a) Coat the O-rings with ATF.

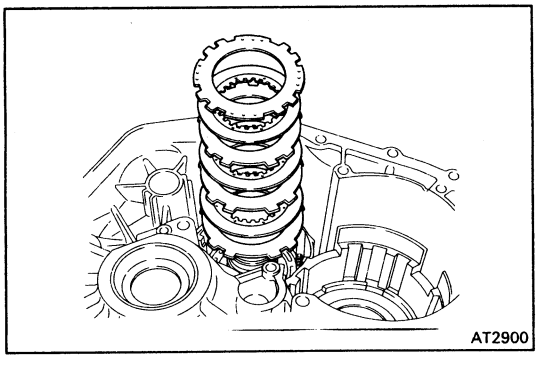
(b) Install the two new O-rings to the piston.



(c) Place the piston into the case with the cup side up, being careful not to damage the O-rings.



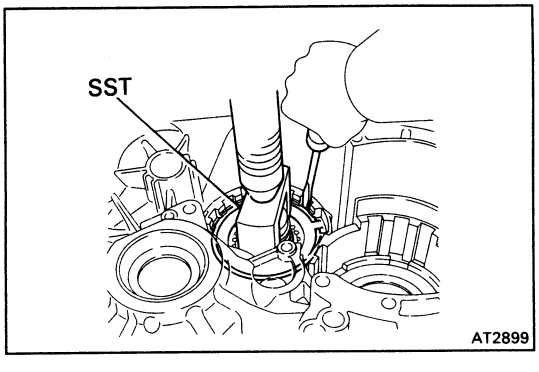
17. INSTALL RETURN SPRING



18. INSTALL PLATES, DISCS AND FLANGE

(a) Install in order: D = Disc P = Plate F = Flange
P – D – P – D – P – D – F

HINT: Install the flange with the flat end facing downward.

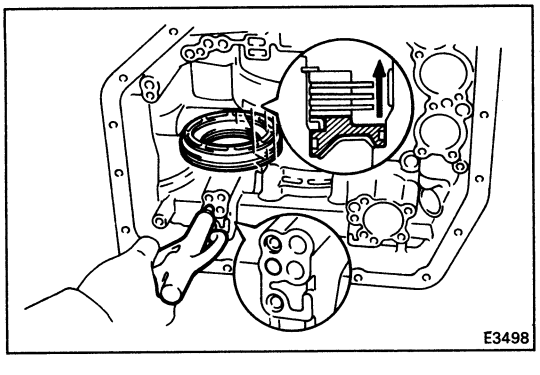


(b) Place SST on the flange, and compress the flange with a press.

SST 09350-32014 (09351-32070)

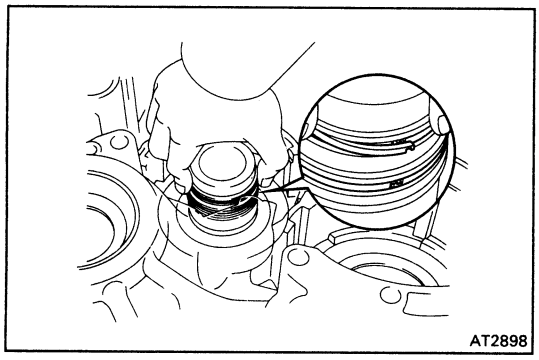
(c) Install the snap ring.

HINT: Be sure the end gap of the snap ring is not aligned with one of the cutouts.



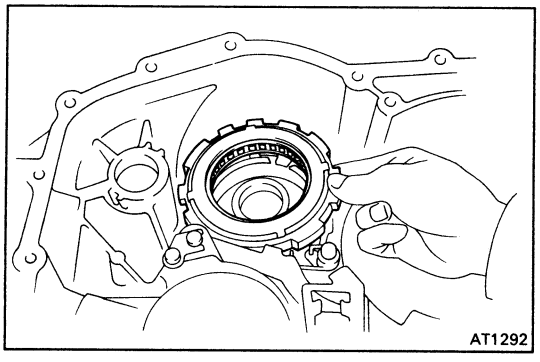
19. CONFIRM THAT UNDERDRIVE BRAKE PISTON MOVES

Using compressed air, confirm that the underdrive brake piston moves smoothly.

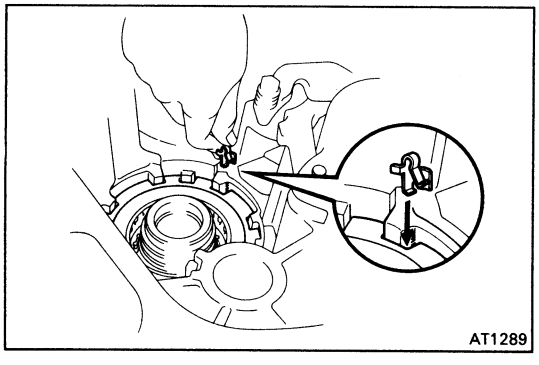


20. INSTALL OIL SEAL RINGS TO TRANSMISSION CASE

Install the two oil seals to the transmission case.

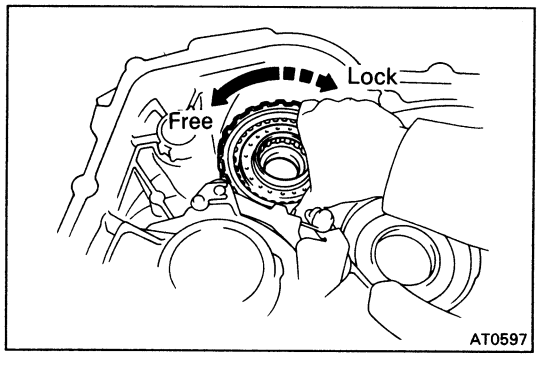


21. INSTALL UNDERDRIVE ONE-WAY CLUTCH



22. INSTALL ANTI-RATTLE CLIP

In the place shown in the figure (the space between the one-way clutch outer race and case), push the anti-rattle clip in until you hear the "click".

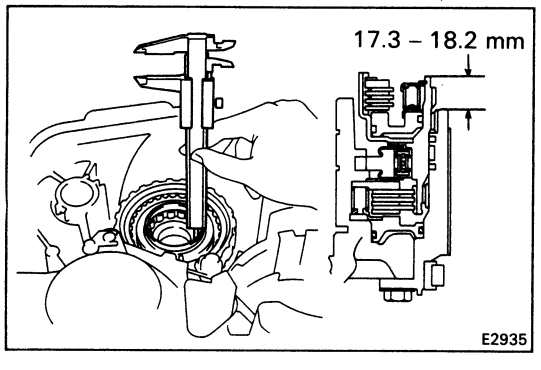


23. INSTALL UNDERDRIVE CLUTCH ASSEMBLY

(a) Align the flukes of discs in the underdrive brake.

(b) Install the clutch assembly.

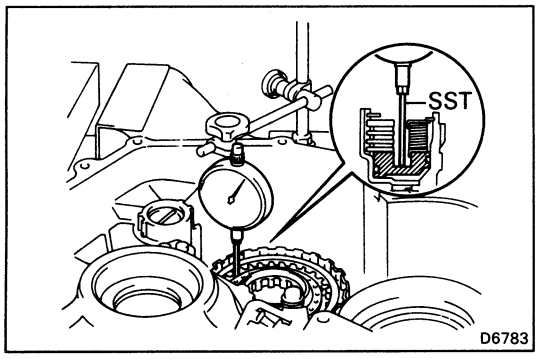
(c) Turn the clutch assembly. The clutch assembly should turn freely counterclockwise and should lock clockwise.



24. CHECK HEIGHT OF CLUTCH ASSEMBLY

Using vernier calipers, check the height from the sleeve to the inner race.

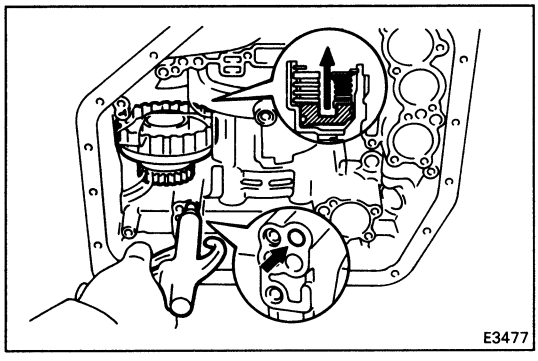
Height: 17.3 – 18.2 mm (0.681 – 0.717 in.)



25. CHECK PISTON STROKE OF UNDERDRIVE CLUTCH

(a) Set a dial indicator (long type pick or SST) as shown.

SST 09350-32014 (09351-32190)



(b) Applying and releasing the compressed air (4 – 8 kg/cm², 57 – 114 psi, 392 – 785 kPa), measure the underdrive clutch piston stroke.

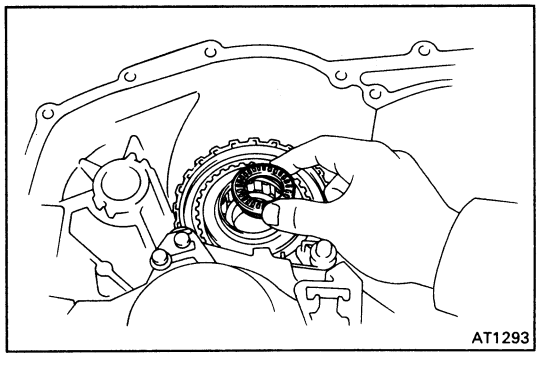
Piston stroke: 1.22 – 1.54 mm (0.0480 – 0.0606 in.)

If the piston stroke is less than limit, parts may have been misassembled. Check them.

If the piston stroke is nonstandard, select another flange.

HINT: There are two different flange thicknesses.

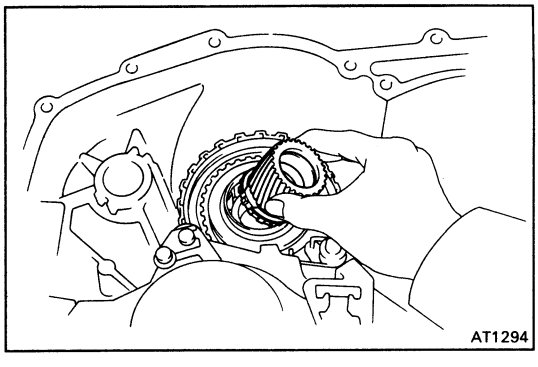
Flange thickness: 2.30 mm (0.0906 in.)
2.50 mm (0.0984 in.)
2.70 mm (0.1063 in.)



26. INSTALL BEARING WITH RACE

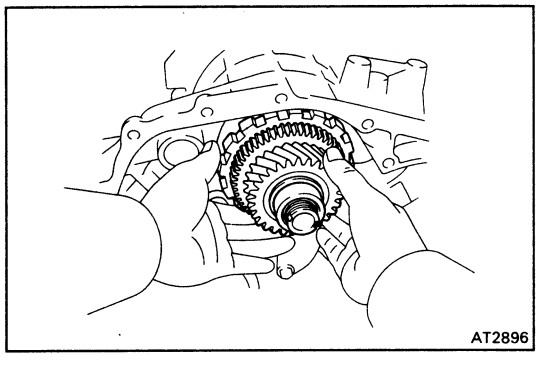
Install the thrust bearing with race, with the bearing facing upward.

Bearing: Outer diameter 45.2 mm (1.780 in.)
Inner diameter 31.0 mm (1.220 in.)



27. INSTALL SUN GEAR TO CASE

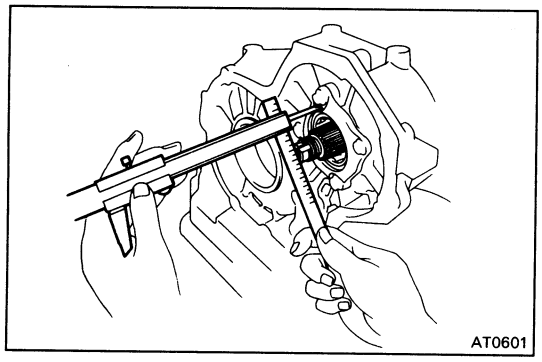
Install the sun gear of the counter shaft to the case.



28. INSTALL COUNTER SHAFT ASSEMBLY

(a) Align the flukes of the discs in the underdrive clutch.

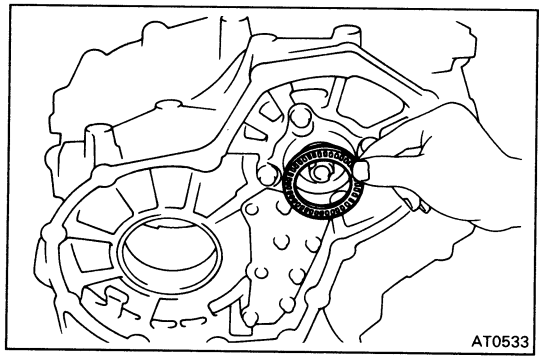
(b) Install the counter shaft assembly.



29. CHECK HEIGHT OF COUNTER SHAFT

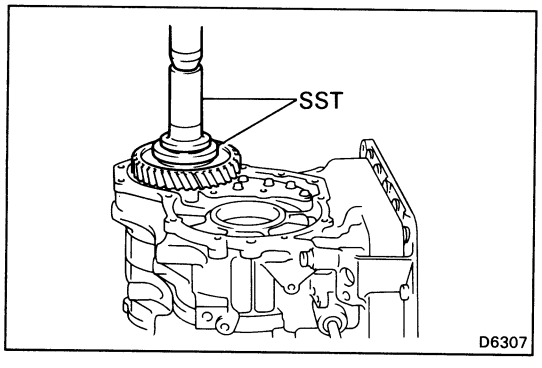
Using vernier calipers, measure the distance between the tip of the counter shaft and bolt seat of the clutch support.

Height: 33.3 – 35.5 mm (1.311 – 1.398 in.)



30. INSTALL THRUST NEEDLE BEARING

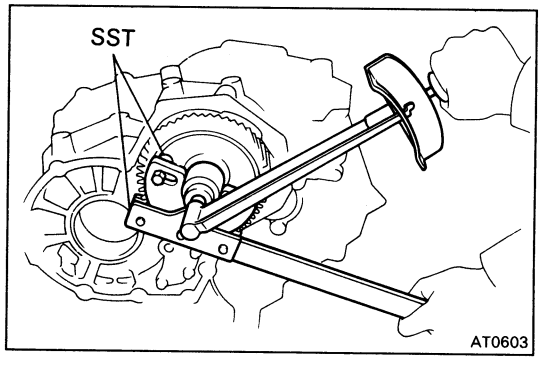
Bearing: Outer diameter 57.7 mm (2.272 in.)
Inner diameter 41.0 mm (1.614 in.)



31. INSTALL COUNTER DRIVEN GEAR

Using SST and press, press in the driven gear.

SST 09350-32014 (09351-32100, 09351-32140)



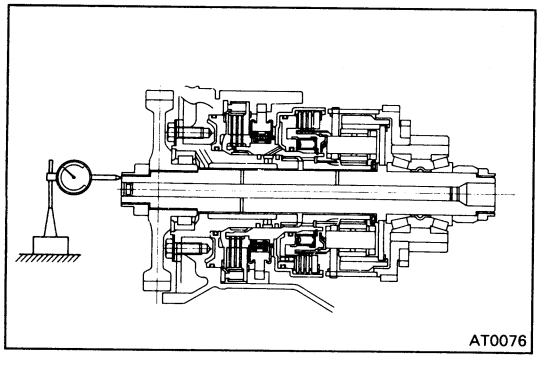
32. TIGHTEN NEW LOCK NUT

(a) Using SST to hold the driven gear, tighten a new lock nut.

SST 09330-00021 and 09350-32014 (09351-32032)

Torque: 1,600 kg-cm (116 ft-lb, 157 N·m)

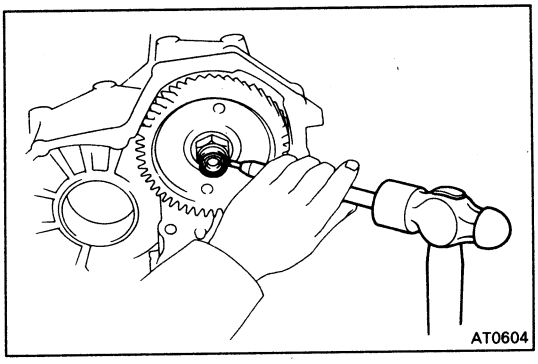
(b) Remove SST.



33. CHECK END PLAY OF COUNTER SHAFT

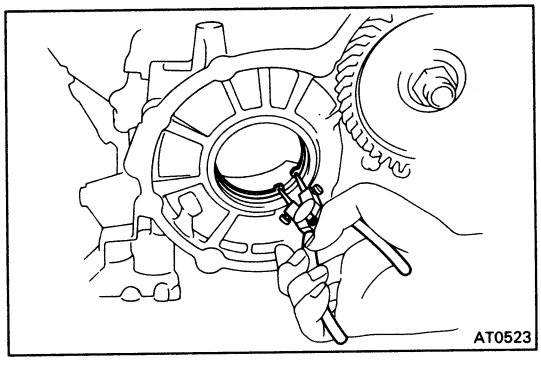
Using a dial indicator, measure the end play of the counter shaft.

End play: 0.23 – 0.89 mm (0.0091 – 0.0350 in.)



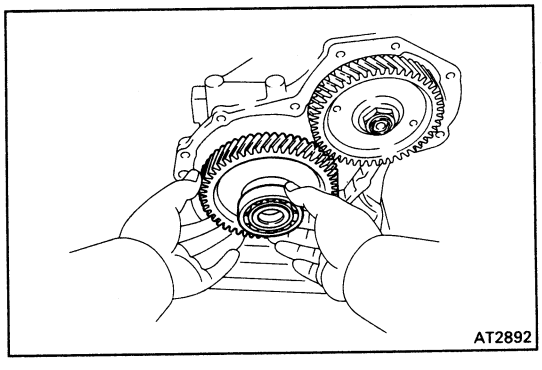
34. STAKE LOCK NUT

Using a punch and hammer, stake the lock nut.

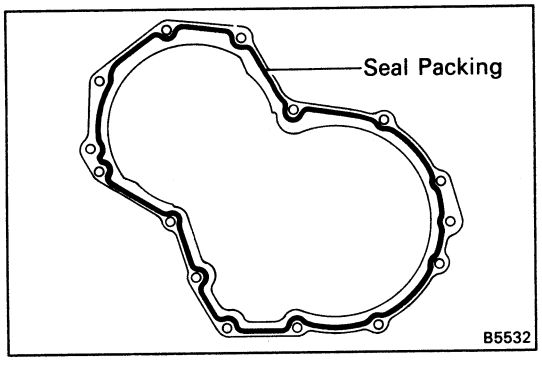


35. INSTALL SNAP RING TO TRANSMISSION CASE

Using snap ring pliers, install the snap ring to the transmission case.



36. INSTALL INTERMEDIATE SHAFT

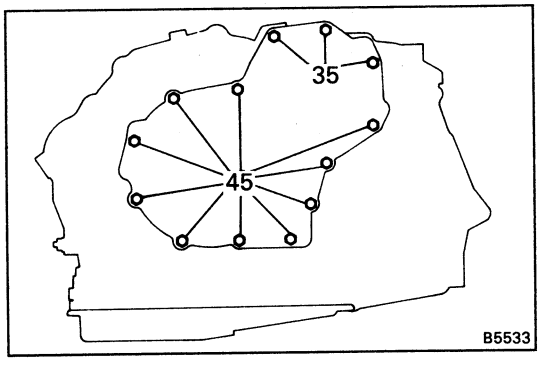


37. INSTALL TRANSAXLE REAR COVER

(a) Remove any packing material and be careful not to get oil on the contacting surfaces of the transaxle rear cover or transmission case.

(b) Apply seal packing to the rear cover as shown.

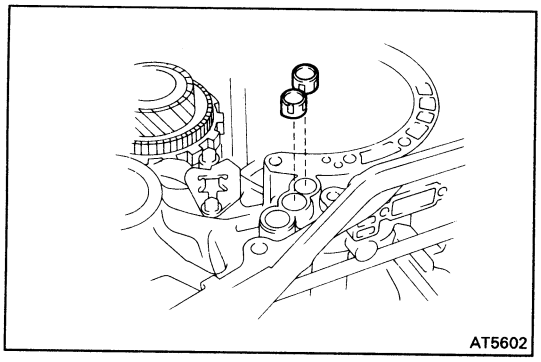
Seal packing: Part No.08833-00090, THREE BOND 1131, LOCTITE 518 or equivalent



(c) Install and tighten the thirteen bolts.

Torque: 300 kg-cm (22 ft-lb, 29 N·m)

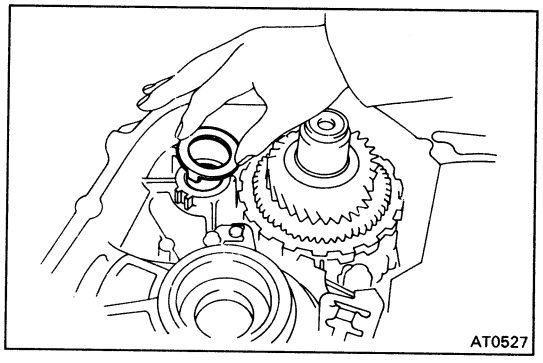
HINT: Each bolt length (mm) is indicated in the figure.



38. INSTALL NEW APPLY GASKETS

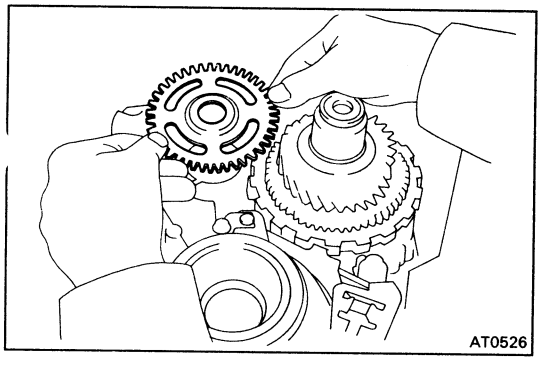
Install the two new apply gaskets.

HINT: The oil seal may be inserted with either end up or down.

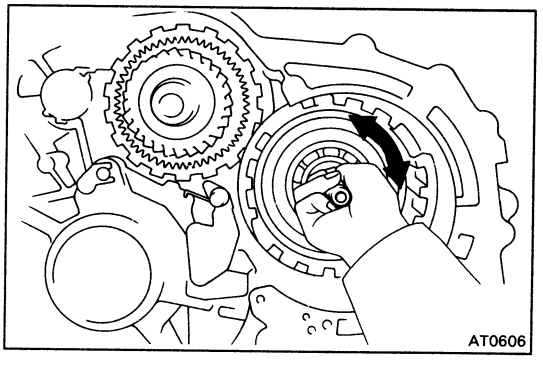


39. INSTALL GOVERNOR DRIVEN GEAR

(a) Install the thrust washer.

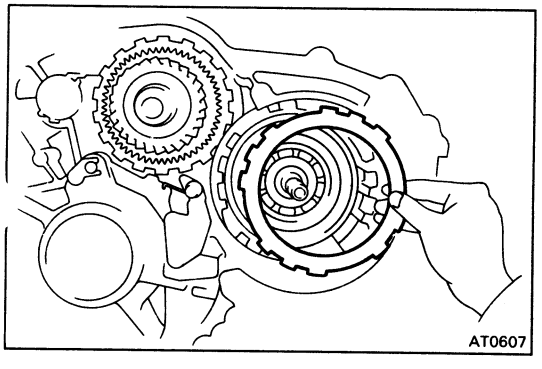


(b) Install the governor driven gear.



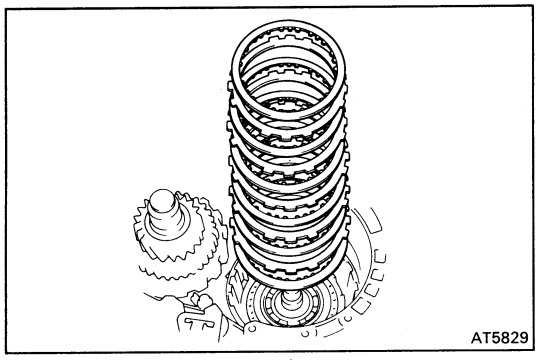
40. CHECK INTERMEDIATE SHAFT

Make sure that the intermediate shaft turns smoothly.

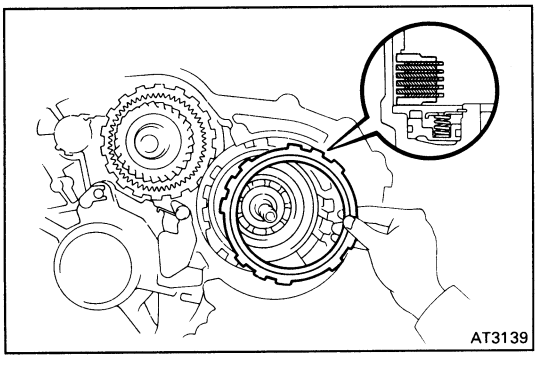


41. INSTALL DISCS, PLATES AND FLANGE

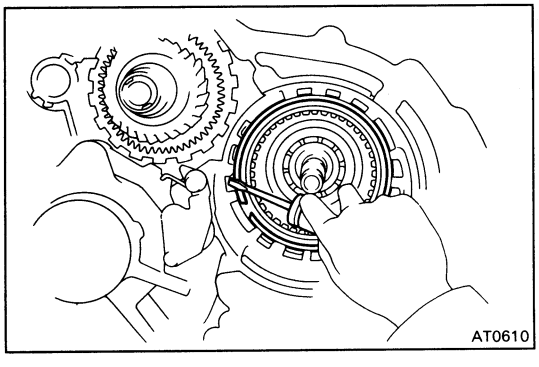
(a) Install the inner flange, facing the flat end upward.



(b) Install in order: D = Disc P = Plate
D – P – D – P – D – P – D – P – D – P – D

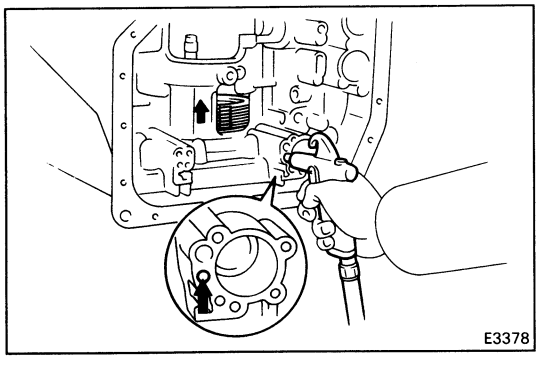


(c) Install the outer flange, the flat end facing downward.



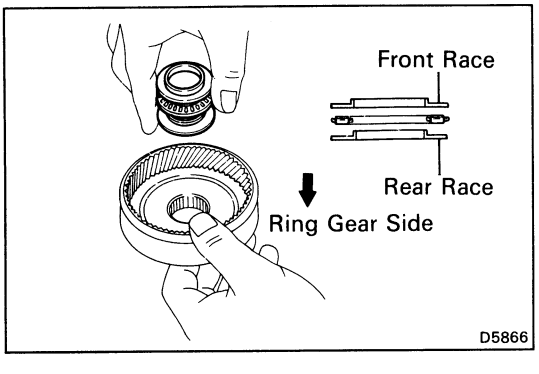
42. INSTALL SNAP RING

HINT: Be sure the snap ring end gap is not aligned with one of the cutouts.



43. CONFIRM THAT FIRST AND REVERSE BRAKE PISTON MOVES

Using compressed air, confirm that the first and reverse brake piston moves smoothly.

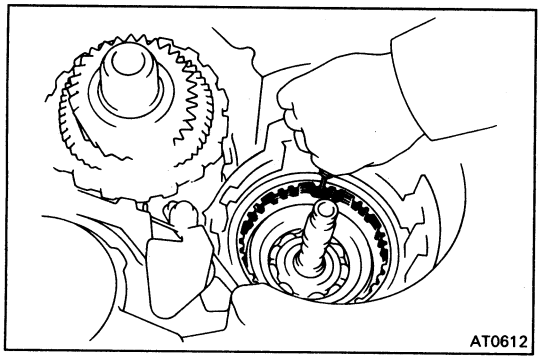


44. INSTALL REAR PLANETARY RING GEAR TO CASE

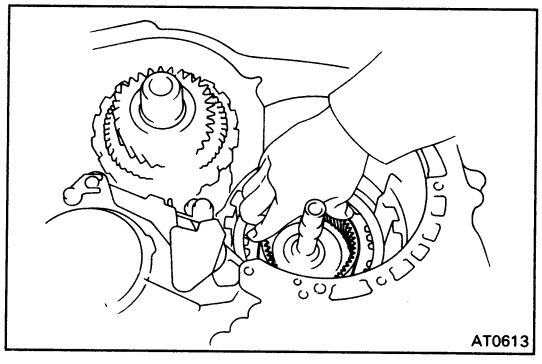
(a) Coat the races and bearing with petroleum jelly, and install them onto the ring gear as shown.

Bearing and races: mm (in.)

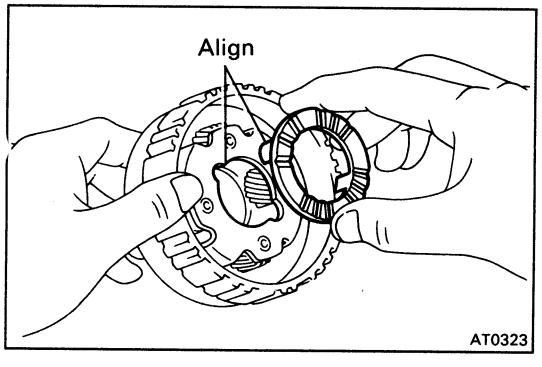
	Outer diameter	Inner diameter
Front Race	37.3 (1.469)	24.1 (0.949)
Bearing	37.6 (1.480)	24.0 (0.945)
Rear Race	37.6 (1.480)	22.2 (0.874)



(b) Using a screwdriver, align the flukes of the discs.



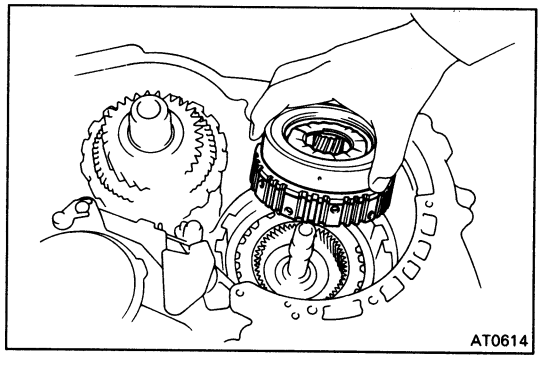
(c) Install the rear planetary ring gear into the case.



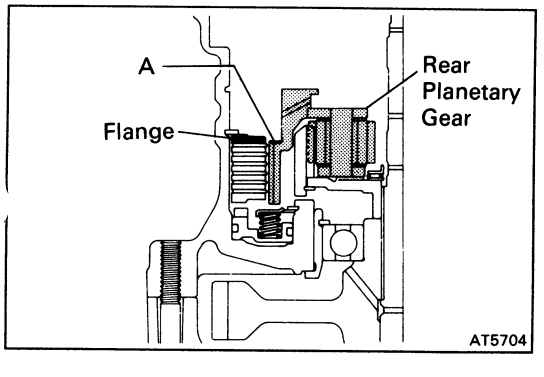
45. INSTALL REAR PLANETARY GEAR

(a) Coat thrust washer with petroleum jelly and install it onto the planetary gear.

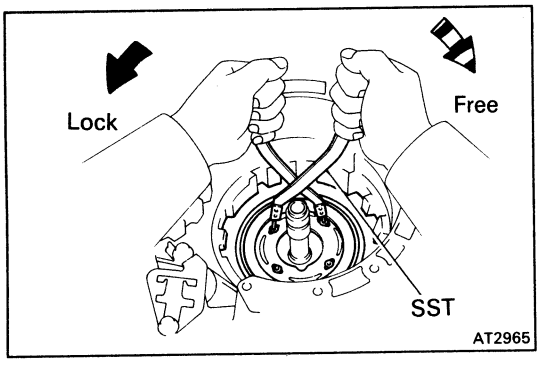
HINT: Make sure that the different lug shapes match the openings on the gear.



(b) Align the spline of the planetary gear with the flukes of the discs and install the planetary gear into the first and reverse brake discs.



(c) Check that parts A of the rear planetary gear is below the upper surface of the flange.



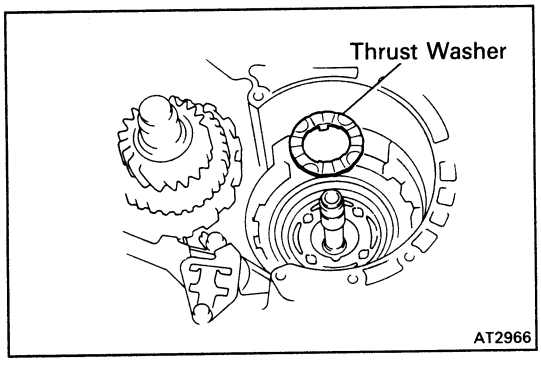
46. INSTALL NO. 2 ONE-WAY CLUTCH

(a) Place the one-way clutch into the case, the shiny side facing upward.

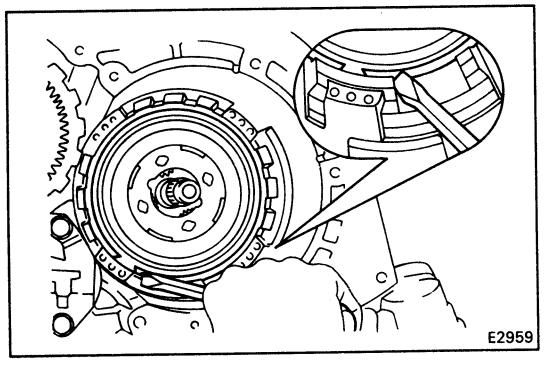
(b) Install the one-way clutch onto the inner race while turning the planetary gear clockwise with SST.

SST 09350-32014 (09351-32050)

(c) Check that the planetary gear turns freely clockwise and locks counterclokwise.

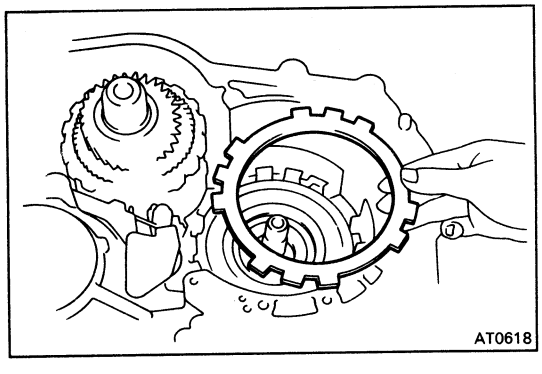


(d) Coat the thrust washer with petroleum jelly and install it onto the planetary gear.



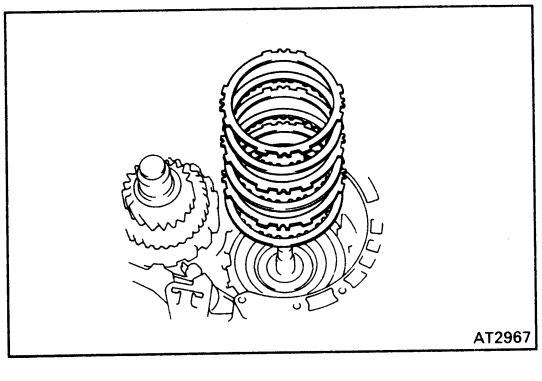
47. INSTALL SNAP RING

Be sure the end gap of the snap ring is not aligned with one of the cutouts.

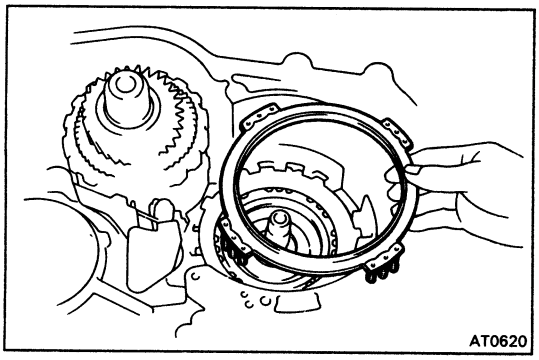


48. INSTALL SECOND BRAKE INTO CASE

(a) Install the flange, the flat side facing upward.

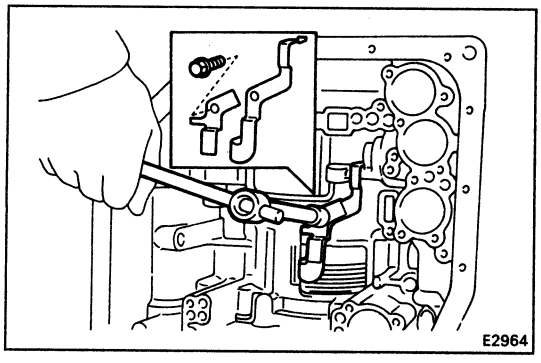


(b) Install the discs and plates in order.
D = Disc P = Plate
D – P – D – P – D – P



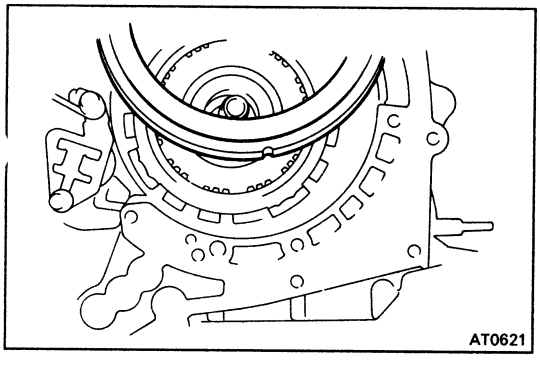
49. INSTALL SECOND BRAKE PISTON RETURN SPRING

Install each of the springs over the protrusions in the case.



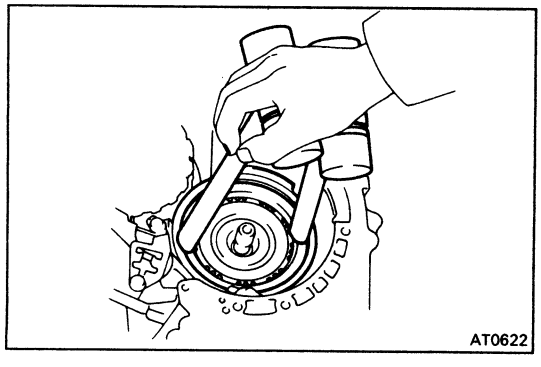
50. INSTALL SECOND COAST BRAKE BAND GUIDE

Install the band guide so that its tip touches the case.



51. INSTALL SECOND BRAKE DRUM INTO CASE

Align the groove of the drum with the bolt and place it into the case.

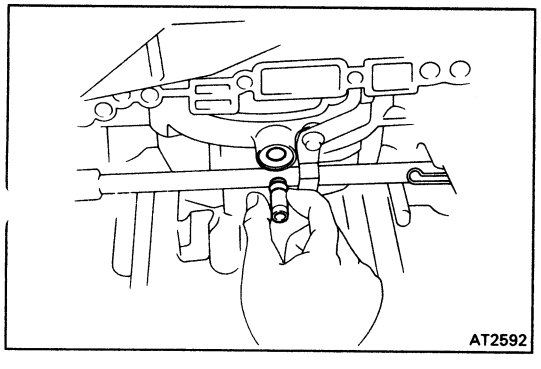


52. INSTALL SNAP RING

(a) Place the snap ring into the case so that the end gap is installed into the groove.

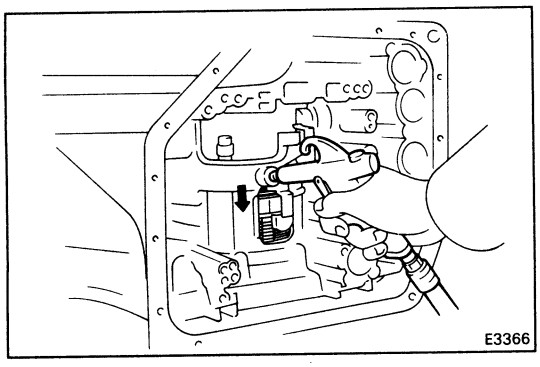
(b) While compressing the piston return springs over the drum with hammer handles, install the snap ring.

HINT: Be sure the end gap of the snap ring is not aligned with one of the cutouts.



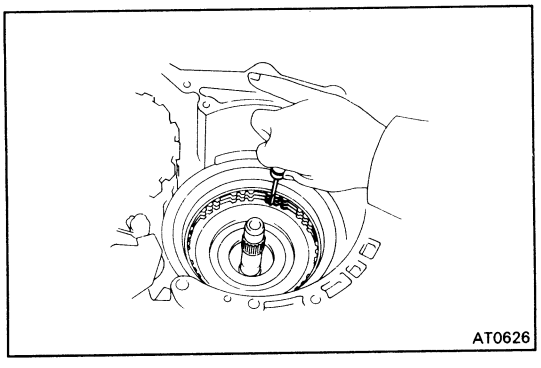
53. INSTALL SECOND BRAKE DRUM GASKET

Drive in a new drum gasket until it makes contact with the second brake drum.


E3366

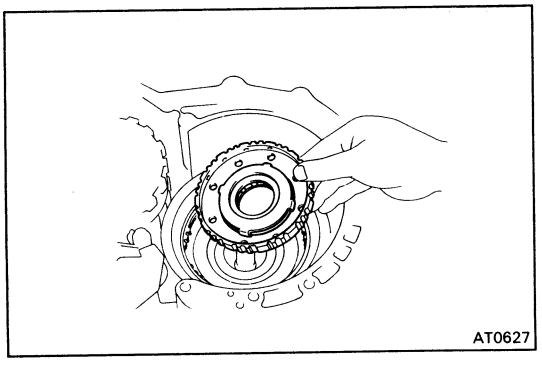
54. CONFIRM THAT SECOND BRAKE PISTON MOVES

Using compressed air, confirm that the second brake piston moves smoothly.

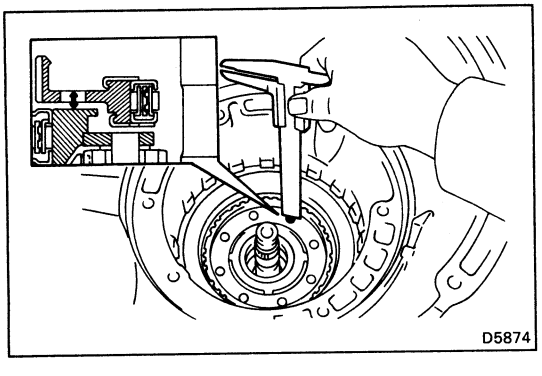

AT0626

55. INSTALL SECOND BRAKE HUB AND NO. 1 ONE-WAY CLUTCH

(a) Using a screwdriver, align the flukes of the discs in the second brake.


AT0627

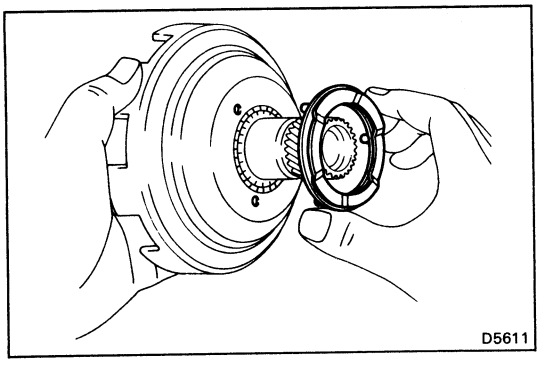
(b) Align the spline of the hub with the flukes of the discs and install the hub to the second brake discs.


D5874

56. CHECK SECOND BRAKE HUB INSTALLATION DISTANCE

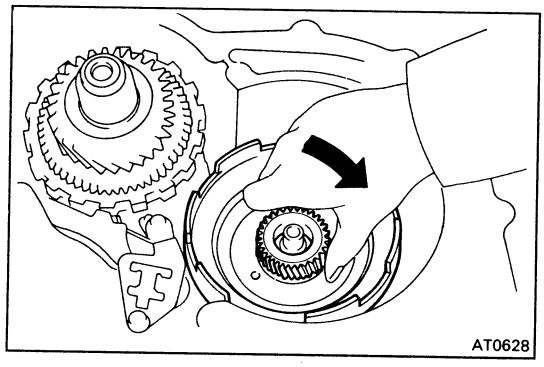
Check the distance between the surface of the second brake hub and rear planetary gear.

Distance: Approx. 5 mm (0.20 in.)

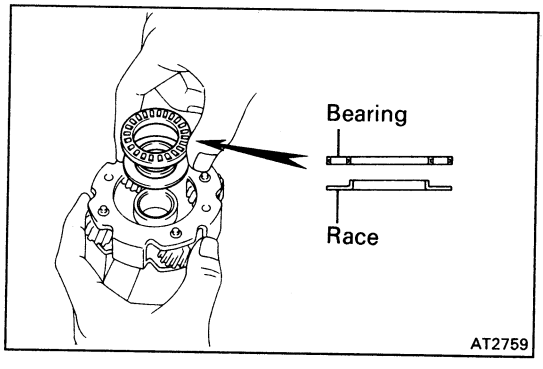

D5611

57. INSTALL SUN GEAR AND SUN GEAR INPUT DRUM

(a) Coat the thrust washer with petroleum jelly and install it on the sun gear input drum.



(b) While turning the sun gear clockwise, install it into the No. 1 one-way clutch.

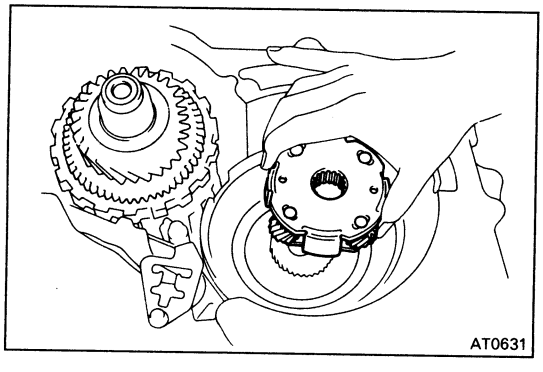


58. INSTALL FRONT PLANETARY GEAR

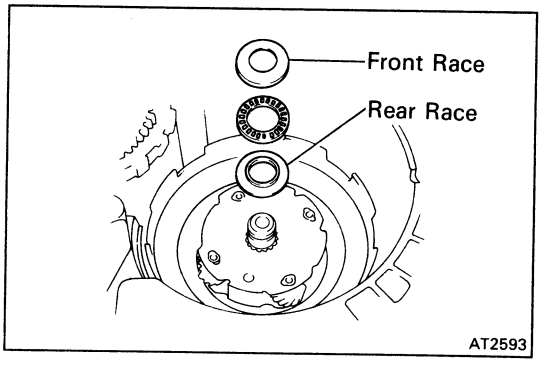
(a) Coat the race and bearing with petroleum jelly and install them onto the planetary gear.

Bearing and races: mm (in.)

	Outer diameter	Inner diameter
Bearing	45.0 (1.772)	30.0 (1.181)
Race	45.0 (1.772)	28.0 (1.102)



(b) Install the planetary gear.

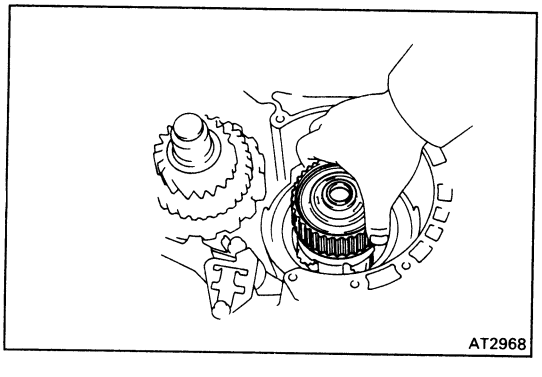


59. INSTALL FRONT PLANETARY RING GEAR

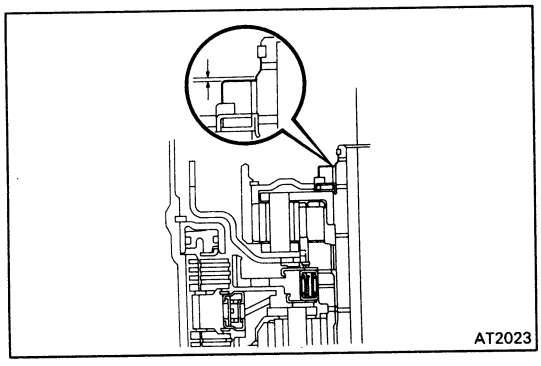
(a) Coat the races and bearing with petroleum jelly and install them onto the planetary ring gear.

Bearing and races: mm (in.)

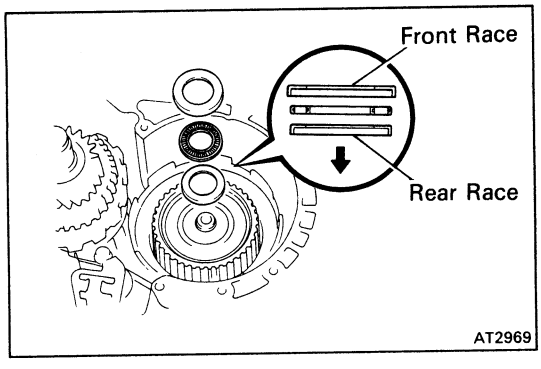
	Outer diameter	Inner diameter
Front Race	37.9 (1.492)	22.0 (0.866)
Bearing	36.1 (1.421)	22.2 (0.874)
Rear Race	35.0 (1.378)	19.0 (0.748)



(b) Install the ring gear.



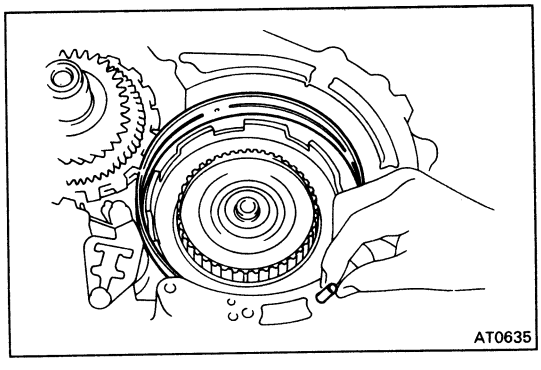
HINT: If the planetary ring gear and the other parts are installed correctly into the case, the end of the bushing with the ring gear flange will be flush with a shoulder of the intermediate shaft or under.



(c) Coat the races and bearing with petroleum jelly and install them onto the tip of ring gear flange as shown.

Bearing and races: mm (in.)

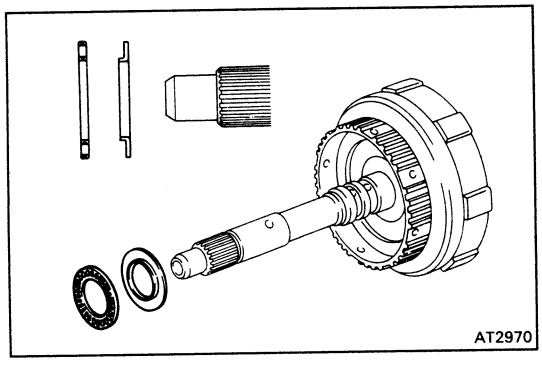
	Outer diameter	Inner diameter
Front Race	37.9 (1.492)	22.0 (0.866)
Bearing	36.1 (1.421)	22.2 (0.874)
Rear Race	35.7 (1.406)	23.0 (0.906)



60. INSTALL SECOND COAST BRAKE BAND

(a) Place the band into the case.

(b) Install the pin through the oil pump mounting bolt hole.

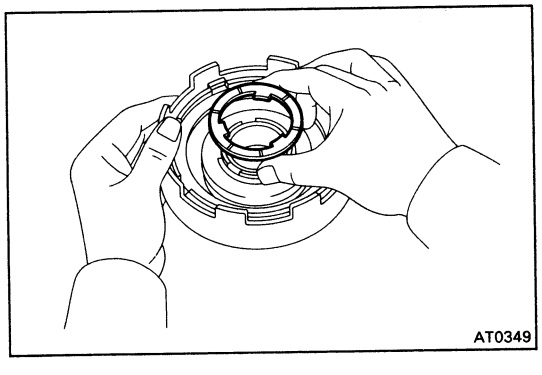


61. INSTALL FORWARD CLUTCH AND DIRECT CLUTCH

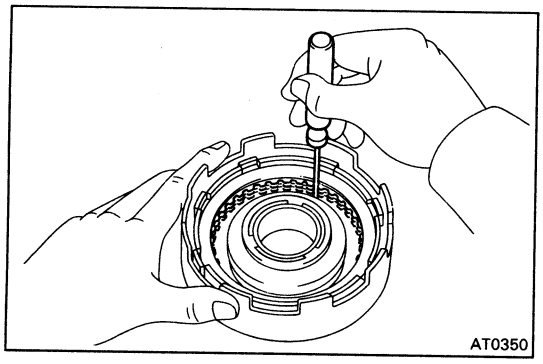
(a) Coat the race and bearing with petroleum jelly, and install them onto the forward clutch drum.

Bearing and race: mm (in.)

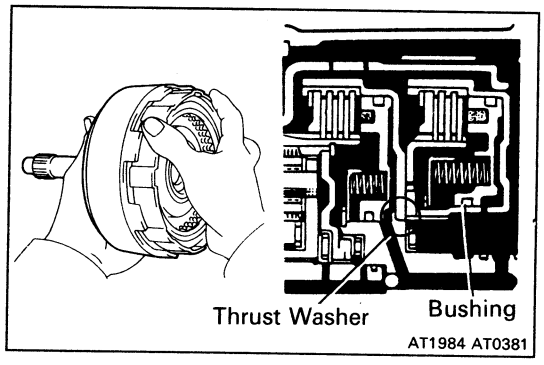
	Outer diameter	Inner diameter
Bearing	42.0 (1.654)	28.9 (1.138)
Race	42.0 (1.654)	27.1 (1.067)



(b) Coat the clutch drum thrust washer with petroleum jelly, and install it onto the direct clutch drum with the oil groove facing upward.

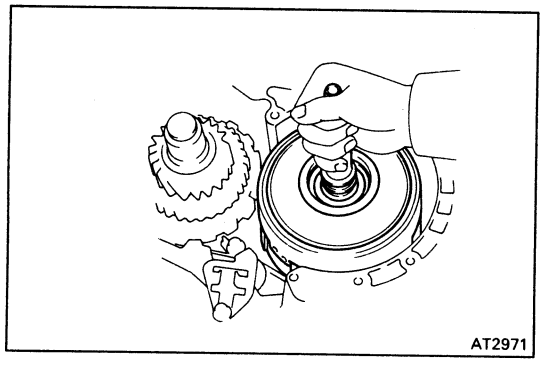


(c) Using a screwdriver, align the flukes of discs in the direct clutch.



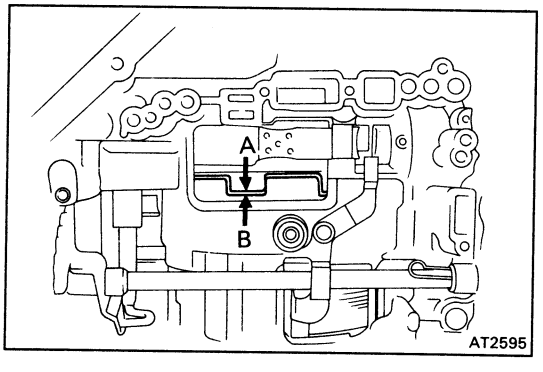
(d) Mesh the hub with the flukes of the direct clutch while turning the clutch drum or forward clutch.

HINT: If the flukes of the discs are meshed with the hub correctly, the end of the bushing with the direct clutch drum will be flush with the surfaces of the forward clutch.



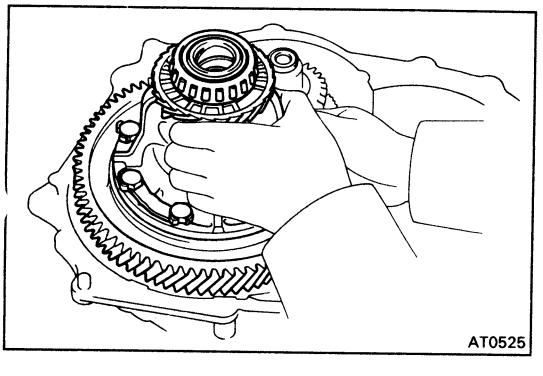
(e) Place the direct clutch and forward clutch into the case.

(f) While rotating the forward clutch to mesh the front planetary ring gear and discs, install them.

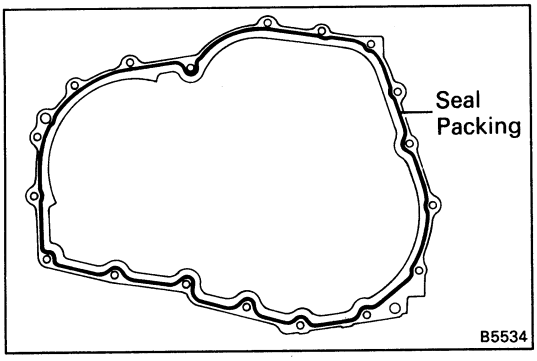


(g) Check the distance between A and B as shown in the illustration.

Distance: Approx. 3 mm (0.118 in.)



62. INSTALL DIFFERENTIAL

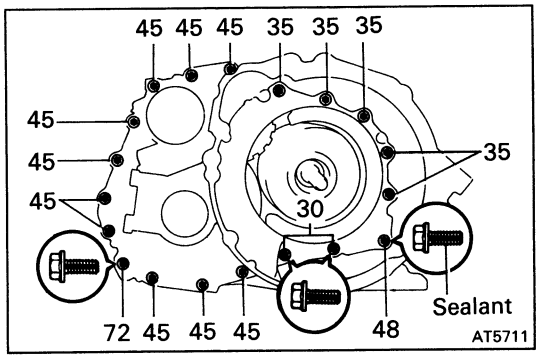


63. INSTALL TRANSAXLE HOUSING

(a) Remove any packing material and be careful not to get oil on the contacting surfaces of the transaxle housing or transmission case.

(b) Apply seal packing to the transaxle housing as shown.

Seal packing: Part No.08833-00090, THREE BOND 1131, LOCTITE 518 or equivalent.



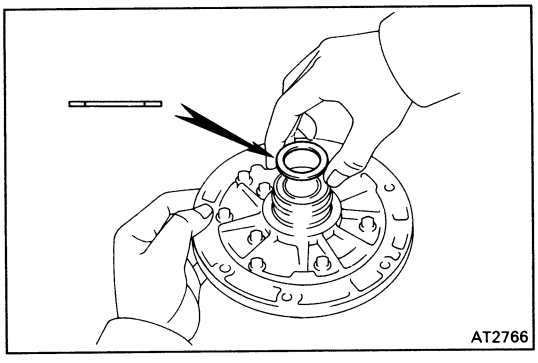
(c) Apply sealant to the bolt threads.

Sealant: Part No.08833-00080, adhesive 1344, THREE BOND 1344, LOCTITE 242 or equivalent

(d) Install and tighten the bolts.

Torque: 300 kg-cm (22 ft-lb, 29 N·m)

HINT: Each bolt length (mm) is indicated in the illustration.

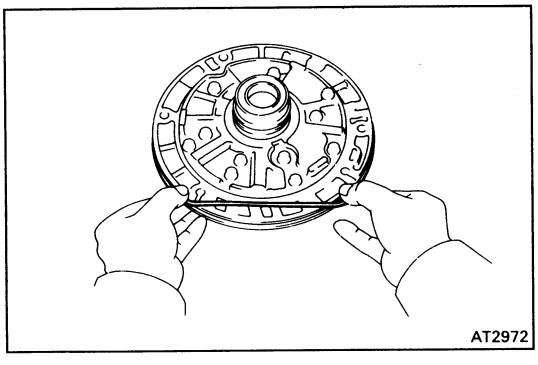


64. CHECK PRELOAD OF DIFFERENTIAL SIDE BEARING (See page AT-130)

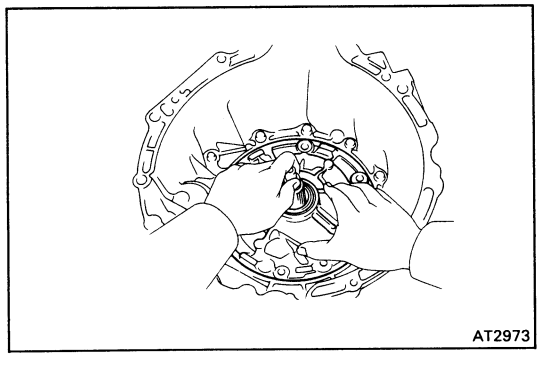
65. INSTALL OIL PUMP INTO CASE

(a) Coat the race with petroleum jelly and install it onto the stator shaft.

Race: Outer diameter 43.0 mm (1.693 in.)
Inner diameter 30.5 mm (1.201 in.)



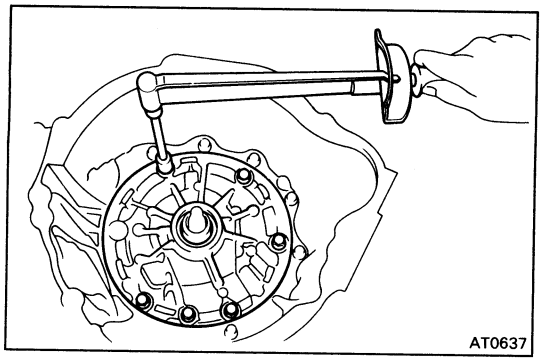
(b) Coat the new O-ring with ATF, and install it to pump body.



(c) Place the oil pump through the input shaft, and align the bolt holes of the pump body with the transmission case.

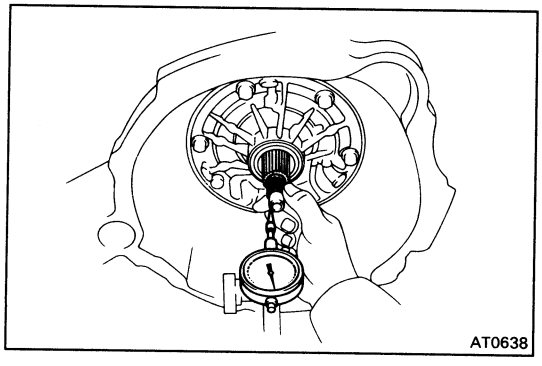
(d) Hold the input shaft, and lightly press the oil pump body to slide the oil seal rings on the stator shaft through the direct clutch drum.

NOTICE: Do not push on the oil pump strongly, or the oil seal ring will stick to the direct clutch drum.



(e) Install and tighten the six bolts.

Torque: 250 kg-cm (18 ft-lb, 25 N·m)



66. MEASURE THRUST PLAY OF INPUT SHAFT

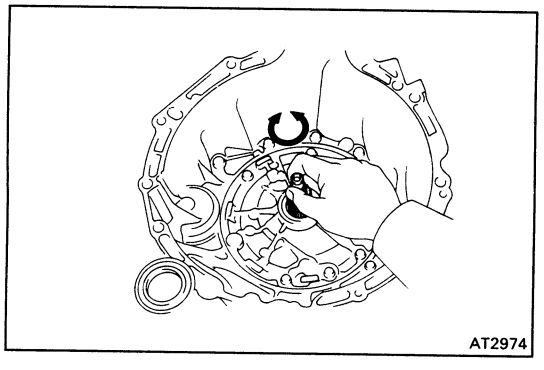
Measure the thrust play in axial direction.

Thrust play: 0.3 – 0.9 mm (0.012 – 0.035 in.)

If the play is not as specified, select and replace the race for the end of the stator shaft.

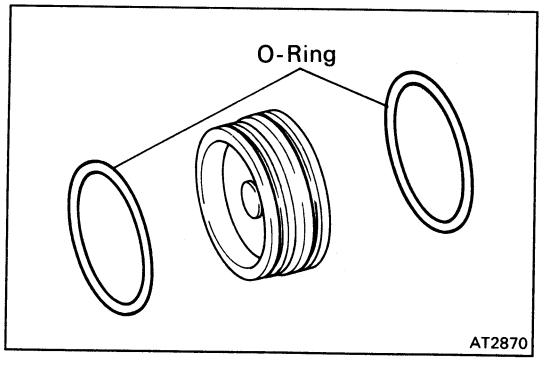
HINT: There are two different thicknesses of races. If necessary, select one of them.

Race thickness: 0.8 mm (0.031 in.)
1.4 mm (0.055 in.)



67. CHECK INPUT SHAFT ROTATION

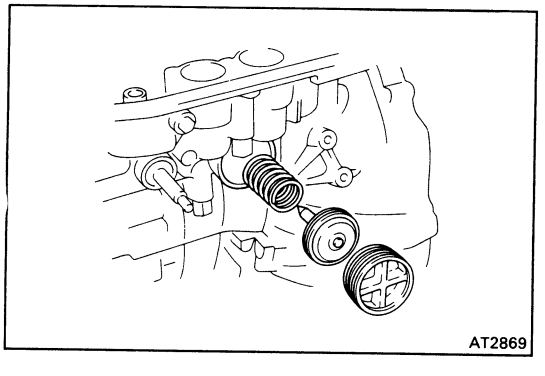
Make sure that the input shaft rotates smoothly.



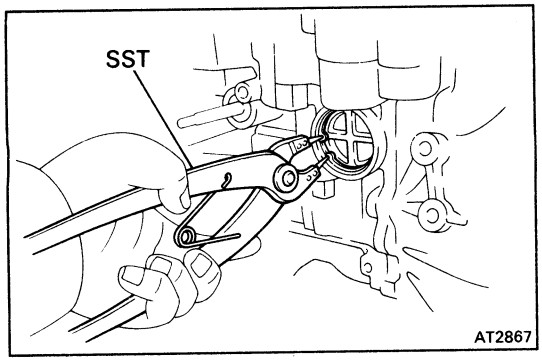
68. INSTALL SECOND COAST BRAKE PISTON

(a) Install the two new O-rings to the cover.

HINT: Coat the O-rings with ATF before installing.



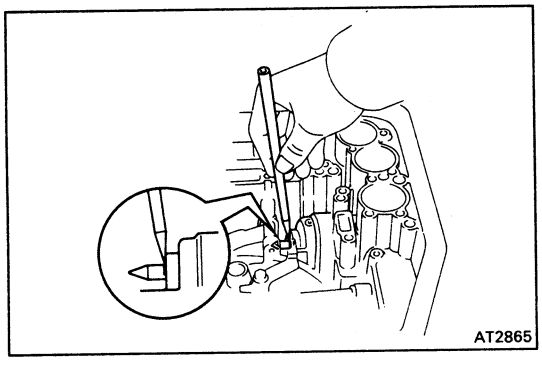
(b) Install the spring, piston and cover into the bore.



(c) Using SST, install the snap ring while pressing the cover.

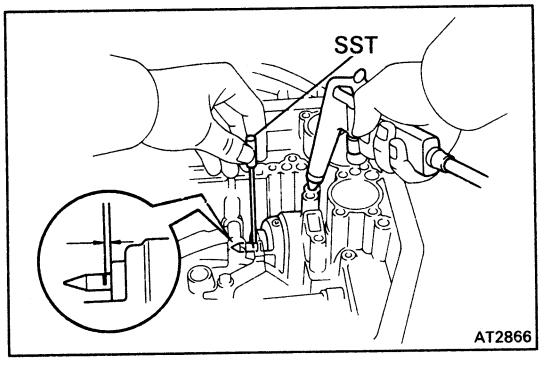
SST 09350-32014 (09351-32050)

(d) Check that the front end of the piston rod contacts the center of the second brake band depression.



69. MEASURE PISTON STROKE OF SECOND COAST BRAKE

(a) Apply a small amount of paint to the piston rod at the point it meets the case as shown in the illustration.

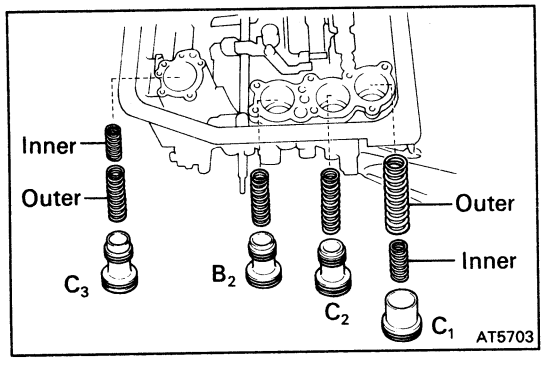


(b) Using SST, measure the piston stroke applying and releasing the compressed air (4 - 8 kg/cm^2, 57 - 114 psi, 392 - 785 kPa) as shown.

SST 09240-00020

Piston stroke: 1.5 – 3.0 mm (0.059 – 0.118 in.)

If it is still more than standard value, replace the brake band with a new one.

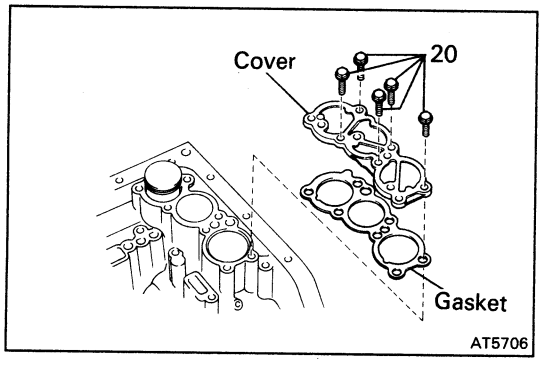


70. INSTALL ACCUMULATOR PISTONS AND SPRINGS

(a) Coat the new O-rings with ATF, and install them to the pistons.

(b) Install the pistons and springs to the case.

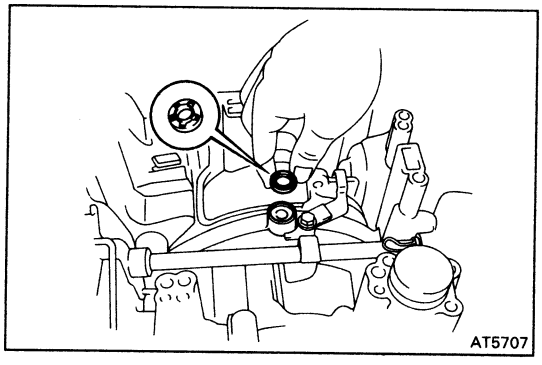
Spring		Free length mm (in.)	Color
C_1	Outer	74.1 (2.917)	Pink
	Inner	41.0 (1.614)	Pink
C_2		62.5 (2.461)	Pink
B_2		64.5 (2.539)	Green
C_3	Outer	65.2 (2.570)	Blue
	Inner	48.0 (1.890)	Orange



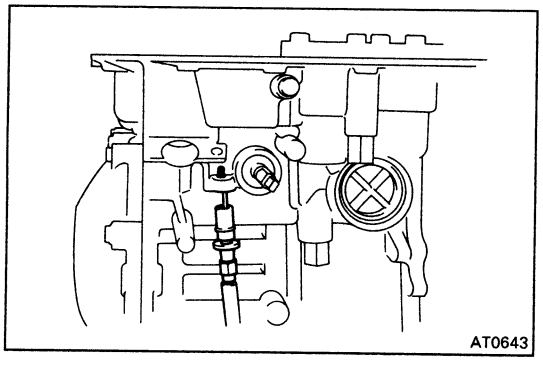
(c) Place the cover with a new gasket and gradually tighten the bolts a little a time in sequence.

HINT: Each bolt length (mm (in.)) is indicated in the figure.

Torque: 100 kg-cm (7 ft-lb, 10 N·m)



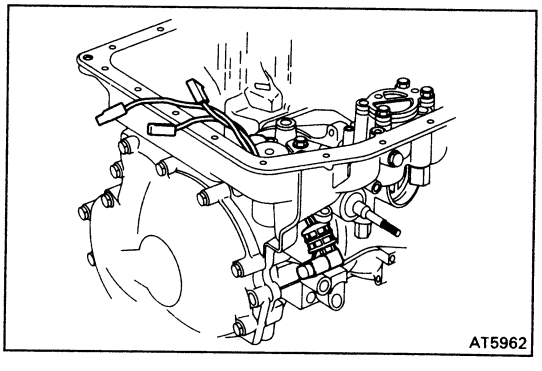
71. INSTALL NEW SECOND BRAKE APPLY GASKET



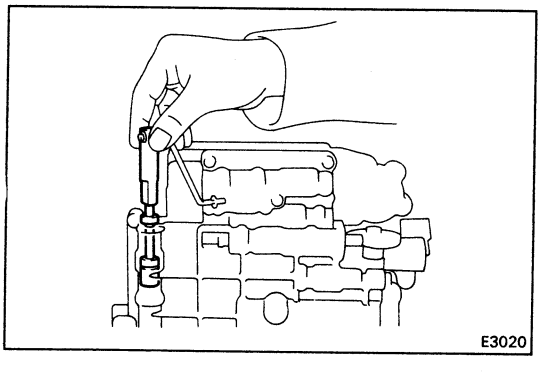
72. INSTALL THROTTLE CABLE IN CASE

Push the cable through the hole on the case, being careful not to damage the O-ring. Check for full seating.

NOTICE: In subsequent work, to avoid breaking the cable fitting do not roll the case over the cable.

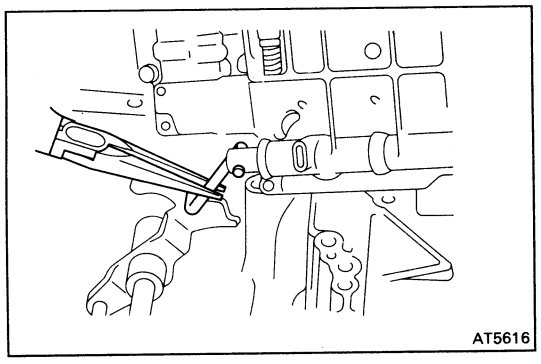


73. INSTALL SOLENOID WIRE

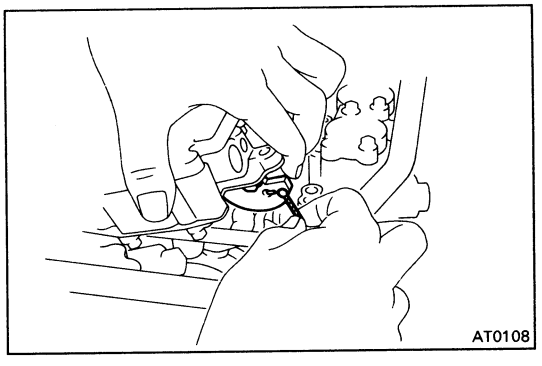


74. INSTALL VALVE BODY

(a) Coat the manual valve with ATF and install it to the valve body.

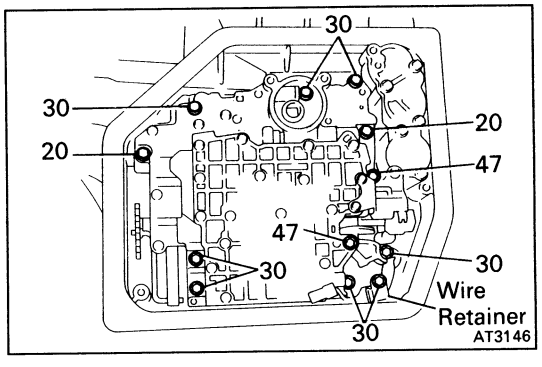


(b) Connect the connecting rod to the manual valve lever.



(c) Place the valve body on the transmission.

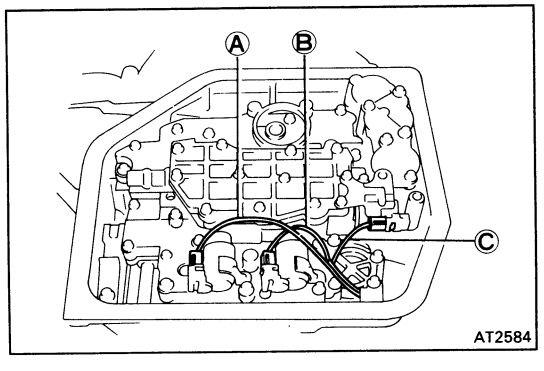
(d) While holding the cam down with your hand, slip the cable end into the slot.



(e) Install the twelve bolts and wire retainer shown in the illustration, and hand tighten all the bolts first. Then tighten them with a torque wrench.

HINT: Each bolt length (mm) is indicated in the illustration.

Torque: 100 kg-cm (7 ft-lb, 10 N·m)



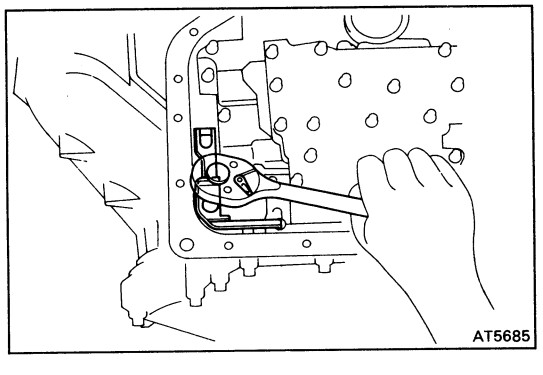
75. CONNECT SOLENOID CONNECTOR

HINT: Wire color

Ⓐ White

Ⓑ Black

Ⓒ Yellow



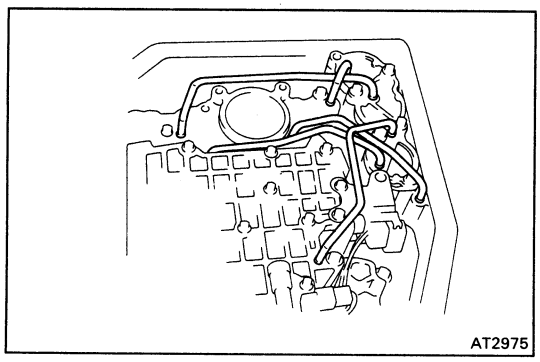
76. INSTALL MANUAL DETENT SPRING

(a) Install the detent spring and cover in place, and install the bolt (length: 16mm).

(b) Hand tighten the bolt first, then tighten the bolt with a torque wrench.

Torque: 100 kg-cm (7 ft-lb, 10 N·m)

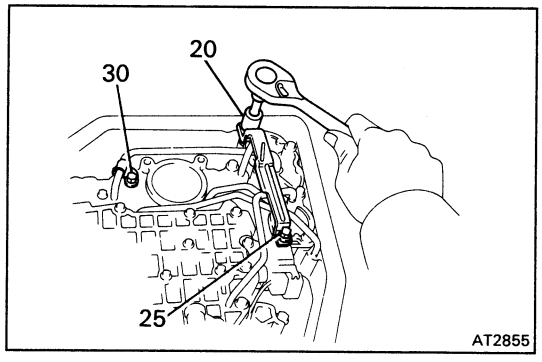
(c) Check that the manual valve lever is in contact with the center of the roller at the tip of the detent spring.



77. INSTALL OIL TUBES

(a) Tap the tubes with a plastic hammer to install them into the positions indicated in the illustration.

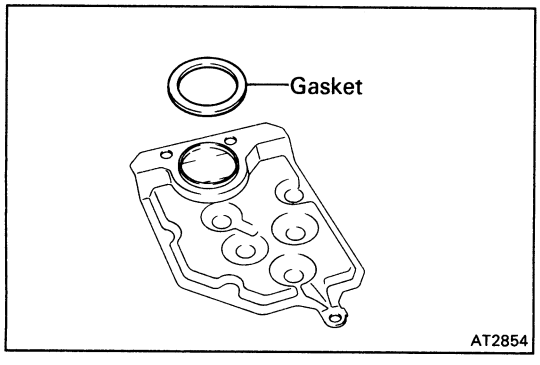
NOTICE: Be careful not to bend or damaged the tubes.



(b) Install the oil tube clamp and bracket.

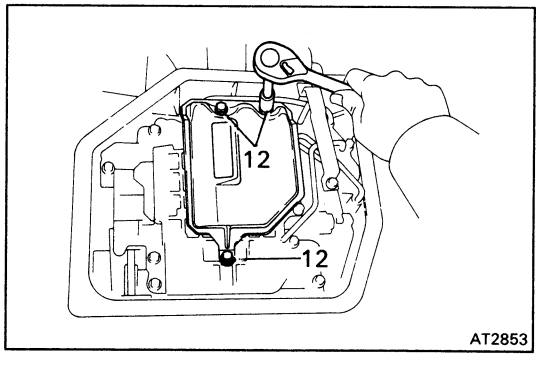
HINT: Each bolt length (mm) is indicated in the illustration. Hand tighten all bolts first, then tighten them with a torque wrench.

Torque: 100 kg-cm (7 ft-lb, 10 N·m)



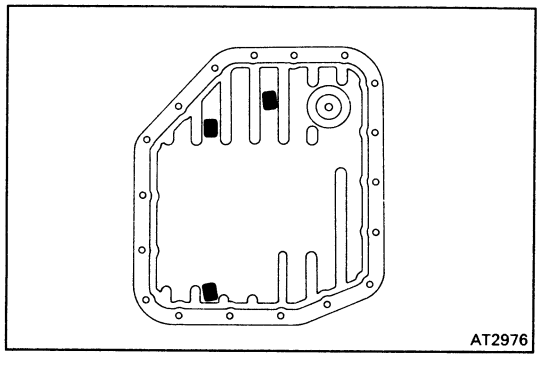
78. INSTALL OIL STRAINER

(a) Install the new gasket to the oil strainer.



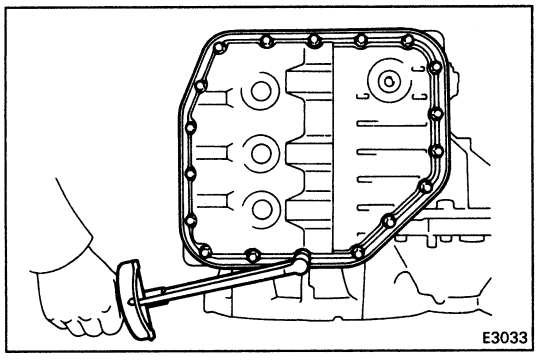
(b) Install the oil strainer with the three bolts.

HINT: Each bolt length (mm) is indicated in the illustration.



79. INSTALL THREE MAGNETS IN OIL PAN

NOTICE: Make sure that the magnets do not interfere with the oil tubes.

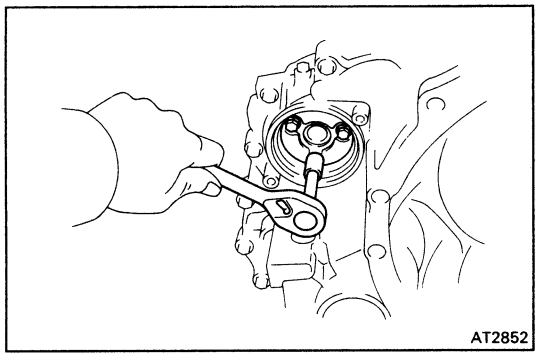


80. INSTALL OIL PAN

(a) Install a new gasket to the oil pan and install them to the transmission.

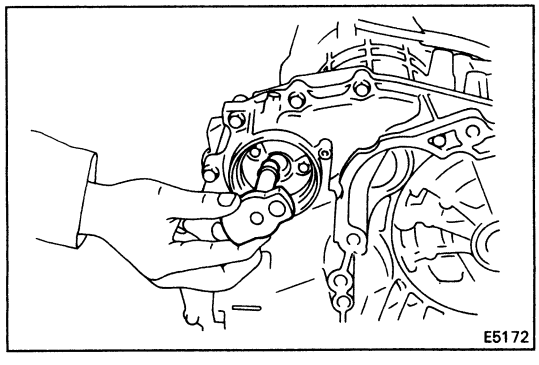
(b) Tighten the eighteen bolts.

Torque: 50 kg-cm (43 in.-lb, 4.9 N·m)

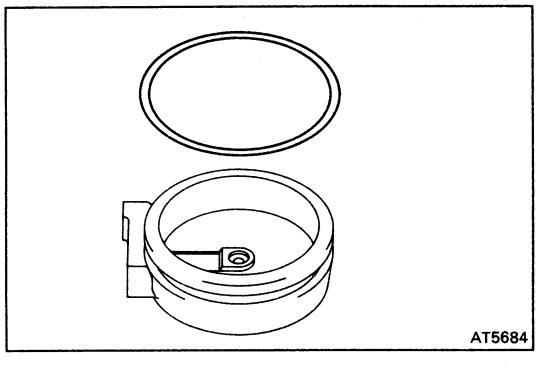


81. INSTALL SPEED SENSOR AND SENSOR ROTOR

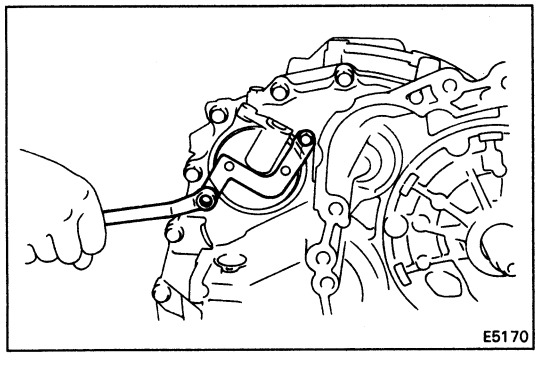
(a) Install the sensor adaptor with three bolts.



(b) Install the sensor rotor.

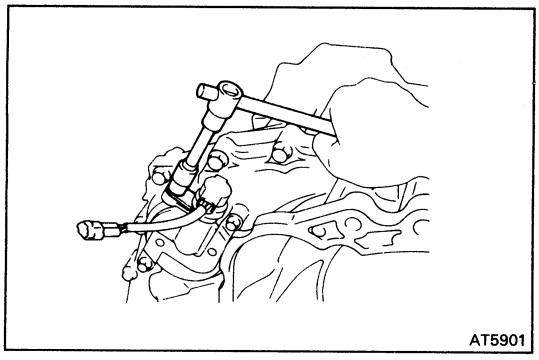


(c) Install a new O-ring to the sensor cover.



(d) Install the sensor cover to the transmission and then install the sensor cover bracket with the two bolts.

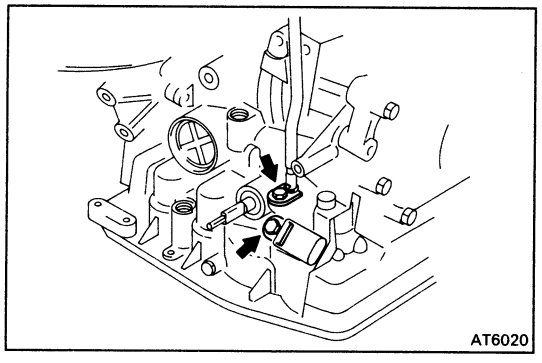
Torque: 130 kg-cm (9 ft-lb, 13 N·m)



(e) Coat a new O-ring with ATF and install it to the speed sensor.

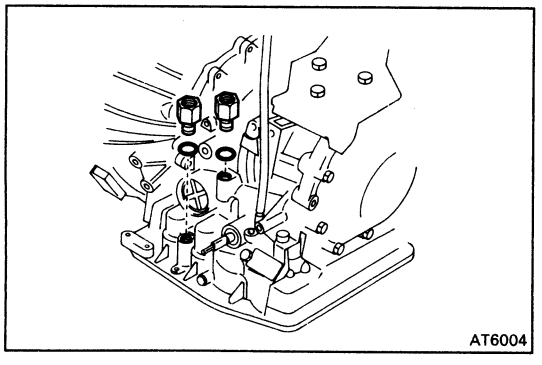
(f) Install the speed sensor and retaining plate.

Torque: 100 kg-cm (7 ft-lb, 10 N·m)



82. INSTALL SOLENOID WIRE RETAINING PLATE

83. INSTALL THROTTLE CABLE RETAINING PLATE

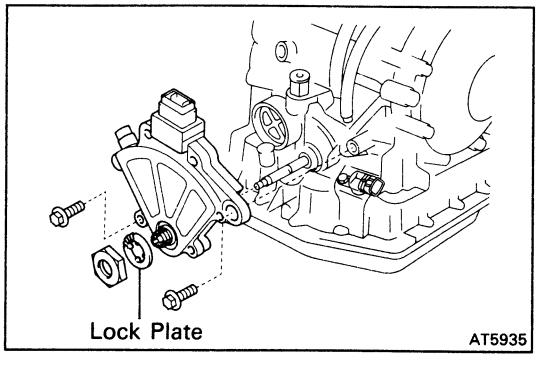


84. INSTALL UNION

(a) Install the new O-rings to the union.

(b) Install the union to the transaxle case.

Torque: 275 kg-cm (20 ft-lb, 27 N·m)



85. INSTALL NEUTRAL START SWITCH

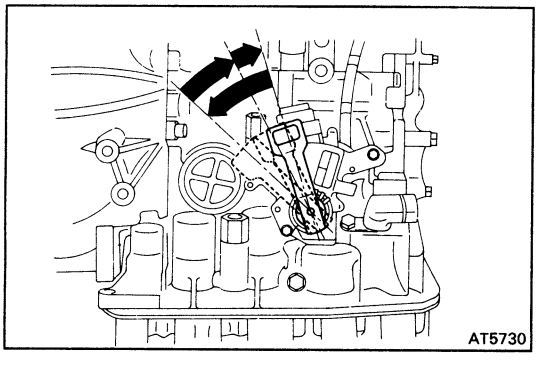
(a) Install the neutral start switch to the manual valve shaft.

(b) Place the new locking plate and tighten the nut.

Torque: 70 kg-cm (61 in.-lb, 6.9 N·m)

(c) Stake the nut with locking plate.

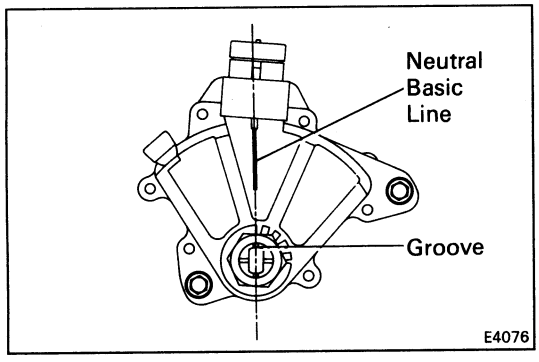
(d) Install the two bolts.



(e) Temporarily install the manual shift lever.

(f) Turn the lever counterclockwise until it stops, then turn it clockwise two notches.

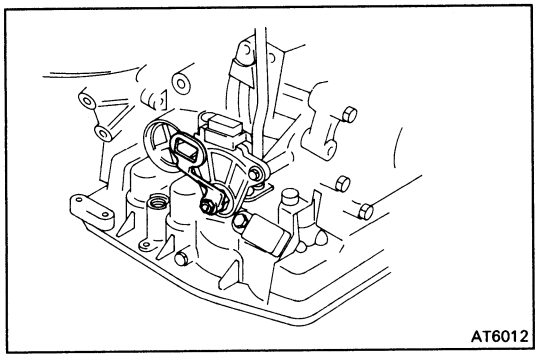
(g) Remove the manual shift lever.



(h) Align the groove and neutral basic line as shown.

(i) Install and tighten the two bolts.

Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)



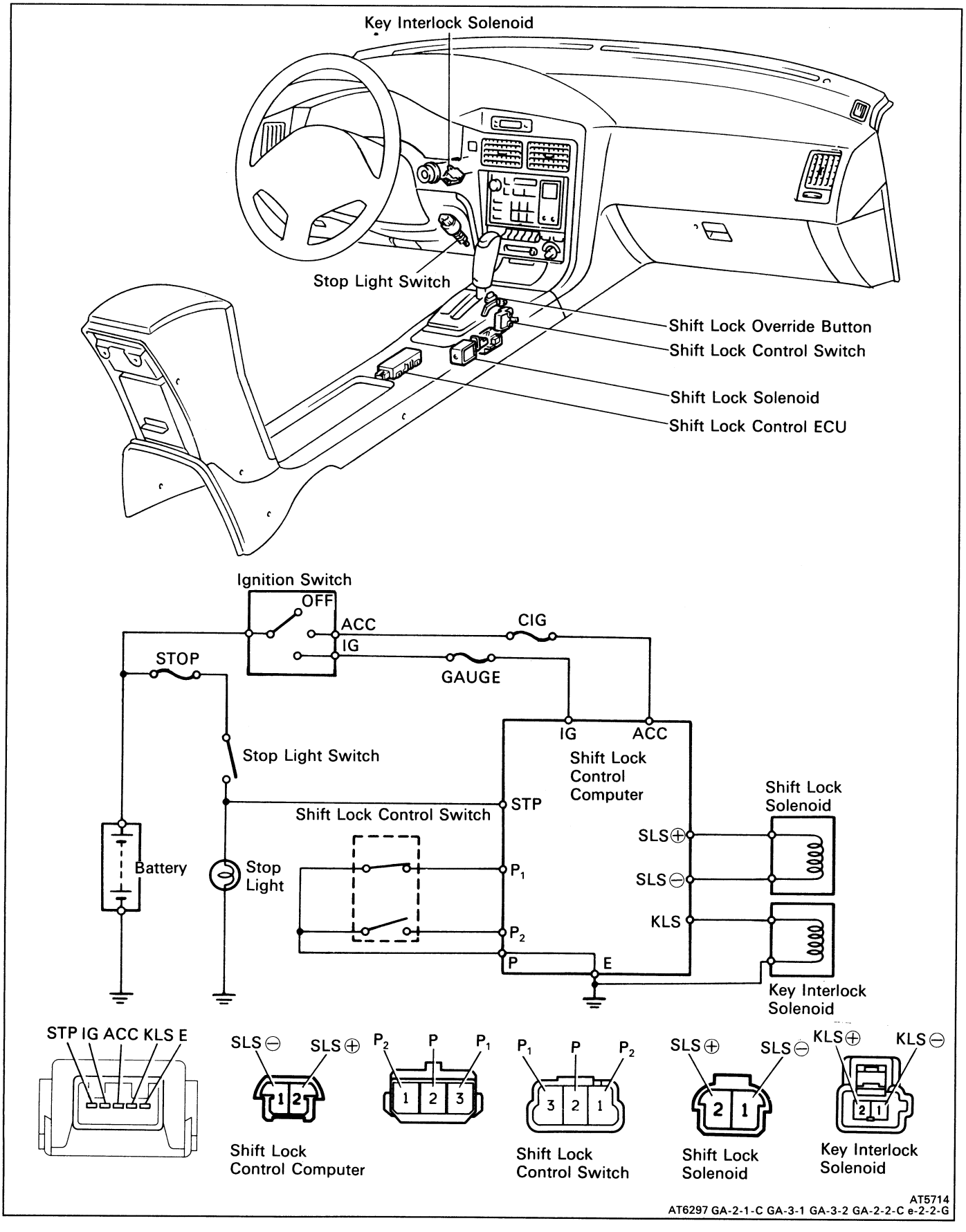
86. INSTALL MANUAL SHIFT LEVER

87. INSTALL FILLER TUBE AND TRANSMISSION DIPSTICK

88. INSTALL TWO OIL COOLER PIPES

SHIFT LOCK SYSTEM

COMPONENT AND CIRCUIT

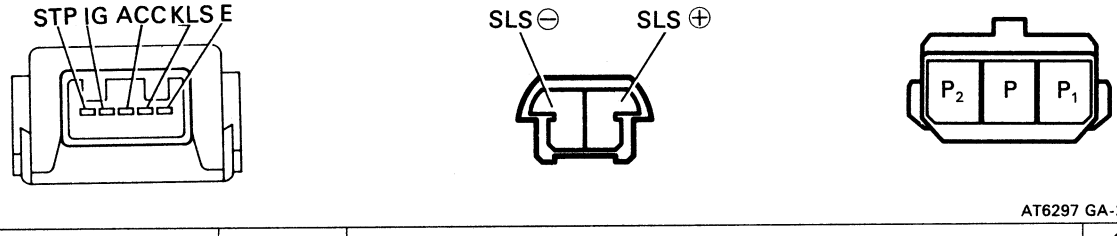


AT5714
AT6297 GA-2-1-C GA-3-1 GA-3-2 GA-2-2-C e-2-2-G

INSPECTION OF ELECTRIC CONTROL COMPONENTS

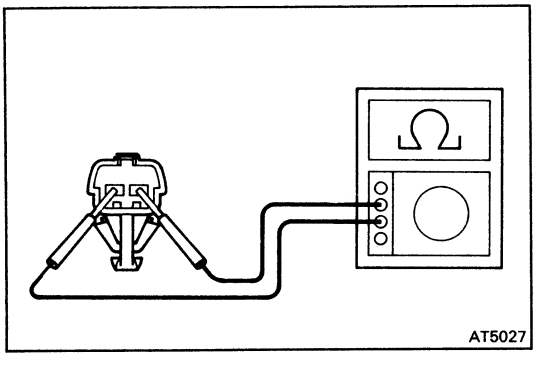
1. INSPECT SHIFT LOCK CONTROL ECU

Do not disconnect the ECU connector.
Measure the voltage and continuity between terminals.



AT6297 GA-2-1-1-C GA-3-1

Connector	Terminal	Measured Item	Measuring Condition	Specified Value
A	ACC – E	Voltage	Ignition switch ACC position	10 – 14 V
	IG – E	Voltage	Ignition switch ON position	10 – 14 V
	KLS – E	Voltage	① Ignition switch ACC position and "P" range	0 V
			② Ignition switch ACC position and other than "P" range	7.5 – 11.5 V
			③ ② and approx-after one second	6 – 9 V
	E – Ground	Continuity	All conditions	Continuity
	STP – E	Voltage	Release brake pedal	0 V
			Depress brake pedal	10 – 14 V
B	SLS⊖ – E	Continuity	All conditions	Continuity
	SLS⊕ – E	Voltage	① Ignition switch ON position and "P" range	0 V
			② ① and depress brake pedal	8.5 – 13.5 V
			③ ② and release brake pedal or ② and shift to range other than "P" range	0 V
C	P_2 – E	Voltage	① Ignition switch ACC position and "P" range	0 – 13.5 V
			② ① and push the shift lever knob, or Ignition switch ACC position and shift to range other than "P" range.	0 V
	P – E	Continuity	All conditions	Continuity
	P_1 – E	Voltage	Ignition switch ON position, "P" range and brake pedal depressed.	0 V
			Ignition switch ON position brake pedal depressed and shift to range other than "P" range	9 – 13.5 V

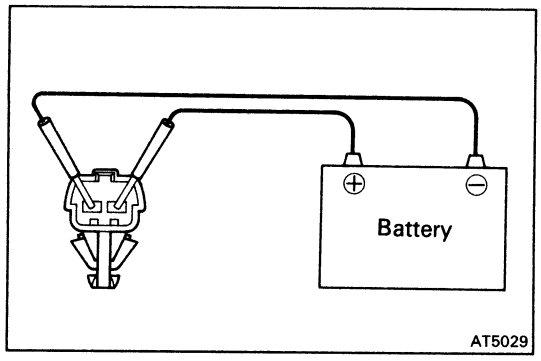


2. INSPECT SHIFT LOCK SOLENOID

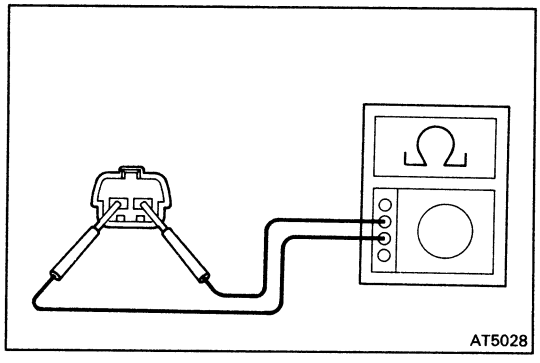
(a) Disconnect the solenoid connector.

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

Standard resistance: 21 – 27 Ω



(c) Apply battery voltage between terminals. Check that an operation noise can be heard from the solenoid.

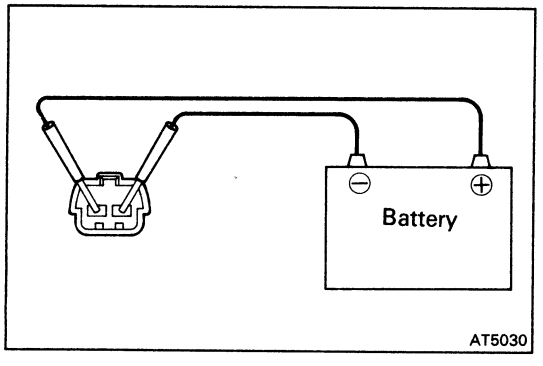


3. INSPECT KEY INTERLOCK SOLENOID

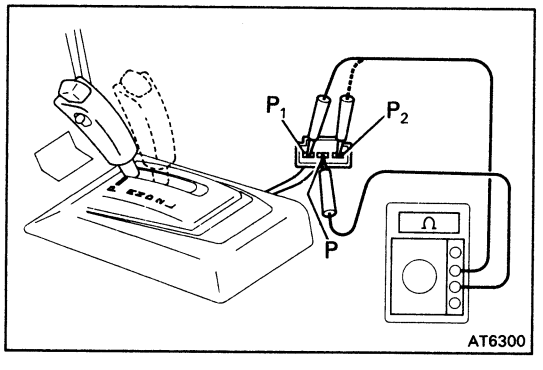
(a) Disconnect the solenoid connector.

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

Standard resistance: 12.5 – 16.5 Ω



(c) Apply the battery voltage between terminals. Check that an operation noise can be heard from the solenoid.



4. INSPECT SHIFT LOCK CONTROL SWITCH

Check whether there is continuity between each terminals.

O—O : Continuity

Shift Position \ Terminal	P	P_1	P_2
P range (Release button is not pushed)	O—O		
P Range (Release button is pushed)	O—O O		O
R, N, D, 2, L range	O		O

SUSPENSION AND AXLE

	Page
TROUBLESHOOTING	SA-2
WHEEL ALIGNMENT	SA-3
Front Wheel Alignment	SA-4
Rear Wheel Alignment	SA-6
FRONT AXLE HUB	SA-9
FRONT SUSPENSION	
Front Shock Absorber	SA-18
Ball Joints, Lower Arm and Stabilizer Bar	SA-24
REAR AXLE SHAFT AND CARRIER	SA-31
REAR DRIVE SHAFT (5S-FE ENGINE)	SA-39
REAR DRIVE SHAFT (3S-GTE ENGINE)	SA-52
REAR SUSPENSION	
Rear Shock Absorber	SA-69
Ball Joint, Lower Arm and Stabilizer Bar	SA-75
Engine Lateral Control Rod	SA-86

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page	
			Front	Rear
Wanders/pulls	Tires worn or improperly inflated	Replace tire or inflate tires to proper pressure	SA-3	SA-3
	Wheel alignment incorrect	Check wheel alignment	SA-4	SA-6
	Hub bearing worn	Replace hub bearing	SA-9	SA-31
	Front of rear suspension parts loose or broken	Tighten or replace suspension parts	SA-18	SA-69
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-22	–
Bottoming	Vehicle overloaded	Check loading		
	Shock absorber worn out	Replace shock absorber	SA-18	SA-69
	Spring weak	Replace spring	SA-18	SA-69
Sways/pitches	Tires improperly inflated	Inflate tires to proper pressure	SA-3	SA-3
	Stabilizer bar bent or broken	Inspect stabilizer bar	SA-24	SA-69
	Shock absorber worn out	Replace shock absorber	SA-18	SA-69
Front wheel shimmy	Tires worn or improperly inflated	Replace tire or inflate tires to proper pressure	SA-3	–
	Wheels out of balance	Balance wheels		
	Shock absorber worn out	Replace shock absorber	SA-18	–
	Wheel alignment incorrect	Check front wheel alignment	SA-4	–
	Hub bearings worn	Replace hub bearings	SA-9	–
	Ball joints or bushings worn	Inspect ball joints and bushings	SA-24	–
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-22	–
Abnormal tire wear	Tires improperly inflated	Inflate tires to proper pressure	SA-3	SA-3
	Shock absorber worn out	Replace shock absorber	SA-18	SA-69
	Wheel alignment incorrect	Check wheel alignment	SA-4	SA-6
	Suspension parts worn	Replace suspension parts	SA-18	SA-69

WHEEL ALIGNMENT

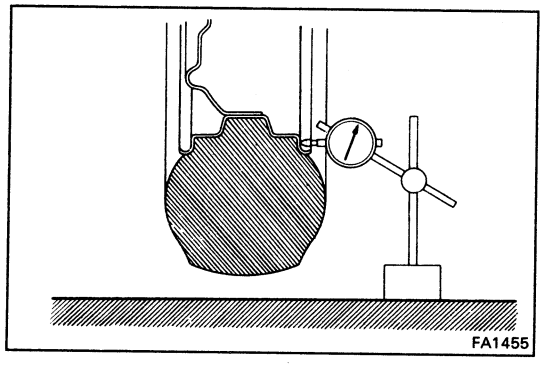
1. MAKE FOLLOWING CHECKS AND CORRECT ANY PROBLEMS

(a) Check the tires for wear, size and proper inflation pressure.

Cold tire inflation pressure:

kg/cm² (psi, kPa)

Engine type	Tire size	Tire pressure
5S-FE Engine	195/60HR14(Front)	2.0 (29, 200)
	205/60HR14(Rear)	2.3 (33, 225)
3S-GTE Engine	195/60VR14(Front)	2.0 (29, 200)
	205/60VR14(Rear)	2.3 (33, 225)


FA1455

(b) Check the wheel runout.

Lateral runout: Less than 1.0 mm (0.039 in.)

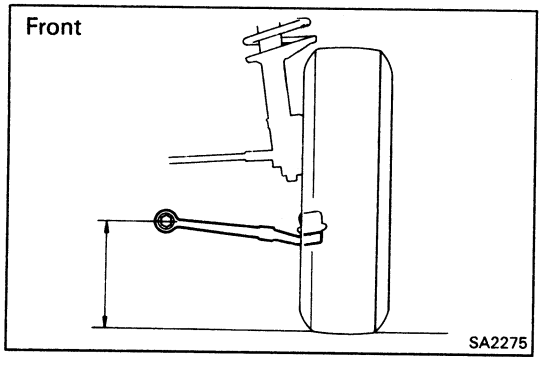
(c) Check the front wheel bearings for looseness.

(d) Check the front suspension for looseness.

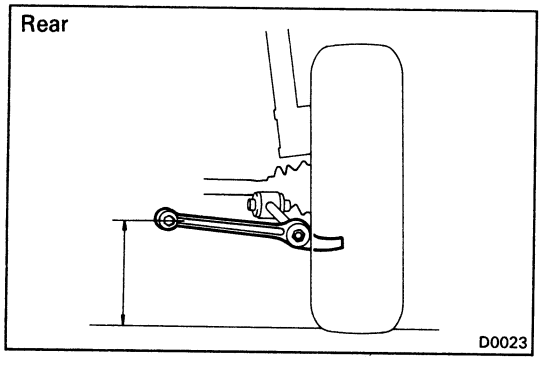
(e) Check the steering linkage for looseness.

(f) Check the ball joint for excessive looseness.

(g) Check that the front shock absorber work properly by using the standard bounce test.



SA2275



D0023

2. MEASURE VEHICLE HEIGHT

Vehicle height:

Front 224 mm (8.82 in.)
Rear 203 mm (7.99 in.)

HINT:

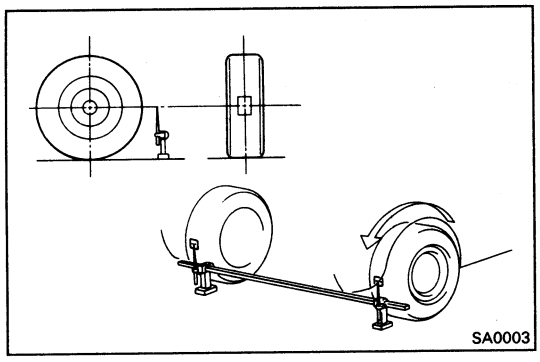
- Measuring point

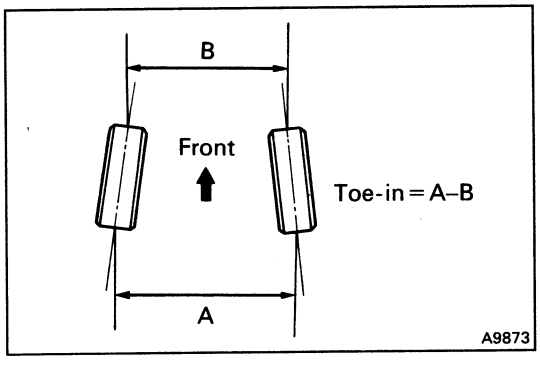
  Front – Measure from the ground to the center of the lower suspension arm mounting bolt.

  Rear – Measure from the ground to the center of the body side Rear suspension No.1 mounting bolt.

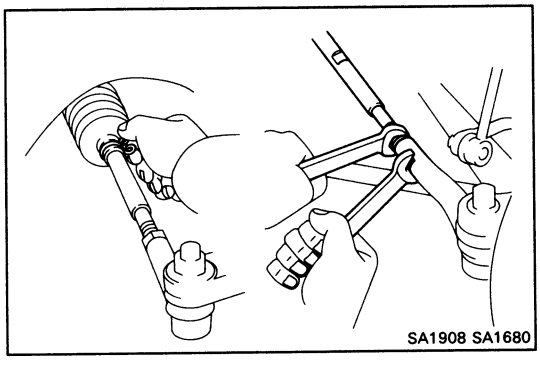
- Before inspecting the wheel alignment, adjust the chassis ground clearance to specification.

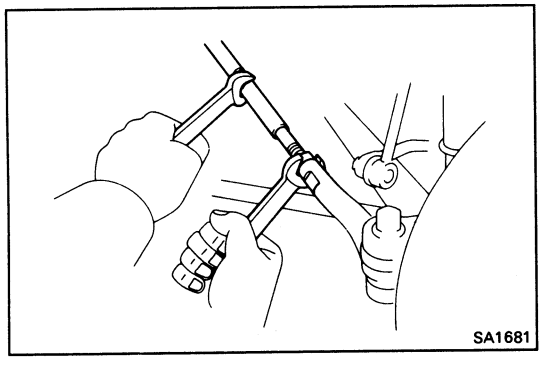
If the clearance of the vehicle is not standard, try to adjust it by pushing down in the body or by lifting the body. If still not correct, check for bad springs or suspension parts.

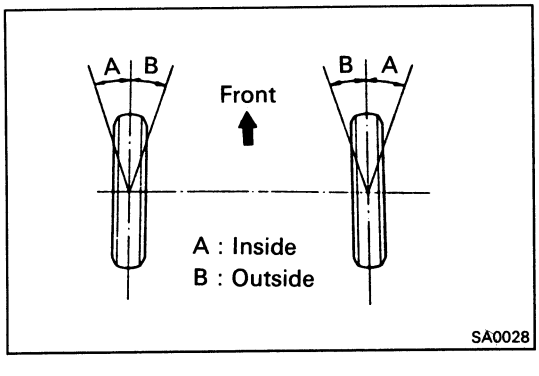

SA0003



A9873


SA1908 SA1680


SA1681



SA0028

Front Wheel Alignment

1. INSPECT TOE-IN

Measure toe-in with a toe-in gauge in the following procedure.

(a) Bounce the vehicle up and down to stabilize the suspension.

(b) Move the vehicle forward about 5 m (16.4 ft) with the front wheel 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 sides of the tires come to the measuring heights of the gauge on the front side.

HINT: If the tire rolls too far, repeat from step (b).

(e) Measure the distance between the marks on the front of the tires.

Inspection standard: 1 ± 2 mm (0.04 ± 0.08 in.)

If toe-in is not within specification, adjust by the tie rod end.

2. ADJUST TOE-IN

(a) Remove the boot clips.

(b) Loosen tie rod end lock nut.

(c) Turn the left and right tie rod ends an equal amount to adjust the toe-in.

Adjustment standard: 1 ± 1 mm (0.04 ± 0.04 in.)

HINT: Insure that the lengths of the left and right tie rod ends are the same.

Tie rod end length left-right error:
1.0 mm (0.039 in.) or less

(d) Torque the tie rod end lock nuts.

Torque: 480 kg-cm (35 ft-lb, 47 N·m)

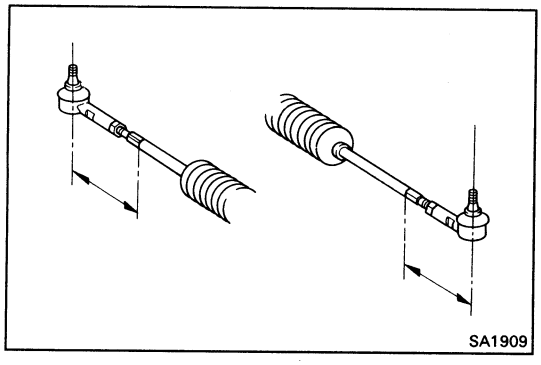
(e) Place the boot on the seat and clamp it.

HINT: Insure that the boots are not twisted.

3. CHECK WHEEL ANGLE

Wheel Angle (Maximum):

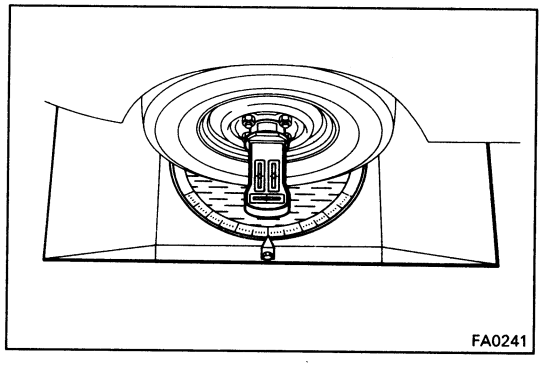
Inside wheel	**37°30′ ± 1°30′**
Outside wheel	**32°**



If wheel angles differ from the standard specifications, check to see of the lengths of the left and right tie rods are the same.

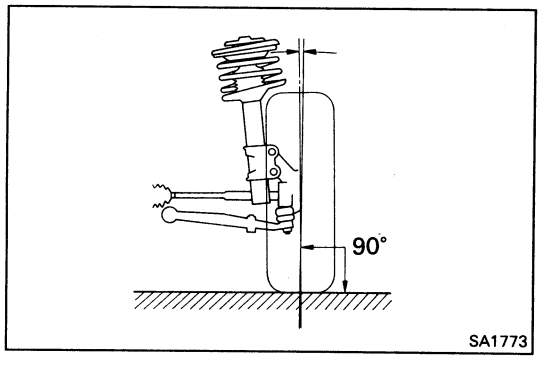
HINT: If the rod lengths are not equal, the wheel angle cannot be adjusted properly.

If the tie rod lengths were changed to adjust the wheel angle, inspect the toe-in.



4. INSTALL WHEEL ALIGNMENT EQUIPMENT

Follow the specific instructions of the equipment manufacturer.

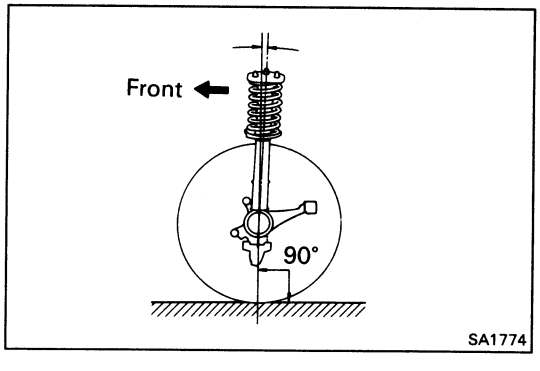


5. CHECK CAMBER

Camber:

Inspection standard	**–0°55′ ± 30′**
Left-right error	**30° or less**

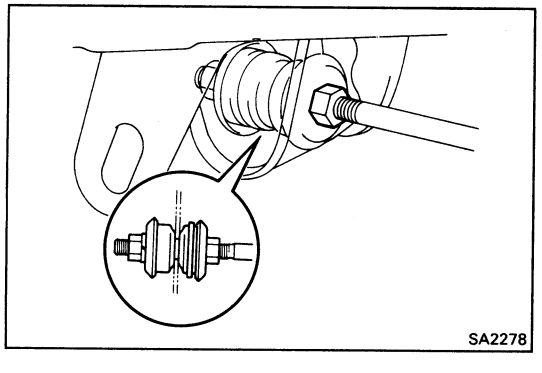
HINT: Camber is not adjustable, of measurement is not within specification, inspect and replace the suspension parts as necessary.



6. CHECK CASTER

Caster:

Inspection standard	**2°45′ ± 45′**
Adjustment standard	**2°45′ ± 30′**
Left-right error	**30′ or less**



If caster is not within specification, adjust by turning the nut.

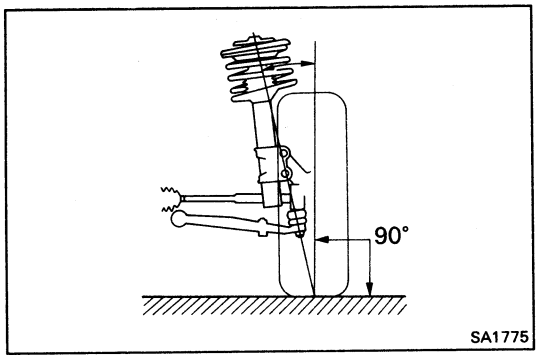
(a) Loosen the strut bar front nut.

(b) Turn the camber adjusting nut to adjust.

HINT: Each revolution of the nut alters the caster angle by 14′.

(c) Tighten the strut bar front nut.

Torque: 1,150 kg-cm (83 ft-lb, 113 N·m)

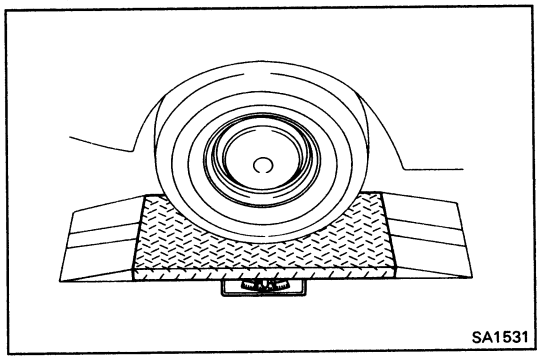


7. CHECK STEERING AXIS INCLINATION

Steering axis inclination:

Inspection standard	**13°30′ ± 30′**
Left-right error	**30′ or less**

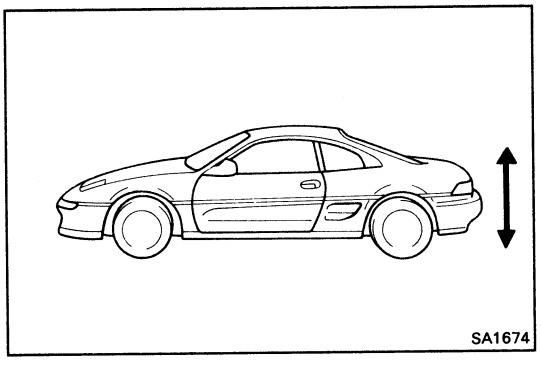
HINT: Steering axis inclination is not adjustable, if measurement is not within specification, inspect and replace the suspension parts as necessary.



8. CHECK SIDE SLIP (REFERENCE ONLY)

Side slip: 3.0 mm/m (0.118 in./3.3 ft) or less

Rear Wheel Alignment

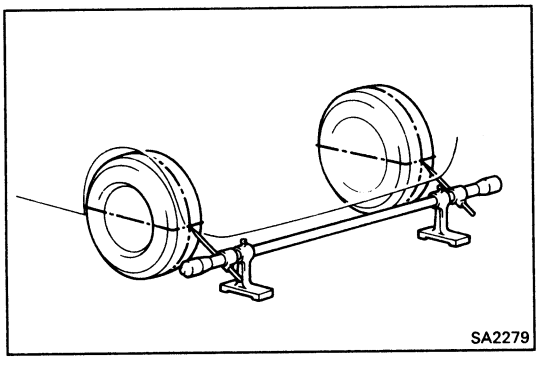


1. INSPECT TOE-IN

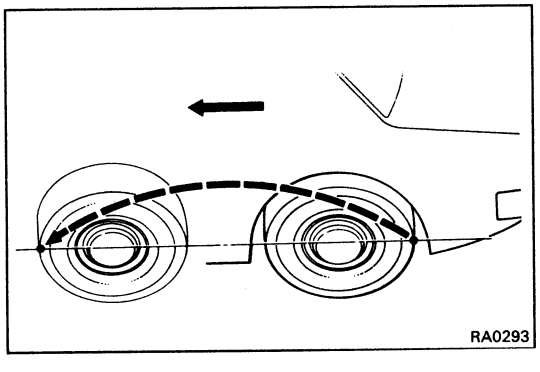
Adjust toe-in with a toe-in gauge in the following procedure.

(a) Bounce the vehicle up and down to stabilize the suspension.

(b) Move the vehicle forward about 5 m (16.4 ft) with the front wheels in the straight-ahead position on a level place.

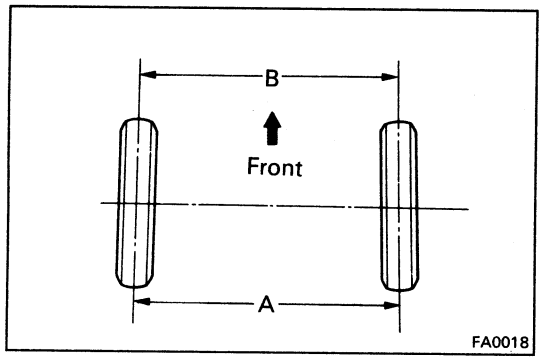


(c) Mark the center of each rear tread and measure the distance between the marks of the right and left tires.



(d) Advance the vehicle until the marks on the rear sides of the tires come to the measuring heights of the gauge on the front side.

HINT: If the tire rolls too far, repeat from step (b).



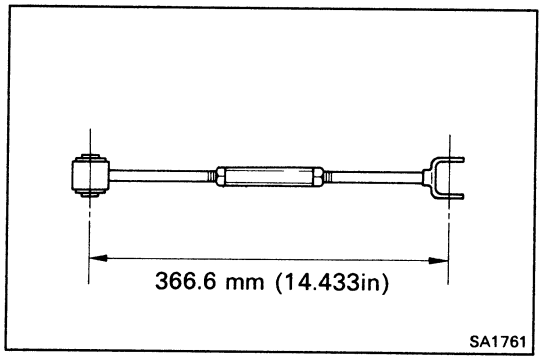
(e) Measure the distance between the marks on the front side of the tires.

Toe-in:

Inspection STD 5 ± 1 mm (0.20 ± 0.04 in.)

If not within specification, inspect and replace any damaged or worn rear suspension parts.

HINT: After replacing damaged or worn suspension parts, measure the toe-in following (b), (c), (d) and (e) above. If toe-in is still not within standard, adjust the toe-in.

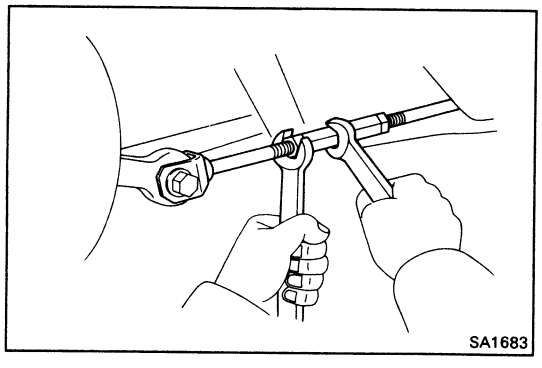


2. ADJUST TOE-IN

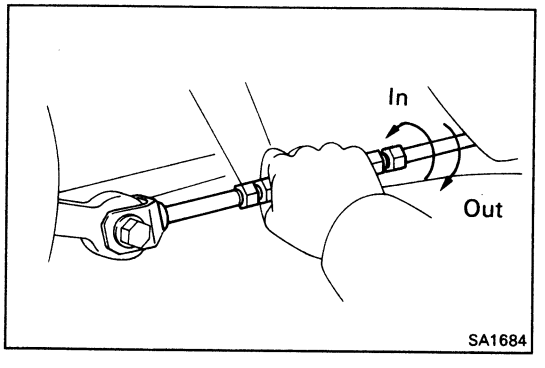
(a) Measure the lengths of the left and right suspension arms to see of the length are equal.

If not equal, adjust following the procedures below.

- If the toe-in is less than standard, adjust the length of the shorter arm by the tie rod tube.
- If the toe-in is greater than standard, adjust the length of the longer arm by the tie rod tube.



(b) Loosen the nuts.



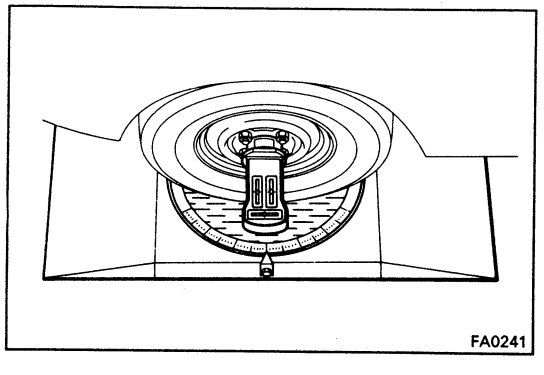
(c) Turn the left and right tie rod tubes and equal amount.

Toe-in:

Adjustment STD 5 ± 1 mm (0.20 ± 0.04 in.)

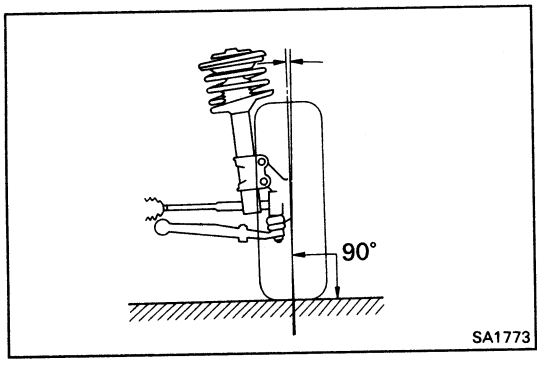
(d) Tighten the nuts.

(e) After toe-in adjustment.



3. INSTALL WHEEL ALIGNMENT EQUIPMENT

Follow the specific instructions of the equipment manufacturer.



4. CHECK CAMBER

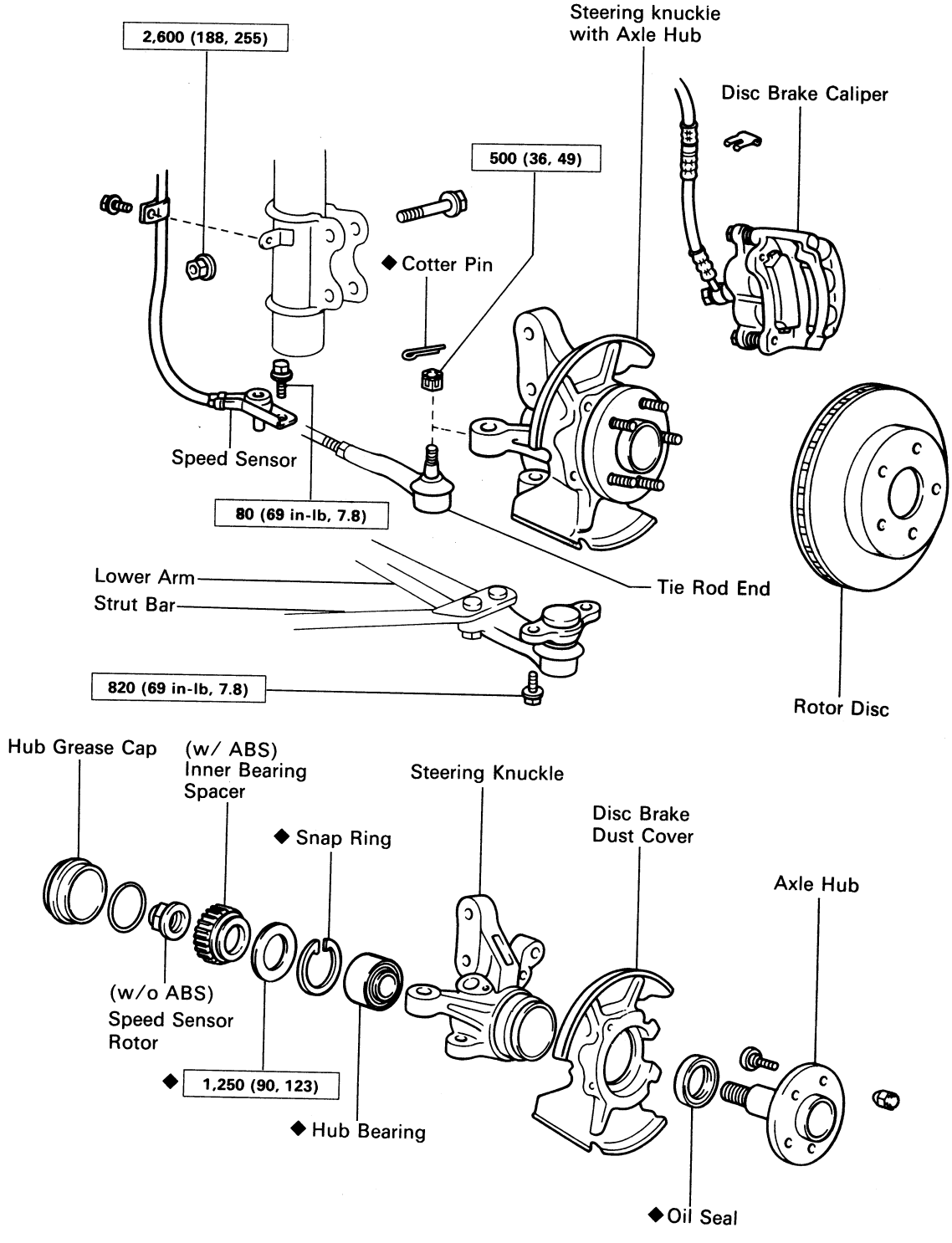
Camber:

Inspection standard	**–1°20′ ± 30′**
Left-right error	**30′ or less**

HINT: Camber is not adjustable, if measurement is not within specification, inspect and replace the suspension parts as necessary.

FRONT AXLE HUB

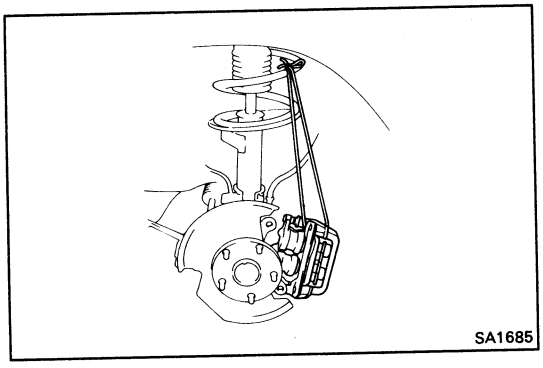
COMPONENTS



kg-cm (ft-lb, N·m) : Specified torque

◆ Non-reusable part

SA1930

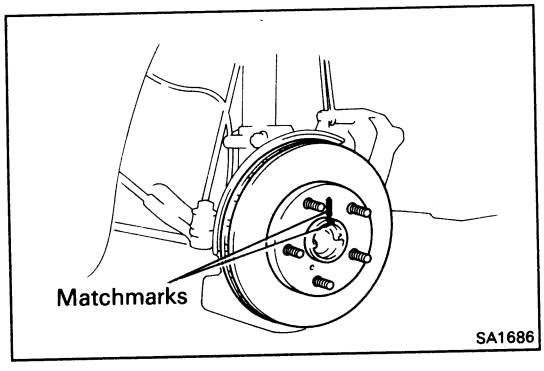

SA1685

REMOVAL OF FRONT AXLE HUB

(See page SA-9)

1. REMOVE BRAKE CALIPER AND ROTOR DISC

(a) Remove the brake caliper from the steering knuckle and suspend it with wire.



SA1686

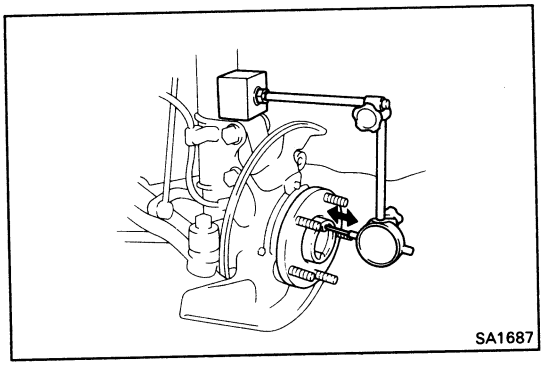
(b) Remove the rotor disc.

HINT: Before removing the rotor disc, place the matchmarks on the axle hub and rotor disc.

2. CHECK BEARING PLAY IN AXIAL DIRECTION

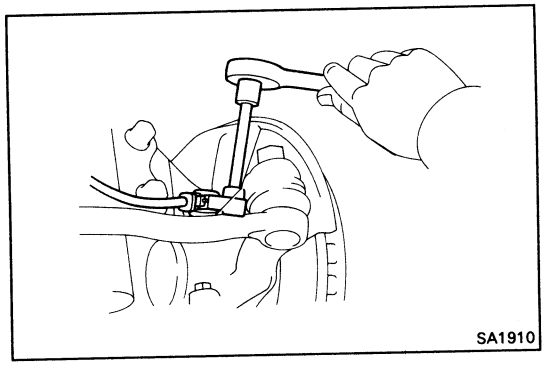
Bearing play: 0.05 mm (0.0020 in.) or less

If the bearing play is greater than the maximum, replace the bearing.


SA1687

3. (w/ ABS) REMOVE SPEED SENSOR

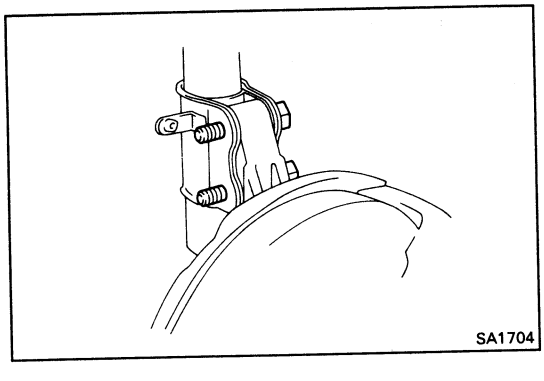
Remove the bolt and pull out the speed sensor.

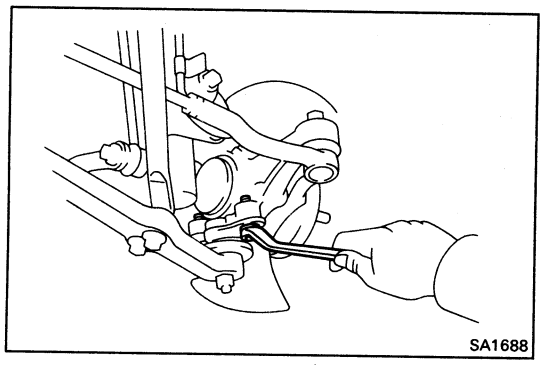

SA1910

4. LOOSEN BOLTS AND NUTS OF SHOCK ABSORBER LOWER BRACKET

Loosen the bolts and nuts, and remove the nuts.

HINT: Leave the bolts not to drop the steering knuckle assembly.

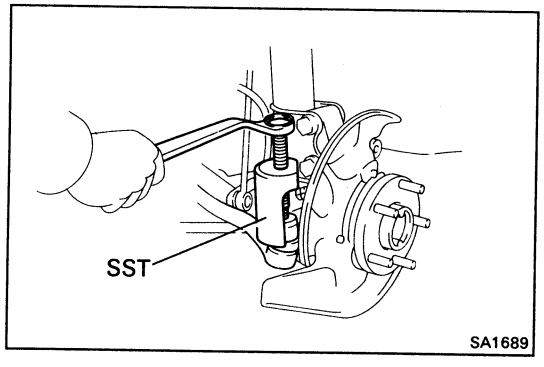

SA1704



5. DISCONNECT LOWER BALL JOINT AND TIE ROD END

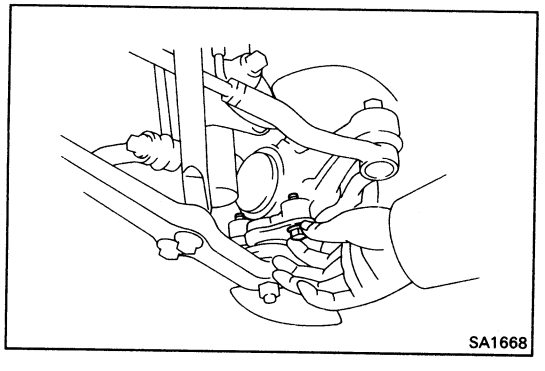
(a) Loosen the two ball joint set bolts.

(b) Remove the cotter pin and nut from the tie rod end.

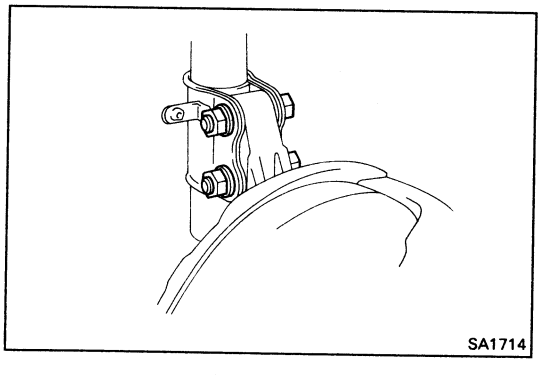


(c) Using SST, disconnect the tie rod end from the steering knuckle.

SST 09610-20012

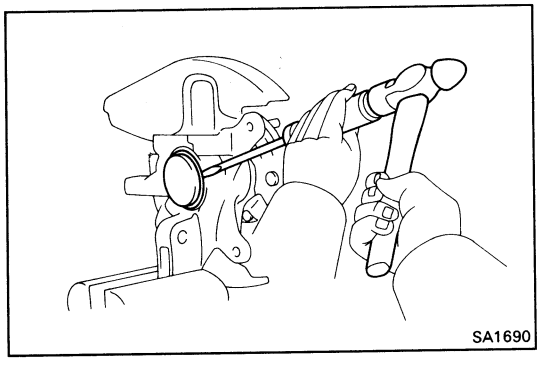


(d) Remove the two bolts and ball joint from the steering knuckle.



6. REMOVE STEERING KNUCKLE WITH AXLE HUB

Remove the two upper axle hub bolts and remove the steering knuckle.



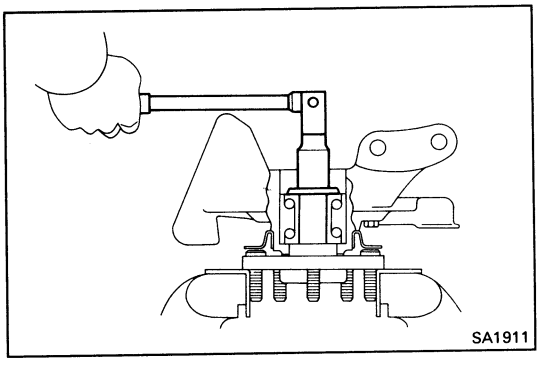
DISASSEMBLY OF FRONT AXLE HUB

(See page SA-9)

1. REMOVE HUB BEARING CAP

(a) Clamp the steering knuckle in a soft jaw vice.

(b) Using a screwdriver and hammer, remove the hub bearing cap.

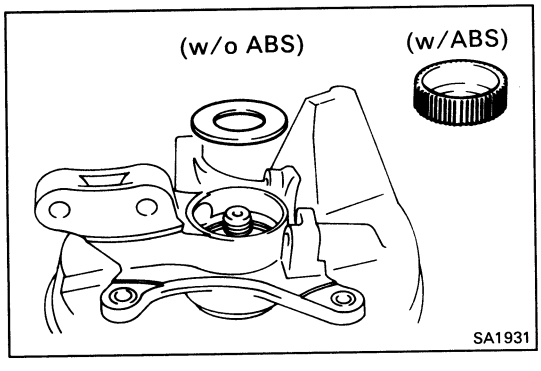


2. REMOVE FRONT AXLE HUB LOCK NUT

(a) Clamp the axle hub in soft jaw vice.

HINT: Close vice until it holds hub bolt. Do not tighten further.

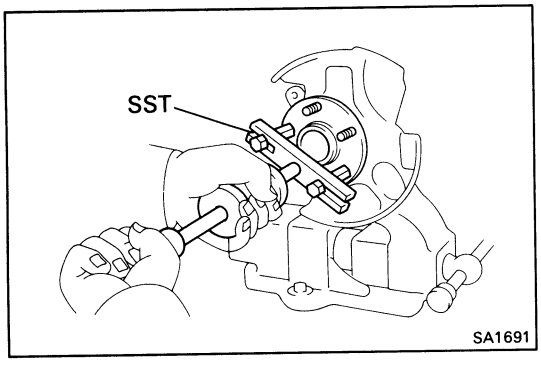
(b) Using a hammer and chisel, loosen the staked part of the nut and remove the lock nut.



3. (w/ ABS)
REMOVE SPEED SENSOR ROTOR

NOTICE: Take care to not scratch the serrations of speed sensor rotor.

4. (w/o ABS)
REMOVE BEARING INNER SPACER

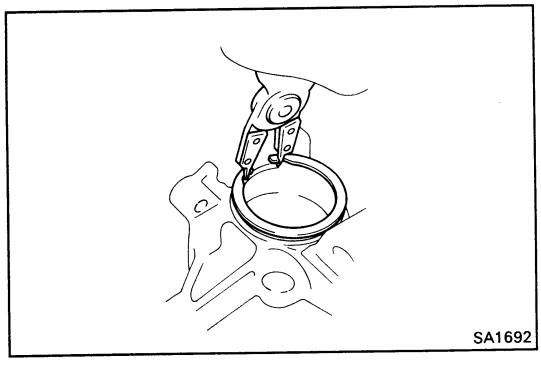


5. REMOVE AXLE HUB

(a) Remove the disc brake dust cover.

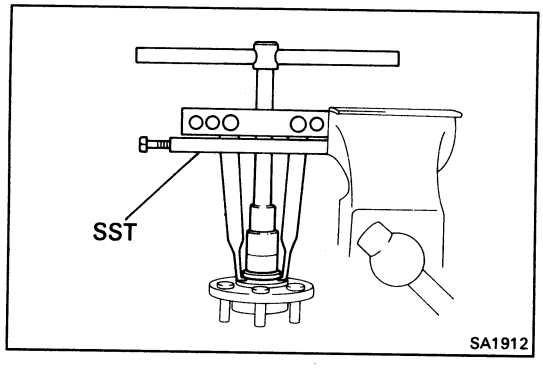
(b) Using SST, remove the axle hub from the steering knuckle.

SST 09520-00031



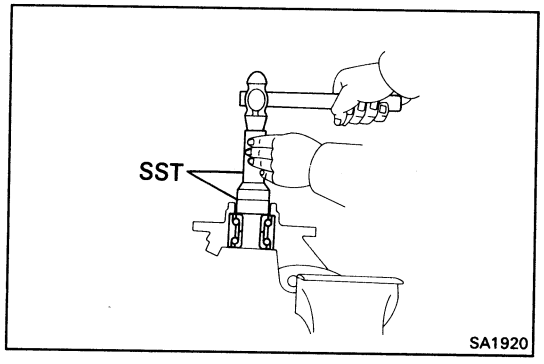
6. REMOVE HUB BEARING

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



(b) Using SST, remove the hub bearing inner race (outside) from the axle hub.

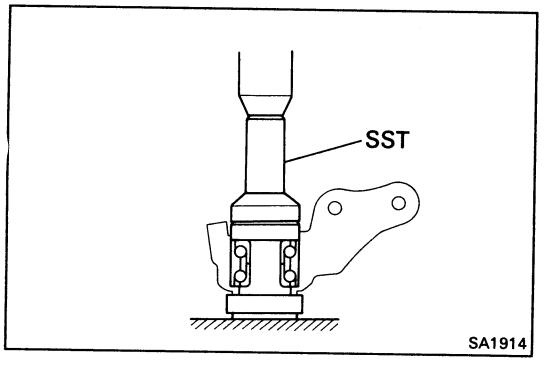
SST 09950-20017



(c) First place the removed inner race (outside) in the bearing.

(d) Using SST, drive out the hub bearing from the steering knuckle.

SST 09608-30012 (09608-04020), 09649-17010



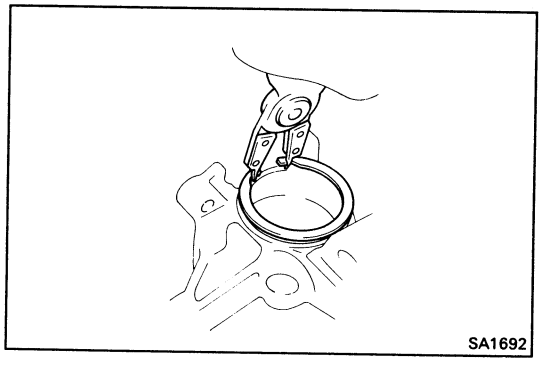
ASSEMBLY OF FRONT AXLE HUB

(See page SA-9)

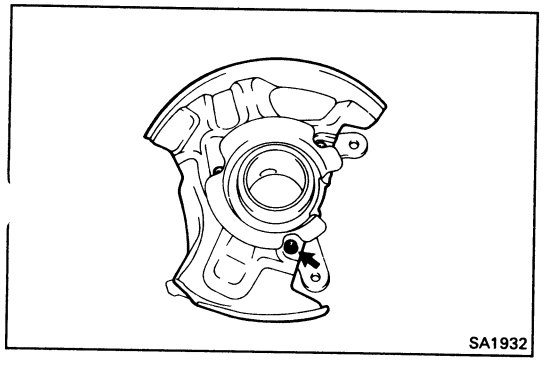
1. INSTALL HUB BEARING

(a) Using SST, install the hub bearing.

SST 09608-30012 (09608-04020)



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



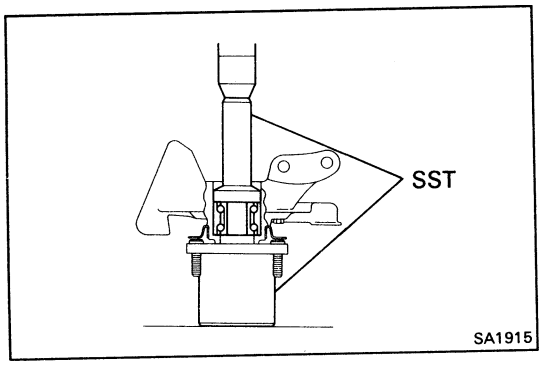
2. INSTALL DISC BRAKE DUST COVER

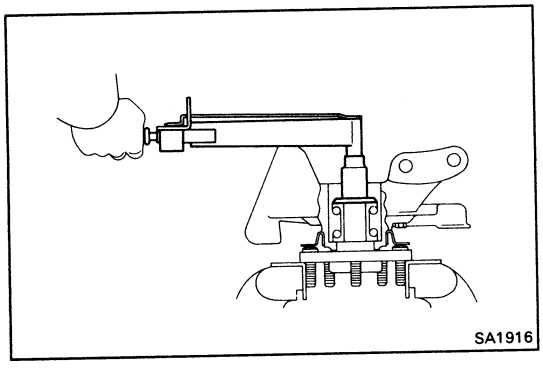
HINT: Apply liquid sealer or sealant the dust cover and steering knuckle connection before assemble.

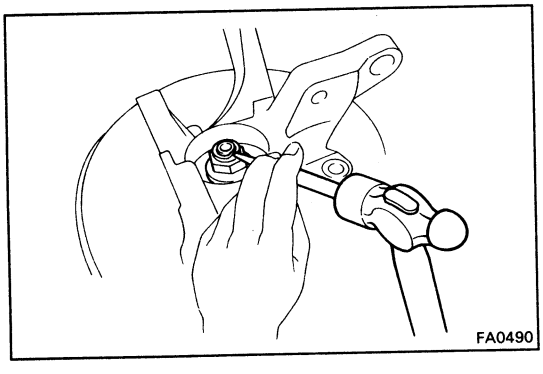
(a) Install the dust cover in place.

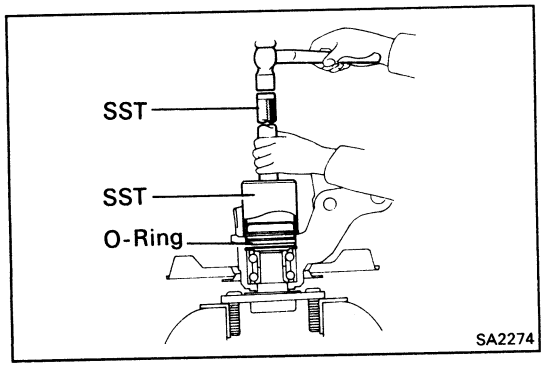
(b) Using a torx driver, install and torque the four bolts.

Torque: 85 kg-cm (74 in.-lb, 8.3 N·m)









3. INSTALL AXLE HUB

(a) Coat the MP grease to the oil seal lip.

(b) Install the bearing outer and inner race into the hub bearing.

(c) Using SST, install the axle hub to the steering knuckle.

SST 09608-30012 (09608-04020)

(d) (w/ ABS)
Install the speed sensor rotor.

NOTICE: Take care to not scratch the serrations of speed sensor rotor.

(w/o ABS)
Install the bearing inner spacer.

(e) Install and torque the axle hub lock nut.

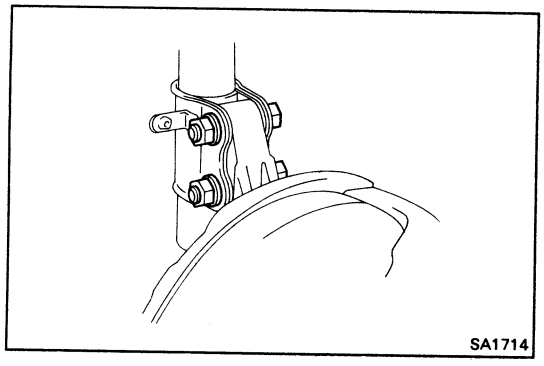
Torque: 1,250 kg-cm (90 ft-lb, 123 N·m)

(f) Using a hammer and punch, stake the nut.

4. INSTALL HUB GREASE CAP

Using SST, install hub grease cap.

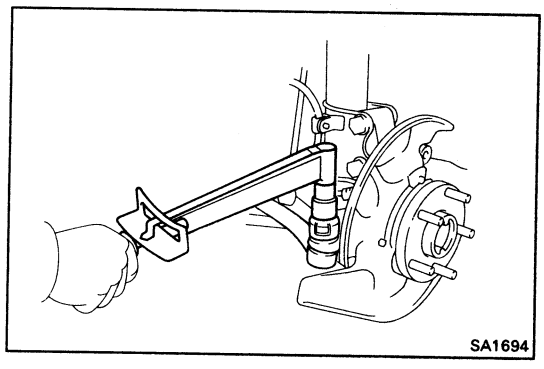
SST 09608-30012(09608-04020), 09649-17010


SA1714

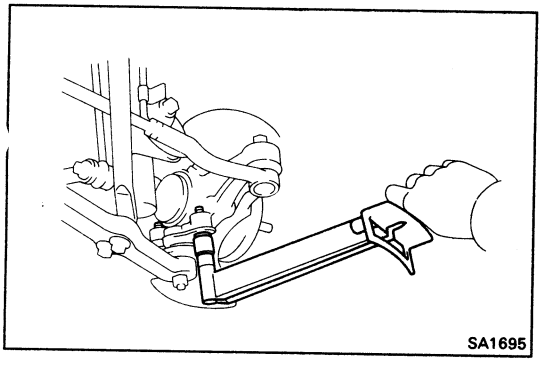
INSTALLATION OF FRONT AXLE HUB

(See page SA-9)

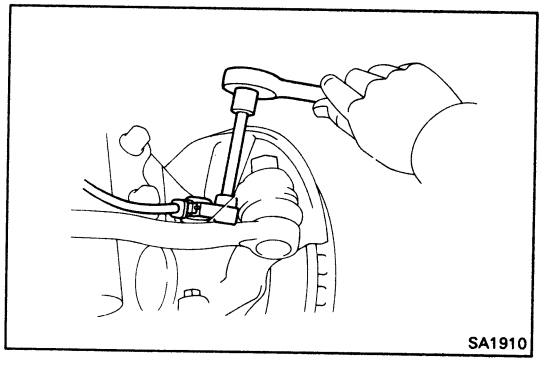
1. **INSTALL STEERING KNUCKLE TO SHOCK ABSORBER**
   (a) Connect the steering knuckle to the shock absorber lower bracket with two bolts.
   (b) Install and finger tighten the two nuts.


SA1694

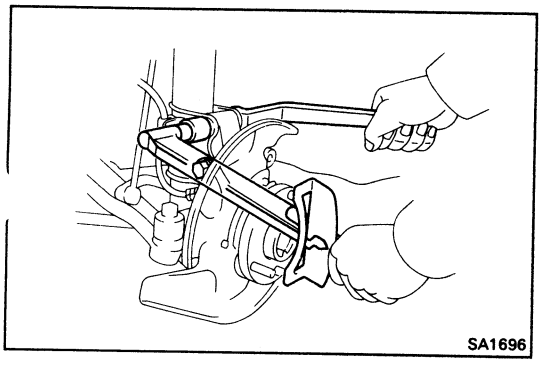
2. **CONNECT TIE ROD END TO STEERING KNUCKLE**
   Torque the castle nut and secure it with a new cotter pin.
   Torque: 500 kg-cm (36 ft-lb, 49 N·m)


SA1695

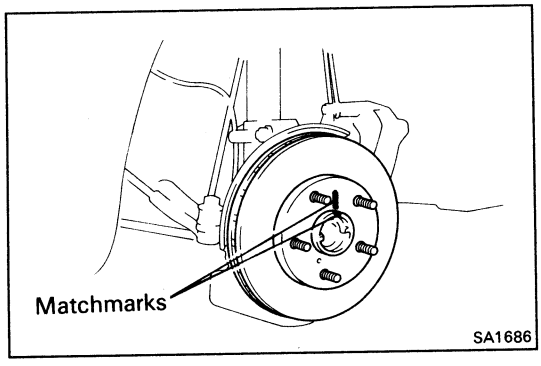
3. **TORQUE STEERING KNUCKLE TO BALL JOINT**
   Install and torque the two bolts.
   Torque: 820 kg-cm (59 ft-lb, 80 N·m)


SA1910

4. **(w/ ABS)**
   INSTALL SPEED SENSOR
   Install the speed sensor in place, then install and torque the bolt.
   HINT: Before installing, check that there is no ferric chip or foreign material on the sensor tip.
   Torque: 80 kg-cm (69 in.-lb, 7.8 N·m)

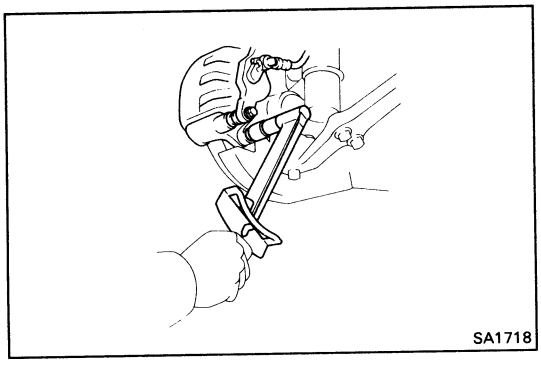

SA1696

5. **TORQUE STEERING KNUCKLE TO SHOCK ABSORBER**
   Torque: 2,600 kg-cm (188 ft-lb, 255 N·m)



6. INSTALL ROTOR DISC TO AXLE HUB

HINT: Before removing the rotor disc, place the matchmarks on the axle hub and rotor disc.

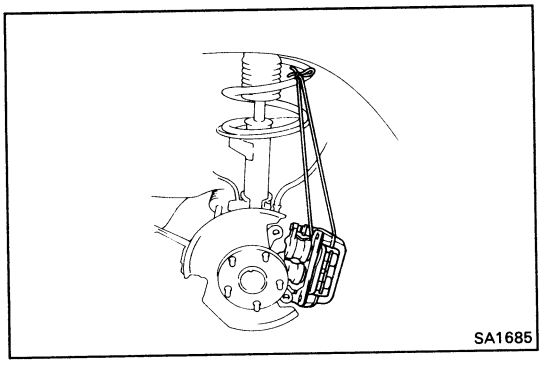


7. INSTALL DISC BRAKE CALIPER TO STEERING KNUCKLE

Install and torque the two bolts.

Torque: 600 kg-cm (43 ft-lb, 59 N·m)

REPLACEMENT OF FRONT AXLE HUB BOLT

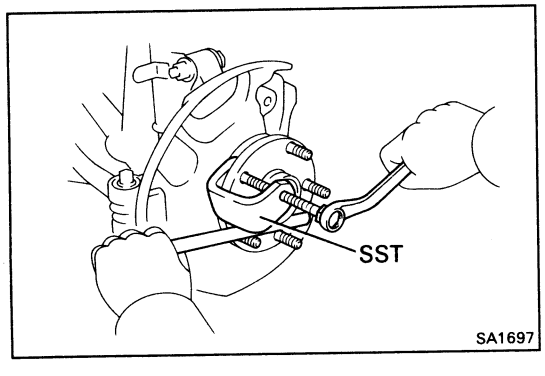


1. REMOVE BRAKE CALIPER

Remove the brake caliper from the steering knuckle and suspend it with a wire.

2. REMOVE ROTOR DISC

Align the matchmarks, and install the rotor disc to the axle hub.

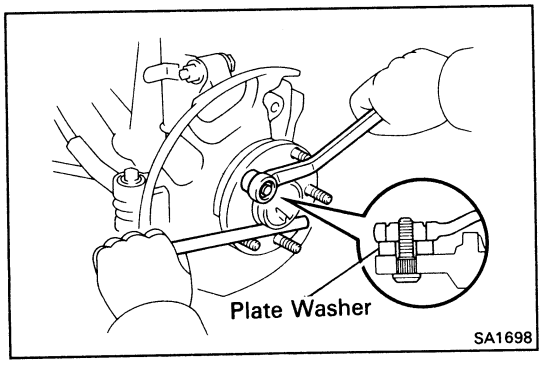


3. REMOVE FRONT AXLE HUB BOLT

(a) Align the disc brake dust cover cutting portion and axle hub bolt.

(b) Using SST, remove the axle hub bolt.

SST 09628-10011

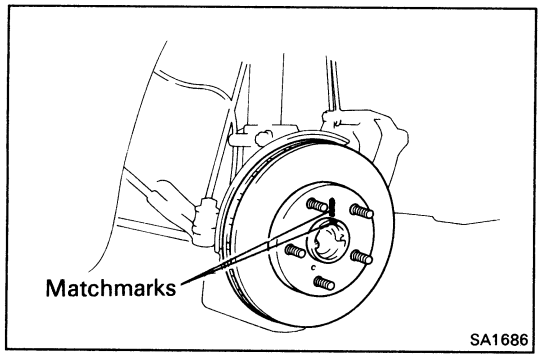


4. INSTALL FRONT AXLE HUB BOLT

(a) Install a new hub bolt from the backing plate side.

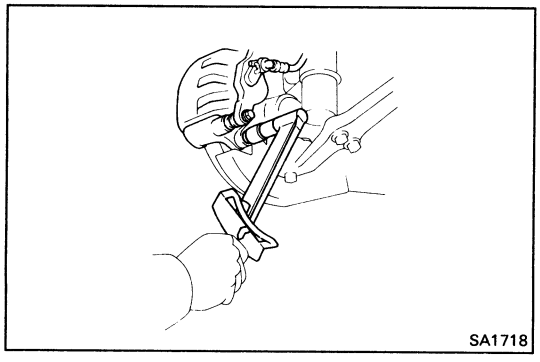
(b) Install the suitable plate washer and nut.

(c) Tighten the nut, while holding the axle hub.



5. INSTALL ROTOR DISC

Align the matchmarks and install the rotor disc to the axle hub.



6. INSTALL DISC BRAKE CALIPER TO STEERING KNUCKLE

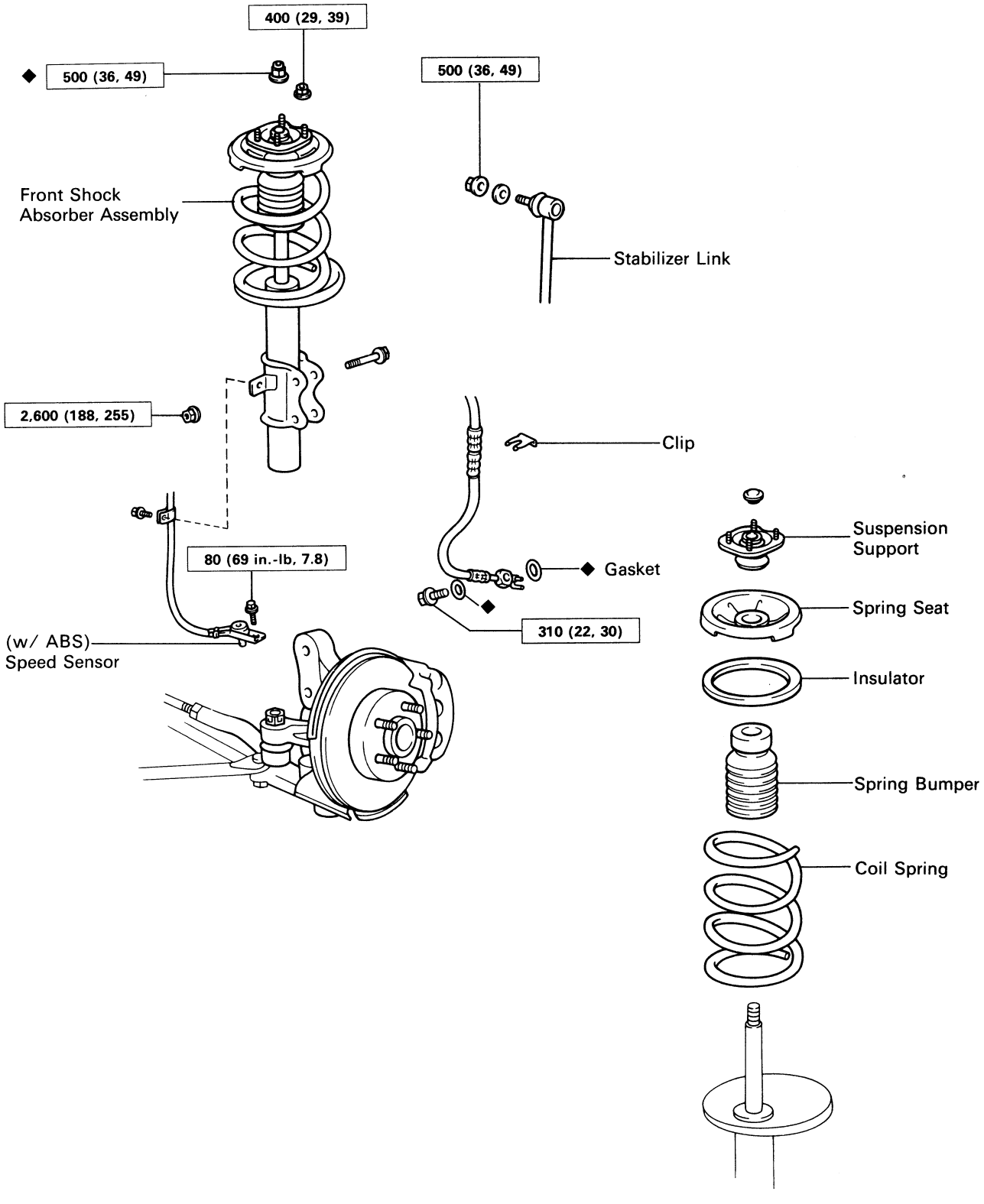
Install and torque the two bolts.

Torque: 600 kg-cm (43 ft-lb, 59 N·m)

FRONT SUSPENSION

Front Shock Absorber

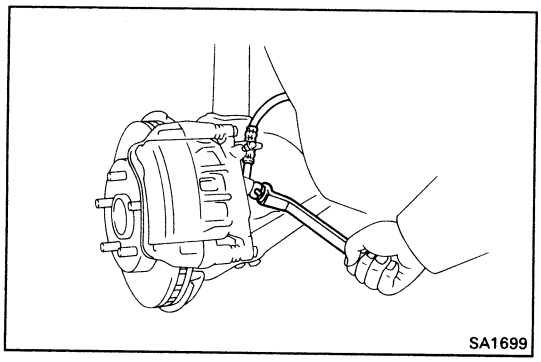
COMPONENTS



kg-cm (ft-lb, N·m) : Specified torque

◆ Non-reusable part

SA1933


SA1699

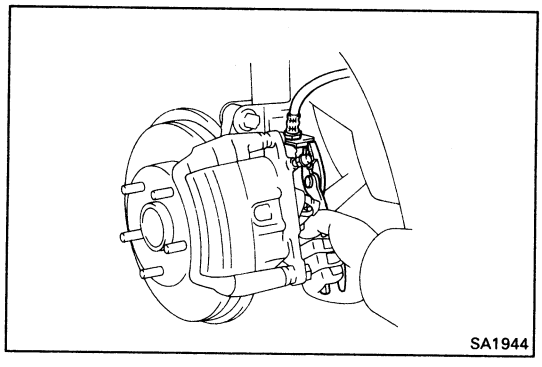
REMOVAL OF SHOCK ABSORBER ASSEMBLY

(See page SA-18)

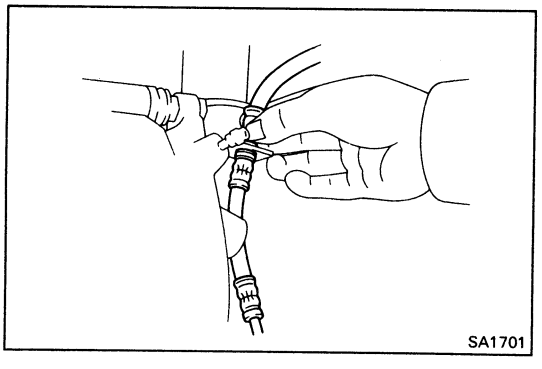
1. DISCONNECT BRAKE HOSE

(a) Remove the union bolt and two gaskets, and disconnect the brake hose from the disc brake caliper.

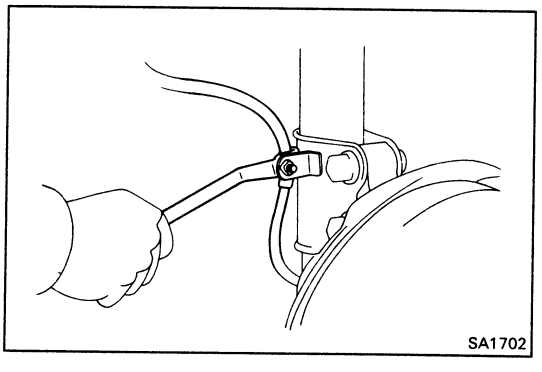
HINT: Drain the brake fluid into a container.


SA1944

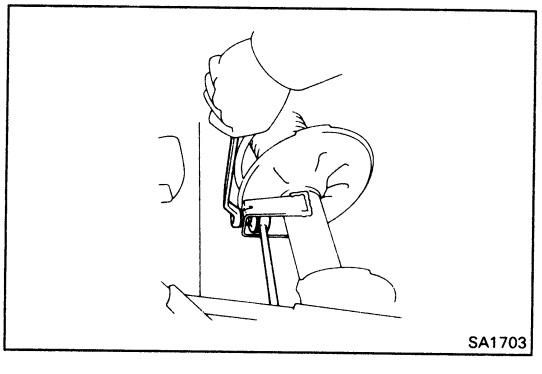
(b) Remove the clip from the brake hose.


SA1701

(c) Pull off the brake hose from the brake hose bracket.


SA1702

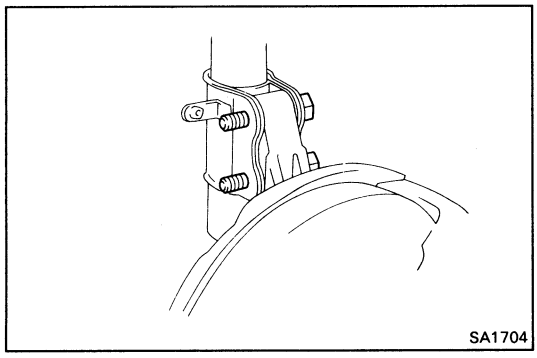
(d) (w/ ABS)
Remove the speed sensor wire harness clamp bracket bolt.


SA1703

2. DISCONNECT STABILIZER LINK

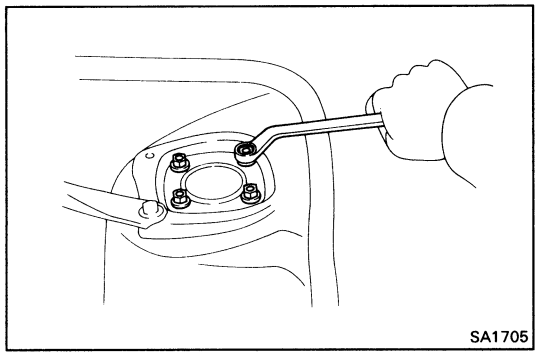
Disconnect the stabilizer link from the shock absorber.

HINT: If the ball joint stud turns together with the nut, use a hexagon wrench 5 mm (0.197 in.) to hold the stud.


SA1704

3. DISCONNECT SHOCK ABSORBER FROM STEERING KNUCKLE

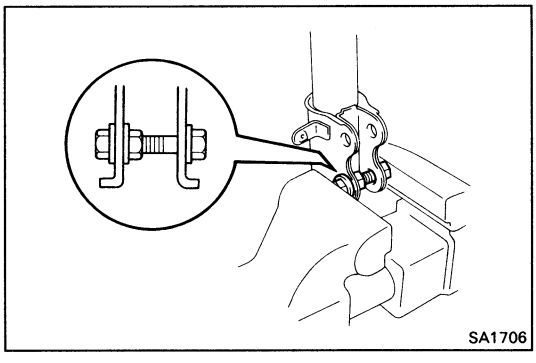
Remove the bolts and nuts, disconnect the shock absorber from the steering knuckle.


SA1705

4. REMOVE SHOCK ABSORBER FROM BODY

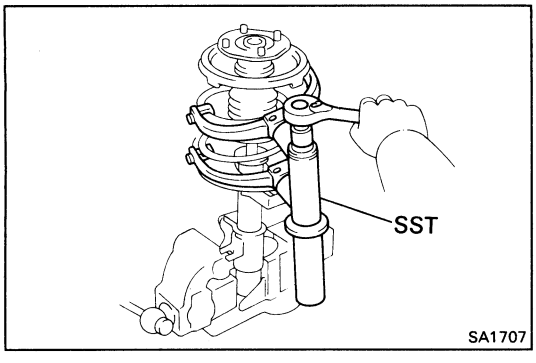
(a) Remove the four nuts holding the top of the suspension support.

(b) Remove the shock absorber from the body.


SA1706

5. CLAMP SHOCK ABSORBER IN VISE

Install a bolt and two nuts to the bracket at the lower portion of the shock absorber shell and secure it in a vise.

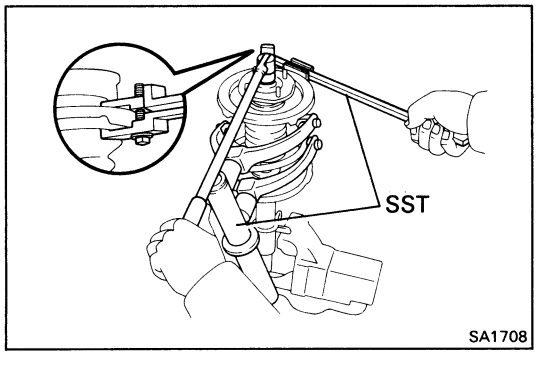


SA1707

6. REMOVE COIL SPRING

(a) Using SST, compress the coil spring.

SST 09727-00045, 09727-30020

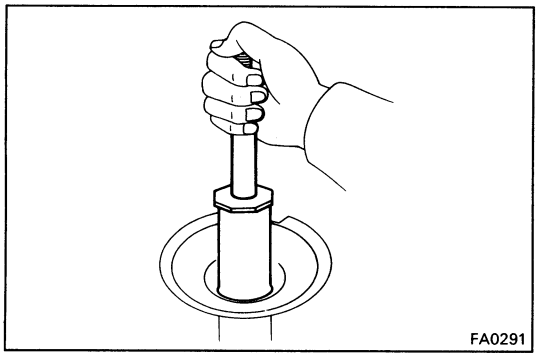


SA1708

(b) Using SST, hold the spring seat so that it will not turn, and remove the nut.

SST 09729-22031

(c) Remove the suspension support, dust seal, spring seat, spring, insulators and bumper.


FA0291

INSPECTION OF FRONT SHOCK ABSORBER ASSEMBLY

INSPECT OPERATION OF SHOCK ABSORBER

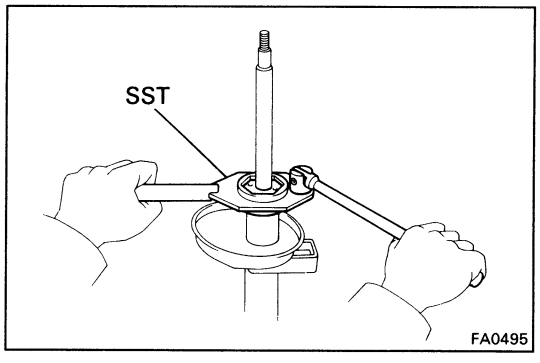
(a) While pushing rod, check that the pull throughout the stroke is even, and there is no abnormal resistance or noise.

(b) Push the piston rod in fully and release it. Check that it returns at a constant speed throughout.

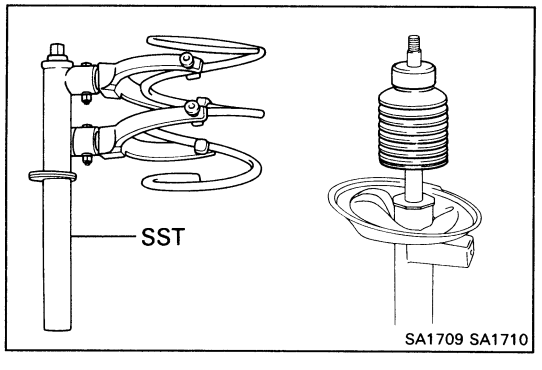
If the absorber operation is defective, replace the absorber, as and assembly.

NOTICE: Before discarding the shock absorber, first loosen the ring nut 2 or 3 turns with SST to release the gas completely.

SST 09720-00012 (09721-00071)



FA0495



SA1709 SA1710

INSTALLATION OF FRONT SHOCK ABSORBER ASSEMBLY

(See page SA-18)

1. **INSTALL BUMPER COIL SPRING, SPRING SEAT AND DUST SEAL**

(a) Using SST, compress the coil spring.

(b) Install the bumper to the piston rod.

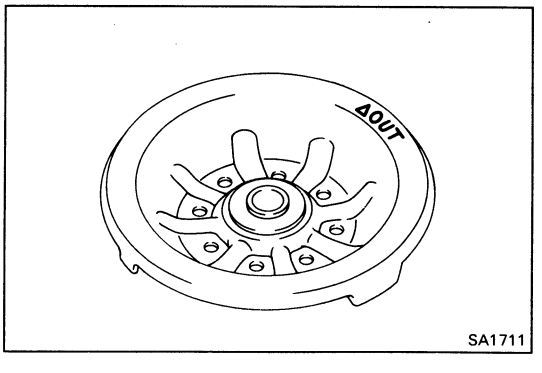
SST 09727-00045, 09727-30020

(c) Align the coil spring end with the lower seat hollow and install.

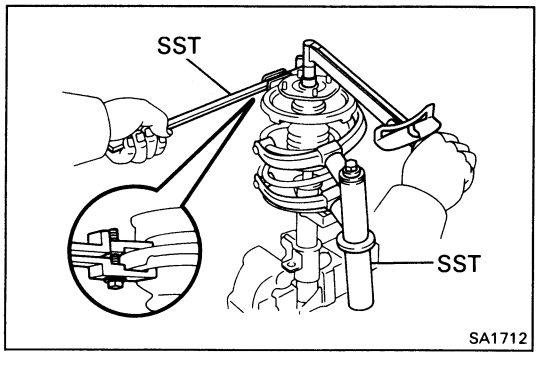
(d) Face the " OUT " mark of the spring seat toward the outside of the vehicle, and install it.

(e) Install the dust seal on the spring seat.

(f) Install the suspension support.



SA1711

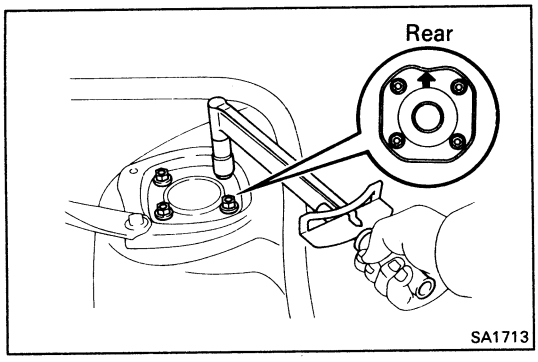


SA1712

(g) Using SST, install and torque a new suspension support nut.

SST 09729-22031

Torque: 500 kg-cm (36 ft-lb, 49 N·m)

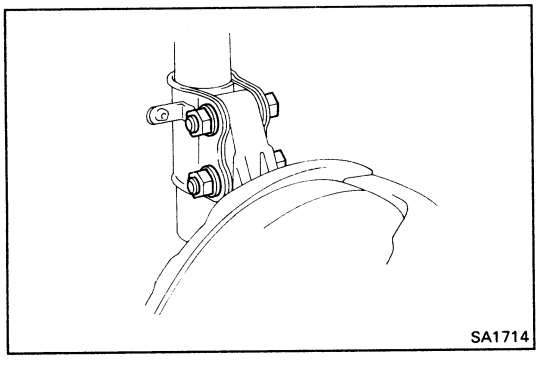


2. INSTALL SHOCK ABSORBER ASSEMBLY TO BODY

Install the four bolts holding the shock absorber to the body. Torque the nut.

HINT: Install the shock absorber with the hollow part to the rearward.

Torque: 400 kg-cm (29 ft-lb, 39 N·m)



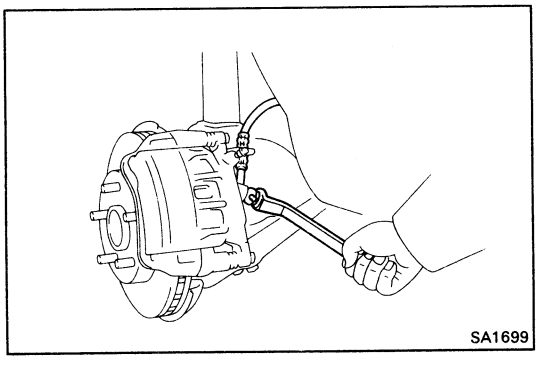
3. CONNECT SHOCK ABSORBER TO STEERING KNUCKLE

(a) Connect the steering knuckle to the shock absorber lower bracket.

(b) Insert the two bolts from the rear side.

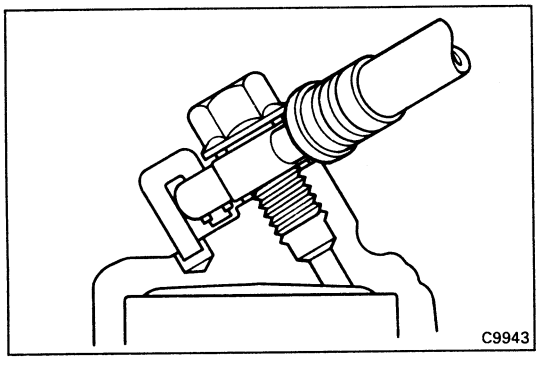
(c) Install and torque the two nuts.

Torque: 2,600 kg-cm (188 ft-lb, 255 N·m)



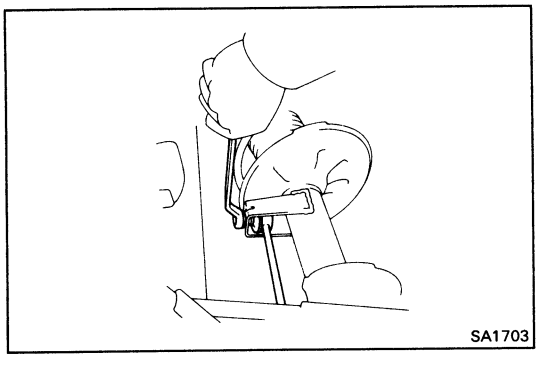
4. CONNECT BRAKE HOSE

(a) Run the brake hose through the brake hose bracket.



(b) Connect the brake hose through the disc brake caliper with the union and new gaskets.

Torque: 310 kg-cm (22 ft-lb, 30 N·m)

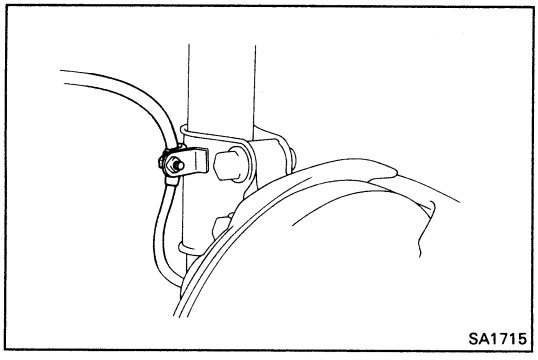


5. CONNECT STABILIZER LINK

Install and torque the nut.

HINT: If the ball joint stud turns together with the nut, use a hexagon wrench 5 mm (0.197 in.) to hold the stud.

Torque: 650 kg-cm (47 ft-lb, 64 N·m)



6. **(w/ ABS)**
CONNECT SPEED SENSOR WIRE HARNESS TO SHOCK ABSORBER

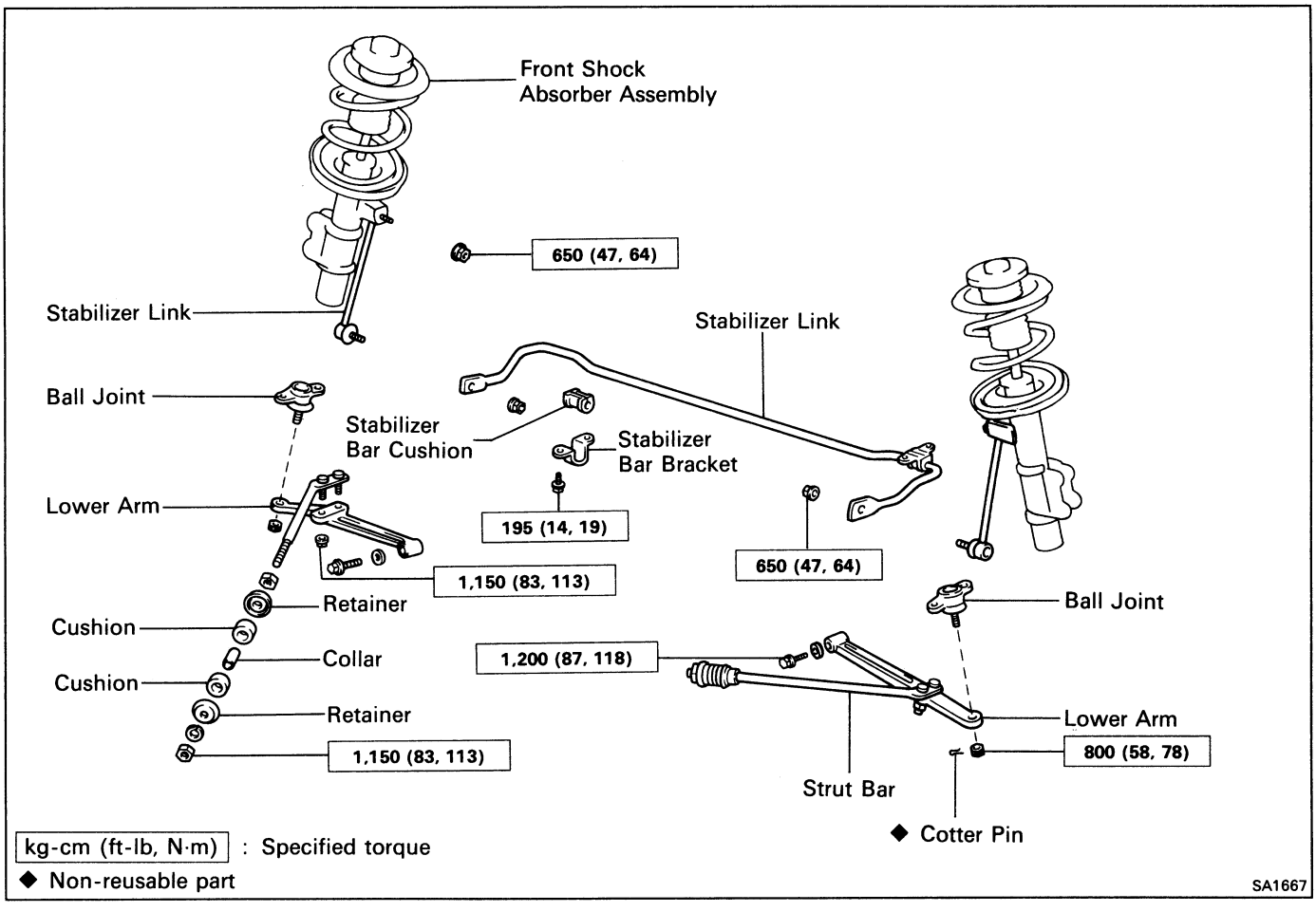
Clamp the speed sensor to the steering knuckle and install the wire harness clamp bracket to the shock absorber with a bolt.

7. **BLEED BRAKE SYSTEM**
(See page BR-7)

8. **INSPECT FRONT WHEEL ALIGNMENT**
(See page SA-4)

Ball Joints, Lower Arm, Stabilizer Bar and Strut Bar

COMPONENTS



Ball Joints

INSPECTION OF BALL JOINTS

1. INSPECT BALL JOINTS FOR EXCESSIVE LOOSENESS

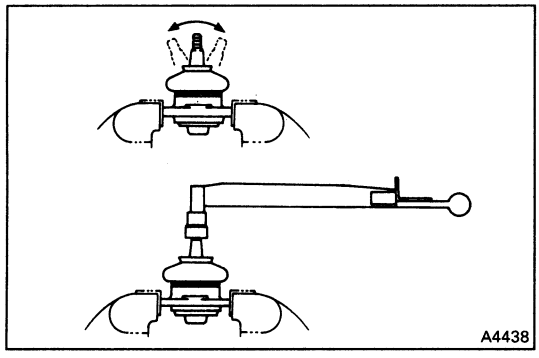
(a) Jack up the front of the vehicle and place a wooden block with a height of 180 - 200 mm (7.09 - 7.87 in.) under one front tire.

(b) Lower the jack until there is about half a load on the front coil spring. Place stands under the vehicle for safety.

(c) Make sure the front wheels are in a straight forward position and block the wheel with chocks.

(d) Move the lower arm up and down and check that the ball joint has no excessive play.

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



2. INSPECT BALL JOINT FOR ROTATION

(a) Remove the ball joint.

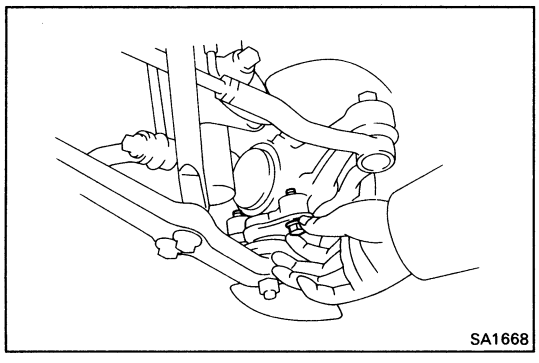
(b) Flip the ball joint stud back and forth 5 times as shown in the figure, before installing the nut.

(c) Using a torque gauge, turn the nut continuously one turn each 2 - 4 seconds and take the torque reading on the fifth turn.

Torque (turning): 8 – 25 kg-cm (7 – 22 in.-lb, 0.8 – 2.5 N·m)

If not within specification, replace the ball joint.

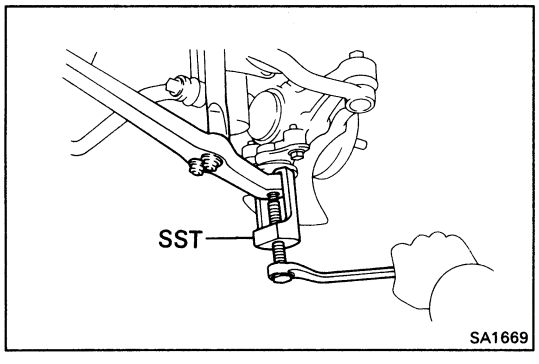
(d) Install the ball joint.



Lower Arm

REMOVAL OF LOWER ARM

(See page SA-24)

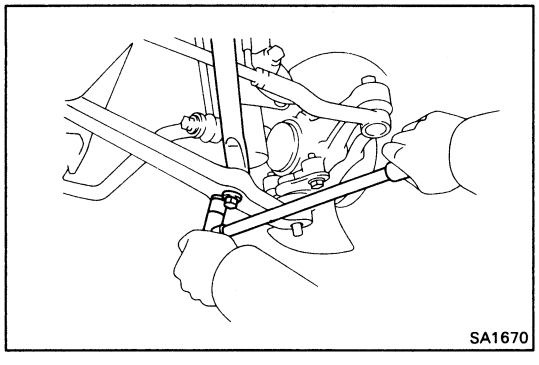


1. DISCONNECT LOWER ARM FROM BALL JOINT

(a) Remove the cotter pin and castle nut.

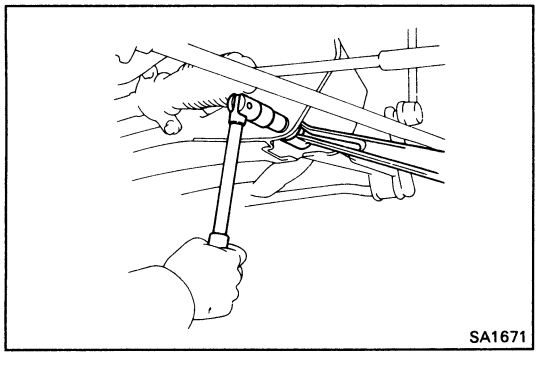
(b) Using SST, disconnect the lower arm from the ball joint.

SST 09610-20012



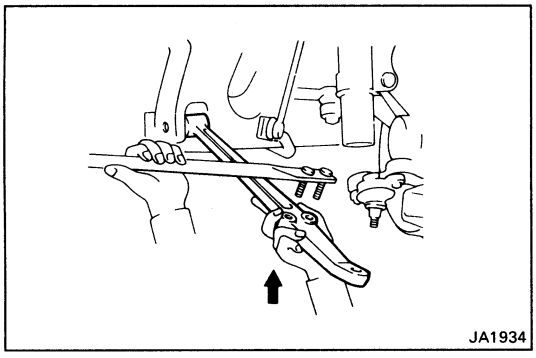
2. DISCONNECT STRUT BAR FROM LOWER ARM

Remove the two nuts and disconnect the strut bar from the lower arm.



3. REMOVE LOWER ARM

Remove the bolt and lower arm from the body.

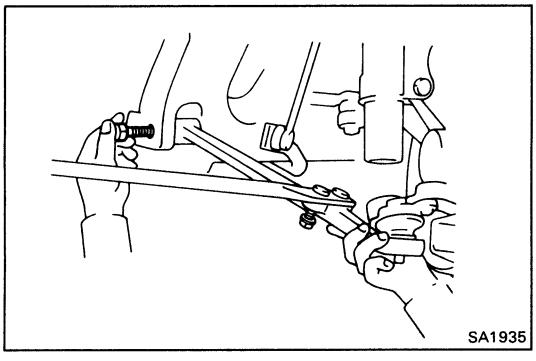

JA1934

INSTALLATION OF LOWER ARM

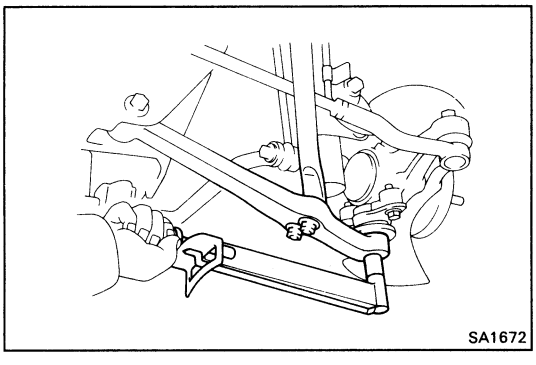
(See page SA-24)

1. INSTALL LOWER ARM

(a) Temporarily install the strut bar to the lower arm with the nuts.


SA1935

(b) Temporarily install the lower arm to the body with the bolt.

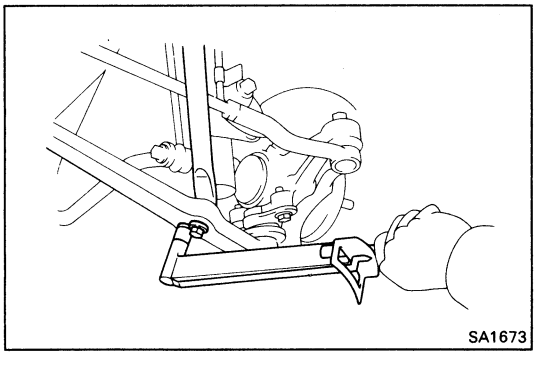

SA1672

2. CONNECT LOWER ARM TO BALL JOINT

(a) Connect the lower arm to the ball joint and torque the castle nut.

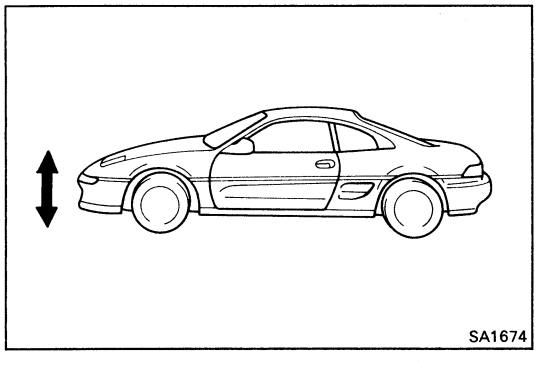
Torque: 800 kg-cm (58 ft-lb, 78 N·m)

(b) Install a new cotter pin.


SA1673

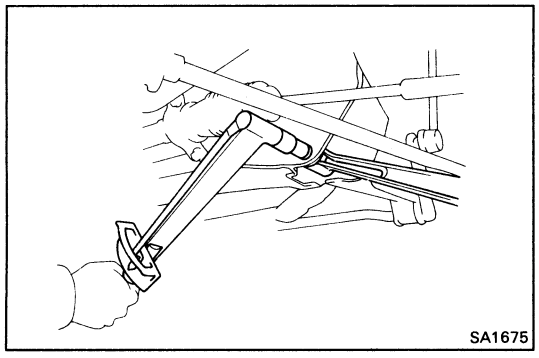
3. TORQUE STRUT BAR TO LOWER ARM

Torque: 1,150 kg-cm (83 ft-lb, 113 N·m)


SA1674

4. TORQUE LOWER ARM TO BODY

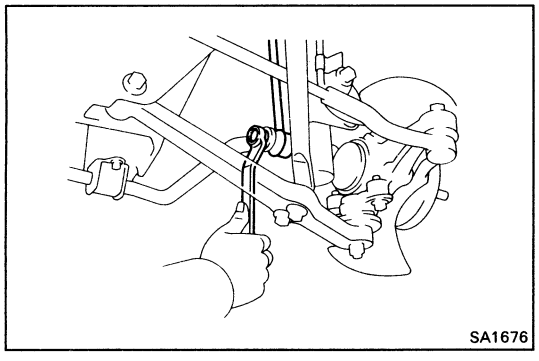
(a) Install the tires and lower the vehicle. Then rock the vehicle up and down to stabilize suspension.


SA1675

(b) Torque the nut.

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

(See page SA-24)


SA1676

Stabilizer Bar and Link

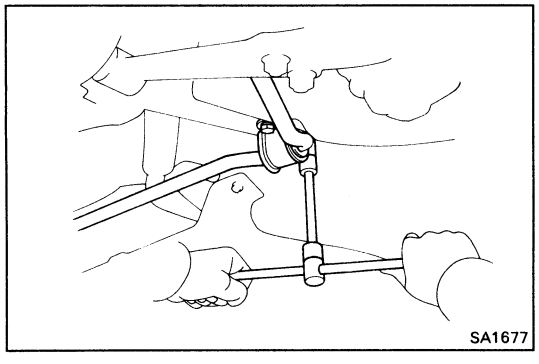
(See page SA-24)

REMOVAL OF STABILIZER BAR AND LINK

1. DISCONNECT STABILIZER LINK FROM STABILIZER BAR

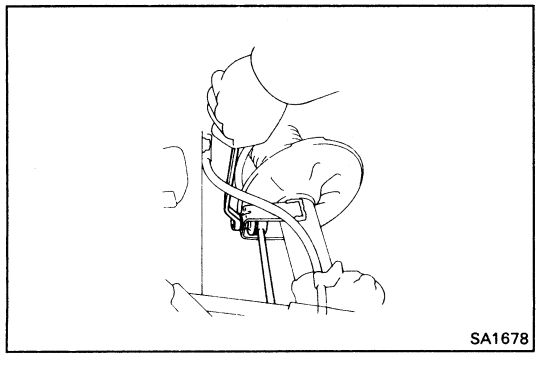
Remove the nut and disconnect the stabilizer link from stabilizer bar.

HINT: If the ball joint stud turns together with the nut, use a hexagon wrench 5 mm (0.197 in.) to hold the stud.


SA1677

2. REMOVE STABILIZER BAR FROM BODY

Remove the bolts and stabilizer bar with brackets.


SA1678

3. REMOVE STABILIZER LINK FROM FRONT SHOCK ABSORBER

Remove the nut and stabilizer link.

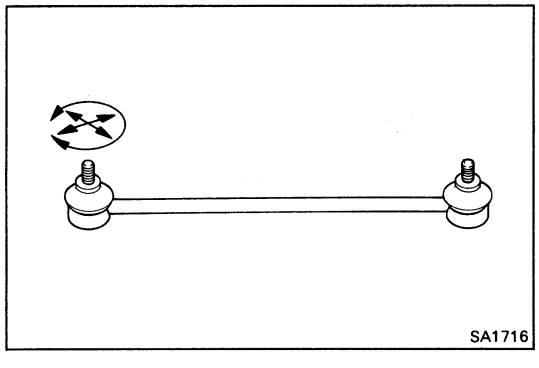
HINT: If the ball joint stud turns together with the nut, use a hexagon wrench 5 mm (0.197 in.) to hold the stud.

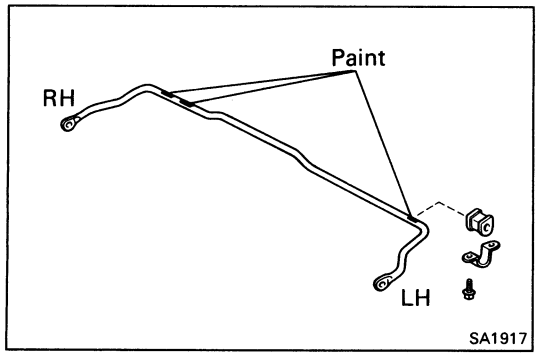
4. REMOVE STABILIZER BAR BRACKETS AND STABILIZER BAR CUSHIONS FROM STABILIZER BAR

INSPECTION OF STABILIZER LINK

INSPECT STABILIZER LINK

Rotate ball joint arm in all directions. If movement is not smooth and free, replace stabilizer link.

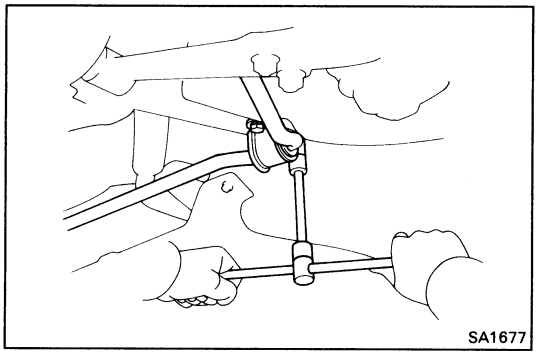

SA1716



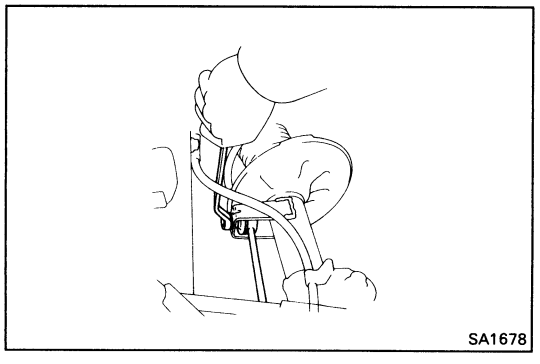
INSTALLATION OF STABILIZER BAR AND LINK

(See page SA-24)

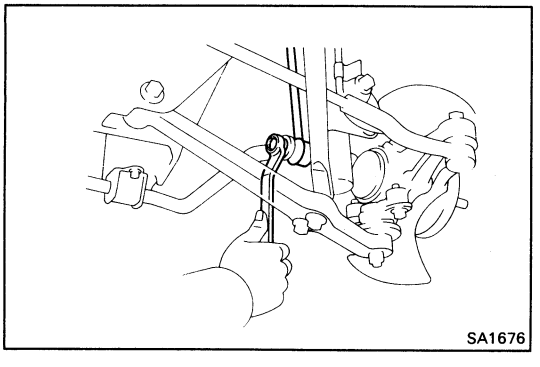
1. **INSTALL STABILIZER BAR**
   (a) Install the stabilizer cushions on the painted portions of the stabilizer.
   (b) Install the stabilizer bar in place, then install the both stabilizer brackets with the bolts and nuts.



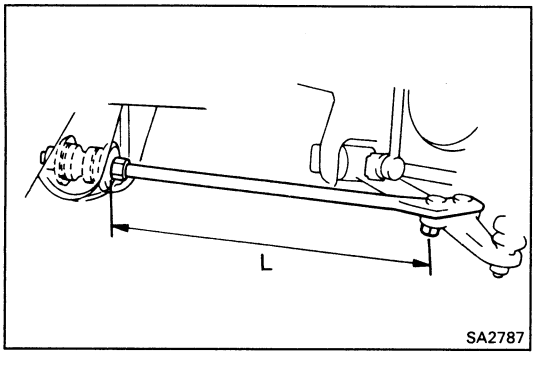
2. **INSTALL STABILIZER BAR TO BODY**
   Install the stabilizer bar to the body.
   Torque: 195 kg-cm (14 ft-lb, 19 N·m)



3. **INSTALL STABILIZER LINK TO FRONT SHOCK ABSORBER ASSEMBLY**
   Install the stabilizer link to the front shock absorber and torque the nut.
   HINT: If the ball joint stud turns together with the nut, use a hexagon wrench 5 mm (0.197 in.) to hold the stud.
   Torque: 650 kg-cm (47 ft-lb, 64 N·m)



4. **CONNECT STABILIZER LINK TO STABILIZER BAR**
   Connect the stabilizer link to the stabilizer bar and torque the nut.
   HINT: If the ball joint stud turns together with the nut, use a hexagon wrench 5 mm (0.197 in.) to hold the stud.
   Torque: 650 kg-cm (47 ft-lb, 64 N·m)

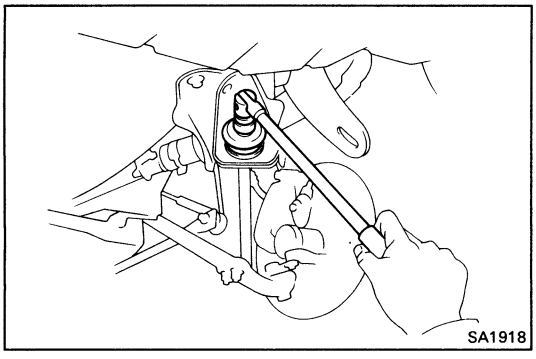


Strut Bar

(See page SA-24)

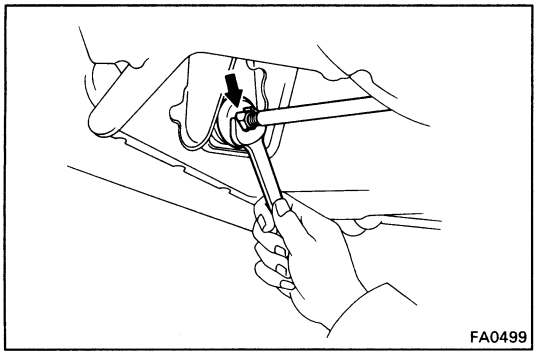
REMOVAL OF STRUT BAR

1. **MEASURE LENGTH "L" BEFORE REMOVE**

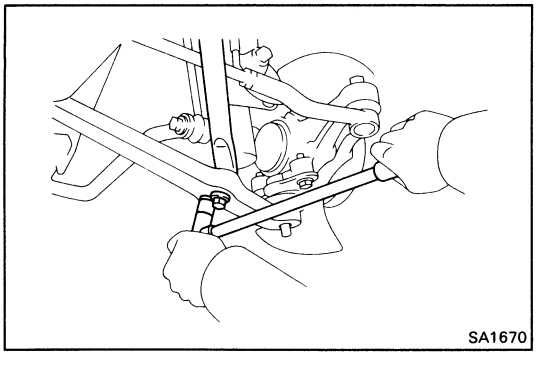

SA1918

2. REMOVE STRUT BAR

(a) Remove the nut, front retainer and cushion.


FA0499

(b) Loosen the nuts.


SA1670

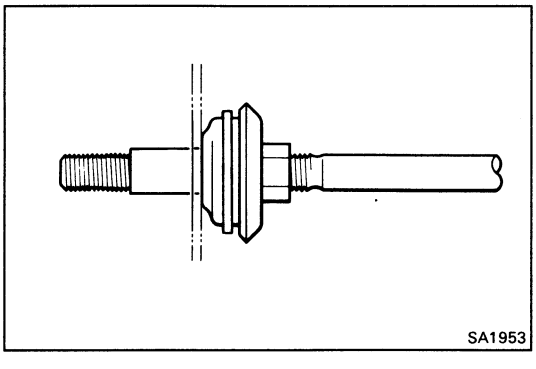
(c) Disconnect the strut bar from the lower arm, and remove the strut bar from the body.

(d) Remove the collar, cushion, retainer and nut from the strut bar.

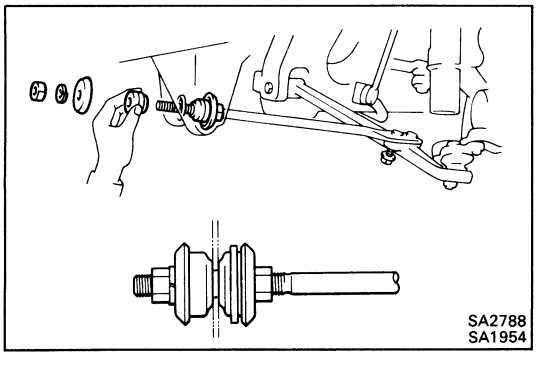
INSTALLATION OF STRUT BAR

(See page SA-24)

1. INSTALL STRUT BAR


SA1953

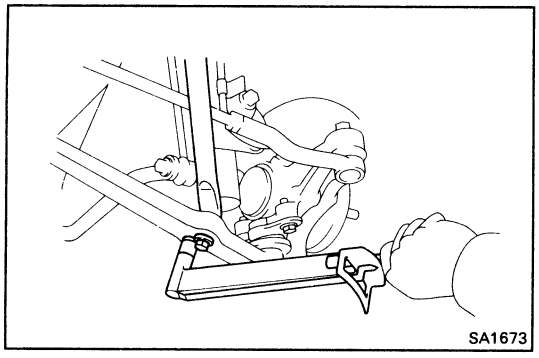
(a) Install the nut, retainer, cushion and collar to the strut bar.


SA2788
SA1954

(b) Install the strut bar to the body, and connect to the lower arm.

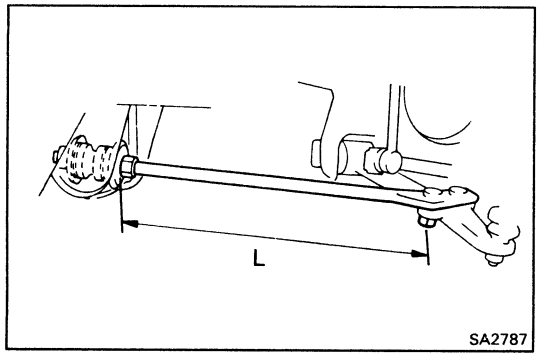
(c) Install the cushion, retainer spring washer and nut.

NOTICE: Do not misinstall the front and rear cushions.



2. TORQUE LOWER ARM TO STRUT BAR

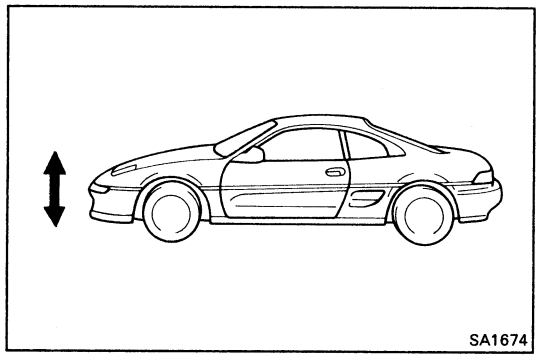
Torque: 1,150 kg-cm (83 ft-lb, 113 N·m)



3. ADJUST STRUT BAR LENGTH
(See page SA-24)

Turn the nut and adjust to precious length.

HINT: The length of "L" in figure should be approximately 362.0 mm (14.25 in.).



4. TORQUE STRUT BAR TO BODY

(a) Install the wheel and lower the vehicle.

(b) Bounce the vehicle up and down to stabilize the suspension.

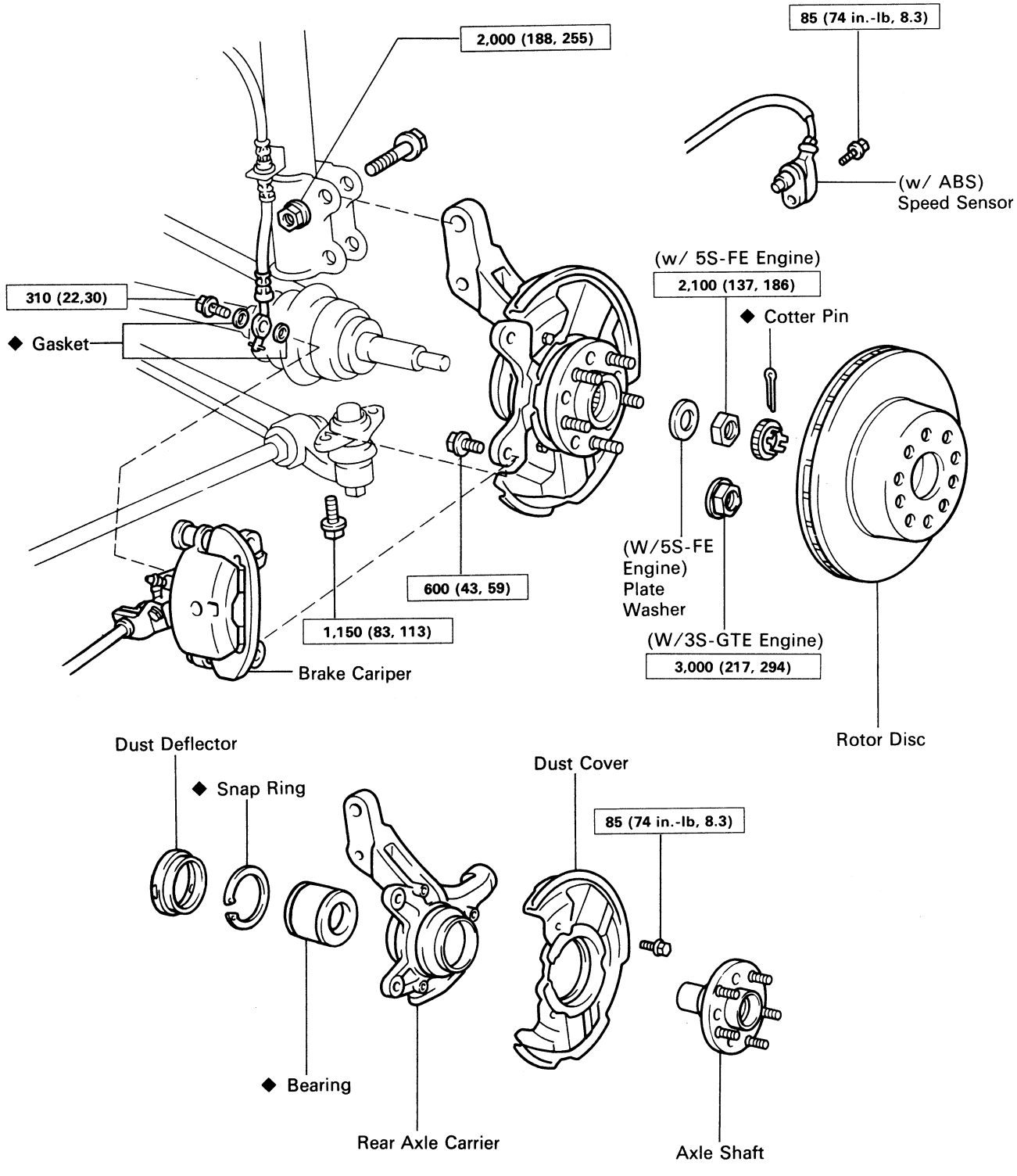
(c) Torque the nut.

Torque: 1,150 kg-cm (83 ft-lb, 113 N·m)

5. INSPECT FRONT WHEEL ALIGNMENT
(See page SA-4)

REAR AXLE SHAFT AND CARRIER

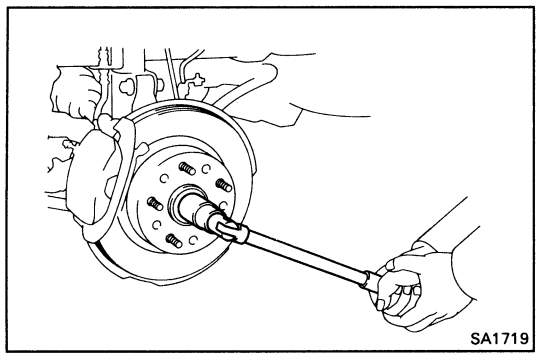
COMPONENTS



kg-cm (ft-lb, N·m) : Specified torque

◆ Non-reusable part

SA2832


SA1719

REMOVAL OF REAR AXLE SHAFT AND CARRIER

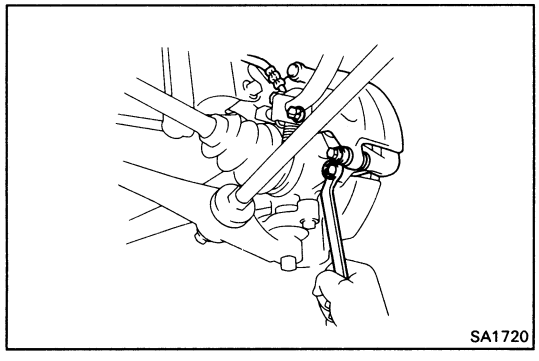
(See page SA-31)

1. REMOVE COTTER PIN, BEARING LOCK NUT CAP AND BEARING LOCK NUT

(a) Remove the cotter pin and bearing lock nut cap.

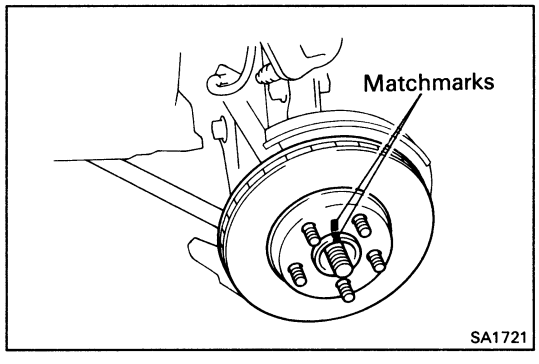
(b) With the parking brake lever pulled, remove the bearing lock nut and plate washer.

(c) Release the parking brake lever.


SA1720

2. REMOVE BRAKE CALIPER

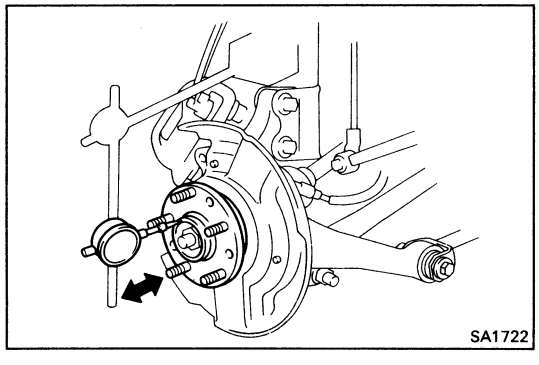
Remove the brake caliper from the rear axle carrier and suspend it with wire.



SA1721

3. REMOVE ROTOR DISC

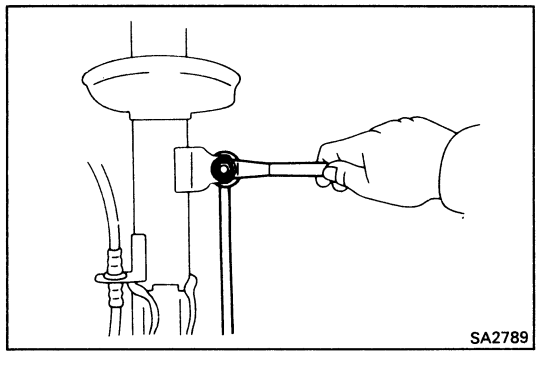
HINT: Before removing the rotor disc, place the matchmarks on the axle shaft and rotor disc.


SA1722

4. CHECK BEARING PLAY IN AXIAL DIRECTION

Bearing play: 0.05 mm (0.0020 in.) or less

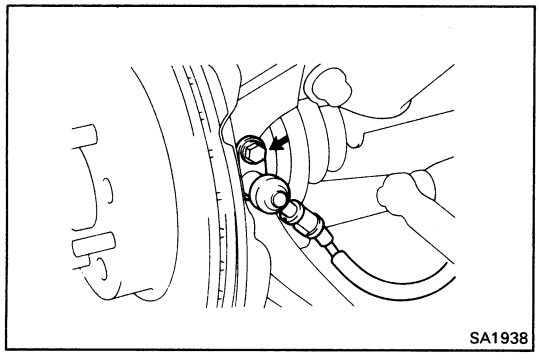
HINT: Measure the bearing play when install the Lock nut to the drive shaft.


SA2789

5. DISCONNECT STABILIZER LINK

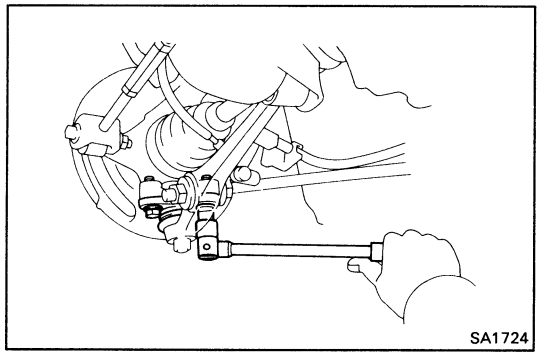
When disconnecting the stabilizer link.

HINT: If the ball joint stud turns together with the nut, use a hexagon wrench to hold the stud.



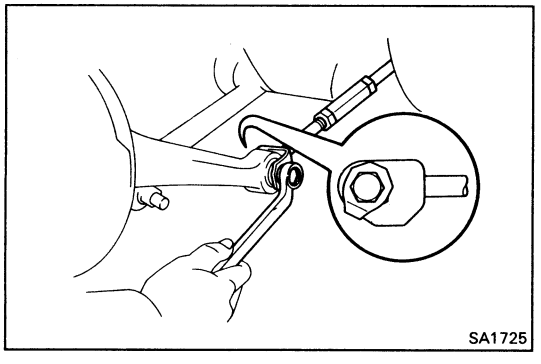
6. (w/ ABS)
REMOVE SPEED SENSOR FROM AXLE CARRIER

Remove the bolt and pull out the speed sensor.



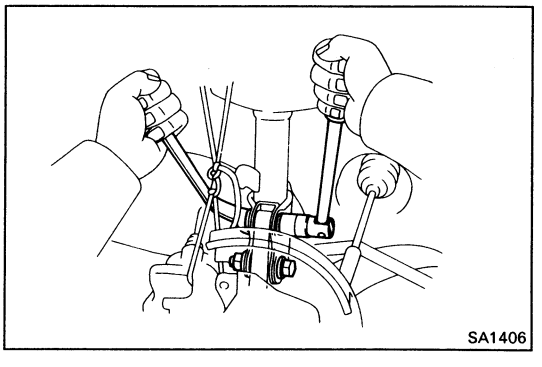
7. DISCONNECT BALL JOINT AND LOWER ARM

Remove the two bolts holding the ball joint to the rear axle carrier.



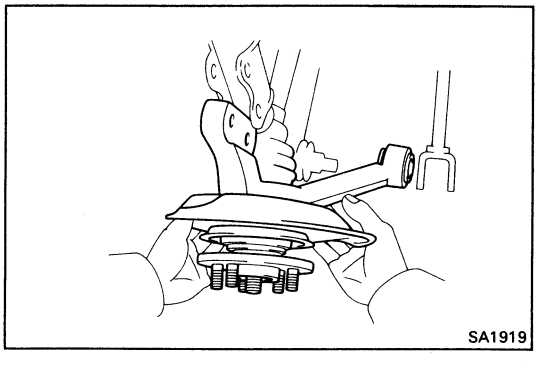
8. DISCONNECT SUSPENSION ARM

Remove the bolt and nut, then disconnect the suspension arm.



9. REMOVE REAR AXLE CARRIER WITH AXLE SHAFT

(a) Remove the two axle carrier set nuts and two bolts.

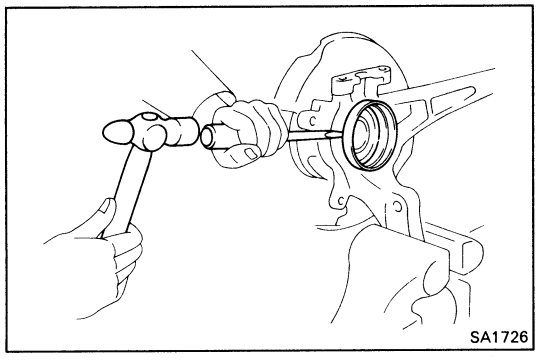


(b) Remove the rear axle carrier with axle shaft.

NOTICE: Cover the drive shaft boot with cloth to protect it from damage.

(w/ ABS)

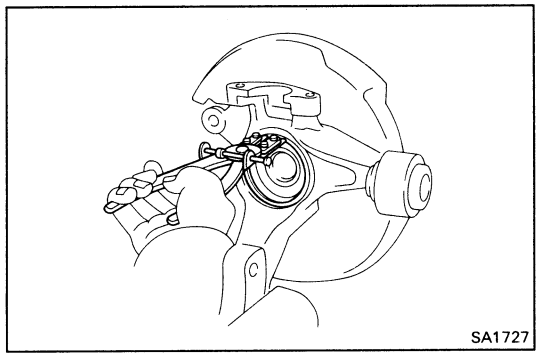
NOTICE: Be careful not to damage the speed sensor rotor of the drive shaft.


SA1726

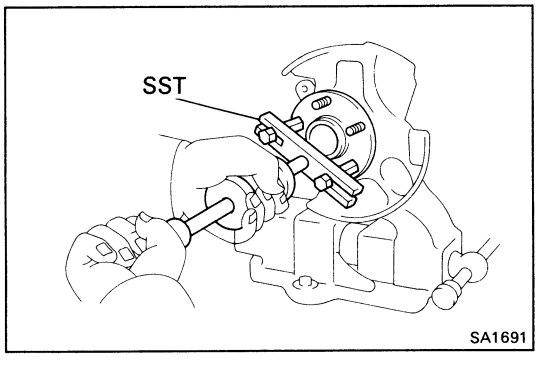
DISASSEMBLY OF REAR AXLE SHAFT

(See page SA-31)

1. **REMOVE DUST DEFLECTOR**
   (a) Clamp the rear axle shaft and carrier in a soft jaw vise.
   (b) Using a screwdriver, remove the dust deflector.


SA1727

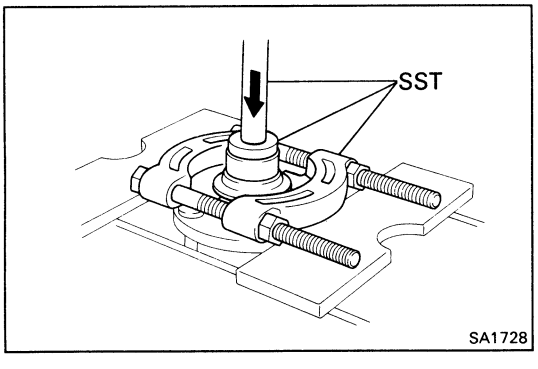
2. **REMOVE HOLE SNAP RING**
   Using snap ring pliers, remove the hole snap ring.



SA1691

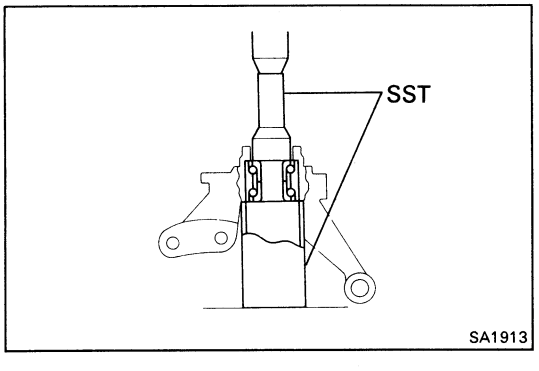
3. **REMOVE AXLE SHAFT**
   (a) Remove the three bolts holding the disc brake dust cover to the rear axle carrier.
   (b) Using SST, remove the axle shaft from the rear axle carrier.
   SST 09520-00031
   (c) Remove the disc brake dust cover.

4. **REMOVE BEARING INNER RACE (INSIDE)**



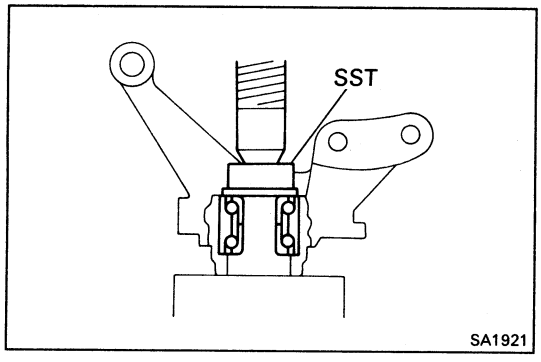
SA1728

5. **REMOVE BEARING INNER RACE (OUTSIDE)**
   Using SST, remove the inner race (outside) from the rear axle shaft.
   SST 09608-20012 (09608-00040, 09608-03020), 09950-00020



SA1913

6. **REMOVE AXLE BEARING**
   (a) First place the removed inner race (outside) in the bearing.
   (b) Using SST and a press, press out the bearing.
   SST 09310-35010, 09527-17010
   NOTICE: Always replace the bearing as an assembly.



ASSEMBLY OF REAR AXLE SHAFT AND CARRIER

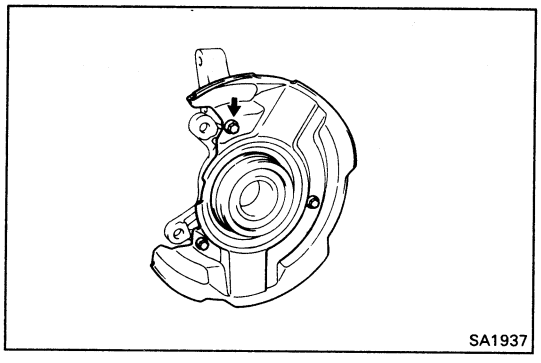
(See page SA-31)

1. INSTALL AXLE BEARING

Using SST and a press, press a new bearing into the rear axle carrier.

SST 09710-22041 (09710-02050)

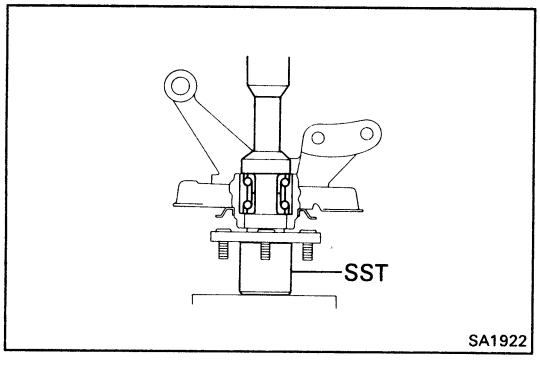
HINT: Be careful not to damage the bearing.



2. INSTALL DISC BRAKE DUST COVER

Install the disc brake dust cover with the three bolts.

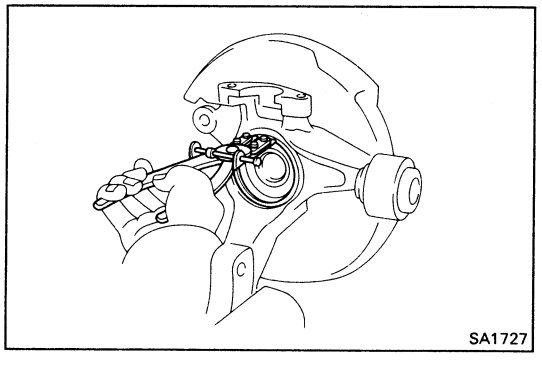
Torque: 85 kg-cm (73 in.-lb, 8.3 N·m)



3. INSTALL AXLE SHAFT

Using SST and a press, press the shaft into the rear axle carrier.

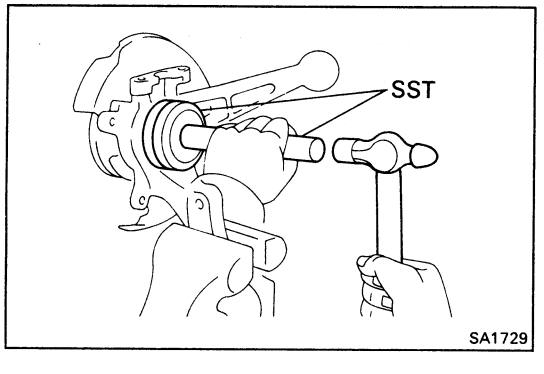
SST 09310-35010, 09315-00021



4. INSTALL HOLE SNAP RING

Using snap ring pliers, install a hole snap ring into the rear axle carrier.

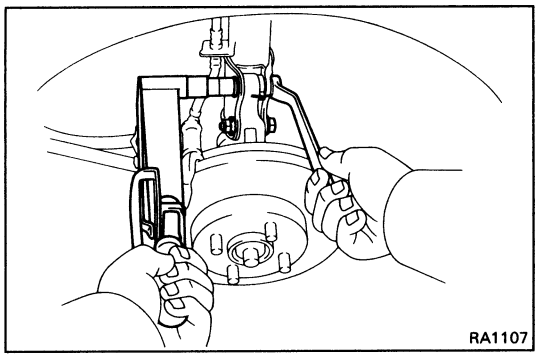
HINT: Be careful not to damage the bearing.



5. INSTALL DUST DEFLECTOR

Using SST, drive a new dust deflector to the rear axle carrier.

SST 09316-60010 (09316-00010, 09316-00040)


RA1107

INSTALLATION OF REAR AXLE SHAFT AND CARRIER

(See page SA-31)

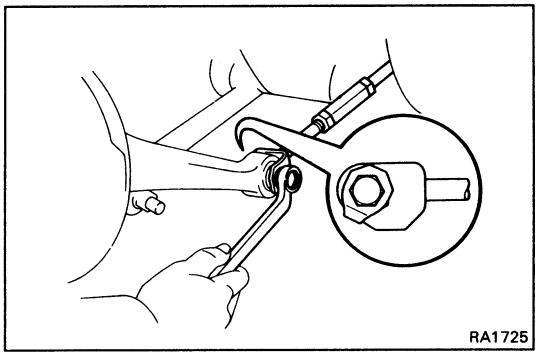
1. INSTALL REAR AXLE CARRIER WITH AXLE SHAFT

(a) Place the rear axle carrier to the shock absorber lower bracket.

(b) Install the two set bolts and two nuts.

(c) Torque the nuts.

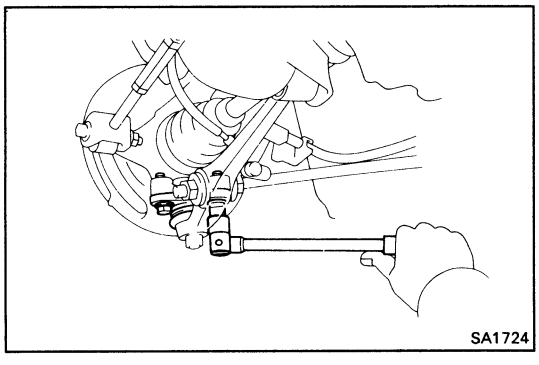
Torque: 2,600 kg-cm (188 ft-lb, 255 N·m)


RA1725

2. CONNECT SUSPENSION ARM

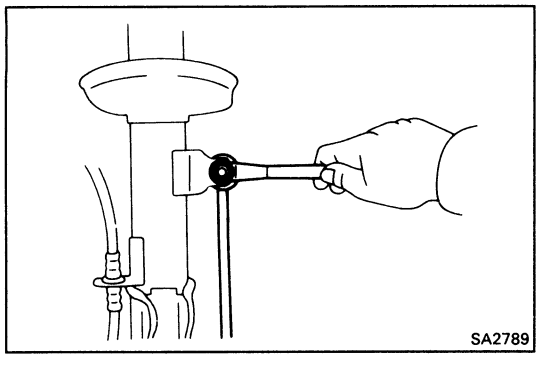
Install the suspension arm in place, then install and torque the bolt and nut.

Torque: 1,050 kg-cm (76 ft-lb, 103 N·m)


SA1724

3. CONNECT REAR AXLE CARRIER TO LOWER ARM

Torque: 1,150 kg-cm (83 ft-lb, 113 N·m)

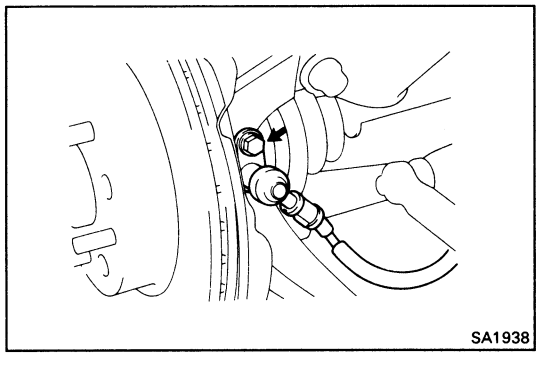

SA2789

4. CONNECT STABILIZER LINK

Install and torque the nut.

Torque: 500 kg-cm (36 ft-lb, 49 N·m)

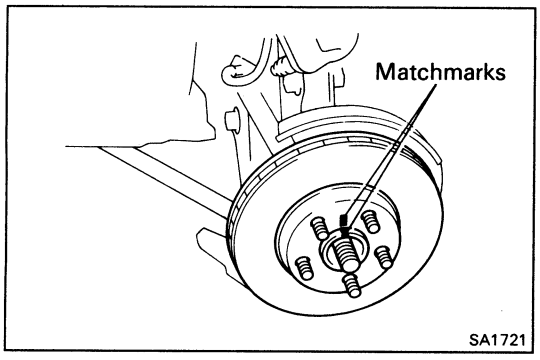
HINT: If the ball joint stud turns together with the nut, use a hexagon wrench to hold the stud.


SA1938

5. (w/ ABS)
INSTALL SPEED SENSOR TO AXLE CARRIER

HINT: Before installing, check that there is no ferric chip or foreign material on the sensor tip.

Torque: 80 kg-cm (69 in.-lb, 7.8 N·m)

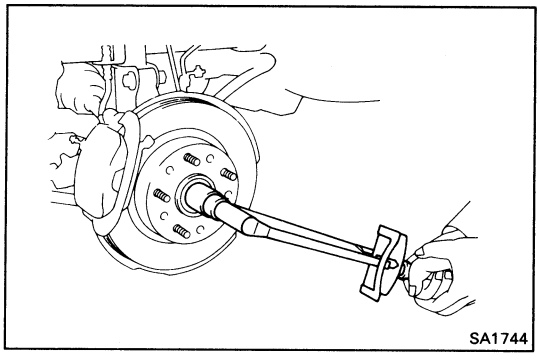


6. INSTALL ROTOR DISC

Align the matchmarks and install the rotor disc to the axle hub.

7. INSTALL BRAKE CALIPER

Torque: 600 kg-cm (43 ft-lb, 59 N·m)



8. INSTALL PLATE WASHER, BEARING LOCK NUT, BEARING LOCK NUT CAP AND NEW COTTER PIN

(a) Install the plate washer and lock nut.

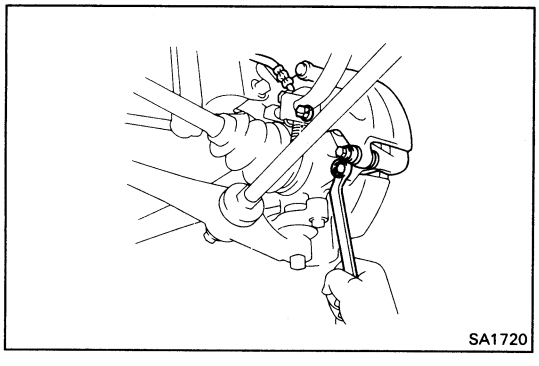
(b) With the parking brake engaged, and tighten the nut.

Torque:

5S-FE 2,100 kg-cm (152 ft-lb, 206 N·m)
3S-GTE 3,000 kg-cm (217 ft-lb, 294 N·m)

(c) Install the lock nut cap and a new cotter pin.

9. INSPECT REAR WHEEL ALIGNMENT
(See page SA-31)

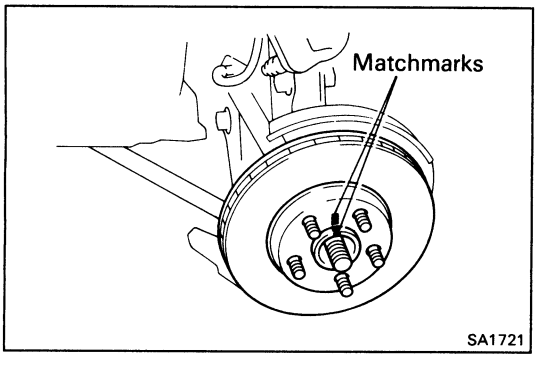


REPLACEMENT OF REAR AXLE SHAFT BOLT

(See page SA-31)

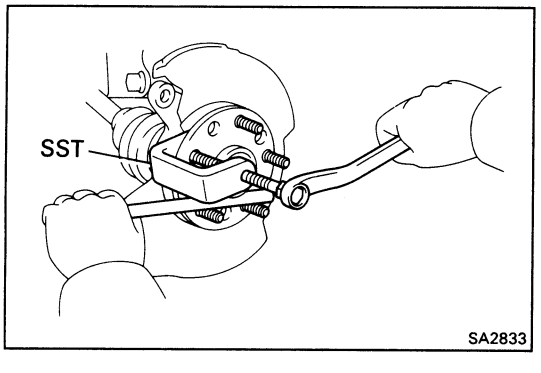
1. DISCONNECT BRAKE CALIPER FROM AXLE CARRIER

Disconnect the brake caliper from the axle carrier and suspend it with wire.



2. REMOVE ROTOR DISC

HINT: Before removing the rotor disc, place the matchmarks on the axle shaft and rotor disc.

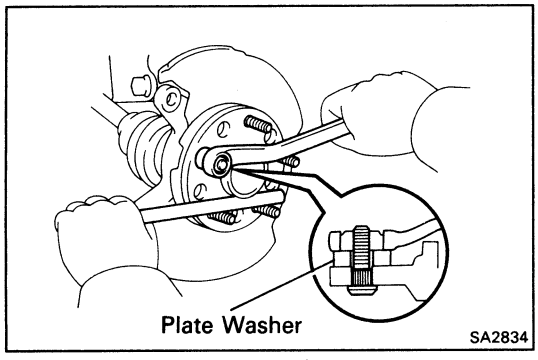


3. REMOVE REAR AXLE SHAFT BOLT

(a) Align the brake dust cover cut portion and axle shaft bolt.

(b) Using SST, remove the axle shaft bolt.

SST 09628-10011

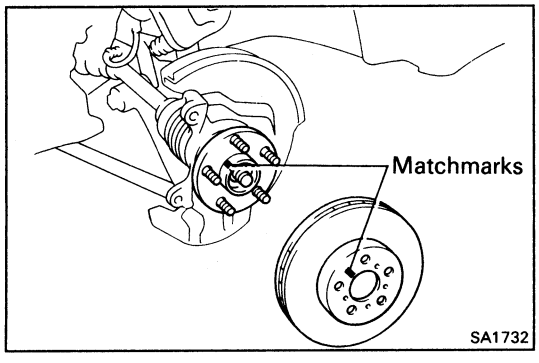


4. INSTALL REAR AXLE SHAFT BOLT

(a) Install a new bolt from the backing plate side.

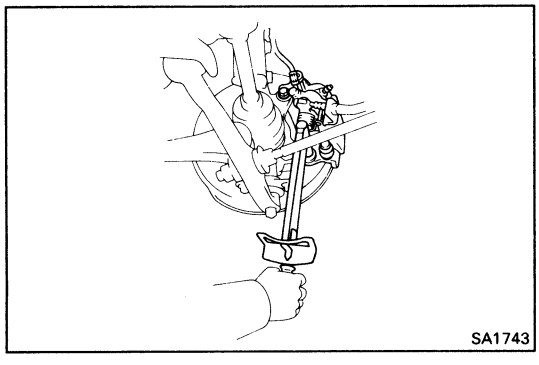
(b) Install the suitable plate washer and nut.

(c) Tighten the nut, while holding the axle shaft.



5. INSTALL ROTOR DISC

Align the matchmarks and install the rotor disc to the axle shaft.



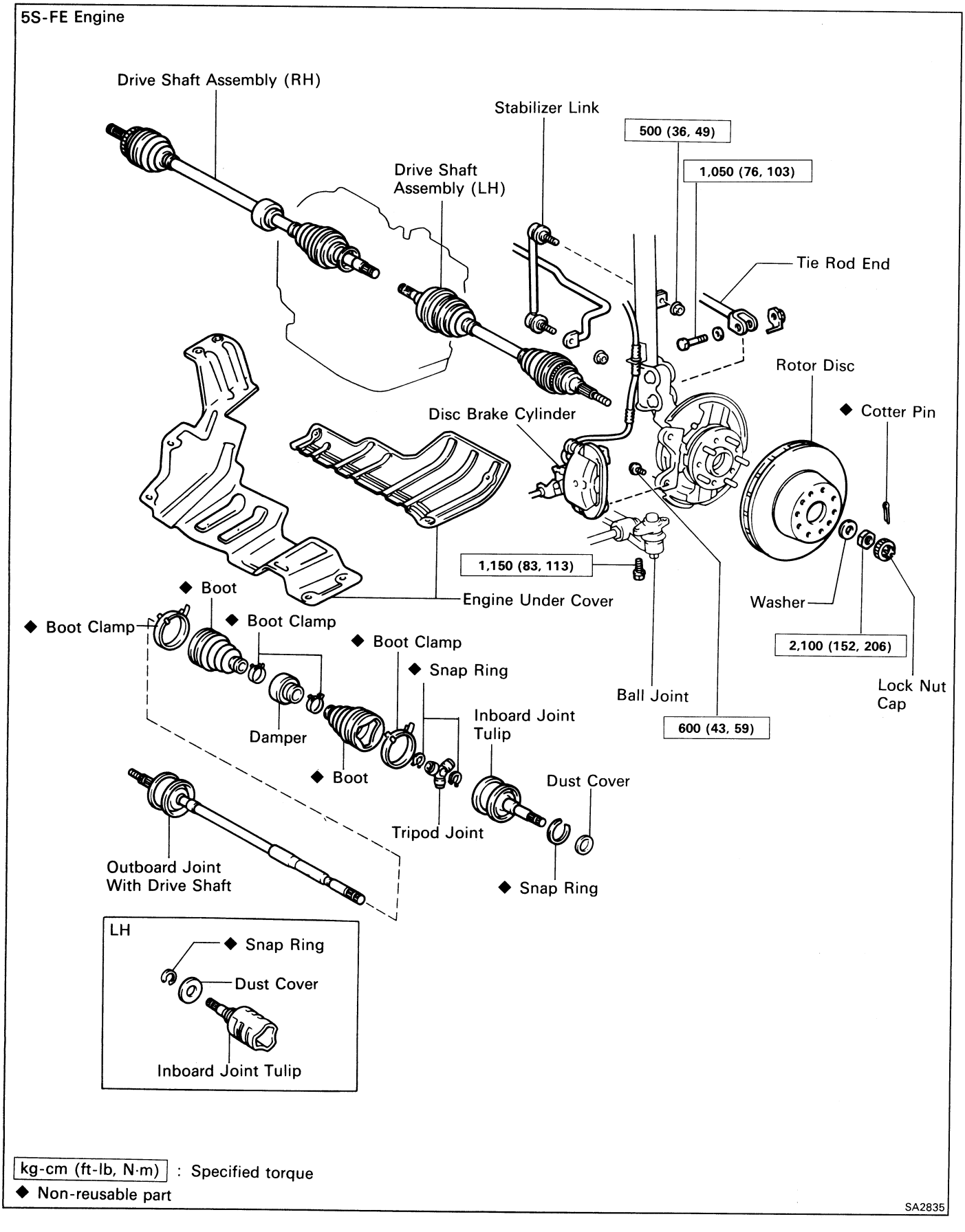
6. INSTALL DISC BRAKE CALIPER TO REAR AXLE CARRIER

Install and torque the two bolts.

Torque: 600 kg-cm (43 ft-lb, 59 N·m)

REAR DRIVE SHAFT (5S-FE ENGINE)

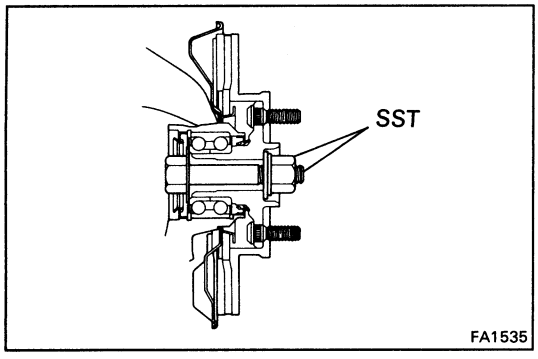
COMPONENTS



kg-cm (ft-lb, N·m) : Specified torque

◆ Non-reusable part

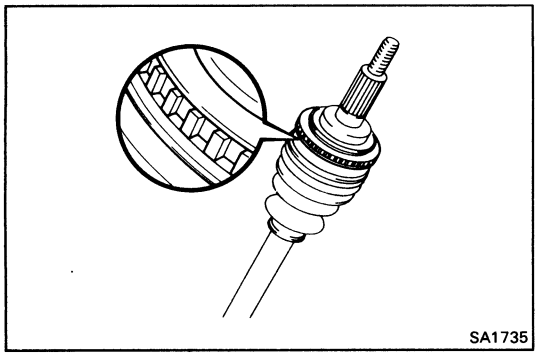
SA2835



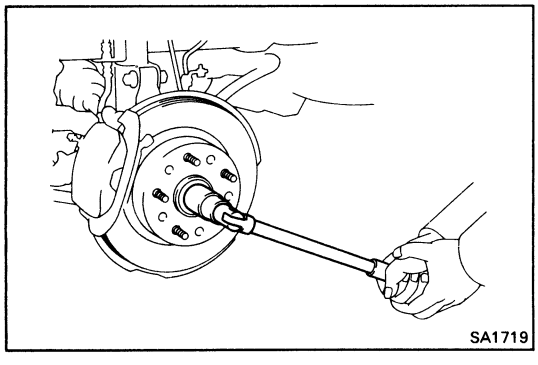
NOTICE:

- **The axle bearing could be damaged if it is subjected to the vehicle weight, such as when moving the vehicle with the drive shaft removed. Therefore, if it is absolutely necessary to place the vehicle weight on the axle bearing, first support it with SST.**

  SST 09608-16041 (09608-02020, 09608-02040)



- **(w/ ABS)**
  After disconnecting the drive shaft from the axle hub, work carefully so as not to damage the sensor rotor serrations on the drive shaft.



REMOVAL OF REAR DRIVE SHAFT

(See page SA-39)

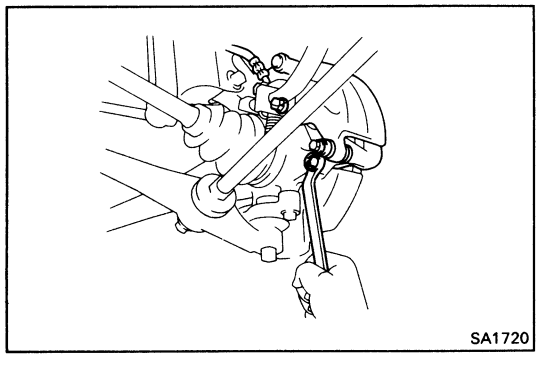
1. **REMOVE ENGINE UNDER COVER**

2. **DRAIN TRANSAXLE OIL**

3. **REMOVE COTTER PIN, LOCK NUT CAP AND BEARING LOCK NUT**

   (a) Remove the cotter pin and lock nut cap.

   (b) With the parking brake engaged, remove the bearing lock nut.

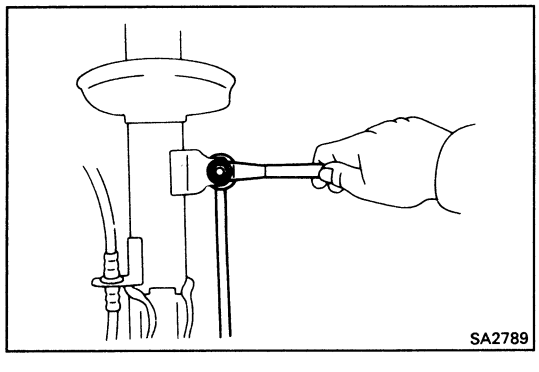


4. **REMOVE BRAKE CALIPER**

   Remove the brake caliper from the axle carrier and suspend it with wire.

5. **REMOVE ROTOR DISC**

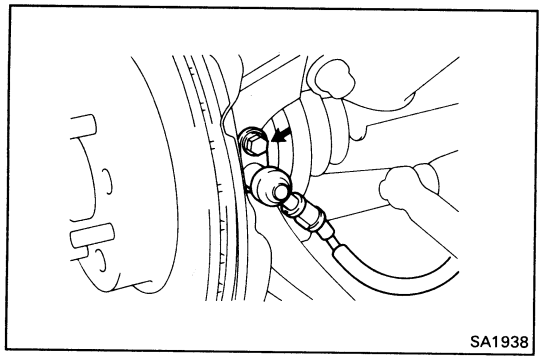
   HINT: Before removing the rotor disc, place the matchmarks on the axle shaft and rotor disc.



6. **DISCONNECT STABILIZER LINK**

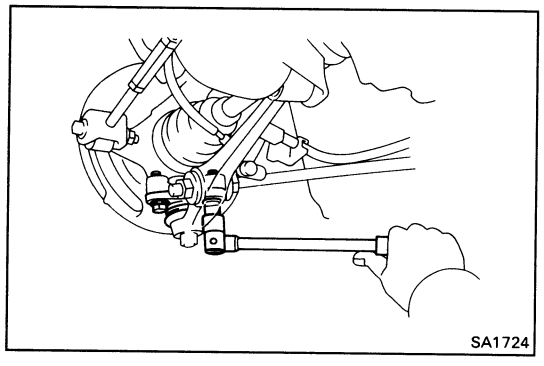
   Remove the upper side nut from the stabilizer link.

   HINT: If the ball joint stud turns together with the nut, use a hexagon wrench 5 mm (0.197 in.) to hold the stud.



7. **(w/ ABS)**
REMOVE SPEED SENSOR FROM AXLE CARRIER

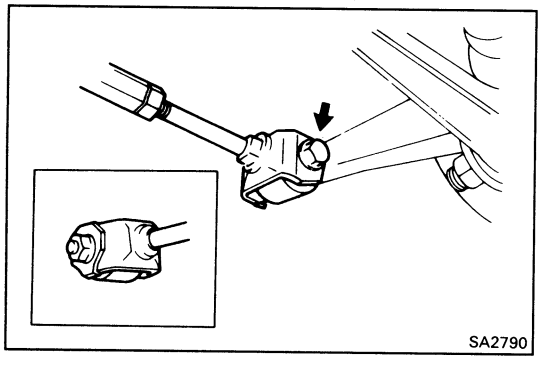
Remove the bolt and pull out the speed sensor.



8. **DISCONNECT LOWER ARM FROM REAR AXLE CARRIER**

(a) Remove the two bolts holding the ball joint to the lower arm.

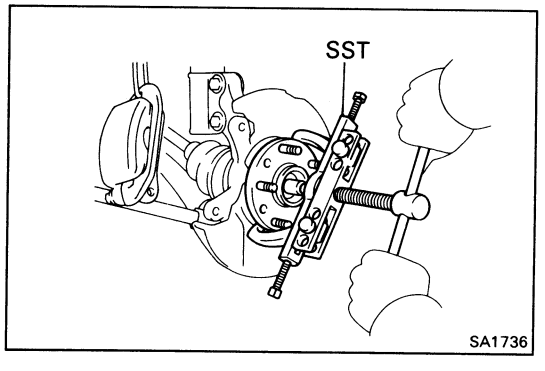
(b) Disconnect the lower arm.



9. **DISCONNECT TIE ROD END**

(a) Remove the tie rod end mounting bolt and nut, disconnect the tie rod end from the rear axle carrier.

(b) Similarly disconnect the other side.



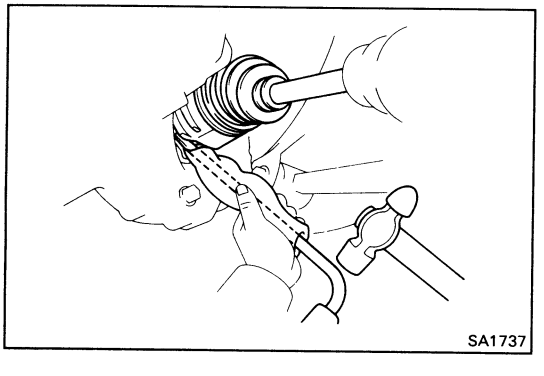
10. **DISCONNECT DRIVE SHAFT FROM AXLE CARRIER**

Using SST, disconnect the drive shaft from the axle carrier.

SST 09950-20017

NOTICE:

- **Cover the drive shaft boot with cloth to protect it from damage.**
- **(w/ ABS)**
  Be careful not to damage the sensor rotor of the drive shaft

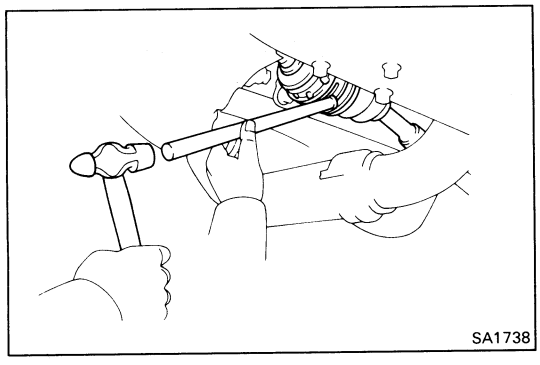


11. **REMOVE LH DRIVE SHAFT**

Using a hammer and hub nut wrench or an equivalent, remove the LH drive shaft.

NOTICE:

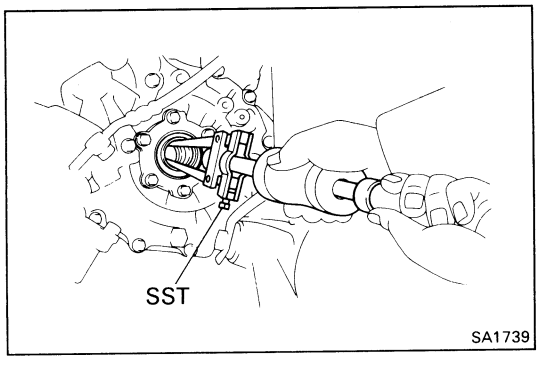
- **Be careful not to damage the dust cover.**
- **Cover the hub nut wrench or an equivalent with cloth so as not to damage the transaxle body.**



12. REMOVE RH DRIVE SHAFT

Using a hammer and brass bar, drive out the RH drive shaft.

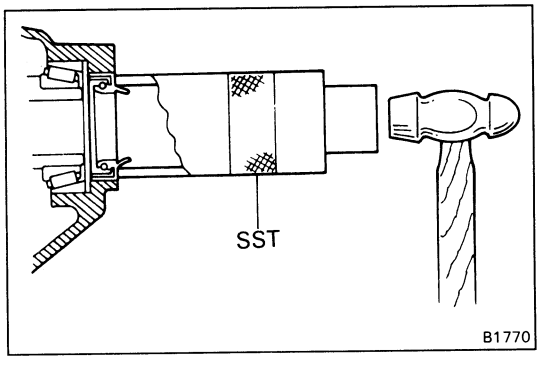
REPLACEMENT OF OIL SEAL



1. REMOVE OIL SEAL

Using SST, drive out the oil seal.

SST 09308-00010

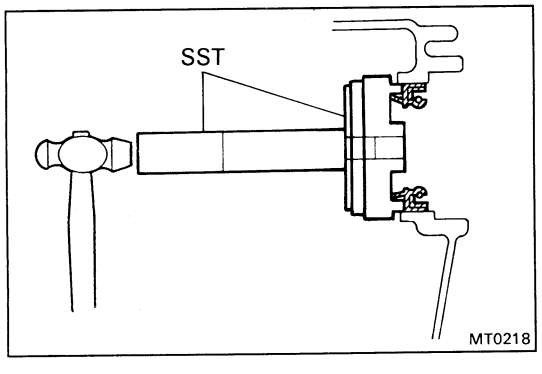


2. INSTALL NEW OIL SEAL

(a) (M/T)
Using SST and hammer, tap in a new oil seal.

SST 09316-60010 (09316-00010)

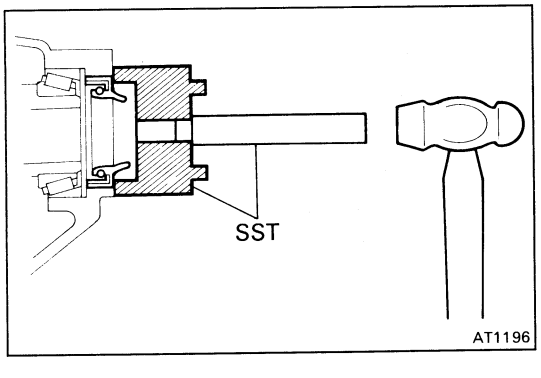
HINT: Coat the oil seal lip with MP grease.



(b) (A/T LH)
Using SST and hammer, tap in a new LH oil seal.

SST 09350-32014 (09351-32111, 09351-32150)

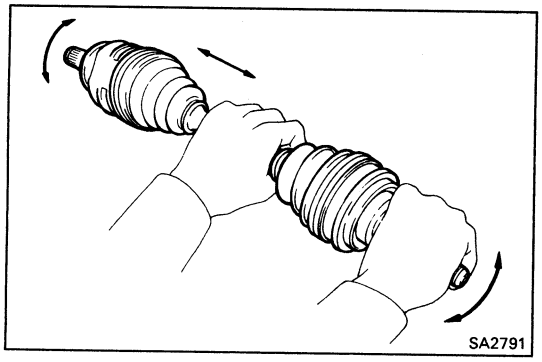
HINT: Coat the oil seal lip with MP grease.



(c) (A/T RH)
Using SST and hammer, tap in a new RH oil seal.

SST 09350-32014 (09351-32130, 09351-32150)

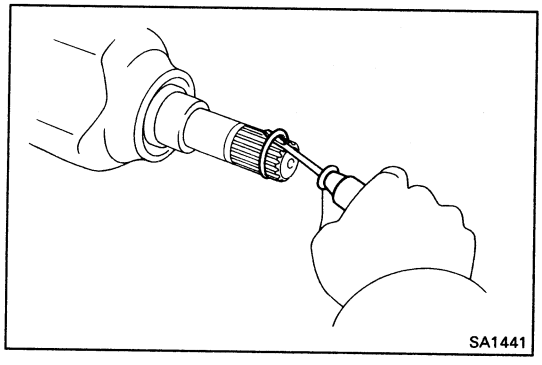
HINT: Coat the oil seal lip with MP grease.


SA2791

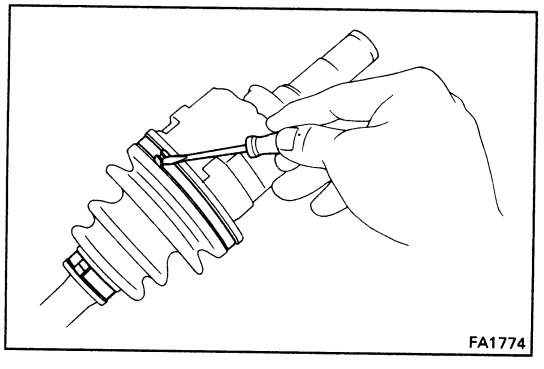
DISASSEMBLY OF REAR DRIVE SHAFT

(See page SA-39)

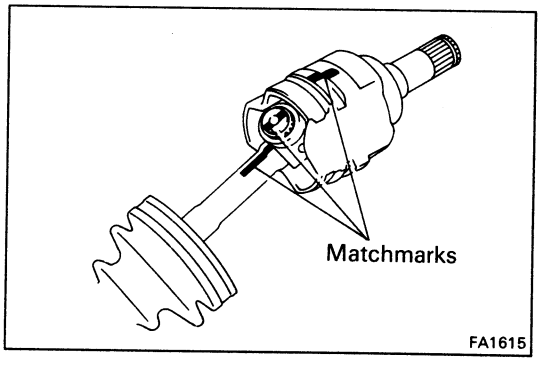
1. CHECK DRIVE SHAFT
   (a) Check to see that there is no play in the outboard joint.
   (b) Check to see that the inboard joint slides smoothly in the thrust direction.
   (c) Check to see that there is no remarkable play in the radial direction of the inboard joint.
   (d) Check for damage to boots.


SA1441

2. REMOVE SNAP RING FROM INBOARD JOINT SHAFT
   Using a screwdriver, pry out the snap ring.


FA1774

3. REMOVE INBOARD JOINT BOOT CLAMPS
   (a) Using a screwdriver, remove the two boot clamps.
   (b) Slide the inboard joint boot toward the outboard joint.

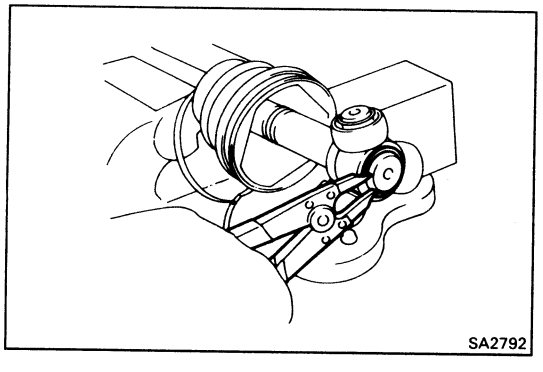


FA1615

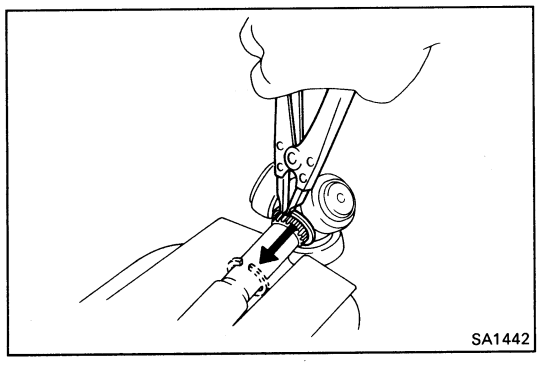
4. DISASSEMBLE INBOARD JOINT
   (a) Place matchmarks on the inboard joint tulip and tripod.

   NOTICE: Do not punch the marks.

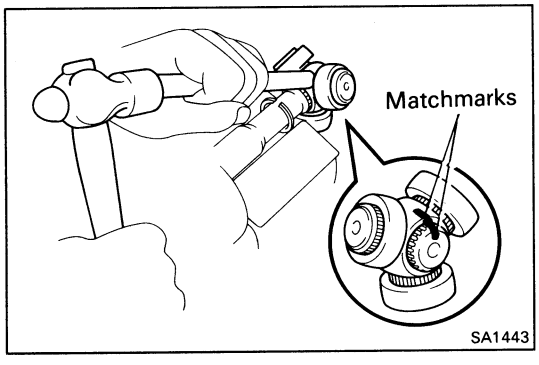
   (b) Remove the inboard joint tulip from the drive shaft.


SA2792

5. DISASSEMBLE TRIPOD JOINT
   (a) Using snap ring pliers, remove the snap ring.



(b) Using snap ring pliers, temporarily slide the snap ring toward the outboard joint side.

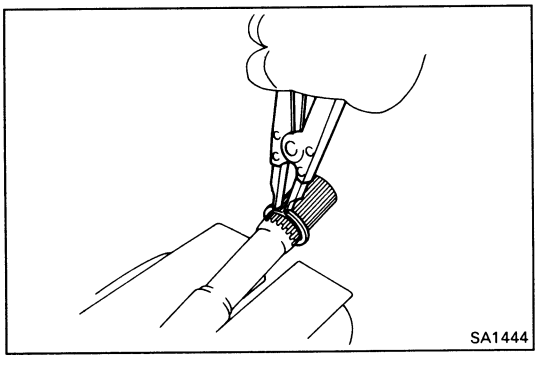


(c) Place the matchmarks on the drive shaft and tripod.

NOTICE: Do not punch the marks.

(d) Using a brass bar and a hammer, remove the tripod joint from the drive shaft.

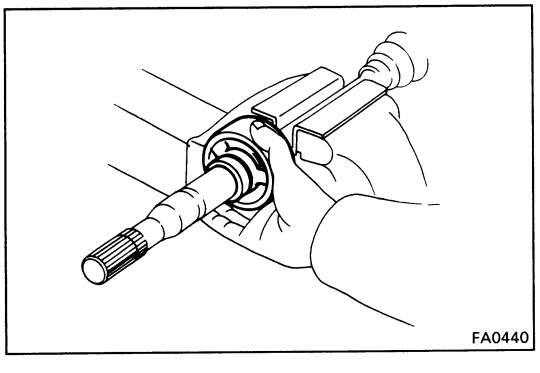
NOTICE: Do not tap the roller.



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

6. REMOVE INBOARD JOINT BOOT

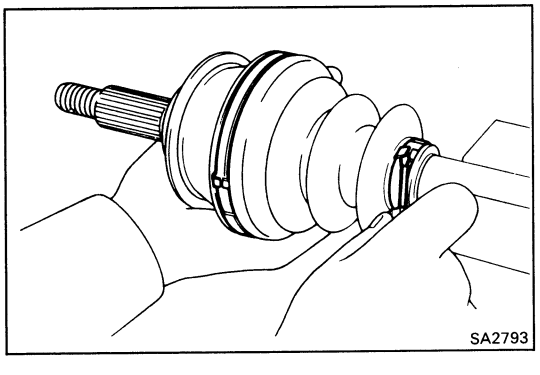
Slide out the inboard joint boot.



7. REMOVE DAMPER

(a) Using a screwdriver, remove the damper clamp.

(b) Slide out the damper.

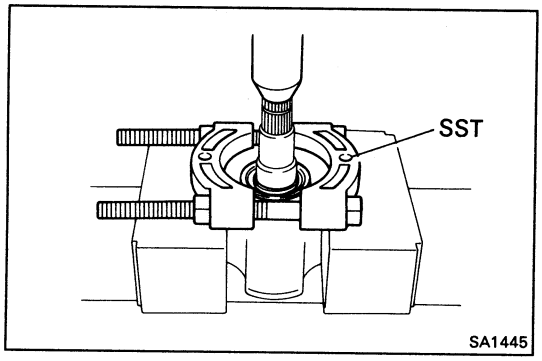


8. REMOVE OUTBOARD JOINT BOOT CLAMPS AND BOOT

(a) Using a screwdriver, remove the two boot clamps of the outboard joint boot.

(b) Slide out the boot from the outboard joint.

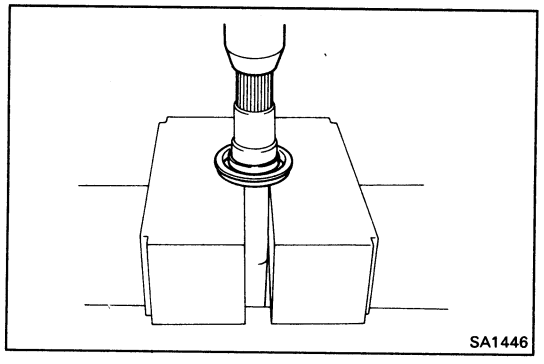
NOTICE: Do not disassemble the outboard joint.



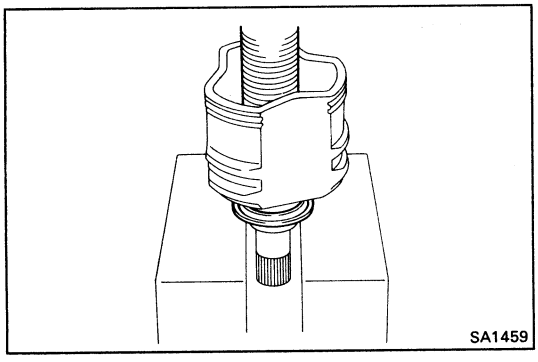
9. REMOVE DUST COVER

(a) (LH Drive Shaft)
Using SST and press, press out the dust cover from the inboard joint tulip.

SST 09950-00020



(b) (RH Drive Shaft)
Using a press, press out the dust cover.

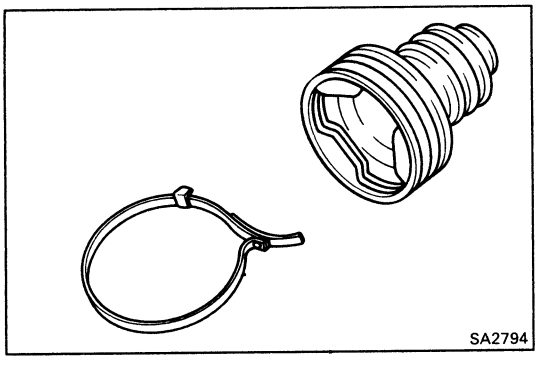


ASSEMBLY OF REAR DRIVE SHAFT

(See page SA-39)

1. INSTALL DUST COVER

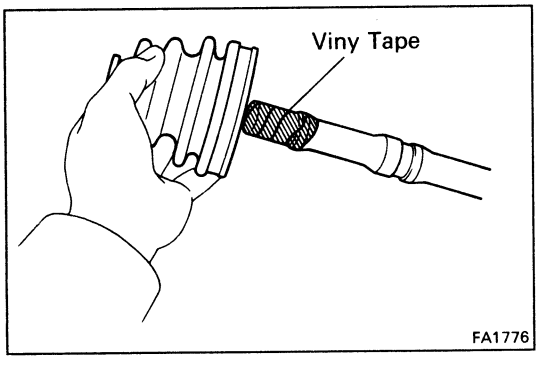
Using a press, press into the dust cover.

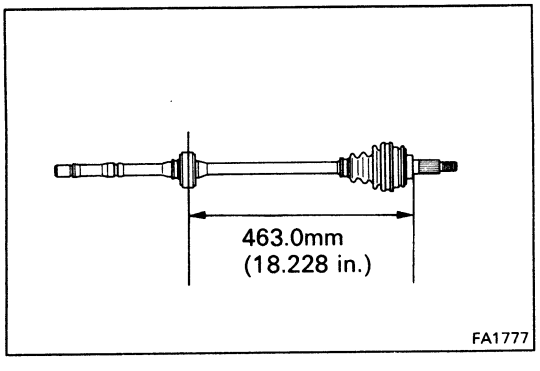


2. TEMPORARILY INSTALL OUTBOARD JOINT BOOT AND NEW BOOT CLAMPS

Temporarily install the boot and two new boot clamps for the outboard joint to the drive shaft.

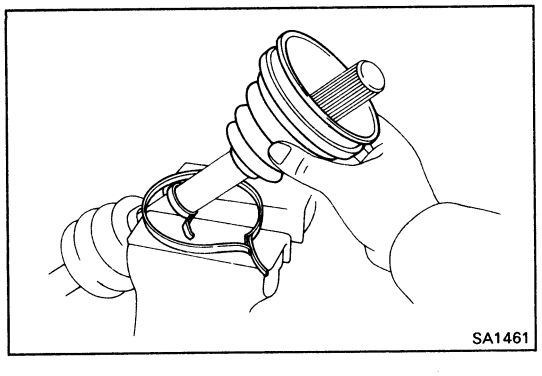
HINT: Before installing the boot, wrap vinyl tape around the spline of the drive shaft to prevent damaging the boot.





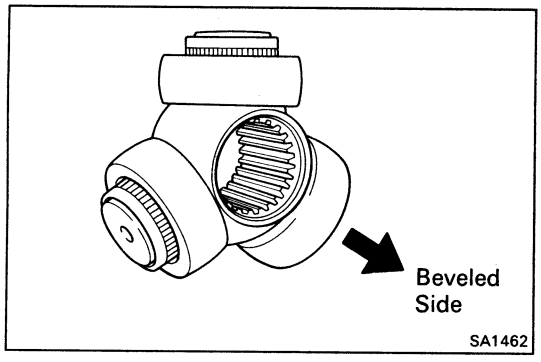
3. TEMPORARILY INSTALL DAMPER AND NEW DAMPER CLAMP

HINT: Fix the clamp position in line with the groove of the drive shaft.



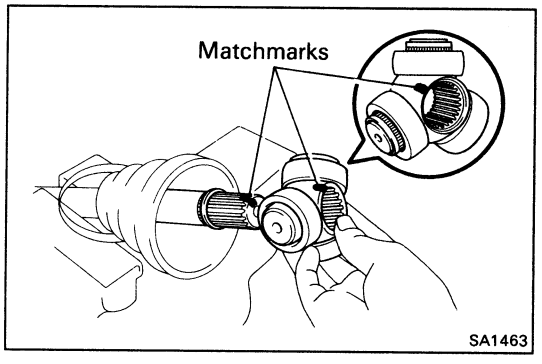
4. TEMPORARILY INSTALL INBOARD JOINT BOOT AND NEW BOOT CLAMPS

Temporarily install the boot and two new boot clamps for the inboard joint to the drive shaft.

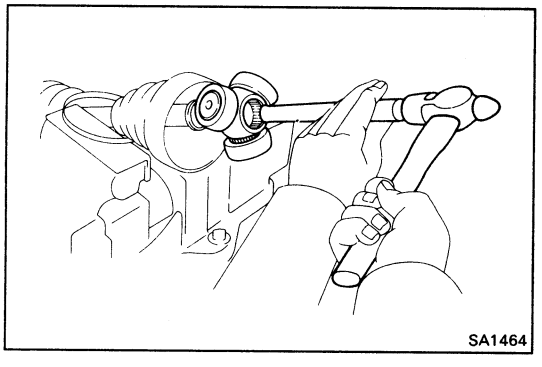


5. ASSEMBLE TRIPOD JOINT

(a) Place the beveled side of the tripod axial spline toward outboard joint.

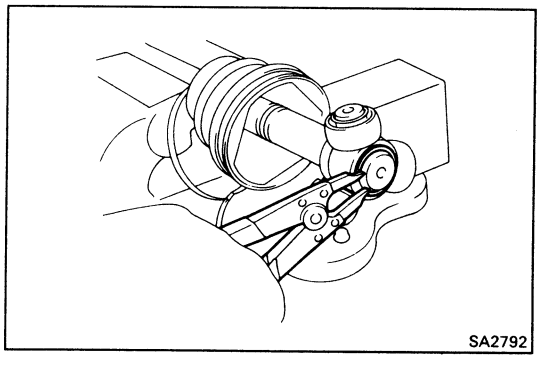


(b) Align the matchmarks placed before disassembly.

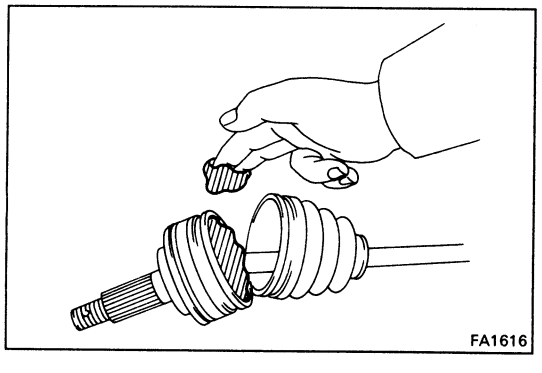


(c) Using a brass bar and hammer, tap in the tripod joint to the drive shaft.

NOTICE: Do not tap the roller.



(d) Using snap ring pliers, install a new snap ring.

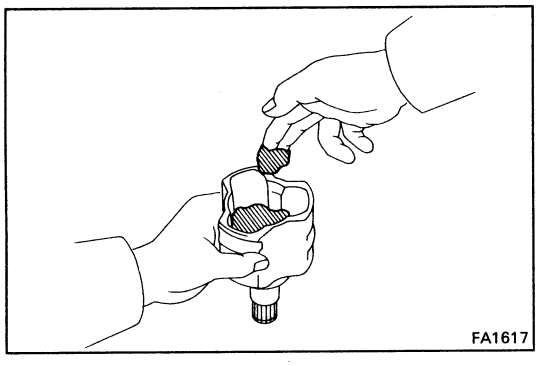


6. INSTALL BOOT TO OUTBOARD JOINT

Before assembling the boot, fill grease into the outboard joint and boot.

HINT: Use the grease supplier in the boot kit.

Grease capacity: 120 – 130 g (0.26 – 0.29 lb)
Grease color: Black

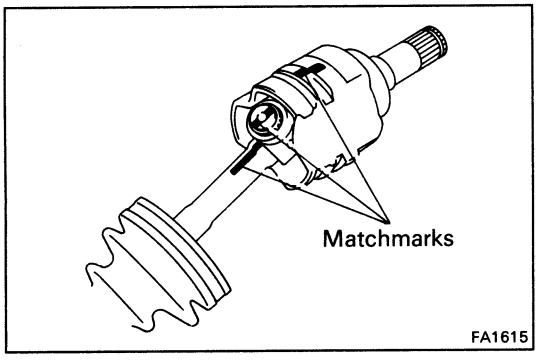

FA1617

7. INSTALL INBOARD JOINT TULIP TO REAR DRIVE SHAFT

(a) Pack in the grease to the boot and inboard joint tulip.

HINT: Use the grease supplied in the boot kit.

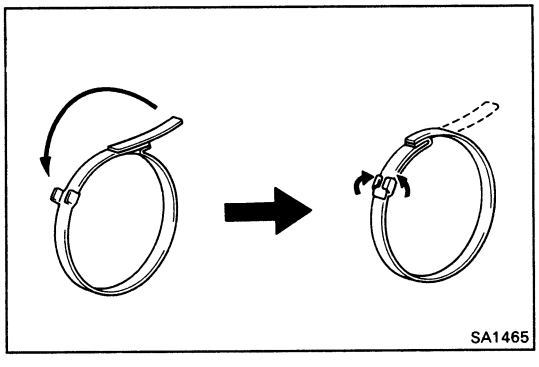
Grease capacity: 232 – 242 g (0.51 – 0.53 lb)
Grease color: Yellow ocher



FA1615

(b) Align the matchmarks placed before remove, and install the inboard joint tulip to the drive shaft.

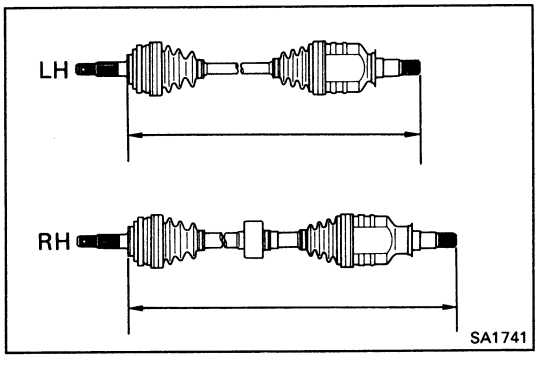
(c) Install the boot to the inboard joint tulip.


SA1465

8. ASSEMBLE BOOT CLAMPS AND DAMPER CLAMP

(a) Be sure the boot is on the shaft groove.

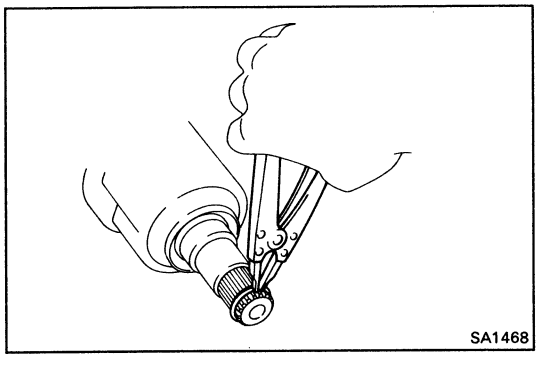
(b) Using a screwdriver, bend the clamp and lock it as shown.



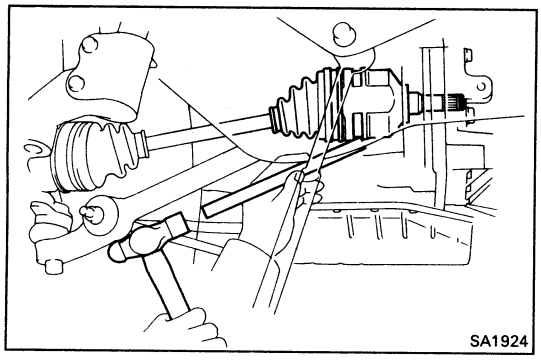
SA1741

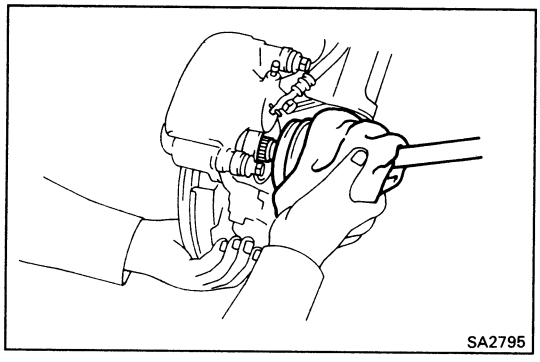
(c) Insure that the boot is not stretched or contracted when the drive shaft is at standard length.

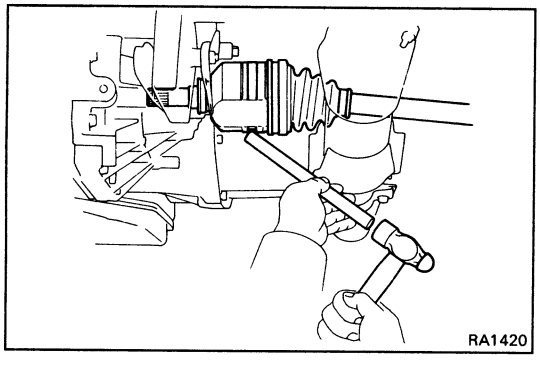
Drive shaft standard length:
LH 540.3 ± 5.0 mm (21.272 ± 0.197 in.)
RH 831.4 ± 5.0 mm (32.732 ± 0.197 in.)

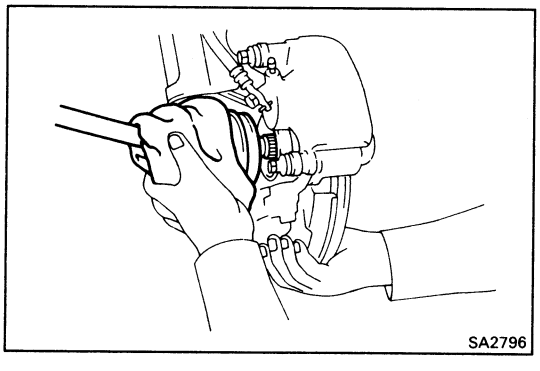

SA1468

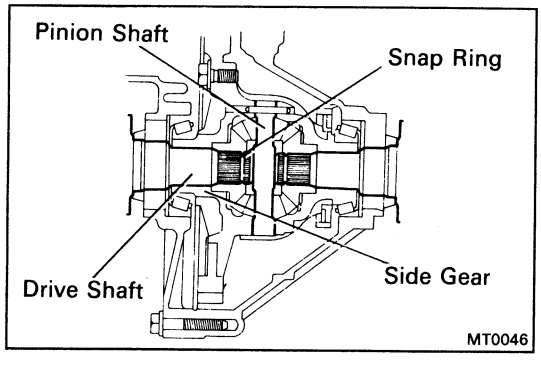
(d) Using snap ring pliers, install a new snap ring.


SA1924


SA2795


RA1420


SA2796



INSTALL OF REAR DRIVE SHAFT

(See page SA-39)

1. INSTALL LH DRIVE SHAFT

(a) Coat the oil seal lip with MP grease.

(b) Using a brass bar and hammer, drive in the drive shaft until it makes contact with the pinion shaft.

NOTICE: Be careful not to damage the boots.

HINT:

- Before installing the drive shaft, set the snap ring opening side facing downward.
- Whether or not the drive shaft is making contact with the pinion shaft can be known by sound or feeling when driving it in.

(c) Install the outboard joint side of the drive shaft to the axle shaft.

NOTICE:

- **Be careful not to damage the boots.**
- **(w/ ABS)**
  Be careful not to damage the speed sensor rotor of the drive shaft.

2. INSTALL RH DRIVE SHAFT

(a) Coat the oil seal lip with MP grease.

(b) Using a brass bar and hammer, drive in the drive shaft until it makes contact with the pinion shaft.

NOTICE: Be careful not to damage the boots.

HINT:

- Before installing the drive shaft, set the snap ring opening side facing downward.
- Whether or not the drive shaft is making contact with the pinion shaft can be known by sound or feeling when driving it in.

(c) Install the outboard joint side of the drive shaft to the axle shaft.

NOTICE:

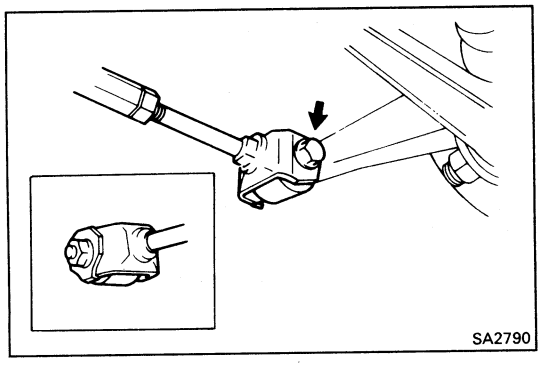
- **Be careful not to damage the boots.**
- **(w/ ABS)**
  Be careful not to damage the speed sensor rotor of the drive shaft.

3. CHECK INSTALLATION OF REAR DRIVE SHAFT

(a) Check that there is 2 – 3 mm (0.08 – 0.12 in.) of play in axial direction.

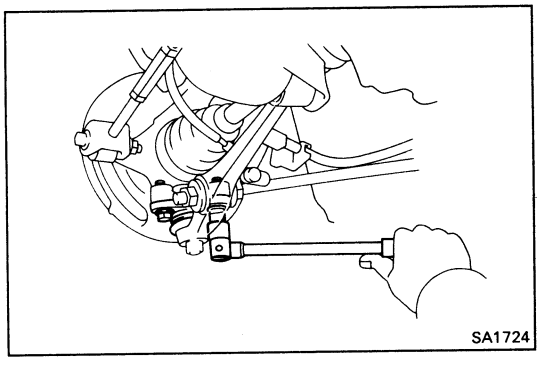
(b) Check that the drive shaft will not come out by trying to pull it completely out by hand.

HINT: When checking pull the inboard joint so as not to damage the boots.



4. CONNECT TIE ROD END

Temporarily connect the tie rod end to rear axle carrier with the bolt and nut.

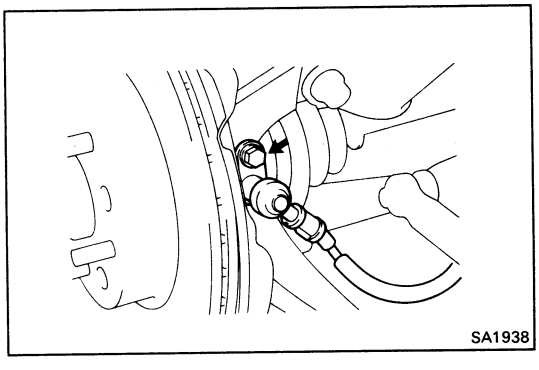


5. CONNECT BALL JOINT TO AXLE CARRIER

(a) Connect the ball joint to the axle shaft.

(b) Install and torque the two bolts.

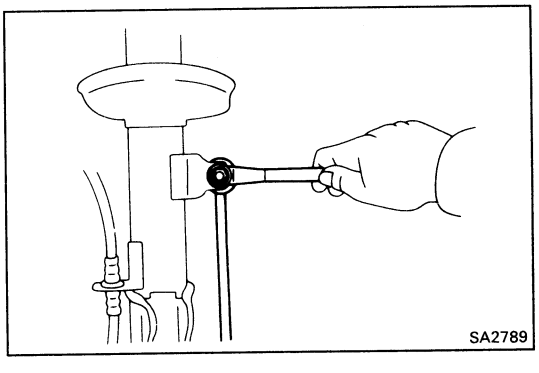
Torque: 1,150 kg-cm (83 ft-lb, 113 N·m)



6. (w/ ABS)
INSTALL SPEED SENSOR TO AXLE CARRIER

Torque: 80 kg-cm (69 in.-lb, 7.4 N·m)

HINT: Before installing, check that there is no ferric clip or foreign material on the sensor tip.

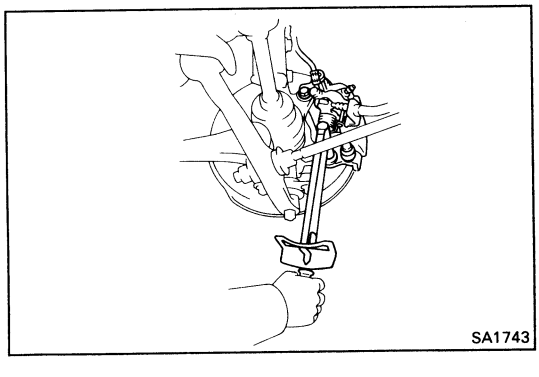


7. CONNECT STABILIZER LINK

Connect the upper side nut to the stabilizer link.

Torque: 500 kg-cm (36 ft-lb, 49 N·m)

HINT: If the ball joint stud turns together with the nut, use a hexagon wrench 5 mm (0.197 in.) to hold the stud.



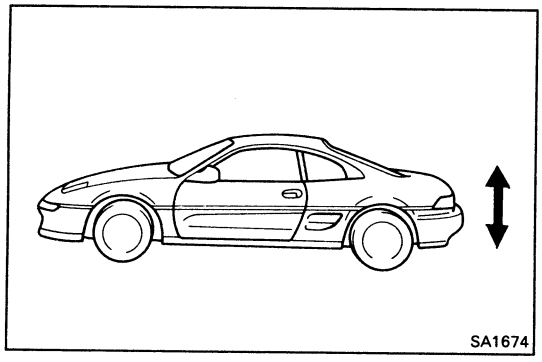
8. INSTALL ROTOR DISC TO AXLE CARRIER

HINT: Before removing the rotor disc, place the match-marks on the axle shaft and rotor disc.

9. INSTALL BRAKE CALIPER AXLE CARRIER

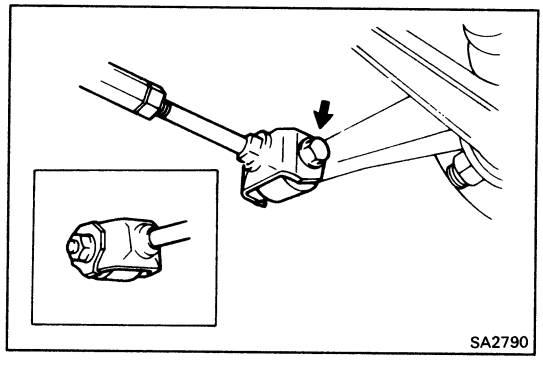
Torque the two bolts.

Torque: 600 kg-cm (43 ft-lb, 59 N·m)



10. INSTALL WHEEL AND LOWER VEHICLE

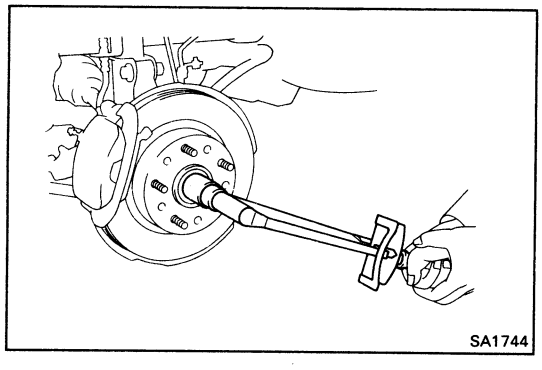
Rock the vehicle up and down to stabilize the suspension.



11. TORQUE BOLT AND NUT

Torque the tie rod end mount bolt and nut.

Torque: 1,050 kg-cm (76 ft-lb, 103 N·m)



12. INSTALL BEARING LOCK NUT, LOCK NUT CAP AND COTTER PIN

(a) Install the washer and lock nut.

(b) With the parking brake engaged, and tighten the nut.

Torque: 2,100 kg-cm (152 ft-lb, 206 N·m)

(c) Install the lock cap, and using pliers, install a new cotter pin.

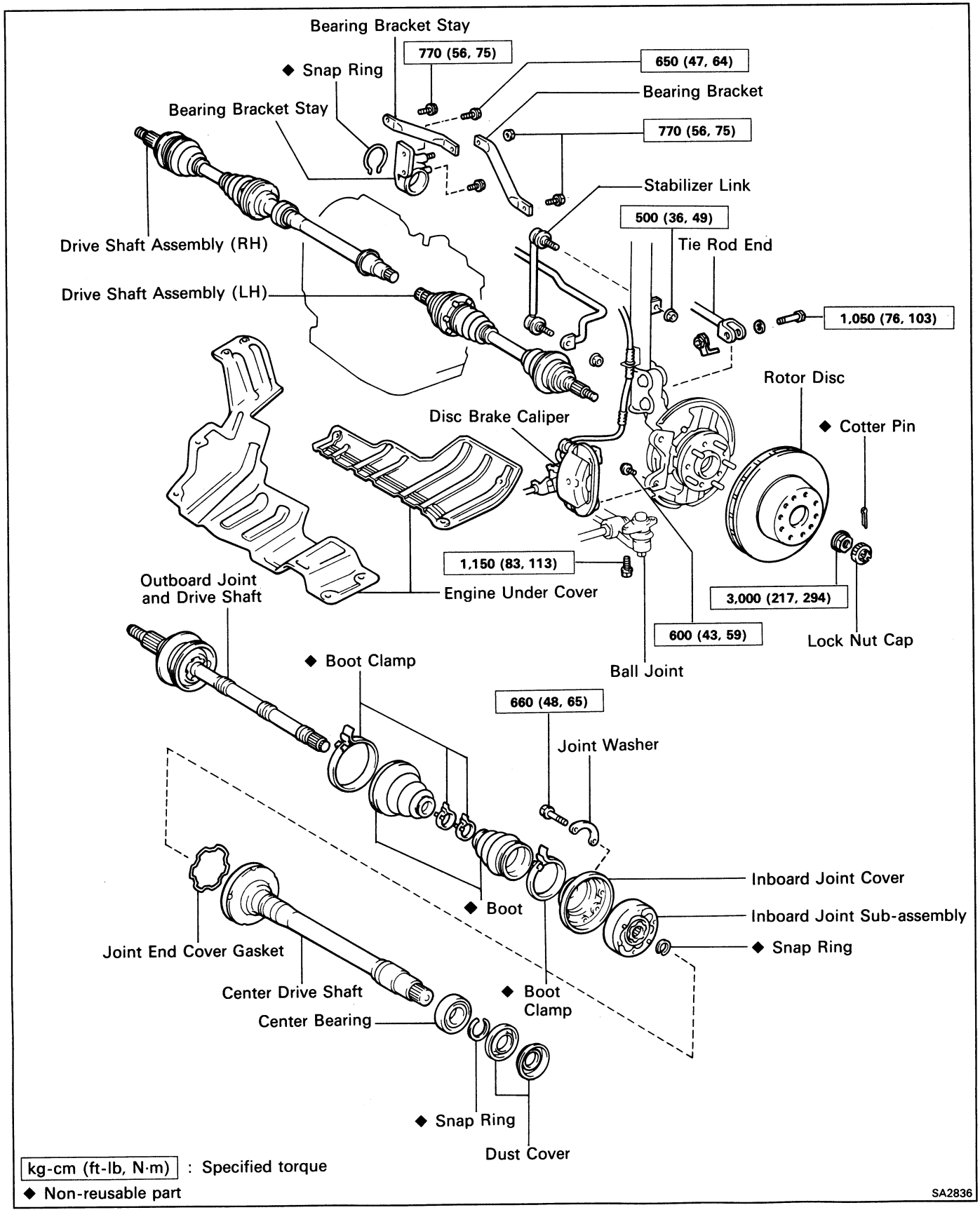
13. FILL TRANSAXLE WITH GEAR OIL

Fluid type: ATF DEXRON II

14. INSTALL ENGINE UNDER COVER

REAR DRIVE SHAFT (3S-GTE ENGINE)

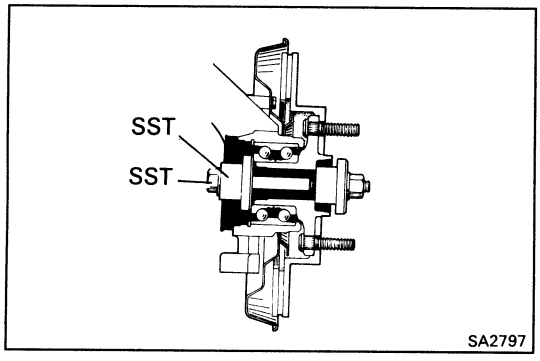
COMPONENTS



kg-cm (ft-lb, N·m) : Specified torque

◆ Non-reusable part

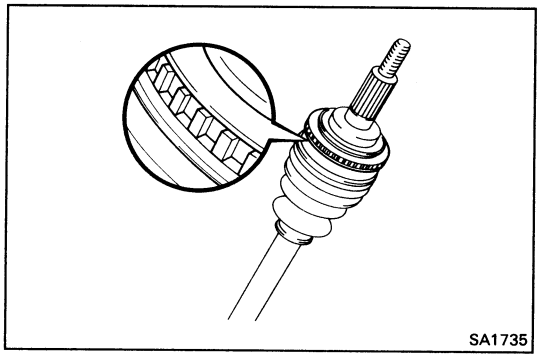
SA2836



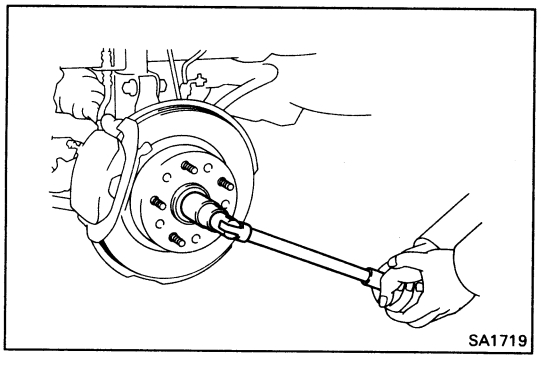
NOTICE:

- **The axle bearing could be damaged if it is subjected to the vehicle weight, such as when moving the vehicle with the drive shaft removed. Therefore, if it is absolutely necessary to place the vehicle weight on the axle bearing, first support it with SST.**

SST 09570-22010, 09608-16041 (09608-02010)



- **(w/ ABS)**
  After disconnecting the drive shaft from the axle hub, work carefully so as not to damage the sensor rotor serrations on the drive shaft.



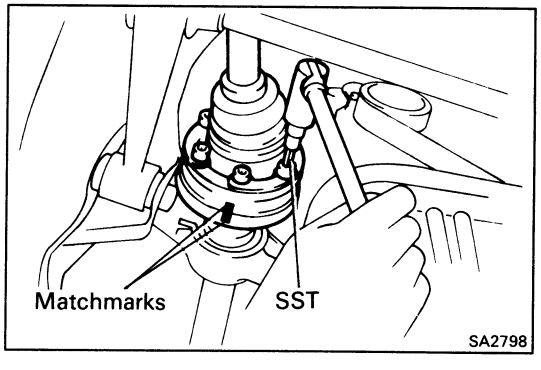
REMOVAL OF REAR DRIVE SHAFT

(See page SA-52)

1. **REMOVE ENGINE UNDER COVER**

2. **DRAIN TRANSAXLE OIL**

3. **REMOVE COTTER PIN, LOCK NUT CAP AND BEARING LOCK NUT**
   (a) Remove the cotter pin and lock nut cap.
   (b) With the parking brake engaged, remove the bearing lock nut.



4. **LOOSEN SIX BOLTS HOLDING DRIVE SHAFT TO DIFFERENTIAL SIDE GEAR SHAFT OR CENTER DRIVE SHAFT**
   (a) Place matchmarks on the drive shaft and side gear shaft.

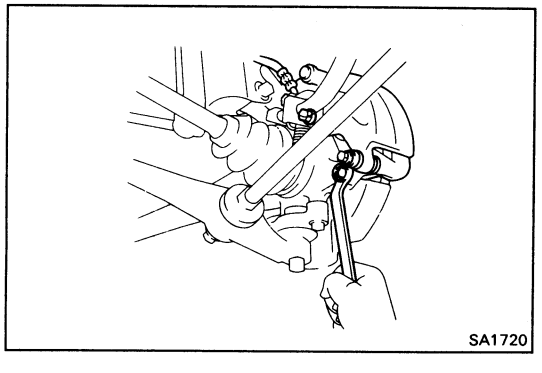
   NOTICE: Do not punch the marks.

   Use paint, etc.

   (b) With the parking brake engaged, using SST, loosen the six hexagon bolts.

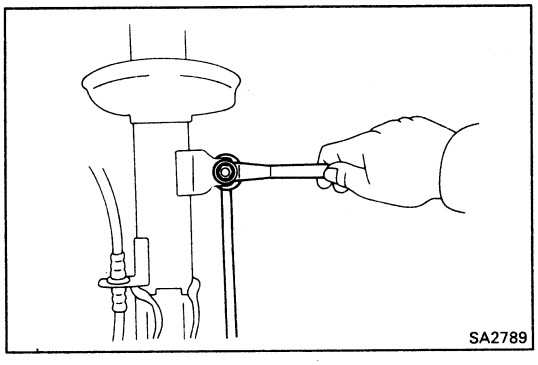
   SST 09043-88010

   HINT: Do not remove the bolts, finger tighten them not to drop down the drive shaft.



5. **REMOVE BRAKE CALIPER**
   Remove the brake caliper from the axle carrier and suspend it with wire.

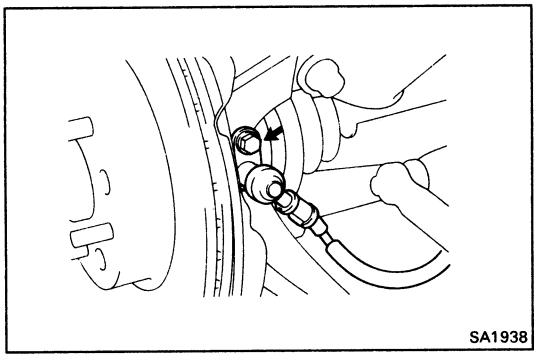
6. **REMOVE ROTOR DISC**
   HINT: Before removing the rotor disc, place matchmarks on the axle shaft and rotor disc.



7. DISCONNECT STABILIZER LINK

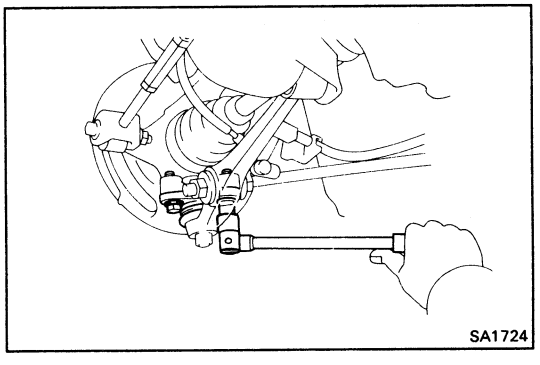
Remove the upper side nut from the stabilizer link.

HINT: If the ball joint stud turns together with the nut, use a hexagon wrench 5 mm (0.197 in.) to hold the stud.



8. (w/ ABS)
REMOVE SPEED SENSOR FROM AXLE CARRIER

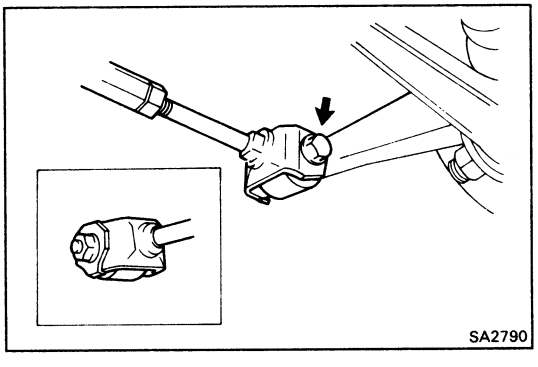
Remove the bolt and pull out the speed sensor.



9. DISCONNECT LOWER ARM FROM REAR AXLE CARRIER

(a) Remove the two bolts holding the ball joint to the lower arm.

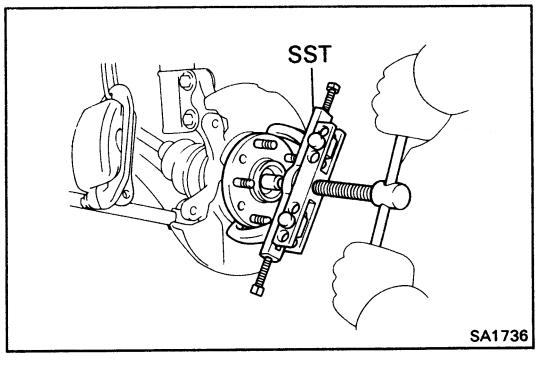
(b) Disconnect the lower arm.



10. DISCONNECT TIE ROD END

(a) Remove the tie rod end mounting bolt and nut, disconnect the tie rod end from the rear axle carrier.

(b) Similarly disconnect the other side.



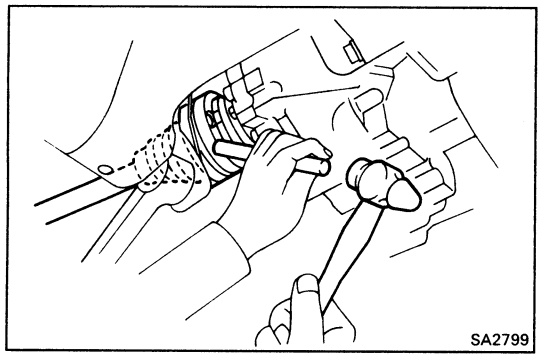
11. DISCONNECT DRIVE SHAFT FROM AXLE CARRIER

Using SST, disconnect the drive shaft from the axle carrier.

SST 09950-20017

NOTICE:

- **Cover the drive shaft boot with cloth to protect it from damage.**
- **(w/ ABS)**
  Be careful not to damage the sensor rotor of the drive shaft.

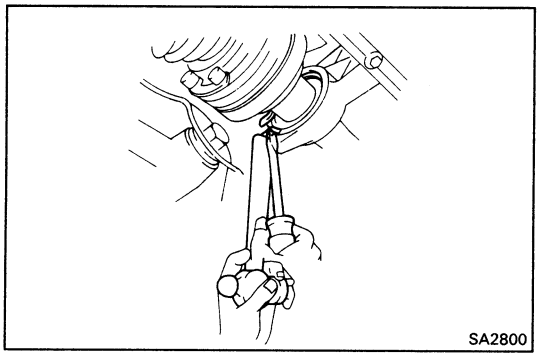


12. REMOVE LH DRIVE SHAFT

Using a hammer and brass bar, drive out the drive shaft from the transaxle.

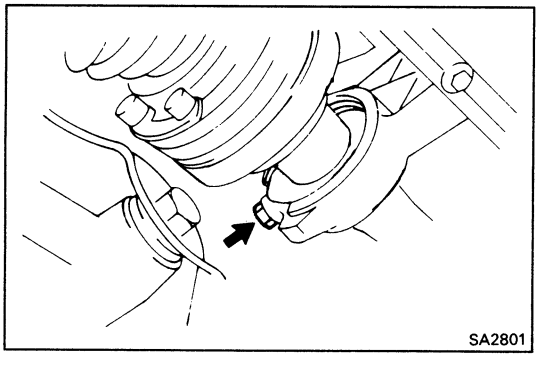
NOTICE:

- **Be careful not to damage the side gear shaft.**
- **Be careful not to damage the differential side oil seal.**



13. REMOVE RH DRIVE SHAFT

(a) Using a hammer and screwdriver, remove the snap ring from the bearing bracket.

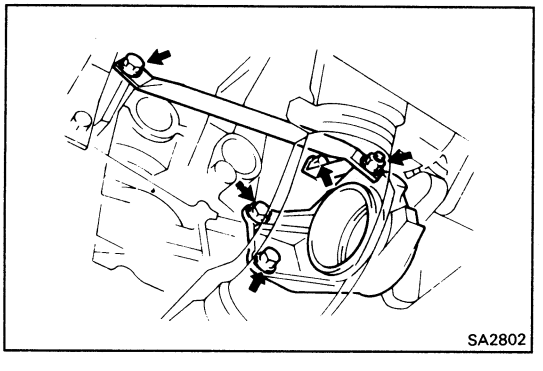


(b) Remove the bolt from the bearing bracket.

(c) Remove the RH drive shaft with center drive shaft.

NOTICE: Be careful not to damage the differential side oil seal.

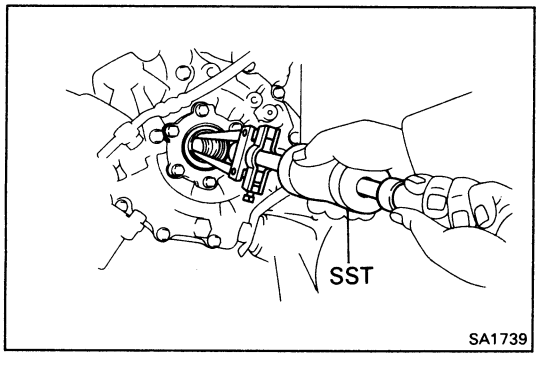
HINT: If it is hard to remove the bearing, use a brass bar and hammer and the drive flange end of the drive shaft.



14. REMOVE DRIVE SHAFT BEARING BRACKET AND BEARING BRACKET STAY

(a) Remove the two bolts, nut and the two bearing bracket stays from the bearing bracket and engine.

(b) Remove the two bolts and the bearing bracket from the engine.

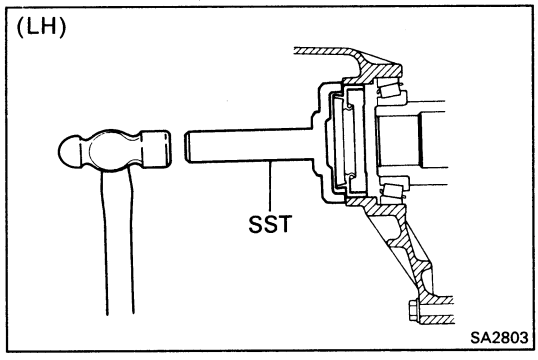


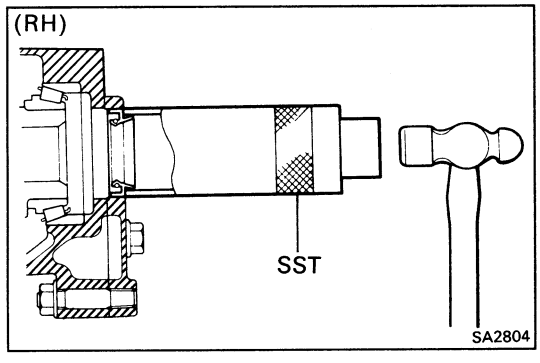
REPLACEMENT OF OIL SEAL

1. REMOVE OIL SEAL

Using SST, drive out the oil seal.

SST 09308-00010





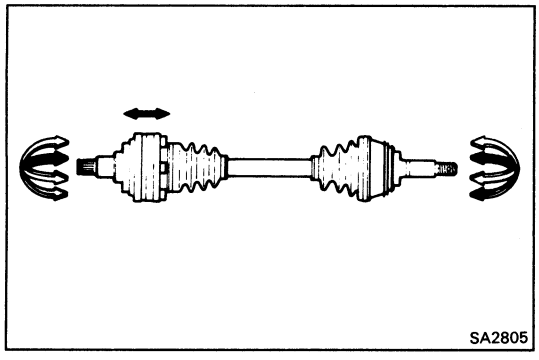
2. INSTALL NEW OIL SEAL

(a) (LH)
Using SST and hammer, tap in a new LH oil seal.

SST 09223-15010

(b) (RH)
Using SST and hammer, tap in a new RH oil seal.

SST 09316-60010 (09316-00010)


SA2805

DISASSEMBLY OF REAR DRIVE SHAFT

(See page SA-52)

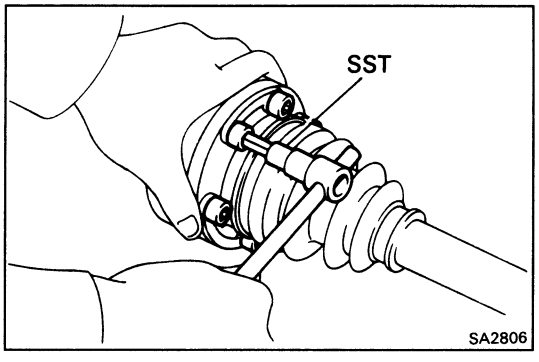
1. CHECK DRIVE SHAFT

(a) Check to see that there is no play in the outboard joint.

(b) Check to see that the 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 boots.



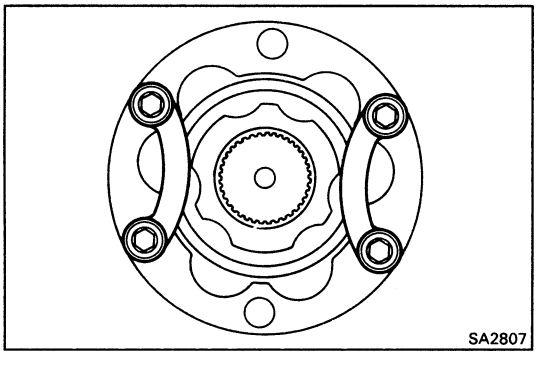
SA2806

2. DISCONNECT SIDE GEAR SHAFT

(a) Using SST, remove the six hexagon bolts and the three washers.

SST 09043-88010

(b) Disconnect the side gear shaft from the drive shaft.


SA2807

(c) Use bolts, nuts and washers to keep the inboard joint together.

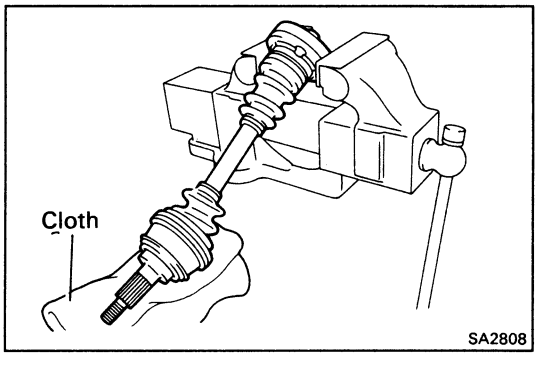
NOTICE: Tighten the bolts by hand to avoid scratching the flange surface.

3. REMOVE INBOARD JOINT AND BOOT CLAMPS

(a) Mount the inboard joint sub-assembly in a vise.

HINT:

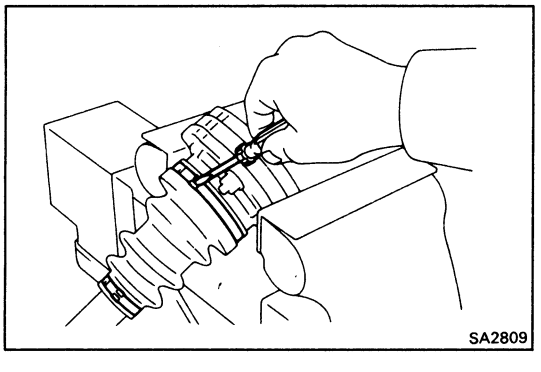
- Use a set of soft jaws in the vise to protect the inboard joint sub-assembly.
- Cover the outboard joint side dust cover with cloth to protect it from damage.

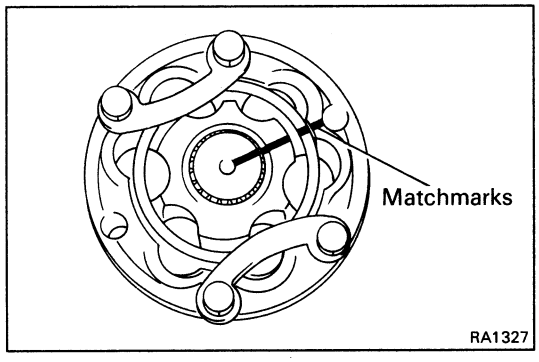


SA2808

(b) Using a screwdriver, remove the two inboard joint boot clamps.

(c) Remove the inboard joint boot from the inboard joint cover.

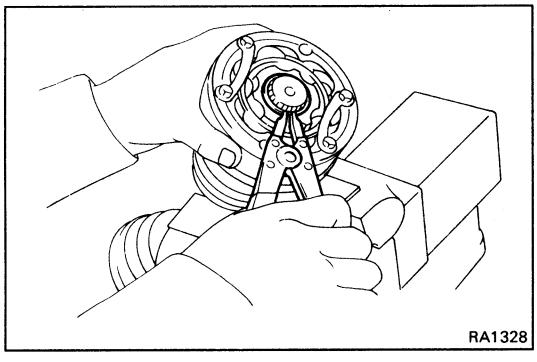

SA2809



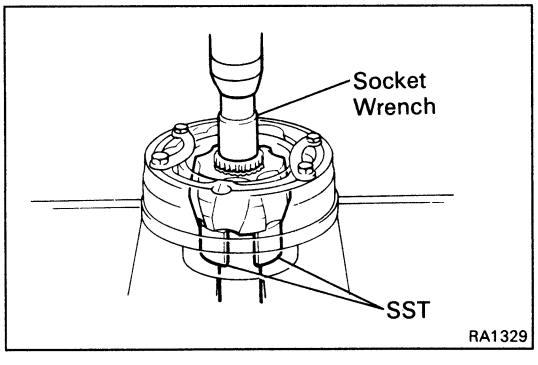
4. DISASSEMBLE INBOARD JOINT

(a) Place matchmarks on the inboard joint and drive shaft.

NOTICE: Do not punch marks.



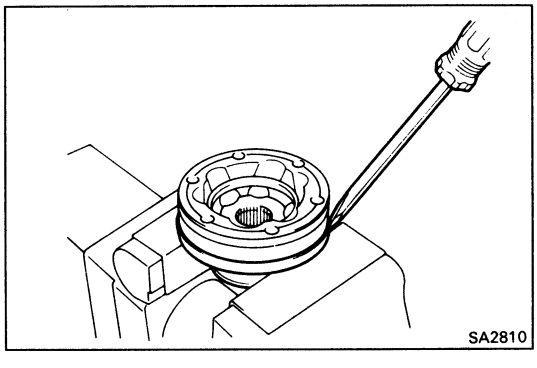
(b) Using snap ring pliers, remove the snap ring.



(c) Using SST, a socket wrench and a press, remove the inboard joint from the drive shaft.

SST 09726-10010 (09726-00030)

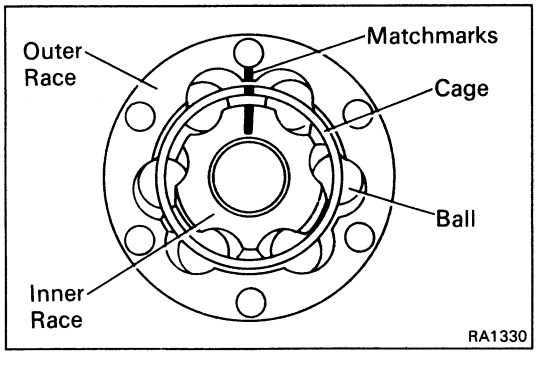
(d) Remove the bolts, nuts and washers from the inboard joint.



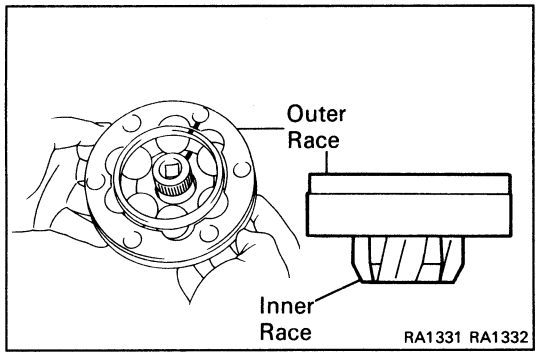
(e) Using a screwdriver, unstake the inboard joint cover.

(f) Using a screwdriver, pry out the inboard joint from the inboard joint cover.

NOTICE: When lifting the inboard joint, hold onto the inner race and outer race.

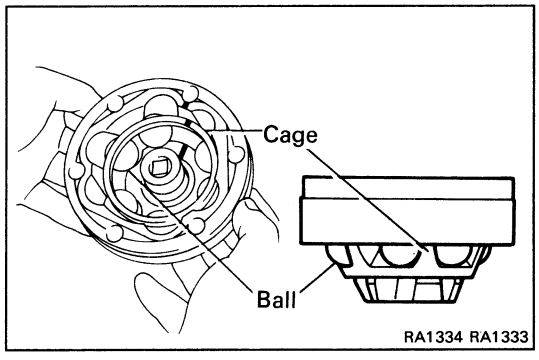


HINT: Should the joint become disassembled, reassemble it in the way shown.

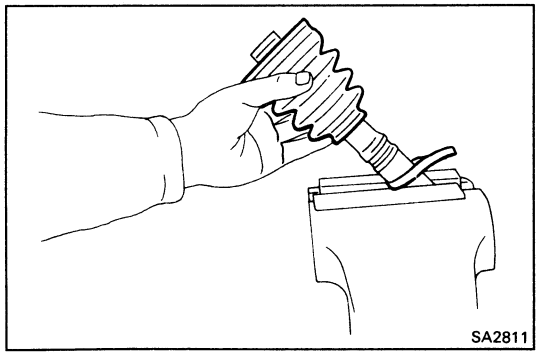


SERVICE HINT

(a) Align the matchmarks place before disassembly.
(b) Insert the spark plug wrench into the inner race.
(c) Lift the outer race and cage, and insert the six balls.

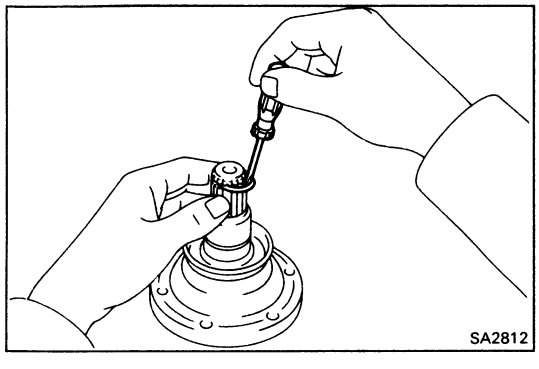


(d) Jiggle the outer race and cage as shown to place the balls in their respective grooves.
(e) Lower the outer race and cage so that fit tightly with the inner race.



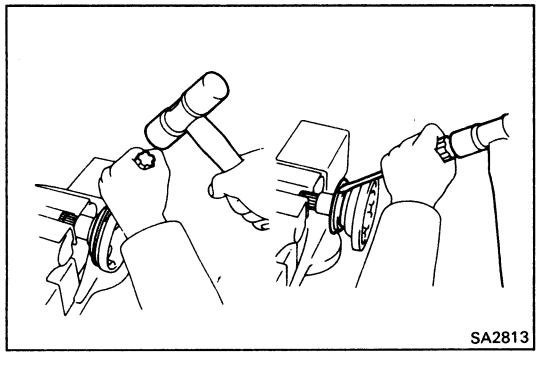
5. REMOVE BOOTS

Remove boots of the inboard joint and outboard joint.



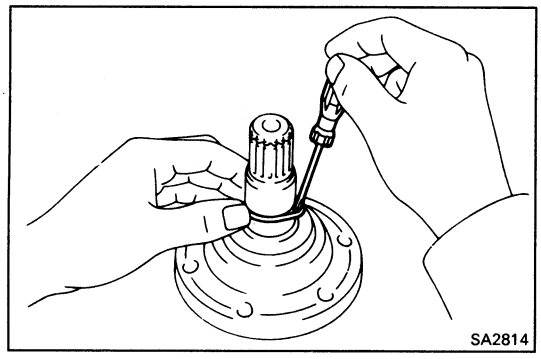
6. REPLACE SIDE GEAR SHAFT SNAP RING

(a) Using a screwdriver, pry out the snap ring.
(b) Using snap ring pliers, install the new snap ring.



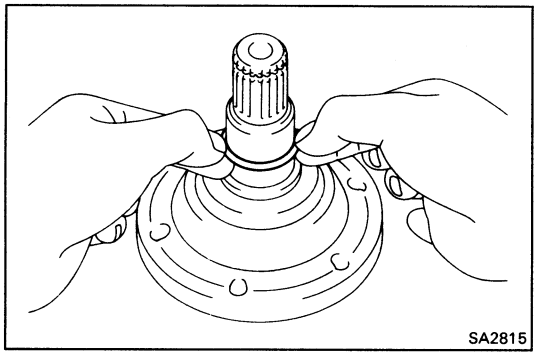
7. REMOVE DUST COVER FROM SIDE GEAR SHAFT

Using a screwdriver and hammer, tap out the dust cover.



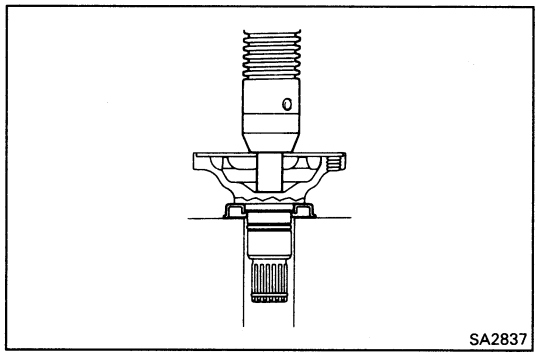
8. REPLACE SIDE GEAR SHAFT O-RING

(a) Using s screwdriver, remove the O-ring.



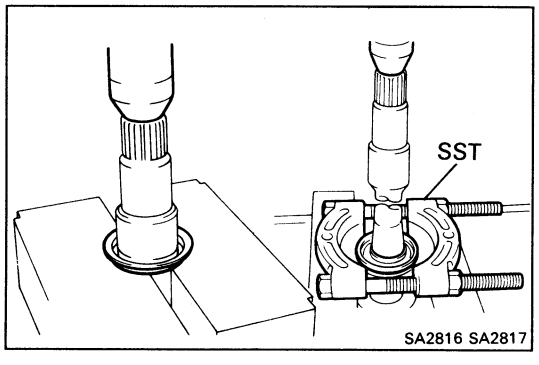
(b) Coat O-ring with MP grease.

(c) Install a new O-ring.



9. INSTALL DUST COVER TO SIDE GEAR SHAFT

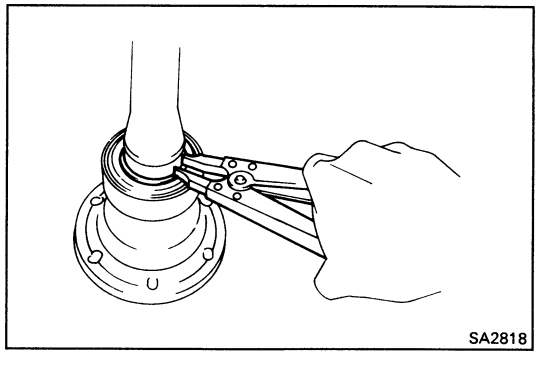
Using a press, install a new dust cover.



10. REMOVE DUST COVER FROM CENTER DRIVE SHAFT

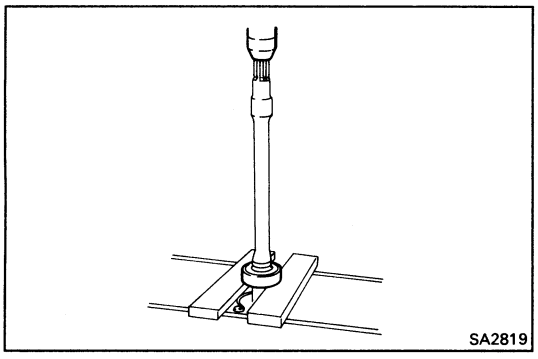
Using SST and press, remove the dust cover from the inboard joint.

SST 09950-00020

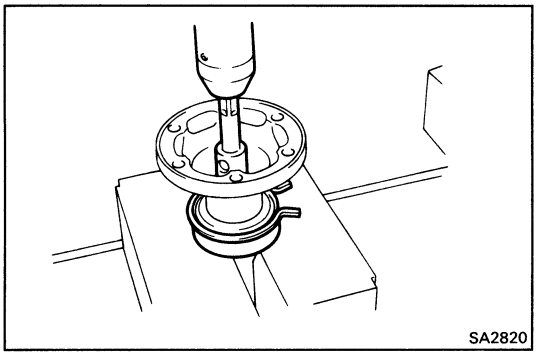


11. REMOVE BEARING FROM CENTER DRIVE SHAFT

(a) Using snap ring pliers, remove the snap ring from the inboard joint.


SA2819

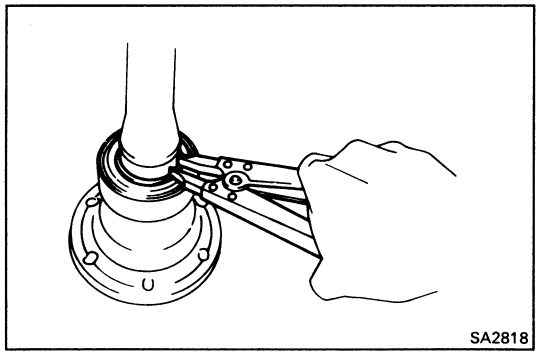
(b) Using a press, press out the bearing from the inboard joint.


SA2820

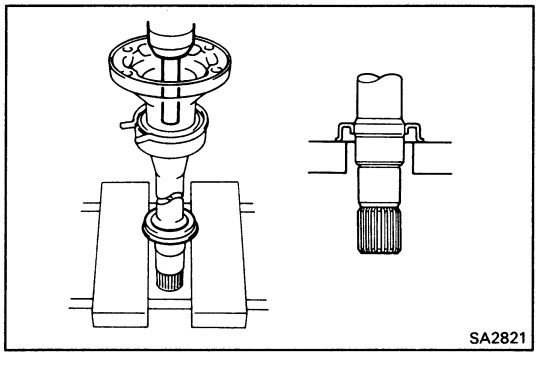
12. INSTALL BEARING TO CENTER DRIVE SHAFT

(a) Install a new snap ring to the center drive shaft.

(b) Using a press and extension bar, press in a new bearing.

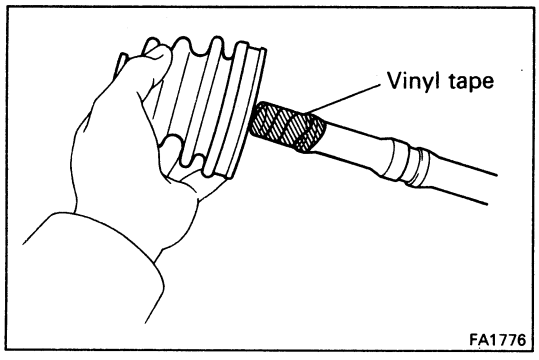

SA2818

(c) Using snap ring pliers, install a new snap ring.


SA2821

13. INSTALL DUST COVER TO CENTER DRIVE SHAFT

Using a press, press in a new dust cover to the inboard joint.



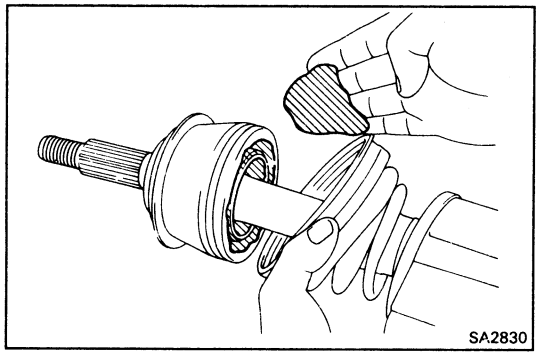
ASSEMBLY OF REAR DRIVE SHAFT

(See page SA-52)

1. TEMPORARILY INSTALL BOOTS AND NEW BOOT CLAMPS

HINT: Before installing the boot, wrap vinyl tape around the spline of the shaft to prevent damaging the boot.

NOTICE: The boot and clamp of the outboard joint are smaller than those of the inboard joint. Temporarily install the two boots and four new clamps to the outboard joint and inboard joint.

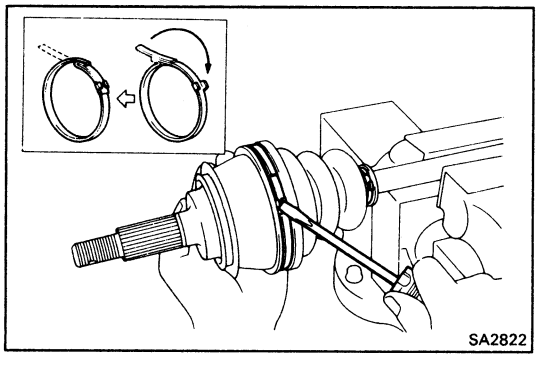


2. INSTALL BOOT TO OUTBOARD JOINT

(a) Before assembling the boots, pack in grease.

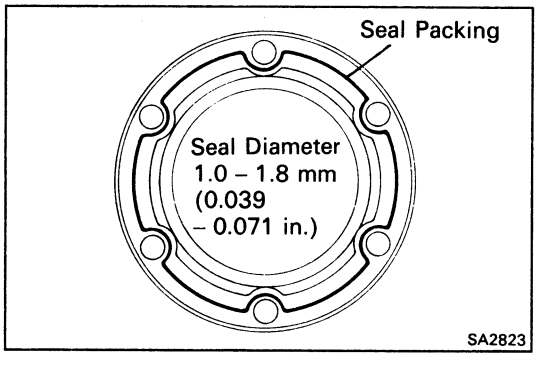
HINT: Use the grease supplied in the boot kit.

Grease capacity: 120 – 130 g (0.26 – 0.29 lb)
Grease color: Black



(b) Install the two boot clamps to the outboard joint boot.

(c) Bend the boot clamp and lock it as shown.



3. INSTALL INBOARD JOINT COVER

(a) Clean contacting surfaces of any residual packing material using gasoline or alcohol.

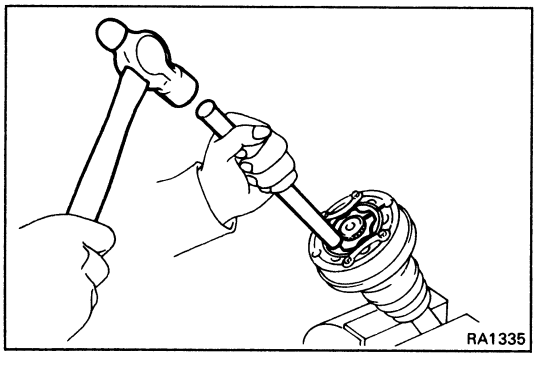
(b) Apply seal packing to the inboard joint cover as shown.

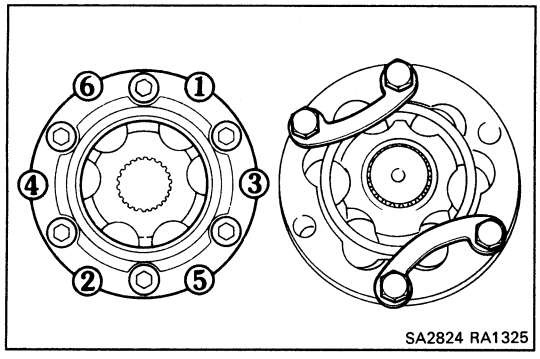
Seal packing: Part No.08826-00801, THREE BOND 1121 or equivalent

HINT: Avoid applying an excess amount to the surface.

(c) Align the bolt holes of the cover with those of the inboard joint, then insert the hexagon bolts.

(d) Using a hammer and brass bar, tap the rim of the inboard joint cover into place.

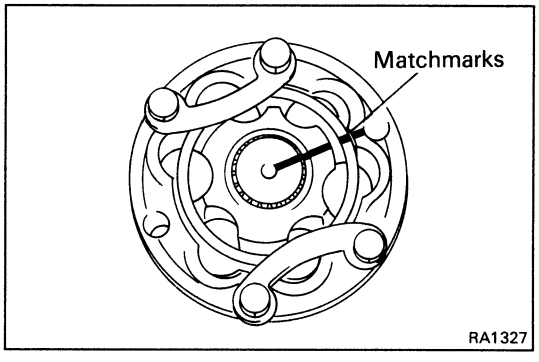




(e) Do this in the order shown, and repeat several time.

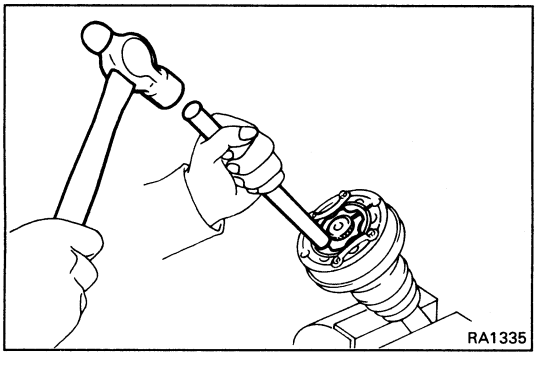
(f) Use bolts, nuts and washers to keep the inboard joint together.

NOTICE: Tighten the bolts by hand to avoid scratching the flange surface.



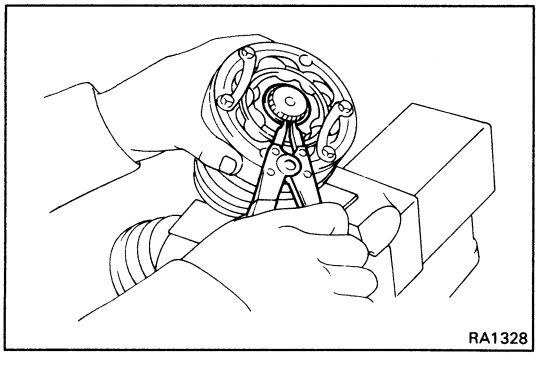
4. ASSEMBLE INBOARD JOINT

(a) Align the matchmarks placed before disassembly.

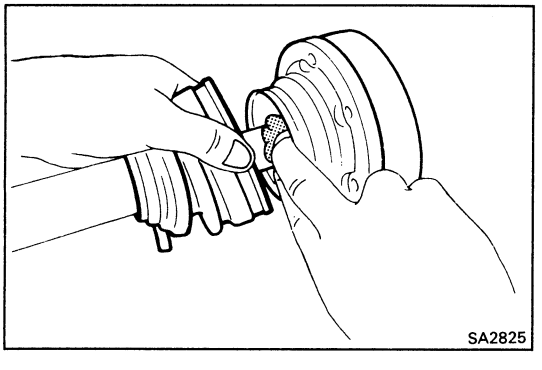


(b) Using a brass bar and hammer, tap the inboard joint onto the drive shaft.

NOTICE: Make sure that the brass bar is touching the inner race, and not the cage.



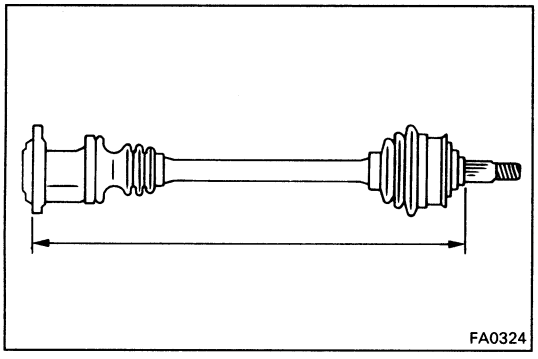
(c) Using snap ring pliers, install a new snap ring.



(d) Pack in grease to the inboard tulip and boot.

HINT: Use the grease supplied in the boot kit.

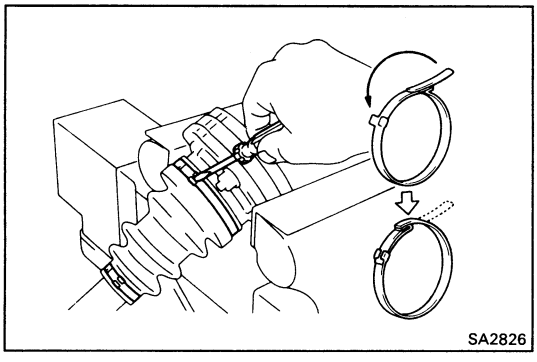
Grease capacity: 90 – 100 g (0.20 – 0.22 lb)
Grease color: Black


FA0324

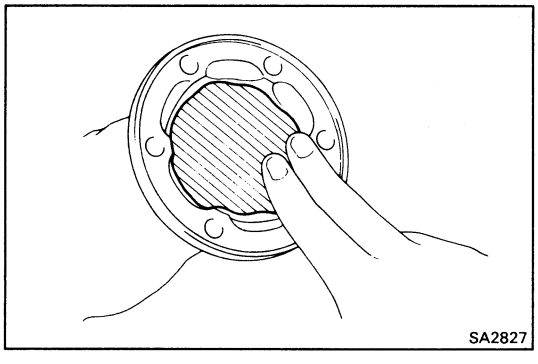
(e) Be sure the boot is on the shaft groove.

(f) Insure that the boot is no stretched or contracted when the drive shaft is at standard length.

Drive shaft length: 389.7 ± 5.0 mm (15.343 ± 0.197 in.)


SA2826

(g) Bend the boot clamp and lock it as shown.


SA2827

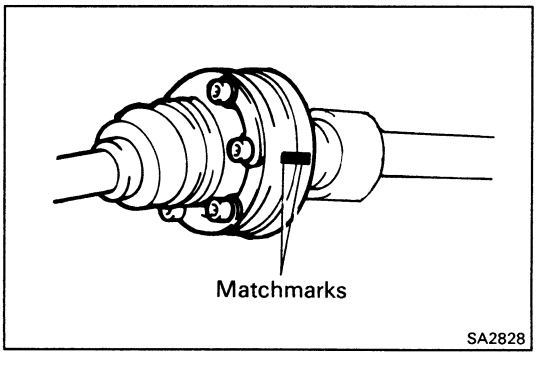
5. INSTALL SIDE GEAR SHAFT

(a) Pack in grease to the side gear shaft.

HINT: Use the grease supplied in the boot kit.

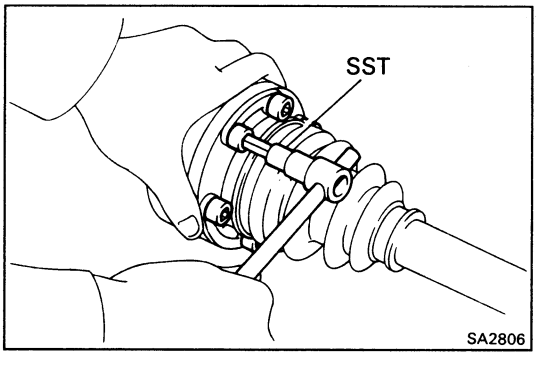
Grease capacity: 43 – 53 g (0.09 – 0.12 lb)
Grease color: Black

(b) Remove the two washers and four bolts from the drive shaft.



SA2828

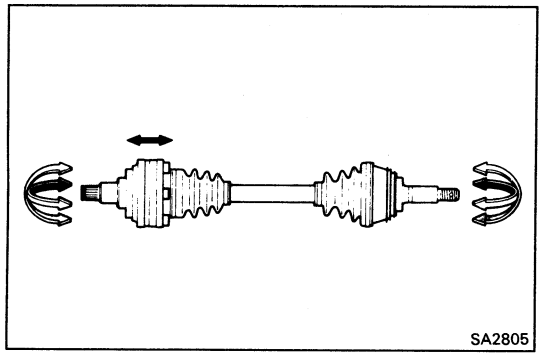
(c) Align the matchmarks placed before remove, and install the side gear shaft or center drive shaft and a new gasket to the inboard joint sub-assembly.



SA2806

(d) Using SST, temporarily tighten the six hexagon bolts with three washers.

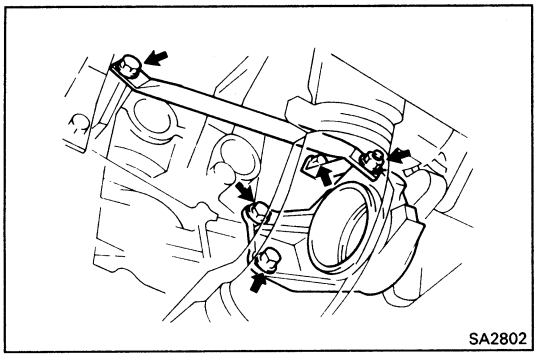
SST 09043-88010

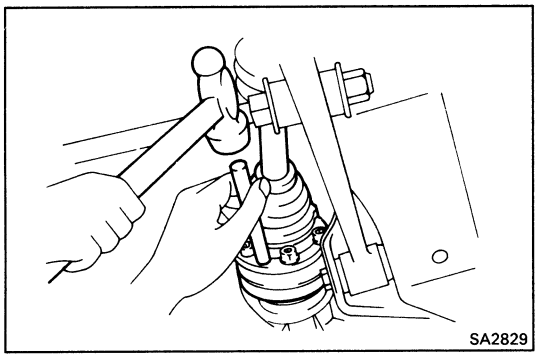


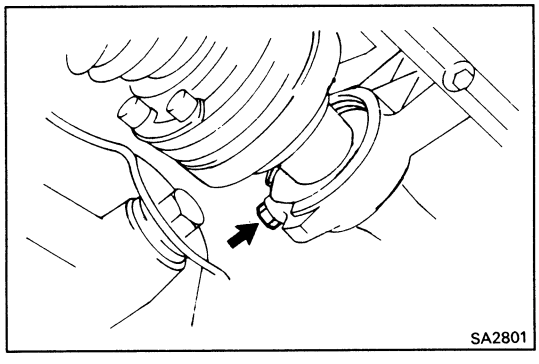
6. CHECK DRIVE SHAFT

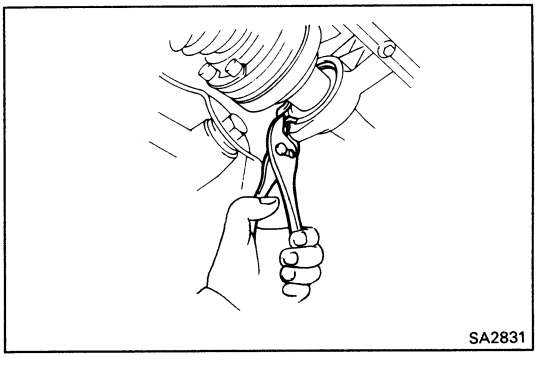
(a) Check to see that the there is no play in the inboard joint and outboard joint.

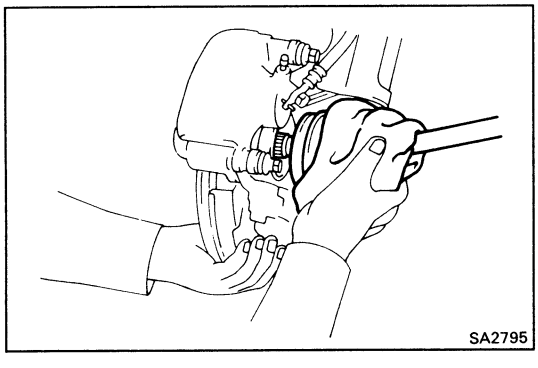
(b) Check to see that the inboard slide smoothly in the thrust direction.


SA2802


SA2829


SA2801


SA2831


SA2795

INSTALLATION OF REAR DRIVE SHAFT

(See page SA-52)

1. INSTALL DRIVE SHAFT BEARING BRACKET AND BEARING BRACKET STAY

(a) Install the bearing bracket to the engine with the two bolts.

Torque: 650 kg-cm (47 ft-lb, 64 N·m)

(b) Install the two bearing bracket stays to the engine and bearing bracket with the two bolts and the nut.

Torque:
Bolt: 770 kg-cm (56 ft-lb, 75 N·m)
Nut: 770 kg-cm (56 ft-lb, 75 N·m)

2. INSTALL LH DRIVE SHAFT

(a) Apply the oil seal lip with MP grease.

(b) Using a brass bar and hammer, drive in the drive shaft until it makes contact with the pinion shaft.

NOTICE: Be careful not to damage the boots.

HINT:
- Before installing the drive shaft, set the snap ring opening side facing downward.
- Whether or not the drive shaft is making contact with the pinion shaft can be known by sound or feeling when driving it in.

3. INSTALL RH DRIVE SHAFT

(a) Apply MP grease to the transaxle oil lip.

(b) Insert the center drive shaft with the RH drive shaft to the transaxle through the bearing bracket.

(c) Install the bolt to the bearing bracket.

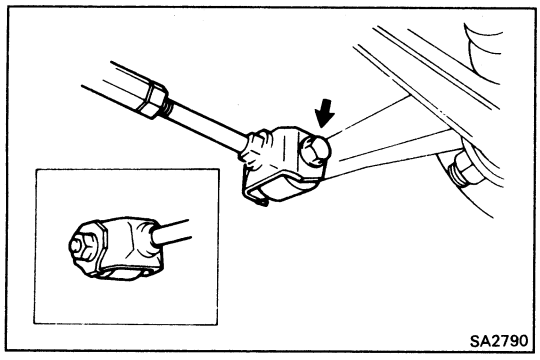
Torque: 300 kg-cm (24 ft-lb, 32 N·m)

(d) Using pliers, install the snap ring to the bearing bracket.

4. CONNECT OUTBOARD JOINT SIDE OF DRIVE SHAFT

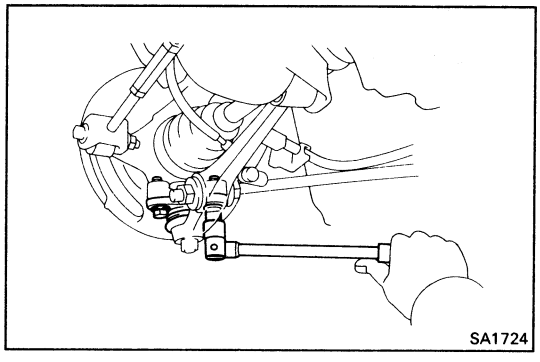
Connect the outboard joint side of the drive shaft to the axle shaft.

NOTICE:
- **Be careful not to damage the boots.**
- **(w/ ABS)**
  Be careful not to damage the sensor rotor of the drive shaft.



5. CONNECT TIE ROD END

Temporarily connect the tie rod end to the rear axle carrier with the bolt and nut.

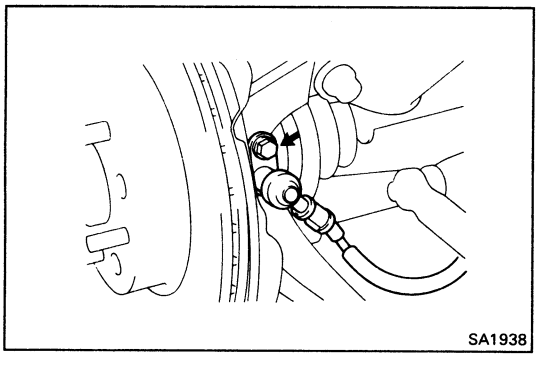


6. CONNECT BALL JOINT TO AXLE CARRIER

(a) Connect the ball joint to the axle shaft.

(b) Install and torque the two bolts.

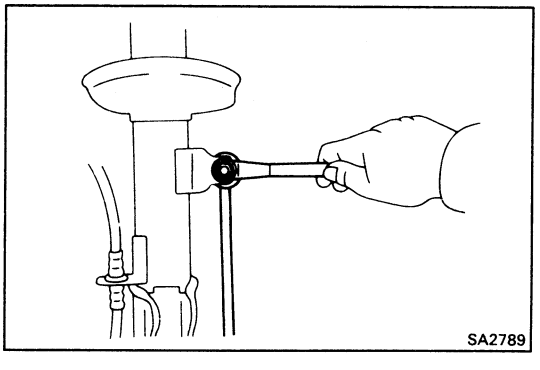
Torque 1,150 kg-cm (73 ft-lb, 113 N·m)



7. (W/ABS)
INSTALL SPEED SENSOR TO AXLE CARRIER

Torque: 80 kg-cm (69 in.-lb, 7.4 N·m)

HINT: Before installing, check that there is no ferric chip or foreign material on the sensor tip.

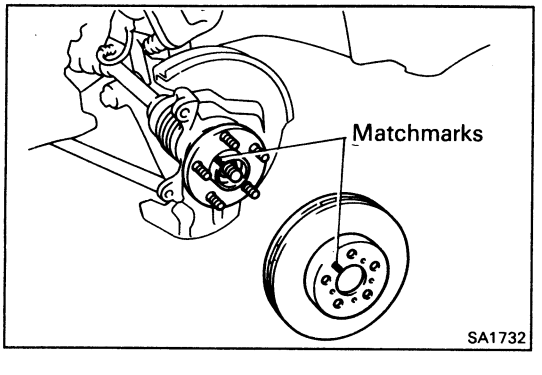


8. CONNECT STABILIZER LINK

Connect the upper side to the stabilizer link.

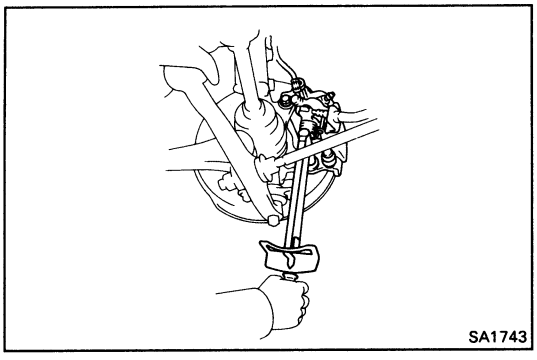
Torque: 500 kg-cm (36 ft-lb, 49 N·m)

HINT: If the ball joint stud turns together with the nut, use a hexagon wrench 5 mm (0.197 in.) to hold the stud.



9. INSTALL ROTOR DISC TO AXLE CARRIER

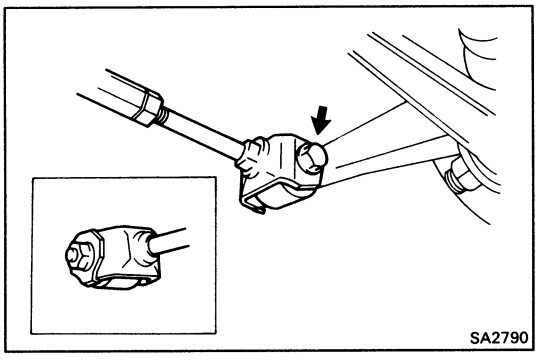
HINT: Align the matchmarks, and install the rotor the axle shaft.



10. INSTALL BRAKE CALIPER AXLE CARRIER

Torque the two bolts.

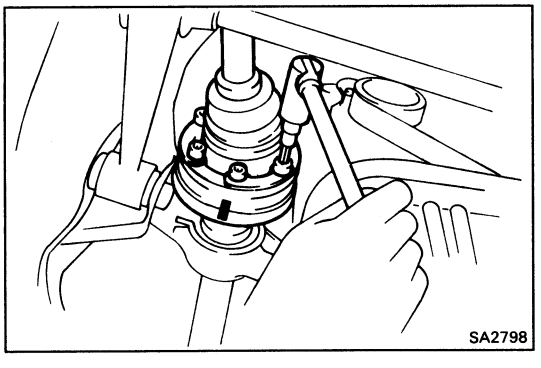
Torque: 600 kg-cm (43 ft-lb, 59 N·m)



11. TORQUE BOLT AND NUT

Torque the tie rod end mount bolt and nut.

Torque: 1,050 kg-cm (76 ft-lb, 103 N·m)

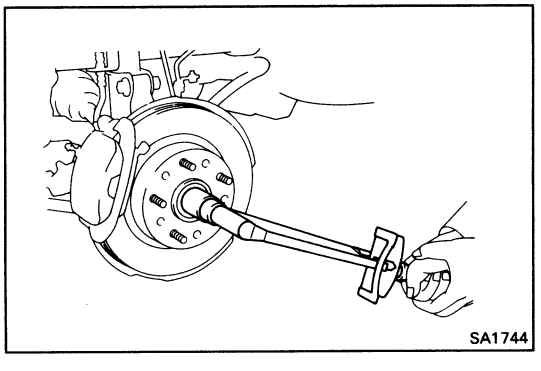


12. TIGHTEN INBOARD JOINT HOLDING SIX HEXAGON BOLTS

With the parking brake engaged, using SST torque the six hexagon bolts.

SST 09043-88010

Torque: 660 kg-cm (48 ft-lb, 65 N·m)



13. INSTALL BEARING, LOCK NUT CAP AND COTTER PIN

(a) Install the lock nut.

(b) With the parking brake engaged, and tighten the nut.

Torque: 3,000 kg-cm (217 ft-lb, 294 N·m)

(c) Install the lock nut cap, and using pliers, install a new cotter pin.

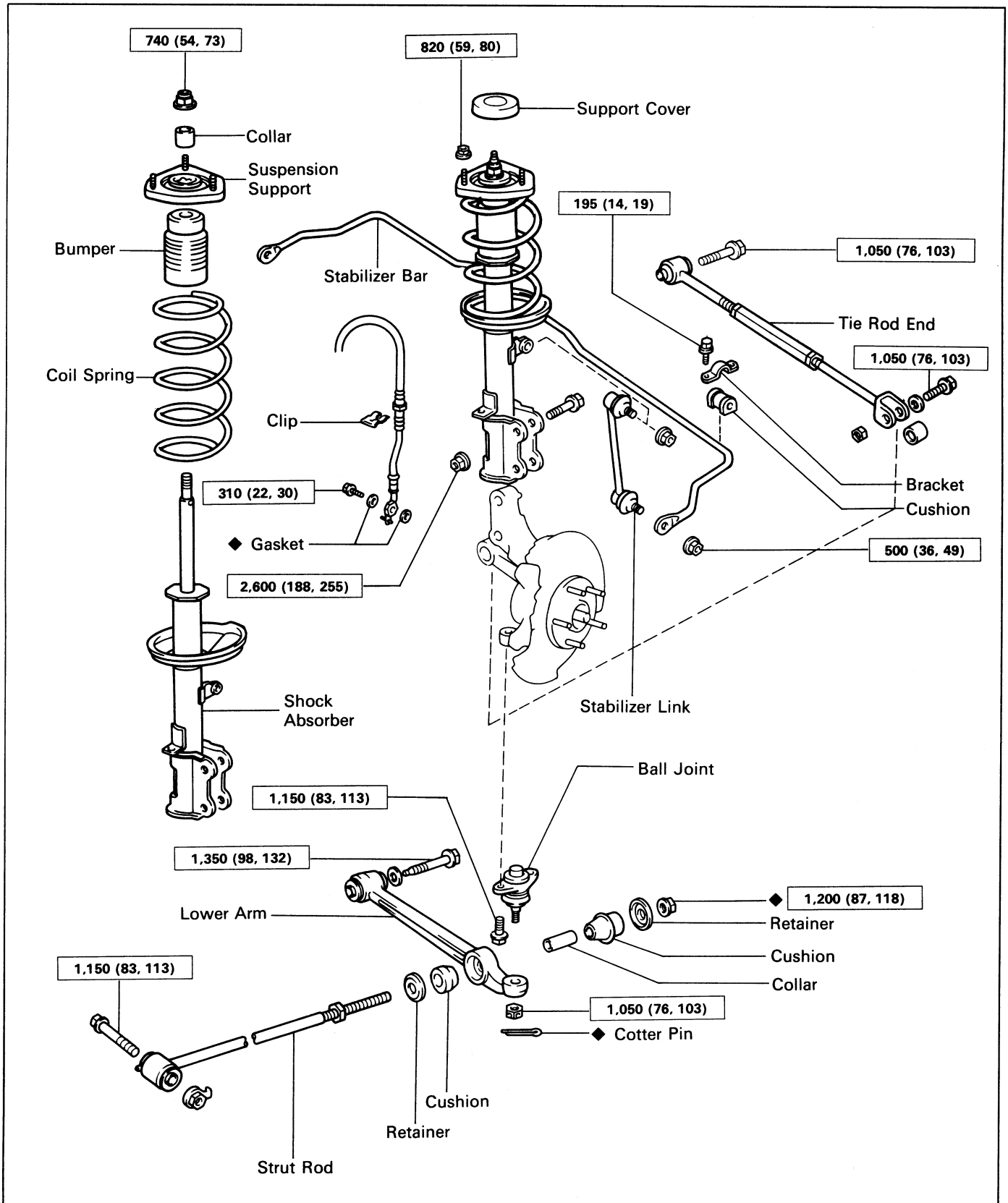
14. FILL TRANSAXLE WITH GEAR OIL

Oil grade: API GL-4 or GL-5
Viscosity: SAE 75W-90 or 85w-90

15. INSTALL ENGINE UNDER COVER

REAR SUSPENSION

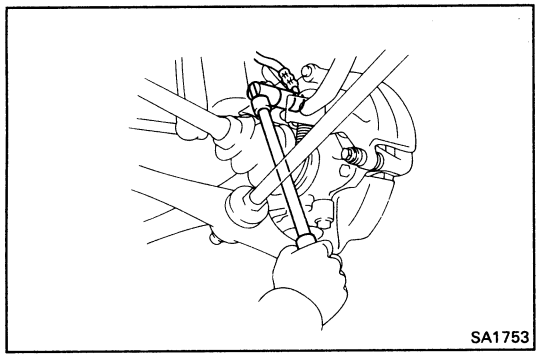
COMPONENTS



kg-cm (ft-lb, N·m) : Specified torque

◆ Non-reusable part

SA1745


SA1753

Rear Shock Absorber

(See page SA-69)

REMOVAL OF REAR SHOCK ABSORBER

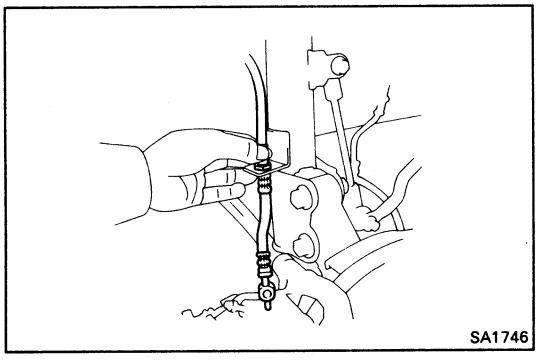
1. DISCONNECT BRAKE HOSE

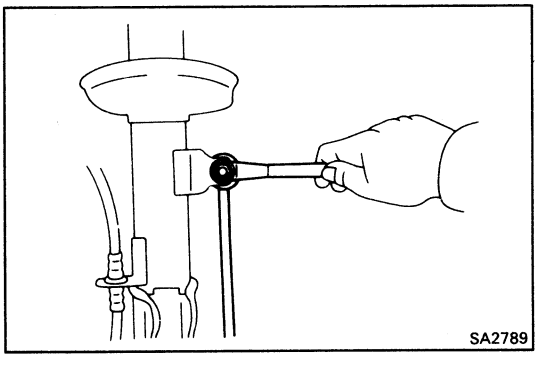
(a) Remove the hose clip.

(b) Remove the union bolt and two gaskets and disconnect the brake hose.

(c) Drain the brake fluid into a container.

(d) Remove the clip and remove brake hose from the shock absorber.

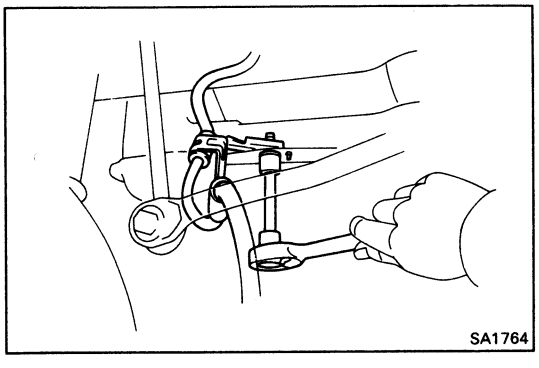

SA1746


SA2789

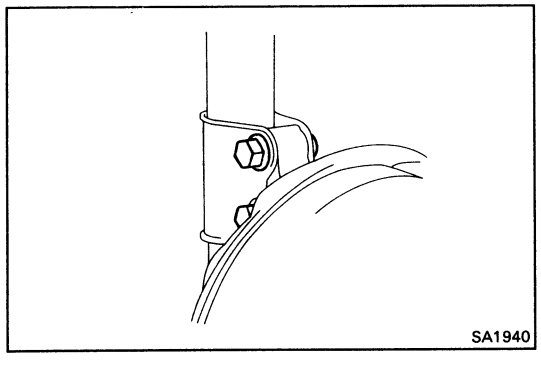
2. DISCONNECT STABILIZER LINK

Disconnect the stabilizer link from the shock absorber.

HINT: If the ball joint stud turns together with the nut, use a hexagon wrench 5 mm (0.197 in.) to hold the stud.


SA1764

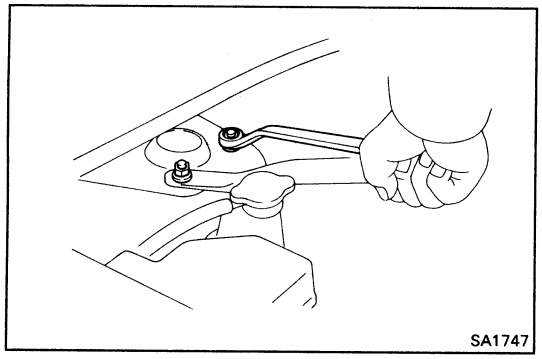
3. (w/ ABS) REMOVE SPEED SENSOR WIRE HARNESS CLAMP


SA1940

4. DISCONNECT REAR AXLE CARRIER FROM SHOCK ABSORBER

Loosen the bolts and nuts, and remove the nuts.

HINT: Leave the bolts not to drop the axle carrier assembly.



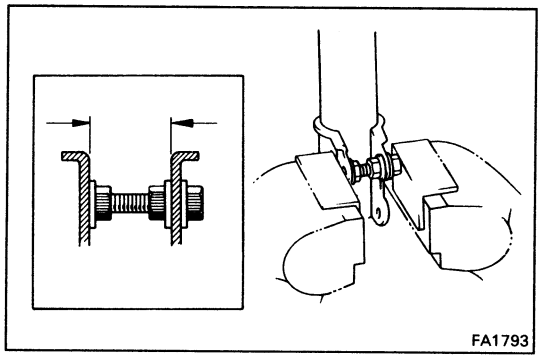
5. REMOVE SHOCK ABSORBER

(a) Remove the three suspension holding nuts.

(b) Remove the two upper bolts and remove the axle carrier assembly.

(c) Remove the shock absorber.

NOTICE: Cover the drive shaft boot with cloth to avoid damaging it.

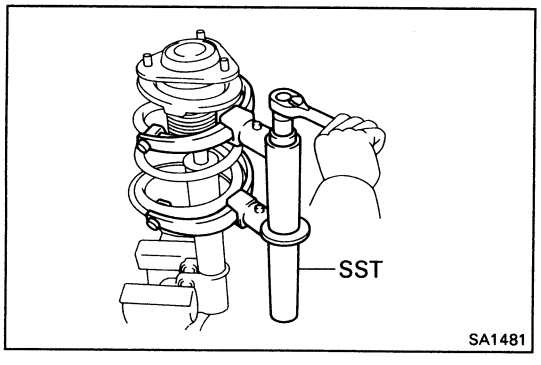


DISASSEMBLY OF REAR SHOCK ABSORBER

(See page SA-69)

1. CLAMP SHOCK ABSORBER IN VISE

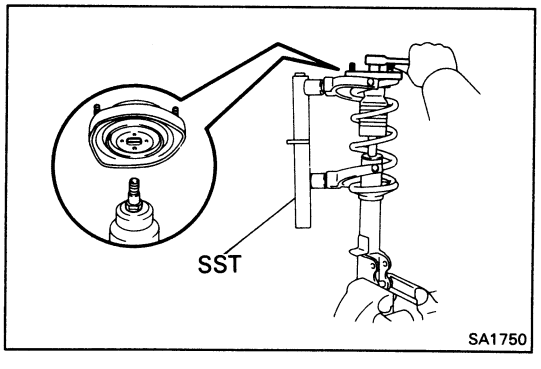
Install a bolt and two nuts to the bracket at the lower portion of the shock absorber shell and secure it in a vise.



2. REMOVE COIL SPRING

(a) Using SST, compress the coil spring.

SST 09727-30020

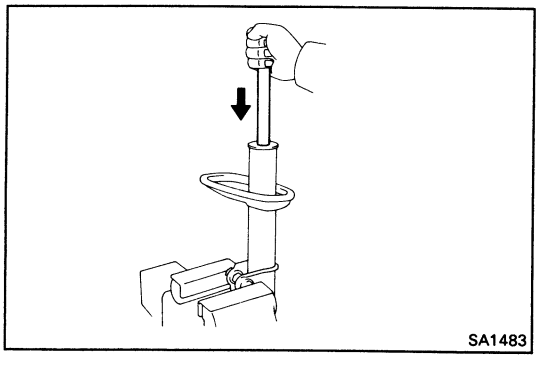


(b) Hold the octagon head of the suspension support in the vise.

(c) Remove the suspension support cover.

(d) Remove the suspension support nut.

(e) Remove the suspension support, coil spring, insulator and bumper.

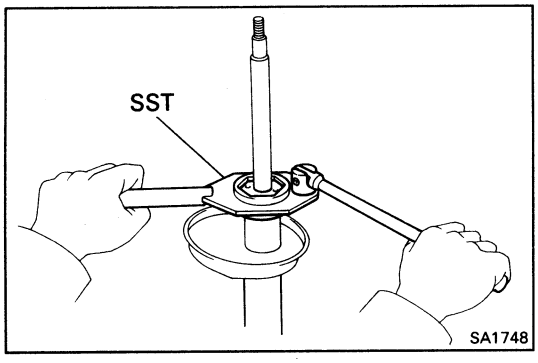


3. INSPECT OPERATION OF SHOCK ABSORBER

(a) While pushing the piston rod, check that the pull throughout the stroke is even, and that there is no abnormal resistance or noise.

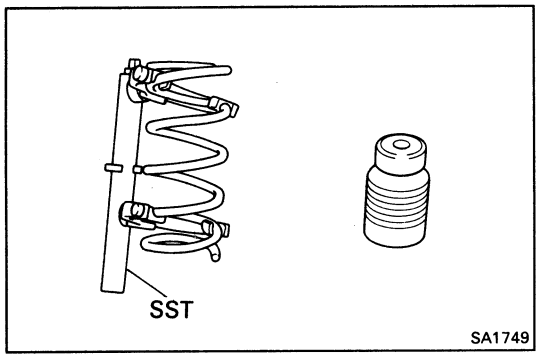
(b) Push the piston rod in fully and release it. Check that it returns at a constant speed.

If the absorber operation is defective, replace the absorber, as an assembly.



NOTICE: Before discarding the shock absorber, first loosen the ring nut 2 or 3 turns to release the gas completely.

SST 09720-00012 (09721-00071)



ASSEMBLY OF REAR SHOCK ABSORBER

(See page SA-69)

1. INSTALL COIL SPRING

(a) Install the bumper to piston rod.

(b) Using SST, compress the coil spring.

SST 09727-30020

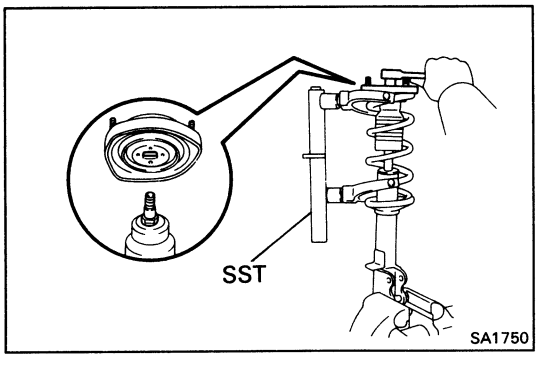
(c) Install the lower insulator.

(d) Align the coil spring end with the lower seat hollow and install.

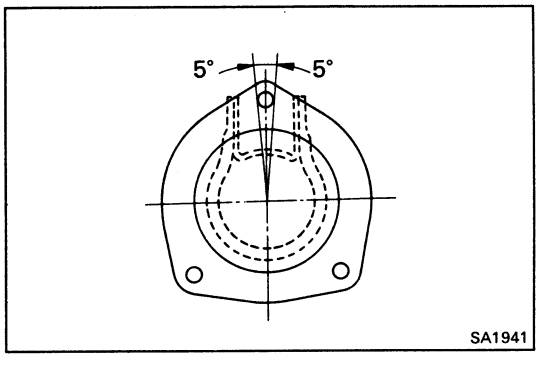
(e) Install the suspension support to piston rod.

HINT: Align the piston rod notch and the suspension support hole.

(f) Temporarily install a new suspension support nut.



(g) Align the suspension support with the shock absorber lower bracket as shown.

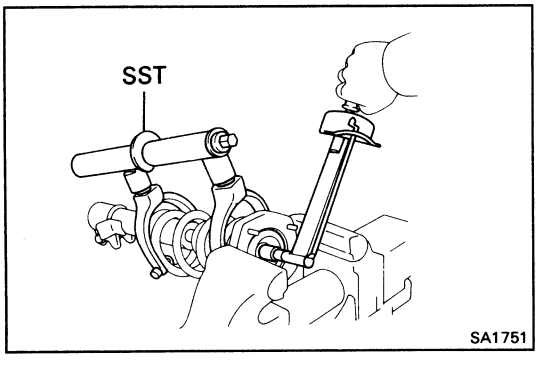


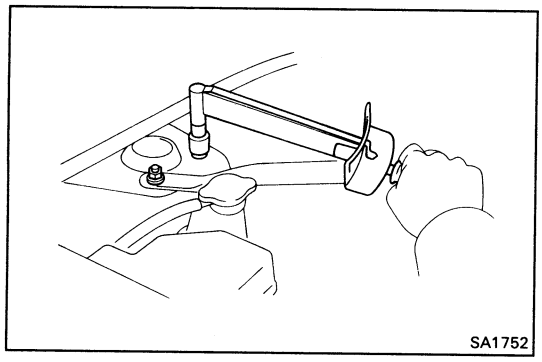
(h) Hold the octagon head of suspension support to the vise.

(i) Torque the suspension support nut.

Torque: 740 kg-cm (54 ft-lb, 73 N·m)

(j) Install the suspension support cover.




SA1752

INSTALLATION OF REAR SHOCK ABSORBER

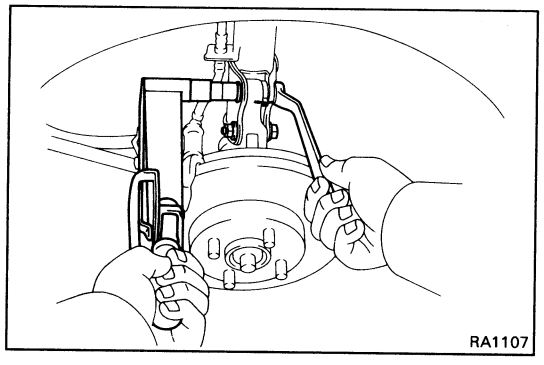
(See page SA-69)

1. INSTALL SHOCK ABSORBER

Install the three nuts holding the shock absorber to the body. Torque the nuts.

Torque: 820 kg-cm (59 ft-lb, 80 N·m)

NOTICE: Be careful not to damage the drive shaft boot.


RA1107

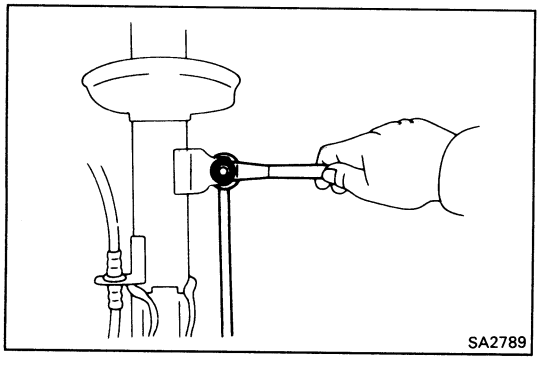
2. INSTALL REAR AXLE CARRIER TO SHOCK ABSORBER

(a) Connect the axle carrier to the shock absorber lower bracket.

(b) Insert the two bolts from the rear side.

(c) Torque the nuts.

Torque: 2,600 kg-cm (188 ft-lb, 255 N·m)

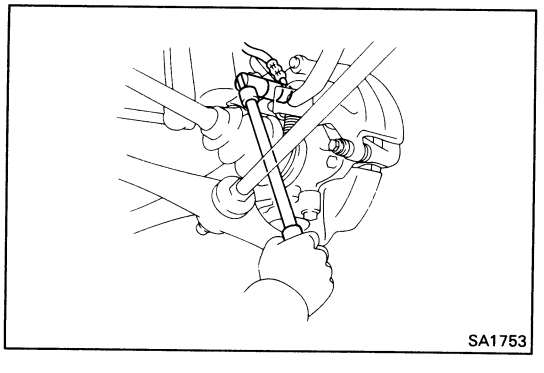

SA2789

3. CONNECT STABILIZER LINK

Connect the stabilizer link with the nut.

Torque: 500 kg-cm (36 ft-lb, 49 N·m)

HINT: If the ball joint stud turns together with the nut, use a hexagon wrench 5 mm (0.197 in.) to hold the stud.

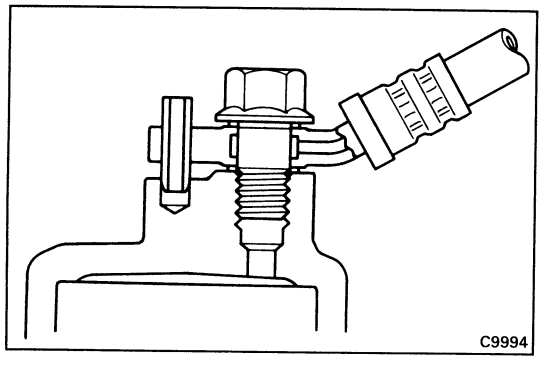

SA1753

4. CONNECT BRAKE HOSE

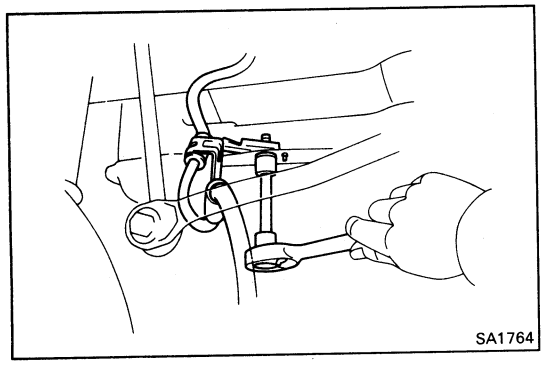
(a) Install the brake hose and clip to the shock absorber.

(b) Install the union bolt and two gaskets and torque the union bolt.

Torque: 310 kg-cm (22 ft-lb, 30 N·m)


C9994

HINT: Insert the flexible hose lock securely in the lock hole in the brake caliper.



5. **(w/ ABS)**
INSTALL SPEED SENSOR WIRE HARNESS CLAMP

Install ABS speed sensor wire harness clamp to suspension cross member wire harness with the bolt.

Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)

6. **BLEED BRAKE LINE**
(See page BR-7)

7. **INSPECT REAR WHEEL ALIGNMENT**
(See page SA-6)

Ball Joints

(See page SA-69)

INSPECTION AND REMOVAL OF BALL JOINTS

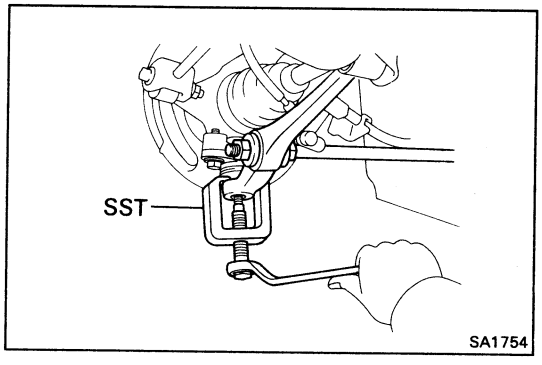
1. INSPECT BALL JOINTS FOR EXCESSIVE LOOSENESS

(a) Jack up the rear of vehicle and place wooden blocks with a height of 180 – 200 mm (7.09 – 7.87 in.) under one rear tire.

(b) Lower the jack until there is about half a load on the front coil spring. Place stands under the vehicle for safety.

(c) Move the lower arm up and down and check that the ball joint has no excessive play.

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



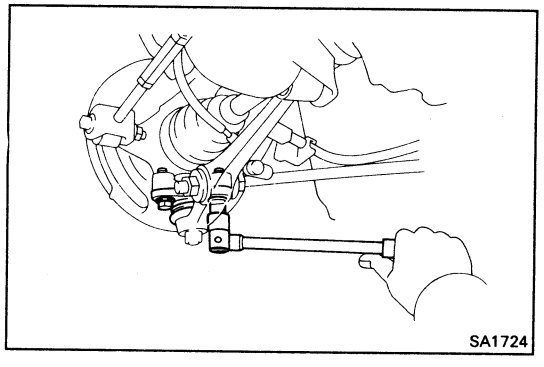
2. REMOVE BALL JOINTS

(a) Remove the cotter pin and nut from the lower arm.

(b) Using SST, disconnect the ball joint from the lower arm.

SST 09628-62011

(c) Remove the two bolts and ball joint from the rear axle carrier.



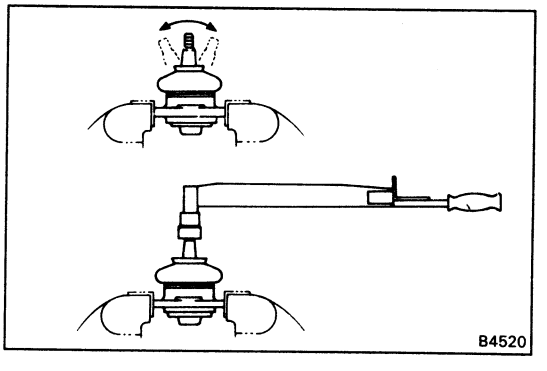
3. INSPECT BALL JOINT FOR ROTATION CONDITION

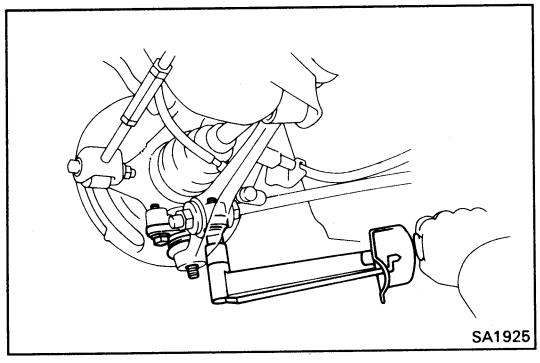
(a) Flip the ball joint stud back and forth 5 times as shown in the figure, before installing the nut.

(b) Using a torque gauge, turn the nut continuously one turn each 2 – 4 seconds and take the torque reading on the fifth turn.

Torque (turning): 15 – 30 kg-cm (13 – 26 in.-lb, 1.47 – 2.94 N·m)

If not with in specification, replace the ball joint.





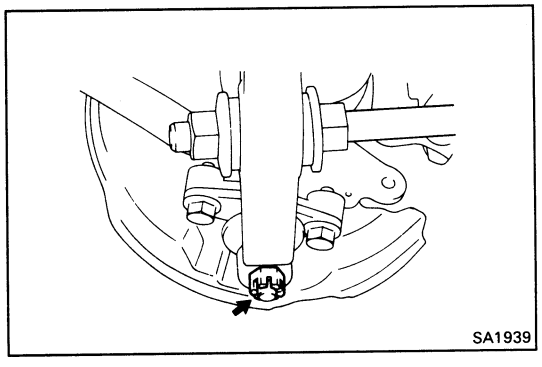
INSTALLATION OF BALL JOINT

(See page SA-69)

1. **INSTALL BALL JOINT TO REAR AXLE CARRIER**

   Install the ball joint in place with the two bolts.

   Torque: 1,150 kg-cm (83 ft-lb, 113 N·m)



2. **CONNECT LOWER ARM**

   (a) Connect the lower arm to the ball joint.

   (b) Torque the nut.

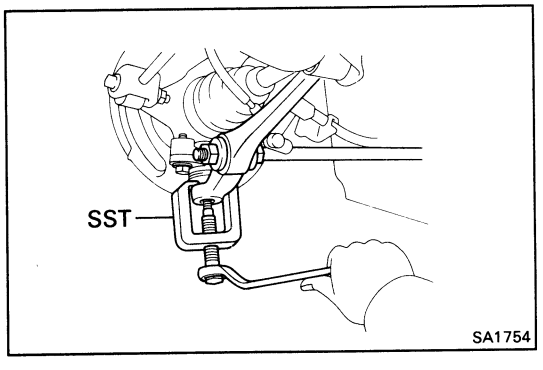
   Torque: 930 kg-cm (67 ft-lb, 91 N·m)

   (c) Install a new cotter pin.

Lower Arm

(See page SA-69)

REMOVAL OF LOWER ARM

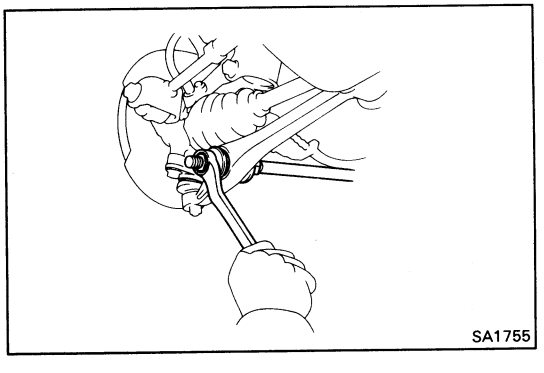


1. **DISCONNECT LOWER ARM FROM BALL JOINT**

   (a) Remove the cotter pin and nut.

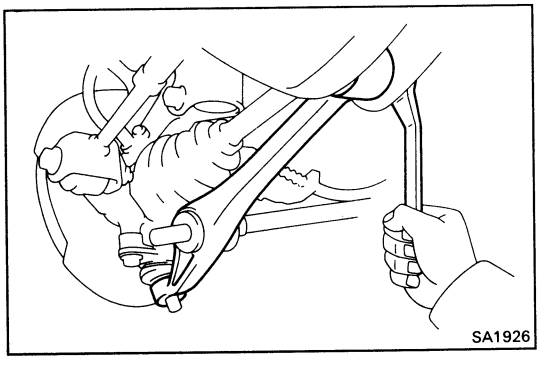
   (b) Using SST, disconnect the lower arm from the ball joint.

   SST 09628-62011



2. **REMOVE STRUT ROD NUT AND RETAINER**

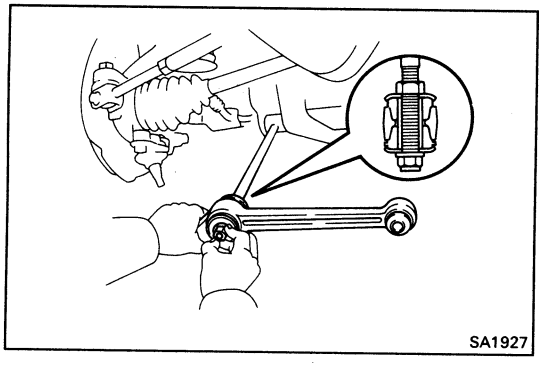
   Remove a new strut rod nut and retainer from the lower arm.



3. **REMOVE LOWER ARM**

   (a) Remove the bolt holding the lower arm to the body and remove the lower arm.

   (b) Remove the strut rod cushion, collar and retainer from the lower arm.


SA1927

INSTALLATION OF LOWER ARM

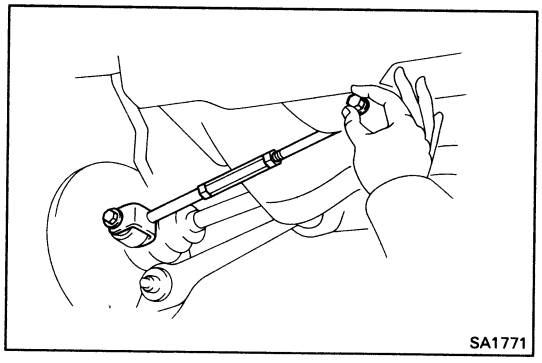
(See page SA-69)

1. INSTALL LOWER ARM

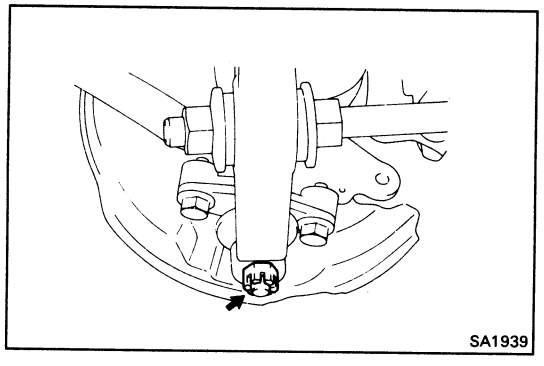
(a) Install the strut rod retainer, cushion and collar to the strut rod.

(b) Connect the lower arm to the strut rod.

(c) Temporarily install the strut rod nut.


SA1771

(d) Install the lower arm to the body. Do not torque the bolt.


SA1939

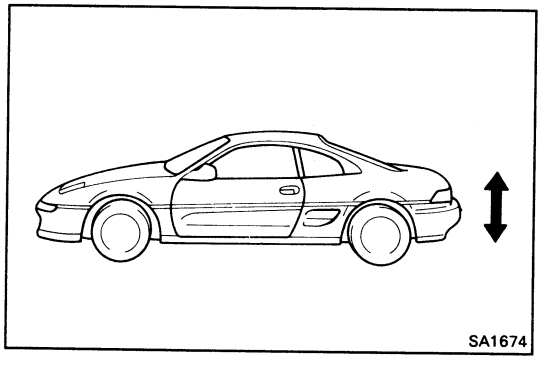
2. CONNECT LOWER ARM TO BALL JOINT

(a) Connect the lower arm to the ball joint.

(b) Torque the nut.

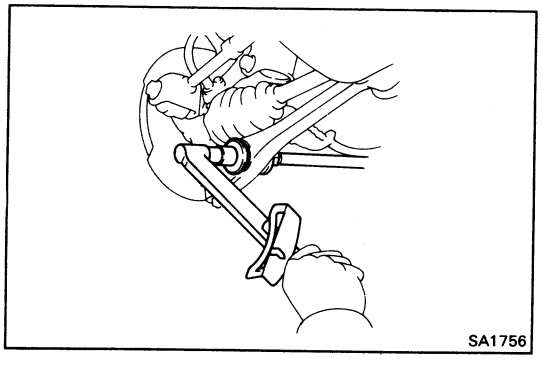
Torque: 930 kg-cm (67 ft-lb, 91 N·m)

(c) Install a new cotter pin.


SA1674

3. INSTALL WHEEL AND LOWER VEHICLE

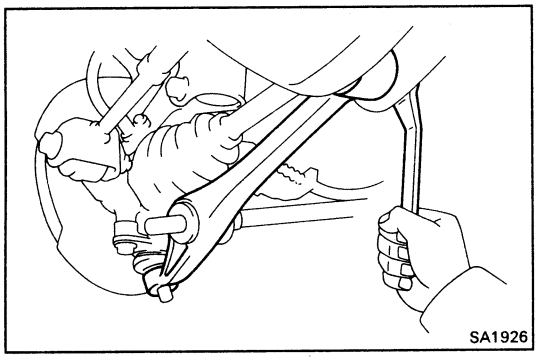
Rock the vehicle up and down to stabilize the suspension.


SA1756

4. TIGHTEN LOWER ARM HOLDING NUT

(a) Torque the strut rod nut.

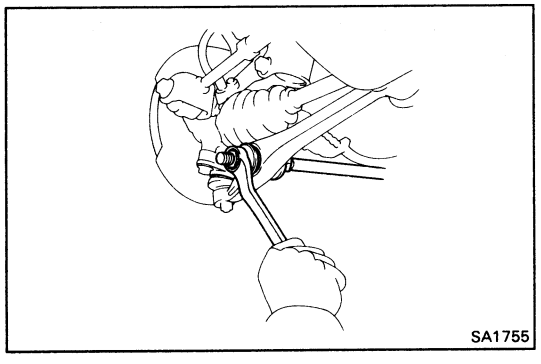
Torque: 1,200 kg-cm (87 ft-lb, 118 N·m)



(b) Torque the lower arm holding nut.

Torque: 1,350 kg-cm (98 ft-lb, 132 N·m)

5. INSPECT REAR WHEEL ALIGNMENT

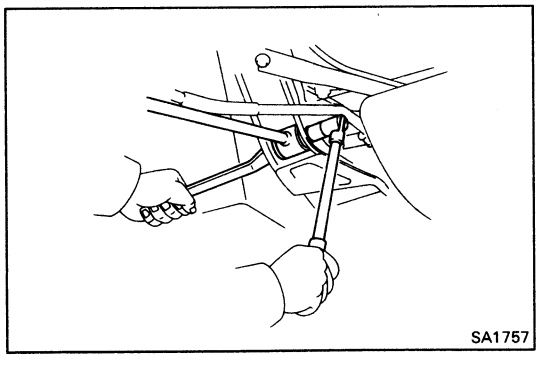


Strut Rod

(See page SA-69)

REMOVAL OF STRUT ROD

1. REMOVE STRUT ROD NUT AND RETAINER



2. REMOVE STRUT ROD

(a) Remove the strut rod holding nut.

(b) Remove the cushion collar and retainer from the strut rod.

INSTALLATION OF STRUT ROD

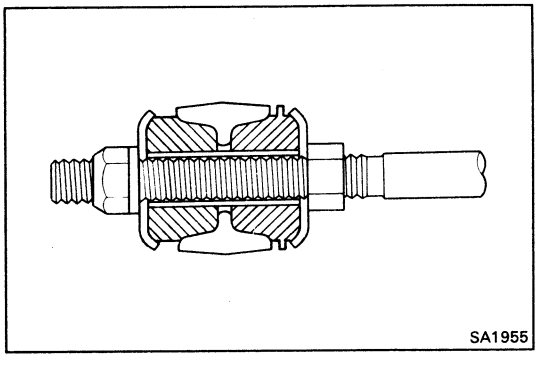
(See page SA-69)

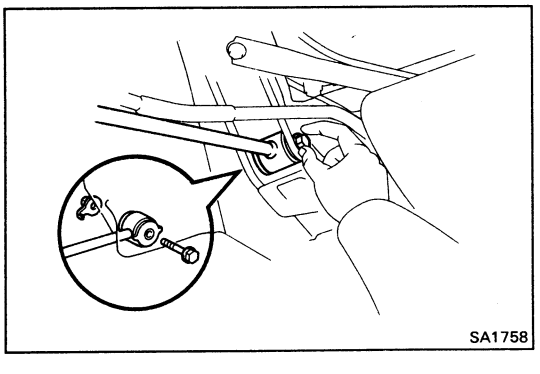
1. INSTALL REAR SUSPENSION ARM No.1

(a) Install the retainers, cushions, collar and suspension arm No.1 to the strut rod with the nut as shown.

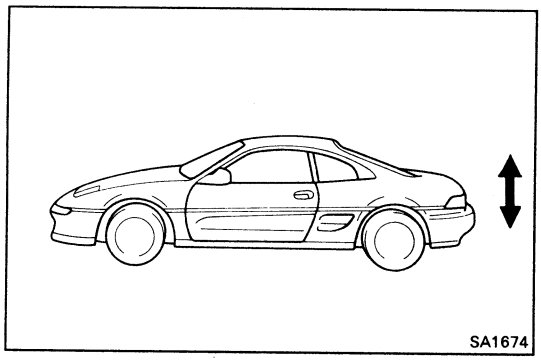
NOTICE:

- **Install the nut to the bolt end.**
- **Do not misinstall the front and rear cushions.**



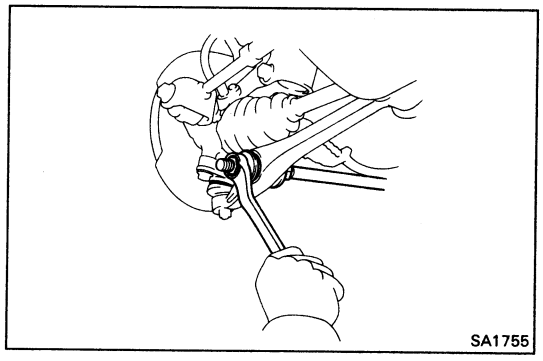


(c) Temporarily install the strut rod holding bolt and nut and cushion to the body.


SA1674

2. **INSTALL WHEEL AND LOWER VEHICLE**

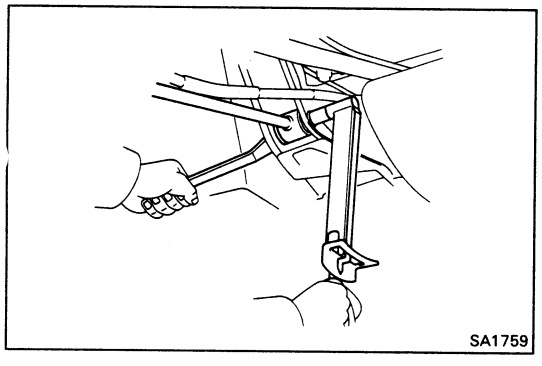
Rock the vehicle up and down to stabilize the suspension.


SA1755

3. **TIGHTEN STRUT ROD INSTALLATION NUT**

Tighten the strut rod installation nut of the lower arm side.

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


SA1759

4. **TIGHTEN STRUT ROD INSTALLATION BOLT**

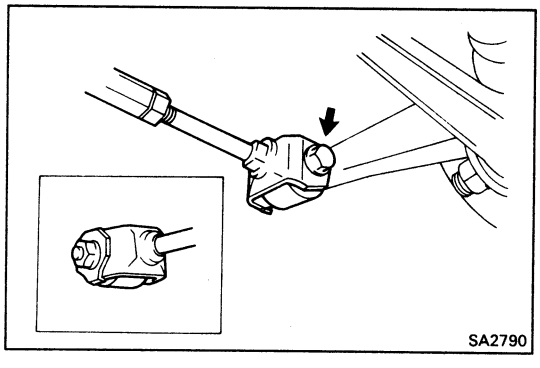
Tighten the strut rod installation bolt of the body side.

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

Suspension Arm

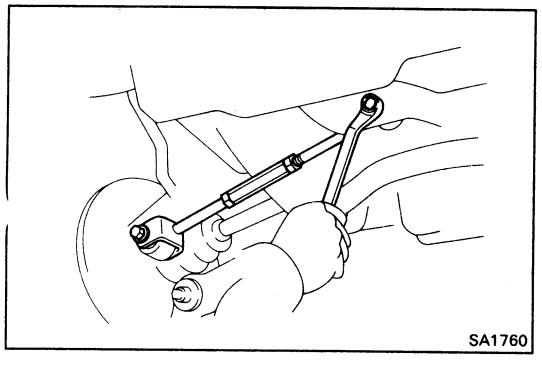
(See page SA-69)

REMOVAL OF SUSPENSION ARM


SA2790

1. **DISCONNECT SUSPENSION ARM**

Loosen the bolt and nut.

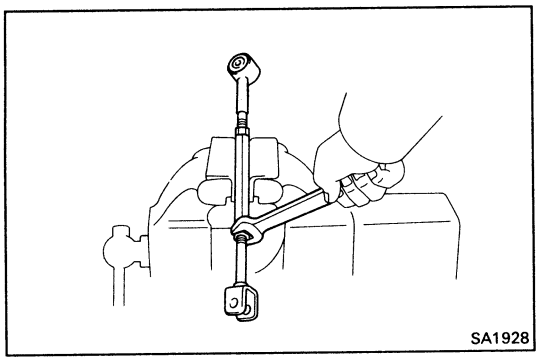

SA1760

2. **REMOVE SUSPENSION ARM FROM BODY**

(a) Remove the suspension arm holding bolt.

(b) Disconnect the suspension arm from the body.

(c) Remove the bolt, nut and suspension.


SA1928

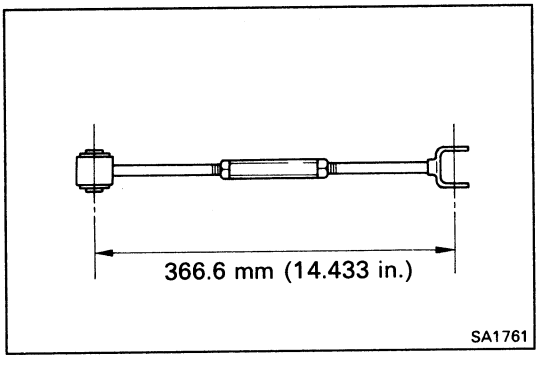
DISASSEMBLY OF SUSPENSION ARM NO.1

(See page SA-69)

DISASSEMBLE SUSPENSION ARM

(a) Loosen the tie rod adjusting tube two nuts.

(b) Turn the tie rod adjusting tube, and remove the tie rod end and the suspension arm No.2.



SA1761

ASSEMBLY OF SUSPENSION ARM

(See page SA-69)

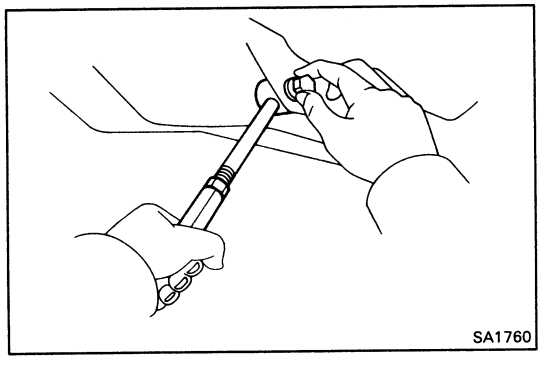
INSTALL TIE ROD END AND SUSPENSION ARM TO TIE ROD TUBE

(a) Install the tie adjustting tube, tie rod adjsuting tube nuts, tie rod end and rear suspension arm No.2. tie rod tube.

(b) Adjust the rear suspension arm No.2.

(c) Temporarily tighten the tie rod adjusting tube nut.

HINT: Fully tighten after adjusting the rear wheel alignment.

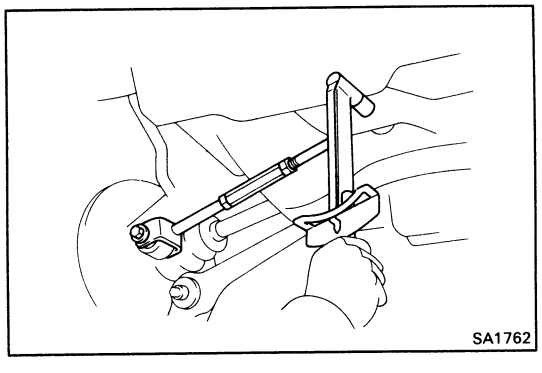

SA1760

INSTALLATION OF SUSPENSION ARM

(See page SA-69)

1. INSTALL SUSPENSION ARM TO BODY

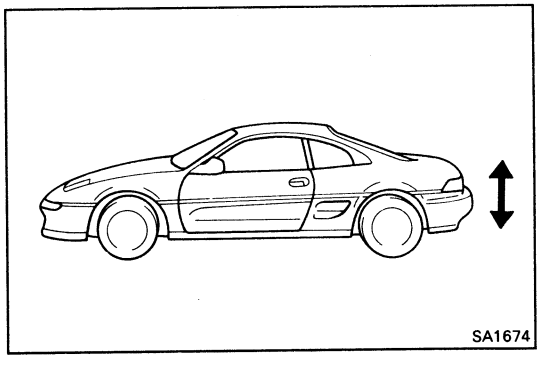
Temporarily connect the suspension arm to the body with the bolt.


SA1762

2. INSTALL SUSPENSION ARM TO REAR AXLE CARRIER

Install the suspension arm to the rear axle carrier with the bolt and nut.

Torque: 1,050 kg-cm (76 ft-lb, 103 N·m)


SA1674

3. INSTALL WHEEL AND LOWER VEHICLE

(a) Install the wheel and lower the vehicle.

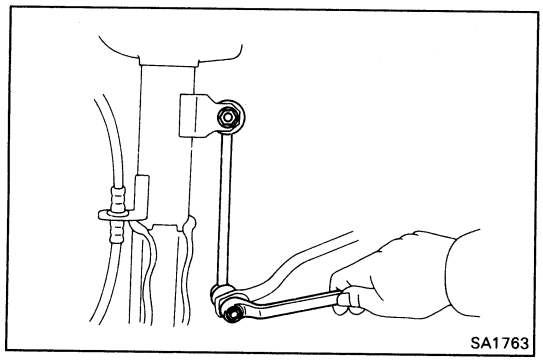
(b) Bounce the vehicle up and down to stabilize the suspension.

4. TORQUE SUSPENSION ARM HOLDING BOLT

Torque: 1,050 kg-cm (76 ft-lb, 103 N·m)

5. INSPECT REAR WHEEL ALIGNMENT

(See page SA-6)


SA1763

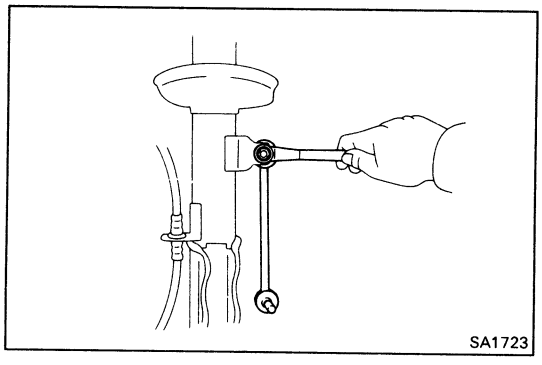
Rear Stabilizer Bar and Link

(See page SA-69)

REMOVAL OF STABILIZER BAR

1. **DISCONNECT STABILIZER LINK FROM STABILIZER BAR**

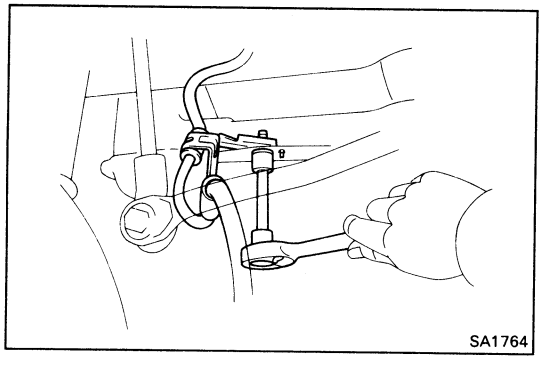
   Remove the nuts and remove the stabilizer link from the stabilizer bar.


SA1723

2. **REMOVE STABILIZER LINK**

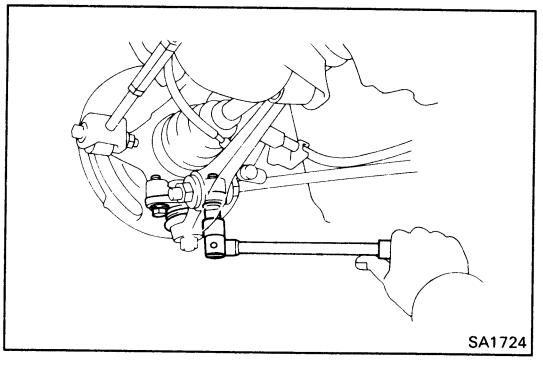
   Remove the stabilizer link from the shock absorber.

   HINT: If the ball joint stud turns together with the nut, use a hexagon wrench 5 mm (0.197 in.) to hold the stud.


SA1764

3. **(w/ ABS)**
   REMOVE SPEED SENSOR BRACKET

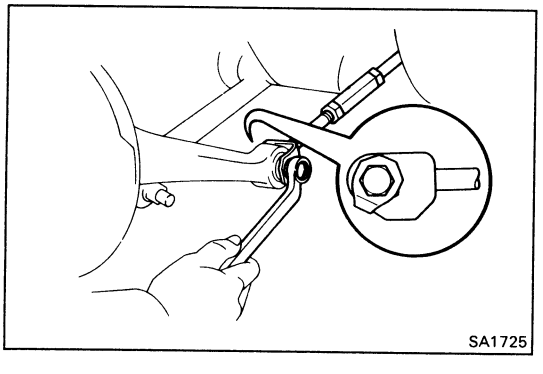
   Remove the bolt and disconnect the speed sensor bracket from the rear suspension crossmember.


SA1724

4. **DISCONNECT REAR AXLE CARRIER FROM LOWER ARM**

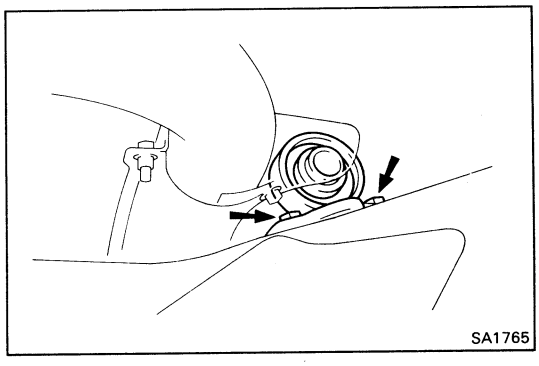
   (a) Remove the two bolts holding the lower arm to ball joint.

   (b) Disconnect the ball joint.


SA1725

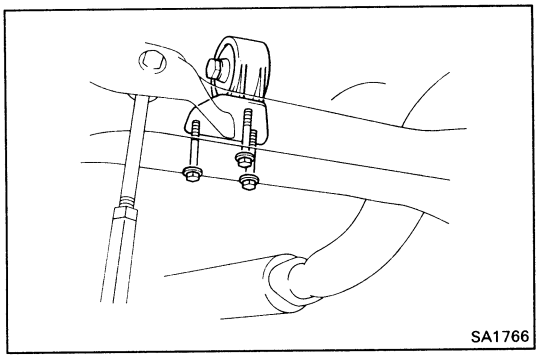
5. **DISCONNECT REAR AXLE CARRIER FROM SUSPENSION ARM**

   Disconnect the suspension arm from the rear axle carrier.


SA1765

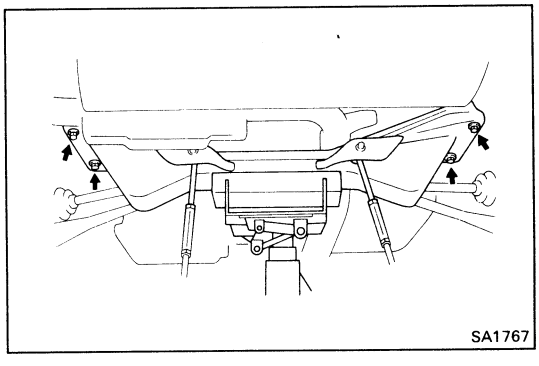
6. DISCONNECT EXHAUST PIPE MOUNTING FROM REAR SUSPENSION CROSSMEMBER

Remove the two exhaust pipe mounting installation bolts.


SA1766

7. DISCONNECT REAR ENGINE MOUNT FROM REAR SUSPENSION CROSSMEMBER

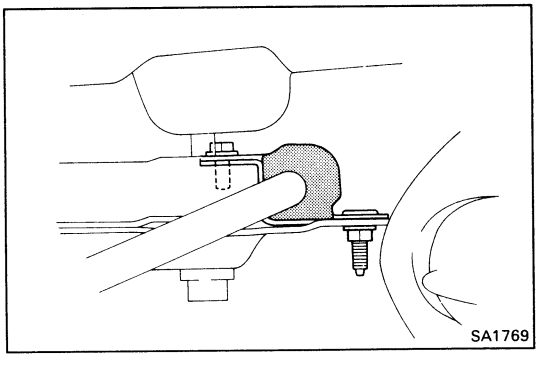
Remove the three installation bolts of the rear engine mounting.


SA1767

8. REMOVE SUSPENSION CROSSMEMBER MOUNTING BOLTS

(a) Hold the rear suspension crossmember with a jack.

(b) Remove the four bolts, then remove the rear suspension crossmember.


SA1769

9. REMOVE STABILIZER BAR

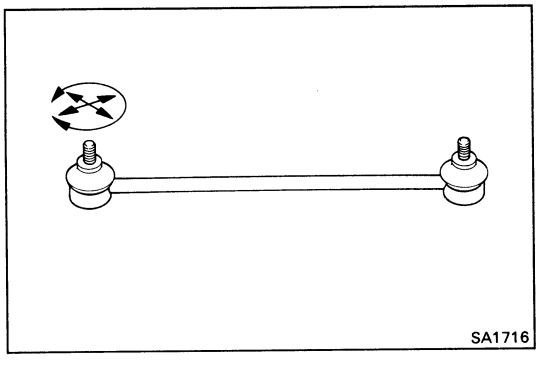
(a) Lift down the crossmember until the front side bolt of the stabilizer bar bracket can be removed.

HINT: Be careful not to damage the exhaust pipe by shoving with the stabilizer bar.

(b) Remove the two bolts and two nuts.

(c) Remove the stabilizer bar with brackets.

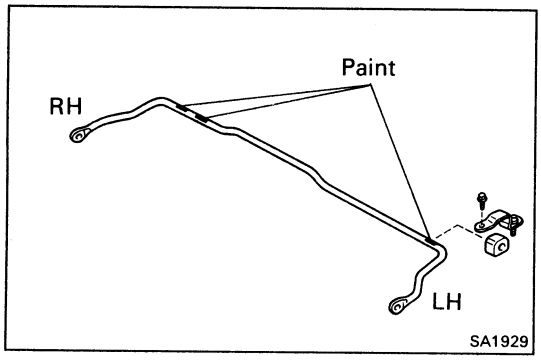
(d) Remove the brackets and cushions from the stabilizer bar.


SA1716

INSPECTION OF STABILIZER LINK

INSPECT STABILIZER LINK

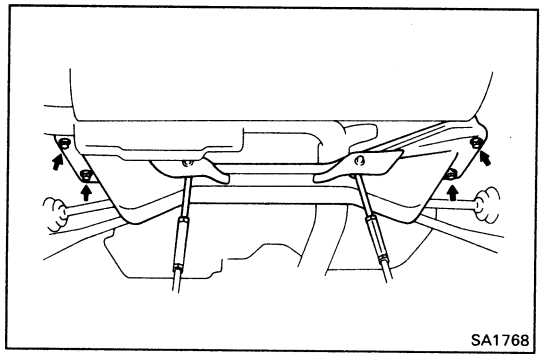
Rotate the ball joint arm in all directions, if the movement is not smooth and free, replace the stabilizer link.



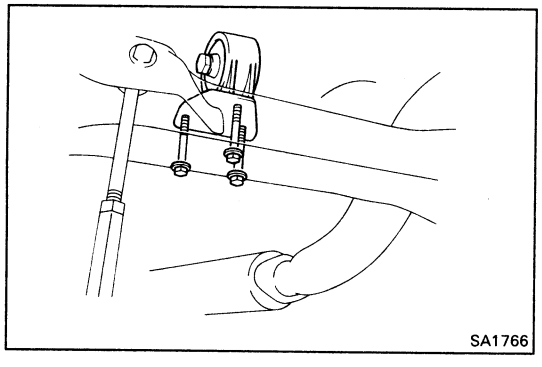
INSTALLATION OF STABILIZER BAR

(See page SA-69)

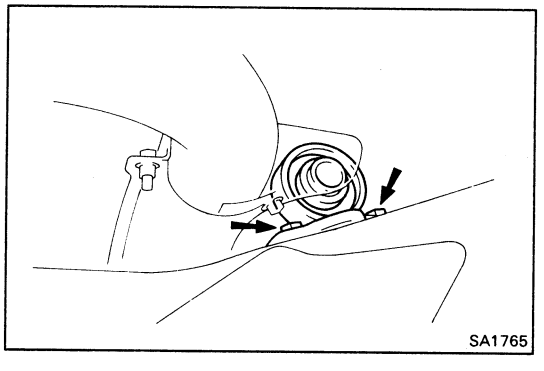
1. **INSTALL STABILIZER BAR**
   (a) Install the cushions and brackets touching the line painted on the stabilizer bar.
   (b) Install the stabilizer bar to the rear suspension crossmember and tighten the bracket bolts.
   Torque: 195 kg-cm (14 ft-lb, 19 N·m)



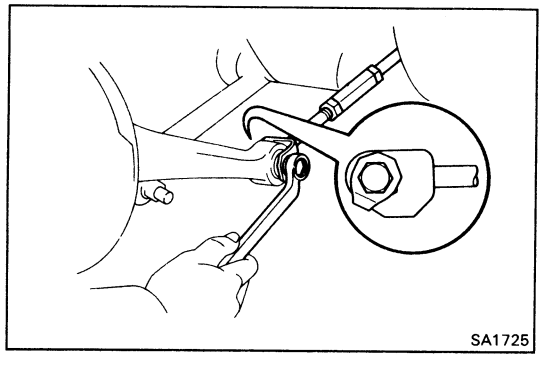
2. **INSTALL SUSPENSION CROSSMEMBER**
   Install the suspension crossmember in place, then install and tighten the four bolts.
   Torque: 1,150 kg-cm (83 ft-lb, 113 N·m)



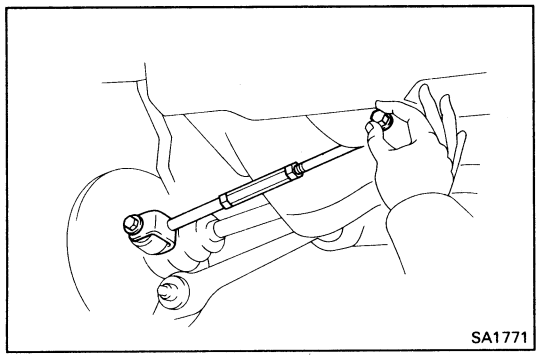
3. **CONNECT REAR ENGINE MOUNTING TO REAR SUSPENSION CROSSMEMBER**
   Connect the engine mount to rear suspension crossmember in place with the three bolts.
   Torque: 790 kg-cm (57 ft-lb, 77 N·m)



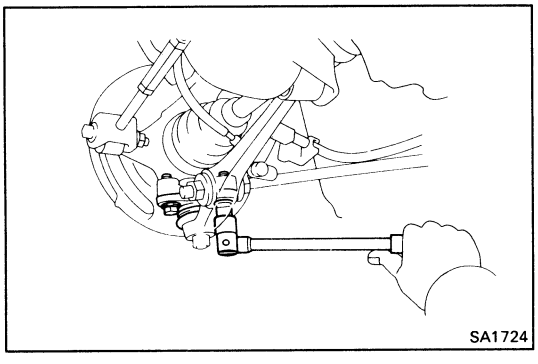
4. **CONNECT EXHAUST PIPE MOUNTING TO REAR SUSPENSION CROSSMEMBER**
   Torque: 210 kg-cm (15 ft-lb, 21 N·m)



5. **CONNECT SUSPENSION ARM TO REAR AXLE CARRIER**
   (a) Connect the suspension arm to the rear axle carrier with the bolt and nut.

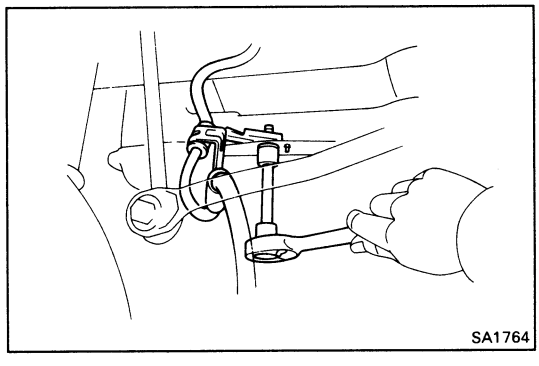


(b) Similarly connect the other side suspension arm.



6. INSTALL REAR AXLE CARRIER TO LOWER ARM

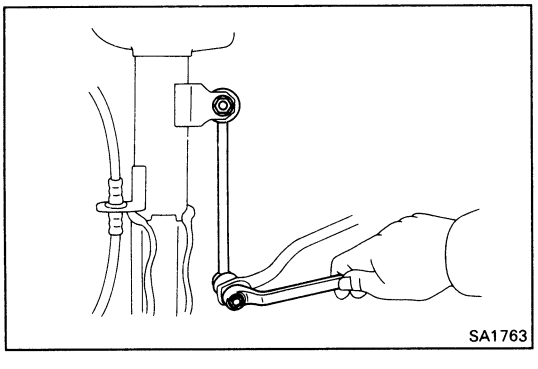
Torque: 1,150 kg-cm (83 ft-lb, 113 N·m)



7. (w/ ABS)
INSTALL ABS SPEED SENSOR BRACKET TO REAR SUSPENSION CROSSMEMBER

Install the ABS speed sensor bracket to the rear suspension crossmember.

Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)

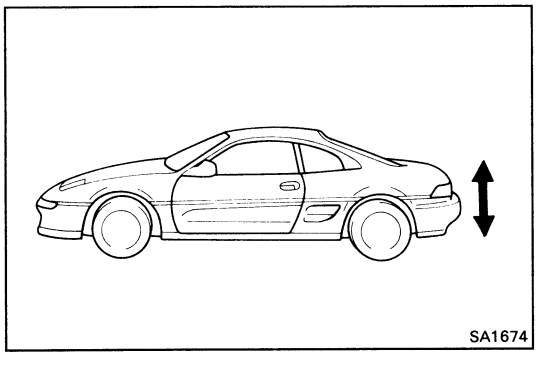


8. INSTALL STABILIZER LINK

Install the stabilizer link with the nuts.

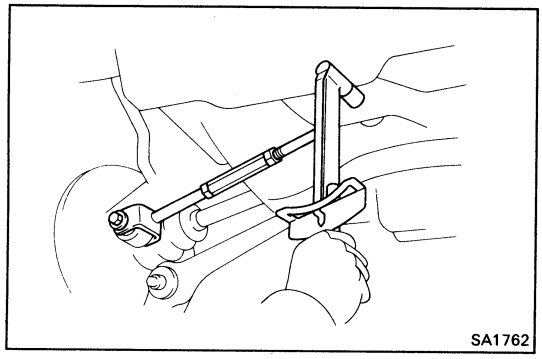
Torque: 500 kg-cm (36 ft-lb, 49 N·m)

HINT: If the ball joint stud together with the nut, use hexagon wrench 5 mm (0.197 in.) to hold the stud.



9. INSTALL WHEEL AND LOWER VEHICLE

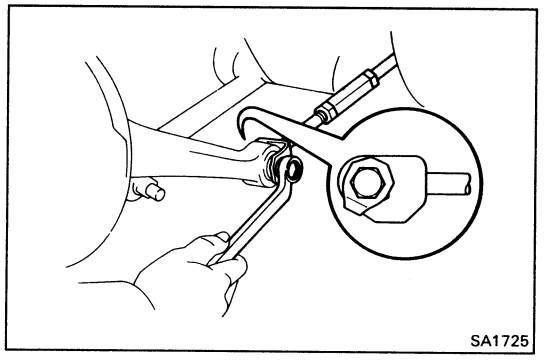
Rock the vehicle up and down to stabilize the suspension.


SA1762

10. TIGHTEN SUSPENSION ARM INSTALLATION BOLTS

(a) Tighten the crossmember side bolt.

Torque: 1,050 kg-cm (76 ft-lb, 103 N·m)

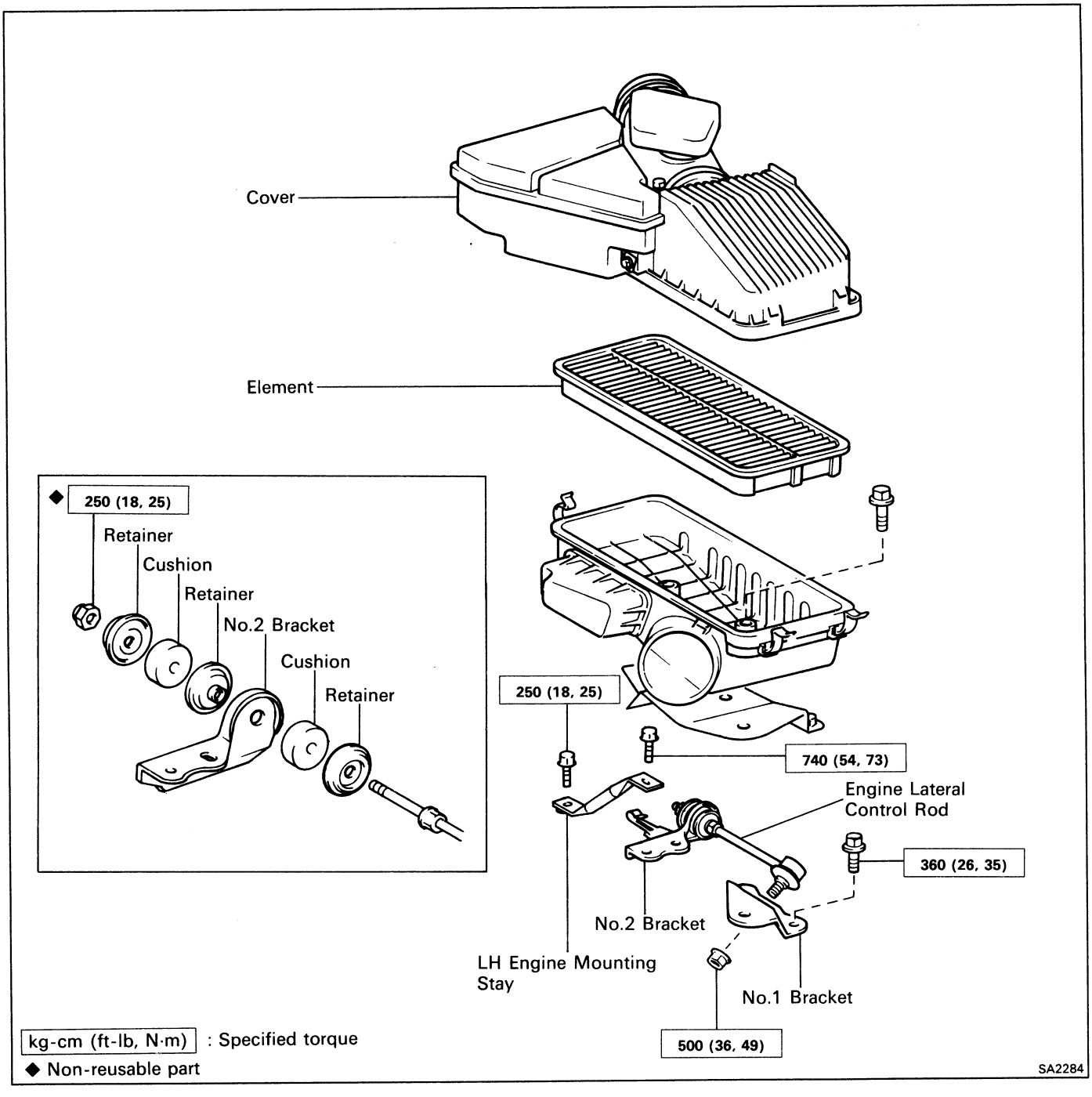

SA1725

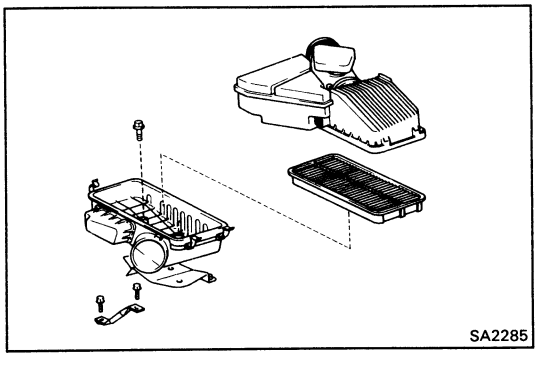
(b) Tighten axle carrier side bolt.

Torque: 1,050 kg-cm (76 ft-lb, 103 N·m)

Engine Lateral Control Rod

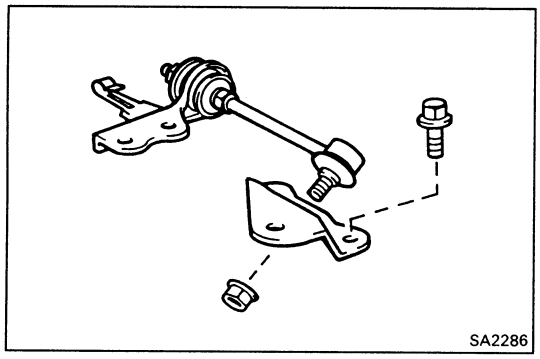
COMPONENTS





REMOVAL OF ENGINE LATERAL CONTROL ROD

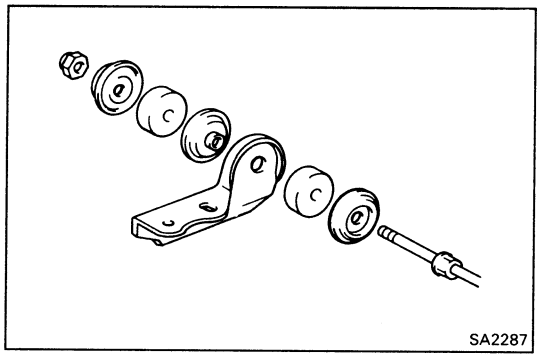
1. REMOVE AIR CLEANER ASSEMBLY
2. REMOVE LH ENGINE MOUNTING STAY



3. **REMOVE ENGINE LATERAL CONTROL ROD**

(a) Remove the engine lateral control rod with the No.1 and No.2 brackets.

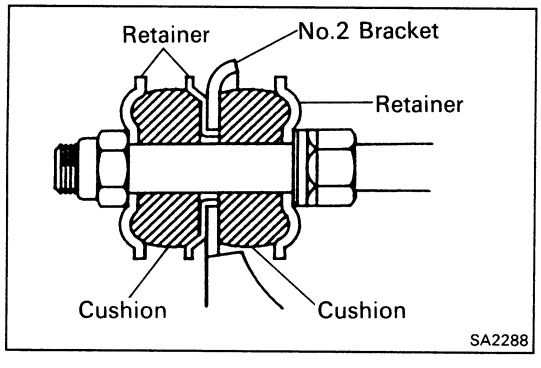
(b) Remove the engine lateral control rod from the engine No.1 lateral control rod brackets.



4. **DISASSEMBLE ENGINE LATERAL CONTROL ROD**

Remove the following parts.

- Nut
- Three retainers
- Two cushions
- No.2 bracket

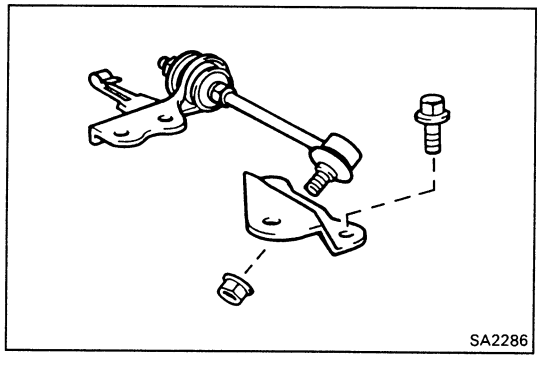


INSTALLATION OF LATERAL CONTROL ROD

1. **ASSEMBLE ENGINE LATERAL CONTROL ROD**

Assemble the parts in the correct direction as shown.

Torque: 250 kg-cm (18 ft-lb, 25 N·m)



2. **INSTALL ENGINE LATERAL CONTROL ROD**

(a) Install the No.1 bracket to the control rod.

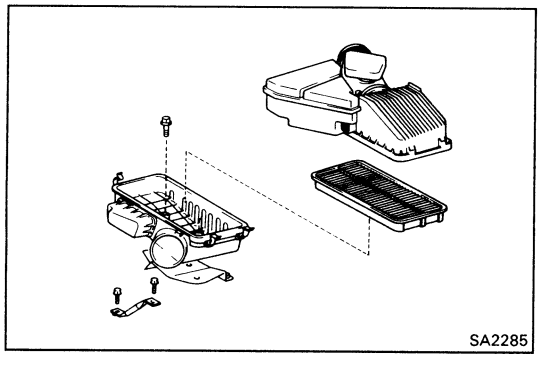
Torque: 500 kg-cm (36 ft-lb, 49 N·m)

(b) Install the control rod in place and torque the No.1 bracket installation bolts.

Torque: 360 kg-cm (26 ft-lb, 35 N·m)

(c) Install and torque the No.2 bracket installation bolt.

Torque: 740 kg-cm (54 ft-lb, 73 N·m)



3. **INSTALL LH ENGINE MOUNTING STAY**

Torque:

No.2 bracket side	**740 kg-cm (54 ft-lb, 73 N·m)**
Body side	**250 kg-cm (18 ft-lb, 25 N·m)**

4. **INSTALL AIR CLEANER ASSEMBLY**

BRAKE SYSTEM

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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 of equivalent.**

2. **It is very important to keep parts and the area clean when repairing the brake system.**

TROUBLESHOOTING

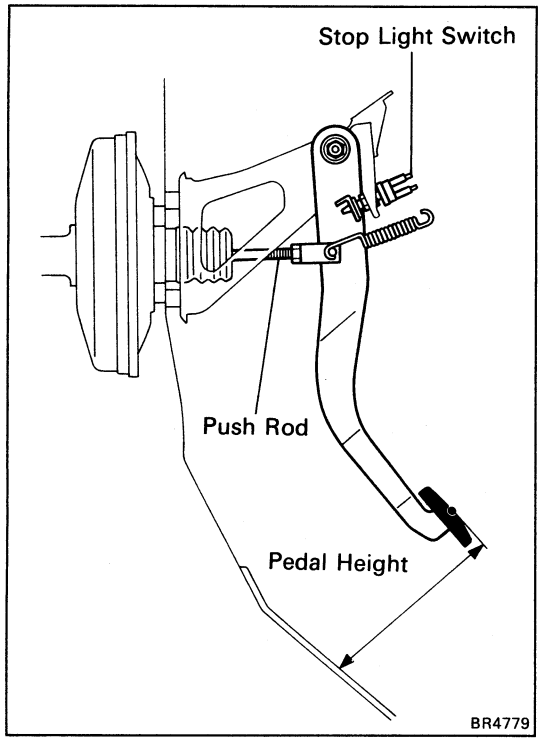
Problem	Possible cause	Remedy	Page
Low or spongy pedal	Brake pads worn	Replace pads	BR-17, 25, 33
	Leak in brake system	Repair leak	
	Master cylinder faulty	Repair or replace master cylinder	BR-9
	Air in brake system	Bleed brake system	BR-7
	Brake cylinder faulty	Repair cylinder	BR-17, 25, 33
	Piston seals worn or damaged	Repair brake cylinder	BR-17, 25, 33
	Rear brake automatic adjuster faulty	Repair or replace adjuster	
Brakes drag	Parking brake out of adjustment	Adjust parking brake	BR-7
	Binding parking brake wire	Repair as necessary	
	Booster push rod out of adjustment	Adjust push rod	BR-16
	Brake line restricted	Repair as necessary	
	Pad cracked or distorted	Replace pad	BR-17, 25, 33
	Caliper piston sticking	Repair as necessary	BR-17, 25, 33
	Adjuster broken	Replace adjuster	
	Master cylinder faulty	Repair or replace master cylinder	BR-9
Brakes pull	Tires improperly inflated	Inflate tires to proper pressure	
	Oil or grease on pads	Check for cause. Replace shoes	
	Brake pads distorted, worn or glazed	Replace pads	BR-17, 25, 33
	Disc out of round	Replace disc	BR-30, 40
	Brake cylinder faulty	Repair cylinder	BR-17, 25, 33
	Piston frozen in brake cylinder	Repair cylinder	BR-17, 25, 33
	Brake pad sticking	Replace pads	BR-17, 25, 33

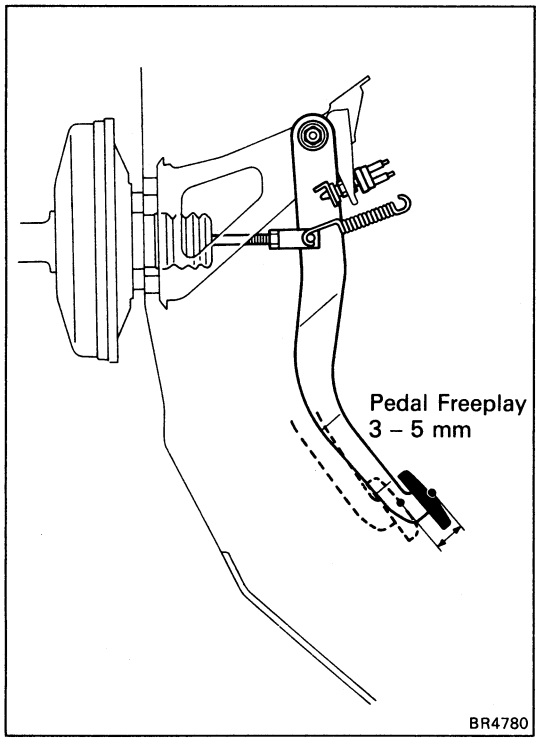
TROUBLESHOOTING (Cont'd)

Problem	Possible cause	Remedy	Page
Hard pedal but brakes inefficient	Oil or grease on shoes or pads	Check for cause. Replace pads	BR-17, 25, 33
	Brake pads distorted, worn or glazed	Replace pads	BR-17, 25, 33
	Piston frozen in brake cylinder	Repair cylinder	BR-17, 25, 33
	Brake booster faulty	Replace booster	BR-15
	Vacuum leaks	Repair as necessary	
	Brake line restricted	Repair as necessary	
Snapping or clicking noise when brakes are applied	Loose or missing pad support plate	Replace pad support plate	BR-17, 25, 33
	Loose installation bolt	Tighten	BR-17, 25, 33
Scraping or grinding noise when brakes are applied	Worn brake pads	Replace or refinish rotors if heavily scored	BR-17, 25, 33
	Caliper to rotor interference	Replace as required	BR-17, 25, 33
	Dust cover to rotor or backing plate to drum interference	Correct or replace	BR-17, 25, 33
	Other brake system components faulty	Repair or replace as necessary	
	Tires rubbing against chassis and/or body	Repair as necessary	
Groaning, clicking or rattling noise when brakes are not applied	Stones or foreign material trapped inside wheel covers	Remove foreign material	
	Loose wheel nuts	Tighten to correct torque	
		Replace if stud holes are elongated	
	Mal-adjustment of brake pedal or booster push rod	Inspect and adjust	BR-5, 16
	Worn, damaged or dry wheel bearings	Inspect and lubricate or replace	
	Loose or missing anti-rattle spring or pad support plate or crimping on outer pad	Inspect, repair or replace	BR-17, 25, 33
	Failure of shim	Inspect, replace if necessary	BR-17, 25, 33
	Wear on slide bushing	Inspect, replace if necessary	BR-17, 25, 33
	Loose installation bolt	Inspect, tighten is necessary	BR-17, 25, 33
	Poor return of piston	Inspect, repair or replace	BR-17, 25, 33
Squealing and squeaking noise when brakes are not applied	Mal-adjustment of brake pedal or booster push rod	Inspect and adjust	BR-5, 16
	Poor return of brake booster or master cylinder or cylinder	Inspect, repair or replace	BR-9, 14
	Rusted or stuck piston	Inspect and lubricate as necessary	BR-17, 25, 33
	Improper positioning of pad in caliper	Repair or replace	BR-17, 25, 33
	Rotor rubbing against caliper housing	Repair or replace	BR-17, 25, 33
	Improper installation of disc brake pad support plate	Repair or replace	BR-17, 25, 33
	Other brake system components	Inspect, repair or replace as necessary	
	Loose or extra parts in brakes		
	Worn, damaged or insufficiently		
	lubricated wheel bearings		

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 environmental 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	Rotors and pads worn or scored	Inspect, repair or replace	BR-17, 25, 33
	Dirty, greased, contaminated or glazed pads	Clean or replace	BR-17, 25, 33
	Improper pads using	Inspect for correct usage or replace	BR-17, 25, 33
	Mal-adjustment of brake pedal or booster push rod	Inspect and adjust	BR-5, 16
	Missing or damaged brake pad anti-squeal shim	Replace	BR-17, 25, 33
	Burred or rusted calipers	Clean or deburr	BR-17, 25, 33





CHECKS AND ADJUSTMENTS

CHECK AND ADJUSTMENT OF BRAKE PEDAL

1. CHECK THAT PEDAL HEIGHT IS CORRECT, AS SHOWN

Pedal height from asphalt sheet:
177 – 187 mm (6.968 – 7.362 in.)

If the pedal height is incorrect, adjust it.

2. IF NECESSARY, ADJUST PEDAL HEIGHT

(a) Disconnect the connector from the stop light switch.

(b) Loosen the stop light switch lock nut.

(c) Sufficiently loosen the stop light switch.

(d) Loosen the push rod lock nut.

(e) Adjust the pedal height by turning the pedal push rod.

(f) Return the stop light switch until it lightly contact the pedal stopper.

(g) Tighten the lock nut and connect the connector to the stop light switch.

(h) Check that the stop lights light when the brake pedal is depressed.

(i) 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) (Single booster)
Push in the pedal until the beginning of resistance is felt. Measure the distance, as shown.

(Tandem booster)
Push in the pedal until the beginning of the second resistance is felt. Measure the distance, as shown.

Pedal freeplay: 3 – 5 mm (0.12 – 0.20 in.)

(Tandem booster)

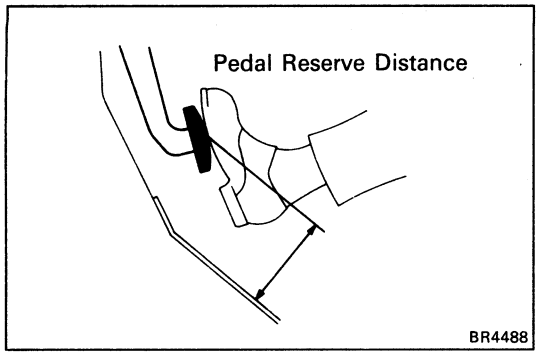
HINT: The freeplay to the first resistance is due to the play between the clevis and pin. And it is 1 – 3 mm (0.04 – 0.12 in.) on the pedal.

4. IF NECESSARY, ADJUST PEDAL FREEPLAY

(a) If incorrect, adjust the pedal freeplay by turning the pedal push rod.

(b) Start the engine and confirm that there is pedal freeplay.

(c) After adjusting the pedal freeplay, check the pedal height.



5. CHECK THAT PEDAL RESERVE DISTANCE IS CORRECT, AS SHOWN

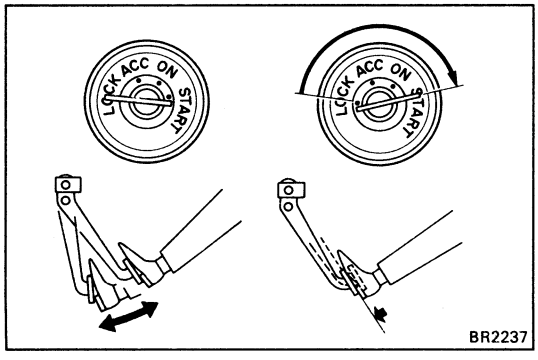
Release the parking brake.

With the engine running, depress the pedal and measure the pedal reserve distance, as shown.

Pedal reserve distance from asphalt sheet at 50 kg (110.2 lb, 490 N):

More than 117 mm (4.61 in.)

If the reserve distance is incorrect, troubleshoot the brake system.

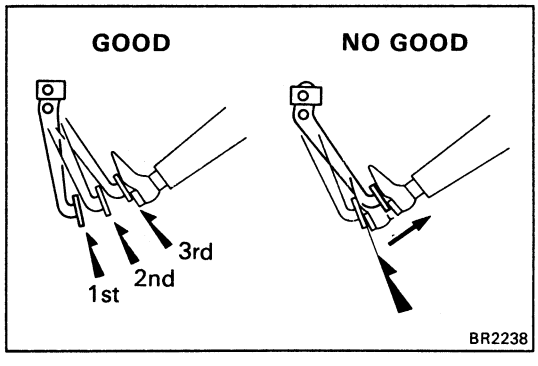


OPERATIONAL TEST OF BRAKE BOOSTER

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.

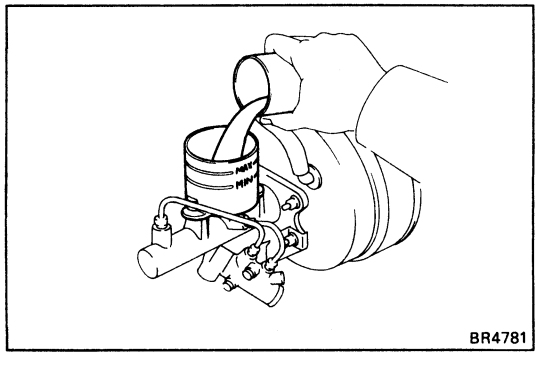
(b) Depress the brake pedal and start the engine. If the pedal goes down slightly, operation is normal.



2. AIR TIGHTNESS

(a) Start the engine and stop it after one or two minutes. Depress the brake pedal several times slowly. If the pedal goes down the farthest the first time, but gradually rises after the second or third time, the booster is air tight.

(b) Depress the brake pedal while the engine is running, and stop the engine with the pedal depressed. If there is no change in the pedal reserve travel after holding the pedal for thirty seconds, the booster is air tight.



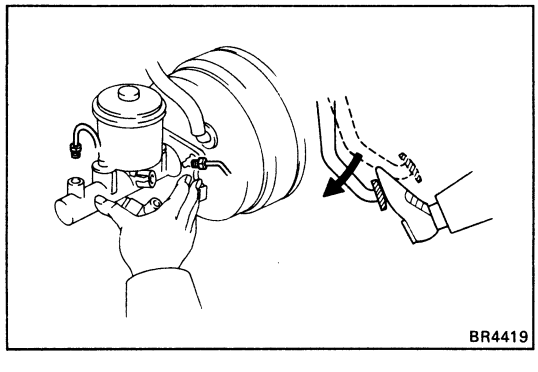
BLEEDING OF BRAKE SYSTEM

HINT: If any work is done one the brake system or if air in the brake lines is suspected, bleed the system of air.

NOTICE: Do not let brake fluid remain on a painted surface. Wash it off immediately.

1. FILL BRAKE RESERVOIR TANK WITH BRAKE FLUID

Fluid: SAEJ1703 or FMVSS No. 116 DOT3

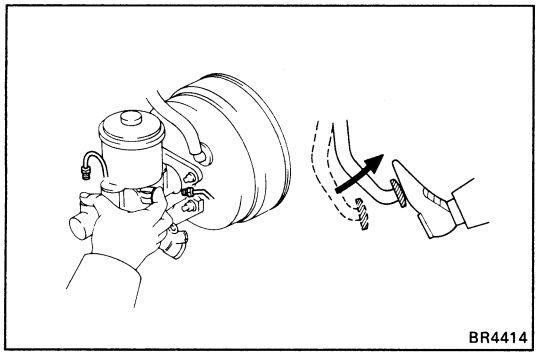


2. BLEED MASTER CYLINDER

HINT: If the master cylinder has been disassembled or if the reservoir tank becomes empty, bleed the air from the master cylinder.

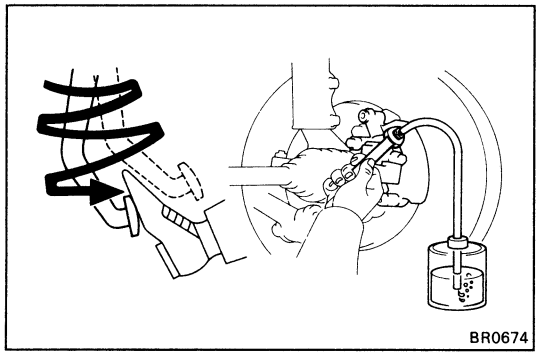
(a) Disconnect the brake tubes from the master cylinder.

(b) Slowly depress the brake pedal and hold it.


BR4414

(c) Block off the outlet plug with your finger and release the brake pedal.

(d) Repeat (b) and (c) three or four times.


BR0674

3. BLEED BRAKE LINE

(a) Connect the vinyl tube to the brake cylinder.

(b) Depress the brake pedal several times, then loosen the bleeder plug with the pedal held down.

(c) At the point when fluid stops coming out, tighten the bleeder plug, then release the brake pedal.

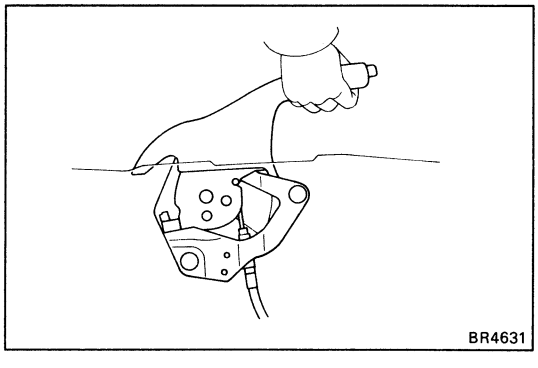
(d) Repeat (b) and (c) until all the air in the fluid has been bled out.

(e) Repeat the above procedure to bleed the out of the brake line for each wheel.

4. CHECK FLUID LEVEL IN RESERVOIR TANK

Check the fluid level and add fluid if necessary.

Fluid: SAEJ 1703 or FMVSS No. 116 DOT3


BR4631

CHECK AND ADJUSTMENT OF PARKING BRAKE

1. CHECK THAT PARKING BRAKE LEVER TRAVEL IS CORRECT

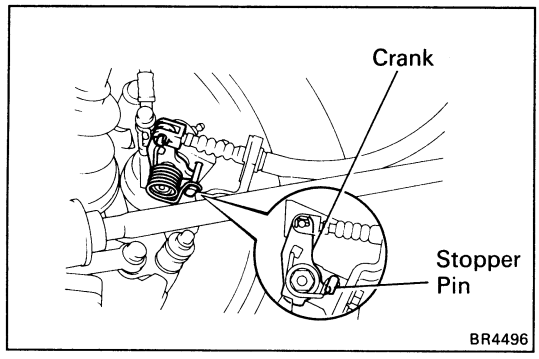
(a) Pull the parking brake lever all the way up and down for two or three times. Then return the parking brake lever.

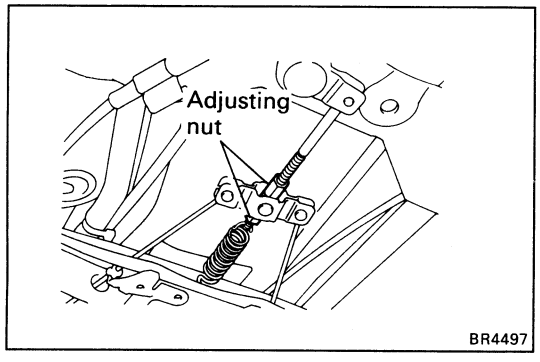
(b) Depress the brake pedal for several times.

(c) Pull the parking brake lever all the way up, and count the notches of lever travel.

Parking brake lever travel
at 20 kg (44.1 lb, 196 N): 5 – 8 clicks

If incorrect, adjust the parking brake.





2. IF NECESSARY, ADJUST PARKING BRAKE

(a) Pull the parking brake lever all the way up and down for two or three times. Then return the parking brake lever.

(b) Depress the brake pedal for several times.

(c) Remove the fuel tank protector.

(d) Loosen the adjusting nut and brake cable, and check that the parking brake crank touches stopper pin.

(e) Stretch the brake cable by turning the adjusting nut before the parking brake crank begin moving.

(f) Tighten the adjusting nuts.

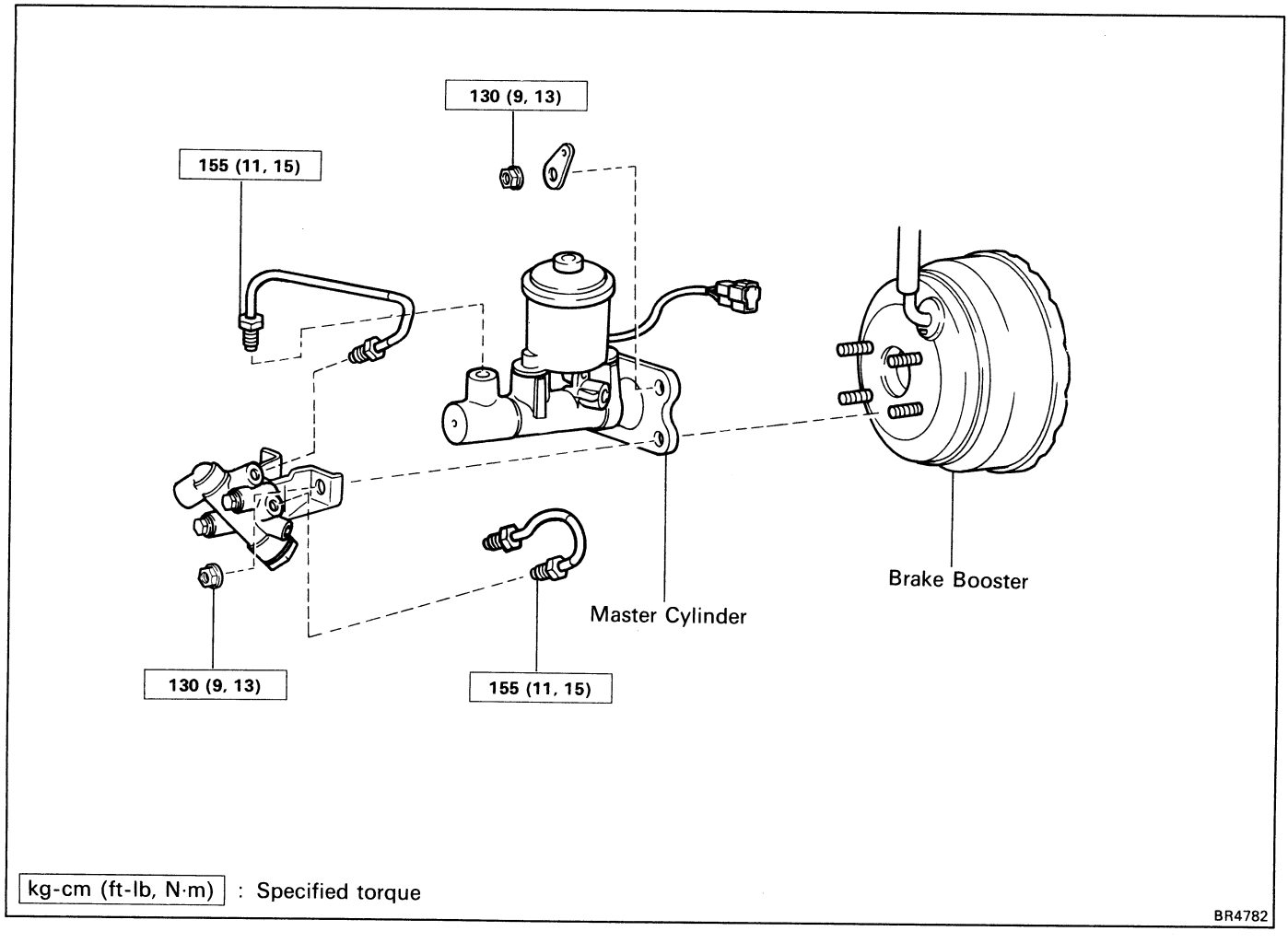
HINT: Tighten the adjusting nuts so the equalizer is horizontal to the ground.

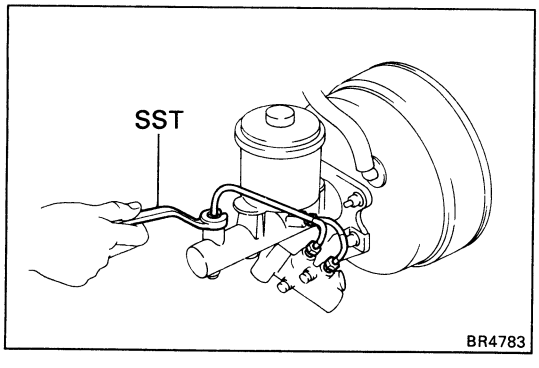
Torque: 160 kg-cm (12 ft-lb, 16 N·m)

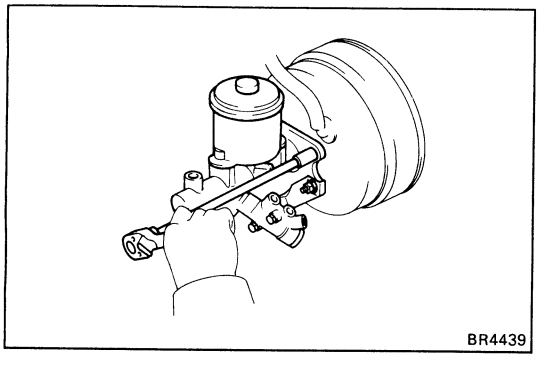
(g) Install the fuel tank protector.

MASTER CYLINDER

REMOVAL OF MASTER CYLINDER







1. **DISCONNECT LEVEL WARNING SWITCH CONNECTOR**

2. **DRAW OUT FLUID WITH SYRINGE**

   NOTICE: Do not let brake fluid remain on a painted surface. Wash it off immediately.

3. **DISCONNECT BRAKE TUBES**

   Using SST, disconnect the brake tubes from the master cylinder.

   SST 09751-36011

4. **REMOVE MASTER CYLINDER**

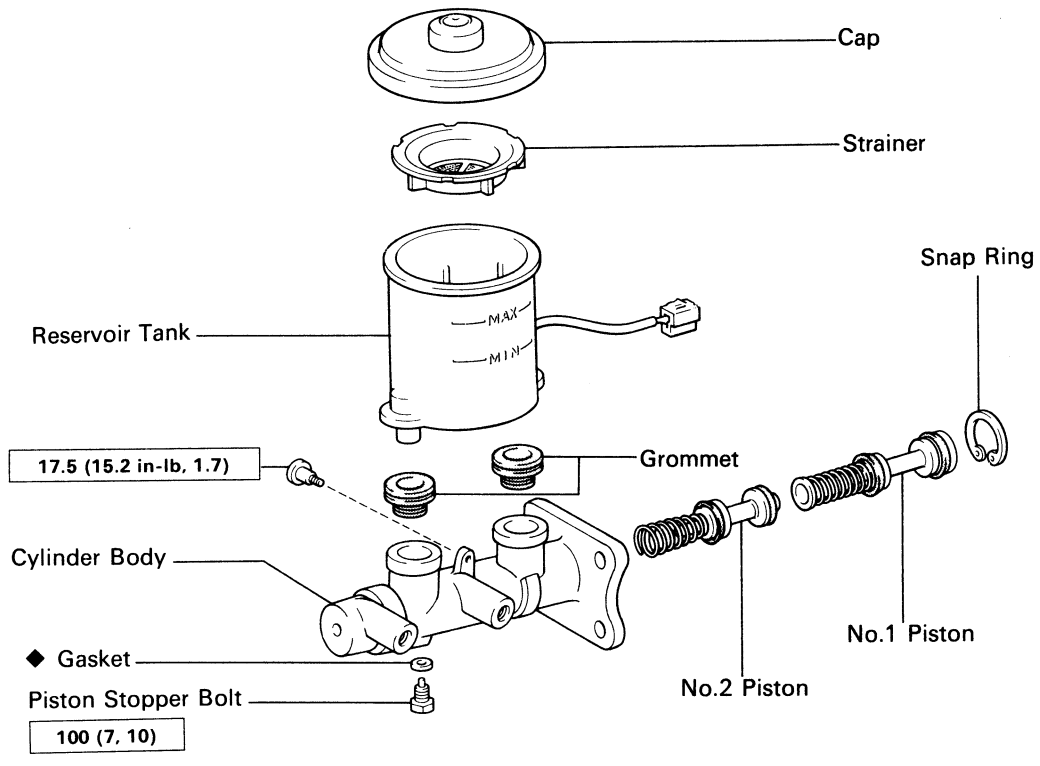
   (a) Remove the four nuts.

   (b) (w/ABS)
   Remove the P valve with the P valve bracket.

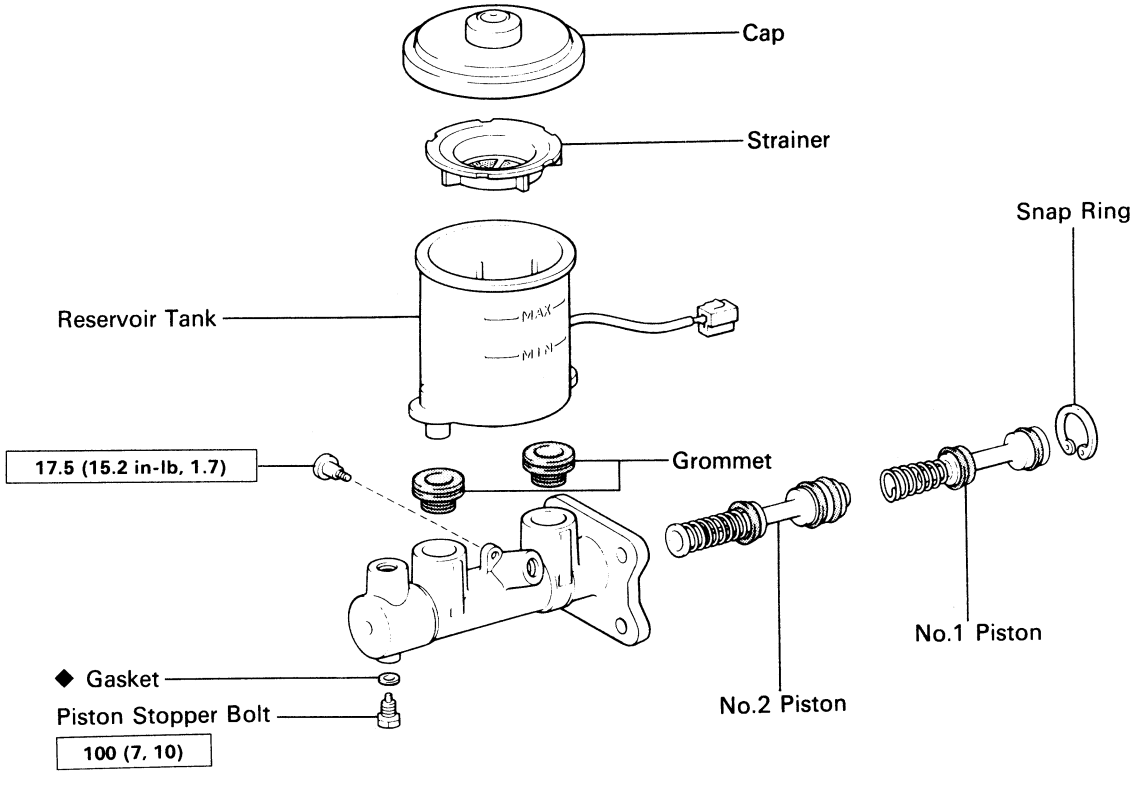
   (c) Remove the master cylinder.

COMPONENTS

w/o ABS



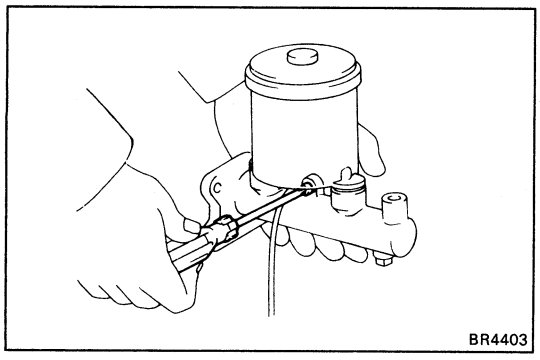
w/ ABS



kg-cm (ft-lb, N·m) : Specified torque

◆ Non-reusable part

BR4406
BR4407


BR4403

DISASSEMBLY OF MASTER CYLINDER

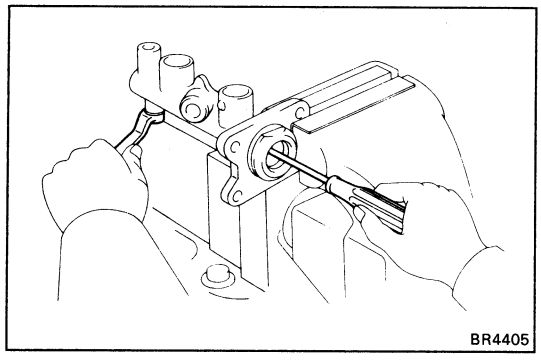
1. REMOVE RESERVOIR TANK

(a) Remove the set screw and pull out the reservoir tank.

(b) Remove the cap and strainer from the reservoir tank.

2. REMOVE TWO GROMMETS

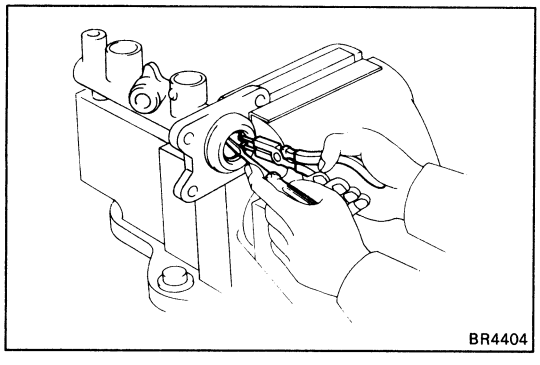
3. PLACE CYLINDER IN VISE


BR4405

4. REMOVE PISTON STOPPER BOLT

Using a screwdriver, push the pistons in all the way and remove the piston stopper bolt and gasket.

HINT: Tape the screwdriver tip before use.

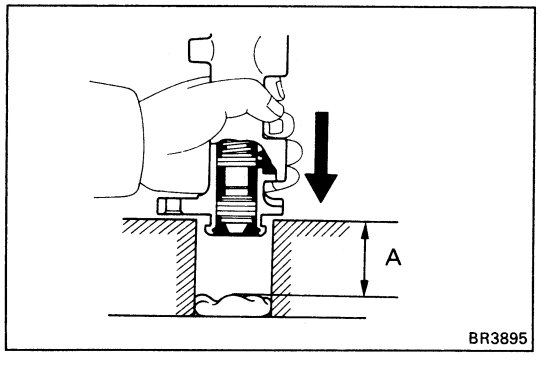

BR4404

5. REMOVE TWO PISTONS

(a) Push in the piston with a screwdriver and remove the snap ring with snap ring pliers.

(b) Remove the No. 1 piston and spring by hand, pulling straight out, not at an angle.

NOTICE: If pulled out at an angle, there is possibility that the cylinder bore could be damaged.



BR3895

(c) Place a rag and two wooden blocks on the work table and lightly tap the cylinder flange against the block edges until the piston drops out of the cylinder.

HINT: Make sure the distance (A) from the rag to the top of the blocks is at least 100 mm (3.94 in.).

INSPECTION OF MASTER CYLINDER COMPONENTS

HINT: Clean the disassembled parts with compressed air.

1. **INSPECT CYLINDER BORE FOR RUST OR SCORING**

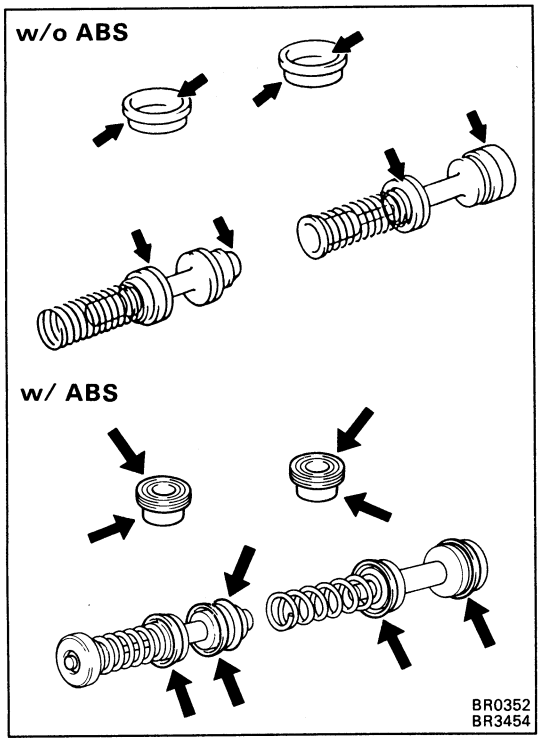
2. **INSPECT CYLINDER FOR WEAR OR DAMAGE**

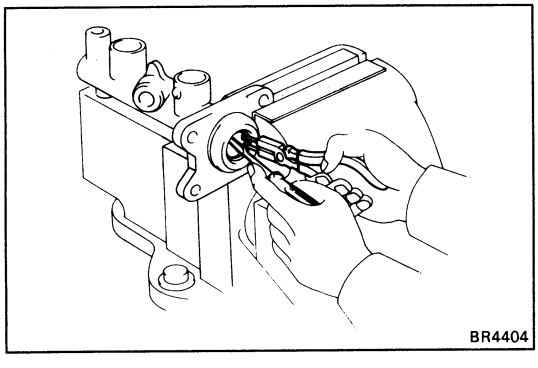
   If necessary, clean or replace the cylinder.

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**

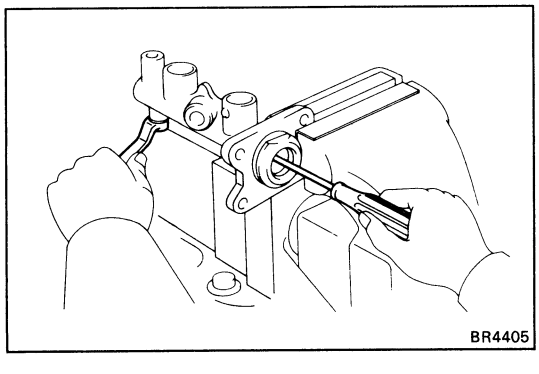
   NOTICE: Be careful not to damage the rubber lips on the pistons.

   (a) Insert the two piston straight in, not at an angle.

   NOTICE: If inserted at angle, there is a possibility that the cylinder bore could be damaged.

   (b) Push in the piston with a screwdriver and install the snap ring with snap ring pliers.

   HINT: Tape the screwdriver tip before use.

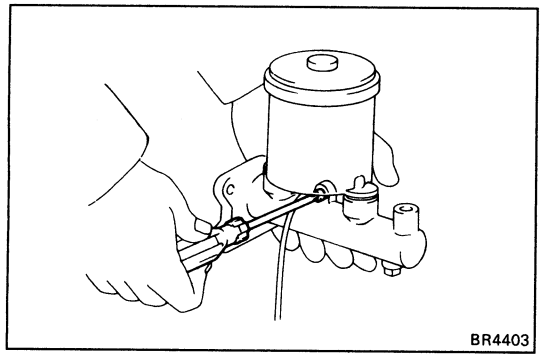


3. **INSTALL PISTON STOPPER BOLT**

   Using a screwdriver, push the piston in all the way and install the piston stopper bolt over the gasket. Torque the bolt.

   Torque: 100 kg-cm (7 ft-lb, 10 N·m)

4. **INSTALL TWO GROMMETS**



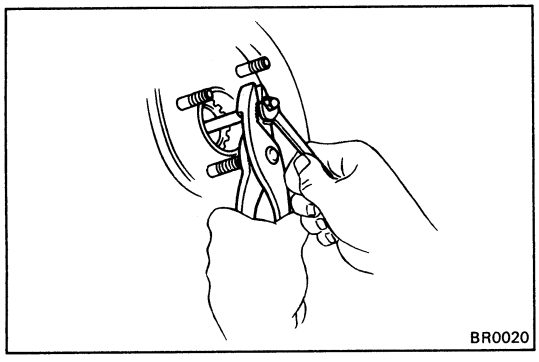
5. INSTALL RESERVOIR TANK

(a) Install the cap and strainer to the reservoir tank.

(b) Push the reservoir tank onto the cylinder.

(c) Install the set screw while pushing on the reservoir tank.

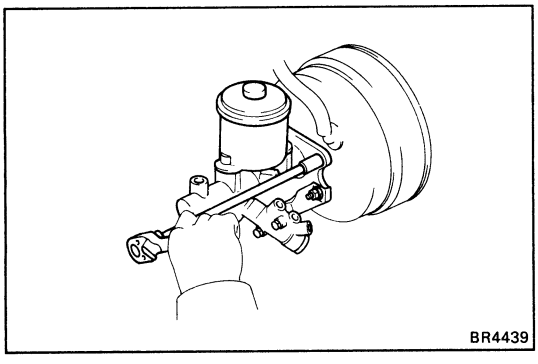
Torque: 17.5 kg-cm (15.2 in.-lb, 1.7 N·m)



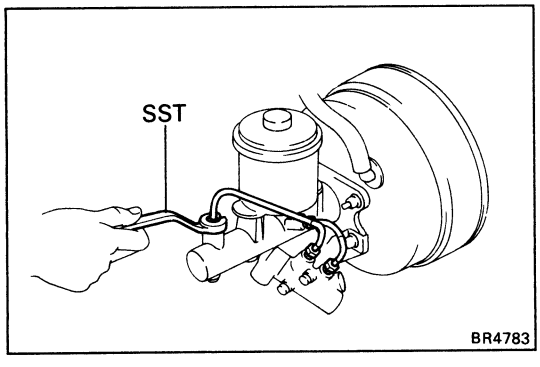
INSTALLATION OF MASTER CYLINDER

(See page BR-9)

1. **ADJUST LENGTH OF BRAKE BOOSTER PUSH ROD BEFORE INSTALLING MASTER CYLINDER**
(See page BR-16)



2. **INSTALL MASTER CYLINDER**
   (a) Install the master cylinder.
   (b) Install the P & BV with the P & BV bracket.
   (c) Install the four nuts and torque nuts.
   Torque: 130 kg-cm (9 ft-lb, 13 N·m)



3. **CONNECT TWO BRAKE TUBES**
   Using SST, connect the brake tubes to the master cylinder. Torque the union nuts.
   SST 09751-36011
   Torque: 155 kg-cm (11 ft-lb, 15 N·m)

4. **CONNECT LEVEL WARNING SWITCH CONNECTOR**

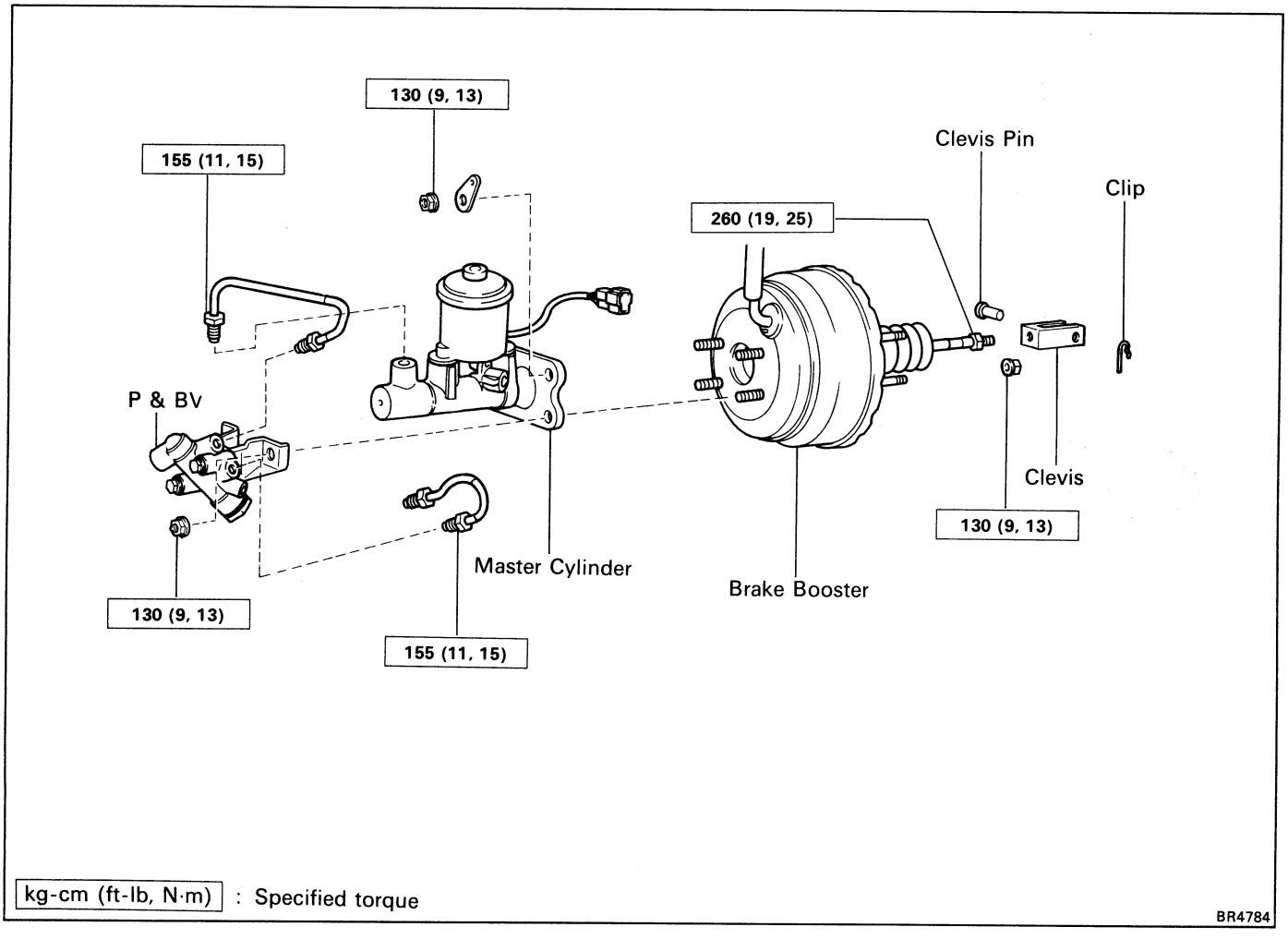
5. **FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM**
(See page BR-6)

6. **CHECK FOR FLUID LEAKAGE**

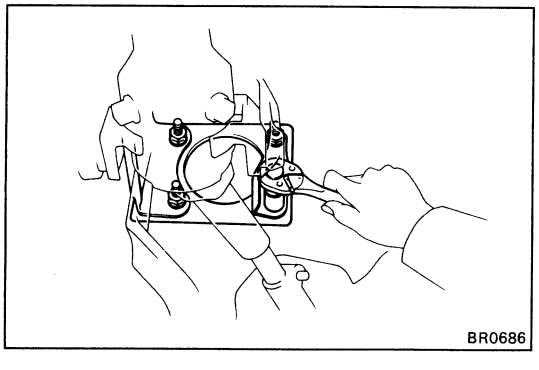
7. **CHECK AND ADJUST BRAKE PEDAL**
(See page BR-5)

BRAKE BOOSTER

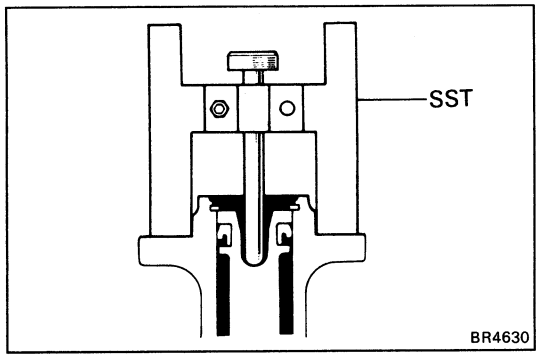
REMOVAL OF BRAKE BOOSTER

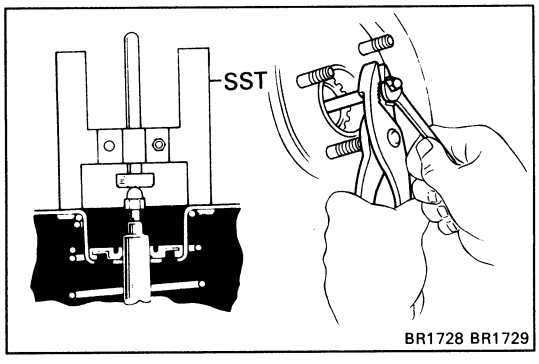


1. **REMOVE MASTER CYLINDER (See page BR-9)**
2. **DISCONNECT VACUUM HOSE FROM BRAKE BOOSTER**
3. **REMOVE PEDAL RETURN SPRING**
4. **REMOVE CLIP AND CLEVIS PIN**



5. **REMOVE BRAKE BOOSTER**
   Remove the four nuts, and pull out the brake booster.





INSTALLATION OF BRAKE BOOSTER

(See page BR-15)

1. ADJUST LENGTH OF BOOSTER PUSH ROD

(a) Set the SST on the master cylinder, and lower the pin until its tip slightly touches the piston.

SST 09737-00010

(b) Turn the SST upside down, and set it on the booster.

SST 09737-00010

(c) Measure the clearance between the booster push rod and pin head (SST).

Clearance: 0 mm (0 in.)

(d) Adjust the booster push rod length until the push rod lightly touches the pin head.

2. INSTALL VACUUM HOSE

3. INSTALL MASTER CYLINDER
(See page BR-9)

4. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM
(See page BR-6)

5. CHECK FOR FLUID LEAKAGE

6. CHECK AND ADJUST BRAKE PEDAL
(See page BR-5)

Check and adjust the brake pedal, then tighten the clevis lock nut.

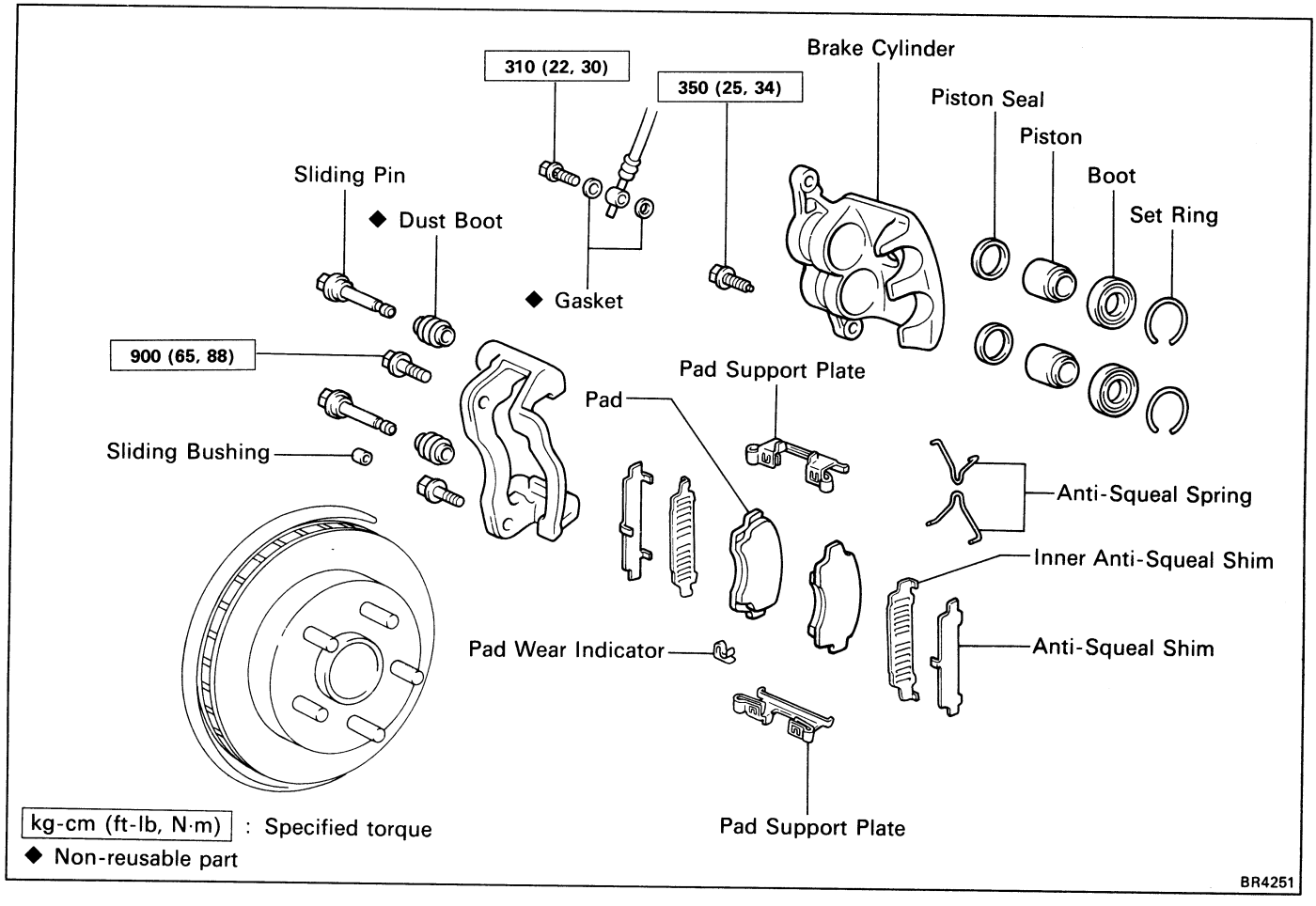
Torque: 260 kg-cm (19 ft-lb, 25 N·m)

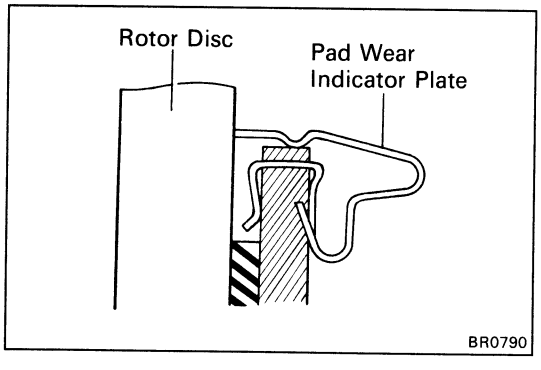
7. PERFORM OPERATIONAL CHECK
(See page BR-6)

FRONT BRAKE

PE36T DISC (For 3S-GTE)

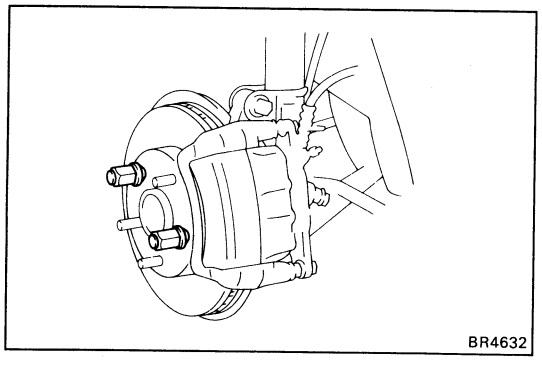
COMPONENTS





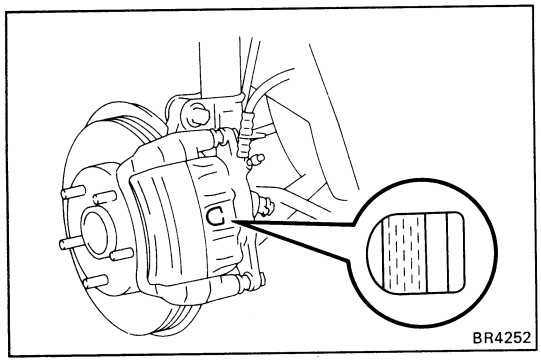
REPLACEMENT OF BRAKE PADS

HINT: If a squealing noise is made by the front brakes while driving, check the pad wear indicator. If there is evidence of the indicator contacting the rotor disc, the brake pad should be replaced.



1. **REMOVE FRONT WHEEL**

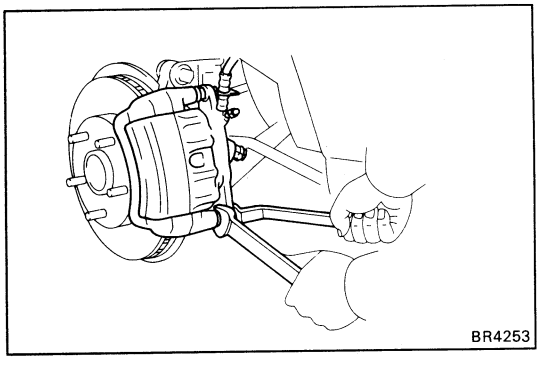
Remove the wheel and temporarily fasten the rotor disc with the hub nuts.



2. **INSPECT PAD LINING THICKNESS**

Check the pad thickness through the cylinder inspection hole and replace the pads if it is not within specification.

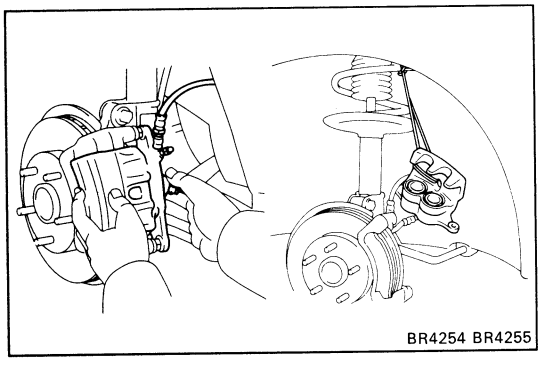
Minimum thickness: 1.0 mm (0.039 in.)



3. **REMOVE CYLINDER FROM TORQUE PLATE**

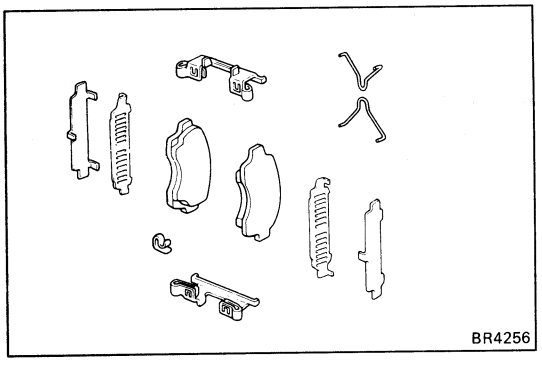
(a) Hold the sliding pin and loosen the two installation bolts.

(b) Remove the installation bolts.



(c) Remove the brake cylinder and suspend it so the hose is not stretched.

HINT: Do not disconnect the brake hose.



4. **REMOVE FOLLOWING PARTS:**

(a) Two anti-squeal springs

(b) Two brake pads

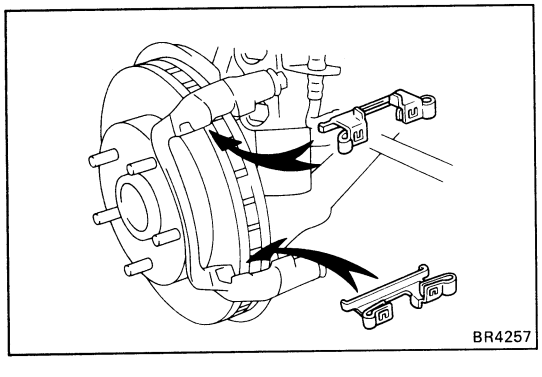
(c) Four anti-squeal shims

(d) Pad wear indicator plate

(e) Two pad support plates

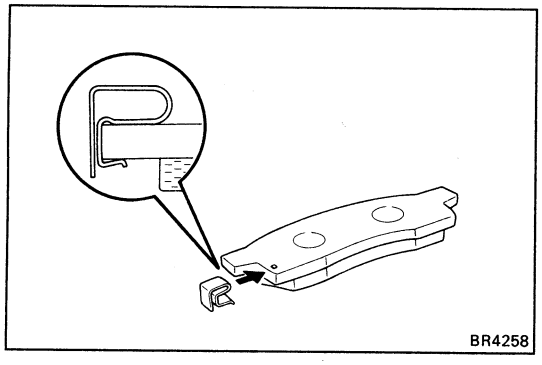
5. **CHECK ROTOR DISC THICKNESS**
(See step 2 on page BR-22)

6. **CHECK ROTOR DISC RUNOUT**
(See step 3 on page BR-22)



7. **INSTALL PAD SUPPORT PLATES**

Install the two pad support plates.

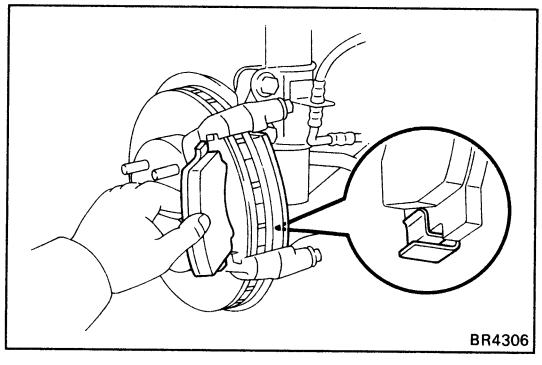

BR4258

8. INSTALL NEW PADS

(a) Install a pad wear indicator plate on the inside pad.

(b) Apply disc brake grease to both sides of the two inner anti-squeal shims.

(c) Install the two anti-squeal shims to the each pad.

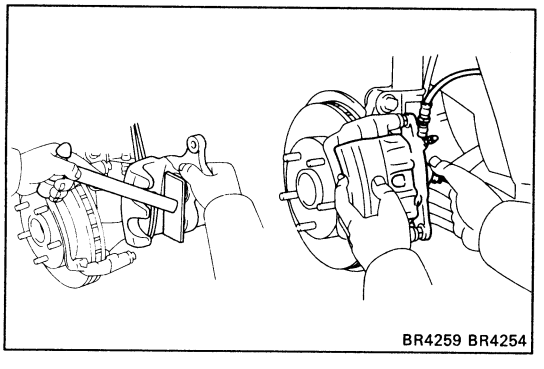

BR4306

(d) Install inside pad with the pad wear indicator plate facing downward.

(e) Install outside pad.

NOTICE: There should be no oil grease adhering to the friction surfaces of the pads or the rotor disc.

(f) Install the two anti-squeal springs.

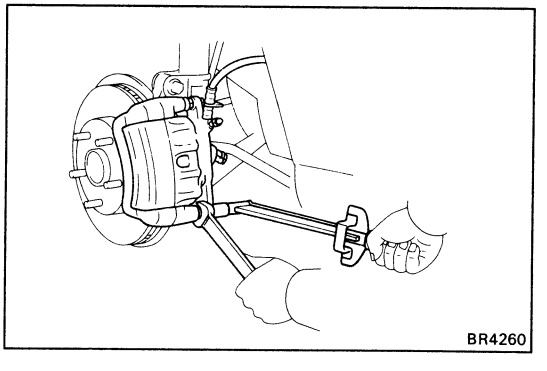

BR4259 BR4254

9. INSTALL CYLINDER

(a) Draw out a small amount of brake fluid from the reservoir tank.

(b) Place a wooden plate on the piston, and press in the piston with a hammer handle or similar implement.

HINT: If the piston is difficult to puch in, loosen the bleeder plug and push in the piston while letting some brake fluid escape.


BR4260

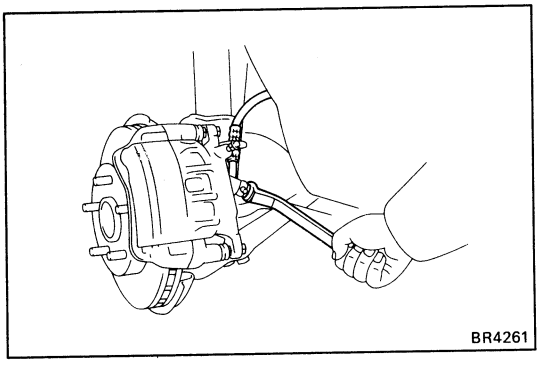
(c) Temporarily install the cylinder on the torque plate with two installation bolts.

(d) Hold the sliding pin and torque the installation bolts.

Torque: 350 kg-cm (25 ft-lb, 34 N·m)

10. INSTALL FRONT WHEEL

11. CHECK THAT FLUID LEVEL IS MAX LINE



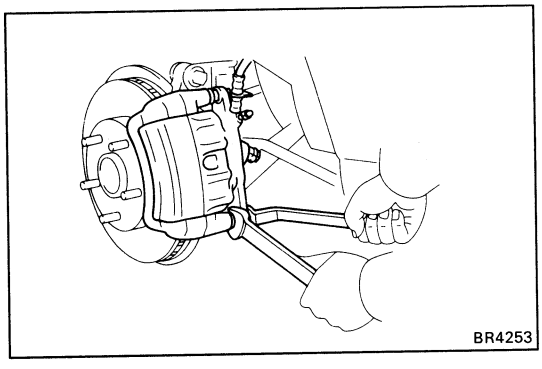
REMOVAL OF CYLINDER

(See page BR-17)

1. DISCONNECT FLEXIBLE HOSE

(a) Remove the union bolt and two gaskets from the brake cylinder, then disconnect the flexible hose from the brake cylinder.

(b) Use a container to catch the brake fluid as it drains out.

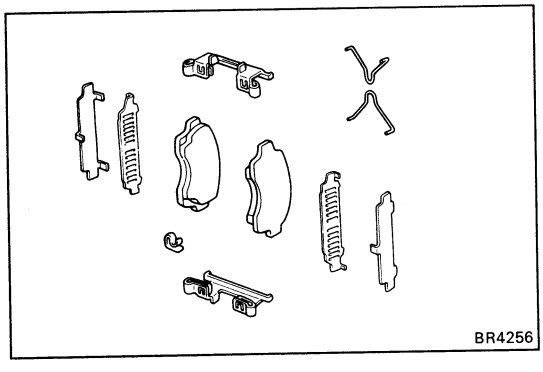


2. REMOVE CYLINDER FROM TORQUE PLATE

(a) Hold the sliding pin and loosen the two installation bolts.

(b) Remove the two installation bolts.

(c) Remove the cylinder from the torque plate.



3. REMOVE FOLLOWING PARTS:

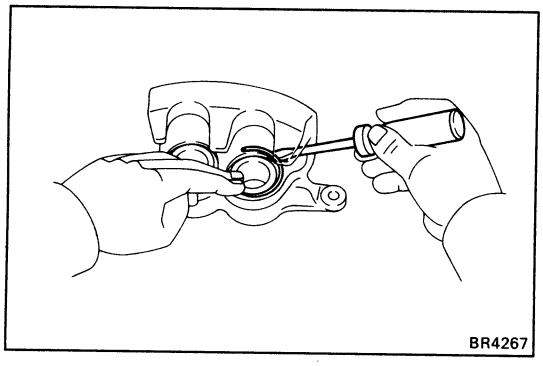
(a) Two anti-squeal springs

(b) Two brake pads

(c) Four anti-squeal shims

(d) Pad wear indicator

(e) Two pad support plates

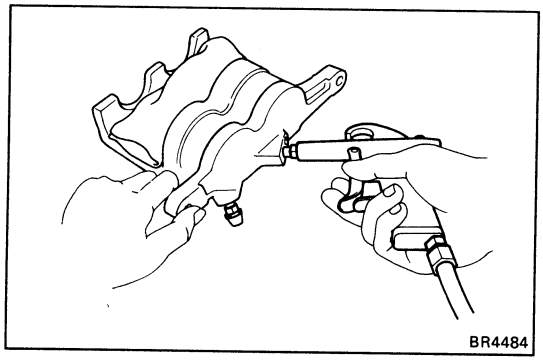


DISASSEMBLY OF CYLINDER

(See page BR-17)

1. **REMOVE CYLINDER BOOT SET RINGS AND CYLINDER BOOTS**

   Using a screwdriver, remove the cylinder boot set rings and cylinder boots from the cylinder.

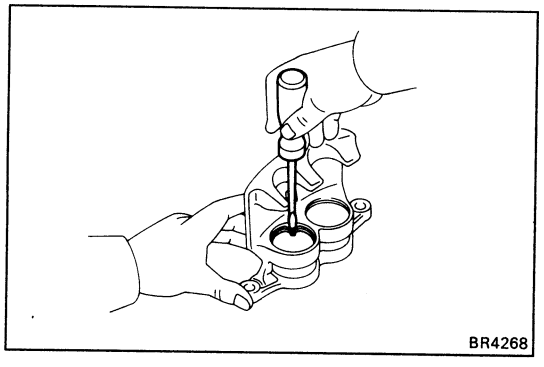


2. **REMOVE PISTONS**

   (a) Place a piece of cloth or similar article between the pistons and the cylinder.

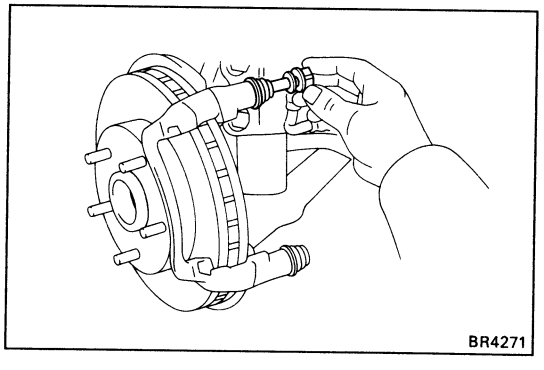
   (b) Use compressed air to remove the pistons from the cylinder.

   CAUTION: Do not place your fingers in front of the piston when using compressed air.



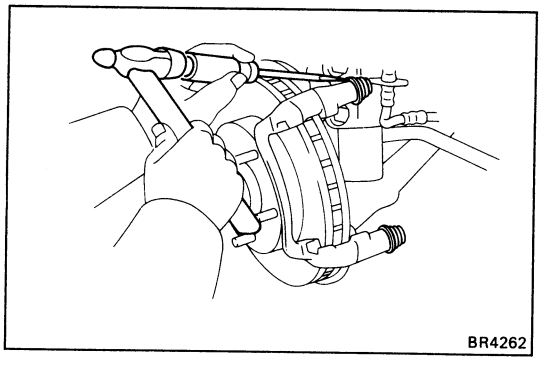
3. **REMOVE PISTON SEALS**

   Using a screwdriver, remove the piston seals from the cylinder.

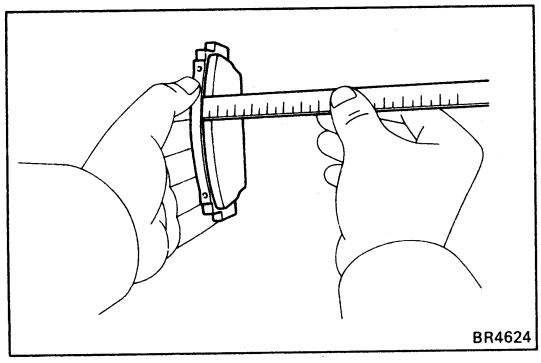


4. **REMOVE SLIDING PINS AND DUST BOOTS**

   (a) Remove the two sliding pins from the torque plate.



   (b) Using a chisel and hammer, tap out the two dust boots.



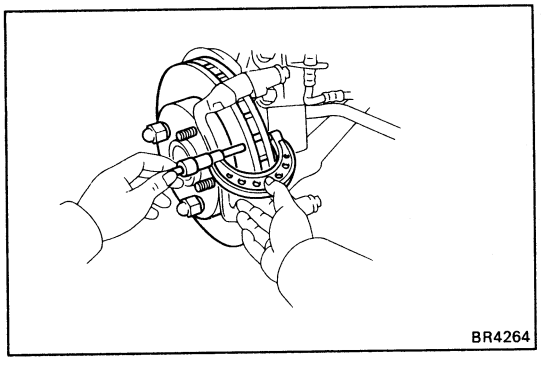
INSPECTION OF FRONT BRAKE COMPONENTS

1. MEASURE PAD LINING THICKNESS

Standard thickness: 10.0 mm (0.39 in.)

Minimum thickness: 1.0 mm (0.039 in.)

Replace the pad if the thickness is less than the minimum of if it shows sign of uneven wear.

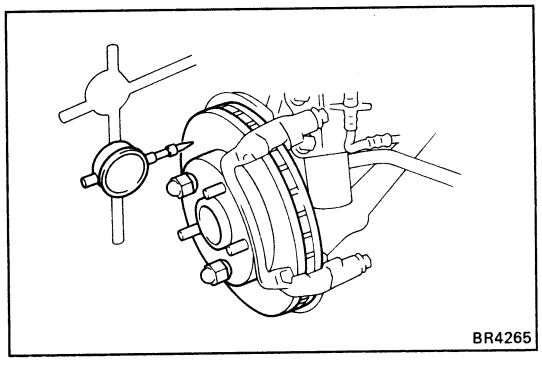


2. MEASURE ROTOR DISC THICKNESS

Standard thickness: 25.0 mm (0.984 in.)

Minimum thickness: 24.0 mm (0.945 in.)

If the disc is scored or worn, of if thickness is less than minimum, repair or replace the disc



3. MEASURE ROTOR DISC RUNOUT

HINT: Before measuring the runout, confirm that the front hub bearing play is within specification.

Measure the rotor disc runout at 10 mm (0.39 in.) from the outer edge of the disc.

Maximum disc runout: 0.07 mm (0.0028 in.)

If the runout is greater than the maximum, inspect and adjust if following the procedure below.

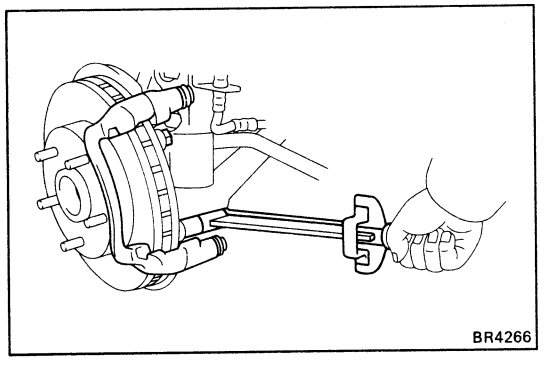
Then replace the disc if necessary.

(a) Remove the torque plate from the knuckle.

(b) Remove the hub nuts of the temporarily installed disc and pull off the rotor disc.

(c) Check that the hub axial play is within specification, and replace the bearing if not within specification. (See page SA-10)

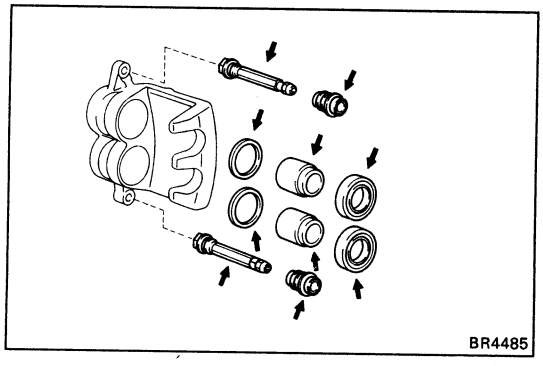
(d) Install the rotor disc and measure the disc runout, then shift the rotor disc one fifth of a turn or one fourth of a turn, and measure the disc runout. Similarly measure the runout at each position, and select the position where the runout is minimum.



(e) In this position, if the runout is within specification, install the torque plate and torque the mounting bolts.

Torque: 900 kg-cm (65 ft-lb, 88 N·m)

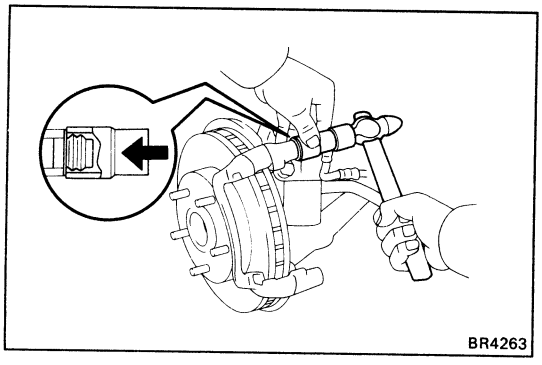
(f) If not within specification, replace the rotor disc, and repeat (d) and (e).



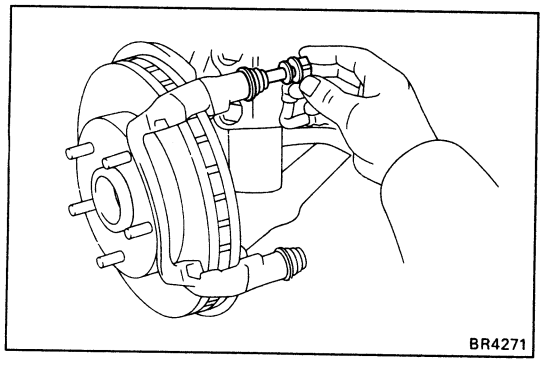
ASSEMBLY OF CYLINDER

(See page BR-17)

1. **APPLY LITHIUM SOAP BASE GLYCOL GREASE TO PARTS INDICATED WITH ARROWS**

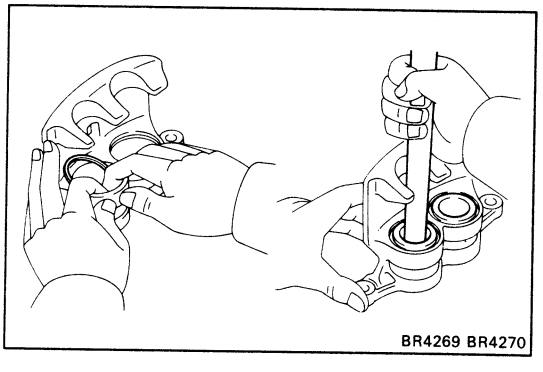


2. **INSTALL DUST BOOTS AND SLIDING PINS**
   (a) Using a 19 mm socket wrench and hammer, tap in two new dust boots into the torque plate.
   (b) Confirm that the metal plate portion of the dust boot fits snugly in the torque plate.

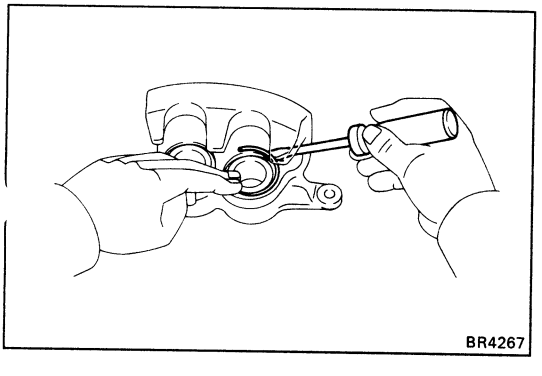


   (c) Insert two sliding pins into the torque plate.

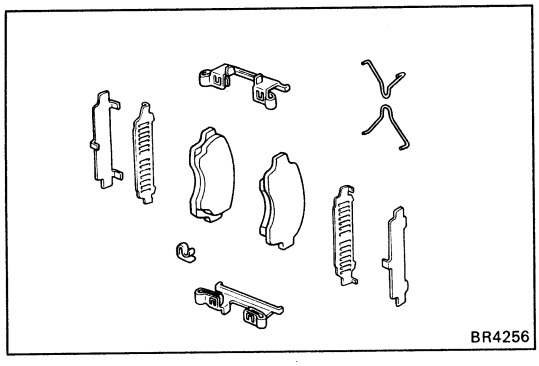
NOTICE: Insert the sliding pin with sliding bushing into the bottom side.

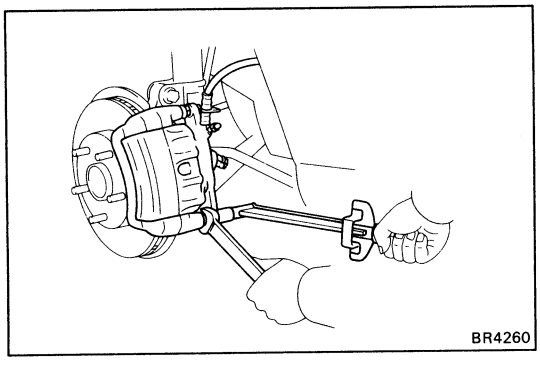


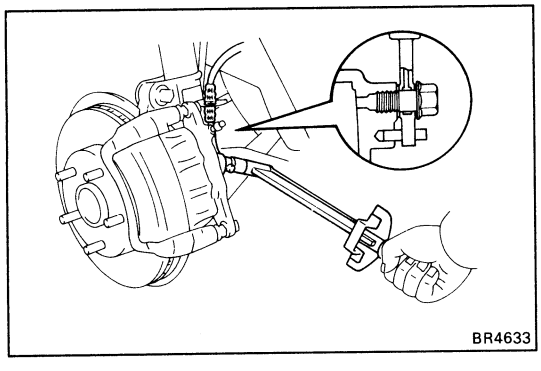
3. **INSTALL PISTON SEALS AND PISTONS IN CYLINDER**



4. **INSTALL CYLINDER BOOTS AND CYLINDER BOOT SET RINGS**


BR4256


BR4260


BR4633

INSTALLATION OF CYLINDER

(See page BR-17)

1. **INSTALL FOLLOWING PARTS:**
   (a) Two pad support plates
   (b) Pad wear indicator
   (c) Four anti-squeal shims
   (d) Two brake pads
   (e) Two anti-squeal springs
   (See steps 7 and 8 on pages BR-18 and 19)

2. **INSTALL CYLINDER**
   (a) Temporarily install the cylinder on the torque plate with two installation bolts.
   (b) Hold the sliding pin and torque the installation bolts.
   Torque: 350 kg-cm (25 ft-lb, 34 N·m)

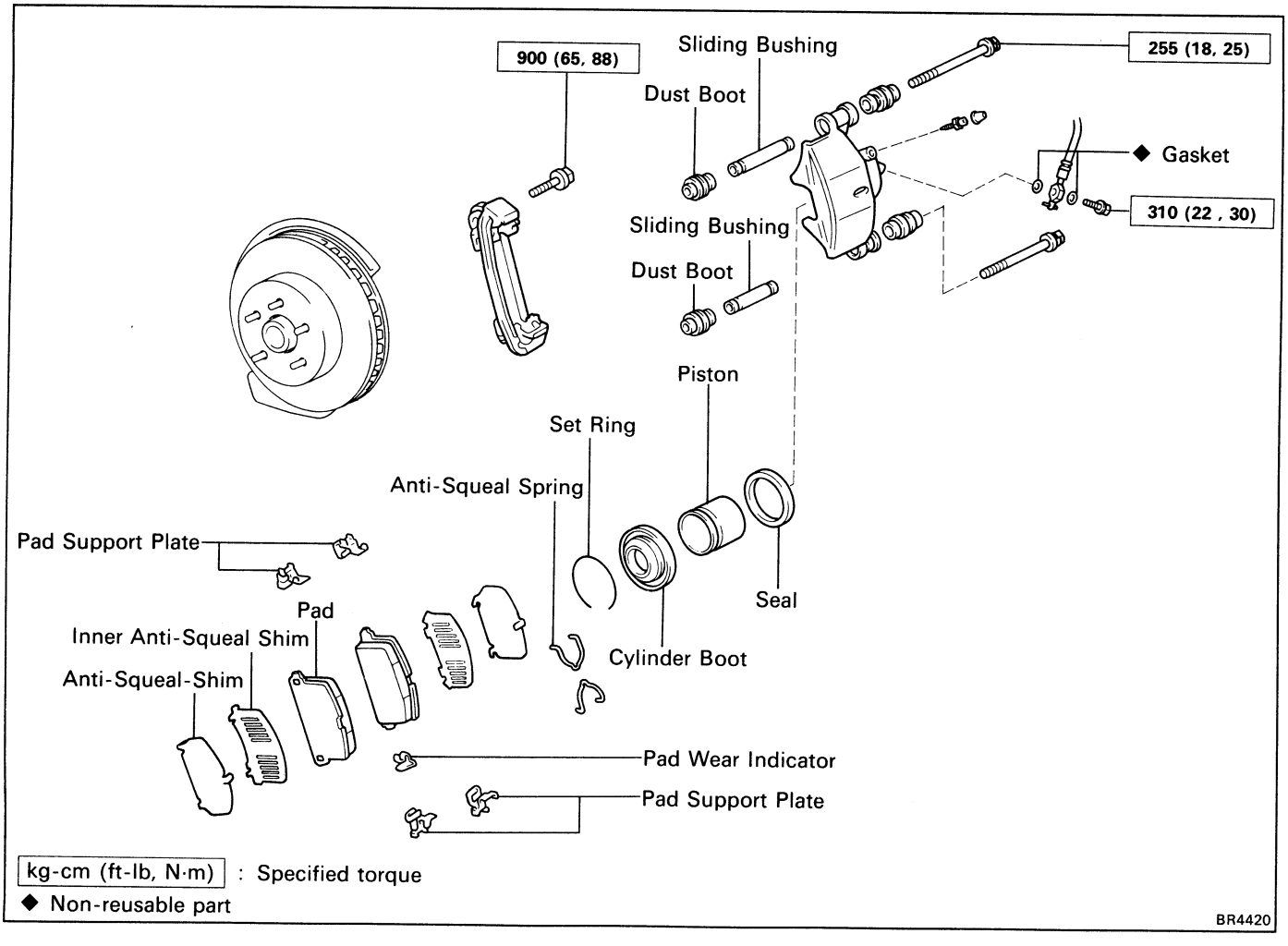
3. **CONNECT FLEXIBLE HOSE**
   Install the flexible hose on the brake cylinder with two new gaskets.
   Torque: 310 kg-cm (22 ft-lb, 30 N·m)
   HINT: Insert the flexible hose lock securely in the lock hole in the brake cylinder.

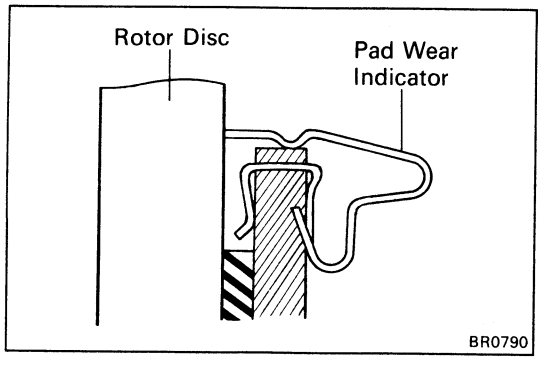
4. **FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM**
   (See page BR-6)

5. **CHECK FOR LEAKS**

PD51 DISC (For 5S-FE)

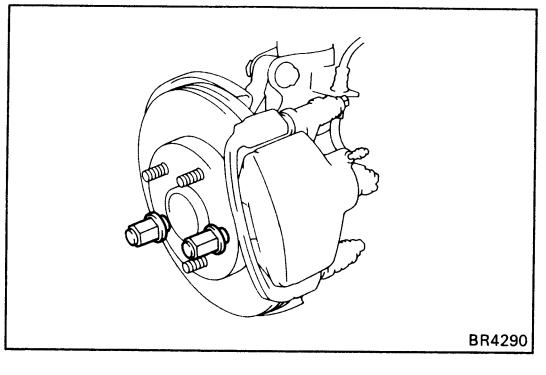
COMPONENTS





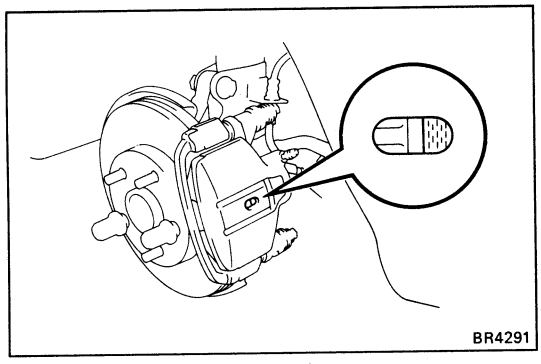
REPLACEMENT OF BRAKE PADS

HINT: If a squealing noise is made by the front brakes while driving, check the pad wear indicator. If there is evidence of the indicator contacting the rotor disc, the brake pad should be replaced.



1. REMOVE FRONT WHEEL

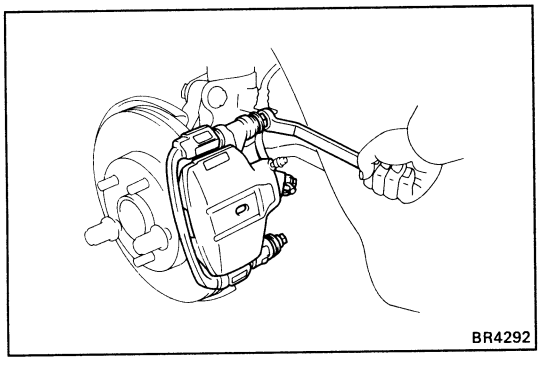
Remove the wheel and temporarily fasten the rotor disc with the hub nuts.


BR4291

2. INSPECT PAD LINING THICKNESS

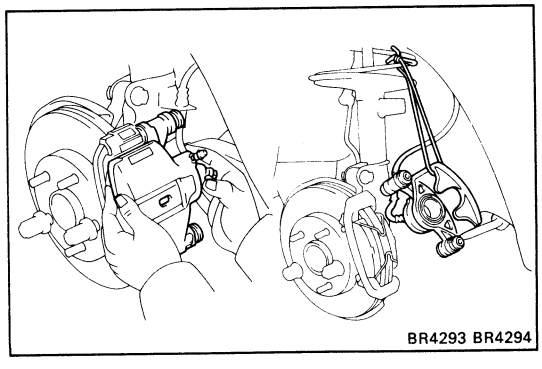
Check the pad thickness through the cylinder inspection hole and replace the pads if it is not within specification.

Minimum thickness: 1.0 mm (0.039 in.)


BR4292

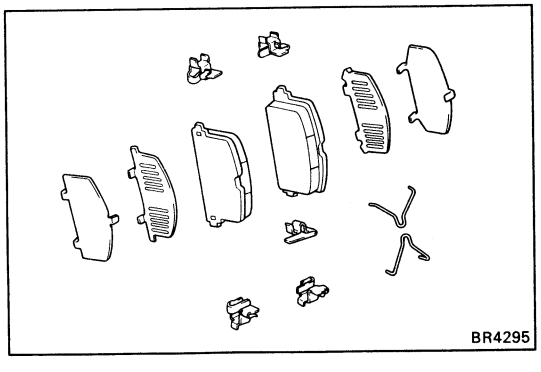
3. REMOVE CYLINDER FROM TORQUE PLATE

(a) Remove two installation bolts from the torque plate.


BR4293 BR4294

(b) Remove the brake cylinder and suspend it so the hose is not stretched.

HINT: Do not disconnect the brake hose.

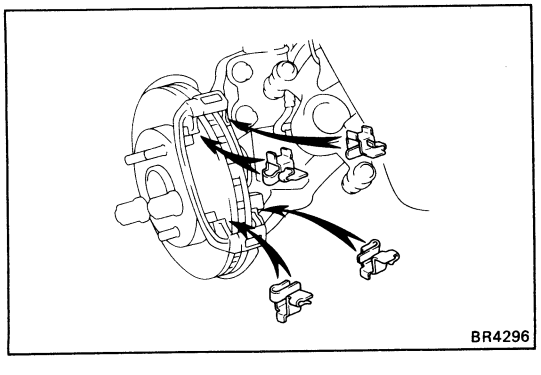

BR4295

4. REMOVE FOLLOWING PARTS:

(a) Two anti-squeal springs
(b) Two brake pads
(c) Four anti-squeal shims
(d) Pad wear indicator plate
(e) Four pad support plates

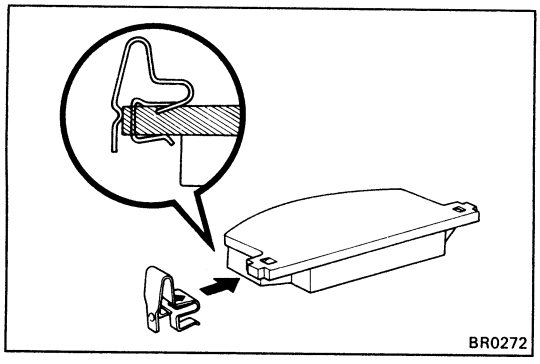
5. CHECK ROTOR DISC THICKNESS
(See step 2 on page BR-30)

6. CHECK ROTOR DISC RUNOUT
(See step 3 on page BR-30)


BR4296

7. INSTALL PAD SUPPORT PLATES

Install the pad support plates.

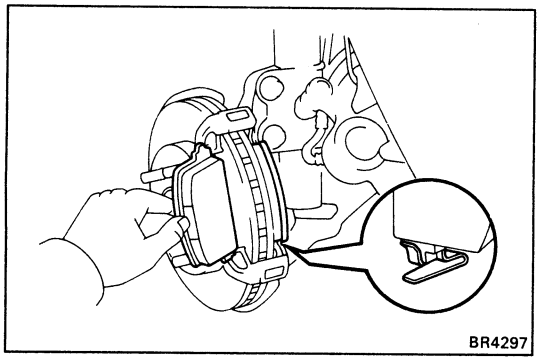


8. INSTALL NEW PADS

(a) Install a pad wear indicator plate on the inside pad.

(b) Apply disc brake grease to both sides of the two inner anti-squeal shims.

(c) Install the two anti-squeal shims to the each pad.

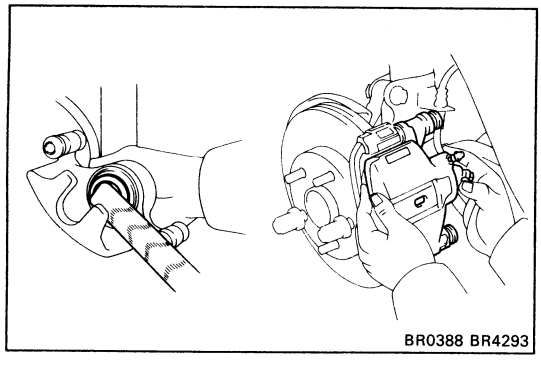


(d) Install inside pad with the pad wear indicator plate facing downward.

(e) Install outside pad.

NOTICE: There should be no oil or grease adhering to the friction surfaces of the pads or the rotor disc.

(f) Install the two anti-squeal springs.

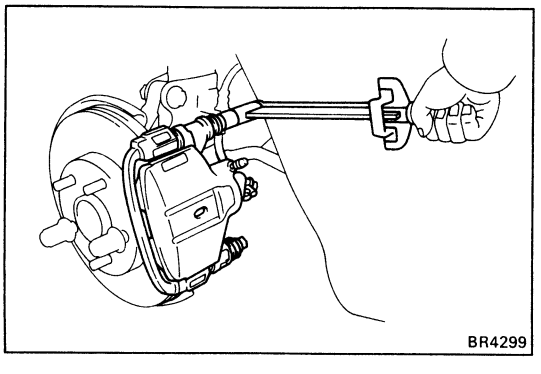


9. INSTALL CYLINDER

(a) Draw out a small amount of brake fluid from the reservoir tank.

(b) Press in the piston with a hammer handle or an equivalent.

HINT: If the piston is difficult to push in, loosen the bleeder plug and push in the piston while letting some brake fluid escape.



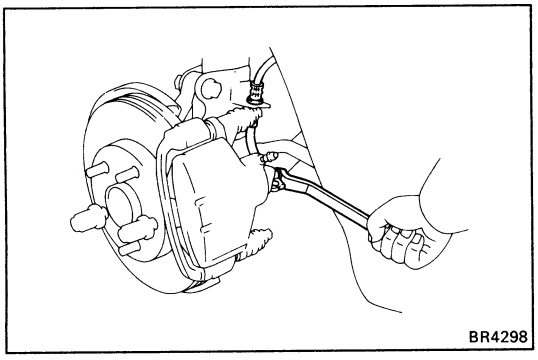
(c) Install the brake cylinder.

(d) Install and torque the two installation bolts.

Torque: 255 kg-cm (18 ft-lb, 25 N·m)

10. INSTALL FRONT WHEEL

11. CHECK THAT FLUID LEVEL IS MAX LINE



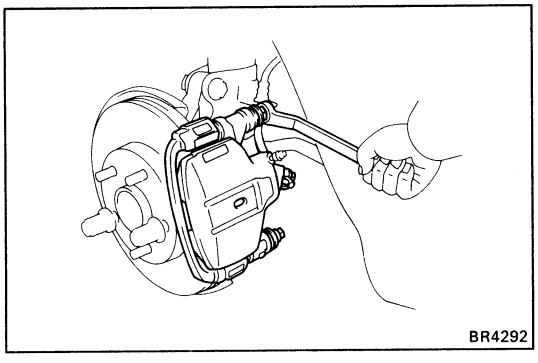
REMOVAL OF CYLINDER

(See page BR-25)

1. DISCONNECT FLEXIBLE HOSE

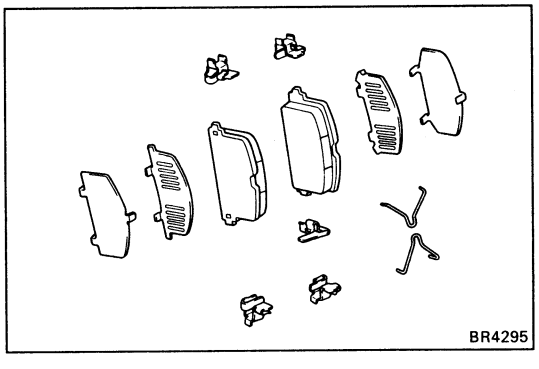
(a) Remove the union bolt and two gaskets from the brake cylinder, then disconnect the flexible hose from the brake cylinder.

(b) Use a container to catch the brake fluid as it drains out.



2. REMOVE CYLINDER FROM TORQUE PLATE

Remove the two installation bolts and cylinder.



3. REMOVE FOLLOWING PARTS:

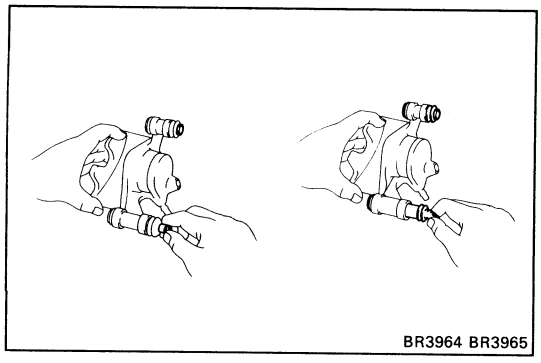
(a) Two anti-squeal springs

(b) Two brake pads

(c) Four anti-squeal shims

(d) Pad wear indicator

(e) Four pad support plates


BR3964 BR3965

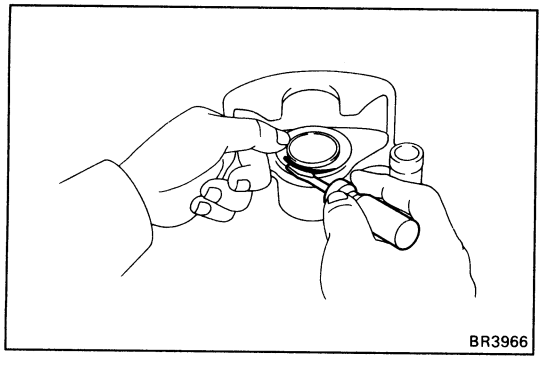
DISASSEMBLY OF CYLINDER

(See page BR-25)

1. REMOVE FOLLOWING PARTS:

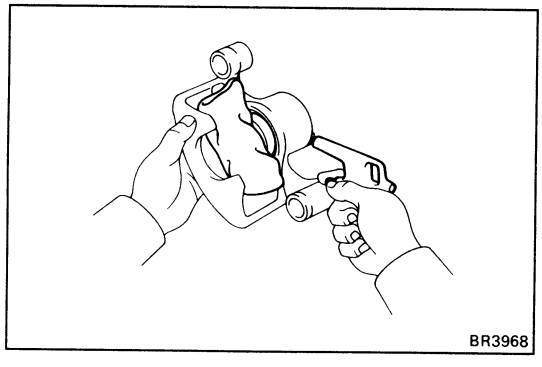
(a) Two sliding bushings

(b) Four dust boots


BR3966

2. REMOVE CYLINDER BOOT SET RING AND CYLINDER BOOT

Using a screwdriver, remove the cylinder boot set ring and cylinder boot.

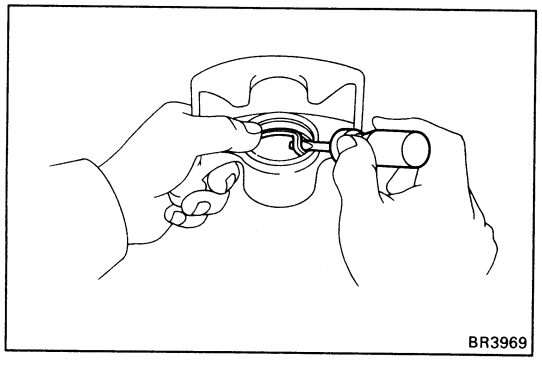

BR3968

3. REMOVE PISTON FROM CYLINDER

(a) Put a piece of cloth or an equivalent between the piston and the cylinder.

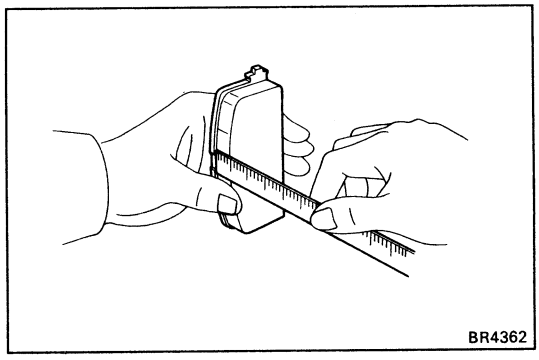
(b) Use compressed air to remove the piston from the cylinder.

CAUTION: Do not place your fingers in front of the piston when using compressed air.


BR3969

4. REMOVE PISTON SEAL FROM BRAKE CYLINDER

Using a screwdriver, remove the piston seal.


BR4362

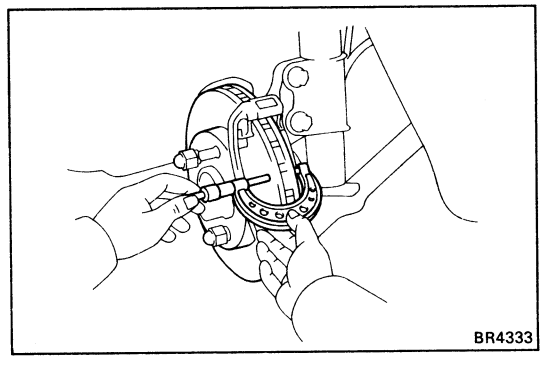
INSPECTION OF FRONT BRAKE COMPONENTS

1. MEASURE PAD LINING THICKNESS

Standard thickness: 10.0 mm (0.39 in.)

Minimum thickness: 1.0 mm (0.039 in.)

Replace the pad if the thickness is less than the minimum of if it shows sign of uneven wear.

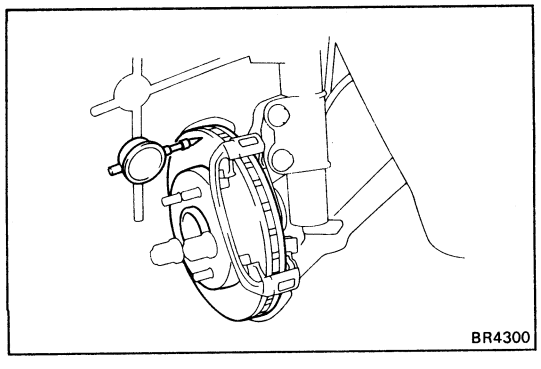

BR4333

2. MEASURE ROTOR DISC THICKNESS

Standard thickness: 25.0 mm (0.984 in.)

Minimum thickness: 24.0 mm (0.945 in.)

If the disc is scored or worn, of if thickness is less than minimum, repair or replace the disc.


BR4300

3. MEASURE ROTOR DISC RUNOUT

HINT: Before measuring the runout, confirm that the front hub bearing play is within specification.

Measure the rotor disc runout at 10 mm (0.39 in.) from the outer edge of the rotor disc.

Maximum disc runout: 0.07 mm (0.0028 in.)

If the runout is greater than the maximum, inspect and adjust if following the procedure below.

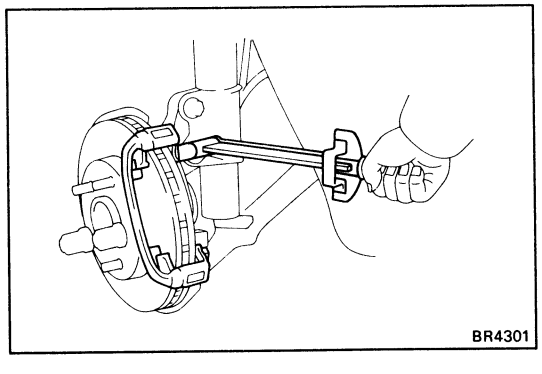
Then replace the disc if necessary.

(a) Remove the torque plate from the knuckle.

(b) Remove the hub nuts of the temporarily installed disc and pull off the rotor disc.

(c) Check that the hub axial play is within specification, and replace the bearing if not within specification. (See page SA-10)

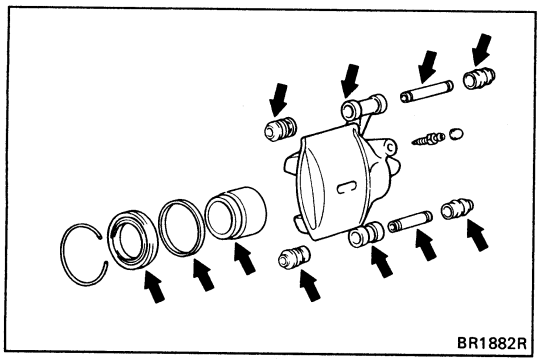
(d) Install the rotor disc and measure the disc runout, then shift the rotor disc one fifth of a turn or one fourth of a turn, and measure the disc runout. Similarly measure the runout at each position, and select the position where the runout is minimum.


BR4301

(e) In this position, if the runout is within specification, install the torque plate and torque the mounting bolts.

Torque: 900 kg-cm (65 ft-lb, 88 N·m)

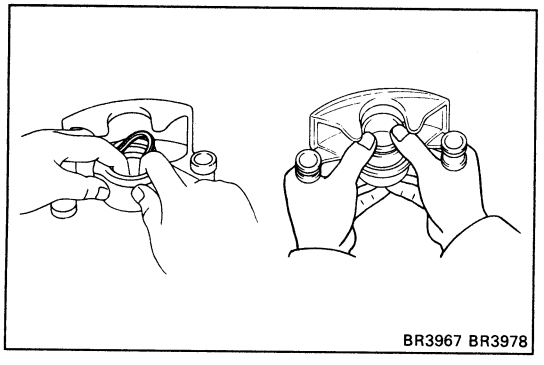
(f) If not within specification, replace the rotor disc, and repeat (d) and (e).



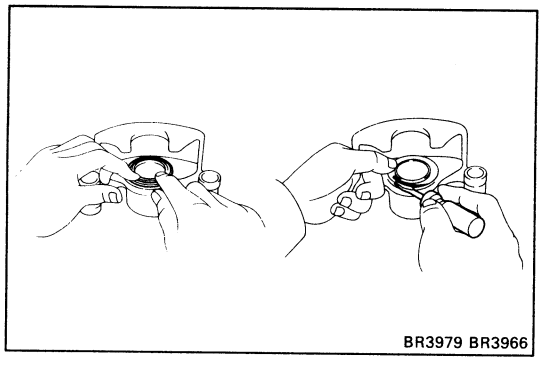
ASSEMBLY OF CYLINDER

(See page BR-25)

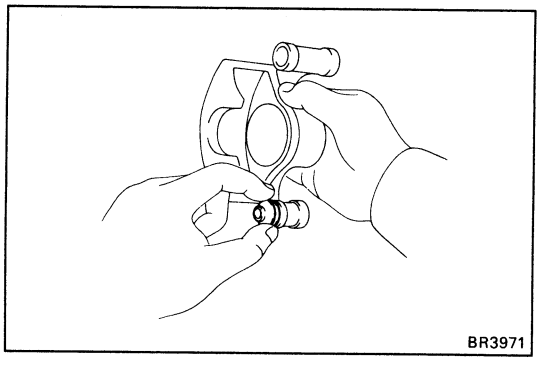
1. **APPLY LITHIUM SOAP BASE GLYCOL GREASE TO PARTS INDICATED WITH ARROWS**



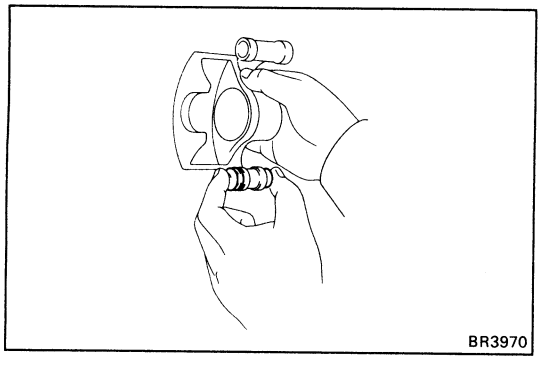
2. **INSTALL PISTON SEAL AND PISTON IN CYLINDER**



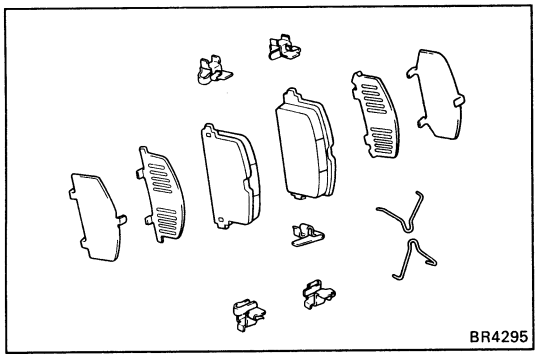
3. **INSTALL CYLINDER BOOT AND RING IN CYLINDER**



4. **INSTALL DUST BOOTS AND CYLINDER SLIDING BUSHINGS**
   (a) Install the dust boots into the brake cylinder.
   (b) Insure that the boots is secured firmly to the brake cylinder grooves.



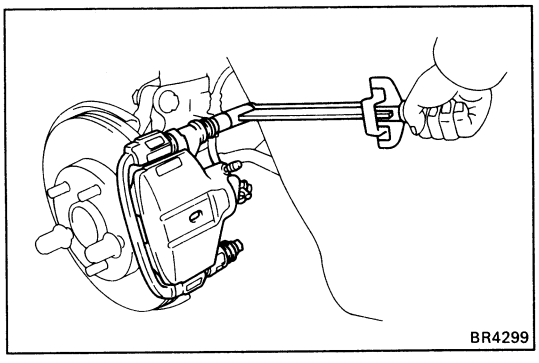
   (c) Install the bushing into the boots.
   (d) Insure that the boots is secured firmly to the bushing grooves.



INSTALLATION OF CYLINDER

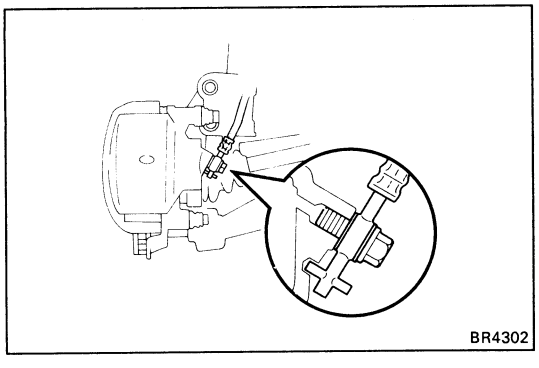
(See page BR-25)

1. **INSTALL FOLLOWING PARTS:**
   - (a) Four pad support plates
   - (b) Pad wear indicator
   - (c) Four anti-squeal shims
   - (d) Two brake pads
   - (e) Two anti-squeal springs
     (See steps 7 and 8 on pages BR-26 and 27)



2. **INSTALL CYLINDER**
   - (a) Install the brake cylinder.
   - (b) Install and torque the two installation bolts.

   Torque: 255 kg-cm (18 ft-lb, 25 N·m)



3. **INSTALL FLEXIBLE HOSE**

   Install the flexible hose on the brake cylinder with two new gaskets.

   Torque: 310 kg-cm (22 ft-lb, 30 N·m)

   HINT: Insert the flexible hose lock securely in the lock hole in brake cylinder.

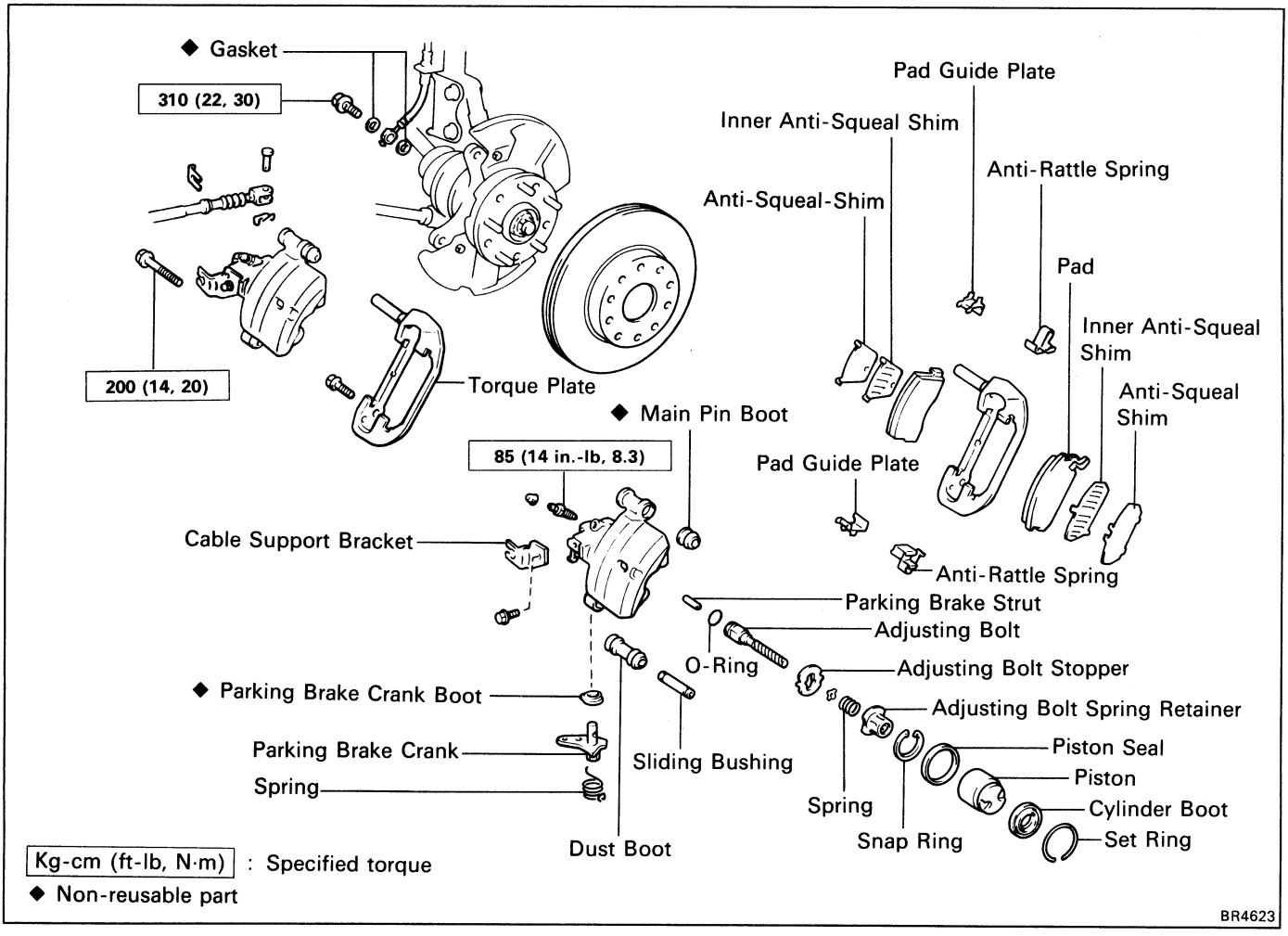
4. **FILL BRAKE RESERVOIR WIHT BRAKE FLUID AND BLEED BRAKE SYSTEM**

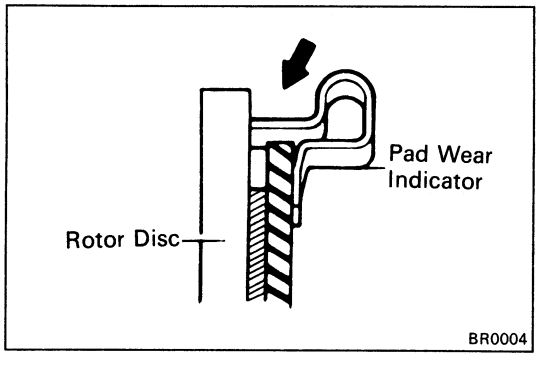
   (See page BR-6)

5. **CHECK FOR LEAKS**

REAR BRAKE

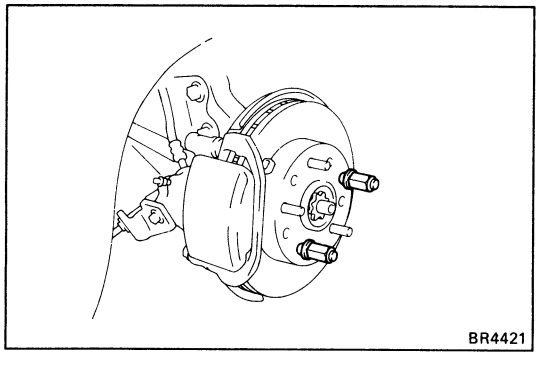
COMPONNENTS





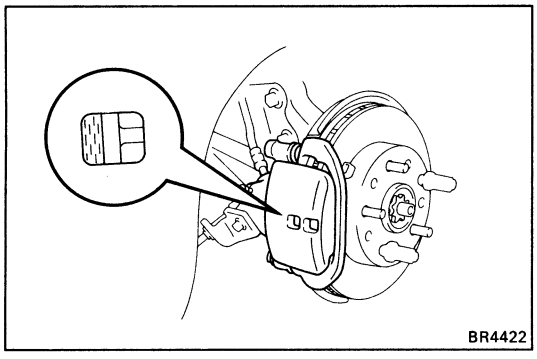
REPLACEMENT OF BRAKE PADS

HINT: If a squealing noise is made by the front brakes while driving, check the pad wear indicator. If there is evidence of the indicator contacting the rotor disc, the brake pad should be replaced.



1. REMOVE FRONT WHEEL

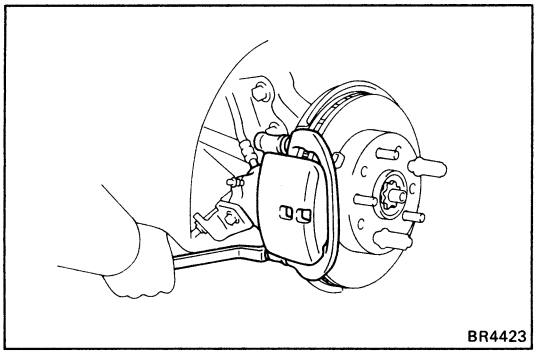
Remove the wheel and temporarily fasten the rotor disc with the hub nuts.


BR4422

2. INSPECT PAD LINING THICKNESS

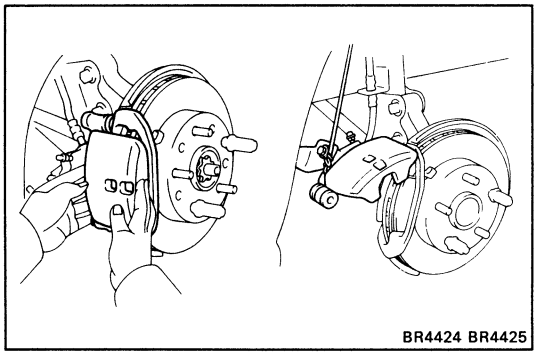
Check the pad thickness through the cylinder inspection hole and replace the pads if it is not within specification.

Minimum thickness: 1.0 mm (0.039 in.)


BR4423

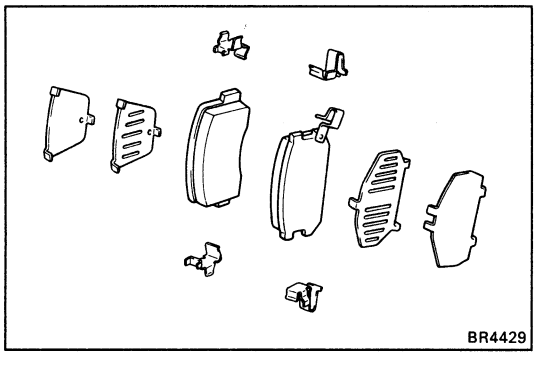
3. LIFT UP CYLINDER

(a) Remove the installation bolt from the torque plate.


BR4424 BR4425

(b) Lift up the brake cylinder and suspend the cylinder with string.

HINT: Do not disconnect the flexible hose from the brake cylinder.


BR4429

4. REMOVE FOLLOWING PARTS:

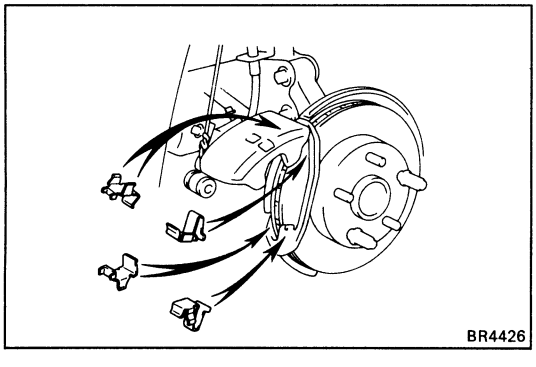
(a) Two brake pads
(b) Four anti-squeal shims
(c) Two anti-rattle springs
(d) Two pad guide plats

5. CHECK ROTOR DISC THICKNESS

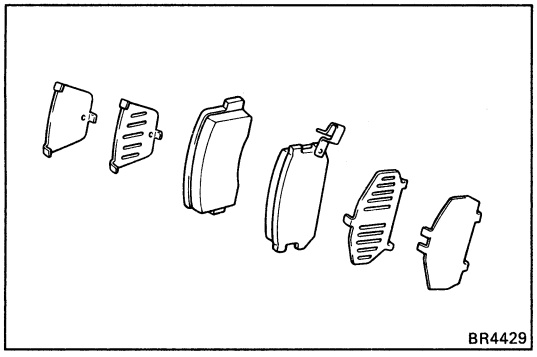
(See step 2 on page BR-40)

6. CHECK ROTOR DISC RUNOUT

(See step 3 on page BR-40)


BR4426

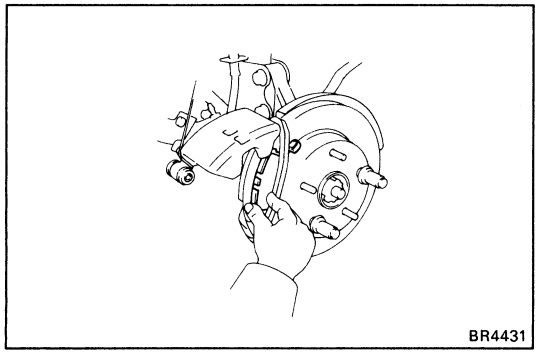
7. INSTALL ANTI-RATTLE SPRINGS AND PAD GUIDE PLATES


BR4429

8. INSTALL NEWPADS

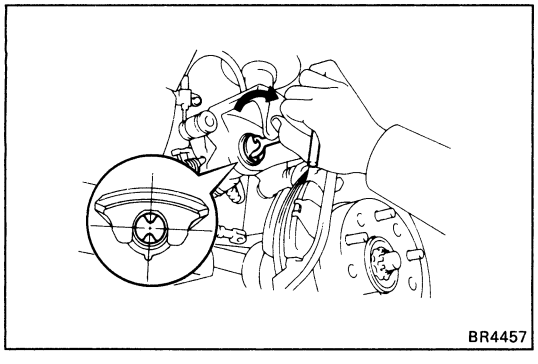
(a) Apply disc brake to both sides of the two inner anti-squeal shims.

(b) Install the two anti-squeal shims to the each pad.


BR4431

(c) Install the two pads.

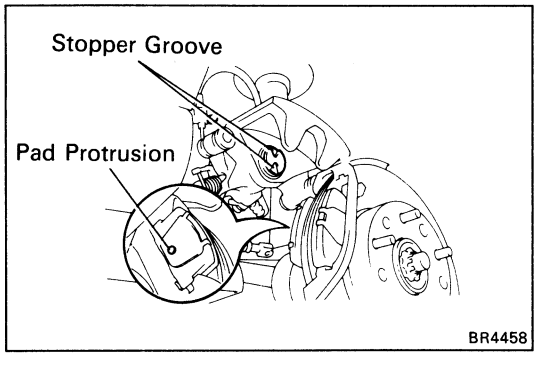
NOTICE: There should be no oil grease adhering to the friction surfaces of the pads or the rotor disc.


BR4457

9. INSTALL CYLINDER

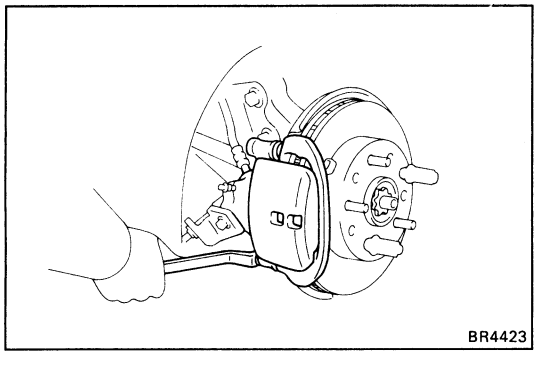
(a) Uusing SST, slowly turn piston clockwise until the piston turns freely, ten alingn the cylinder protrusion and piston stopper groove.

SST 09719-14020 (09719-00020)



BR4458

(b) Fit the pad protrusion into the piston stopper groove and install the cylinder.


BR4423

(c) Install and torque the installation bolt.

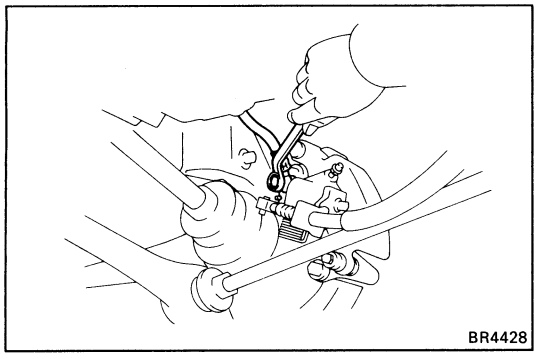
Torque: 200 kg-cm (14 ft-lb, 20 N·m)

10. INSTALL REAR WHEEL

11. CHECK THAT FLUID LEVEL IS MAX LINE

12. ADJUST PAD CLEARANCE

Depress the brake pedal for several times.


BR4428

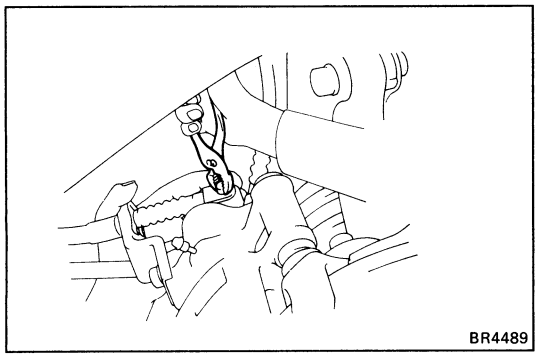
REMOVAL OF CYLINDER

(See page BR-33)

1. DISCONNECT FLXIBLE HOSE

(a) Remove the union bolt and two gaskets, and disconnect the flexible hose.

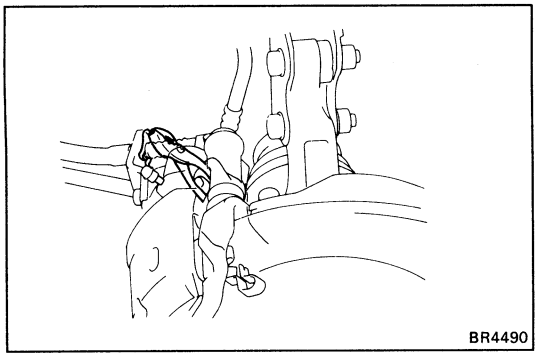
(b) Use a container to catch the brake fluid.


BR4489

2. DISCONNECT PARKING BRAKE CABLE

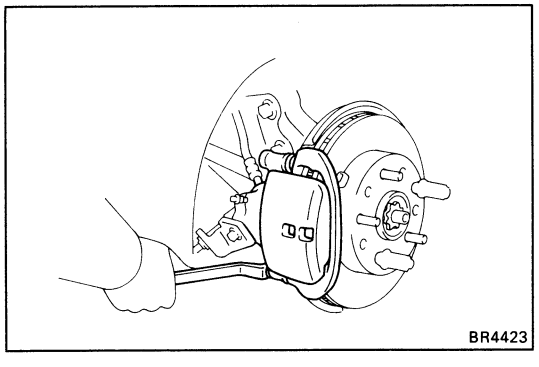
(a) Remove the pin clip.

(b) Pull out the hole pin while pushing the parking brake crank.


BR4490

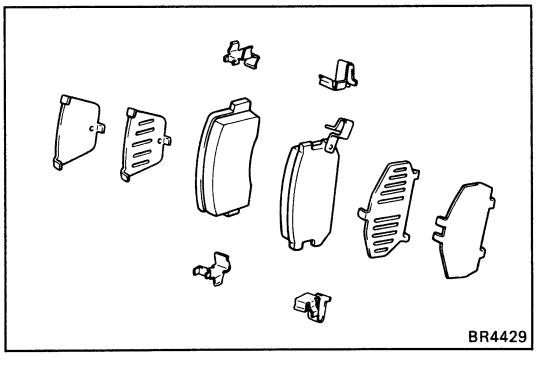
(c) Remove the clip.

(d) Remove the parking brake cable from the cable support bracket.


BR4423

3. REMOVE CYLINDER

Remove the installation bolt, and remove the brake cylinder.


BR4429

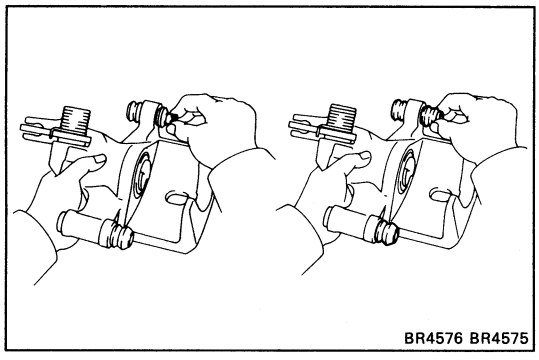
4. REMOVE FOLLOWING PARTS:

(a) Two brake pads

(b) Four anti-squeal shims

(c) Two anti-rattle springs

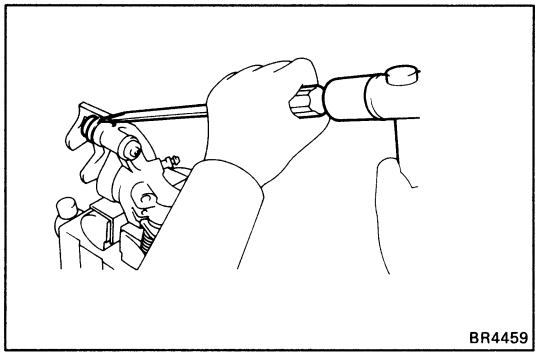
(d) Two pad guide plats


BR4576 BR4575

DISASSEMBLY OF CYLINDER

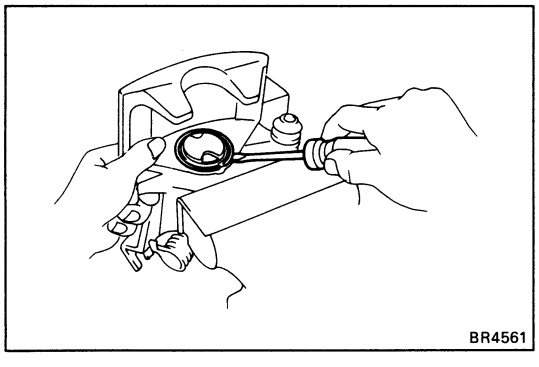
(See page BR-33)

1. **REMOVE DUST BOOT AND SLIDING BUSHING**


BR4459

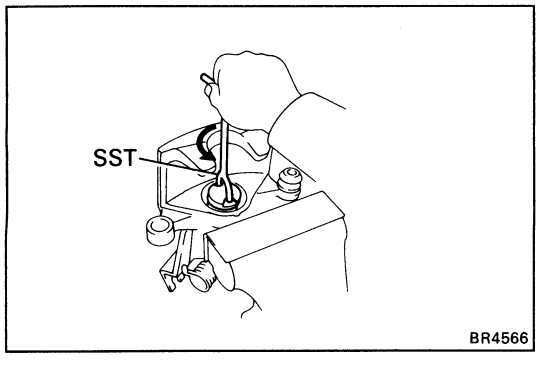
2. **REMOVE MAIN PIN BOOT**

Using a chisel and hammer, tap out the dust boots.


BR4561

3. **REMOVE CYLINDER BOOT SET RING AND CYLINDER BOOT**

Using a screwdriver, remove the cylinder boot set ring and cylinder boot.

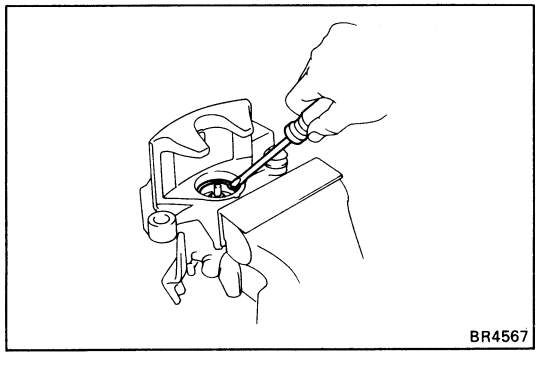


BR4566

4. **REMOVE PISTON FROM CYLINDER**

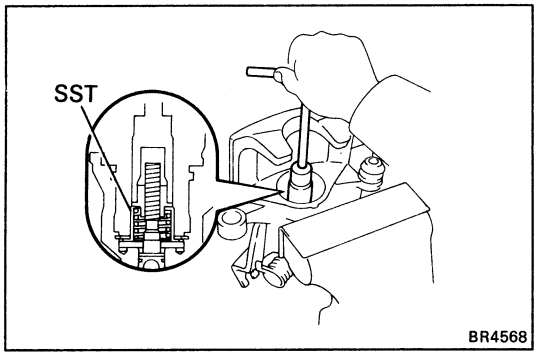
Using SST, turn the piston counterclockwise and remove it.

SST 09719-14020 (09719-00020)


BR4567

5. **REMOVE PISTON SEAL FROM CYLINDER**

Using a screwdriver, remove the piston seal.



6. REMOVE ADJUSTING BOLT

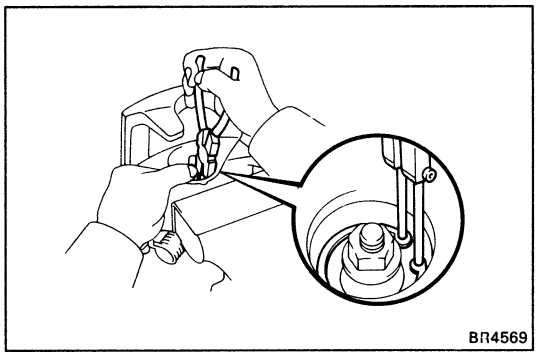
(a) Set SST onto the adjusting bolt, and lightly tighten it with a 14 mm socket.

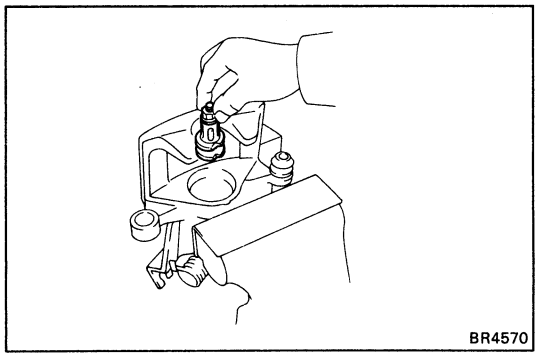
SST 09756-00010

CAUTION:

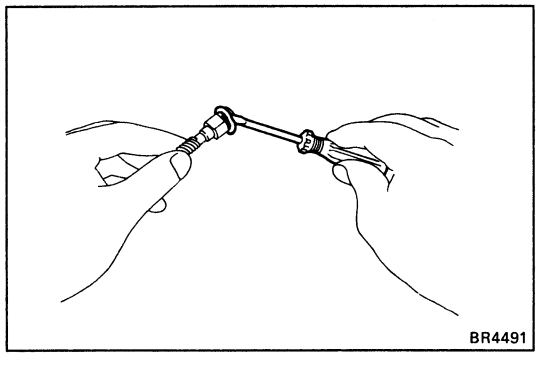
- **To insure safety, always use SST as there is a possibility of the spring flying out, causing injury or damaging to the interior surface of the cylinder.**
- **Be careful not to tighten the SST too tightly as this may damage the spring retainer.**

(b) Using snap ring pliers, remove the snap ring from the cylinder.





(c) Remove the parking brake strut, spring retainer, spring, spring plate and stopper together with the adjusting bolt from the cylinder.



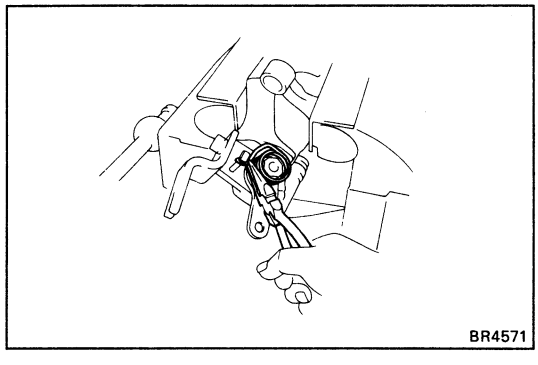
7. DISASSEMBLE ADJUSTING BOLT

(a) Remove SST.

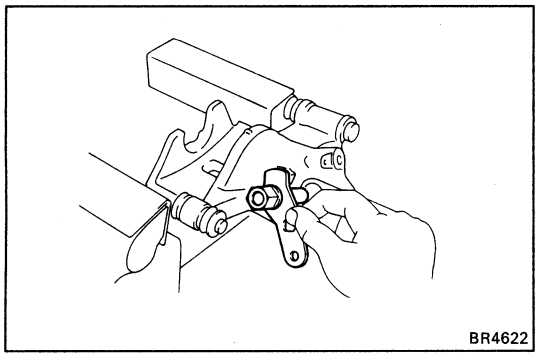
SST 09756-00010

(b) Remove the spring retainer, spring, spring plate and stopper from the adjusting bolt.

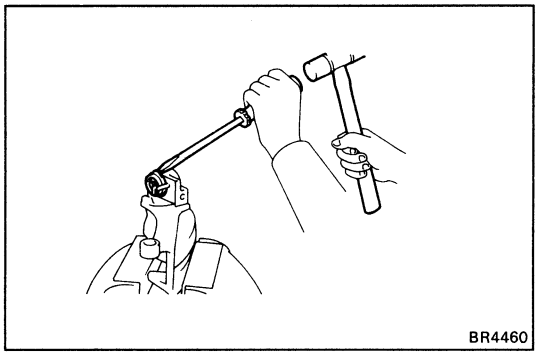
(c) Remove the O-ring from the adjusting bolt.



8. REMOVE TORSION SPRING FROM PARKING BRAKE CRANK


BR4622

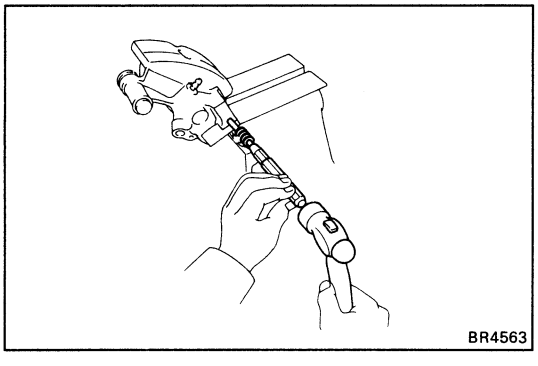
9. REMOVE PARKING BRAKE CRANK FROM CYLINDER


BR4460

10. REMOVE PARKING BRAKE CRANK BOOT

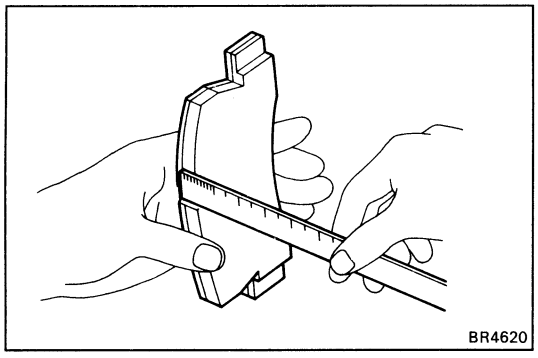
Using a chisel and hammer, tap out the parking brake crank boot.

11. REMOVE CABLE SUPPORT BRACKET


BR4563

12. REMOVE STOPPER PIN

Using a pin punch, tap out the pin.

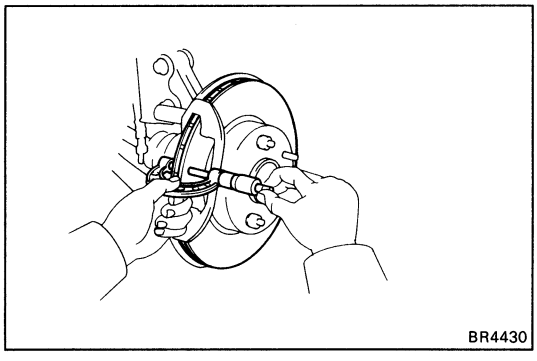

BR4620

INSPECTION OF REAR BRAKE COMPONENTS

1. MEASURE PAD LINING THICKNESS

Standard thickness: 10.0 mm (0.394 in.)
Minimum thickness: 1.0 mm (0.039 in.)

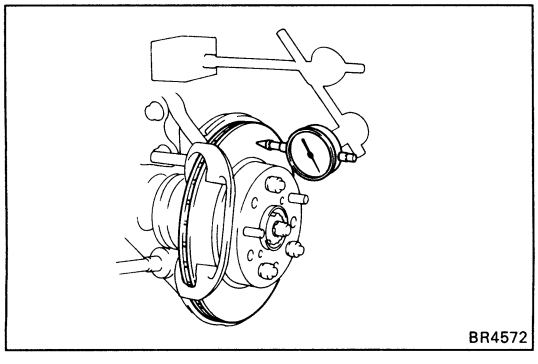
Replace the pad if the thickness is less than the minimum or if it shows sign of uneven wear.


BR4430

2. MEASURE ROTOR DISC THICKNESS

Standard thickness: 16.0 mm (0.630 in.)
Minimum thickness: 15.0 mm (0.591 in.)

If the disc is scored or worn, or if thickness is less than minimum, repair or replace the disc.


BR4572

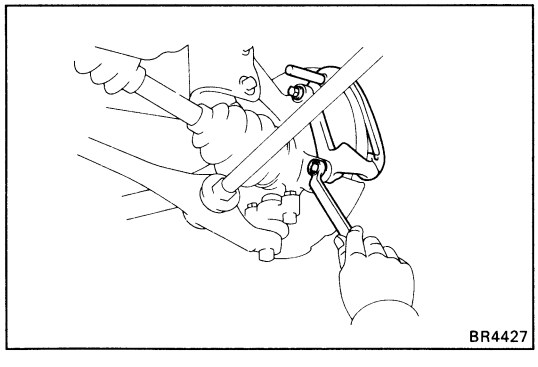
3. MEASURE ROTOR DISC RUNOUT

HINT: Before measuring the runout, confirm that the rear hub bearing play is within specification.

Measure the rotor disc runout at 10 mm (0.39 in.) from the outer edge of the rotor disc.

Maximum disc runout: 0.10 mm (0.0039 in.)

If the runout is greater than the maximum, replace the disc.


BR4427

4. IF NECESSARY, REPLACE ROTOR DISC

(a) Remove the disc brake cylinder mounting from the dust cover.

(b) Remove the hub nuts and rotor disc.

(c) Install a new rotor disc and temporarily fasten the disc with hub nuts.

(d) Install the torque plate to the rear axle carrier.

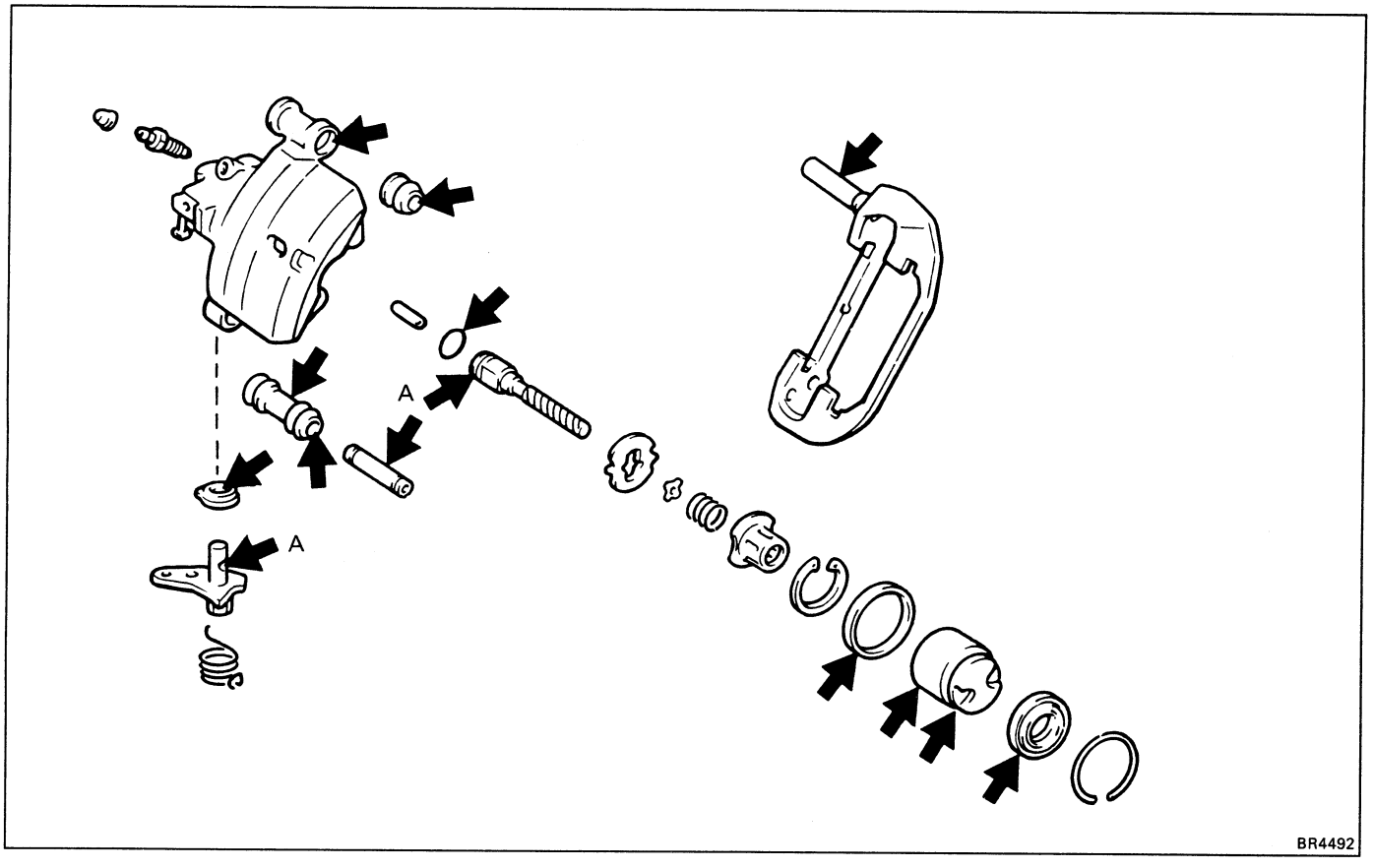
Torque: 600 kg-cm (43 ft-lb, 59 N·m)

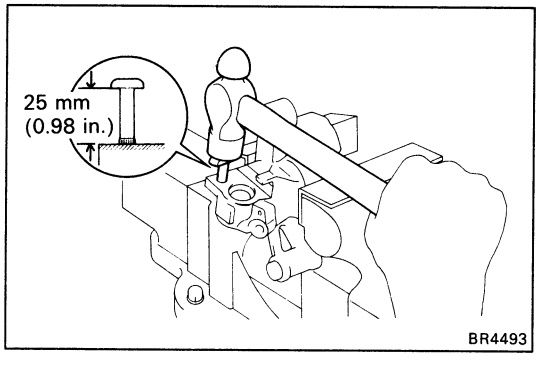
ASSEMBLY OF CYLINDER

(See page BR-33)

1. **APPLY LITHIUM SOAP BASE GLYCOL GREASE TO PARTS INDICATED BY ARROWS**

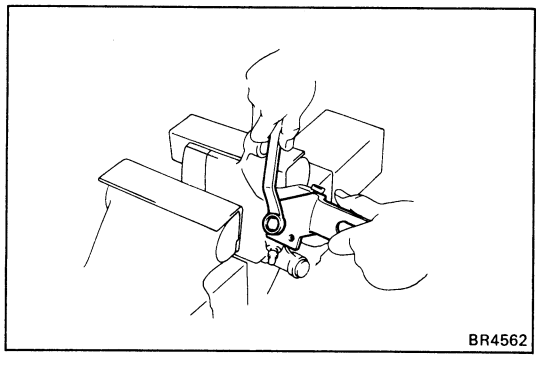
   HINT: Pack the lithium soap base glycol grease into areas marked "A".





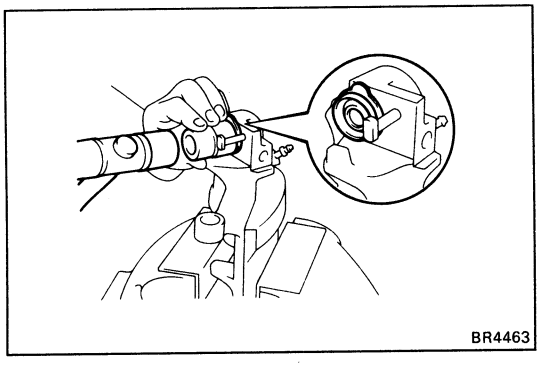
2. **INSTALL STOPPER PIN**

   Tap in the pin to the brake cylinder until the stopper pin extends 25 mm (0.98 in.).



3. **INSTALL CABLE SUPPORT BRACKET**

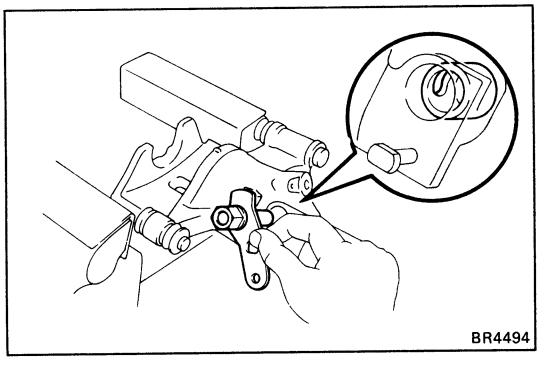
   Torque: 475 kg-cm (34 ft-lb, 47 N·m)



4. INSTALL PARKING BRAKE CRANK BOOT

(a) Using a 24 mm socket wrench and hammer, tap in new parking brake crank boot shown in the figure.

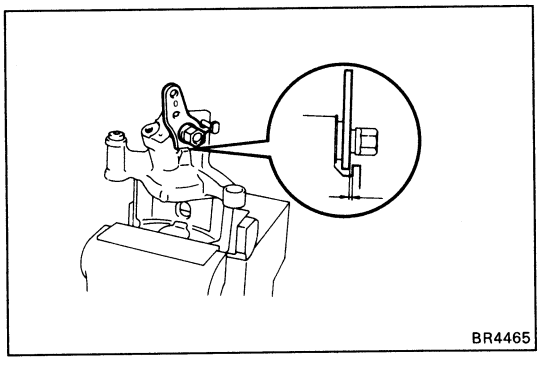
(b) Confirm that the metal plate portion of the parking brake crank boot fits snugly in the cylinder.



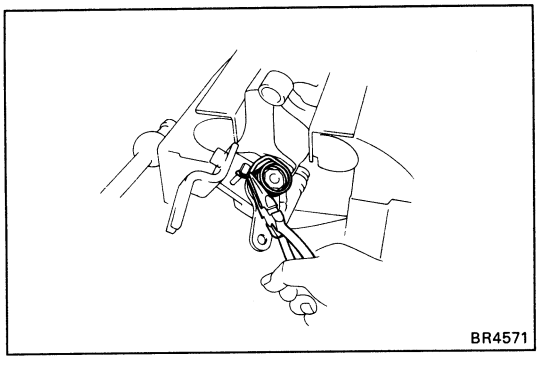
5. INSTALL PARKING BRAKE CRANK

(a) Check that the needle roller bearing is not covering the cylinder hole.

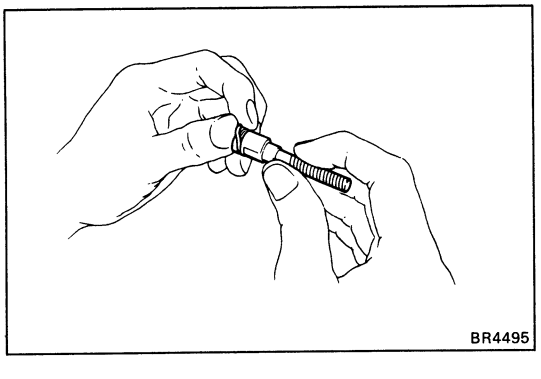
(b) Install the parking brake crank in cylinder.



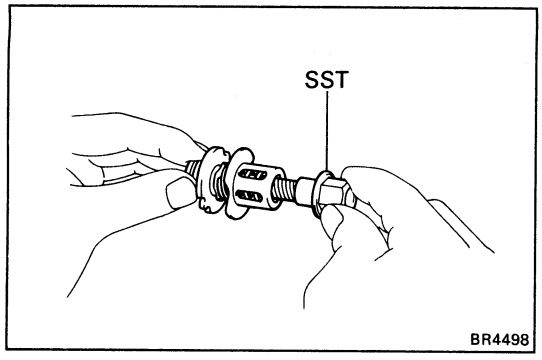
(c) Check that there is clearance between the parking brake crank and cylinder.



7. INSTALL TORSION SPRING



8. INSTALL O-RING TO ADJUSTING BOLT



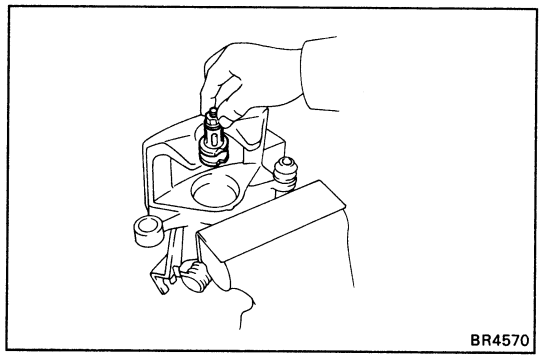
9. INSTALL ADJUSTING BOLT SUB ASSEMBLY

(a) Assemble the parking brake stopper, spring plate, spring, spring retainer and parking brake strut to the adjusting bolt, and using SST, fully tighten them down by hand.

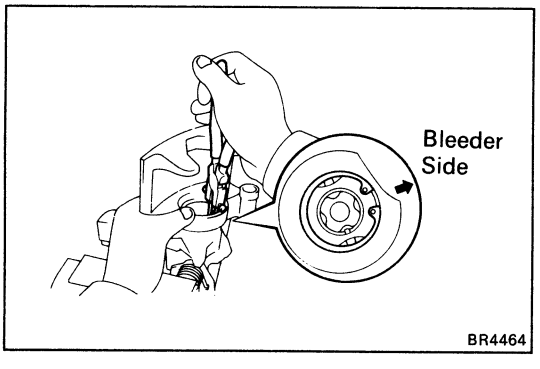
SST 09756-00010

HINT:

- Position the inscribed surface of the stopper upward.
- Align the notches of the spring retainer and stopper.



(b) Install the adjusting bolt sub-assembly into the cylinder.



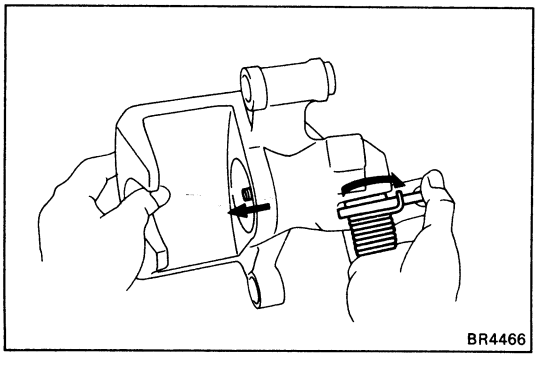
(c) Using snap ring pliers, install the snap ring.

HINT: Face the snap ring opening toward the bleeder side.

(d) Remove the SST.

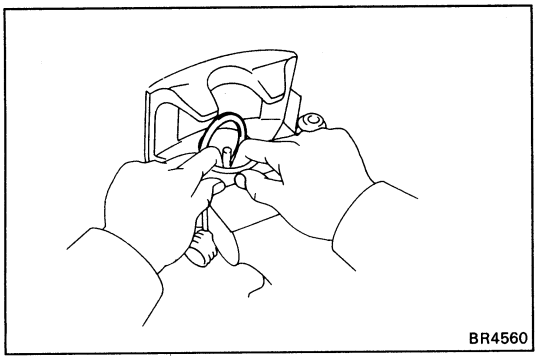
SST 09756-00010

(e) Firmly pull up the adjusting bolt by hand and insure that it does not move.

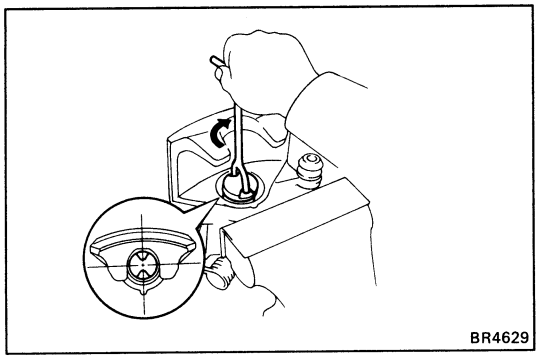


10. OPERATIONAL CHECK

Move the parking brake crank by hand and insure that the adjusting bolt moves smothly.

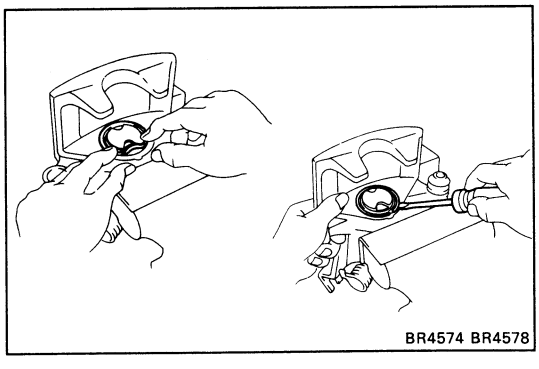

BR4560

11. INSTALL PISTON SEAL IN CYLINDER

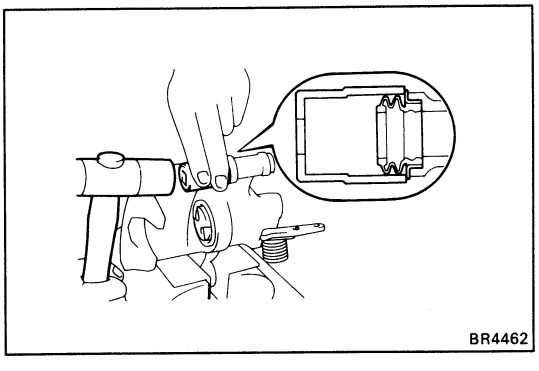

BR4629

12. INSTALL PISTON IN CYLINDER

Using SST, slowly turn the piston clockwise until the piston turns freely, then alin the cylinder protrusion and piston stopper groove.


BR4574 BR4578

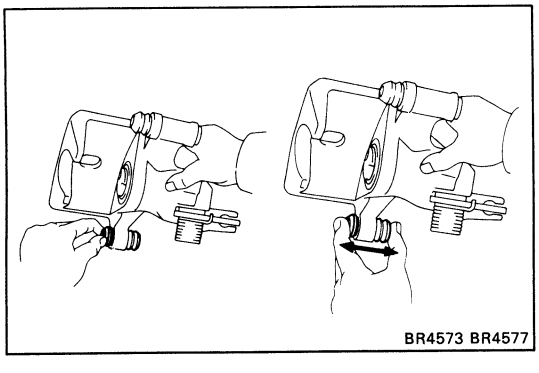
13. INSTALL CYLINDER BOOT AND SET RING IN CYLINDER


BR4462

14. INSTALL MAIN PIN BOOT

(a) Using a 19 mm socket wrench and hammer, tap in new main pin boot into the cylinder.

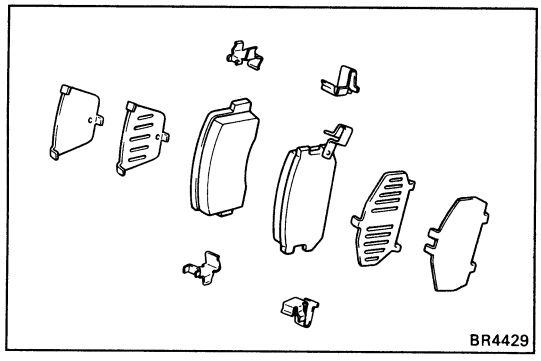
(b) Confirm that the metal plate portion of the main pin boot fits snugly in the cylinder.


BR4573 BR4577

15. INSTALL DUST BOOT AND SLIDING BUSHING

(a) Install the dust boot.

(b) Install the bushing into the boot, with the flange facing inside.



INSTALLATION OF CYLINDER

(See page BR-33)

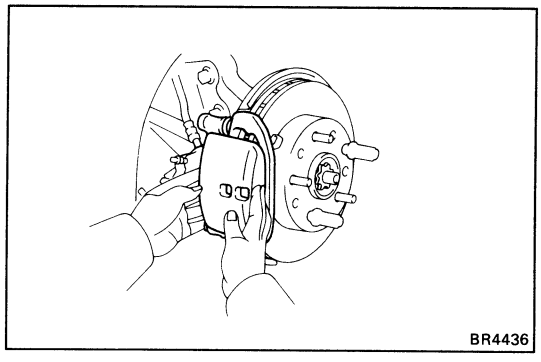
1. INSTALL FOLLOWING PARTS:

(a) Two pad guide plats

(b) Two anti-rattle springs

(c) Four anti-squeal shims

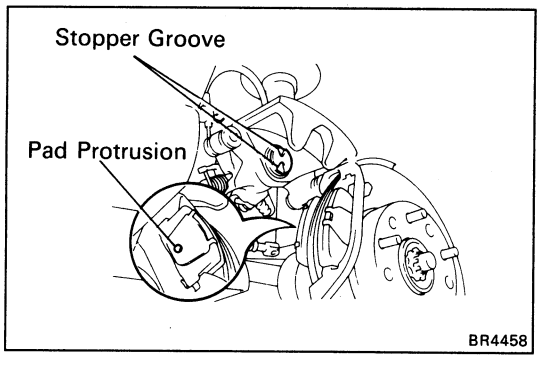
(d) Two brake pads
(See step 7 and 8 on pages BR-26 and 27)



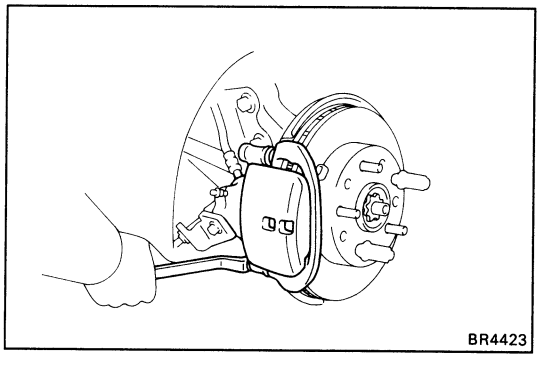
2. INSTALL CYLINDER

(a) Install the cylinder onto the main pin.

HINT: Make sure that the boot end is installed into the groove of the main pin.

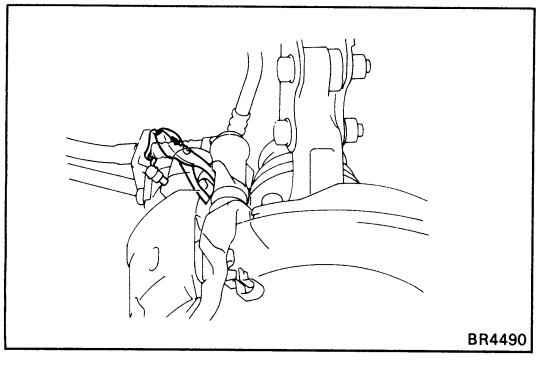


(b) Fit the pad protrusion into the piston stopper groove, and install the cylinder.



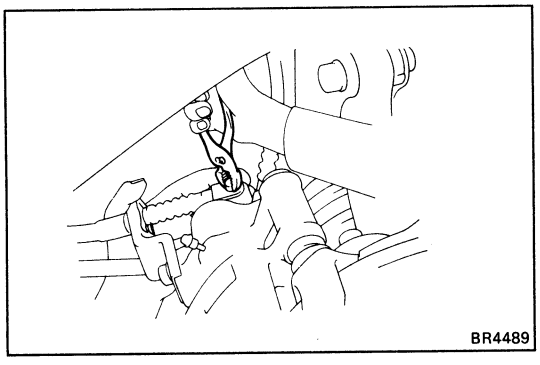
(c) Install and torque the installation bolt.

Torque: 200 kg-cm (14 ft-lb, 20 N·m)

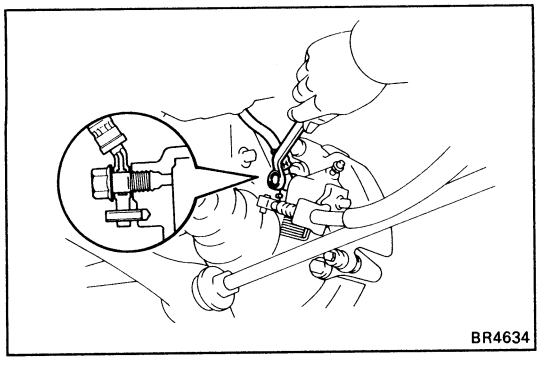


3. CONNECT PARKING BRAKE CABLE

(a) Install the parking brake cable to the cable support bracket and install the retainer.



(b) Install the hole pin while pushing the parking brake lever, and install the clip.



4. CONNECT BRAKE HOSE

Install the flexible hose on the brake cylinder with two new gaskets.

Torque: 310 kg-cm (22 ft-lb, 30 N·m)

HINT: Insert the flexible hose lock securely in the lock hole in the brake cylinder.

5. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR-6)

6. CHECK FOR FLUID LEAKAGE

7. ADJUST REAR BRAKE

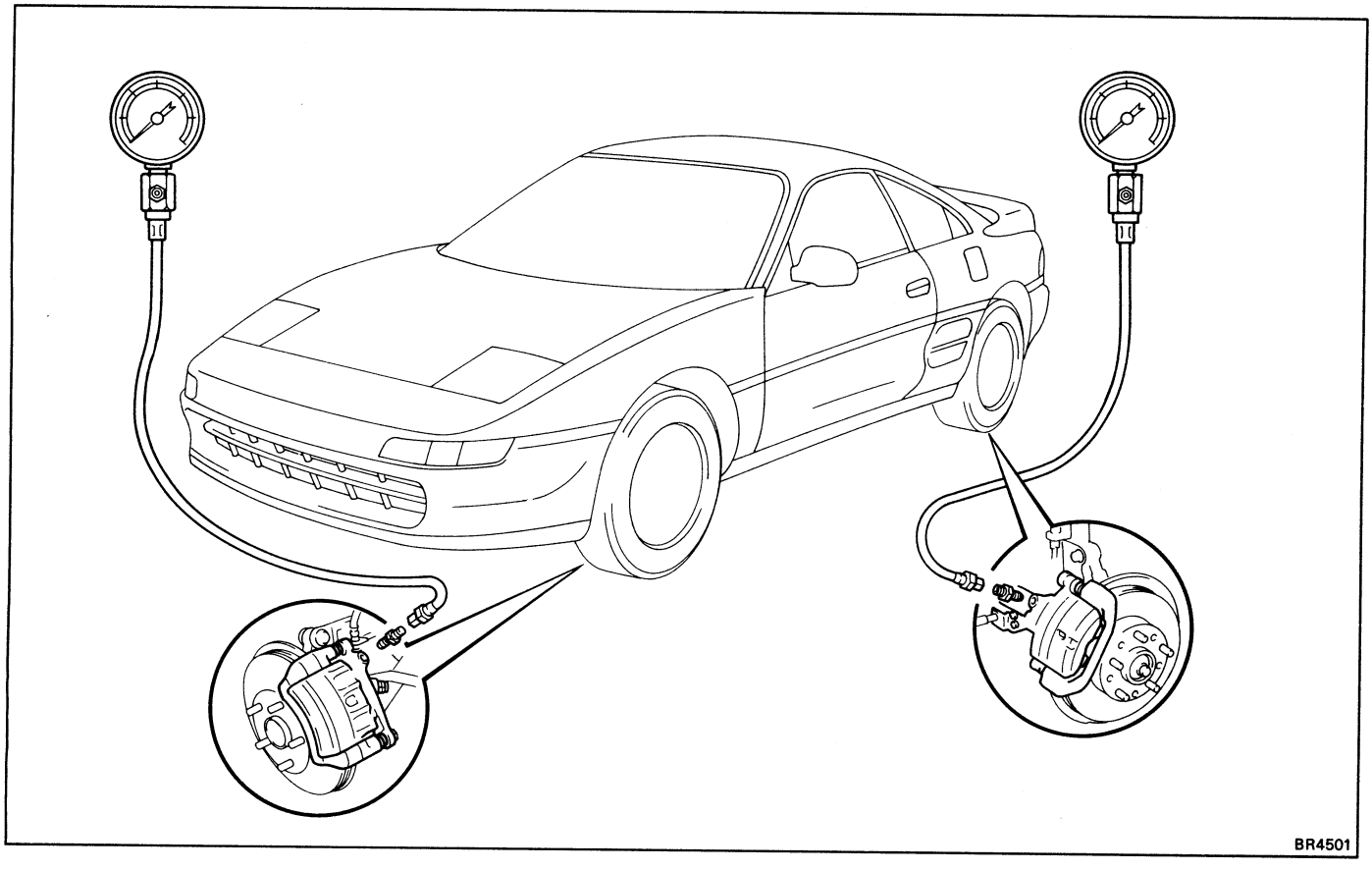
Depress the brake pedal several times and adjust the rear brake automatically.

PROPORTIONING AND BY-PASS VALVE (P & BV)

INSPECTION OF FLUID PRESSURE

1. INSTALL LSPV GAUGE (SST) AND BLEED AIR

SST 09709-29017



2. RAISE MASTER CYLINDER PRESSURE AND CHECK REAR WHEEL CYLINDER PRESSURE

Specifications

	Master cylinder pressure	Rear Wheel cylinder pressure
5S-FE	30 kg/cm² (427 psi, 2,942 kPa)	30 kg/cm² (427 psi, 2,942 kPa)
	80 kg/cm² (1,138 psi, 7,845 kPa)	60 kg/cm² (853 psi, 5,884 kPa)
3S-GTE	60 kg/cm² (853 psi, 5,884 kPa)	60 kg/cm² (853 psi, 5,884 kPa)
	100 kg/cm² (1,422 psi, 9,807 kPa)	84 kg/cm² (1,195 psi, 8,238 kPa)

If the rear wheel cylinder pressure is incorrect, replace the P & B valve assembly.

3. BLEED BRAKE SYSTEM

4. CHECK FOR FLUID LEAKAGE

ANTI-LOCK BRAKE SYSTEM (ABS)

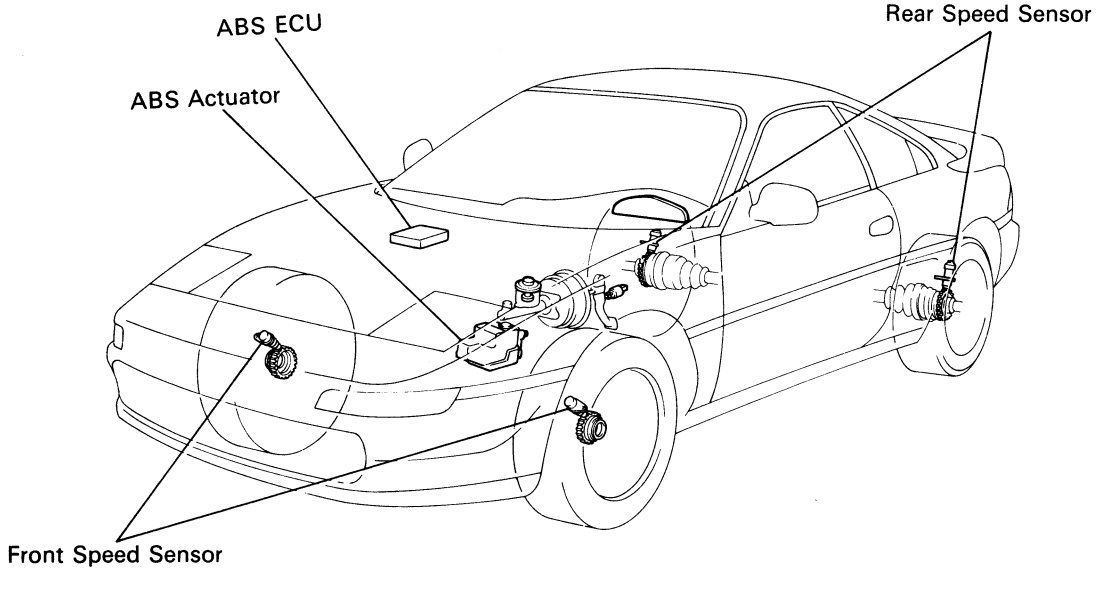
Description

- The ABS is a brake system which controls the wheel cylinder hydraulic pressure of all four wheels during sudden braking and braking on slippery road surfaces, preventing the wheels from locking. This ABS provides the following benefits:
  (1) Enables steering round and obstacle with a greater degree of certainly even when panic braking.
  (2) Enables stopping in a panic brake while keeping effect upon stability and steerability to minimum, even on curves.
- The function of the ABS is to help maintain directional stability and vehicle steerability on most road conditions. However, the system cannot prevent the vehicle from skidding if the cornering speed limit is exceeded.
- In case a malfunction occurs, a diagnosis function and fail-safe system have been adopted for the ABS to increase serviceability.

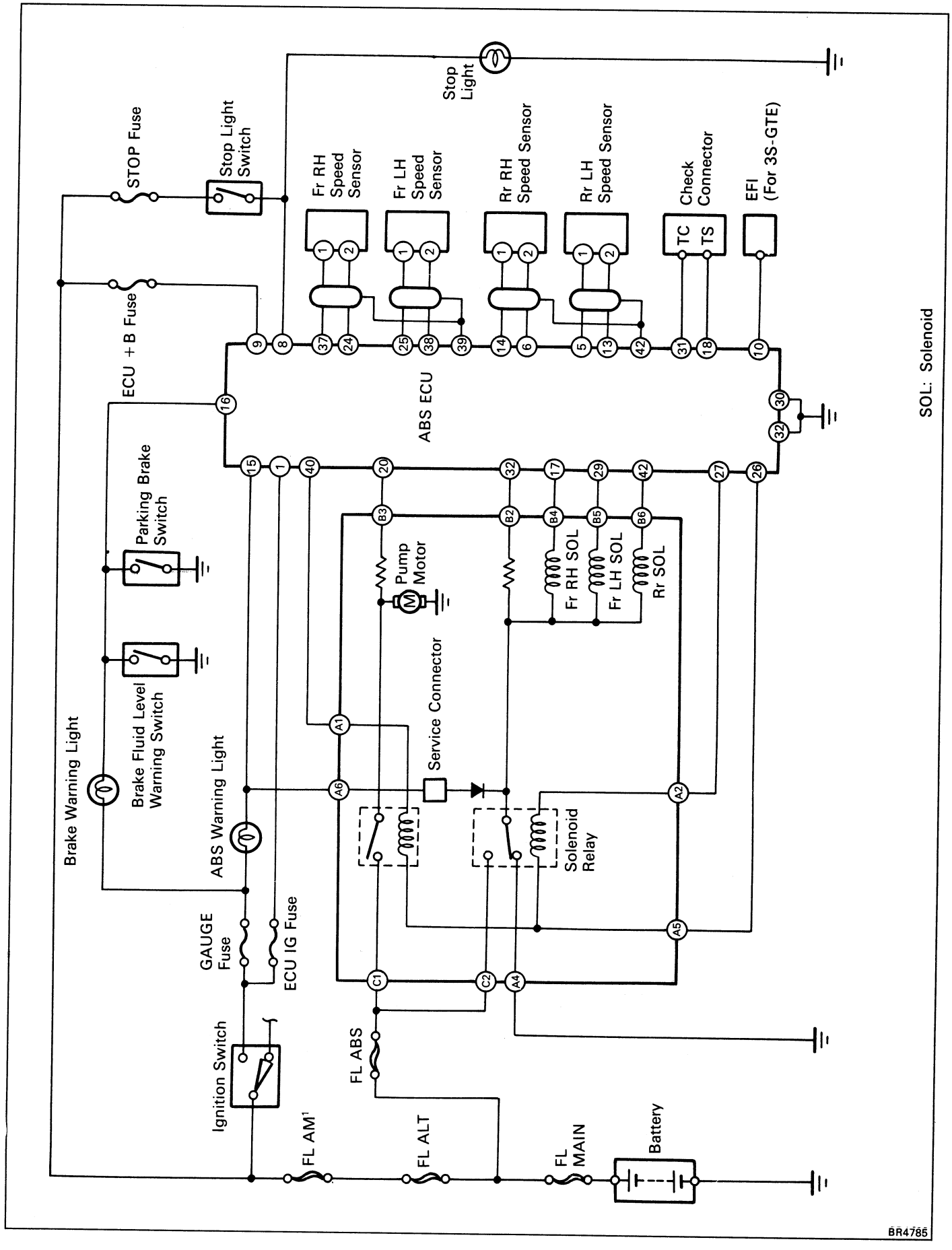
FUNCTION OF COMPONENTS

Component	Function
Front Speed Sensor	Detects the wheel speed of each of the left and right front wheels.
Rear Speed Sensor	Detects the wheel speed of each of the left and right rear wheels.
ABS Warning Light	Lights up to alert the driver when trouble has occured in the Antilock Brake System.
Actuator	Controls the brake fluid pressure to each disc brake cylinder through signals from the computer.
ABS ECU	From the wheel speed signals from each sensor, it calculates acceleration, deceleration and slip values and sends signals to the actuator to control brake fluid pressure.

LOCATION OF SYSTEM PARTS



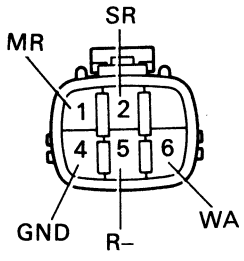
WIRING DIAGRAM



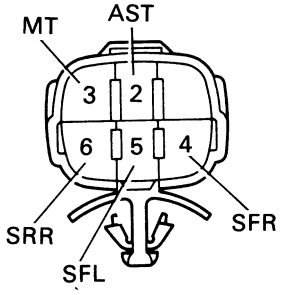
CONNECTORS

ABS Actuator

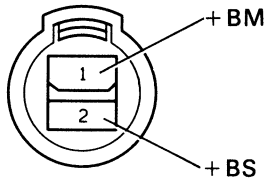
CONNECTOR A



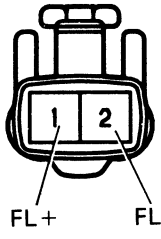
CONNECTOR B



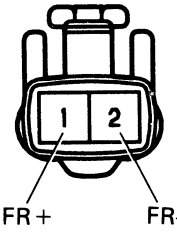
CONNECTOR C



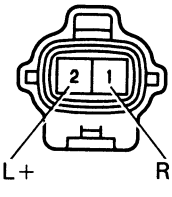
Front Speed Sensor (LH)



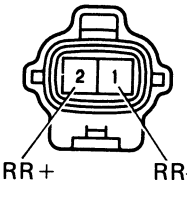
Front Speed Sensor (RH)



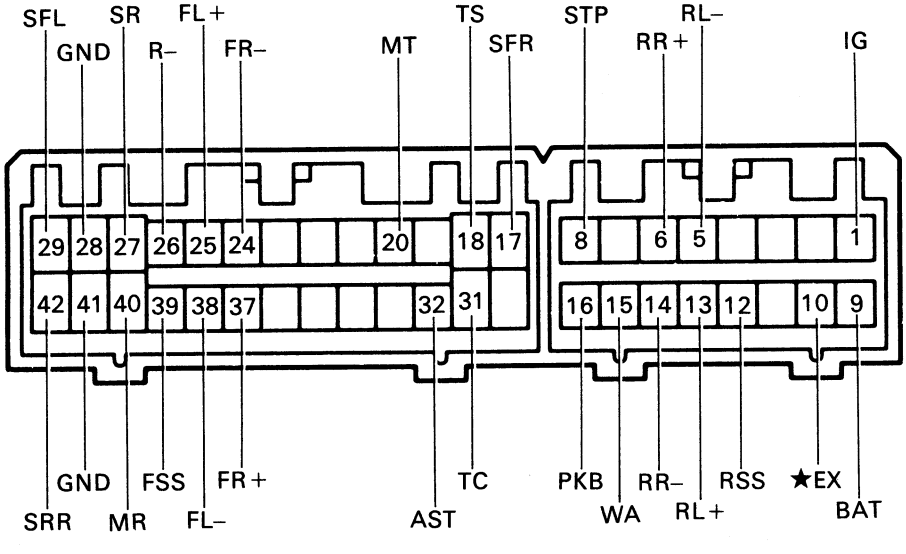
Rear Speed Sensor (LH)



Rear Speed Sensor (RH)

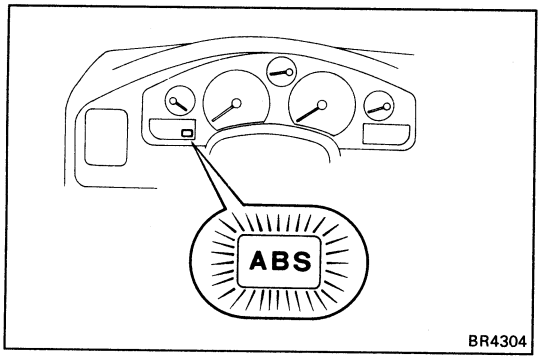


ABS ECU



★ For 3S-GTE

BR4625 BR4626 ID-2-2
Ie-2-1-T Ie-2-1-T
Ie-2-2-T Ie-2-2-T
BR4078



Diagnosis System

DESCRIPTION

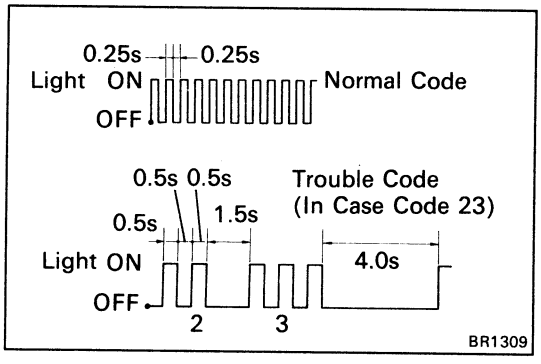
If a malfunction occurs, the system will identify the problem and the ECU will stores the codes for the trouble items.

At the same time, the system informs the driver of a malfunction via the "ABS" warning light in the combination meter.

To identify the trouble by the number of blinks (diagnostic code) of the warning light turn on the ignition switch, disconnect the service connector, and use SST to connect Tc and E1 of the check connector.

In the event of two codes, that having the smallest number (code) will be identified first.

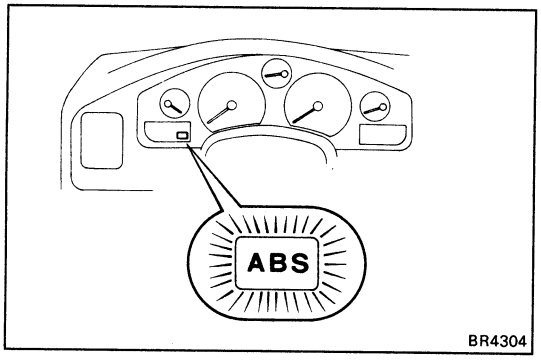
HINT: The warning light does not show the diagnostic codes while the vehicle is running.



INSPECTION OF DIAGNOSIS SYSTEM

1. INSPECT BATTERY VOLTAGE

Inspect that the battery voltage is about 12 V.

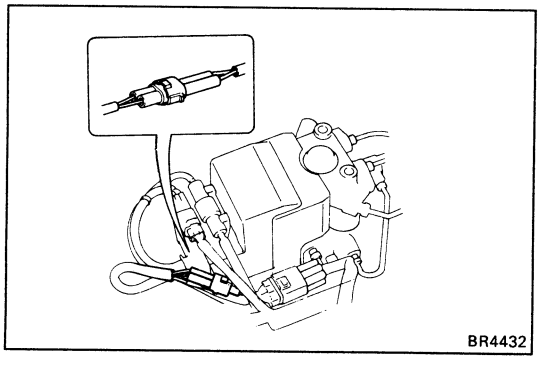


2. CHECK THAT WARNING LIGHT TURNS ON

(a) Turn the ignition switch on.

(b) Check that the "ABS" warning light turns on for 3 seconds.

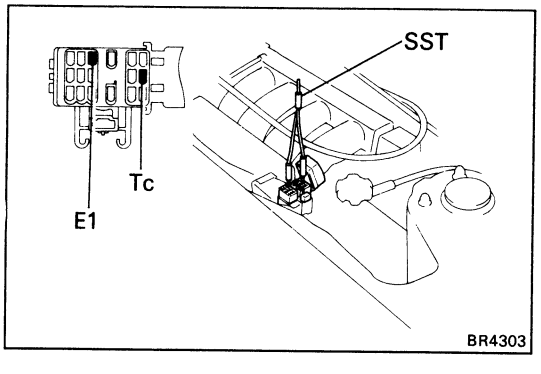
If not, inspect and repair or replace the fuse, bulb and wire harness.



3. READ DIAGNOSTIC CODE

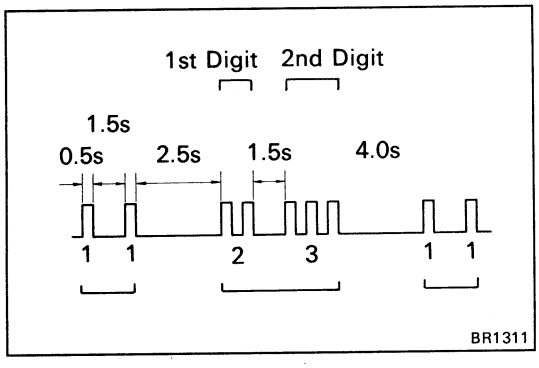
(a) Turn the ignition switch on.

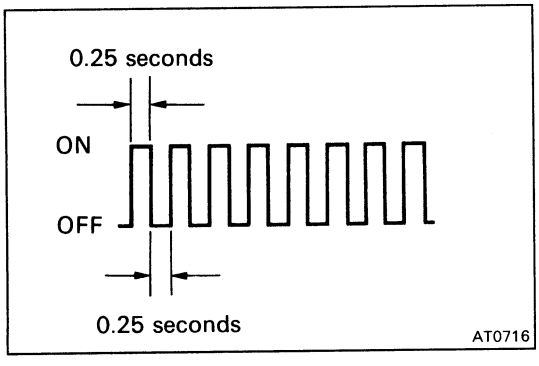
(b) Disconnect the service connector.

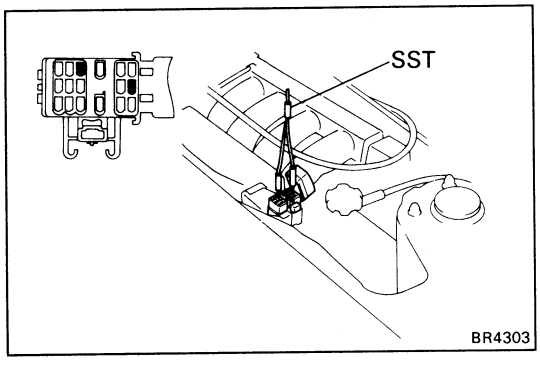


(c) Using SST, connect terminals Tc and E1 of the check connector.

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(d) In event of a malfunction, 4 seconds later the warning light will begin to blink. Read the number of blinks.
(See DIAGNOSTIC CODE on page BR-53)

HINT: The first number of blinks will equal the first digit of a two digit diagnostic code. After a 1.5 second pause, the 2nd number of blinks will equal the 2nd number of a two digit code. If there are two or more codes, there will be a 2.5 second pause between each, and indication will begin after 4.0 second pause from the smaller value and continue in order to larger.

(e) If the system is operating normally (no malfunction), the warning light will blink once every 0.5 seconds.

(f) Repair the system.

(g) After the malfunctioning components has been repaired, clear the diagnostic codes stored in the ECU.
(See page BR-54)

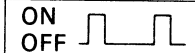
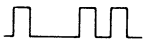
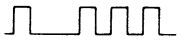
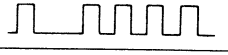
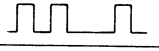
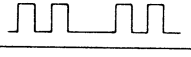
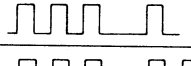
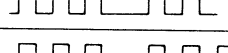
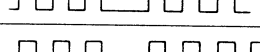
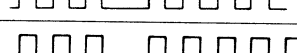
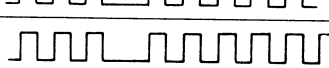
HINT: If you disconnect the battery cable while repairing, all diagnostic codes in the ECU will erased.

(h) Remove the SST from terminals Tc and E1 of the check connector.

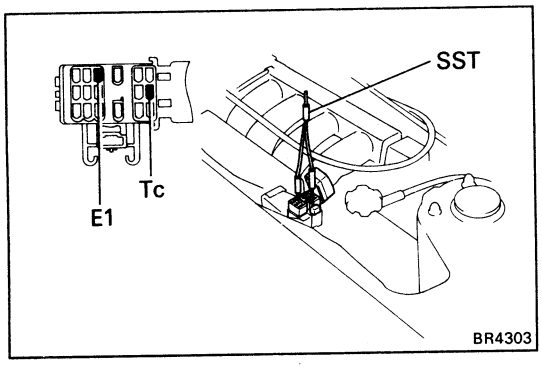
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(i) Connect the service connector.

(j) Turn the ignition switch on, and check that the "ABS" warning light goes off after the warning light goes on for 3 seconds.

Code No.	Light Pattern	Diagnosis	Trouble Part
11		Open circuit in solenoid relay circuit	• Actuator inside wire harness • Solenoid relay • Wire harness and connector of solenoid relay circuit
12		Short circuit in solenoid relay circuit	
13		Open circuit in pump motor relay circuit	• Actuator inside wire harness • Pump motor relay • Wire harness and connector of pump motor relay circuit
14		Short circuit in pump motor relay circuit	
21		Open or short circuit in 3 position solenoid of front right wheel	• Actuator solenoid • Wire harness and connector of actuator solenoid circuit
22		Open or short circuit in 3 position solenoid of front left wheel	
23		Open or short circuit in 3 position solenoid of rear wheels	
31		Front right wheel speed sensor signal malfunction	• Speed sensor • Sensor rotor • Wire harness and connector of speed sensor
32		Front left wheel speed sensor signal malfunction	
33		Rear right wheel speed sensor signal malfunction	
34		Rear left wheel speed sensor signal malfunction	
35		Open circuit in front left or rear right wheel speed sensor	
36		Open circuit in front right or rear left wheel speed sensor	
41		Abnormal battery voltage (9.5 V less than or 17 V more than)	• Battery • Voltage regulator
51		Pump motor of actuator locked or open circuit in pump motor circuit in actuator	• Pump motor, relay and battery • Wire harness, connector and ground bolt or actuator pump motor circuit
Always on		Malfunction in computer	• ECU

BR4418



CLEARING OF DIAGNOSTIC CODES

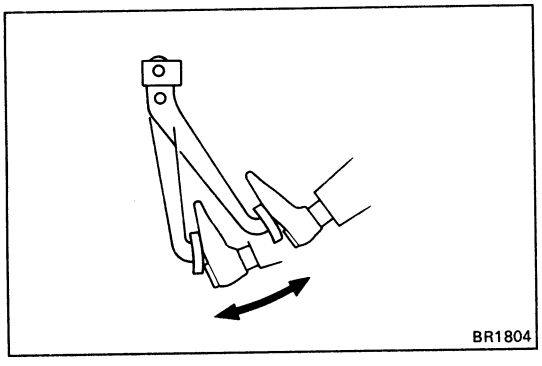
CLEAR DIAGNOSTIC CODES

(a) Turn the ignition switch on.

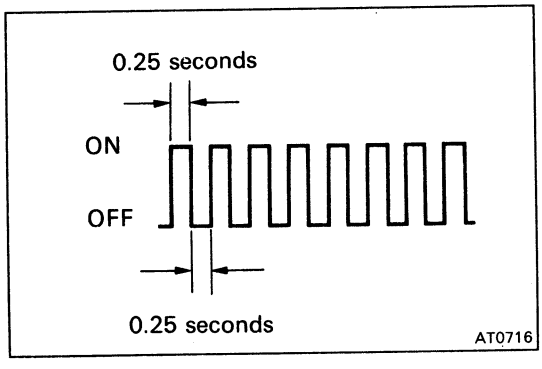
(b) Using SST, connect terminals Tc and E1 of the check connector.

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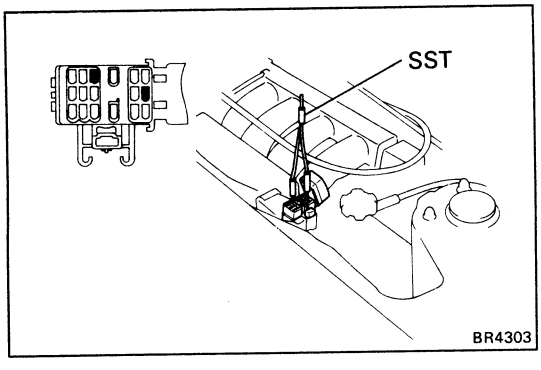
HINT: Keep the vehicle stopped vehicle speed 0 km/h (0 mph).



(c) Clear the diagnostic codes stored in ECU by depressing the brake pedal 8 or more times within 3 seconds.

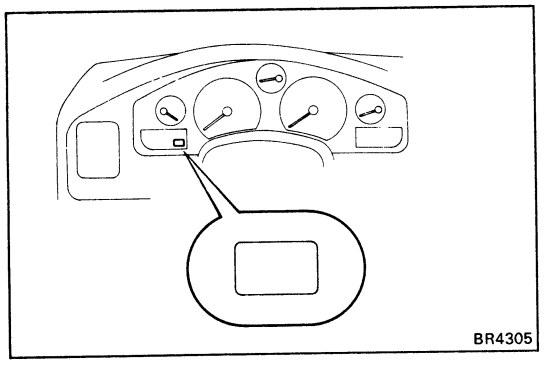


(d) Check that the warning light shows the normal code.



(e) Remove the SST from terminals Tc and E1 of the check connector.

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(f) Check that the warning light goes off.

Troubleshooting

Problem		No.
"ABS" warning light	Always comes on after ignition switch is turned on.	1
	Does not come on for 3 seconds after ignition switch on.	2
	Comes on and off.	3
	Comes on while running.	1
Brake working	Brakes pull.	4
	Braking inefficient.	4
	ABS operates at ordinary braking.	4
	ABS operates just before stopping at ordinary braking.	4
	Brake pedal pulsates abnormally while ABS is operating.	4
	Skidding noise occurs while ABS working. (ABS works inefficiently)	5

1	"ABS" warning light comes on.

Disconnect service connector and connect terminals Tc and E1 of check connector. (See page BR-51)

↓

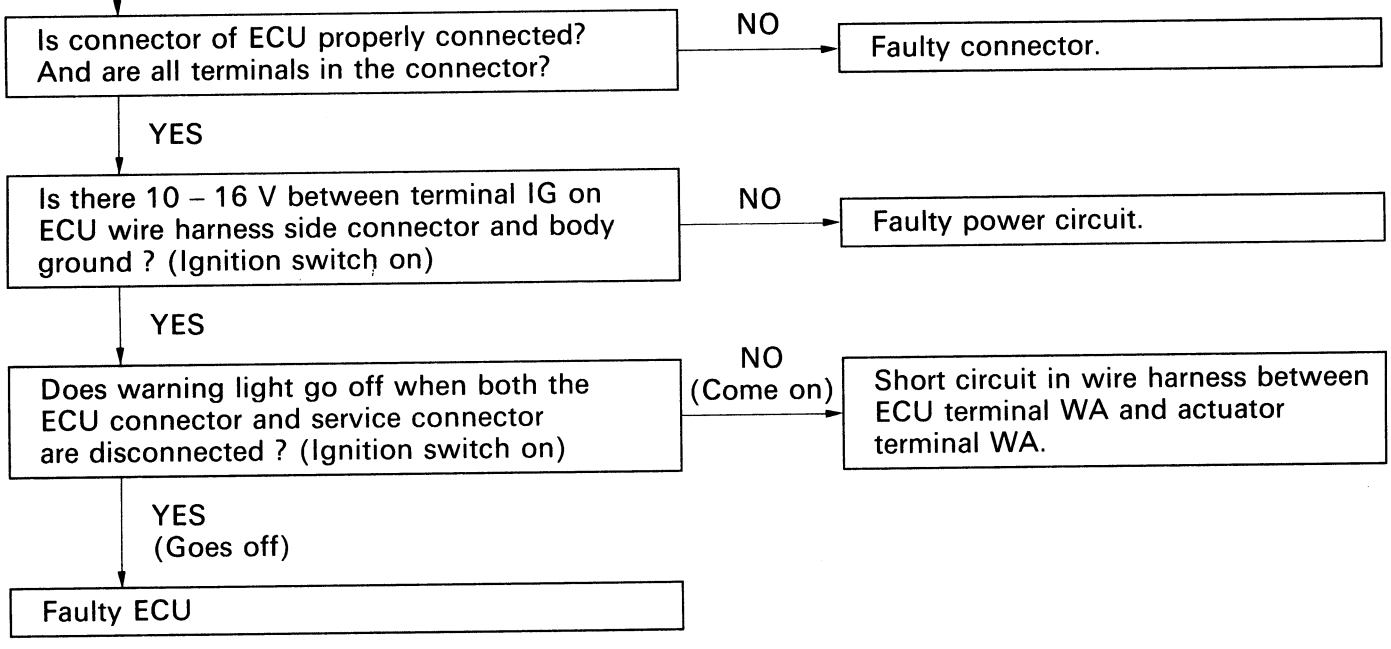
Does warning light always come on or show the normal code? (Ignition switch on)

NO → See diagnostic code. (See page BR-53)

↓ YES

Continued on page BR-56

Continued from page BR-55



2	"ABS" warning light does not come on for 3 seconds after ignition switch on.

Disconnect service connector. and ground the terminal WA of the female side connector. (Ignition switch on)

↓

Does warning light come on? — NO → Bulb burned out or open circuit in wire harness between warning light and actuator terminal WA.

↓ YES

Disconnect connectors from ECU and actuator, and ground terminal WA of ECU wire harness side connector. (Ignition switch on)

↓

Does warning light come on? — NO → Open circuit in wire harness between computer terminal WA and warning light.

↓ YES

With ignition switch off, disconnect actuator connectors, and check continuity between terminal WA and AST on actuator side.

↓

Reverse tester leads and check again. Is there one way continuity between terminals? — NO → Short circuit in actuator inside diode.

↓ YES

Faulty ECU.

HINT: If the diode is short-circuited, a malfunction ECU terminal WA will occur. When inspecting the terminal, connect the ECU connecter and disconnect actuator connectors and service connector. Then turn the ignition switch on, and check that the warning light goes on. If it does, the ECU terminal is OK.

3	"ABS" warning light comes on and off.

- Check for short circuit in wire harness between terminal Tc and E1 or Ts and E_1 of check connector.

4	• Brakes pull. • Braking inefficient. • ABS operates at ordinary braking. • ABS operates just before stopping at ordinary braking. • Brake pedal pulsates abnormally while ABS working.

Disconnect service connector and connect terminals Tc and E1 of check connector. (See page BR-51)

↓

Does warning light show the diagnostic normal code ? (Ignition on) — NO → See diagnostic code. (See page BR-53)

↓ YES

Try speed sensor diagnosis system. Is sensor signal level OK? (See page BR-61) — NO → Inspect speed sensor, and replace if necessary.

↓ YES

Try speed sensor diagnosis system. Is sensor signal change OK? (See page BR-61) — NO → Inspect sensor rotor, and replace if necessary.

↓ YES

Are each speed sensor installed in place? And are each installation bolts tightened securely? — NO → Speed sensor installation faulty.

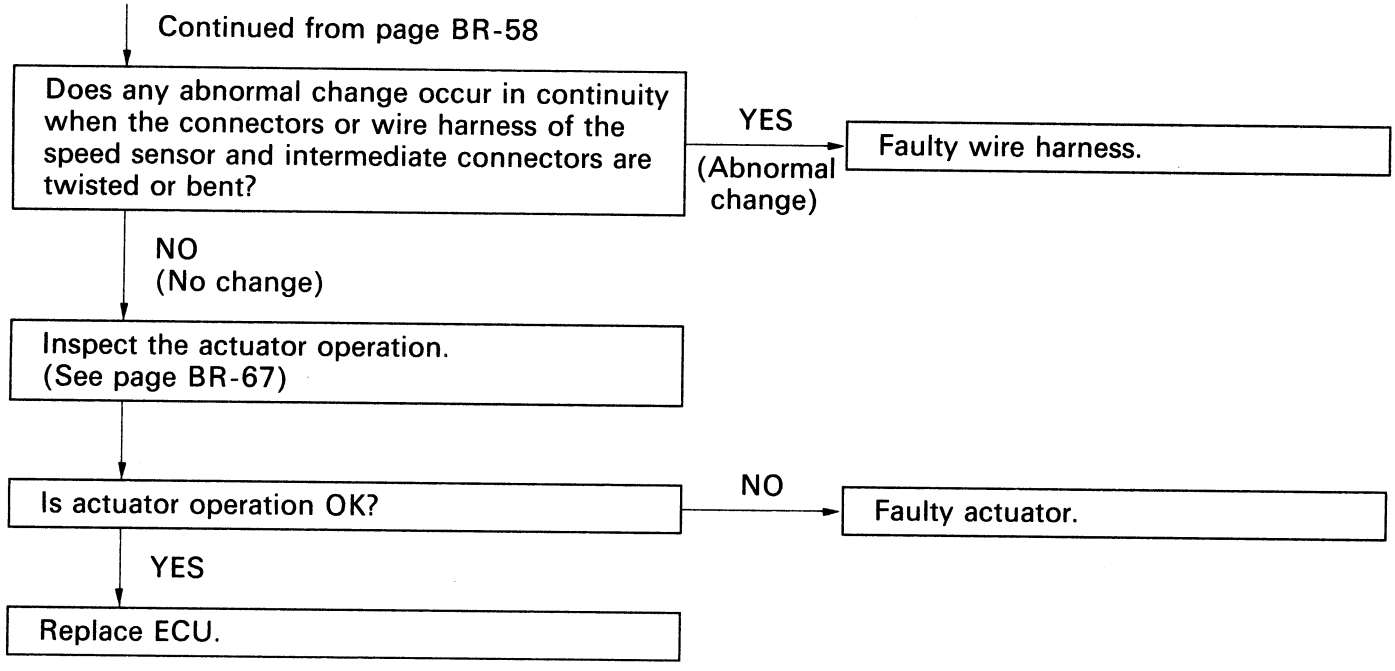
↓ YES

Is there foreign material or ferric chips on the sensor tip? — YES → Clean ships from the speed sensor.

↓ NO

Disconnect connector from ECU, inspect continuity between each speed sensor terminals on wire harness side. (See page BR-67)

↓ Continued on page BR-59


Continued from page BR-58
Does any abnormal change occur in continuity when the connectors or wire harness of the speed sensor and intermediate connectors are twisted or bent?
YES
(Abnormal change)
Faulty wire harness.
NO
(No change)
Inspect the actuator operation.
(See page BR-67)
Is actuator operation OK?
NO
Faulty actuator.
YES
Replace ECU.

5	Antilock brake system works inefficiently.

Disconnect service connector and connect terminals Tc and E1 of check connector. (See page BR-51)

↓

Does warning light show the diagnostic normal code? (Ignition switch on)

NO → See diagnostic code. (See page BR-53)

↓ YES

Is there battery voltage between ECU terminal STP and body ground when depressing brake pedal?

NO → Open circuit in stop light switch and/or wire harness.

↓ YES

Inspect the actuator operation. (See page BR-67)

Speed Sensor Diagnosis System

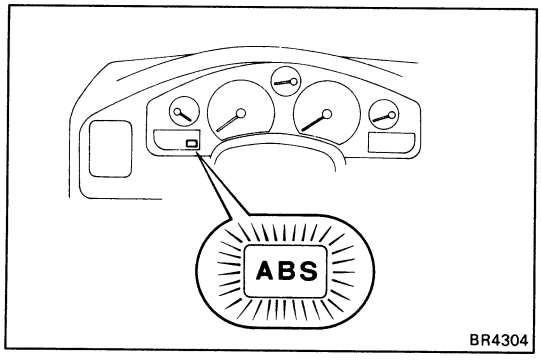
PRECAUTION

While checking the speed sensor diagnosis system, ABS does not work and brake system works as normal brake system.

INSPECTION OF DIAGNOSIS SYSTEM

1. INSPECT BATTERY VOLTAGE

Inspect that the battery voltage is about 12 V.



2. CHECK THAT WARNING LIGHT TURNS ON

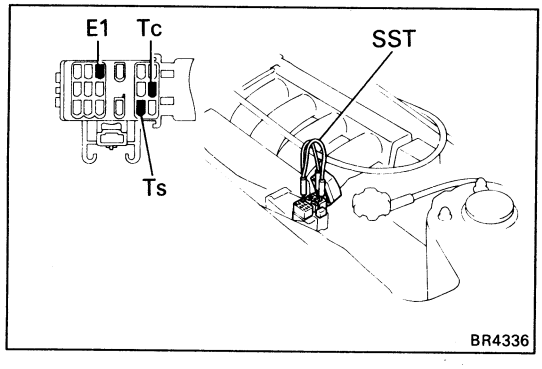
(a) Turn the ignition switch on.

(b) Check that the "ABS" warning light turns on for 3 seconds.

If not, inspect and repair or replace the fuse, bulb and wire harness.

(c) Check that the "ABS" warning light turns off.

(d) Turn the ignition switch off.



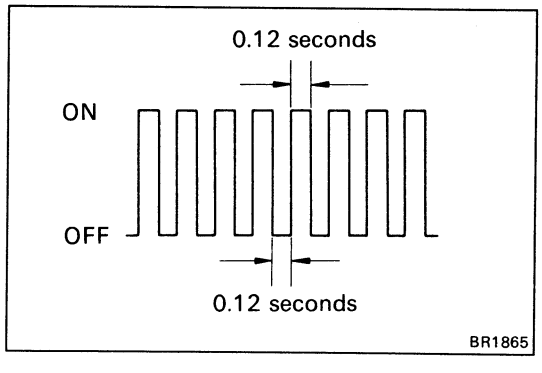
3. PERFORM FOLLOWING STEPS

(a) Using SST, connect terminals E1 and Tc, Ts of the check connector.

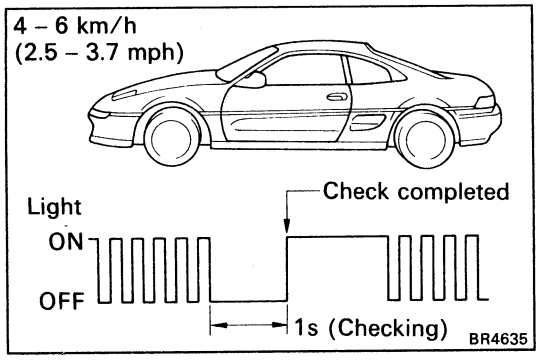
SST 09843-18020

(b) Pull the parking brake lever up, and start the engine.

HINT: Do not depress the brake pedal.



(c) Check that the warning light blinks about 4 times every 1 second as shown.



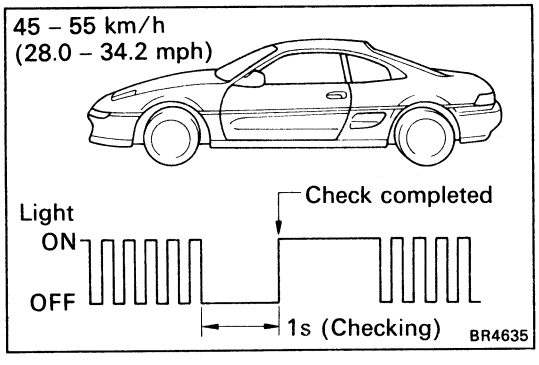
4. INSPECT SENSOR SIGNAL LEVEL

Drive the vehicle straight ahead at about 4 – 6 km/h (2.5 – 3.7 mph), and check that the warning light turns on after a 1 second pause.

If the warning light turns on without blinking when the vehicle speed is not within the specified speed range above, stop the vehicle and read the diagnostic code, and repair the malfunctioning parts.
(See step 6 on this page)

HINT: If the warning light turns on while the vehicle speed is within specified speed range above, the check is completed. And when the vehicle speed exceeds 6 km/h (3.7 mph), the warning light will blink again. In this condition, speed sensors are OK.

NOTICE: While the warning light is off, do not give any shocks to vehicle such as acceleration, deceleration, braking, shift change, steering or shocks from the road condition.



5. INSPECT SENSOR SIGNAL CHANGE

Drive the vehicle straight ahead at about 45 – 55 km/h (28.0 – 34.2 mph), and check that the warning light turns on after a 1 second pause.

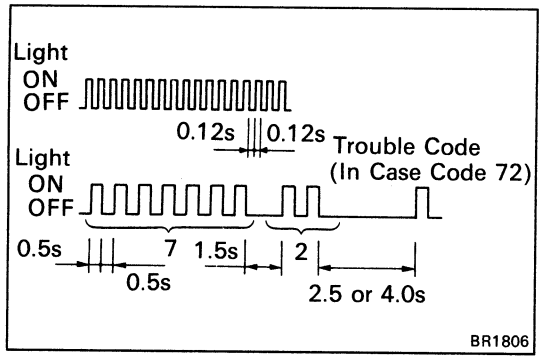
If the warning light turns on without blinking when the vehicle speed is not within the specified speed range above, stop the vehicle and read the diagnostic code, and repair the malfunctioning parts. (See step 6 on this page)

HINT: If the warning light turns on while the vehicle speed is within specified speed range above, the check is completed. And when the vehicle speed is not within specified speed range, the warning light will blink again. In this condition, sensor rotors are OK.

NOTICE: While the warning light is off, do not give any shocks to vehicle such as acceleration, deceleration, braking, shift change, steering or shocks from the road condition.

6. READ DIAGNOSTIC CODE

Stop the vehicle, and warning light will begin to blink. Read the number of blinks. (See DIAGNOSTIC CODE on page BR-64)



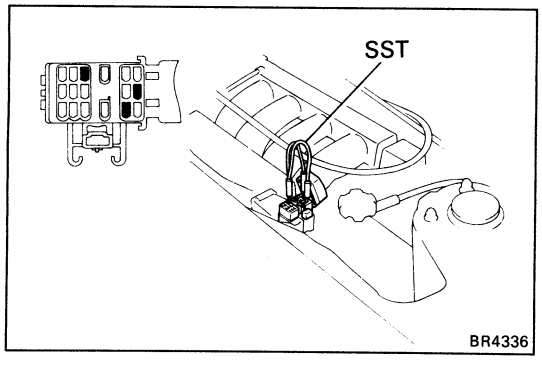
HINT: The first number of blinks will equal the first digit of a two digit diagnostic code. After a 1.5 second pause, the 2nd number of blinks will equal the 2nd number of a two digit code. If there are two or more codes, there will be a 2.5 second pause between each code, and then indication will begin again after a 4.0 second pause, continuing in order from the smaller value up to the larger one.

7. REPAIR MALFUNCTIONING PARTS

Repair or replace the malfunctioning parts.

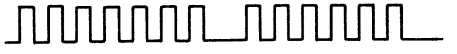
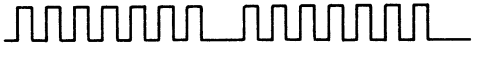
8. PERFORM FOLLOWING STEPS

(a) Turn the ignition switch off.



(b) Remove the SST from terminals E1 and Tc, Ts of the check connector.

DIAGNOSTIC CODE

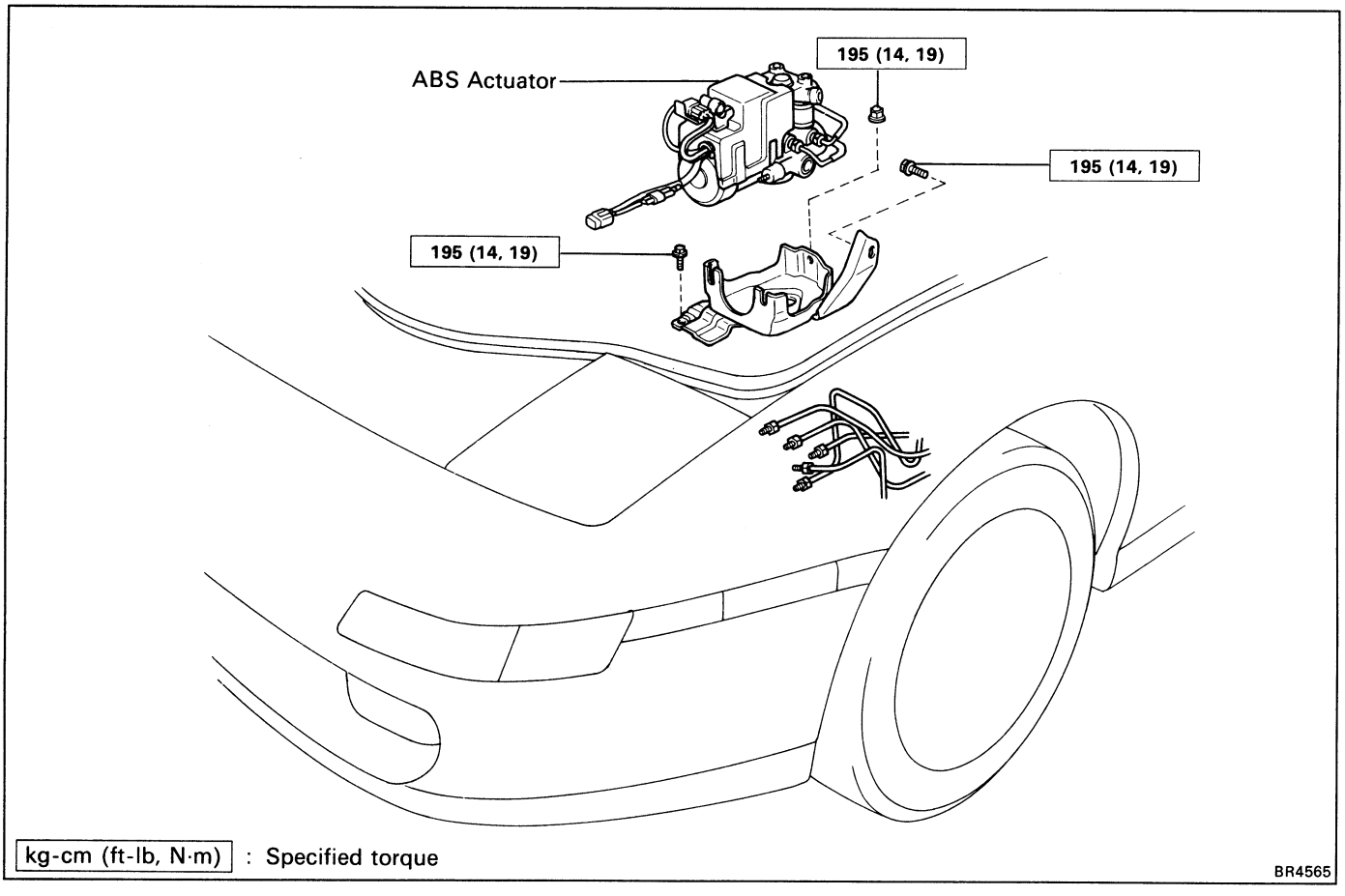
Code No.	Light Pattern	Diagnosis	Malfunctioning Part
		All speed sensors and sensor rotors are normal	
71		Low voltage of front right speed sensor signal	● Front right speed sensor ● Sensor installation
72		Low voltage of front left speed sensor signal	● Front left speed sensor ● Sensor installation
73		Low voltage of rear right speed sensor signal	● Rear right speed sensor ● Sensor installation
74		Low voltage of rear left speed sensor signal	● Rear left speed sensor ● Sensor installation
75		Abnormal change of front right speed sensor signal	● Front right sensor rotor ● Front sealed wire
76		Abnormal change of front left speed sensor signal	● Front left sensor rotor ● Front sealed wire
77		Abnormal change of rear right speed sensor signal	● Rear right sensor rotor ● Rear sealed wire
78		Abnormal change of rear left speed sensor signal	● Rear left sensor rotor ● Rear sealed wire

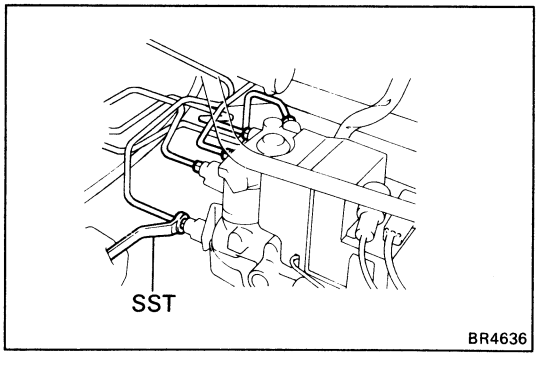
BR1807

ABS Actuator

REMOVAL AND INSTALLATION OF ABS ACTUATOR

Remove and install the parts as shown.





1. **DISCONNECT AND CONNECT BRAKE TUBE**

   Using SST, disconnect and connect the brake tubes from/to the ABS actuator.

   SST 09751-36011

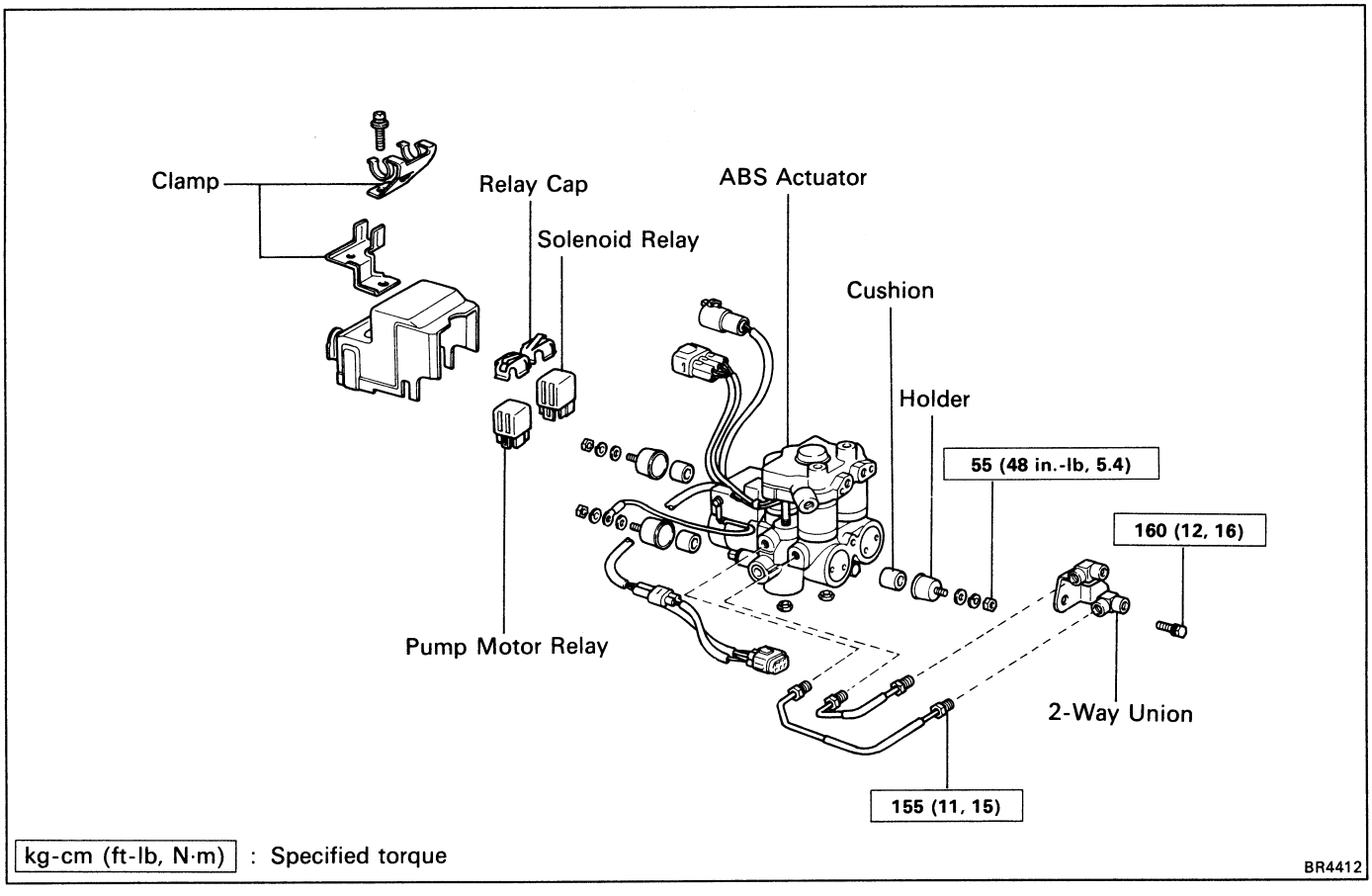
   Torque: 155 kg-cm (11 ft-lb, 15 N·m)

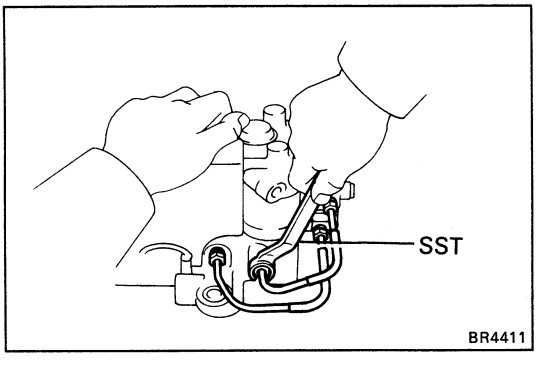
2. **FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM**
   (See page BR-6)

DISASSEMBLY AND ASSEMBLY OF ABS ACTUATOR

Remove and install the parts as shown.

COMPONENTS





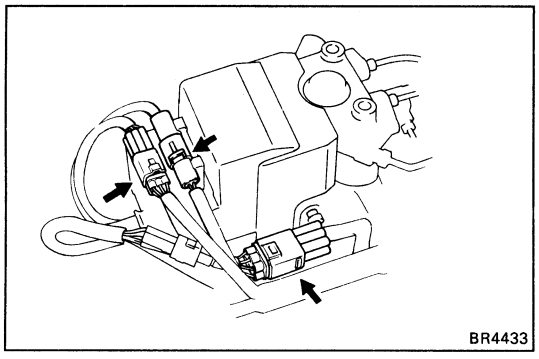
(MAIN POINT OF REMOVAL AND INSTALLATION)

1. DISCONNECT AND CONNECT BRAKE TUBE

Using SST, disconnect and connect the brake tubes from/to the ABS actuator.

SST 09751-36011

Torque: 155 kg-cm (11 ft-lb, 15 N·m)


BR4433

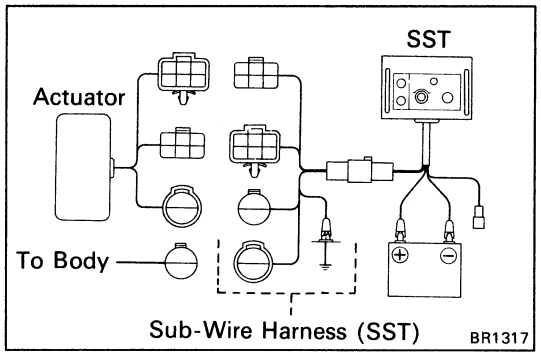
INSPECTION OF ABS ACTUATOR OPERATION

1. INSPECT BATTERY VOLTAGE

Battery voltage: 10 – 14.5 V

2. DISCONNECT CONNECTORS

Disconnect the three connectors from the actuator as shown.



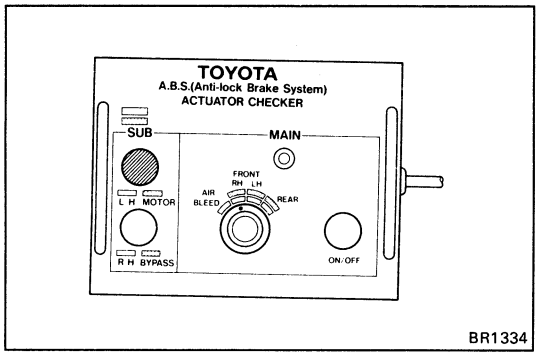
BR1317

3. CONNECT ACTUATOR CHECKER (SST) TO ACTUATOR

(a) Connect the actuator checker (SST) to the actuator and body side wire harness through the sub-wire harness (SST) as shown.

SST 09990-00150

(b) Connect the red cable of the checker to the battery positive (+) terminal and black to the negative (–) terminal. Connect the black cable of the sub-wire harness to the battery negative (–) terminal or body ground.



BR1334

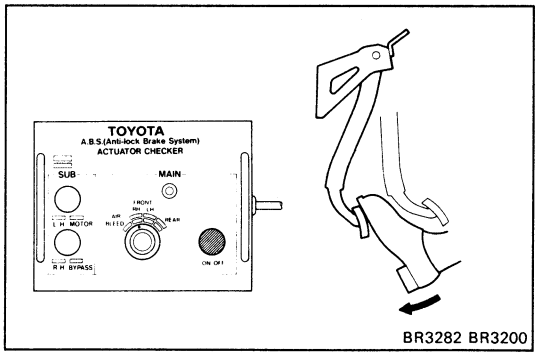
4. INSPECT BRAKE ACTUATOR OPERATION

(a) Start the engine, and run it at idle.

(b) Turn the MAIN selector switch of the actuator checker to "FRONT RH" position.

(c) Push and hold in the SUB MOTOR switch for a few seconds.

(d) Depress the brake pedal and hold it until the step (g) is completed.

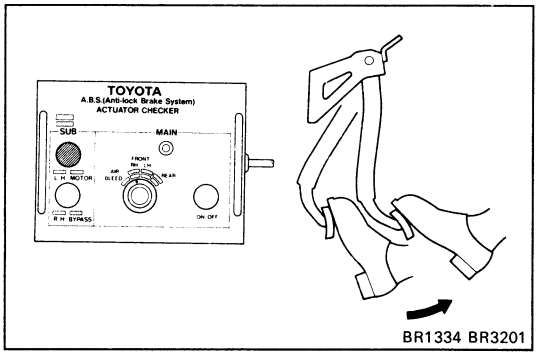


BR3282 BR3200

(e) Push the MAIN push switch and check that the brake pedal does not go down.

NOTICE: Do not keep the MAIN push switch pushing more than 10 seconds.

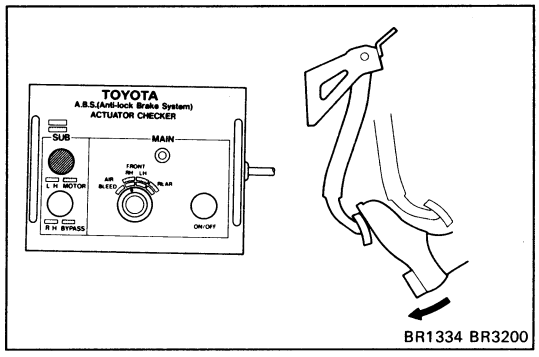
(f) Release the switch, and check that the pedal go down.



BR1334 BR3201

(g) Push and hold in the SUB MOTOR switch for a few seconds, and check that the pedal returns.

(h) Release the brake pedal.



BR1334 BR3200

(i) Push and hold in the SUB MOTOR switch for a few seconds.

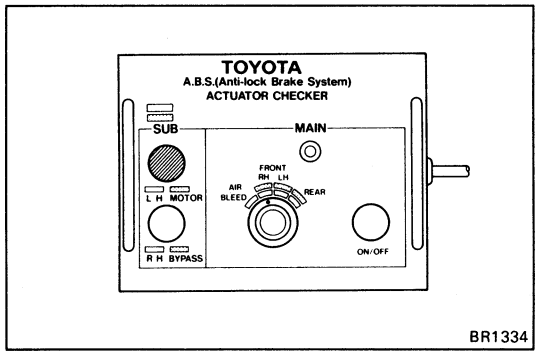
(j) Depress the brake pedal and hold it for about 15 seconds. As you hold the pedal down, push the SUB MOTOR switch for a few seconds. Check that the brake pedal does not pulsate.

5. INSPECT FOR OTHER WHEELS

(a) Turn the MAIN selector switch to "FRONT LH" position.

(b) Repeating (c) to (j) of the step 4, check the actuator operation similarly.

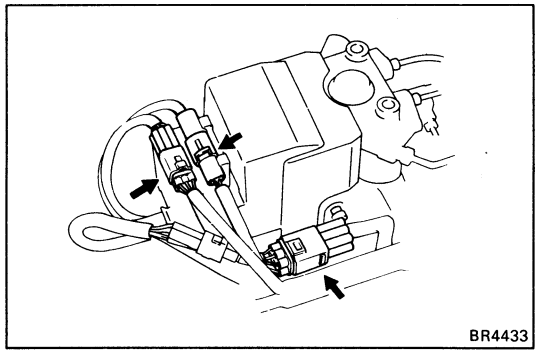
(c) Similarly, inspect "REAR" position.



BR1334

6. PUSH SUB MOTOR SWITCH

Push and hold in the SUB MOTOR switch for a few seconds.


BR4433

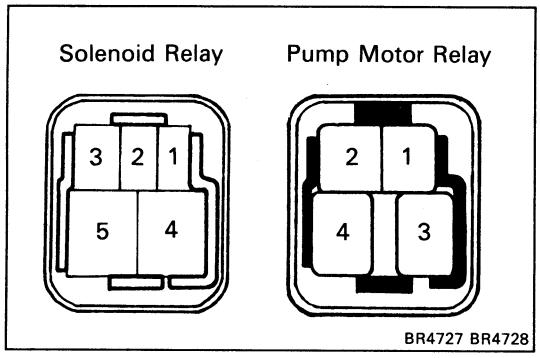
7. DISCONNECT ACTUATOR CHECKER (SST) FROM ACTUATOR

(a) Disconnect the actuator (SST) and sub-wire harness (SST) from the actuator.

SST 09990-00150

(b) Connect the actuator connectors.

(c) Clear the diagnostic codes.
(See page BR-54)

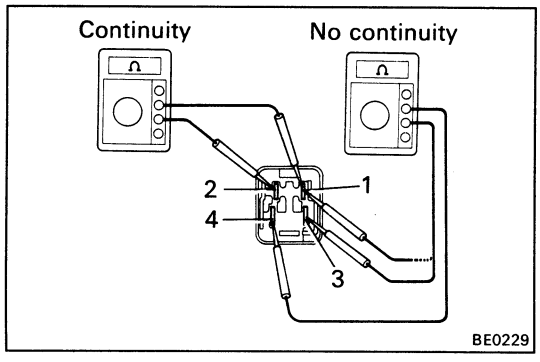


Control Relays

INSPECTION CONTROL RELAYS

1. REMOVE CONTROL RELAYS

Remove the two control relays from the actuator.



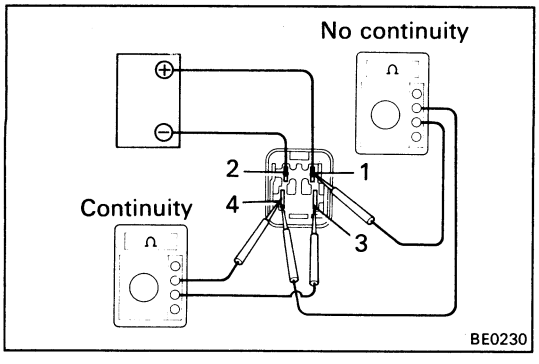
2. INSPECT PUMP MOTOR RELAY CONTINUITY

(a) Check that there is continuity between terminals 1 and 2.

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

(c) Check that there is no continuity between terminals 1 and 4.

If continuity is not as specified, replace the relay.



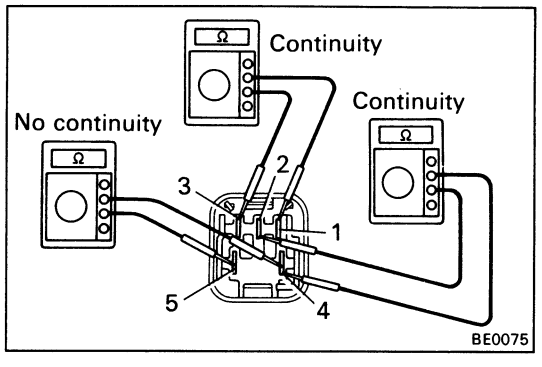
3. INSPECT PUMP MOTOR RELAY OPERATION

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

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

(c) Check that there is no continuity between terminals 1 and 4.

If operation is not as specified, replace the relay.



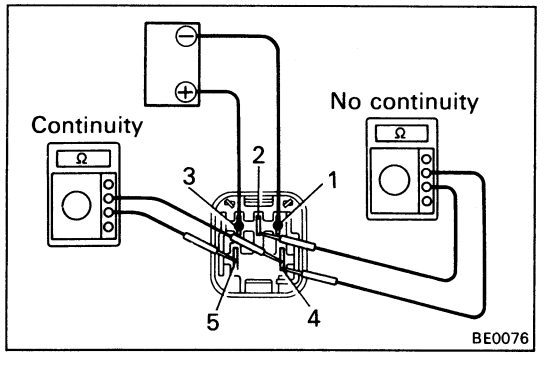
4. INSPECT SOLENOID RELAY CONTINUITY

(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.



5. INSPECT SOLENOID RELAY OPERATION

(a) Apply battery voltage to terminals 1 and 3.

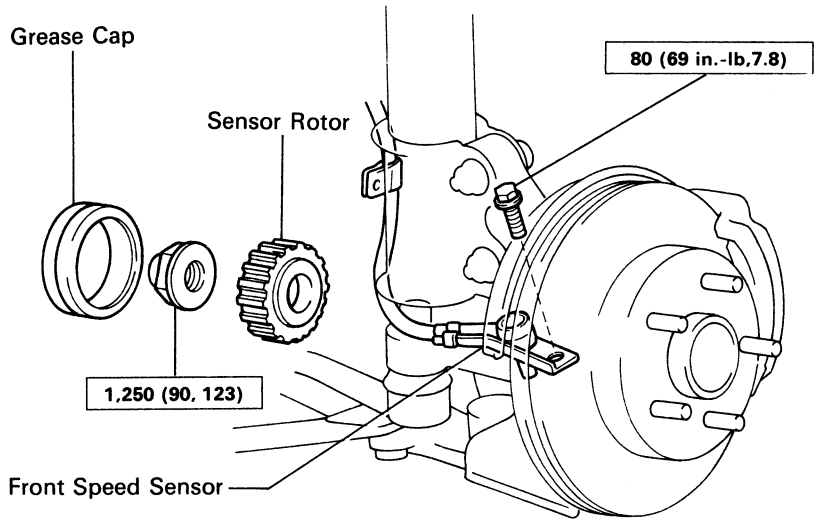
(b) Check that there is continuity between terminals 4 and 5.

(c) Check that there is no continuity between terminals 2 and 4.

If operation is not as specified, replace the relay.

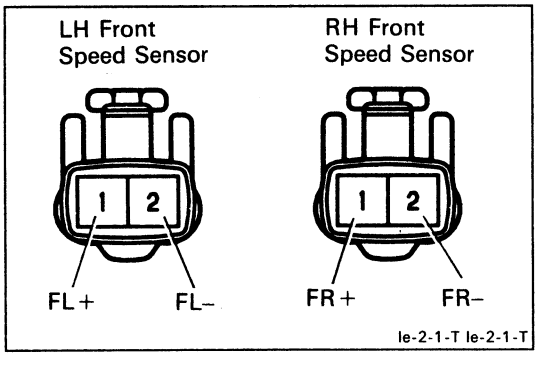
6. INSTALL TWO CONTROL RELAYS

Front Speed Sensor



kg-cm(ft-lb, N·m) : Specified torque

BR4579



INSPECTION OF FRONT SPEED SENSOR

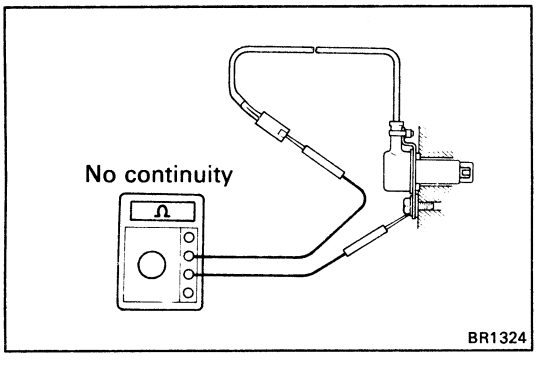
1. INSPECT SPEED SENSOR

(a) Disconnect the speed sensor connector.

(b) Measure the resistance between terminals.

Resistance: 0.9 – 1.5 kΩ

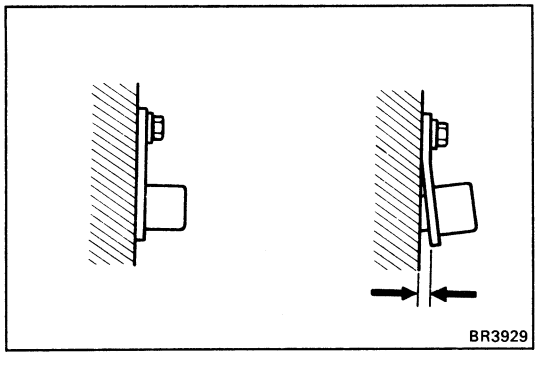
If resistance value is not as specified, replace the sensor.



(c) Check that there is no continuity between each terminal and sensor body.

If there is continuity, replace the sensor.

(d) Connect the speed sensor connector.



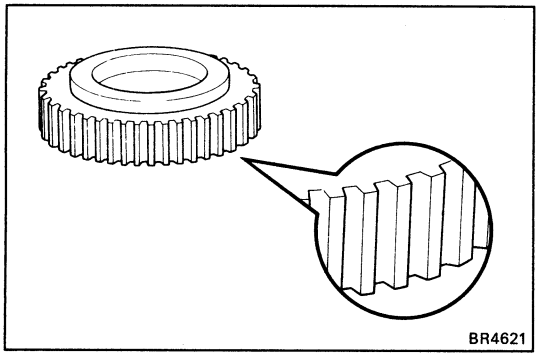
2. INSPECT SENSOR INSTALLATION

(a) Check that the sensor installation bolt is tighten properly. If not, tighten the bolt.

Torque: 80 kg-cm (69 in.-lb, 7.8 N·m)

(b) Check that there is no clearance between the sensor and rear axle carrier as shown.

If there is clearance, replace the sensor.


BR4621

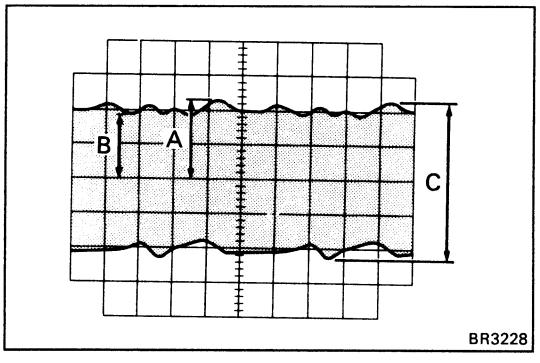
3. VISUALLY INSPECT SENSOR ROTOR SERRATIONS

(a) Remove the sensor rotor.
(See page SA-12)

(b) Inspect the sensor rotor serrations for scratches, cracks, warping or missing teeth.

(c) Install the sensor rotor.
(See page SA-14)

NOTICE: To prevent damage to the serrations, do not strike the sensor rotor.



BR3228

INSPECTION OF FRONT SPEED SENSOR AND SENSOR ROTOR SERRATIONS (REFERANCE)

INSPECT FRONT SPEED SENSOR AND SENSOR ROTOR SERRATIONS BY USING OSCILLOSCOPE

(a) Connect an oscilloscope to the speed sensor connector.

(b) Run the vehicle at 20 km/h (12.4 mph), and inspect speed sensor output wave.

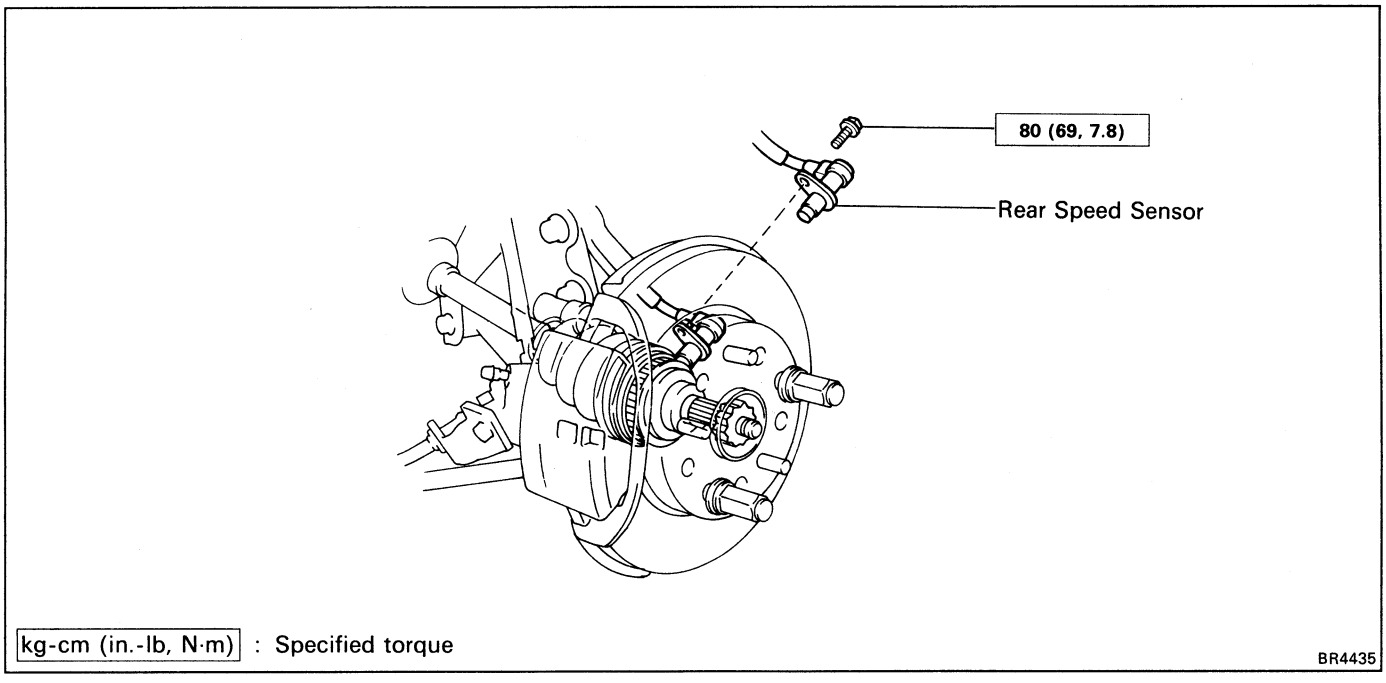
(c) Check that C is 0.5 V or more.

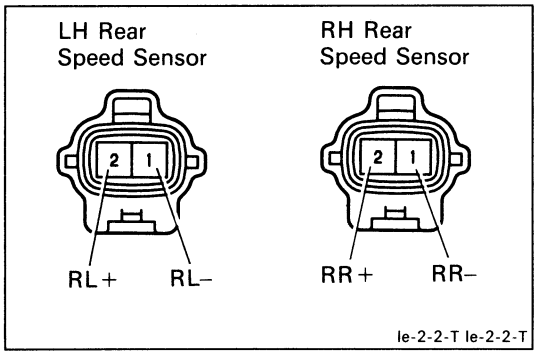
If not as specified, replace the speed sensor.

(d) Check that B is 50 % or more of A.

If not as specified, replace the sensor rotor.

Rear Speed Sensor





INSPECTION OF REAR SPEED SENSOR

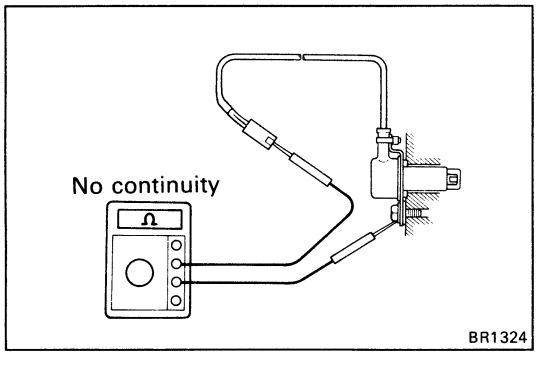
1. INSPECT SPEED SENSOR

(a) Disconnect the speed sensor connector.

(b) Measure the resistance between terminals.

Resistance: 0.9 – 1.5 kΩ

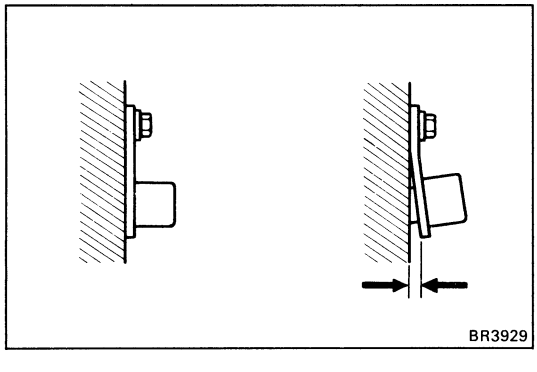
If resistance value is not as specified, replace the sensor.



(c) Check that there is no continuity between each terminal and sensor body.

If there is continuity, replace the sensor.

(d) Connect the speed sensor connector.



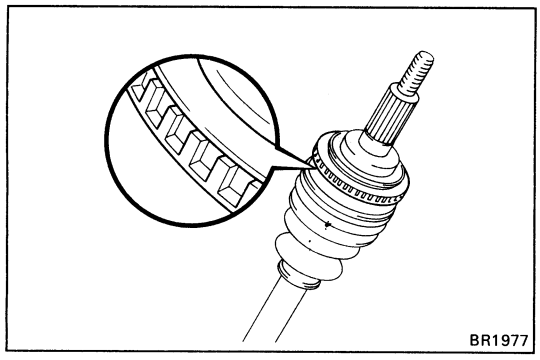
2. INSPECT SENSOR INSTALLATION

(a) Check that the sensor installation bolt is tightened properly. If not, tighten the bolt.

Torque: 80 kg-cm (69 in.-lb, 7.8 N·m)

(b) Check that there is no clearance between the sensor and rear axle carrier as shown.

If there is clearance, replace the sensor.


BR1977

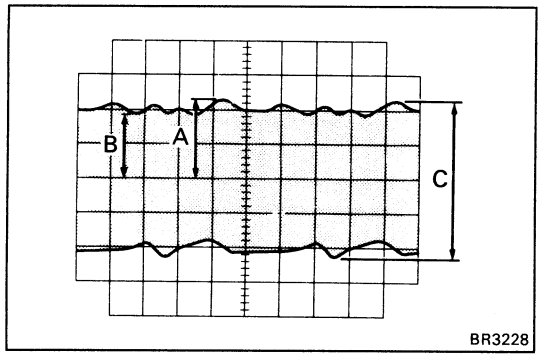
3. VISUALLY INSPECT SENSOR ROTOR SERRATIONS

(a) Remove the drive shaft.
(See page SA-39 or 52)

(b) Inspect the sensor rotor serrations for scratches, cracks, warping or missing teeth.

(c) Install the drive shaft.
(See page SA-49 or 66)

NOTICE: To prevent damage to the serrations, do not strike the drive shaft.



BR3228

INSPECTION OF REAR SPEED SENSOR AND SENSOR ROTOR SERRATIONS (REFERANCE)

INSPECT REAR SPEED SENSOR AND SENSOR ROTOR SERRATIONS BY USING AN OSCILLOSCOPE

(a) Connect an oscilloscope to the speed sensor connector.

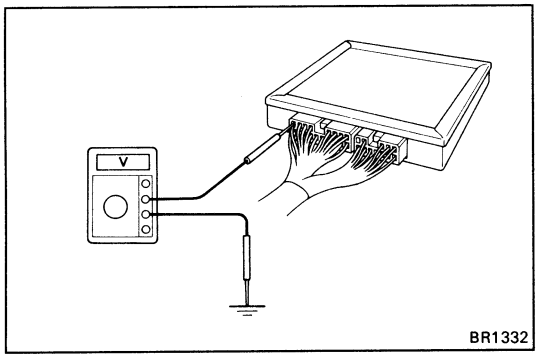
(b) Run the vehicle at 20 km/h (12.4 mph), and inspect speed sensor output wave.

(c) Check that C is 0.5 V or more.

If not as specified, replace the speed sensor.

(d) Check that B is 50 % or more of A.

If not as specified, replace the rear axle hub.



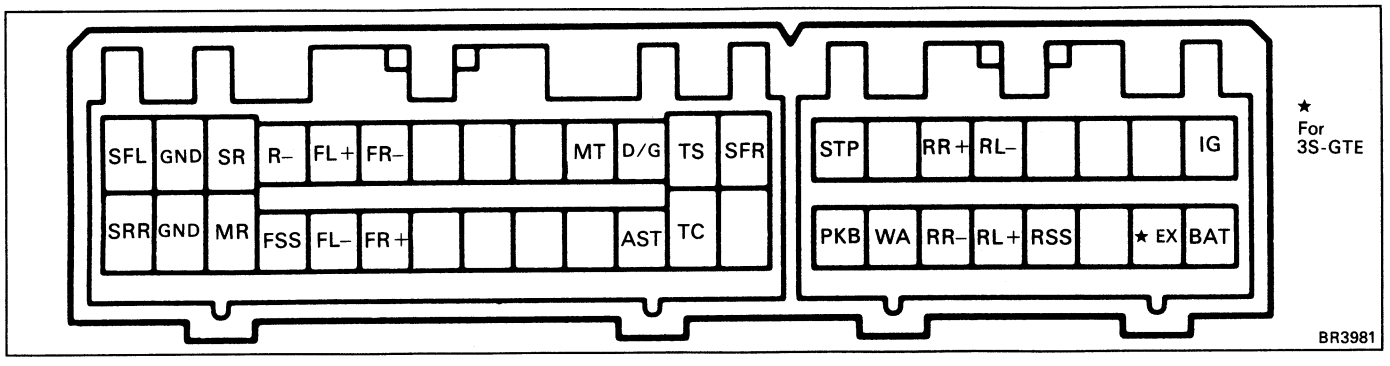
Anti-Lock Brake System Circuit

INSPECTION OF SYSTEM CIRCUIT

1. INSPECT SYSTEM CIRCUIT WITH CONNECTOR CONNECTED

(a) Remove the ABS ECU.

(b) Using a voltmeter with high impedance (10 K ohm/V minimum), measure the voltage at each terminal and body ground.



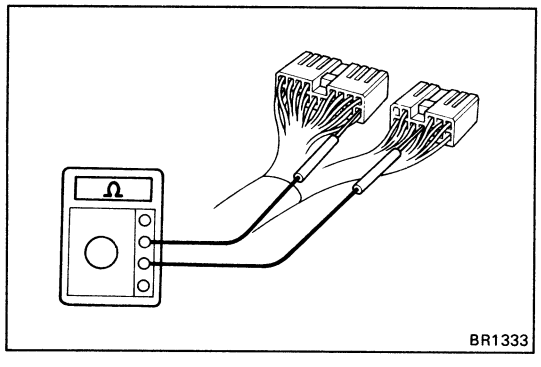
Tester Connection	Check Item	Condition	Specified Value	Trouble Part
IG	Voltage	IG switch on	Battery voltage	ECU-IG Fuse
RL–	Continuity	IG switch off	Continuity	ABS ECU
STP	Voltage	IG switch off and brake pedal depressed	Battery voltage	Stop light switch Stop light
	Continuity	IG switch off and brake pedal returned	Continuity	
BAT	Voltage	IG switch off	Battery voltage	ECU +B Fuse
EX	Voltage	IG switch on	Battery voltage	ABS ECU. EFI ECU
RSS	Continuity	IG switch off	Continuity	ABS ECU
RR–	Continuity	IG switch off	Continuity	ABS ECU
WA	Voltage	IG switch on and "ABS" warning light goes on	About 0V	ABS ECU "ABS" warning light
		IG switch on and "ABS" warning light goes off	Battery voltage	
PKB	Voltage	IG switch on and PKB lever pulled	About 0V	Parking brake switch Level warning switch
		Engine running on and PKB lever returned	Battery voltage	
SFR	Voltage	IG switch on and "ABS"warning light goes on	About 0V	Actuator
		IG switch on and "ABS" warning light goes off	Battery voltage	
TS	Voltage	IG switch on and check connector Ts-E_1 not connected	Battery voltage	ABS ECU
		IG switch on and check connector Ts-E_1 connector	About 0V	
FR–	Continuity	IG switch off	Continuity	
R–	Continuity	IG switch off	Continuity	ABS ECU
SR	Voltage	IG switch on and "ABS" warning light goes on	About 0V	
		IG switch on and "ABS" warning light goes off	Battery voltage	
GND	Continuity	IG switch off	Continuity	Wiring harness
SFL	Voltage	IG switch on and "ABS" warning light goes on	About 0V	Actuator
		IG switch on and "ABS" warning light goes off	Battery voltage	

Continued on page BR-75

Continued from page BR-74

Tester Connection	Check Item	Condition	Specified Value	Trouble Part
TC	Voltage	IG switch on and check connector Tc-E_1 not connected	Battery voltage	ABS ECU
		IG switch on and check connector Tc-E_1 connected	About 0V	
AST	Voltage	IG switch on and "ABS" warning light goes on	About 0V	Actuator
		IG switch on and "ABS" warning light goes off	Battery voltage	
FL–	Continuity	IG switch off	Continuity	ABS ECU
FSS	Continuity	IG switch off	Continuity	
SRR	Voltage	IG switch on and "ABS" warning light goes on	About 0V	Actuator
		IG switch on and "ABS" warning light goes off	Battery voltage	

If the circuit is not as specified, check and repair or replace the trouble part shown in the table above.



2. INSPECT SYSTEM CIRCUIT WITH CONNECTOR DISCONNECTED

(a) Disconnect the connectors from the ECU, inspect at the wire harness side connector.

Tester Connection	Check Item	Specified Value	Trouble Part	Tester Connection	Check Item	Specified Value	Trouble Part
RR+ ↔ RR–	Resistance	0.9 ~ 1.5 kΩ	Rear RH speed sensor	SFL ↔ AST	Resistance	About 6 Ω	Actuator
RL+ ↔ RL–	Resistance	0.9 ~ 1.5 kΩ	Rear LH speed sensor	AST ↔ Body ground	Resistance	About 5 Ω	Actuator
SFR ↔ AST	Resistance	About 6 Ω	Actuator	FR+ ↔ FR–	Resistance	0.8 ~ 1.5 Ω	Front RH speed sensor
MT ↔ Body ground	Resistance	About 5 Ω	Actuator	MR ↔ R–	Resistance	50 ~ 80 Ω	Control relay
FL+ ↔ FL–	Resistance	0.8 ~ 1.5 kΩ	Front LH speed sensor	SRR ↔ AST	Resistance	About 6 Ω	Actuator
SR ↔ R–	Resistance	60 ~ 100 Ω	Control relay				

If the circuit is not as specified, check and repair or replace the trouble part shown in the table above.

(b) Connect the connectors, and install the ECU in place.

STEERING

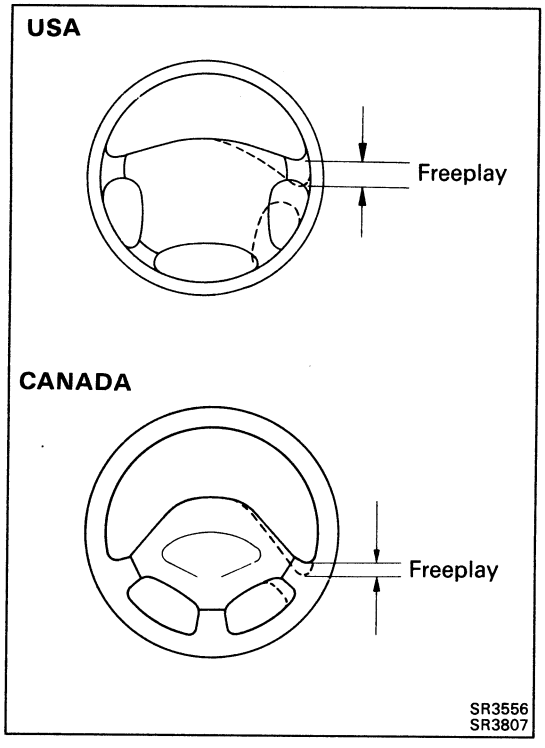
	Page
PRECAUTIONS	SR-2
TROUBLESHOOTING	SR-2
ON-VEHICLE INSPECTION	SR-3
STEERING COLUMN	SR-4
MANUAL STEERING GEAR HOUSING	SR-15
POWER STEERING	
Description	SR-27
On-Vehicle Inspection	SR-30
Power Steering Pump	SR-33
Gear Housing	SR-35
Electronic Control System	SR-53
Diagnosis System	SR-55
Inspection of Electronic Control Components	SR-58

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.**
- **(USA)**
  The steering wheel pad has an airbag built in, so take all due precautions when handling it. For more details, see the SRS AIRBAG section.

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Hard steering	Tires improperly inflated	Inflate tires to proper pressure	SA-3
	Insufficient lubricant	Lubricate suspension and steering linkage	
	Excessive caster	Check front wheel alignment	SA-4
	Steering system joint worn	Replace steering system joints	SR-15, 35
	Lower arm ball joints worn	Replace lower arm ball joints	SA-24
	Steering column binding	Inspect steering column	SR-4
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-15, 35
	Fluid level in reservoir low	Check reservoir	SR-30
	Power steering unit faulty	Check power steering unit	SR-30
Poor return	Tires improperly inflated	Inflate tires to proper pressure	SA-3
	Insufficient lubricant	Lubricate suspension and steering linkage	
	Wheel alignment incorrect	Check front wheel alignment	SA-4
	Steering column binding	Inspect steering column	SR-4
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-15, 35
Excessive play	Front wheel bearing worn	Replace front wheel bearing	SA-9
	Main shaft yoke or intermediate shaft yoke worn	Replace main shaft or intermediate shaft	SR-4
	Lower arm ball joints worn	Replace lower arm ball joints	SA-24
	Steering system joints worn	Replace steering system joint	SR-15, 35
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-15, 35
Abnormal noise	Steering linkage loose	Tighten steering linkage	
	Steering system joints worn	Replace steering system joints	SR-15, 35
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-15, 35



ON-VEHICLE INSPECTION

CHECK THAT STEERING WHEEL FREEPLAY IS CORRECT

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

Freeplay should not exceed the maximum.

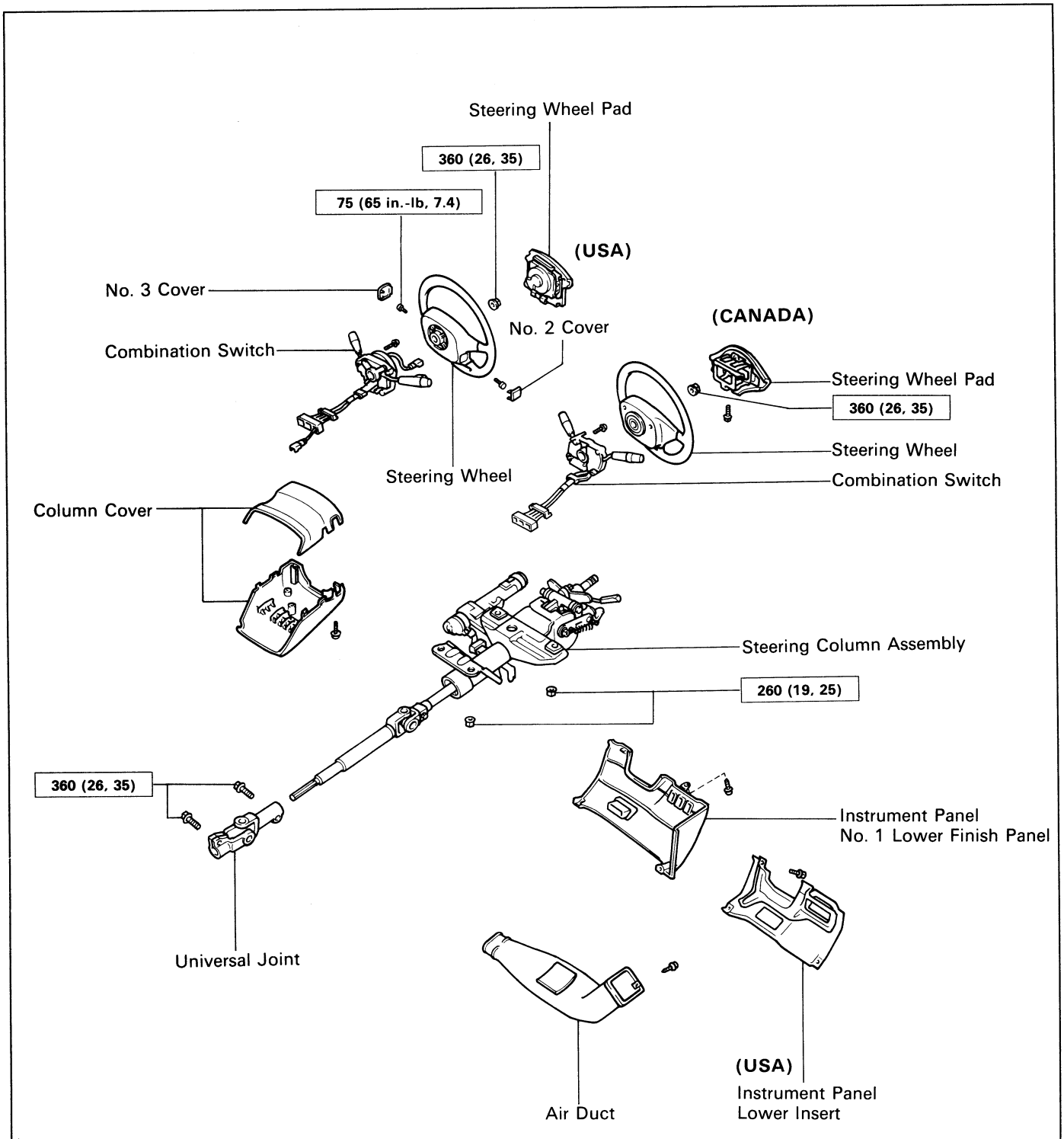
Maximum freeplay: 30 mm (1.18 in.)

If incorrect, repair.

STEERING COLUMN

REMOVAL AND INSTALLATION OF STEERING COLUMN

Remove and install the parts as shown.



kg-cm (ft-lb N·m) : Specified torque

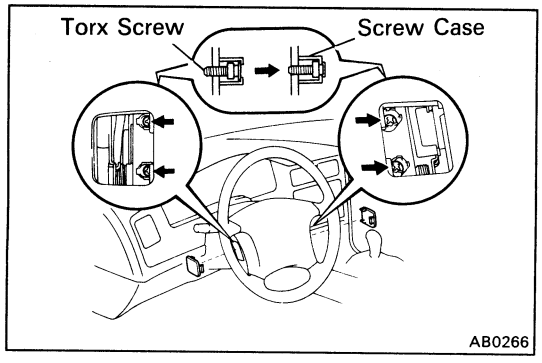
SR3856

(MAIN POINTS OF REMOVAL AND INSTALLATION)

(USA)

CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the LOCK position and the negative (–) terminal cable is disconnected from the battery (See page AB-2).

NOTICE: If the wiring connector of the airbag system is disconnected with the ignition switch at ON or ACC, diagnostic codes will be recorded.



1. REMOVE STEERING WHEEL PAD

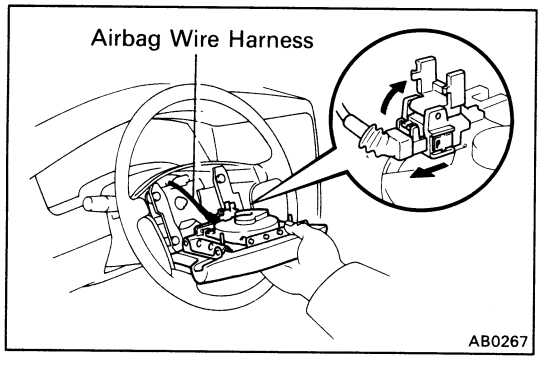
(a) Remove negative terminal (–) from the battery.

(b) Place the front wheels facing straight ahead.

(c) Using a torx wrench, loosen the four screws.

Torx wrench: T30 (Part No. 09042-00010 or locally manufactured tool)

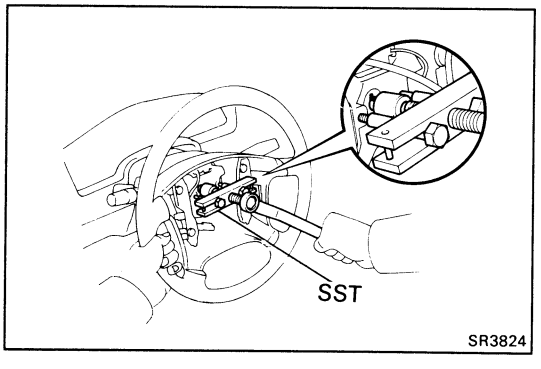
(d) Loosen the torx screws until the groove along the screw circumference catches on the screw case.



(e) Pull the wheel pad out from the steering wheel and disconnect the airbag connector.

NOTICE: When removing the wheel pad, take care not to pull the airbag wire harness.

CAUTION: When storing the wheel pad, keep the upper surface of the pad facing upward.



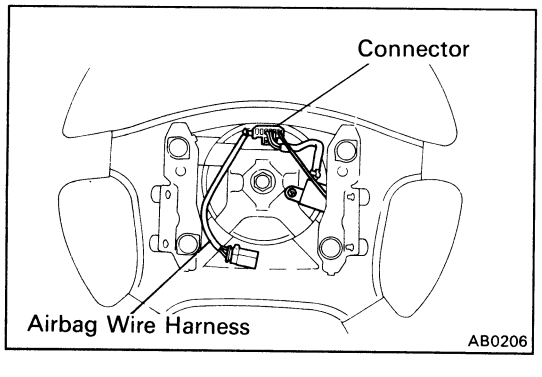
2. REMOVE STEERING WHEEL

(a) Disconnect the connector.

(b) Remove the set nut.

(c) Using SST, remove the steering wheel.

SST 09213-31021



3. INSTALL STEERING WHEEL AND WHEEL PAD

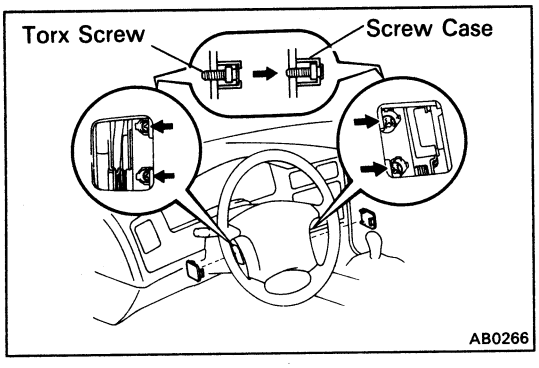
(a) Check that the front wheels are facing straight ahead.

(b) Center the spiral cable.
(See page AB-16)

(c) Install the steering wheel and torque the set nut.

Torque: 360 kg-cm (26 ft-lb, 35 N·m)

(d) Connect the connector.



(e) Install the wheel pad after confirming that the circumference groove of the torx screws is caught on the screw case.

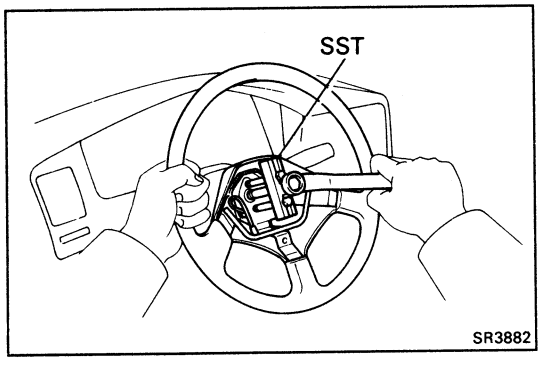
(f) Using a torx wrench, tighten the four screws.

Torque: 75 kg-cm (65 in.-lb, 7.4 N·m)

NOTICE:

- **Make sure the wheel pad is installed to the specified torque.**
- **If the wheel pad has been dropped, or there are cracks, dents or other defects in the case or connector, replace the wheel pad with a new one.**
- **When installing the wheel pad, take care that the wirings do not interfere with other parts and are not pinched between other parts.**

4. CHECK STEERING WHEEL CENTER POINT AFTER INSTALLING STEERING COLUMN



(CANADA)

1. REMOVE STEERING WHEEL

(a) Remove a screw and the steering wheel pad.

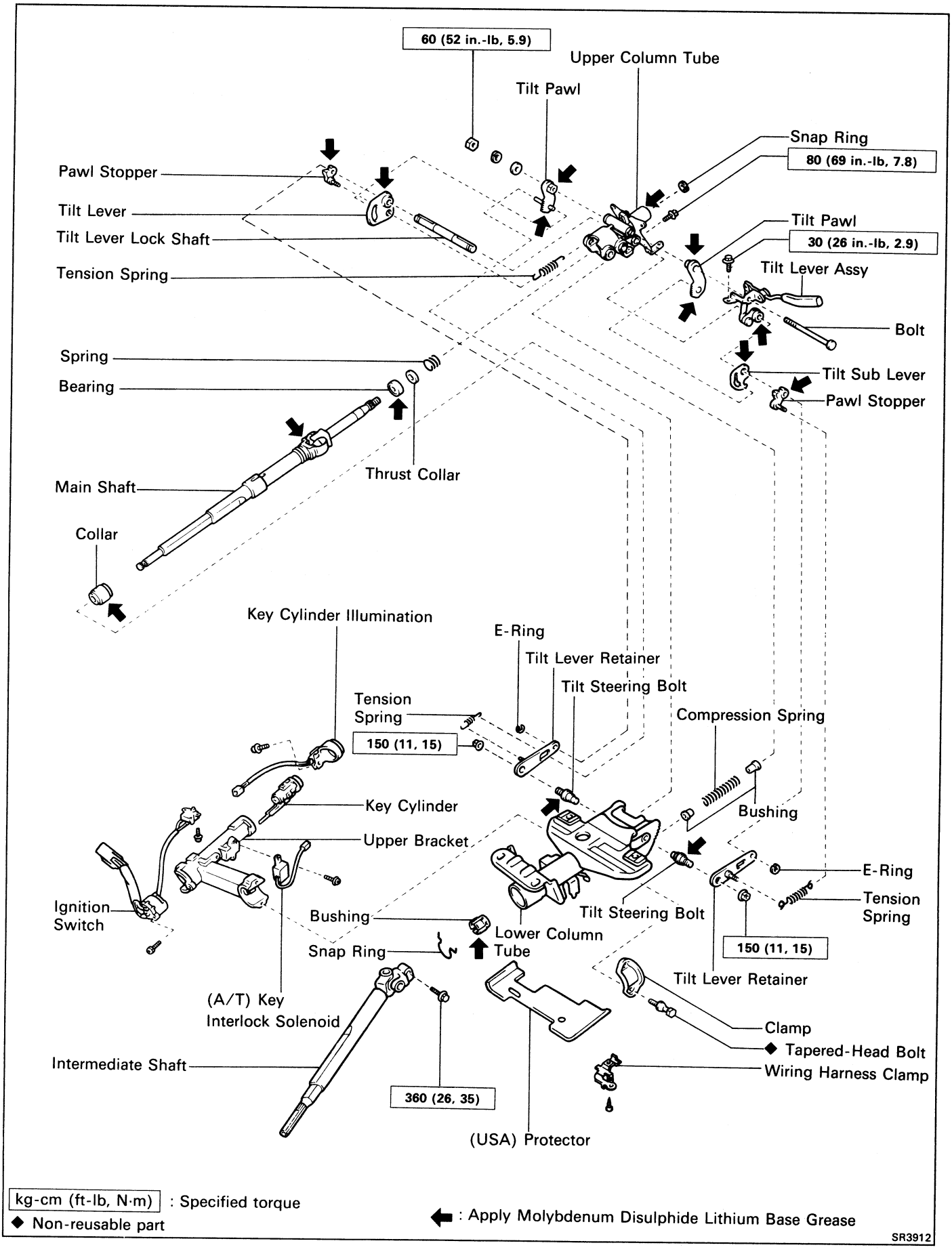
(b) Remove the steering wheel nut.

(c) Using SST, remove the steering wheel.

SST 09609-20011

2. CHECK STEERING WHEEL CENTER POINT AFTER INSTALLING STEERING COLUMN

COMPONENTS

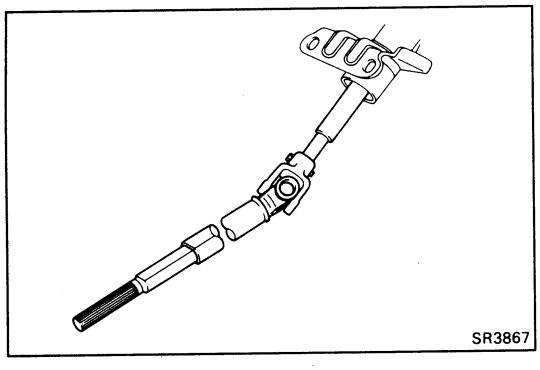


kg-cm (ft-lb, N·m) : Specified torque

◆ Non-reusable part

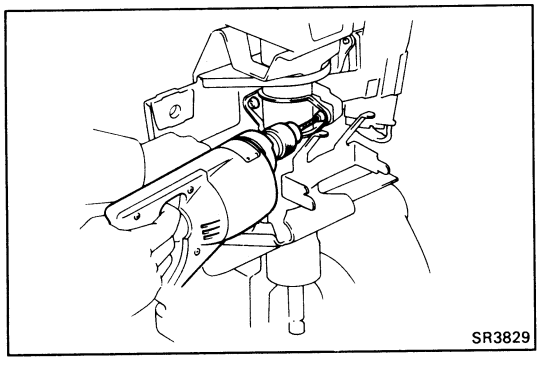
⬅ : Apply Molybdenum Disulphide Lithium Base Grease

SR3912

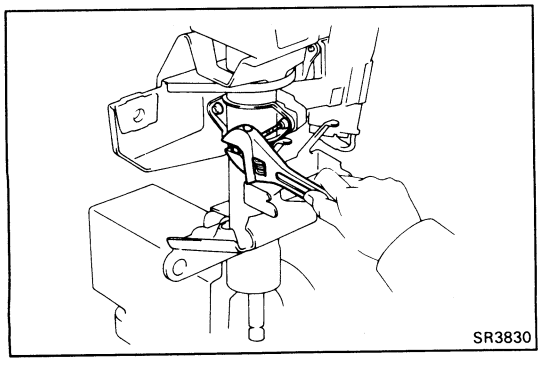

SR3867

DISASSEMBLY OF STEERING COLUMN

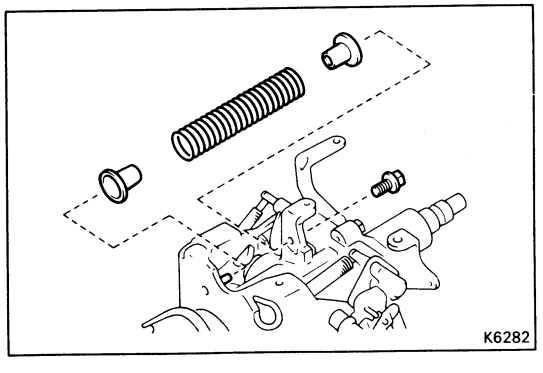
1. **REMOVE IGNITION KEY CYLINDER ILLUMINATION**
2. **REMOVE INTERMEDIATE SHAFT**
3. **REMOVE WIRING HARNESS CLAMP**
4. **(USA)**
   REMOVE PROTECTOR


SR3829

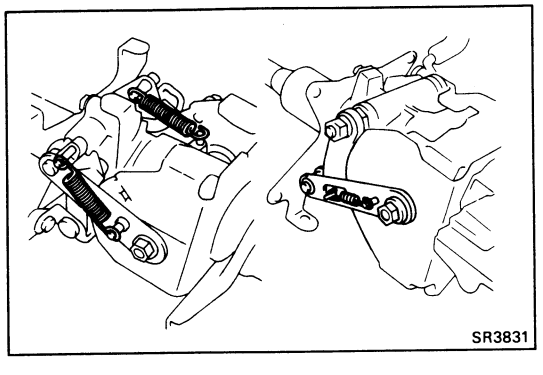
5. **REMOVE UPPER BRACKET**
   (a) Using a centering punch, mark the center of the tapered-head bolts.
   (b) Using a 3 – 4 mm (0.12 – 0.16 in.) drill, drill into the tapered-head bolts.


SR3830

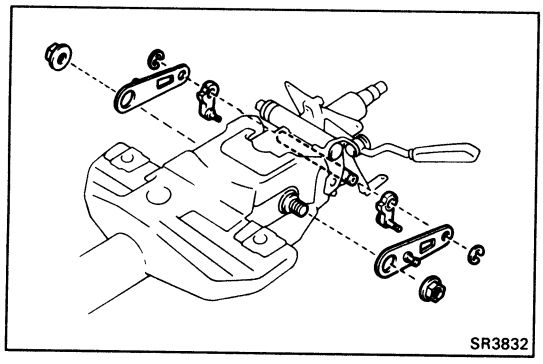
   (c) Using a screw extractor, remove the tapered-head bolts.
   (d) Remove the two bolts, and separate the upper bracket and the column tube.


K6282

6. **REMOVE COMPRESSION SPRING**
   (a) Remove the bolt and spring.
   (b) Remove the two bushings from the spring.


SR3831

7. **REMOVE THREE TENSION SPRINGS**

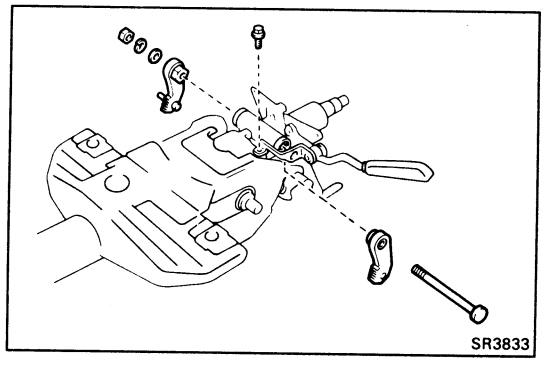


8. REMOVE TILT LEVER RETAINERS AND PAWL STOPPERS

(a) Remove the two E-rings from the tilt lever lock shaft.

(b) Remove the two nuts from the tilt steering bolts.

(c) Remove the two tilt lever retainers and two pawl stoppers.



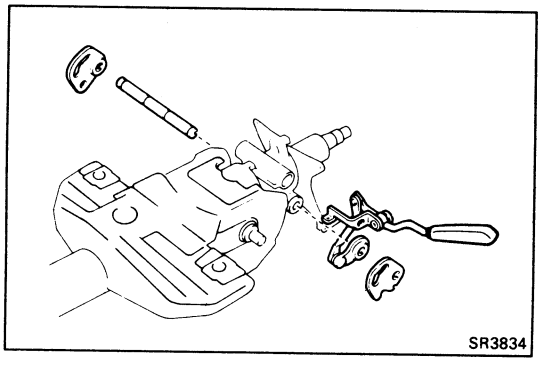
9. REMOVE TILT PAWLS

(a) Remove the nut and two washers.

(b) Pull out the bolt.

(c) Remove the tilt lever assembly installation bolt.

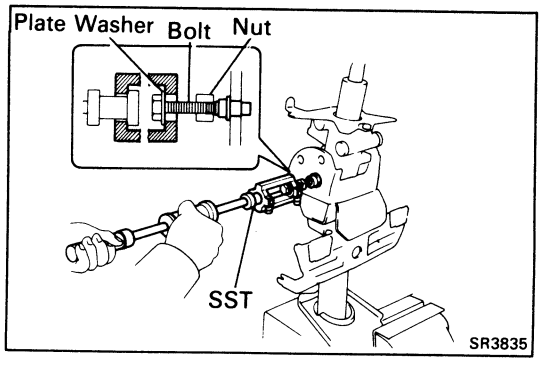
(d) Remove the two tilt pawls.



10. REMOVE TILT LEVER, TILT SUB LEVER, TILT LEVER ASSEMBLY AND TILT LEVER LOCK SHAFT

(a) Remove the tilt lever, tilt sub lever and tilt lever assembly from the tilt lever lock shaft.

(b) Pull out the tilt lever lock shaft.

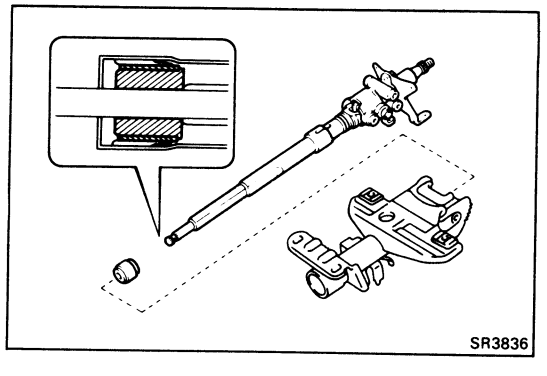


11. REMOVE UPPER COLUMN TUBE

(a) Set SST, the nut (10 mm diameter, 1.25 mm pitch), plate washer (36 mm outer diameter) and bolt (10 mm diameter, 1.25 mm pitch, 50 mm length) as shown.
And then remove the two tilt steering bolts.

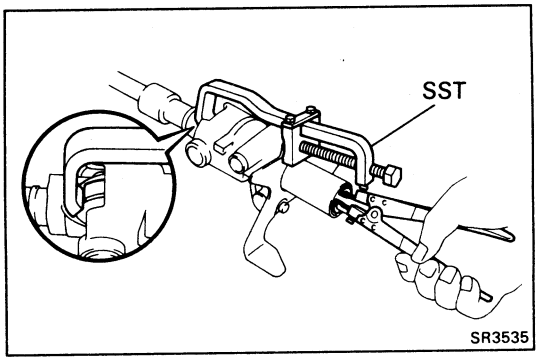
SST 09910-00015 (09911-00011, 09912-00010)

(Reference)	Nut	90170-10004
	Plate washer	90201-10201
	Bolt	91111-51050



(b) Remove the upper column tube from the lower column tube.

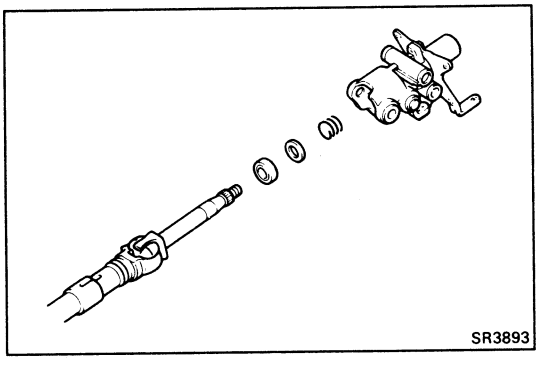
(c) Remove the collar from the main shaft.



12. REMOVE MAIN SHAFT

(a) Using SST to compress the main shaft spring, remove the snap ring with snap ring pliers.

SST 09950-20017



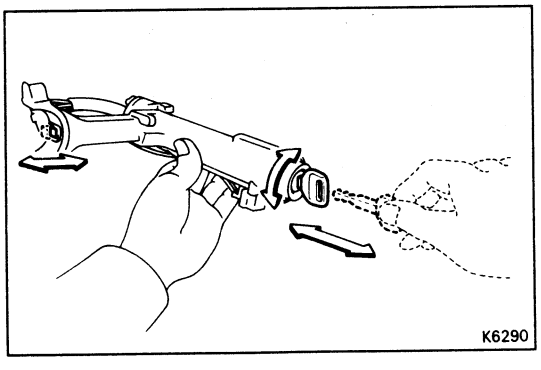
(b) Remove the main shaft from the column tube.

(c) Remove the spring, thrust collar and bearing.

INSPECTION AND REPLACEMENT OF STEERING COLUMN

1. INSPECT KEY CYLINDER

Check that the steering lock mechanism operates properly.



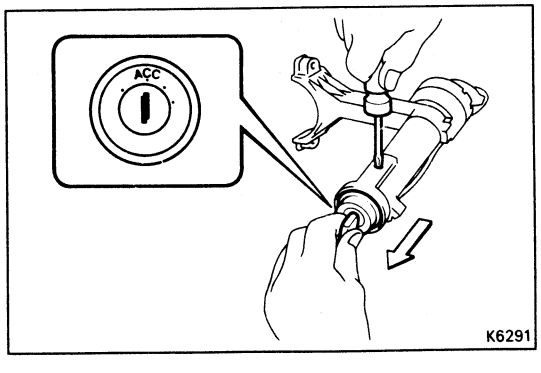
2. IF NECESSARY, REPLACE KEY CYLINDER

(a) Place the ignition key at the ACC position.

(b) Push down the stop pin with a thin rod, and pull out the key cylinder.

(c) Make sure the ignition key is at the ACC position.

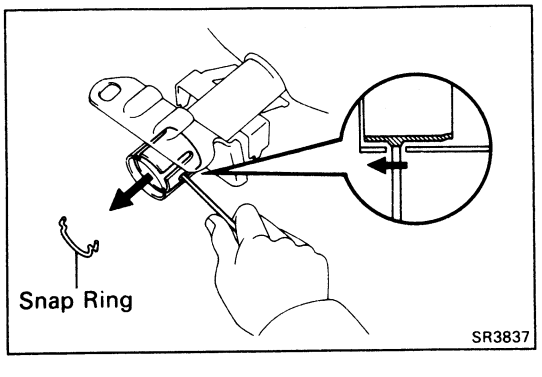
(d) Install a new key cylinder.

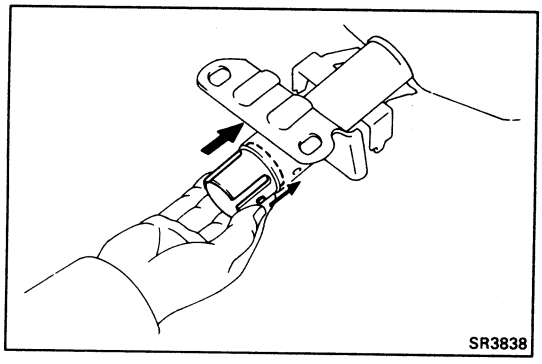


3. IF NECESSARY, REPLACE MAIN SHAFT BUSHING

(a) Remove the snap ring.

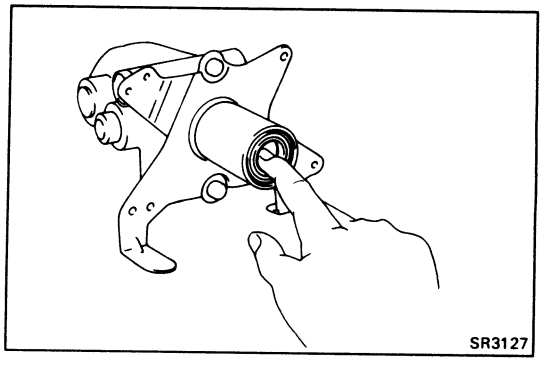
(b) Using a screwdriver, remove the bushing.





(c) Align the holes of the tube and projections of a new bushing, and insert the bushing in the column tube.

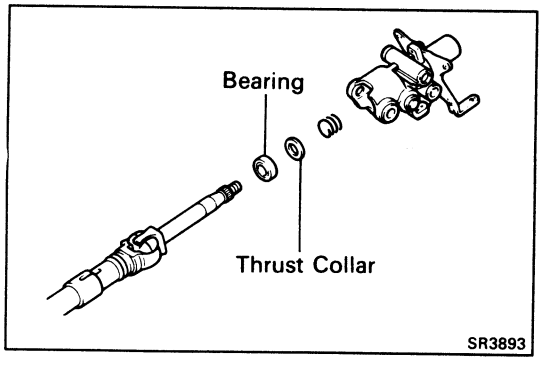
(d) Install the snap ring.



4. INSPECT UPPER BEARING

Check the upper bearing rotation condition and check for abnormal noise.

5. (A/T)
INSPECT KEY INTERLOCK SOLENOID
(See page AT-165)



ASSEMBLY OF STEERING COLUMN

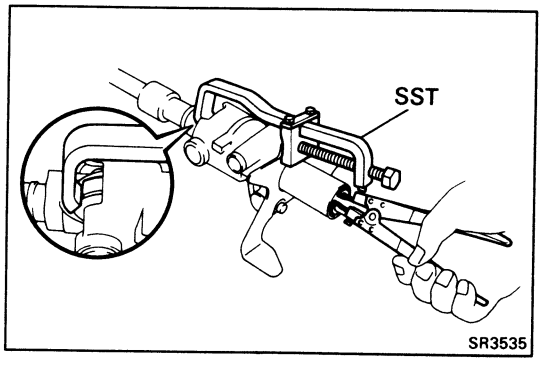
(See page SR-7)

1. APPLY MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE (See page SR-7)

2. INSTALL MAIN SHAFT

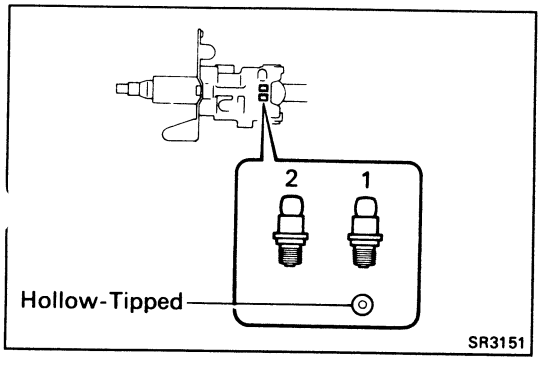
(a) Install the bearing, thrust collar and spring to the main shaft.

(b) Insert the main shaft into the upper column tube.



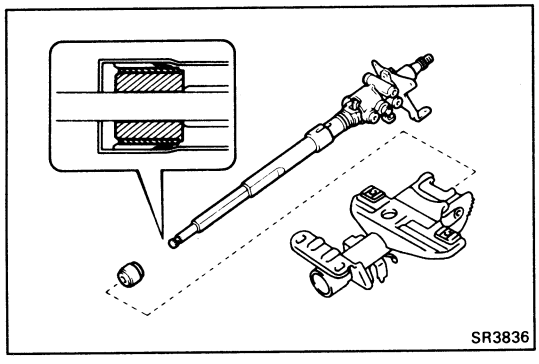
(c) Using SST to compress the main shaft spring, install the snap ring with snap ring pliers.

SST 09950-20017



3. SELECT TILT STEERING BOLTS

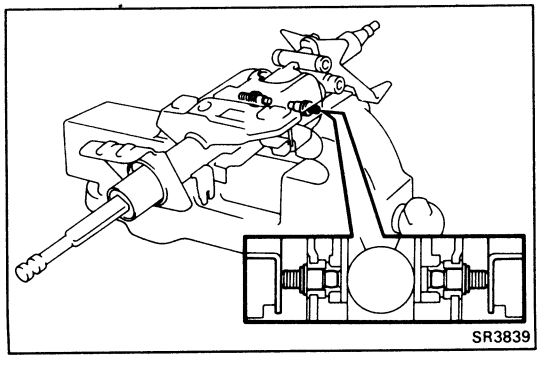
Select the bolt with the plain thread end when the upper column tube mark is 2, and the bolt with the hollow-tipped thread end when the mark is 1.



4. INSTALL MAIN SHAFT WITH UPPER COLUMN TUBE

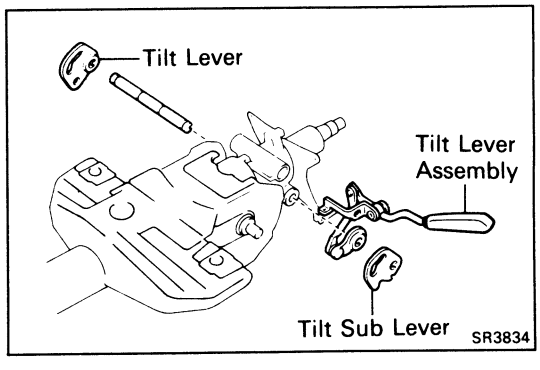
(a) Install the collar to the main shaft.

(b) Insert the main shaft with the upper column tube into the lower column tube.



(c) Using a vise, press in the two tilt steering bolts.

HINT: Make sure the upper tube turns smoothly.

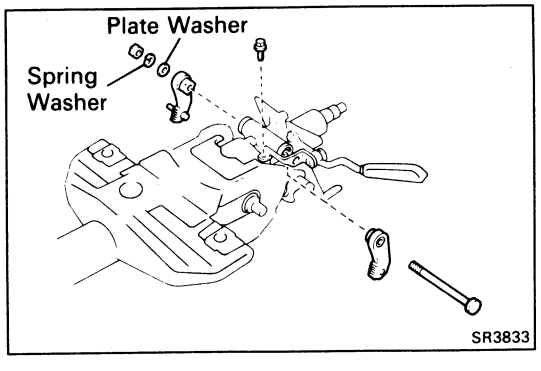


5. INSTALL TILT LEVER LOCK SHAFT, TILT LEVER ASSEMBLY, TILT SUB LEVER AND TILT LEVER

(a) Insert the tilt lever lock shaft into the upper column tube.

(b) Install the tilt lever assembly.

(c) Install the tilt lever and tilt sub lever.



6. INSTALL TILT PAWLS

(a) Install the two tilt pawls to the upper column tube.

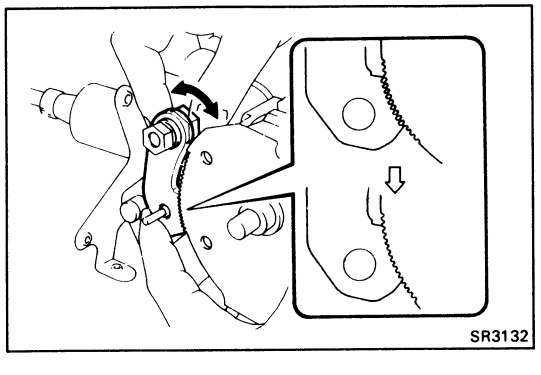
HINT: Insert the pawl pin into the long hole of the tilt lever and tilt sub lever.

(b) Install the bolt through the tilt pawls and tilt lever assembly.

(c) Temporarily install the two washers and nut.

(d) Install and torque the tilt lever assembly installation bolt.

Torque: 30 kg-cm (26 in.-lb, 2.9 N·m)



7. ENGAGE AND ADJUST TILT PAWL

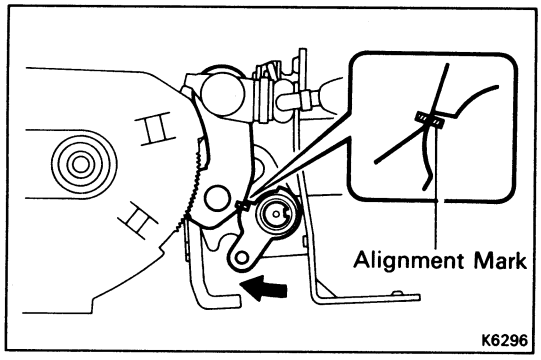
(a) Engage the tilt sub lever side pawl to the center of the ratchet.

(b) While turning the tilt lever side collar, completely engage the tilt lever side pawl to the ratchet.

(c) Tighten the nut.

Torque: 60 kg-cm (52 in.-lb, 5.9 N·m)

(d) Check that the pawls rotate smoothly.



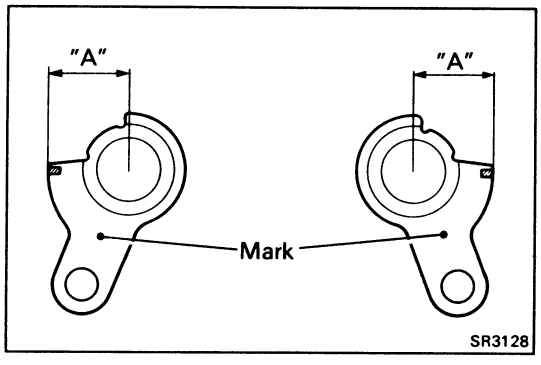
8. SELECT PAWL STOPPERS

(a) With the tilt pawl and ratchet engaged, install two pawl stoppers.

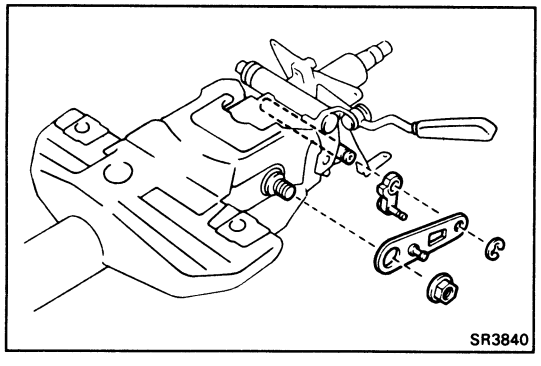
(b) Check that the alignment marks on the stopper and pawl align when the stopper is rotated to the pawl side.

(c) If the alignment marks do not align, select pawl stoppers according to the following table.

Tilt lever side	Tilt sub lever side	Dimension "A" mm (in.)
1	A	12.65 – 12.75 (0.4980 – 0.5020)
2	B	12.55 – 12.65 (0.4941 – 0.4980)
3	C	12.45 – 12.55 (0.4902 – 0.4941)
4	D	12.35 – 12.45 (0.4862 – 0.4902)
5	E	12.25 – 12.35 (0.4823 – 0.4862)



(d) After selecting the stoppers, check that on both sides the pawl and ratchet are fully engaged.



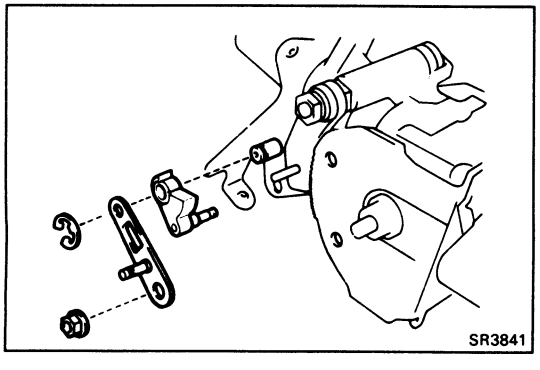
9. INSTALL PAWL STOPPERS AND TILT LEVER RETAINERS

(a) Install the tilt sub lever side pawl stopper and tilt lever retainer.

(b) Install the E-ring.

(c) Install and torque the nut.

Torque: 150 kg-cm (11 ft-lb, 15 N·m)

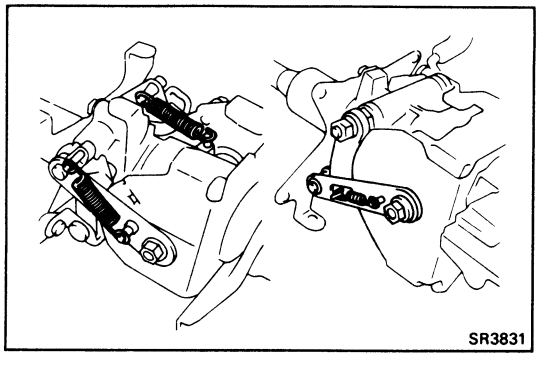


(d) Install the tilt lever side pawl stopper and tilt lever retainer.

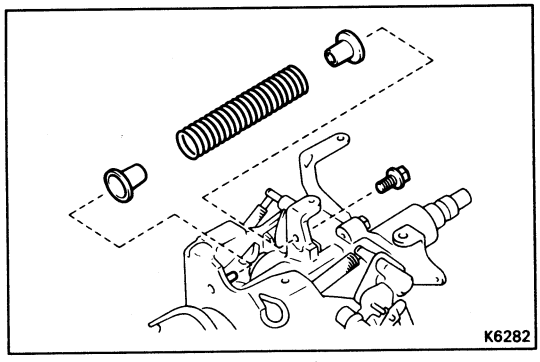
(e) Install the E-ring.

(f) Install and torque the nut.

Torque: 150 kg-cm (11 ft-lb, 15 N·m)



10. INSTALL THREE TENSION SPRINGS



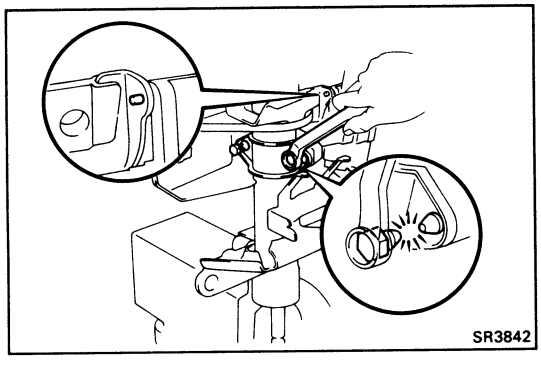
11. INSTALL COMPRESSION SPRING

(a) Install the two bushings to the spring.

(b) Install the spring and bolt.

(c) Torque the bolt.

Torque: 80 kg-cm (69 in.-lb, 7.8 N·m)



12. INSTALL UPPER BRACKET

(a) Install the upper bracket with new tapered-head bolts.

HINT: Insert the upper bracket pin into the column tube hole.

(b) Tighten the tapered-head bolts until the bolt heads brake off.

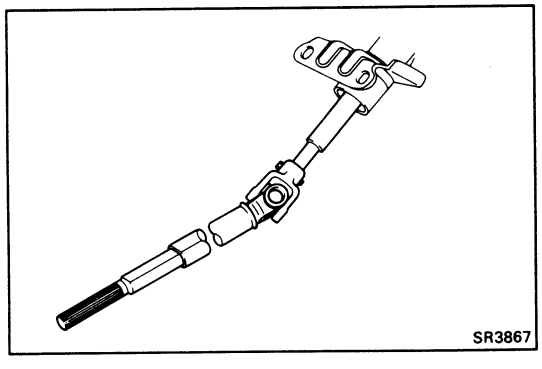
13. (USA)
INSTALL PROTECTOR

14. INSTALL WIRING HARNESS CLAMP

15. INSTALL INTERMEDIATE SHAFT

Torque: 360 kg-cm (26 ft-lb, 35 N·m)

16. INSTALL IGNITION KEY CYLINDER ILLUMINATION



17. CHECK OPERATION OF TILT STEERING

(a) Check that there is no axial play at the end of the main shaft.

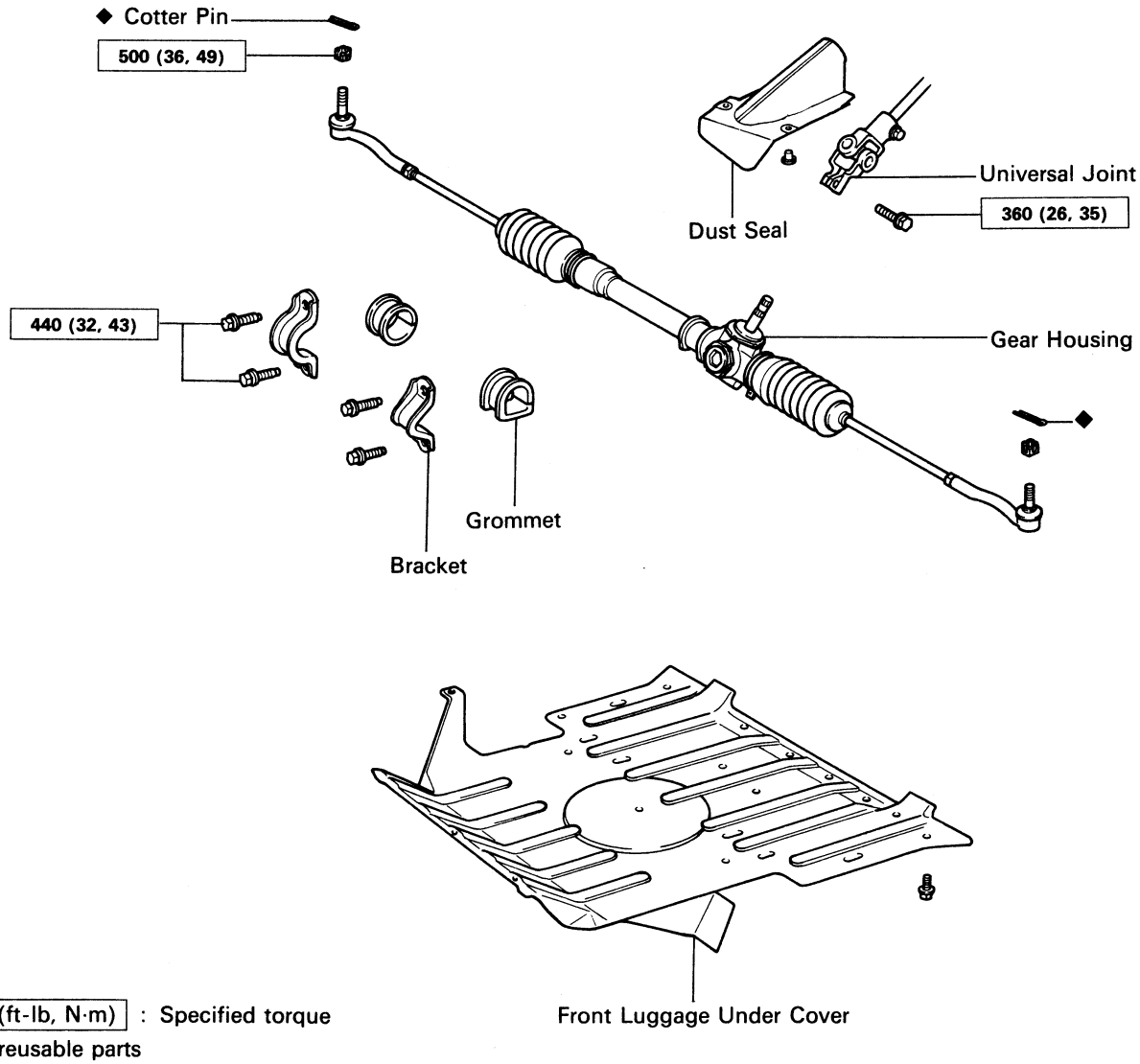
(b) With the main shaft in the neutral position, push the tilt lever and check that the main shaft rises to the uppermost position.

(c) Lower the main shaft, and check that it locks in the uppermost position.

MANUAL STEERING GEAR HOUSING

REMOVAL AND INSTALLATION OF STEERING GEAR HOUSING

Remove and install the parts as shown.

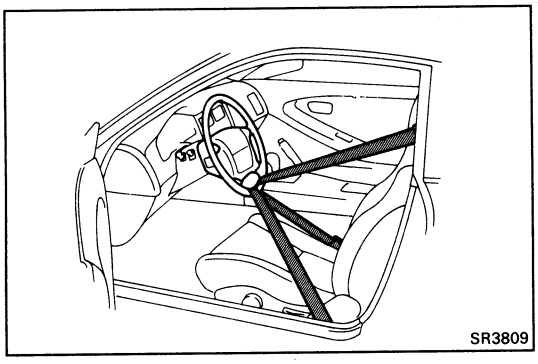


(MAIN POINTS OF REMOVAL AND INSTALLATION)

(USA)

NOTICE: When disconnecting the universal joint during removal of the gear housing, remove the steering wheel and perform centering of the spiral cable. (See page AB-15)

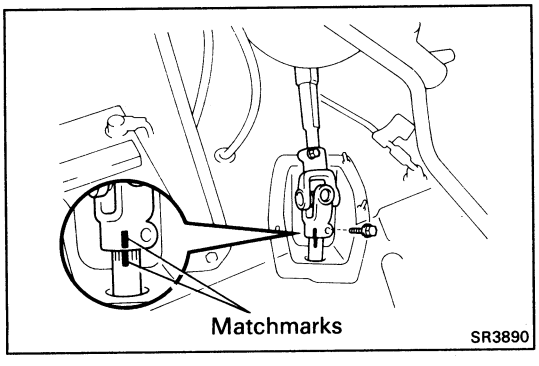
If the operation is performed without removing the steering wheel, use the procedure below to make sure the steering wheel is firmly fixed in position and cannot turn.



1. DISCONNECT UNIVERSAL JOINT

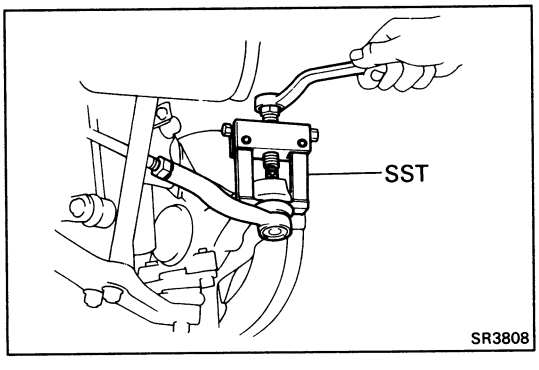
(a) Position the front wheels facing straight ahead.

(b) Using the seat belt of the driver's seat, fix the steering wheel so that it does not turn.



(c) Place matchmarks on the universal joint and pinion shaft.

(d) Loosen the bolt on the upper side of the universal joint, remove the bolt on the lower side and disconnect the universal joint.



2. DISCONNECT TIE ROD ENDS

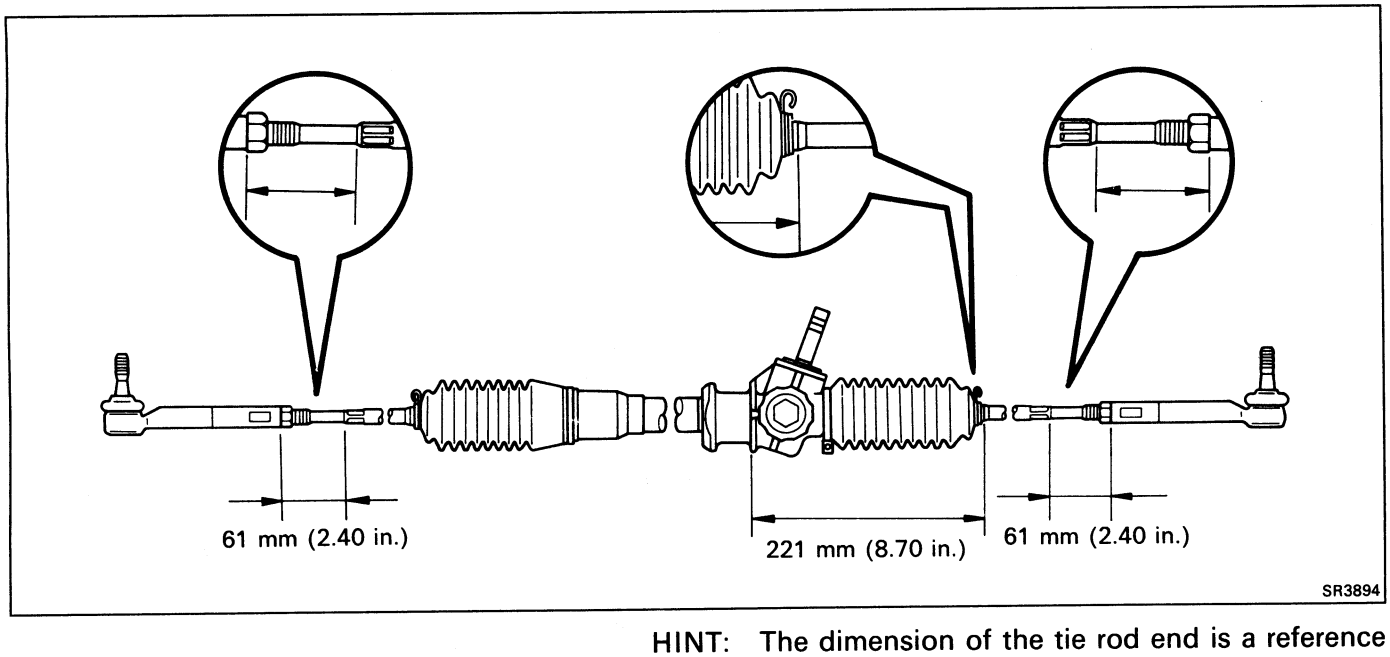
(a) Remove the cotter pin and nut.

(b) Using SST, disconnect the tie rod end from the knuckle arm.

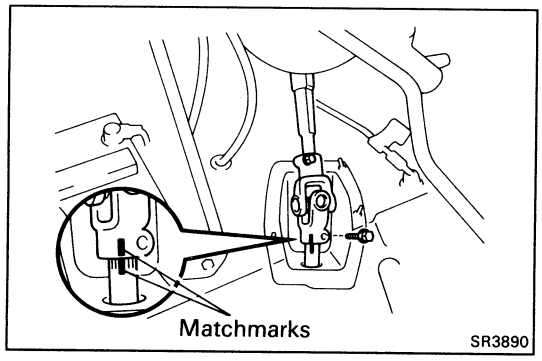
SST 09628-62011

3. CONNECT UNIVERSAL JOINT

(a) Set the gear housing so that it matches the dimensions shown below, with the gear housing at the center point.



HINT: The dimension of the tie rod end is a reference value, so always adjust the toe-in before tightening the lock nut.



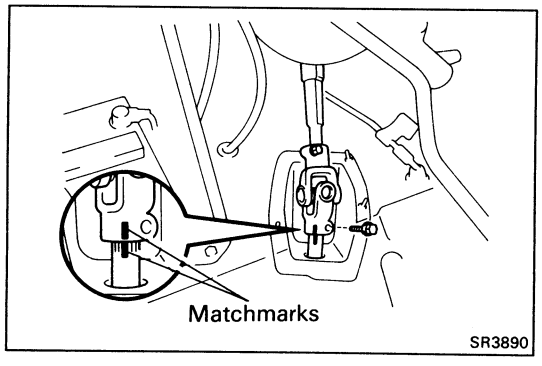
(b) Align matchmarks on the universal joint and pinion shaft and connect them.

4. **CENTER SPIRAL CABLE**

If the steering wheel has been removed, or the steering wheel may have moved during the operation, always perform centering of the spiral cable.
(See page AB-16)

5. **CHECK STEERING WHEEL CENTER POINT**

6. **CHECK TOE-IN**
(See page SA-4)

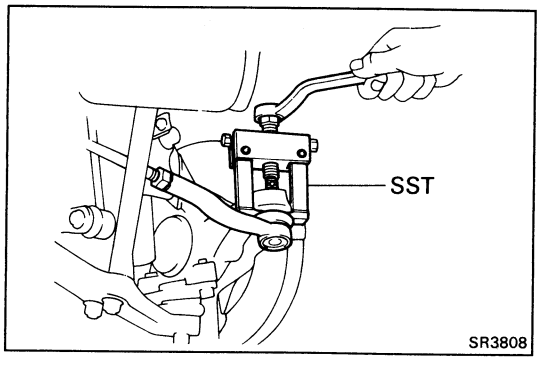


(CANADA)

1. **DISCONNECT UNIVERSAL JOINT**

(a) Place matchmarks on the universal joint and pinion shaft.

(b) Loosen the bolt on the upper side of the universal joint, remove the bolt on the lower side and disconnect the universal joint.



2. **DISCONNECT TIE ROD ENDS**

(a) Remove the cotter pin and nut.

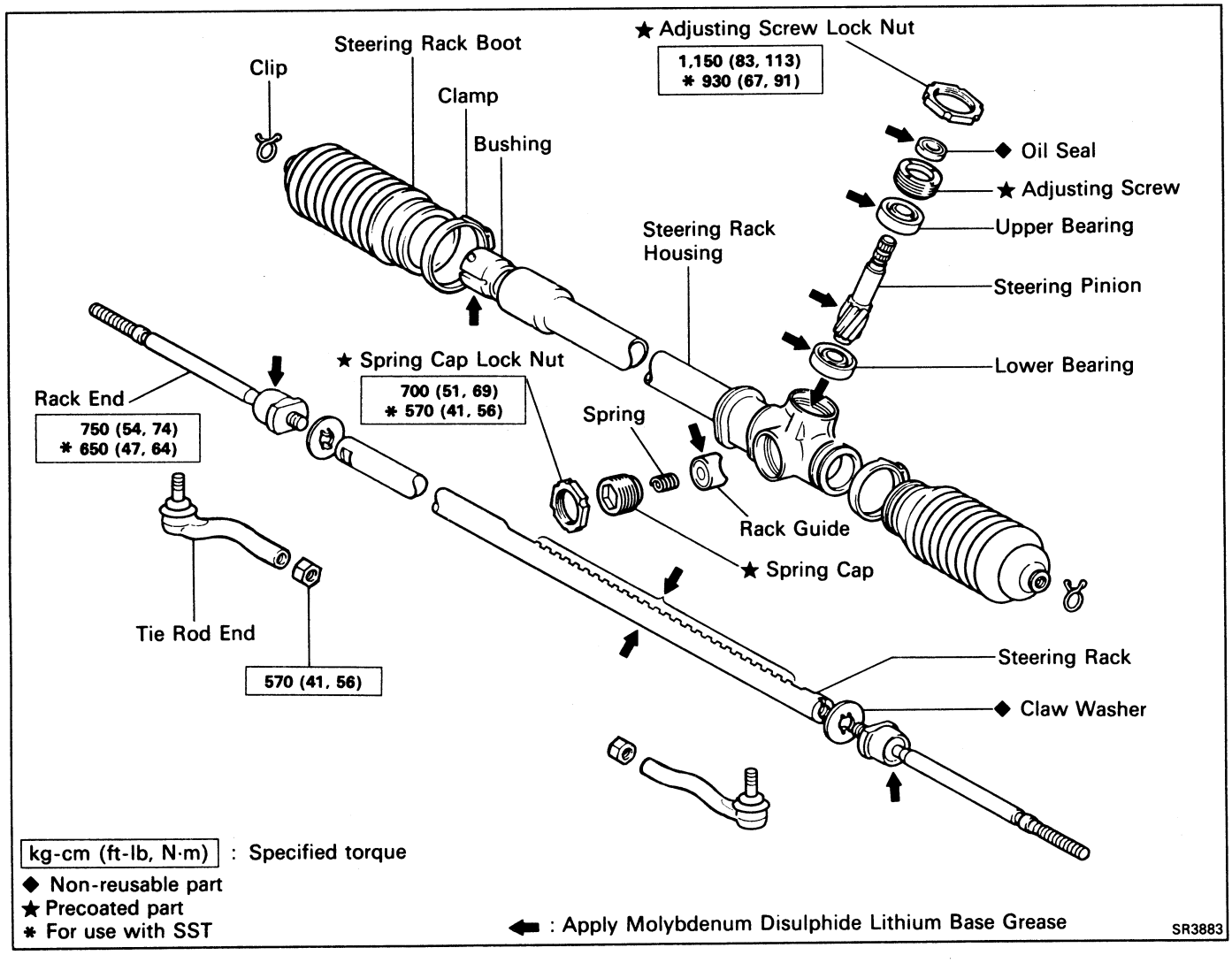
(b) Using SST, disconnect the tie rod end from the knuckle arm.

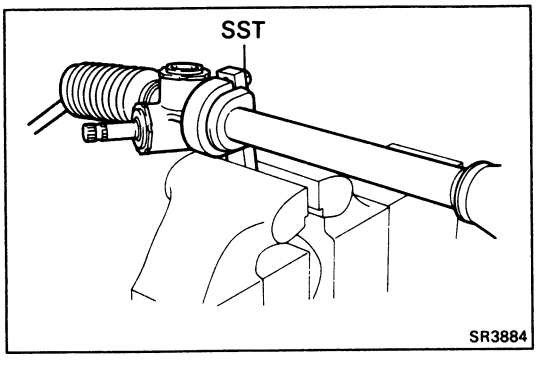
SST 09628-62011

3. **CHECK STEERING WHEEL CENTER POINT**

4. **CHECK TOE-IN**
(See page SA-4)

COMPONENTS



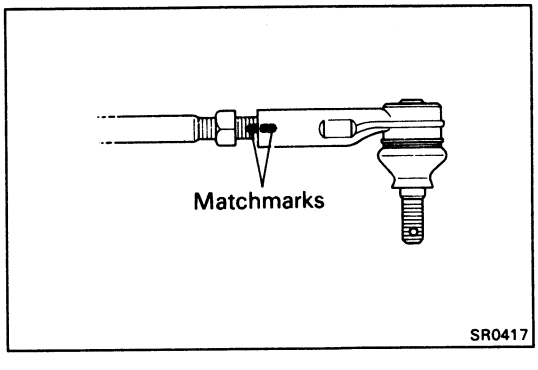


DISASSEMBLY OF GEAR HOUSING

1. CLAMP GEAR HOUSING IN VISE

Using SST, clamp the gear housing in a vise.

SST 09612-00012



2. REMOVE TIE ROD ENDS

(a) Loosen the lock nuts and place matchmarks on the tie rod ends and rack ends.

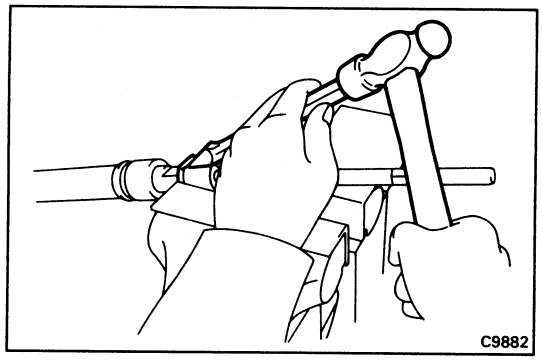
(b) Remove the tie rod ends and lock nuts.

3. REMOVE RACK BOOTS

(a) Remove the clips and clamps.

(b) Remove the rack boots.

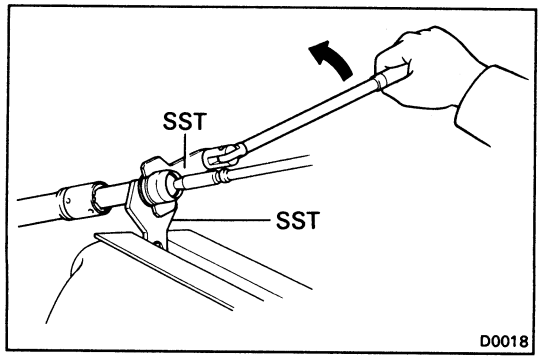
(c) Mark the left and right boots accordingly.



4. REMOVE RACK ENDS

(a) Unstake the claw washers.

NOTICE: Avoid any impact to the rack.

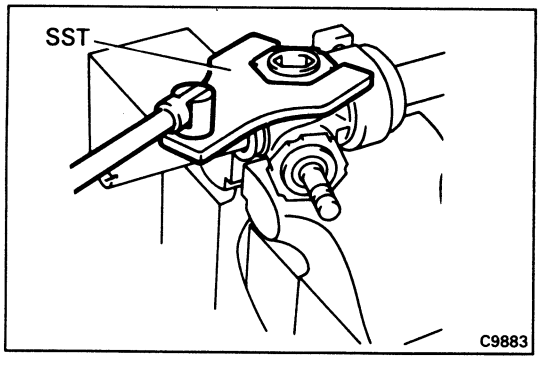


(b) Using SST, remove the rack ends.

SST 09612-10093 (09628-10020) and
09612-24014 (09617-24011)

(c) Mark the left and right rack ends accordingly.

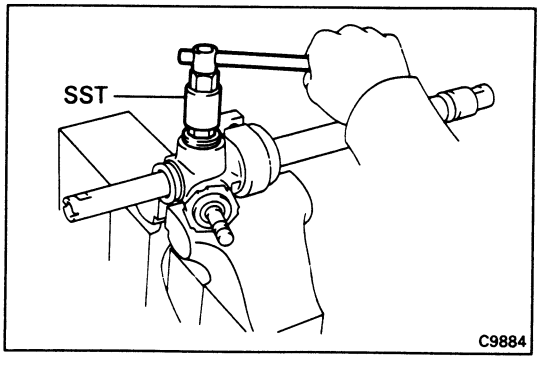
(d) Remove the claw washers.



5. REMOVE RACK GUIDE SPRING CAP LOCK NUT

Using SST, remove the rack guide spring cap lock nut.

SST 09612-10093 (09617-10010)

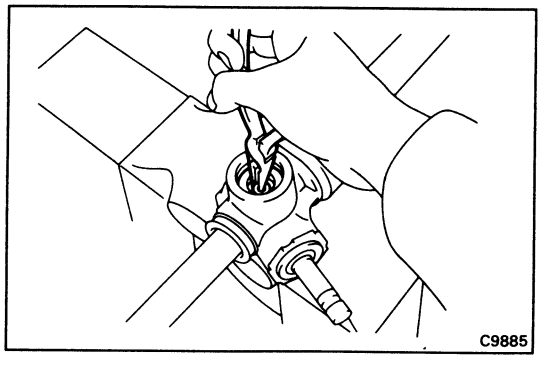


6. REMOVE RACK GUIDE SPRING CAP

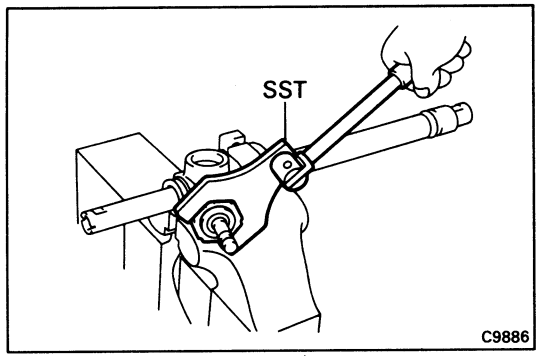
Using SST, remove the rack guide spring cap.

SST 09612-24014 (09612-10022)

7. REMOVE RACK GUIDE SPRING



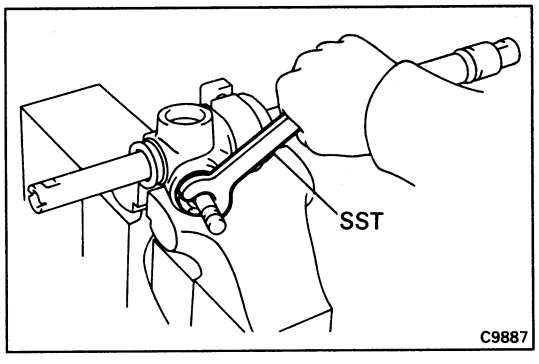
8. REMOVE RACK GUIDE



9. REMOVE PINION BEARING ADJUSTING SCREW LOCK NUT

Using SST, remove the pinion bearing adjusting screw lock nut.

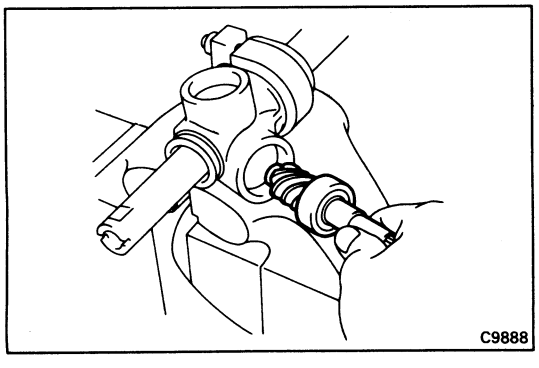
SST 09612-10093 (09617-10010)



10. REMOVE PINION BEARING ADJUSTING SCREW

Using SST, remove the pinion bearing adjusting screw.

SST 09612-24014 (09616-10020)

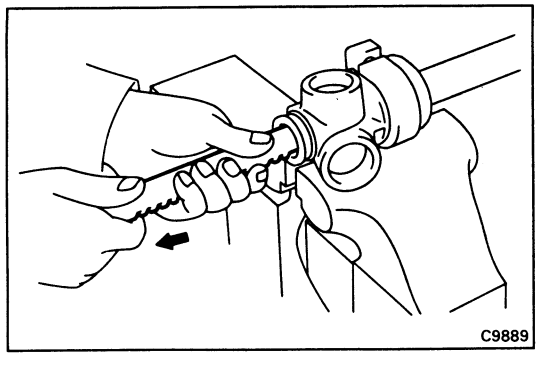


11. REMOVE PINION WITH UPPER BEARING

HINT: Be careful not to damage the serrations.

(a) Fully pull the rack from the housing side and align the rack notched portion with the pinion.

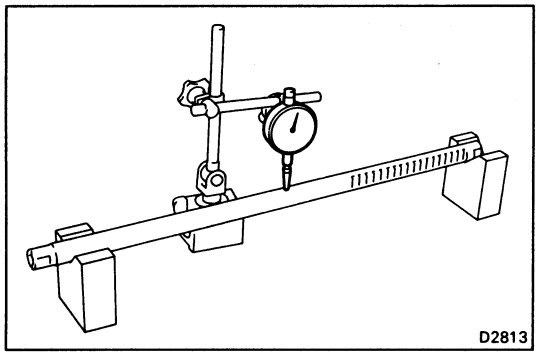
(b) Remove the pinion together with the upper bearing.



12. REMOVE RACK

Remove the rack from the pinion side without revolving it.

HINT: If the rack is pulled from the tube side, there is a possibility of damaging the bushing with the rack teeth surface.


D2813

INSPECTION AND REPAIR OF GEAR HOUSING COMPONENTS

1. INSPECT RACK

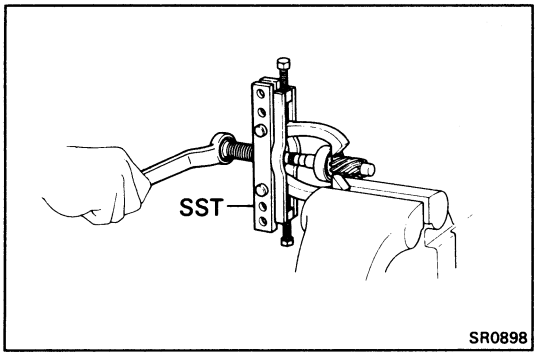
(a) Check the rack for runout and for teeth wear or damage.

Maximum runout: 0.3 mm (0.012 in.)

(b) Check the back surface for wear or damage.

If faulty, replace it.

NOTICE: Do not use a wire brush when cleaning.

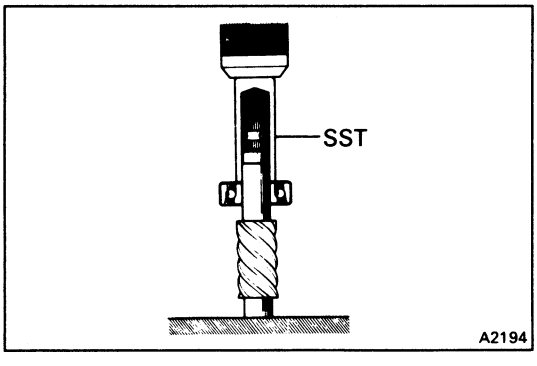


SR0898

2. IF NECESSARY, REPLACE PINION UPPER BEARING

(a) Using SST, remove the upper bearing.

SST 09950-20017



A2194

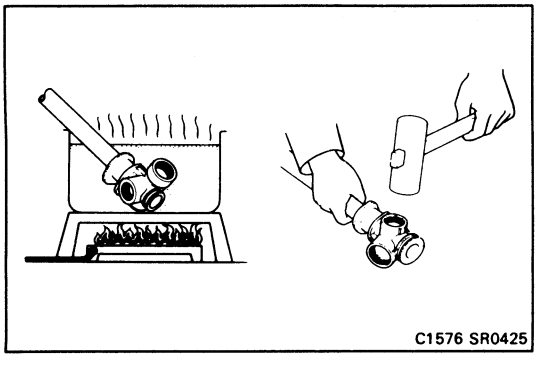
(b) Using SST, install a new upper bearing.

SST 09612-24014 (09612-10061)

3. IF NECESSARY, REPLACE PINION LOWER BEARING

(a) Heat the rack housing to above 80°C (176°F).

(b) Tap the rack housing with a plastic hammer or such to remove the lower bearing by recoil.

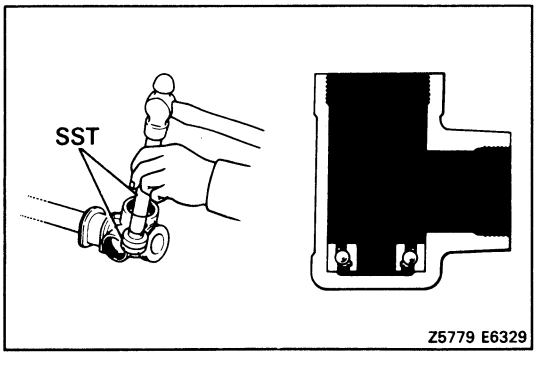

C1576 SR0425

(c) Heat the rack housing to above 80°C (176°F).

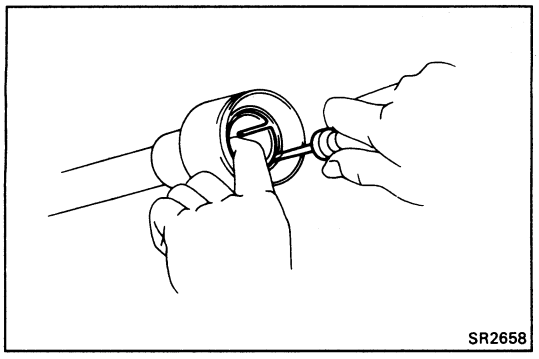
(d) Using SST, install a new lower bearing.

SST 09620-30010 (09631-00020) and 09630-24013 (09620-24030)

HINT: Observe the correct bearing direction.

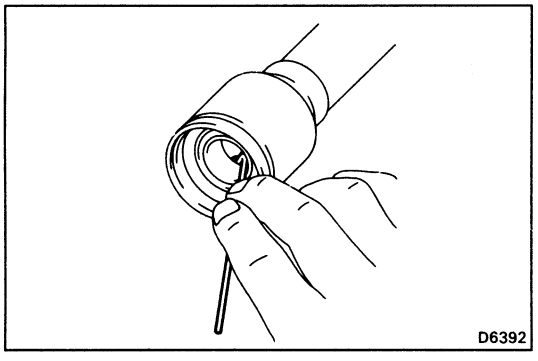


Z5779 E6329


SR2658

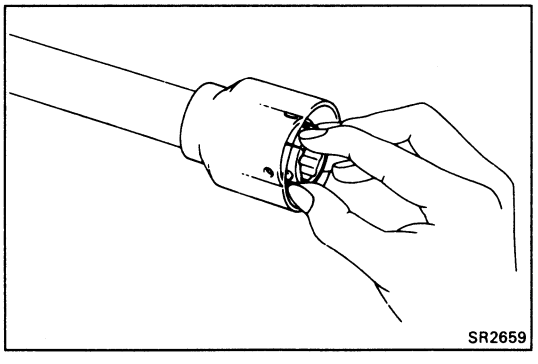
4. IF NECESSARY, REPLACE RACK BUSHING

(a) Using a screwdriver, loosen the three bushing claws and remove the rack busing from the rack housing.

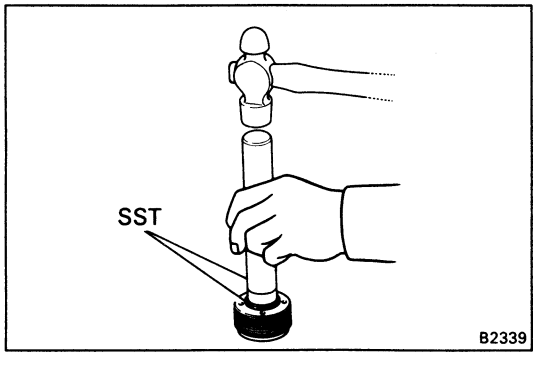

D6392

(b) Insure that the tube holes are not clogged with grease.

HINT: If the tube holes are clogged, the pressure inside the boot will change after it is assembled and the steering wheel turned.


SR2659

(c) Install a new bushing into the rack housing, making sure to align into the three holes.

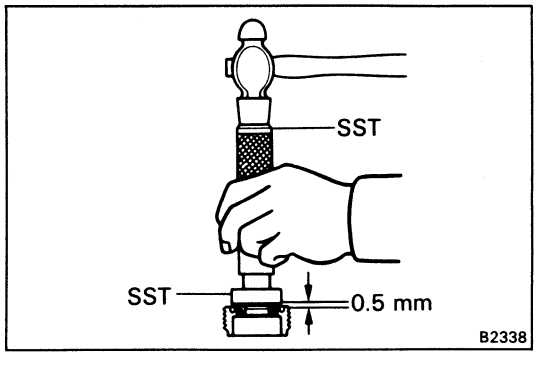


B2339

5. IF NECESSARY, REPLACE PINION OIL SEAL

(a) Using SST, remove the pinion oil seal.

SST 09620-30010 (09631-00020) and 09630-24013 (09620-24010)



B2338

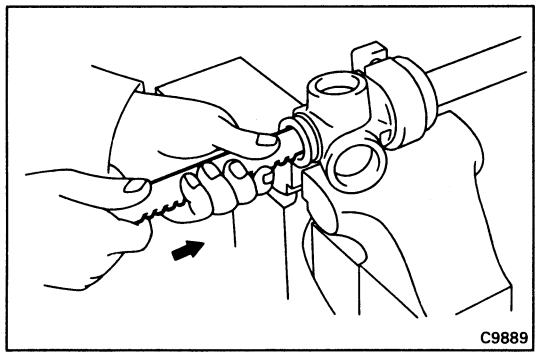
(b) Using SST, drive in a new oil seal until it is protruding 0.5 mm (0.020 in.).

SST 09620-30010 (09631-00020) and 09630-24013 (09620-24020)

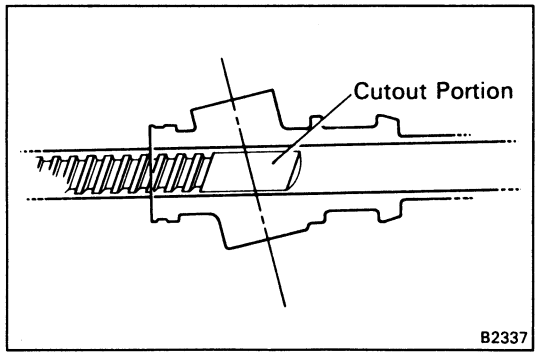
ASSEMBLY OF GEAR HOUSING

(See page SR-18)

1. **PACK MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE**
(See page SR-18)

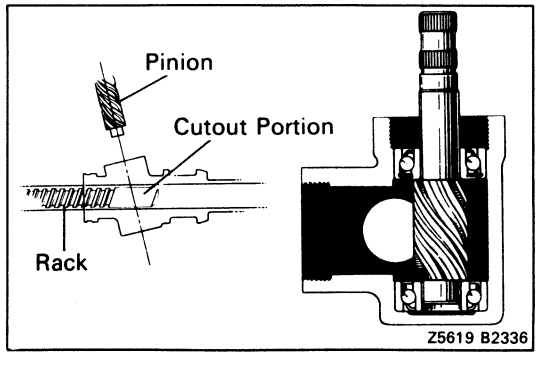

C9889

2. **INSTALL RACK INTO RACK HOUSING**
   (a) From the pinion side, install the rack into the rack housing.
   (b) Set the rack notched side so that the pinion can be positioned inside.



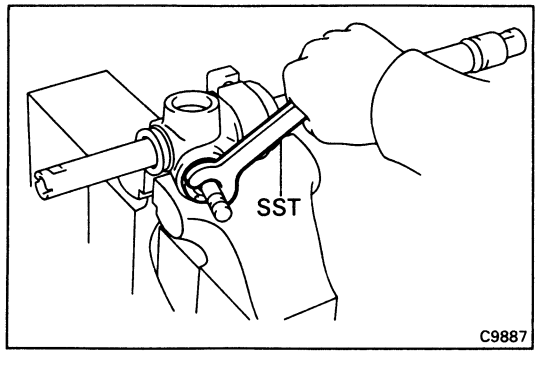
B2337

   (c) Line up the cutout portion of the rack with the pinion.



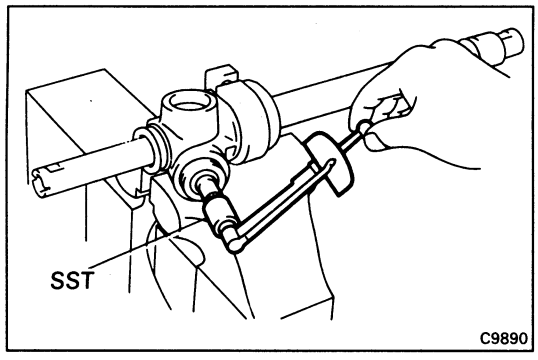
Z5619 B2336

3. **INSTALL PINION INTO HOUSING**
Insure that the pinion end is securely in the lower bearing.



C9887

4. **INSTALL PINION BEARING ADJUSTING SCREW**
   (a) Coat sealant onto the screw threads.
   Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent
   (b) Using SST, install the pinion bearing adjusting screw.
   SST 09612-24014 (09616-10020)

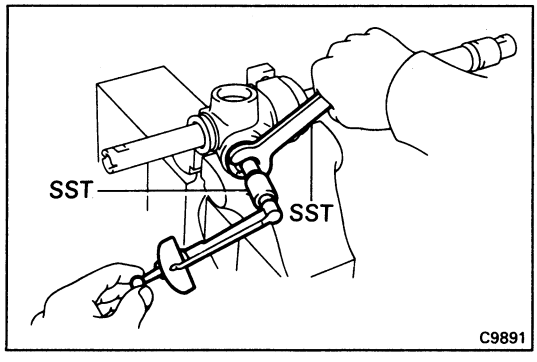


5. ADJUST PINION PRELOAD

(a) Line up the cutout portion of the rack with the pinion.

(b) Using SST, tighten the pinion bearing adjusting screw to the point where the turning torque is 3.7 kg-cm (3.2 in.-lb, 0.4 N·m).

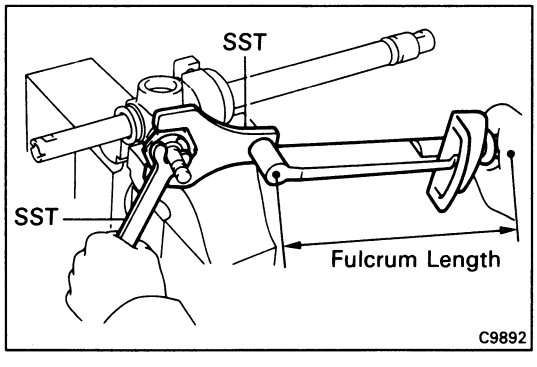
SST 09612-24014 (09616-10010, 09616-10020)



(c) Using SST, loosen the pinion bearing adjusting screw to the point where the turning torque is 2.3 – 3.3 kg-cm (2.0 – 2.9 in.-lb, 0.2 – 0.3 N·m).

SST 09612-24014 (09616-10010, 09616-10020)

Preload (turning): 2.3 – 3.3 kg-cm (2.0 – 2.9 in.-lb, 0.2 – 0.3 N·m)



6. INSTALL PINION BEARING ADJUSTING SCREW LOCK NUT

(a) Apply sealant to 2 or 3 threads of the lock nut.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(b) Using SST, install the lock nut.

SST 09612-10093 (09617-10010) and 09612-24014 (09616-10020)

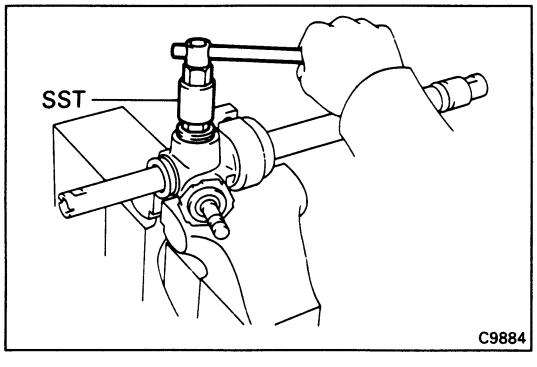
Torque: 930 kg-cm (67 ft-lb, 91 N·m)

HINT: Use a torque wrench with a fulcrum length of 425 mm (16.73 in.).

(c) Recheck the pinion preload.

If incorrect, readjust.

Preload (turning): 1.5 – 2.5 kg-cm (1.3 – 2.2 in.-lb, 0.1 – 0.2 N·m)



7. INSTALL RACK GUIDE AND SPRING

8. INSTALL RACK GUIDE SPRING CAP

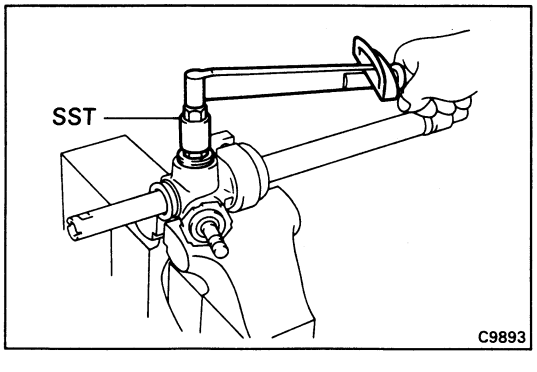
(a) Apply sealant to 2 or 3 threads of the cap.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(b) Mesh the rack with the pinion.

(c) Using SST, install the rack guide spring cap.

SST 09612-24014 (09612-10022)



9. ADJUST TOTAL PRELOAD

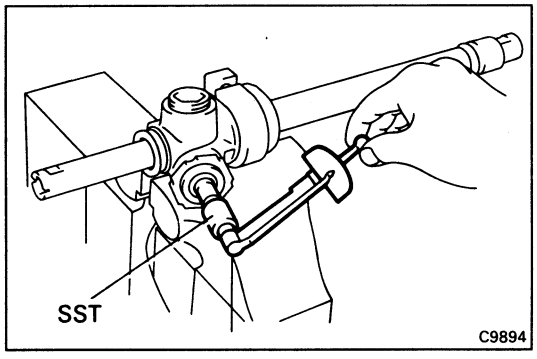
(a) Using SST, tighten the rack guide spring cap.

SST 09612-24014 (09612-10022)

Torque: 250 kg-cm (18 ft-lb, 25 N·m)

(b) Using SST, return the rack spring cap 25°.

SST 09612-24014 (09612-10022)

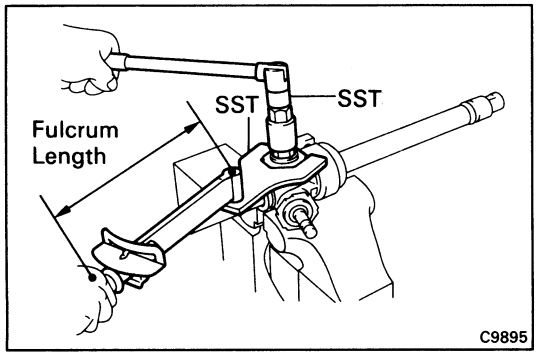


(c) Measure the total preload with SST.

SST 09612-24014 (09616-10010)

Preload (turning): 6 – 13 kg-cm (5.2 – 11.3 in.-lb, 0.6 – 1.3 N·m)

- If preload is insufficient:
  Retorque the rack guide spring cap, and return it 12° or slightly less.
- If there is excess preload:
  Slightly return the rack guide spring cap.



10. INSTALL RACK GUIDE SPRING CAP LOCK NUT

(a) Apply sealant to 2 or 3 threads of the lock nut.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(b) Using SST, install the lock nut.

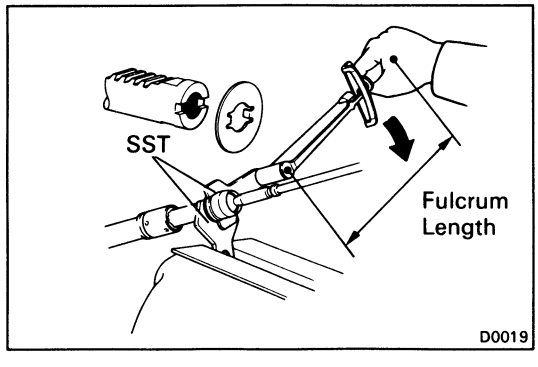
SST 09612-10093 (09617-10010) and 09612-24014 (09612-10022)

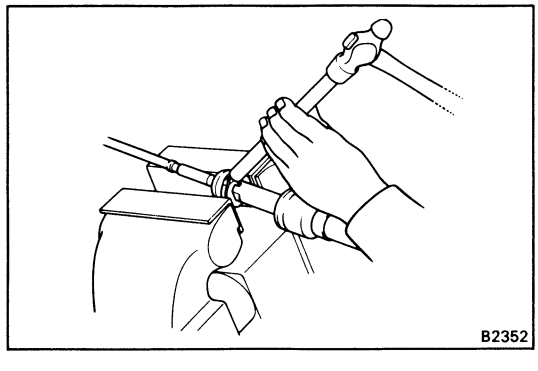
Torque: 570 kg-cm (41 ft-lb, 56 N·m)

HINT: Use a torque wrench with a fulcrum length of 340 mm (13.39 in.).

(c) Recheck the total preload. If incorrect, readjust.

Preload (turning): 6 – 13 kg-cm (5.2 – 11.3 in.-lb, 0.6 – 1.3 N·m)





11. INSTALL RACK ENDS

(a) Install new claw washers.

HINT: Align the claw of the claw washer with the rack groove.

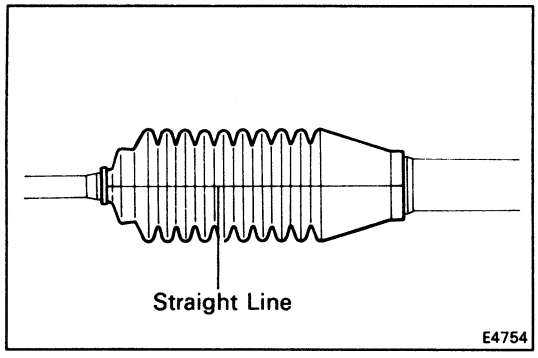
(b) Using SST, install the rack ends.

SST 09612-10093 (09628-10020) and 09612-24014 (09617-24011)

Torque: 650 kg-cm (47 ft-lb, 64 N·m)

HINT: Use a torque wrench with a fulcrum length of 340 mm (13.39 in.).

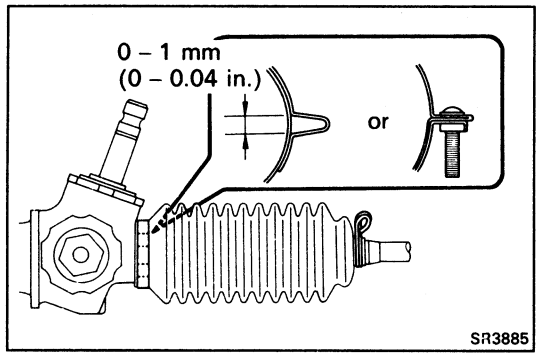
(c) Using a brass bar and hammer, stake the claw washers.



12. INSTALL RACK BOOTS

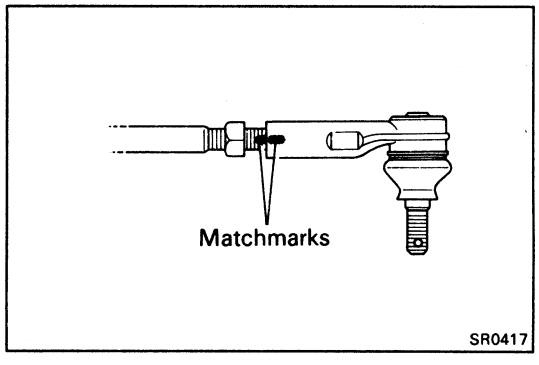
(a) Install the rack boots.

HINT: Be careful not to damage or twist the boot. The left and right boots are different. Be careful not to interchange them.



(b) Install the clamps and clips.

HINT: Face the open ends of the clip outward as shown, to avoid damage to the boot.



13. INSTALL TIE ROD ENDS

(a) Screw the lock nuts and tie rod ends onto the rack ends until the matchmarks are aligned.

(b) After adjusting toe-in, torque the lock nuts.

Torque: 570 kg-cm (41 ft-lb, 56 N·m)

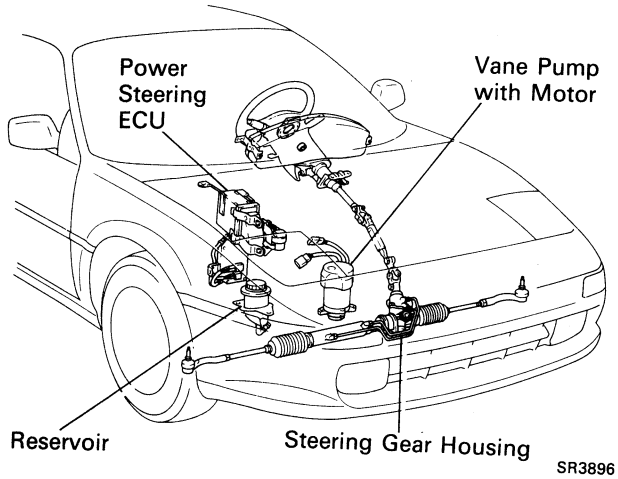
POWER STEERING

Description

EHPS (Electro-Hydraulic Power Steering)

In conventional and ordinary hydraulically-controlled power steering, hydraulic pressure needed for control is generated when the pump is turned by the engine. In the EHPS, the pump is turned by an electric motor.

The ECU controls the voltage acting on the pump motor according to the movement of the steering wheel and the vehicle speed. The pump motor speed is changed accordingly to modulate the hydraulic pressure being generated in the pump.

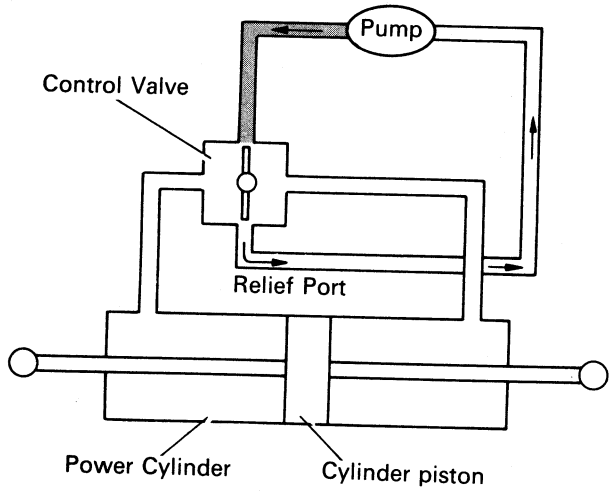


SR3896

PRINCIPLES OF POWER STEERING

NEUTRAL (STRAIGHT-AHEAD) POSITION

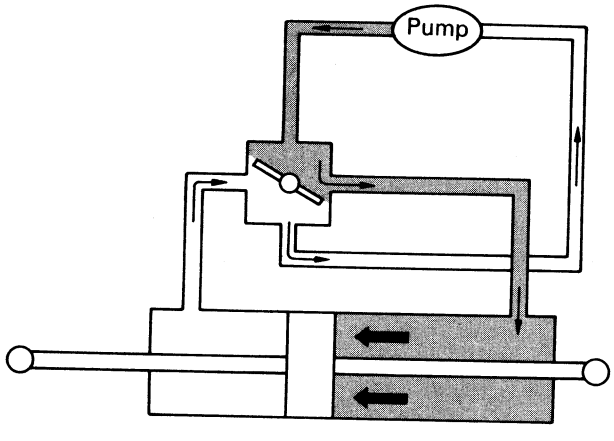
Fluid from the pump is sent to the control valve. If the control valve is in the neutral position, all the fluid will flow through the control valve into the relief port and back to the pump. At this time, hardly any pressure is created and because the pressure on the cylinder piston is equal on both sides, the piston will not move in either direction.



SR2390

WHEN TURNING

When the steering main shaft is turned in either direction, the control valve also moves, closing one of the fluid passages. The other passage then opens wider, causing a change in fluid flow volume and, at the same time, pressure is created. Consequently, a pressure difference occurs between both sides of the piston and the piston moves in the direction of the lower pressure so that the fluid in the cylinder is forced back to the pump through the control valve.



SR2391

SERVICE HINT

Troubles with the power steering system are usually concerned with hard steering due to the fact that there is no assist. In such cases, before attempting to make repairs, it is necessary to determine whether the trouble lies with the pump or with the gear housing. To do this, an on-vehicle inspection can be made by using a pressure gauge.

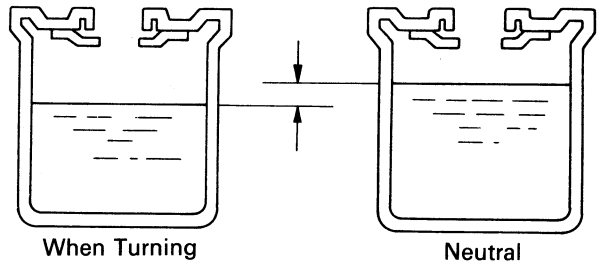
ON-VEHICLE INSPECTION

Power steering is a hydraulic device and problems are normally due to insufficient fluid pressure acting on the piston. This could be caused by either the pump not producing the specified fluid pressure or the control valve in the gear housing not function properly so that the proper fluid pressure can not be obtained.

If the fault lies with the pump, the same symptoms will generally occur whether the steering wheel is turned fully to the right or left. On the other hand, if the fault lies with the control valve, there will generally be a difference between the amount of assist when the steering wheel is turned to the left and right, causing harder steering. However, if the piston seal of the power cylinder is worn, there will be a loss of fluid pressure whether the steering wheel is turned to the right or left and the symptoms will be the same for both.

Before performing an on-vehicle inspection , a check must first be made to confirm that the power steering system is completely free of any air. If there is any air in the system, the volume of this air will change when the fluid pressure is raised, causing a fluctuation in the fluid pressure so that the power steering will not function properly. To determine if there is any air in the system, check to see if there is a change of fluid level in the reservoir tank when the steering wheel is turned fully to the right or left.

For example, if there is air in the system, it will be compressed to a smaller volume when the steering wheel is turned, causing a considerable drop in the fluid level. If the system is free of air, there will be very little change in the level even when the fluid pressure is raised. This is because the fluid, being a liquid, does not change volume when compressed. The little change in the fluid level is due to expansion of the hoses between the pump and gear housing when pressure rises.



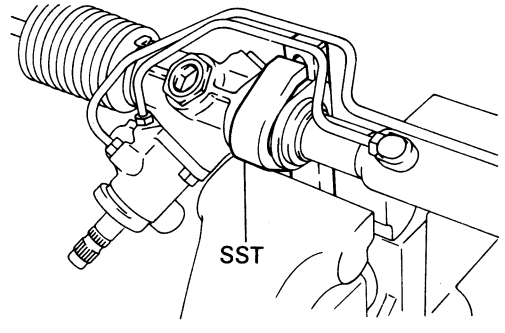
SR2392 SR2393

Also, air in the system will sometimes result in an abnormal noise occuring from the pump or gear housing when the steering wheel is fully turned in either direction.

This on-vehicle inspection must be performed every time to ensure that the power steering system is working properly after overhauling or replacing the pump or gear housing.

GEAR HOUSING

If the gear housing is secured directly in a vise during overhaul, there is danger of deforming it, so always first secure it in the SST provided (rack and pinion steering rack housig stand) before placing it in the vise.



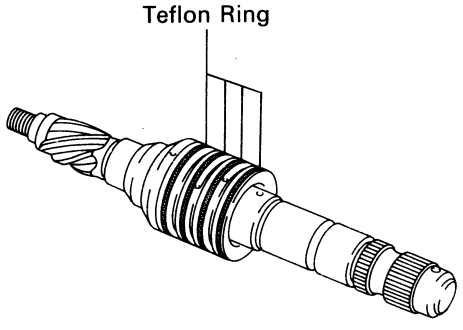
X2369R

The oil seals on both sides of the power cylinder are for the prevention of leakage of the high pressure fluid which acts on the piston. Always use new oil seals when reassembling and be very careful not to scratch or damage them.

Because of the high pressure, even the slightest scratch will cause fluid leakage, resulting in an inoperative power steering system.

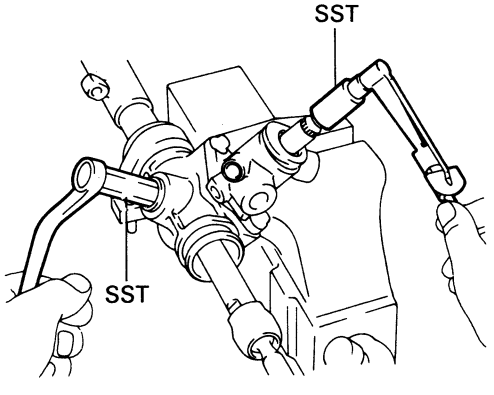
Also, be very careful not to scratch the sliding portion of the rack which makes contact with the oil seals. When removing the rack ends from the rack, it is very easy to cause a burr when holding the tip of the rack with a wrench. Therefore, before assembling the rack, first check the tip for burrs and remove any with an oil stone.

Teflon rings are used for the piston and control valve. These teflon rings are highly durable against wear, but if it is necessary to replace them, be careful not to stretch the new ones. After installing a teflon ring into its groove, snug it down into the groove before assembly of the cylinder or housing to prevent possible damage.



SR3900

As with the rack and pinion type steering, preload is very important. If the preload is not correct, it could result in such trouble as steering wheel play or shimmy or lack of durability, so always make sure that it is correct.



X2413R

On-Vehicle Inspection

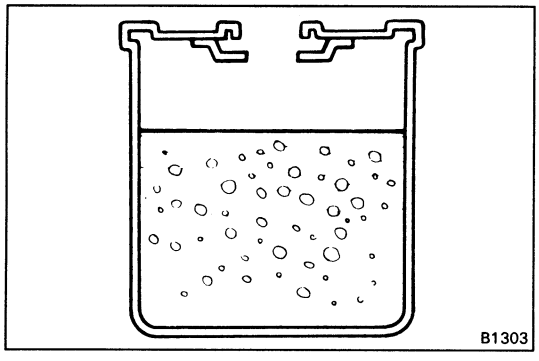
FLUID LEVEL CHECK

1. **KEEP VEHICLE LEVEL**

2. **BOOST FLUID TEMPERATURE**

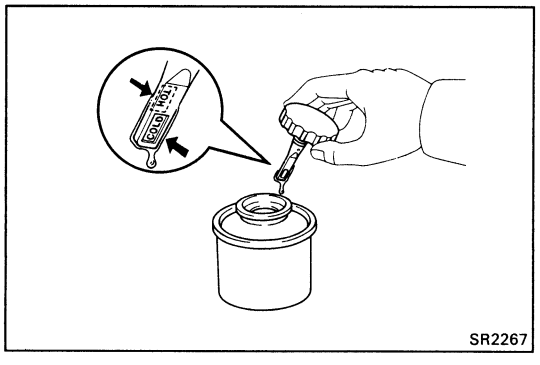
   With the engine idling at 1,000 rpm or less, turn the steering wheel from lock to lock ten or more times to boost fluid temperature.

   Fluid temperature: 40°C or more (104°F or more)



3. **CHECK FOR FOAMING OR EMULSIFICATION**

   HINT: Foaming and emulsification indicate either 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: TOYOTA POWER STEERING FLUID EH (Part No. 08886-01206) or equivalent

   HINT: 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 of the dipstick.

   NOTICE: Use only TOYOTA PS fluid EH or equivalent. Otherwise, you may not get expected power assist.

BLEEDING OF POWER STEERING SYSTEM

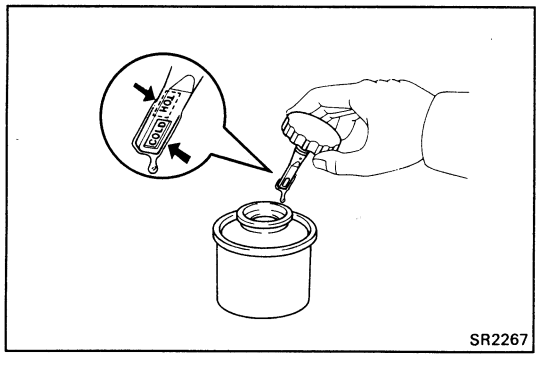
1. **CHECK FLUID LEVEL IN RESERVOIR TANK**

   Check the fluid level and add fluid if necessary.

   Fluid: TOYOTA POWER STEERING FLUID EH (Part No. 08886-01206) or equivalent

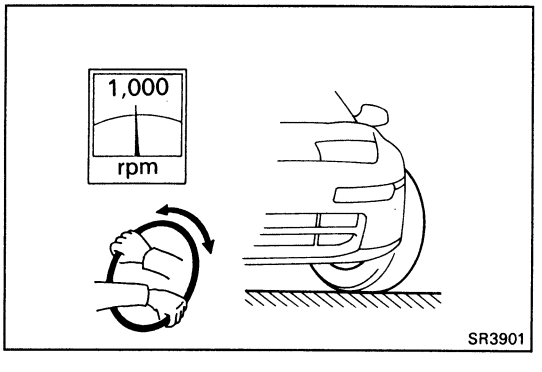
   HINT: Check that the fluid level is within the HOT LEVEL of the dipstick. If the fluid is cold, check that it is within the COLD LEVEL of the dipstick.

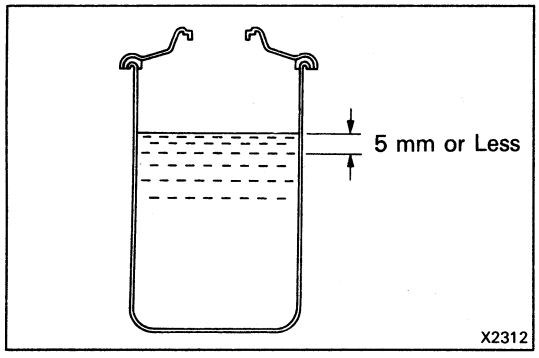
   NOTICE: Use only TOYOTA PS fluid EH or equivalent. Otherwise, you may not get expected power assist.



2. **START ENGINE AND TURN STEERING WHEEL FROM LOCK TO LOCK THREE OR FOUR TIMES**

   With the engine speed below 1,000 rpm, turn the steering wheel to left or right full lock and keep it there for 2 – 3 seconds, then turn the wheel to the reverse full lock and keep it there for 2 – 3 seconds.





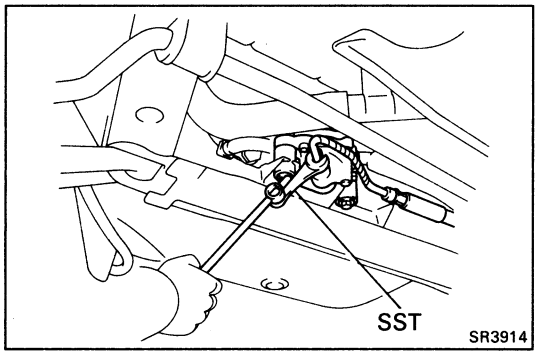
3. **CHECK THAT FLUID IN RESERVOIR IS NOT FOAMY OR CLOUDY AND DOES NOT RISE OVER MAXIMUM WHEN ENGINE IS STOPPED**

Measure the fluid level with the engine running. Stop the engine and measure the fluid level.

Maximum rise: 5 mm (0.20 in.)

OIL PRESSURE CHECK

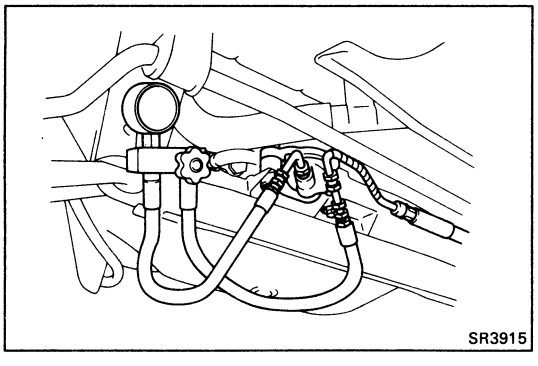
NOTICE: When supplementing the power steering fluid, use TOYOTA POWER STEERING FLUID EH or equivalent which is exclusively for EHPS use.



1. **CONNECT PRESSURE GAUGE**

(a) Using SST, disconnect the pressure line from the PS pump.

SST 09631-22020



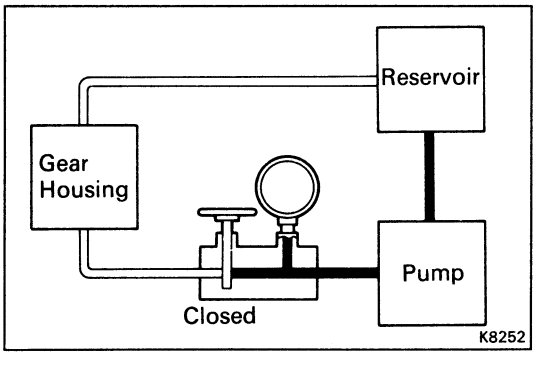
(b) Connect the gauge side of the pressure gauge to the PS pump and the valve side to the pressure line.

(c) Bleed the system. Start the engine and turn the steering wheel from lock to lock two or three times.

(d) Check that the fluid level is correct.

2. **CHECK THAT FLUID TEMPERATURE IS AT LEAST 40°C (104°F)**

3. **START ENGINE AND RUN IT AT IDLE**



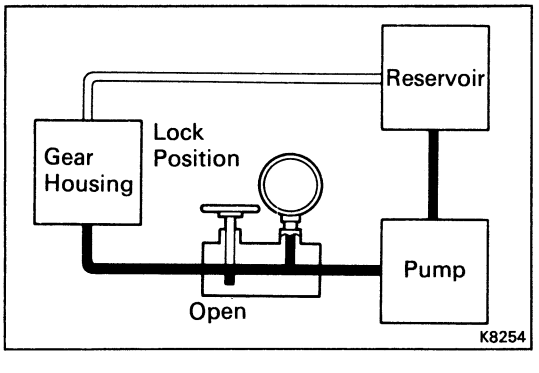
4. **CHECK FLUID PRESSURE READING WITH VALVE CLOSED**

Close the pressure gauge valve and observe the reading on the gauge while turning the steering wheel.

Minimum pressure: 50 kg/cm² (711 psi, 4,903 kPa)

NOTICE:

- **Do not keep the valve closed for more than 10 seconds.**
- **Do not let the fluid temperature become too high.**



5. **CHECK PRESSURE READING WITH STEERING WHEEL TURNED TO FULL LOCK**

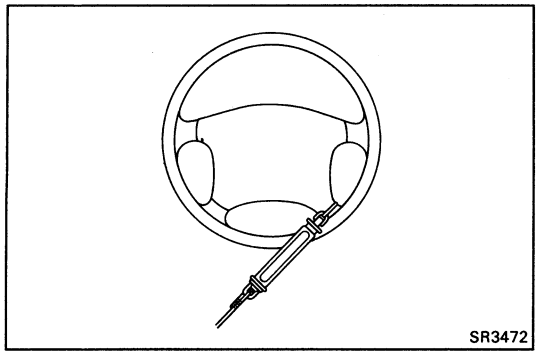
Be sure the pressure gauge valve is fully opened and the engine idling.

Minimum pressure: 50 kg/cm² (711 psi, 4,903 kPa)

NOTICE:

- **Do not maintain lock position for more than 10 seconds.**
- **Do not let the fluid temperature become too high.**

If pressure is low, the gear housing has an internal leak and must be repaired or replaced.


SR3472

6. MEASURE STEERING EFFORT

(a) Center the steering wheel and run the engine at idle.

(b) Using a spring balance, measure the steering effort in both directions.

Maximum steering effort: 4.5 kg (9.9 lb, 44 N)

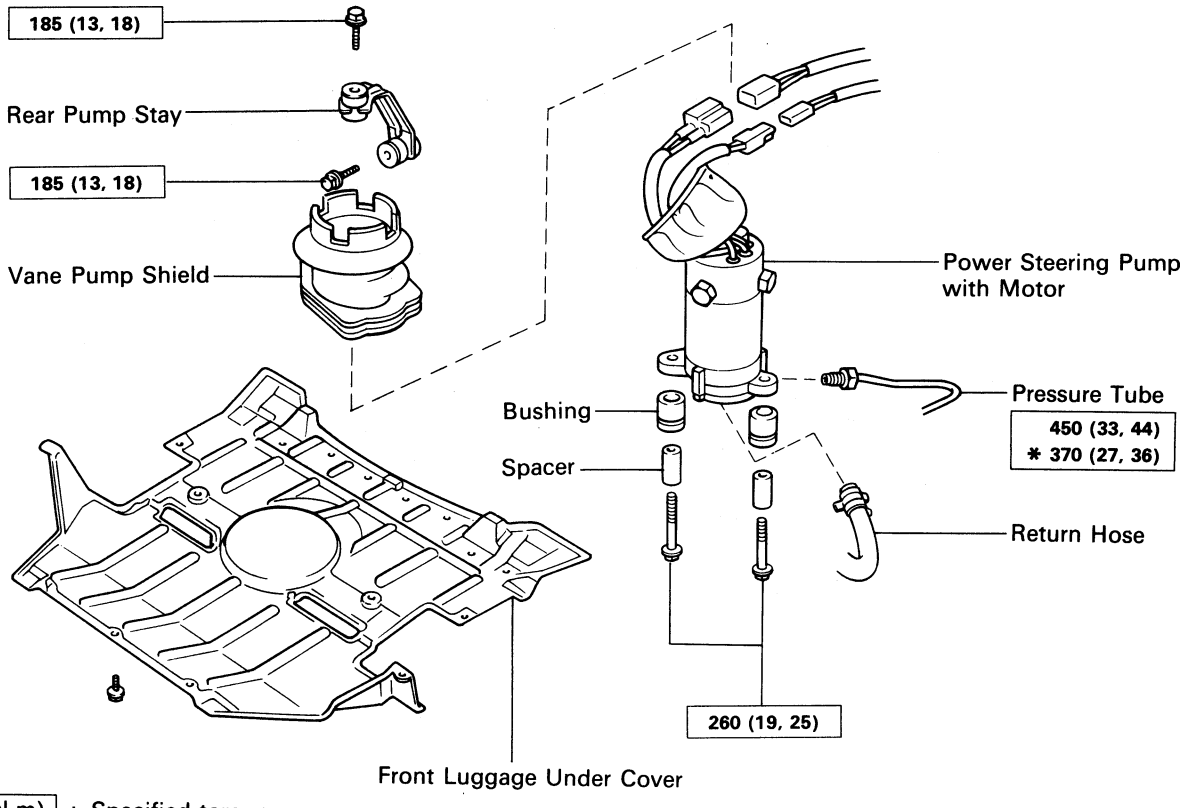
If steering effort is excessive, repair the power steering unit.

HINT: Be sure to consider the tire type, pressure and contact surface before making your diagnosis.

Power Steering Pump

REMOVAL AND INSTALLATION OF POWER STEERING PUMP

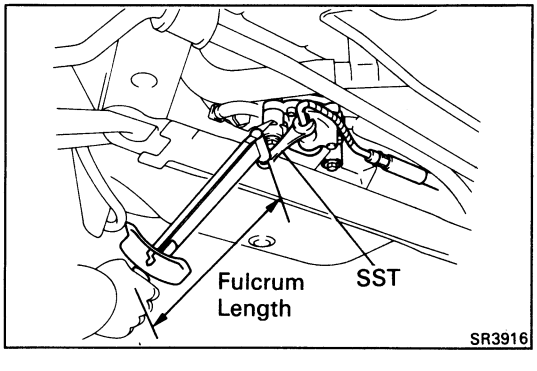
Remove and install the parts as shown.



(MAIN POINTS OF REMOVAL AND INSTALLATION)

NOTICE: When supplementing the power steering fluid, use TOYOTA POWER STEERING FLUID EH or equivalent which is exclusively for EHPS use.

HINT: The power steering pump is not to be disassembled, so if a malfunction occurs, replace it as an assembly.



1. **DISCONNECT AND CONNECT PRESSURE LINE**

   Using SST, disconnect and connect the pressure line.

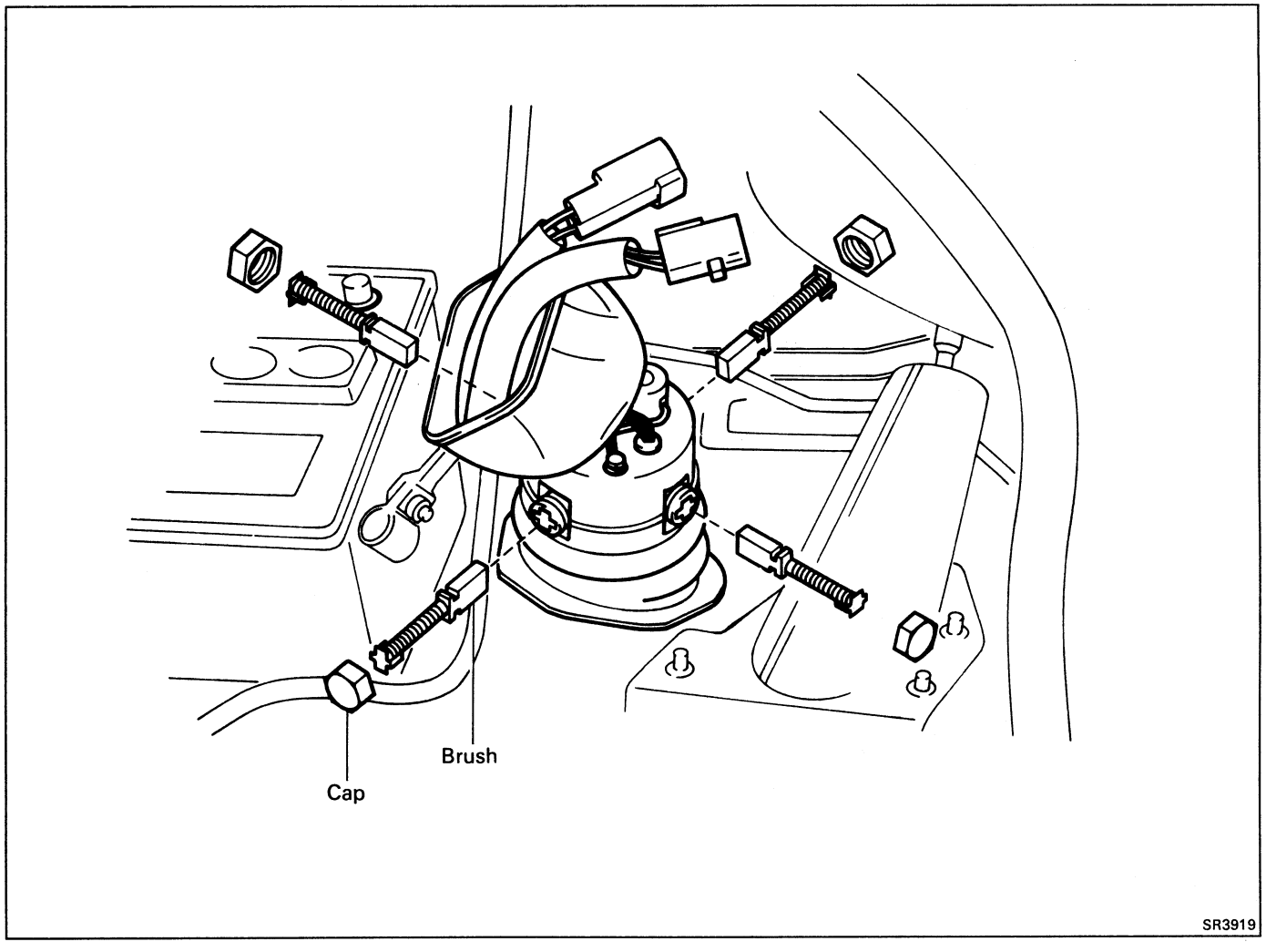
   SST 09631-22020

   Torque: 370 kg-cm (27 ft-lb, 36 N·m)

   HINT: When connecting, use a torque wrench with a fulcrum length of 300 mm (11.81 in.).

2. **BLEED POWER STEERING SYSTEM**
   (See page SR-30)

REPLACEMENT OF POWER STEERING MOTOR BRUSHES



(a) Remove the four caps and brushes.

(b) Install four new brushes.

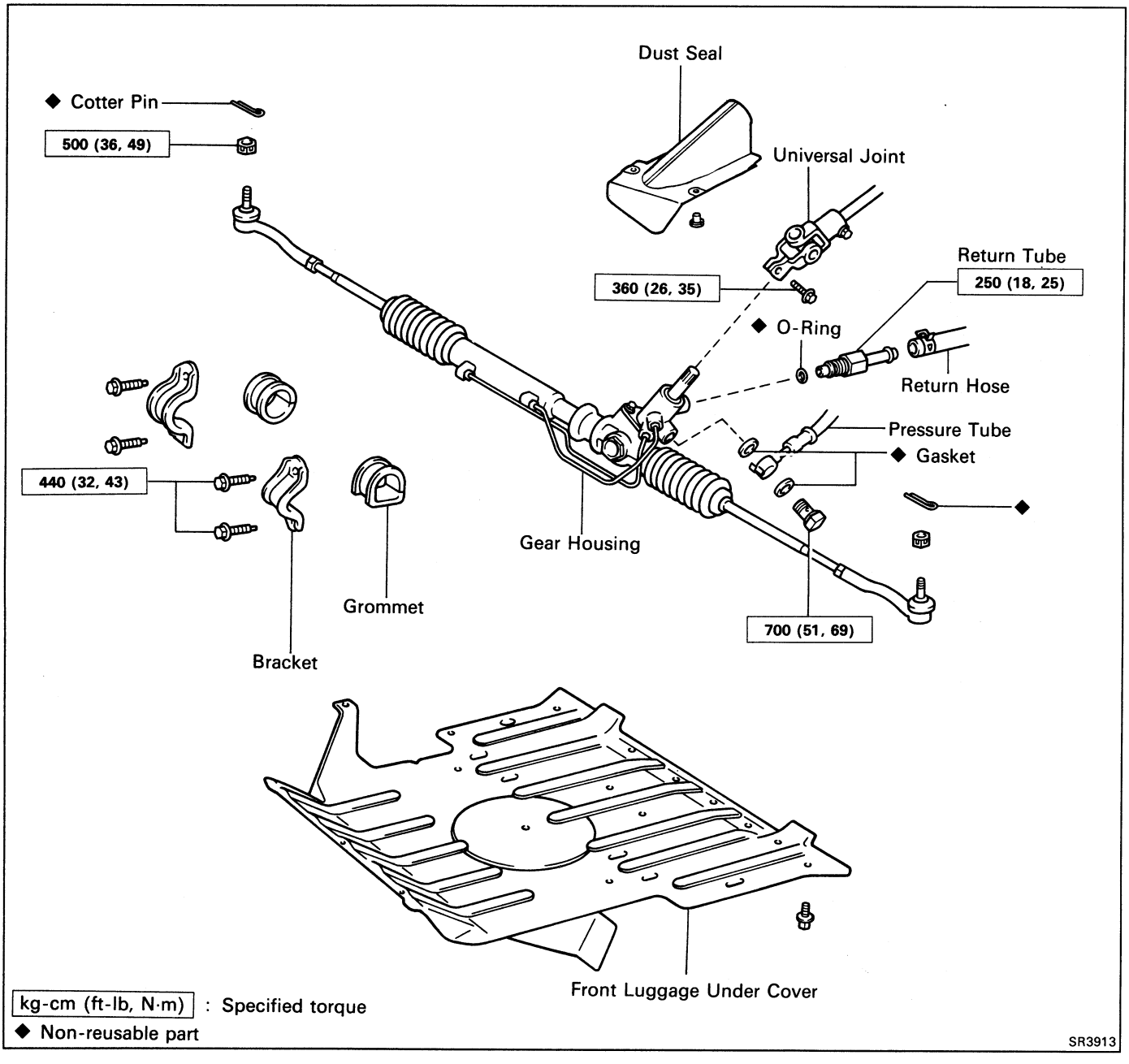
HINT: Replace all four brushes at the same time.

(c) Install the four caps.

Gear Housing

REMOVAL AND INSTALLATION OF STEERING GEAR HOUSING

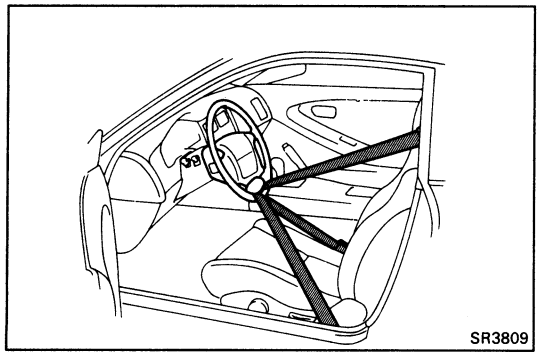
Remove and install the parts as shown.



(MAIN POINTS OF REMOVAL AND INSTALLATION)

NOTICE: When disconnecting the universal joint during removal of the gear housing, remove the steering wheel and perform centering of the spiral cable. (See page AB-15)

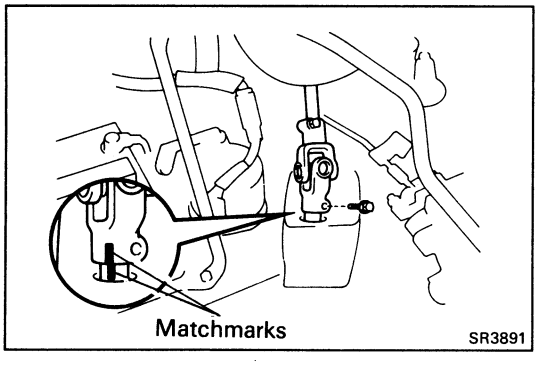
If the operation is performed without removing the steering wheel, use the procedure below to make sure the steering wheel is firmly fixed in position and cannot turn.



1. DISCONNECT UNIVERSAL JOINT

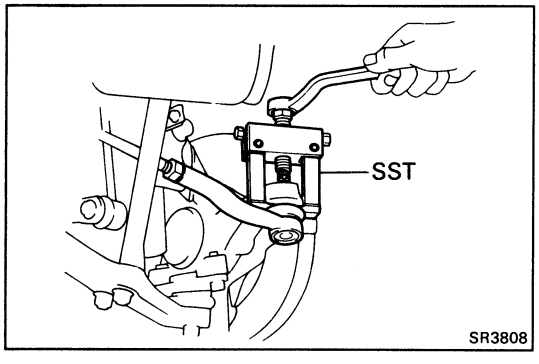
(a) Position the front wheels facing straight ahead.

(b) Using the seat belt of the driver's seat, fix the steering wheel so that it does not turn.



(c) Place matchmarks on the universal joint and control valve shaft.

(d) Loosen the bolt on the upper side of the universal joint, remove the bolt on the lower side and disconnect the universal joint.



2. DISCONNECT TIE ROD ENDS

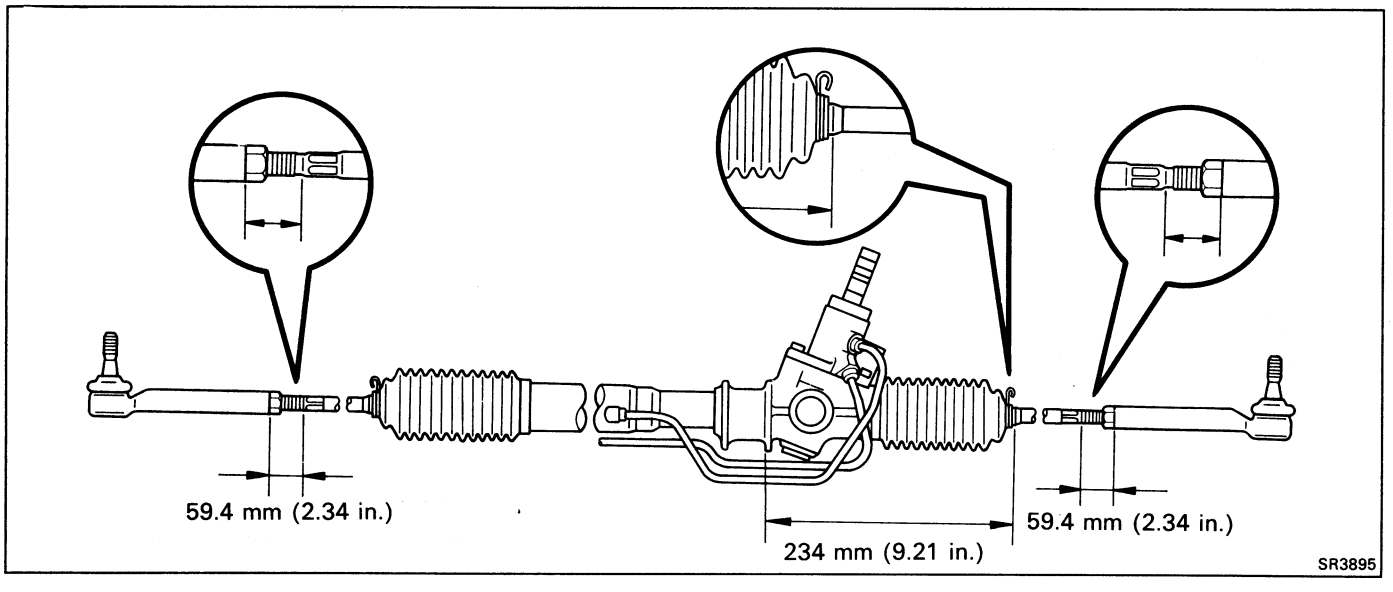
(a) Remove the cotter pin and nut.

(b) Using SST, disconnect the tie rod end from the knuckle arm.

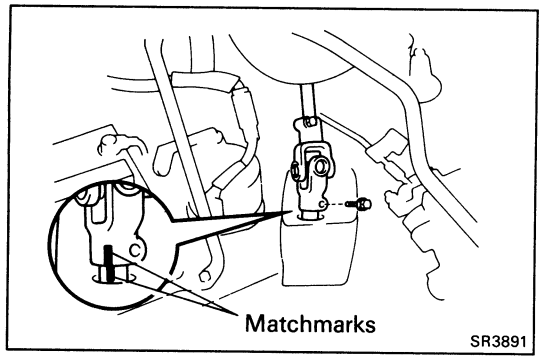
SST 09628-62011

3. CONNECT UNIVERSAL JOINT

(a) Set the gear housing so that it matches the dimensions shown below, with the gear housing at the center point.



HINT: The dimension of the tie rod end is a reference value, so always adjust the toe-in before tightening the lock nut.



(b) Align matchmarks on the universal joint and control valve shaft and connect them.

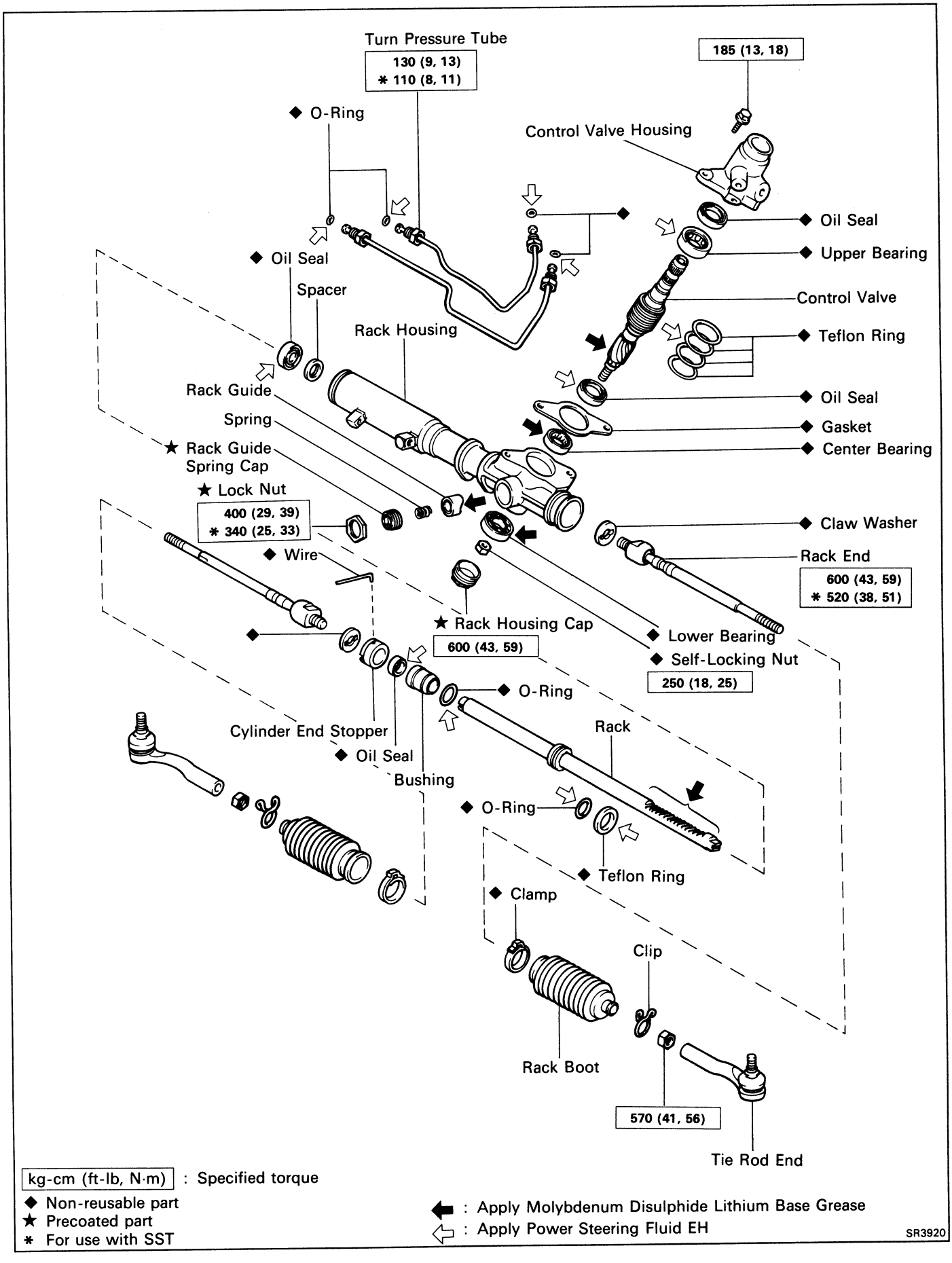
4. **CENTER SPIRAL CABLE**

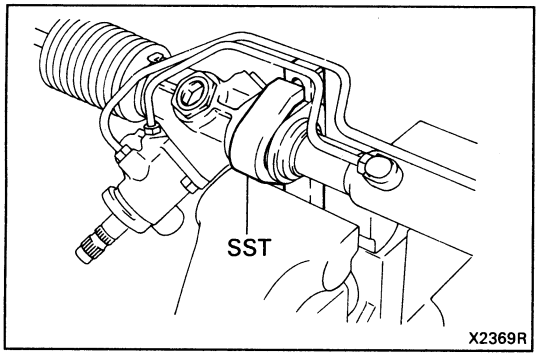
If the steering wheel has been removed, or the steering wheel may have moved during the operation, always perform centering of the spiral cable.
(See page AB-16)

5. **CHECK STEERING WHEEL CENTER POINT**

6. **CHECK TOE-IN**
(See page SA-4)

COMPONENTS


Turn Pressure Tube
130 (9, 13)
* 110 (8, 11)
185 (13, 18)
◆ O-Ring
Control Valve Housing
◆ Oil Seal
◆ Upper Bearing
◆ Oil Seal
Spacer
Control Valve
Rack Housing
◆ Teflon Ring
Rack Guide
◆ Oil Seal
Spring
◆ Gasket
★ Rack Guide Spring Cap
◆ Center Bearing
★ Lock Nut
400 (29, 39)
* 340 (25, 33)
◆ Claw Washer
◆ Wire
Rack End
600 (43, 59)
* 520 (38, 51)
★ Rack Housing Cap
600 (43, 59)
◆ Lower Bearing
◆ Self-Locking Nut
250 (18, 25)
◆ O-Ring
Cylinder End Stopper
Rack
◆ Oil Seal
Bushing
◆ O-Ring
◆ Teflon Ring
◆ Clamp
Clip
Rack Boot
570 (41, 56)
Tie Rod End
kg-cm (ft-lb, N·m) : Specified torque
◆ Non-reusable part
★ Precoated part
* For use with SST
: Apply Molybdenum Disulphide Lithium Base Grease
: Apply Power Steering Fluid EH
SR3920

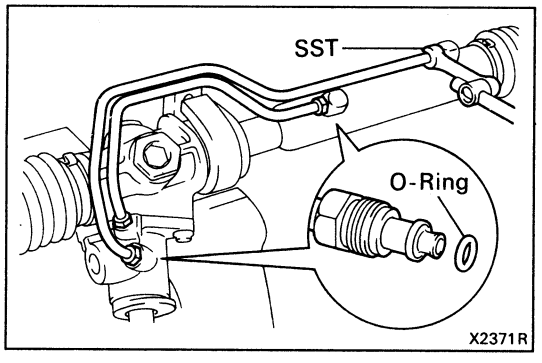


DISASSEMBLY OF GEAR HOUSING

1. CLAMP GEAR HOUSING IN VISE

Using SST, secure the steering gear housing in a vise.

SST 09612-00012

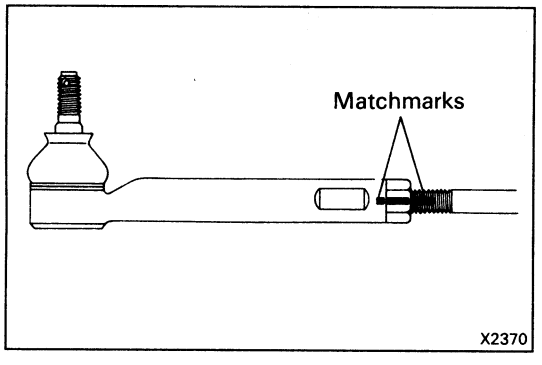


2. REMOVE RIGHT AND LEFT TURN PRESSURE TUBES

(a) Using SST, remove the pressure tubes.

SST 09633-00020

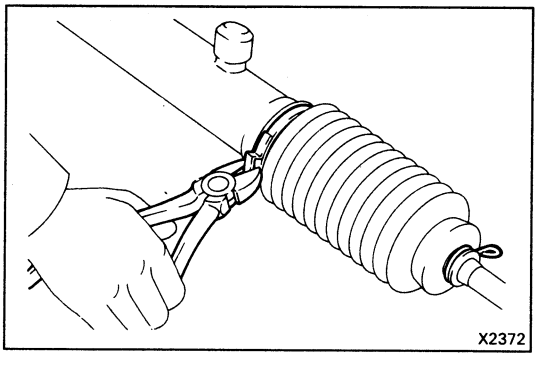
(b) Remove the O-rings from the tubes.



3. REMOVE TIE ROD ENDS

(a) Loosen the lock nuts and place matchmarks on the tie rod ends and rack ends.

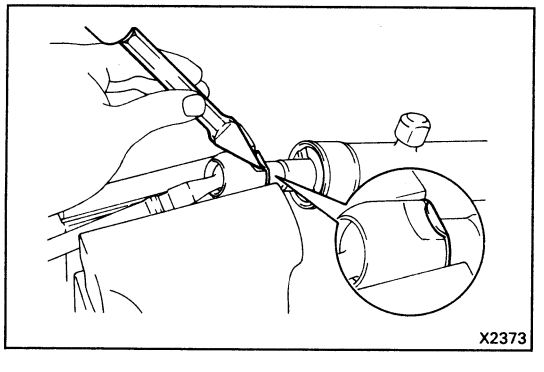
(b) Remove the tie rod ends and lock nuts.



4. REMOVE RACK BOOTS

(a) Remove the clips and clamps.

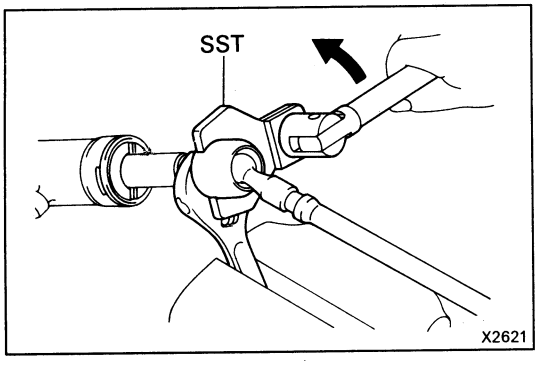
(b) Remove the rack boots.



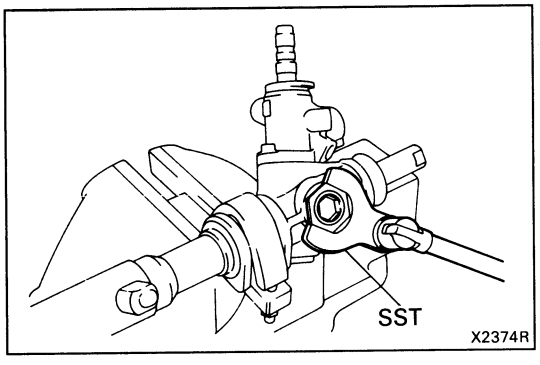
5. REMOVE RACK ENDS AND CLAW WASHERS

(a) Unstake the claw washers.

NOTICE: Avoid any impact to the rack.

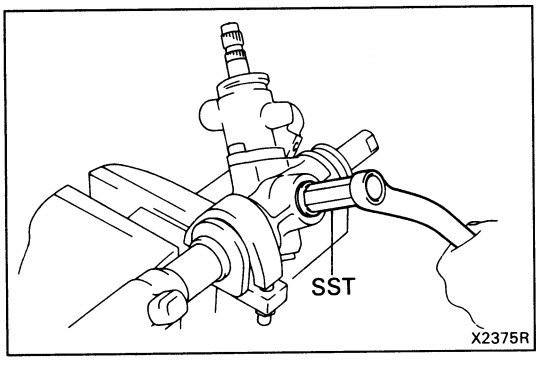


(b) Using SST, remove the rack ends.
SST 09617-10020
(c) Mark the left and right rack ends accordingly.
(d) Remove the claw washers.



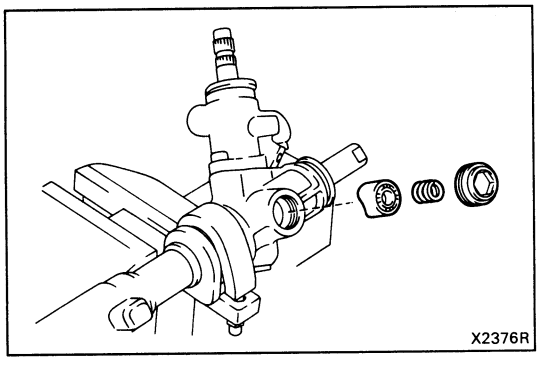
6. REMOVE RACK GUIDE SPRING CAP LOCK NUT

Using SST, remove the rack guide spring cap lock nut.
SST 09612-24014 (09617-22030)

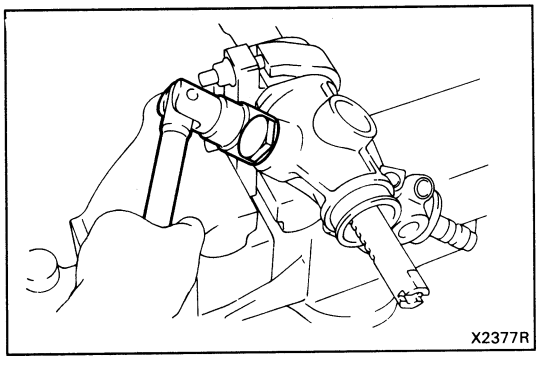


7. REMOVE RACK GUIDE SPRING CAP

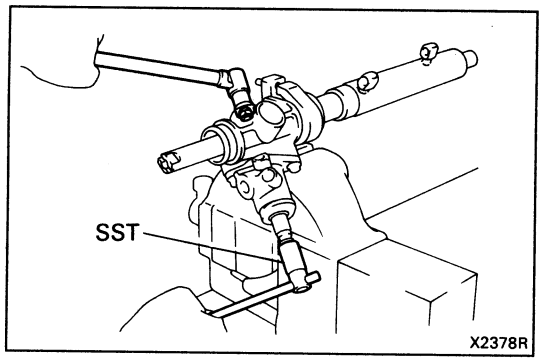
Using SST, remove the rack guide spring cap.
SST 09612-10131



8. REMOVE RACK GUIDE SPRING AND RACK GUIDE



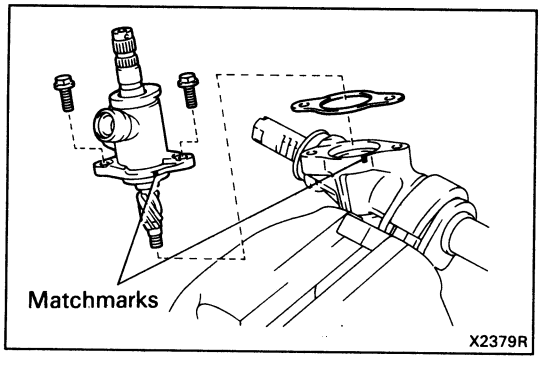
9. REMOVE RACK HOUSING CAP



10. REMOVE SELF-LOCKING NUT

Using SST to hold the control valve, remove the self-locking nut.

SST 09616-00010



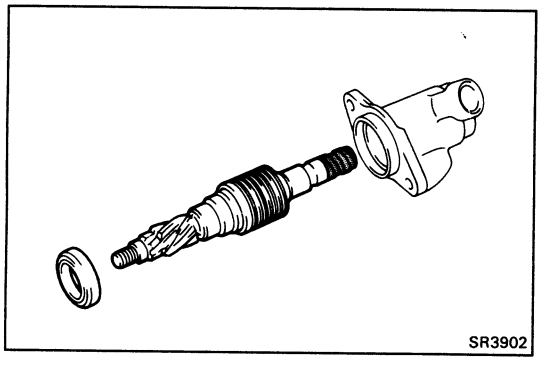
11. REMOVE CONTROL VALVE HOUSING

(a) Place matchmarks on the valve housing and rack housing.

(b) Remove the two bolts.

(c) Pull out the valve housing with the control valve.

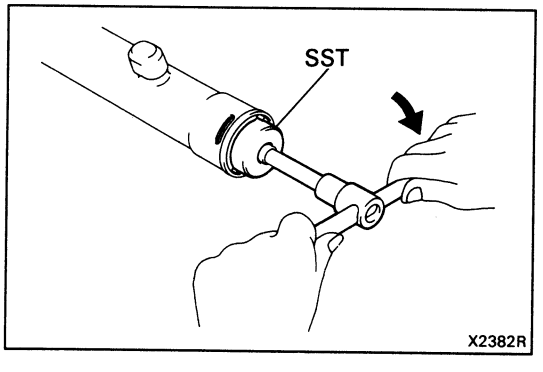
(d) Remove the gasket.



12. REMOVE CONTROL VALVE FROM HOUSING

(a) Tap out the control valve with the oil seal.

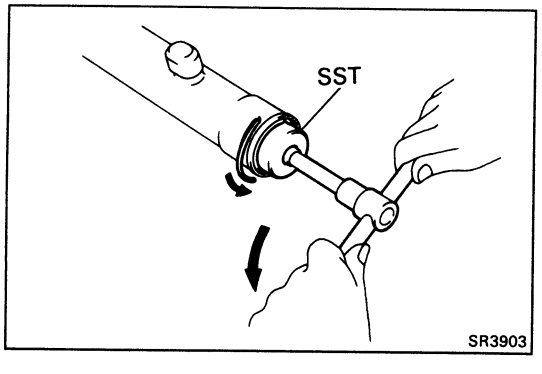
(b) Remove the oil seal from the control valve.



13. REMOVE CYLINDER END STOPPER WIRE

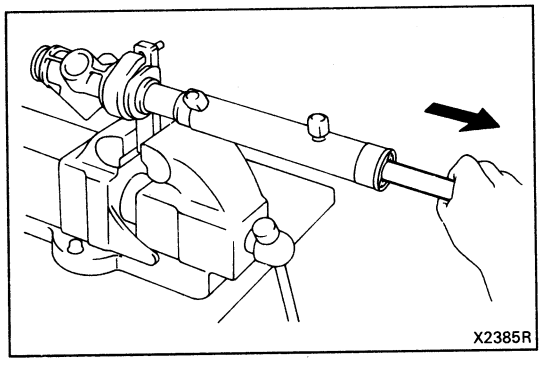
(a) Using SST, turn the cylinder end stopper clockwise until the wire end comes out.

SST 09631-10021



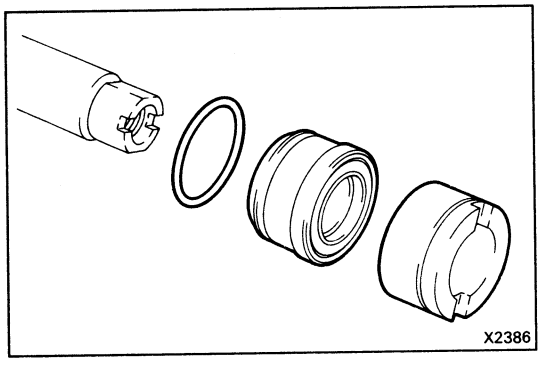
(b) Using SST, turn the cylinder end stopper counter-clockwise, and remove the wire.

SST 09631-10021



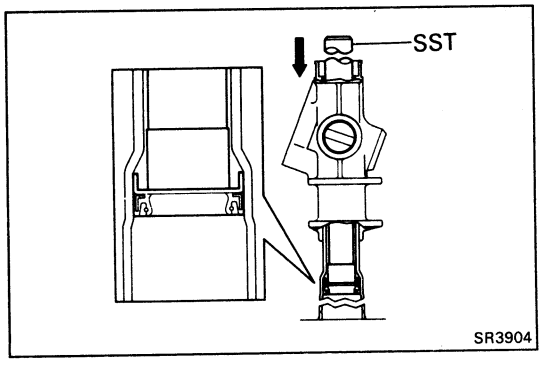
14. REMOVE STEERING RACK

(a) Pull out the steering rack.



(b) Remove the cylinder end stopper and rack bushing from the rack.

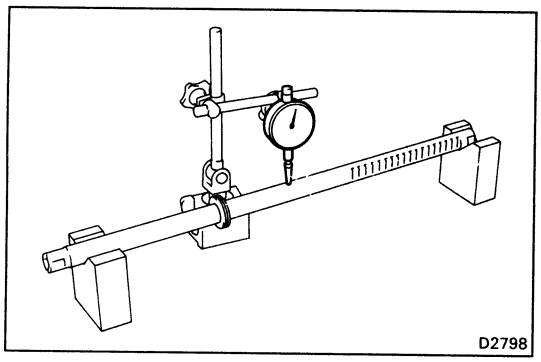
(c) Remove the O-ring from the bushing.



15. REMOVE RACK HOUSING OIL SEAL AND SPACER

Using SST, drive out the spacer and oil seal.

SST 09631-12020



INSPECTION AND REPAIR OF GEAR HOUSING COMPONENTS

NOTICE: When coating the gear housing components with power steering fluid, use TOYOTA POWER STEERING FLUID EH or equivalent which is exclusively for EHPS use.

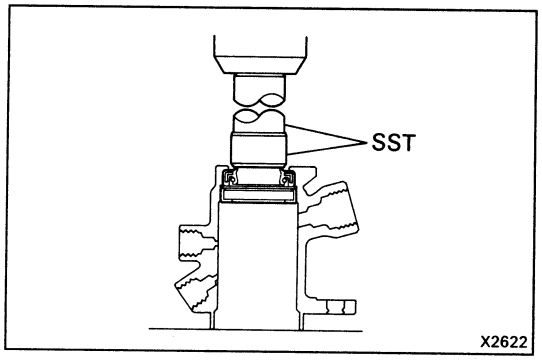
1. INSPECT RACK

(a) Check the rack for runout and for tooth wear or damage.

Maximum runout: 0.3 mm (0.012 in.)

(b) Check the back surface for wear or damage.

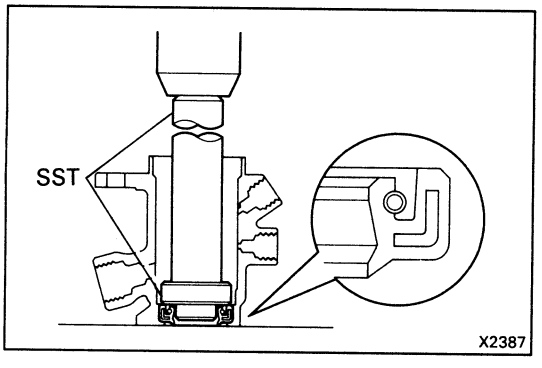
If faulty, replace it.



2. IF NECESSARY, REPLACE CONTROL VALVE HOUSING OIL SEAL AND UPPER BEARING

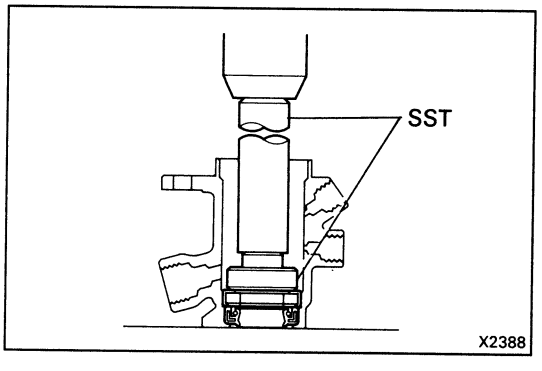
(a) Using SST, press out the oil seal with the bearing.

SST 09620-30010 (09631-00020) and 09630-24013 (09620-24010)



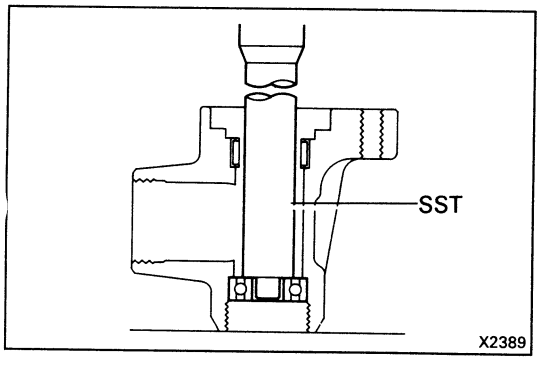
(b) Using SST, press in a new oil seal.

SST 09620-30010 (09631-00020) and 09630-24013 (09620-24020)



(c) Using SST, press in a new bearing.

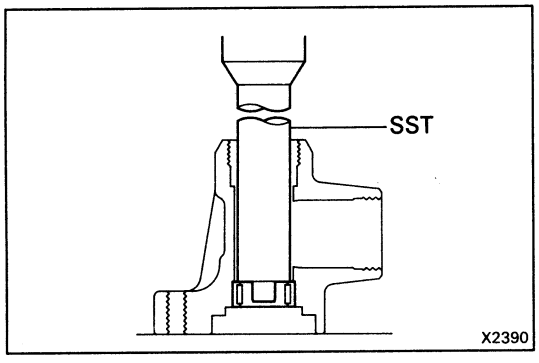
SST 09620-30010 (09631-00020) and 09630-24013 (09620-24020)



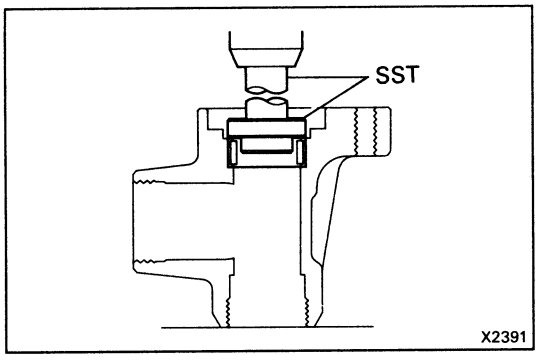
3. IF NECESSARY, REPLACE CONTROL VALVE LOWER BEARING AND CENTER BEARING

(a) Using SST, press out the lower bearing.

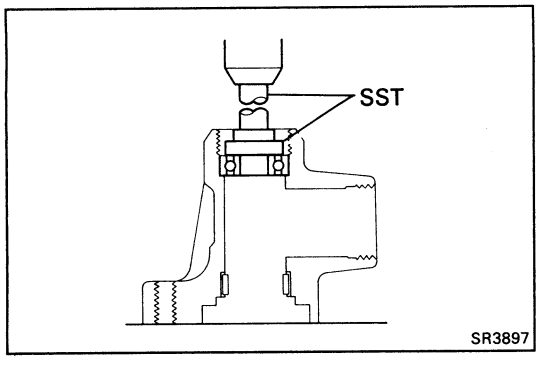
SST 09620-30010 (09631-00020)



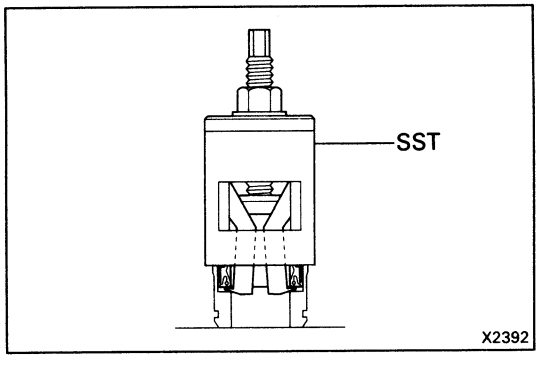
(b) Using SST, press out the center bearing.
SST 09631-12020



(c) Using SST, press in a new center bearing.
SST 09620-30010 (09631-00020) and
09630-24013 (09620-24020)

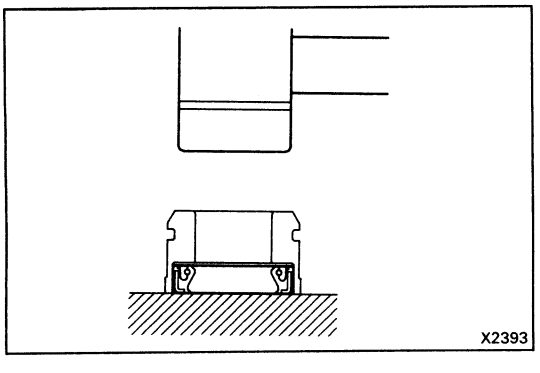


(d) Using SST, press in a new lower bearing.
SST 09620-30010 (09631-00020) and
09631-20031

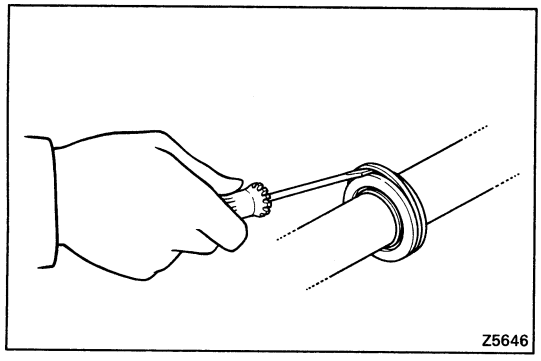


4. IF NECESSARY, REPLACE RACK BUSHING OIL SEAL

(a) Using SST, remove the oil seal.
SST 09612-24014 (09613-22011)



(b) Using a plastic hammer, tap in a new oil seal as shown.



5. IF NECESSARY, REPLACE STEERING RACK TEFLON RING AND O-RING

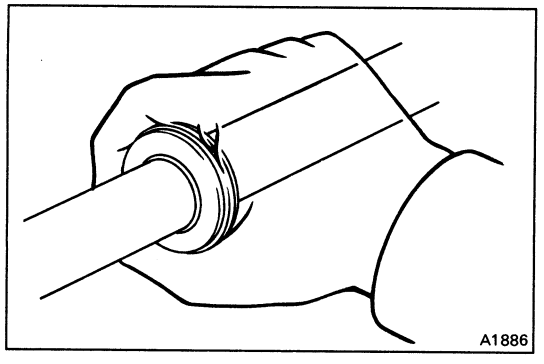
(a) Remove the teflon ring and O-ring.

NOTICE: Be careful not to damage the steering rack.

(b) Coat a new O-ring with power steering fluid and install it.

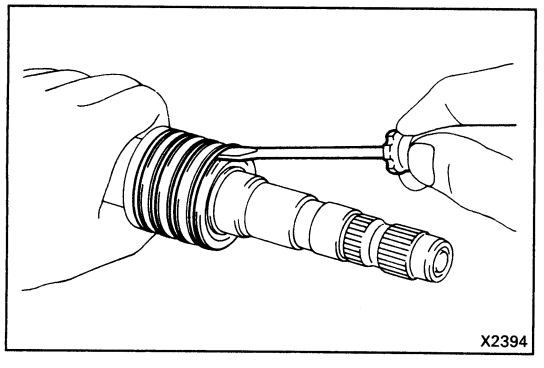
(c) Expand a new teflon ring with your fingers.

NOTICE: Be careful not to over-expand the teflon ring.



(d) Install the new teflon ring to the steering rack.

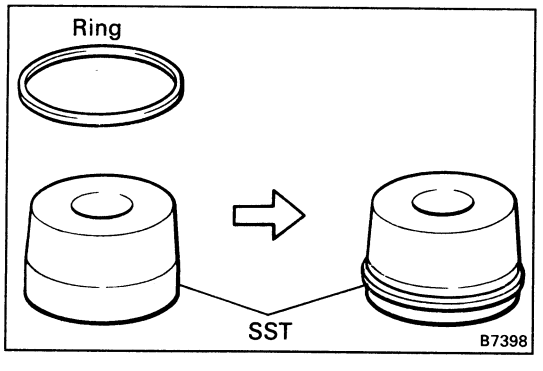
(e) Coat the teflon ring with power steering fluid and snug it down with your fingers.



6. IF NECESSARY, REPLACE CONTROL VALVE TEFLON RINGS

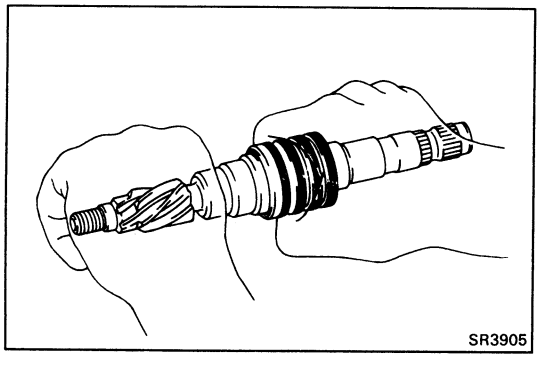
(a) Using a screwdriver, remove the teflon rings.

NOTICE: Be careful not to damage the control valve.

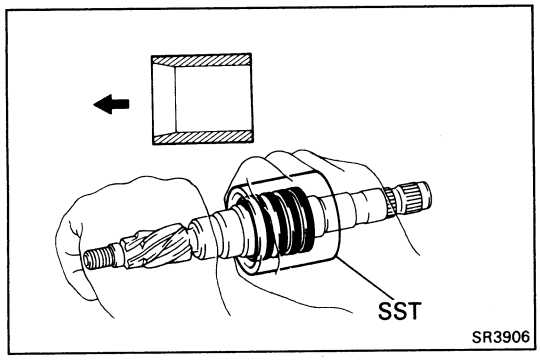


(b) Install new teflon rings to SST and expand them.

SST 09631-20070



(c) Install the expanded teflon rings to the control valve and snug them with your fingers.



(d) Coat the teflon rings with power steering fluid, and carefully slide the tapered end of SST over the teflon rings to seat the rings.

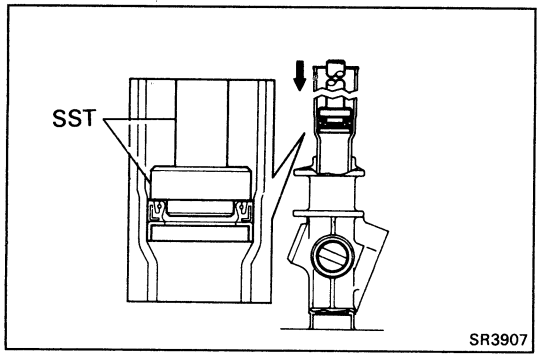
SST 09631-20081

ASSEMBLY OF GEAR HOUSING

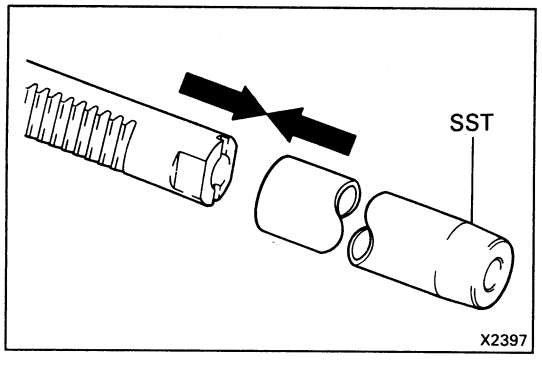
(See page SR-38)

NOTICE: When coating the gear housing components with power steering fluid, use TOYOTA POWER STEERING FLUID EH or equivalent which is exclusively for EHPS use.

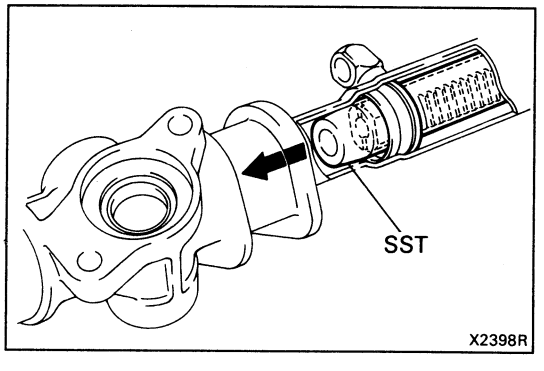
1. **COAT WITH POWER STEERING FLUID OR MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE**
(See page SR-38)



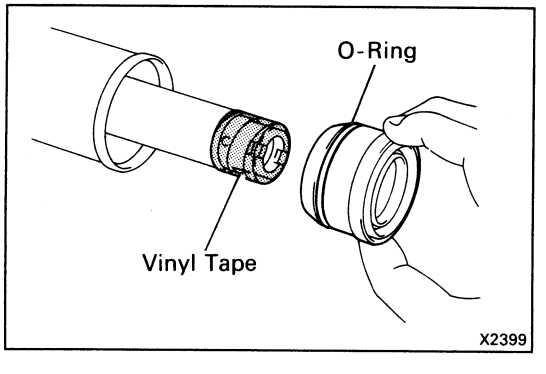
2. **INSTALL RACK HOUSING OIL SEAL AND SPACER**
   (a) Install the spacer into the rack housing.
   (b) Using SST, drive in a new oil seal.
   SST 09630-24013 (09620-24030), 09631-12020



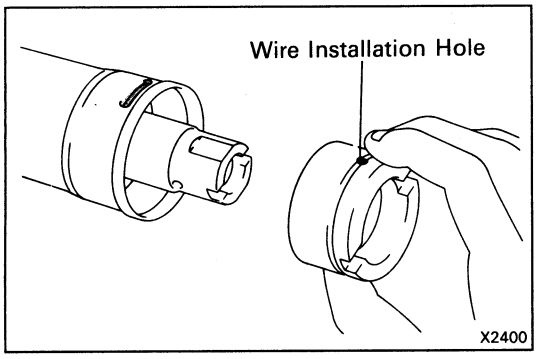
3. **INSTALL RACK**
   (a) Install SST to the rack.
   HINT: If necessary, scrape the burrs off the rack teeth end and burnish.
   SST 09631-10040



   (b) Coat SST with power steering fluid.
   (c) Insert the rack into the cylinder.
   (d) Remove SST.

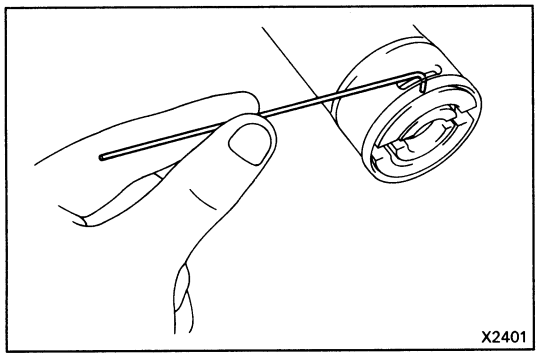


4. **INSTALL RACK BUSHING**
   (a) Coat a new O-ring with power steering fluid and install it to the bushing.
   (b) To prevent oil seal lip damage, wind vinyl tape on the steering rack end, and apply power steering fluid.
   (c) Install the bushing by pushing it into the cylinder in the direction shown in drawing, without tilting.

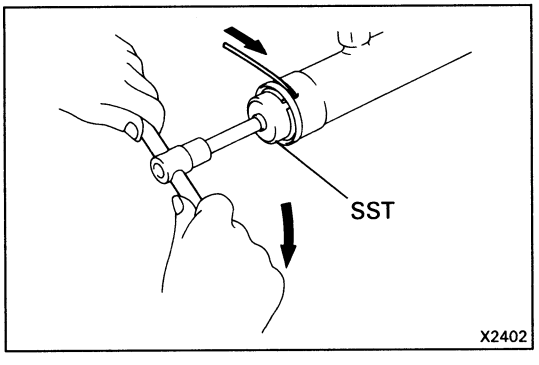


5. INSTALL CYLINDER END STOPPER

(a) Push in the cylinder end stopper until the wire installation hole appears.

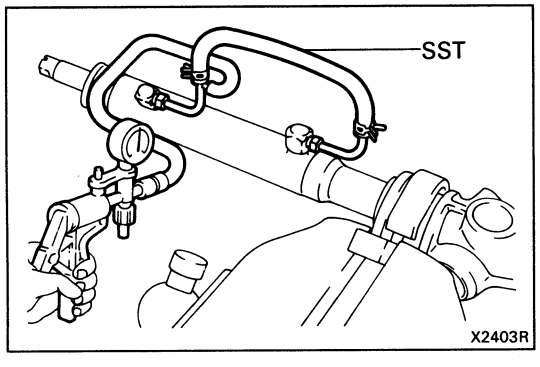


(b) Insert a new wire end into the hole.



(c) Using SST, turn the cylinder end stopper clockwise until the wire end disappears.

SST 09631-10021



6. AIR TIGHTNESS TEST

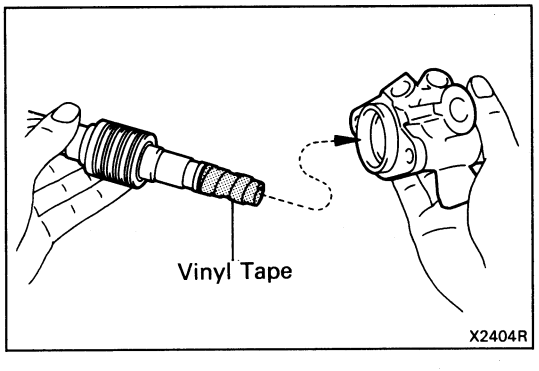
(a) Install SST to the unions of the cylinder housing.

SST 09631-12071

(b) Apply 400 mmHg (15.75 in.Hg, 53.3 kPa) of vacuum for about 30 seconds.

(c) Check that there is no change in the vacuum.

If there is change in the vacuum, check the installation of the rack housing oil seals.

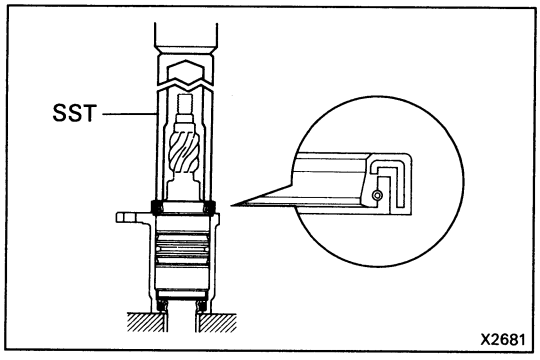


7. INSTALL CONTROL VALVE

(a) Coat the teflon rings with power steering fluid.

(b) Install the control valve into the housing.

NOTICE: To prevent oil seal damage, wind vinyl tape on the serration part of the control valve shaft.

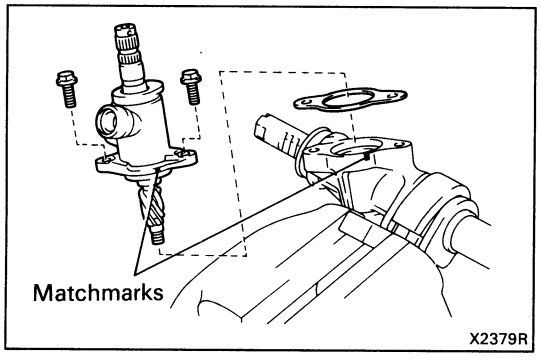


8. INSTALL OIL SEAL

(a) Coat a new oil seal with power steering fluid.

(b) Using SST, install the oil seal as shown.

SST 09612-22011



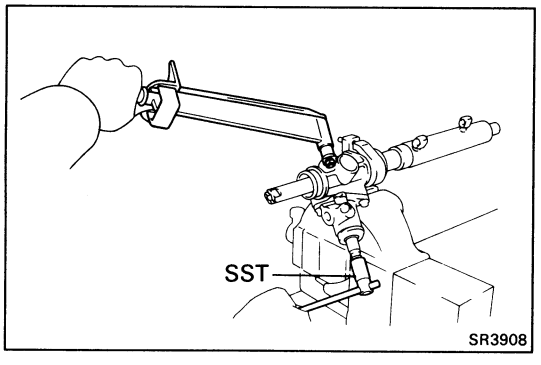
9. INSTALL CONTROL VALVE HOUSING

(a) Place a new gasket on the rack housing.

(b) Align the matchmarks on the valve housing and rack housing.

(c) Torque the two bolts.

Torque: 185 kg-cm (13 ft-lb, 18 N·m)

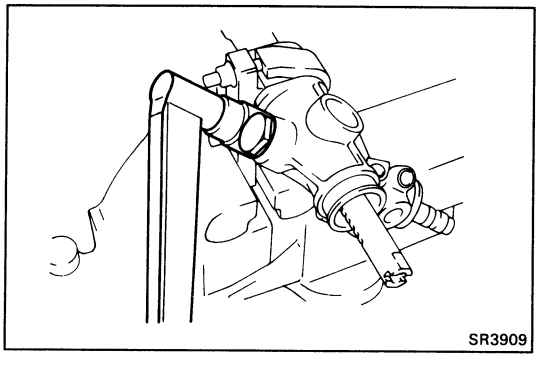


10. INSTALL SELF-LOCKING NUT

Using SST to hold the control valve, install a new self-locking nut.

SST 09616-00010

Torque: 250 kg-cm (18 ft-lb, 25 N·m)



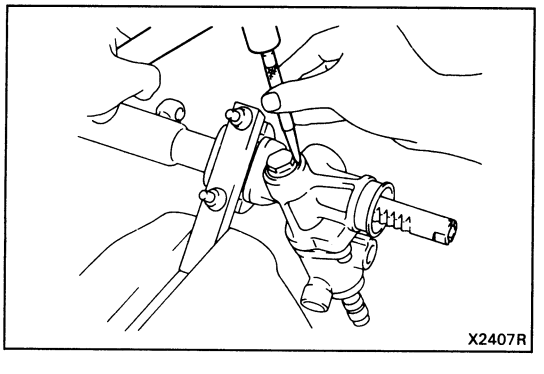
11. INSTALL RACK HOUSING CAP

(a) Apply sealant to 2 or 3 threads of the housing cap.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

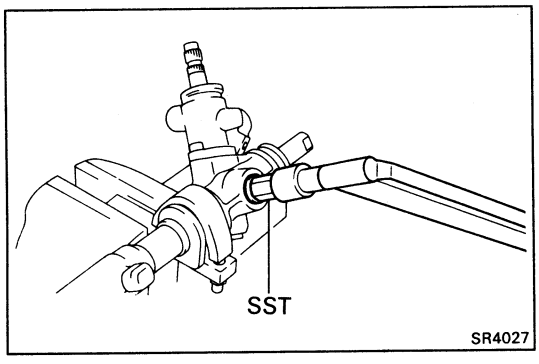
(b) Install the rack housing cap.

Torque: 600 kg-cm (43 ft-lb, 59 N·m)



(c) Using a centering punch, stake the cap at two places.

12. INSTALL RACK GUIDE AND RACK GUIDE SPRING



13. ADJUST TOTAL PRELOAD

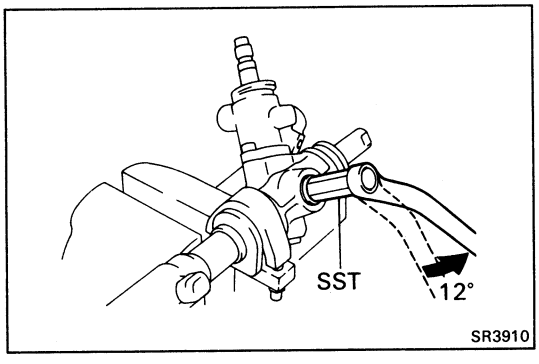
(a) Apply sealant to 2 or 3 threads of the rack guide spring cap.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(b) Using SST, install and torque the spring cap.

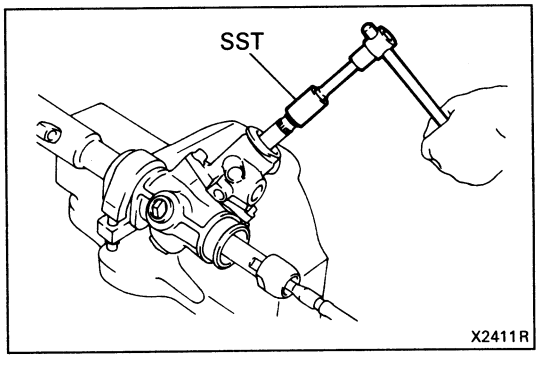
SST 09612-10131

Torque: 250 kg-cm (18 ft-lb, 25 N·m)



(c) Using SST, return the rack guide spring cap 12°.

SST 09612-10131

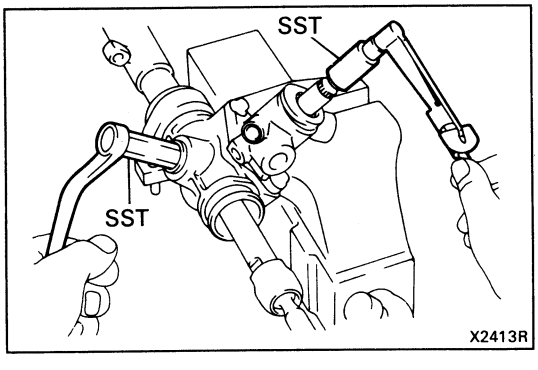


(d) Turn the control valve shaft right and left one or two times.

SST 09616-00010

NOTICE: If the rack overstrokes, the oil seal will be damaged by the teeth of the rack, so temporarily install the rack end so that it does not overstroke.

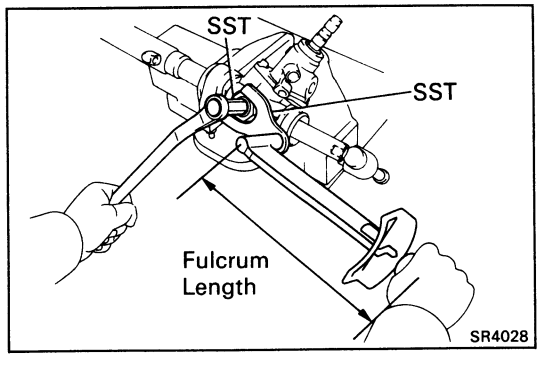
(e) Loosen the spring cap until the rack guide compression spring is not functioning.



(f) Using SST and a torque meter, tighten the rack guide spring cap until the preload is within specification.

SST 09612-10131 and 09616-00010

Preload (turning): 9 – 13 kg-cm (7.8 – 11.3 in.-lb, 0.9 – 1.3 N·m)



14. INSTALL RACK GUIDE SPRING CAP LOCK NUT

(a) Apply sealant to 2 or 3 threads of the lock nut.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

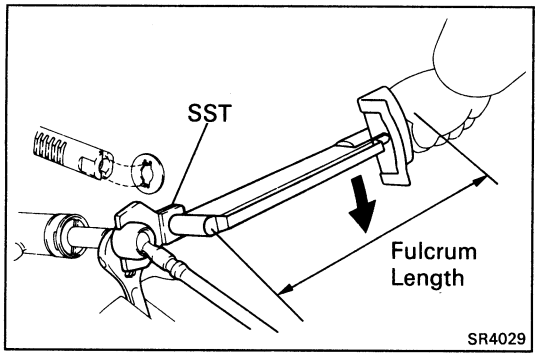
(b) Using SST, install and torque the lock nut.

SST 09612-10131 and 09612-24014 (09617-22030)

Torque: 340 kg-cm (25 ft-lb, 33 N·m)

HINT: Use a torque wrench with a fulcrum length of 340 mm (13.39 in.).

(c) Recheck the total preload.



15. INSTALL CLAW WASHERS AND RACK ENDS

(a) Install new claw washers.

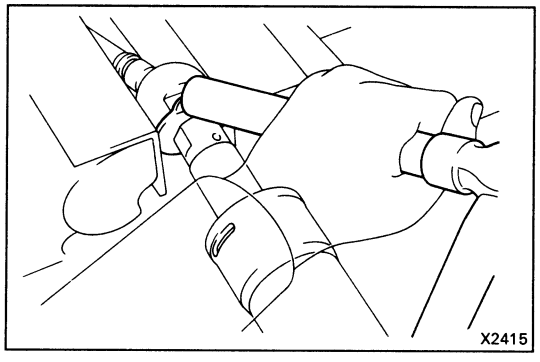
HINT: Align the claws of the claw washer with the rack grooves.

(b) Using SST, install and torque the rack ends.

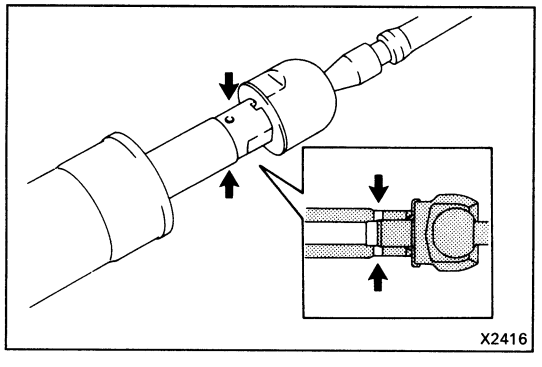
SST 09617-10020

Torque: 520 kg-cm (38 ft-lb, 51 N·m)

HINT: Use a torque wrench with a fulcrum length of 340 mm (13.39 in.).



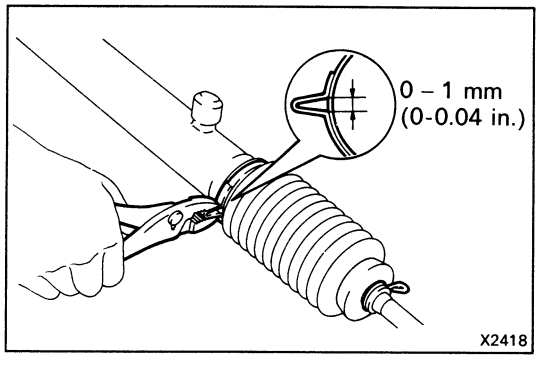
(c) Using a brass bar and hammer, stake the claw washers.



16. INSTALL RACK BOOTS, CLAMPS AND CLIPS

(a) Insure that the rack hole is not clogged with grease.

HINT: If the rack hole is clogged, the pressure inside the boot will change after it is assembled and the steering wheel turned.

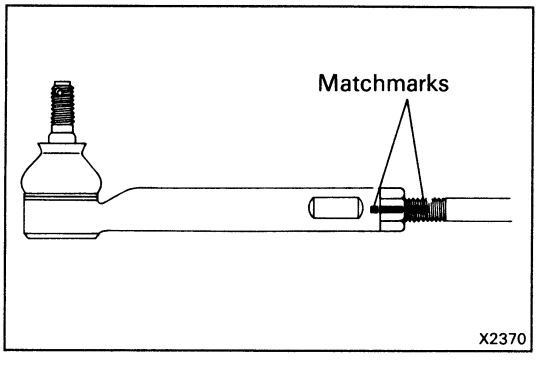


(b) Install the boots.

NOTICE: Be careful not to damage or twist the boots.

(c) Install new clamps.

(d) Install the clips with the ends facing outward.

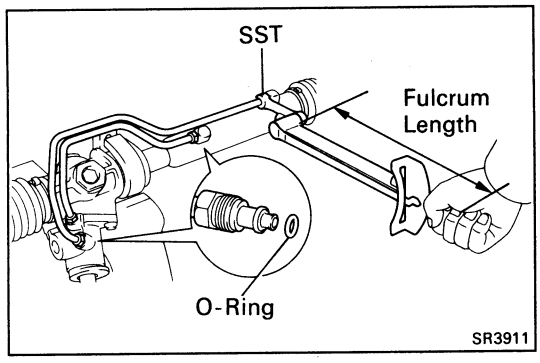


17. INSTALL TIE ROD ENDS

(a) Screw the lock nuts and tie rod ends onto the rack ends until the matchmarks are aligned.

(b) After adjusting toe-in, torque the lock nuts.

Torque: 570 kg-cm (41 ft-lb, 56 N·m)



18. INSTALL RIGHT AND LEFT TURN PRESSURE TUBES

(a) Install four new O-rings to the tubes.

(b) Using SST, install the tubes.

SST 09633-00020

Torque: 110 kg-cm (8 ft-lb, 11 N·m)

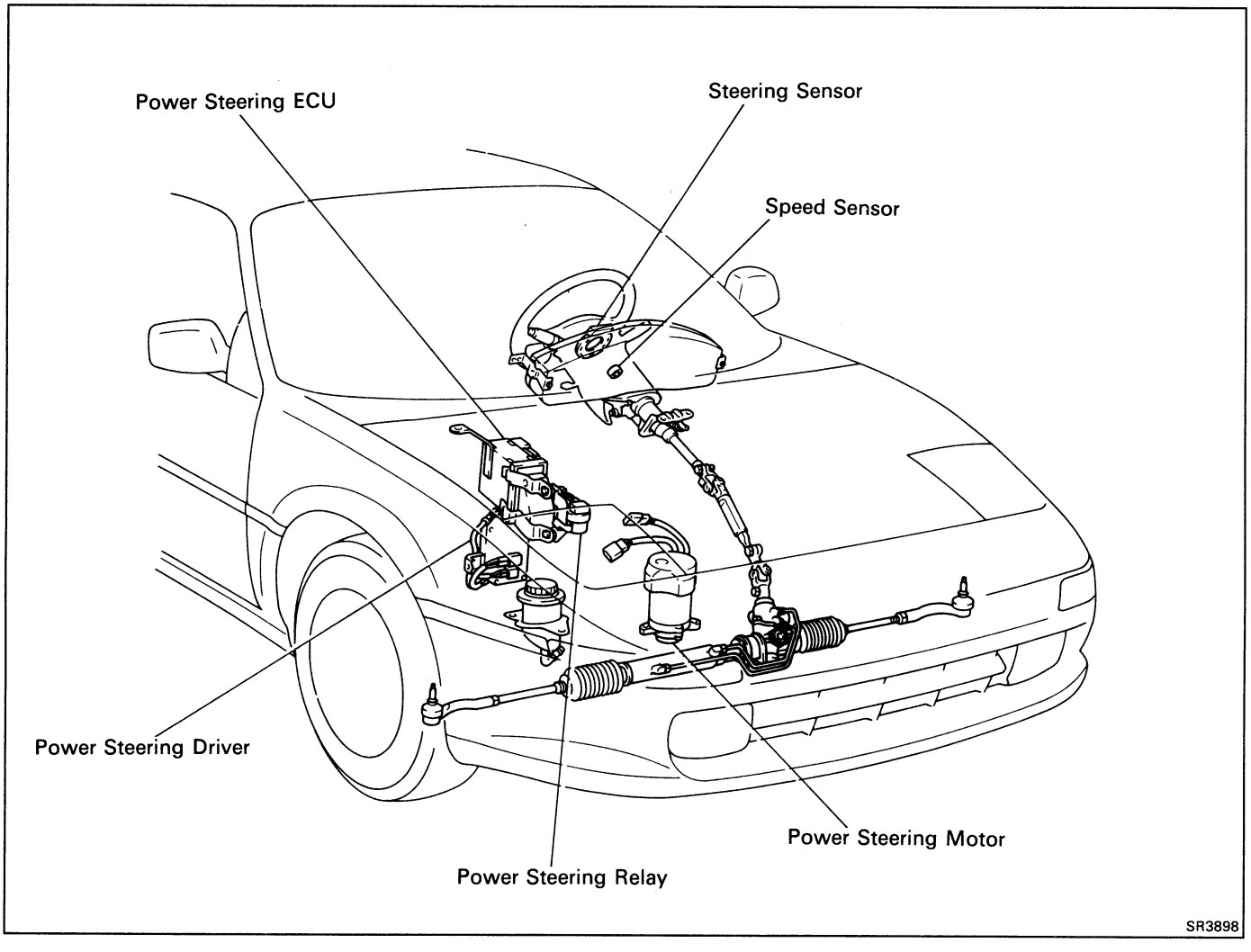
HINT: Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).

Electronic Control System

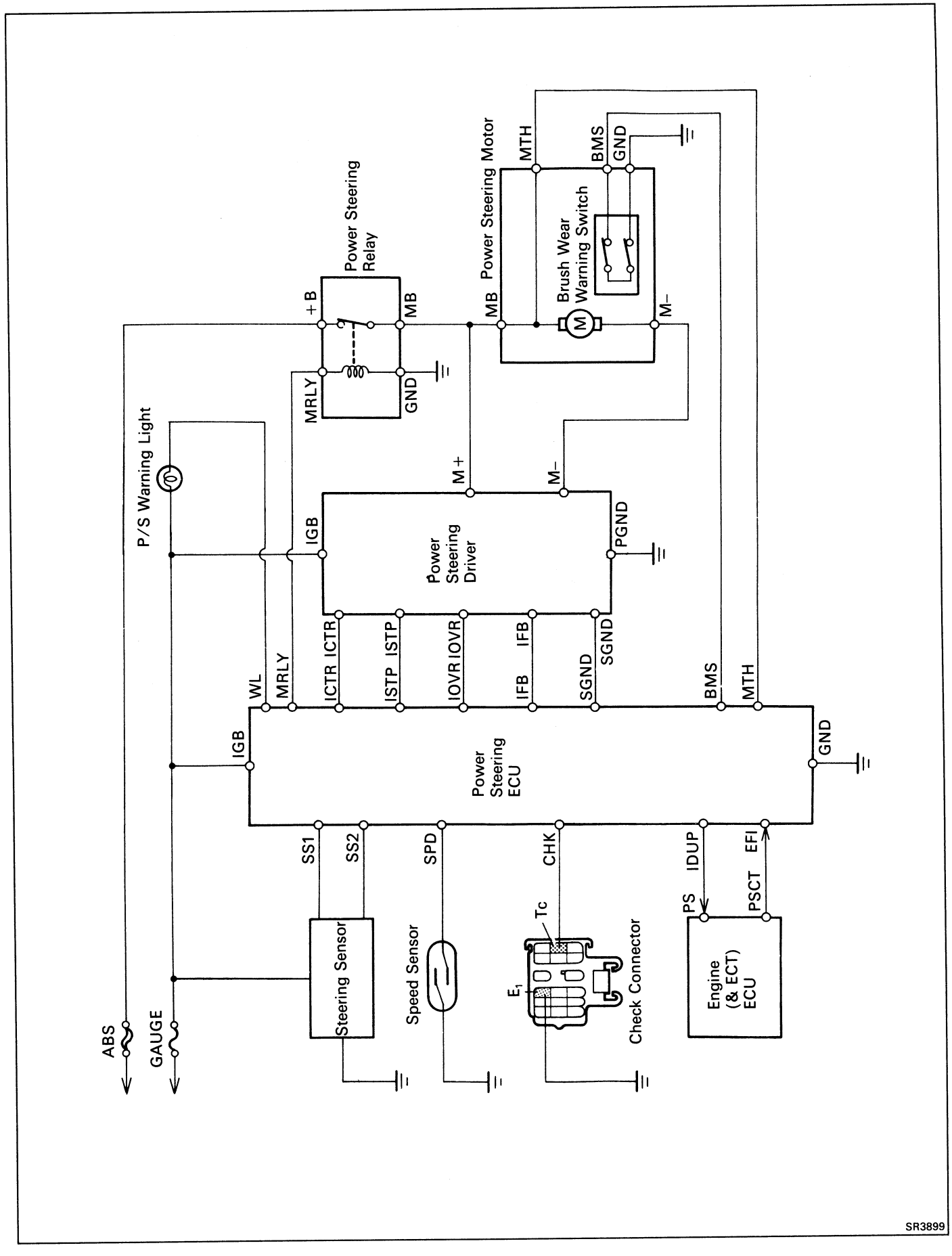
PRECAUTION

Do not open the cover or the case of the ECU and various computers unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)

LOCATION OF COMPONENTS



WIRING DIAGRAM



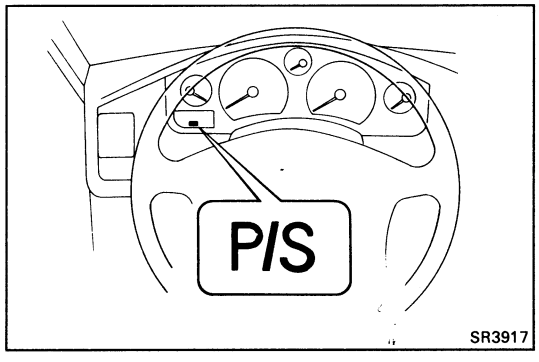
Diagnosis System

DESCRIPTION

When a malfunction exists, the corresponding code number is stored in memory until the ignition switch is turned off.

In case of a malfunction other than one identified by code No. 21, the P/S warning light is turned on to warn the driver.

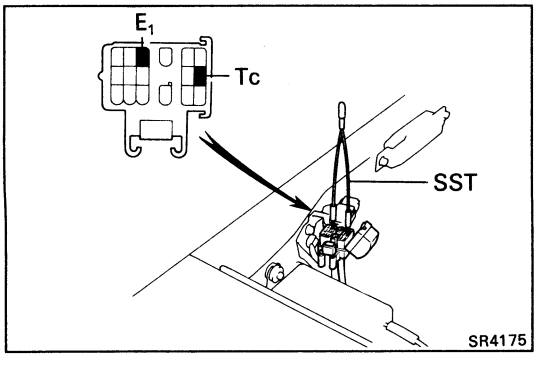
By connecting terminals Tc and E_1 of the check connector, malfunction codes that are stored in memory can be displayed by the way the light blinks.



P/S WARNING LIGHT CHECK

(a) Turn the ignition switch to ON and check that the P/S warning light lights up.

(b) Check that the P/S warning light goes out after approx. 2 seconds.



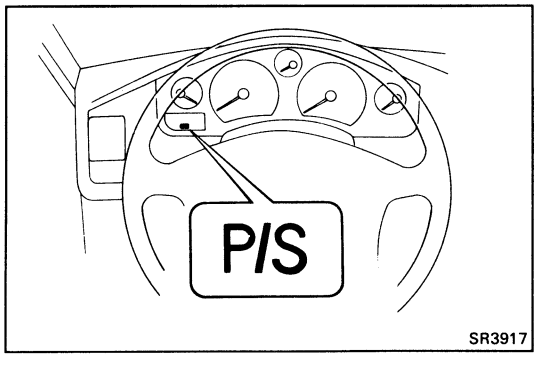
STEERING SENSOR CHECK

(a) Turn the ignition switch to ON.

(b) Using SST, connect terminals Tc and E_1 of the check connector.

SST 09843-18020

NOTICE: Never make a mistake with the terminal connection position as this will cause a malfunction.

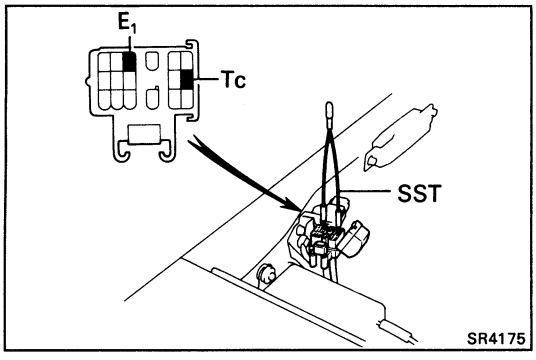


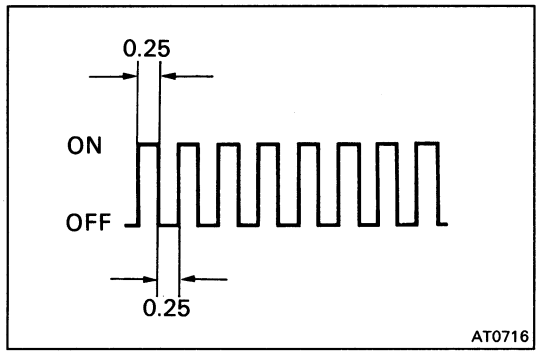
(c) Check that the warning light condition changes according to the steering angle and the vehicle speed, as shown below.

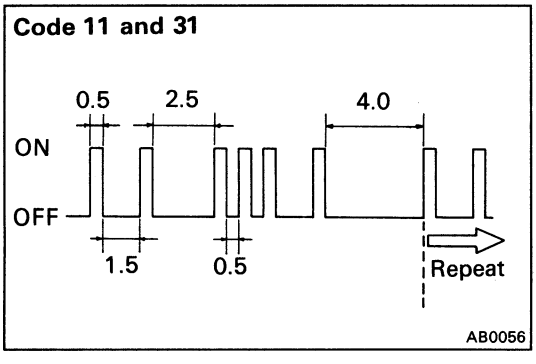
Vehicle Speed / Steering Angle	Below 20 km/h (12 mph)	Above 20 km/h (12 mph)
Less than 36 degrees	BLINK	ON
More than 36 degrees	OFF	OFF

HINT:

- The steering angle is defined as 0° at the steering position at which the ignition switch and terminals Tc and E_1 are turned on simultaneously.
- This check is not performed when a diagnostic code has been stored in memory.







DIAGNOSTIC CODE CHECK

1. OUTPUT DIAGNOSTIC CODE

(a) Turn the ignition switch to ON.

(b) Using SST, connect terminals Tc and E_1 of the check connector.

SST 09843-18020

NOTICE: Never make a mistake with the terminal connection position as this will cause a malfunction.

2. READ DIAGNOSTIC CODE

Read the diagnostic code as indicated by the number of times the P/S warning light blinks.

- **Normal code indication**

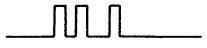
  The light will blink 2 times per second.

- **Malfunction code indication**

  In the event of a malfunction, the light will blink. The first number of the code No. will equal the first digit of a 2-digit diagnostic code, and after a 1.5 second pause, the 2nd number of the code No. will equal the 2nd digit. If there are two or more codes, there will be a 2.5 second pause between each.
  After all the codes have been output, there will be a 4.0 second pause and they will all be repeated.

HINT: In the event of a number of trouble codes, indication will begin from the smaller numbered code to the larger.

DIAGNOSTIC CODES

Code No.	Blink Pattern	Diagnosis	Trouble Area	Warning Light	PS Operation
11	 AB0057	No electric current being supplied to power steering motor	● Wire harness and connector between battery and power steering motor ● Wire harness and connector between ECU and power steering motor ● Power steering relay ● Power steering motor ● ECU	ON	Stopped (*1)
12	 FI1389	Short-circuit in power steering relay coil circuit	● Wire harness and connector between ECU and power steering relay ● Power steering relay ● ECU	ON	Stopped (*1)
21	 FI1609	Power steering motor temperature is abnormally high	● Wire harness and connector between ECU and power steering motor ● Power steering motor ● ECU	OFF	Discontinued (*2)
22	 FI1392	Abnormally high current being supplied to power steering motor	● Wire harness and connector between ECU and power steering driver ● Power steering driver ● ECU	ON	Stopped (*1)
31	 FI1394	Wearing out of power steering motor brush	● Wire harness and connector between ECU and power steering motor ● Power steering motor ● ECU	ON	Continues

*1: Until fault is fixed and ignition is turned OFF, then ON.
*2: Returns when temp. of PS pump drops.

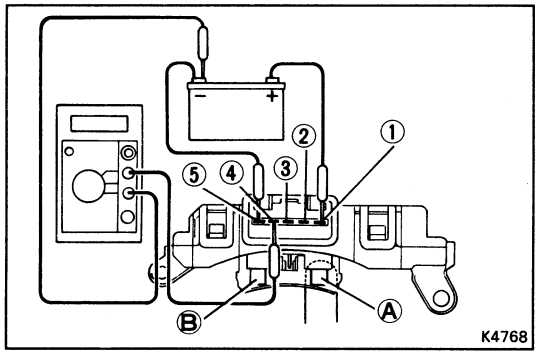
Inspection of Electronic Control Components

STEERING SENSOR

(a) Connect the positive (+) lead from the battery to terminal ① and the negative (–) lead to terminal ⑤.

(b) Connect the tester as shown in the illustration.

(c) Insert thick card at parts Ⓐ and Ⓑ and measure the resistance between ground and terminal ② or ④ when the light is cut out.



Light Exposure Condition	Terminal ② – Ground	Terminal ④ – Ground
Ⓐ and Ⓑ exposed	Approx. 100 Ω	Approx. 100 Ω
Ⓐ and Ⓑ cut out	∞	∞
Only Ⓐ is cut out	∞	Approx. 100 Ω
Only Ⓑ is cut out	Approx. 100 Ω	∞

SPEED SENSOR

(See page BE-52)

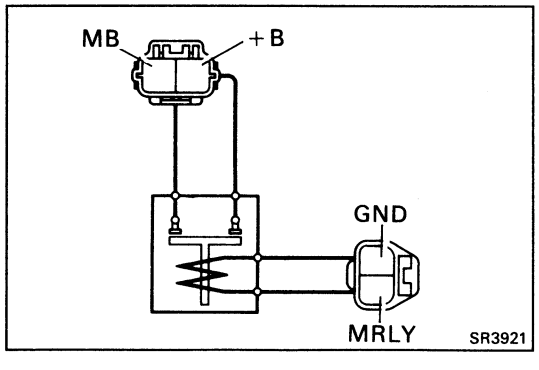
ENGINE (& ECT) ECU

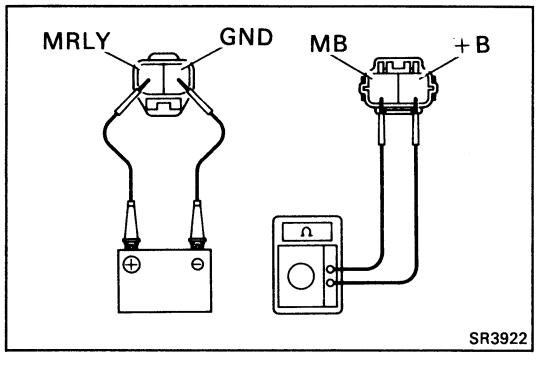
(See page FI-176)

POWER STEERING RELAY

(a) Inspect the relay continuity between terminals as shown.

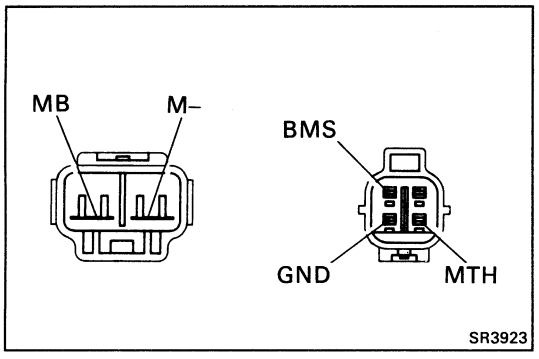
MRLY	GND	+B	MB
o	o		





(b) Connect the positive (+) lead from the battery to terminal MRLY and the negative (–) lead to terminal GND.

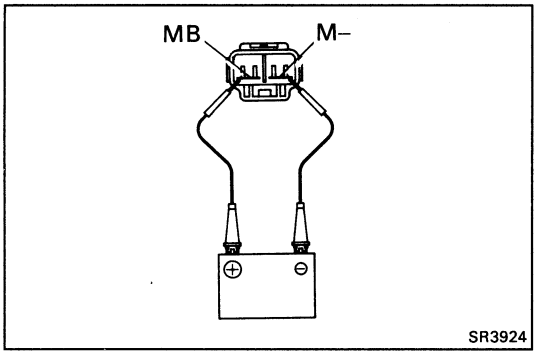
(c) Check that there is continuity between terminals +B and MB.



POWER STEERING MOTOR

(a) Inspect the motor continuity between terminals as shown.

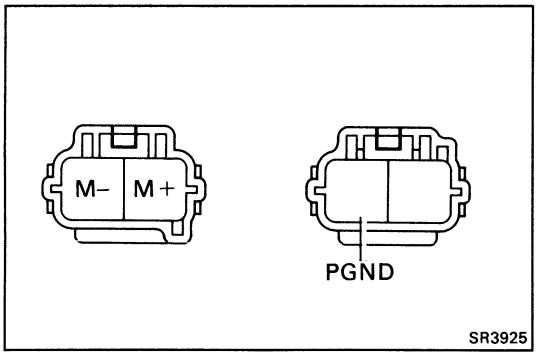
Condition \ Terminal	MB	M–	MTH	BMS	GND
Motor brushes installed	○——	○——	○	○——	○
Motor brushes removed	○——	○——	○		



(b) Connect the positive (+) lead from the battery to terminal MB and the negative (–) lead to terminal M–, check that the motor turns.

NOTICE:

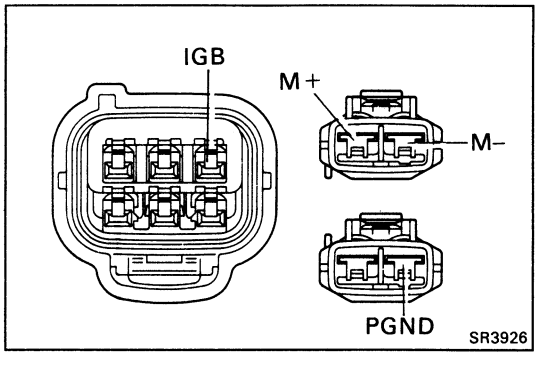
- **Be careful about fluid flying about.**
- **Do not run the motor more than is necessary.**



POWER STEERING DRIVER

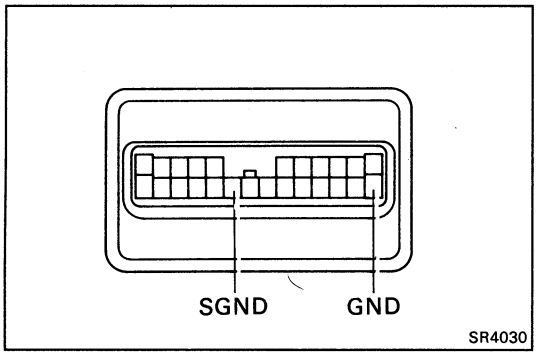
(a) Inspect continuity between terminals on the driver side connector.

M–	M+	PGND
○——▶——○		



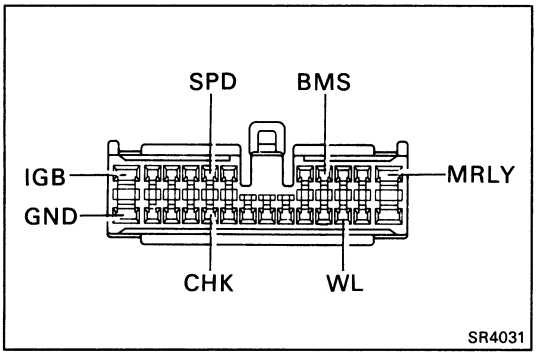
(b) Disconnect the connectors and inspect the connectors on the wire harness side as shown.

Check for	Tester Connection	Condition		Specified Value
Continuity	PGND – Ground	Constant		Continuity
	M+ – M–	Constant		Continuity
Voltage	IGB – Ground	Ignition switch	OFF	0 V
			ON	Battery voltage



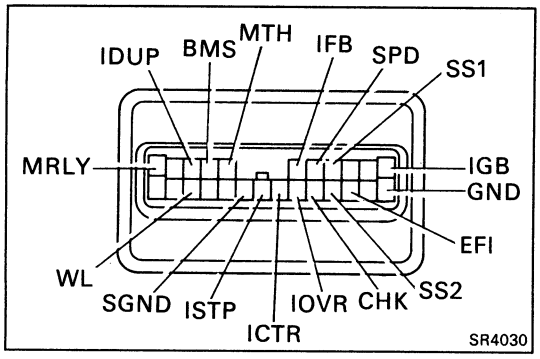
POWER STEERING ECU

(a) Check that there is continuity between terminals GND and SGND.



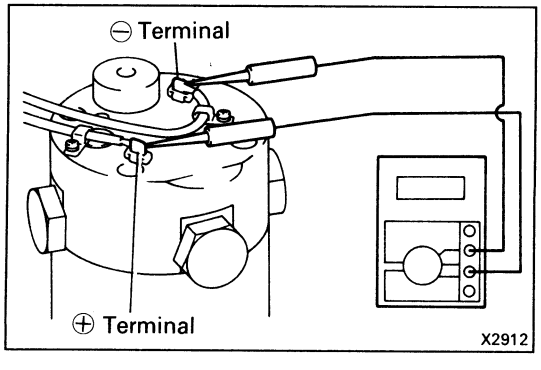
(b) Disconnect the connector and inspect the connector on the wire harness side as shown.

Check for	Tester Connection	Condition		Specified Value
Continuity	GND – Ground	Constant		Continuity
	MRLY – Ground	Constant		Continuity
	BMS – Ground	Power steering motor brushes installed		Continuity
		Power steering motor brushes removed		No continuity
	CHK – Ground	Normal		No continuity
		Connect terminals Tc and E_1 of check connector		Continuity
	SPD – Ground	Ignition switch ON and spin slowly rear wheel		Continuity ↕ No continuity
Voltage	IGB – Ground	Ignition switch	OFF	0 V
			ON	Battery voltage
	WL – Ground	Ignition switch	OFF	0 V
			ON	Battery voltage



(c) Inspect the system circuit with the connector connected.

Tester Connection	Condition	Voltage
EFI – Ground	Ignition switch ON and engine stopped	1.5 V or less
	Engine running	4.5 V or more
MRLY – Ground	Engine running	5 V or more
BMS – Ground	Ignition switch ON and power steering motor brushes installed	1.5 V or less
	Ignition switch ON and power steering motor brushes removed	4.5 V or more
SPD – Ground	Ignition switch ON and spin slowly rear wheel	1.5 V or less ↕ 4.5 V or more
SS1 – Ground	Ignition switch ON and turn slowly steering wheel	1.5 V or less ↕ 5 V or more
SS2 – Ground		
CHK – Ground	Connect terminals Tc and E_1 of check connector	1.5 V or less
	Normal	4.5 V or more
ICTR – SGND	Steering wheel operated with engine running and vehicle speed at 0 km/h (0 mph)	2.3 – 3.5 V
	Steering wheel operated with vehicle speed at 65 km/h (40 mph)	1.3 – 1.8 V



(d) Measure the output voltage (M+) of the power steering driver at the position on the power steering motor shown in the illustration.

Condition	Voltage
Steering wheel operated with engine running and vehicle speed at 0 km/h (0 mph)	9 – 11 V
Steering wheel operated with vehicle speed at 65 km/h (40 mph)	2 – 4 V

NOTICE: Do not bring the tester into contact with anything other than the terminals; if the tester causes a short between the terminals and the housing, this may result in a blown fuse or incorrect measurement.

SRS AIRBAG

	Page
GENERAL DESCRIPTION	AB-2
DESCRIPTION	AB-5
OPERATION	AB-7
INSPECTION ITEMS AND REPLACEMENT REQUIREMENTS	AB-11
REMOVAL AND INSTALLATION OF COMPONENT PARTS	
Steering Wheel Pad and Spiral Cable	AB-15
Front Airbag Sensor	AB-17
Center Airbag Sensor Assembly	AB-19
REPLACEMENT OF REPAIR WIRE FOR FRONT AIRBAG SENSOR	AB-21
TROUBLESHOOTING	AB-24
DISPOSAL OF STEERING WHEEL PAD (WITH AIRBAG)	AB-82
DISPOSAL OF CENTER AIRBAG SENSOR ASSEMBLY	AB-89

GENERAL DESCRIPTION

The 1991 MR2 for USA specifications is equipped with an SRS (Supplemental Restraint System) airbag.

Failure to carry out service operations in the correct sequence could cause the airbag system to unexpectedly deploy during servicing, possibly leading to a serious accident.

Further, if a mistake is made in servicing the airbag system, it is possible the airbag may fail to operate when required.

Before performing servicing (including removal or installation of parts, inspection or replacement), be sure to read the following items carefully, then follow the correct procedure described in the repair manual.

1. Malfunction symptoms of the airbag system are difficult to confirm, so the diagnostic codes become the most important source of information when troubleshooting.

   When troubleshooting the airbag system, always inspect the diagnostic codes before disconnecting the battery (See page AB-24).

2. **Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the LOCK position and the negative (–) terminal cable is disconnected from the battery. (The airbag system is equipped with a back-up power source so that if work is started within 20 seconds of disconnecting the negative (–) terminal cable of the battery, the airbag may be deployed.)**

   When the negative (–) terminal cable is disconnected from the battery, memory of the clock and audio systems will be cancelled. So before starting work, make a record of the contents memorized by the audio memory system. Then when work is finished, reset the audio system as before and adjust the clock.

   To avoid erasing the memory of each memory system, never use a back-up power supply from outside the vehicle.

3. Even in cases of a minor collision where the airbag does not deploy, the front airbag sensors and the steering wheel pad should be inspected (See page AB-11).

4. Never use airbag parts from another vehicle. When replacing parts, replace them with new parts.

5. Before repairs, remove the airbag sensors if shocks are likely to be applied to the sensors during repairs.

6. The center airbag sensor assembly contains mercury.
   After performing replacement, do not destroy the old part. When scrapping the vehicle or replacing the center airbag sensor assembly itself, remove the center airbag sensor assembly and dispose of it as toxic waste.

7. Never disassemble and repair the front airbag sensors, center airbag sensor assembly or steering wheel pad in order to reuse it.

8. If the front airbag sensors, center airbag sensor assembly or steering wheel pad have been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.

9. Do not expose the front airbag sensors, center airbag sensor assembly or steering wheel pad directly to hot air or flames.

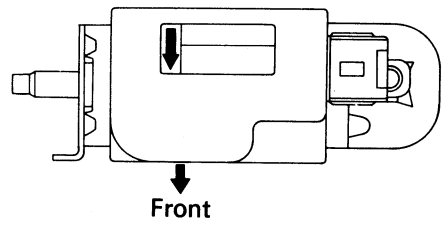
10. Use a volt/ohmmeter with high impedance (10 kΩ/V minimum) for troubleshooting of the electrical circuit.

11. Information labels are attached to the periphery of the airbag components. Follow the instructions on the notices.

12. After work on the airbag system is completed, perform the airbag warning light check (See page AB-29).

FRONT AIRBAG SENSOR

1. Never reuse the front airbag sensors involved in a collision when the airbag has deployed. (Replace both the left and right airbag sensors.)
2. Install the front airbag sensor with the arrow on the sensor facing toward the front of the vehicle.
3. The front airbag sensor set bolts and nuts have been anti-rust treated.
   When the sensor is removed, always replace the set bolt and nut with new ones.



AB0255

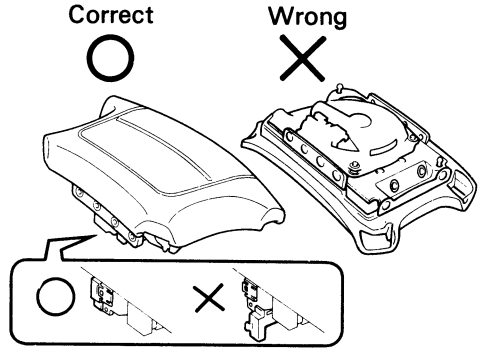
4. The front airbag sensor is equipped with an electrical connection check mechanism. Be sure to lock this mechanism securely when connecting the connector. If the connector is not securely locked, a malfunction code will be detected by the diagnosis system (See page AB-9).

SPIRAL CABLE (in COMBINATION SWITCH)

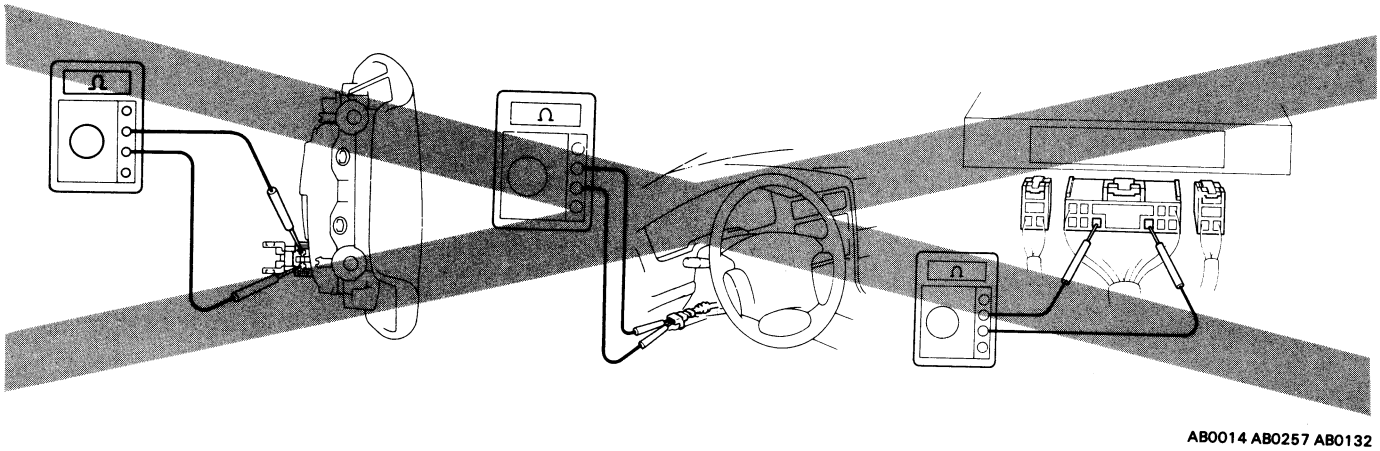
The steering wheel must be fitted correctly to the steering column with the spiral cable at the neutral position, otherwise cable disconnection and other troubles may result. Refer to page AB-16 of this manual concerning correct steering wheel installation.

STEERING WHEEL PAD (with AIRBAG)

1. **When removing the steering wheel pad or handling a new steering wheel pad, it should be placed with the pad top surface facing up.**
   In this case, the twin-lock type connector lock lever should be in the locked state and care should be taken to place it so the connector will not be damaged. And do not store a steering wheel pad on top of another one. (Storing the pad with its metallic surface up may lead to a serious accident if the airbag inflates for some reason.)
2. **Never measure the resistance of the airbag squib.**
   (This may cause the airbag to deploy, which is very dangerous.)



AB0256



AB0014 AB0257 AB0132

3. Grease should not be applied to the steering wheel pad and the pad should not be cleaned with detergents of any kind.
4. Store the steering wheel pad where the ambient temperature remains below 93°C (200°F), without high humidity and away from electrical noise.
5. When using electric welding, first disconnect the airbag connector (yellow color and 2 pins) under the steering column near the combination switch connector before starting work.
6. When disposing of a vehicle or the steering wheel pad alone, the airbag should be deployed using an SST before disposal (See page AB-82). Perform the operation in a place away from electrical noise.

CENTER AIRBAG SENSOR ASSEMBLY

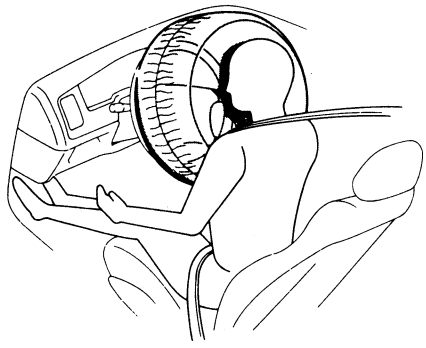
The connectors to the center airbag sensor assembly should be connected or disconnected with the sensor mounted on the floor. If the connectors are connected or disconnected while the center airbag sensor assembly is not mounted to the floor, it could cause undesired ignition of the airbag system.

WIRE HARNESS AND CONNECTOR

The airbag system wire harness is integrated with the cowl wire harness assembly and luggage compartment wire harness assembly. The wires for the airbag wire harness are encased in a yellow corrugated tube. All the connectors for the system are also a standard yellow color. If the airbag system wire harness becomes disconnected or the connector becomes broken due to an accident, etc., repair or replace it as shown on page AB-21.

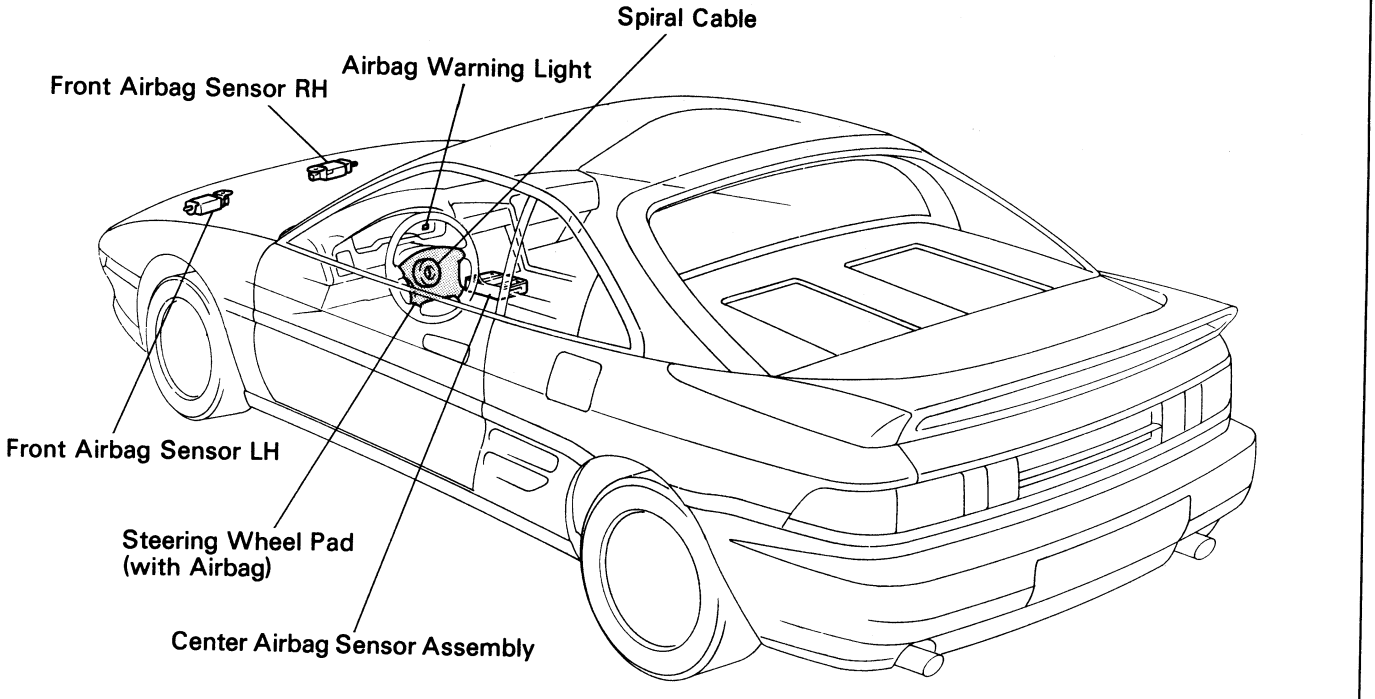
DESCRIPTION

The SRS (Supplemental Restraint System) airbag, together with the seat belt, is designed to help protect the driver. In a collision, the airbag sensors detect the shock, and if the front-to-rear shock is greater than a specified value, an airbag stored in the steering wheel pad is inflated instantaneously to help reduce the shock to the driver.



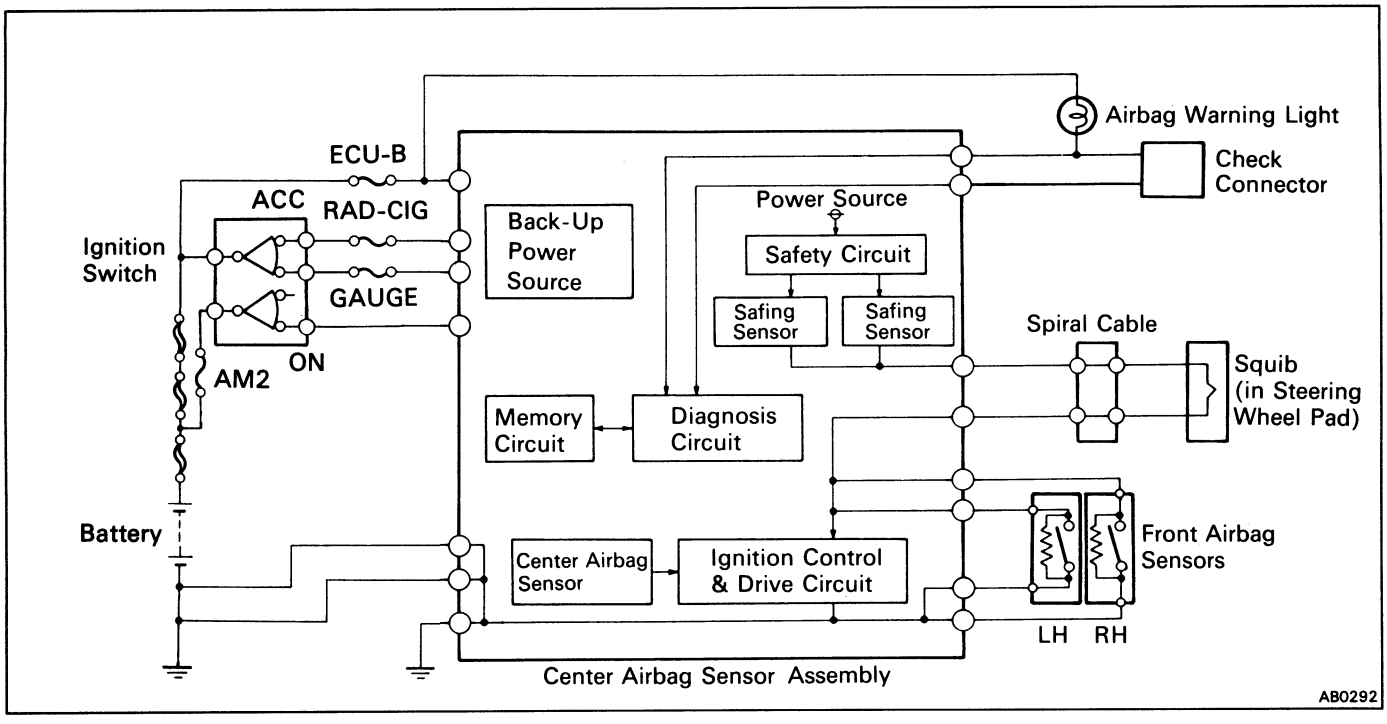
AB0279

LOCATION OF COMPONENTS

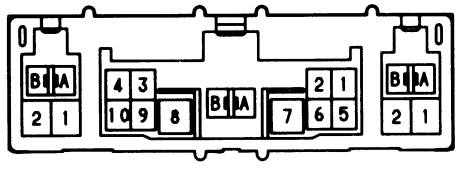


AB0280

WIRING DIAGRAM



CENTER AIRBAG SENSOR ASSEMBLY CONNECTORS



AB0055

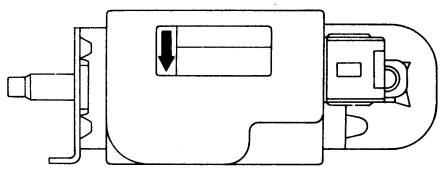
Connector	No.	Symbol	Terminal Name
Ⓐ	1	−SL	LH Front Airbag Sensor ⊖
	2	+SL	LH Front Airbag Sensor ⊕
Ⓑ	1	IG_2	Power Source (AM2 Fuse)
	2	IG_1	Power Source (GAUGE Fuse)
	3	ACC	Power Source (RAD-CIG Fuse)
	4	+B	Battery (ECU-B Fuse)
	5	E_2	Ground
	6	LA	Airbag Warning Light
	7	D^-	Squib ⊖
	8	D^+	Squib ⊕
	9	Tc	Diagnosis
	10	E_1	Ground
Ⓒ	1	+SR	RH Front Airbag Sensor ⊕
	2	−SR	RH Front Airbag Sensor ⊖
Ⓐ Ⓑ Ⓒ	A	−	Electrical Connection Check Mechanism
	B	−	Electrical Connection Check Mechanism

OPERATION

FUNCTION OF COMPONENTS

1. FRONT AIRBAG SENSOR

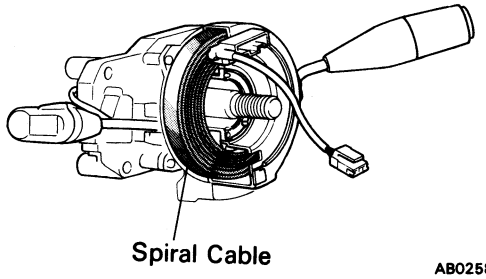
The front airbag sensors are mounted inside of the radiator upper support. The sensor unit is a mechanical type. When the sensor detects deceleration force above a predetermined limit in a collision, the contacts in the sensor make contact, sending a signal to the center airbag sensor assembly.
The sensor cannot be disassembled.



AB0255

2. SPIRAL CABLE (in COMBINATION SWITCH)

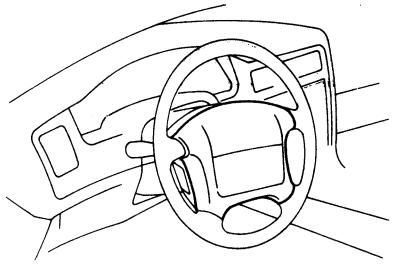
A spiral cable is used as an electrical joint from the vehicle body side to the steering wheel.



AB0258

3. STEERING WHEEL PAD (with AIRBAG)

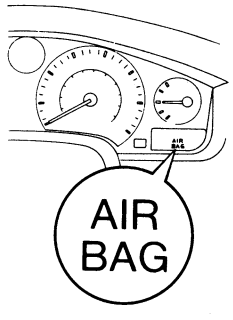
The inflater and bag of the airbag system are stored in the steering wheel pad and cannot be disassembled.
The inflater contains a squib, igniter charge, gas generant, etc., and inflates the bag in case of a frontal collision.



AB0259

4. AIRBAG WARNING LIGHT

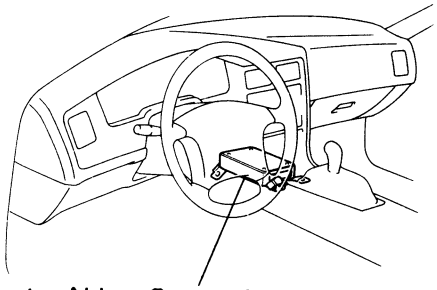
The airbag warning light is located on the combination meter. It goes on to alert the driver of trouble in the system when a malfunction is detected in the center airbag sensor assembly self-diagnosis. In normal operating condition when the ignition switch is turned to the ACC or ON position, the light goes on for about 6 seconds and then goes off.



AB0260

5. CENTER AIRBAG SENSOR ASSEMBLY

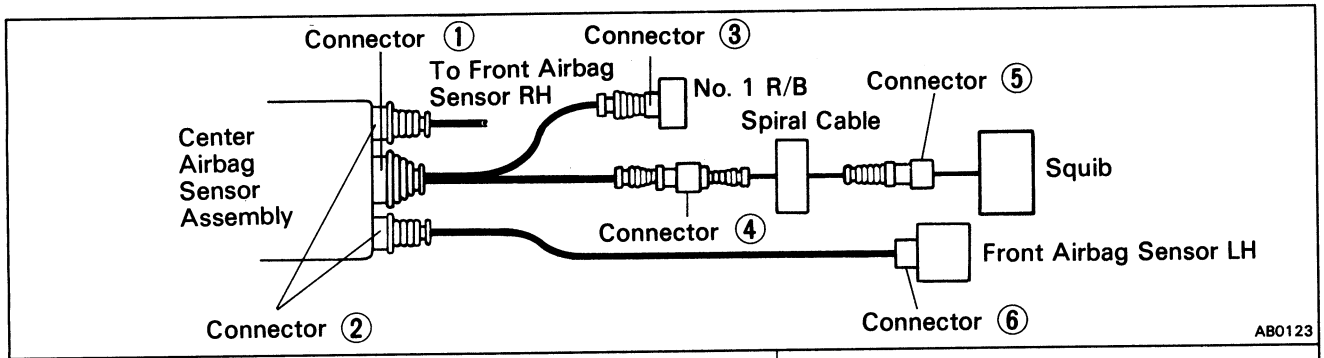
The center airbag sensor assembly is mounted on the floor inside the center cluster. The center airbag sensor assembly consists of a center airbag sensor, safing sensors, ignition control and drive circuit, diagnosis circuit, etc. It receives signals from the airbag sensors, judges whether the airbag must be activated or not and diagnoses system malfunctions.



AB0261

6. AIRBAG CONNECTORS

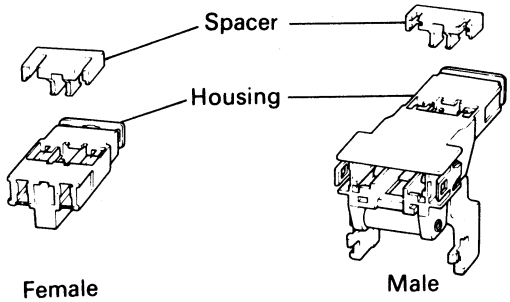
All connectors in the airbag system are colored yellow. Connectors having special functions and specifically designed for airbags are used in the locations shown below to ensure high reliability. These connectors use durable gold-plated terminals.



No.	Item	Application
(1)	Terminal Twin-Lock Mechanism	Connectors ①, ②, ③, ④, ⑤, ⑥
(2)	Airbag Activation Prevention Mechanism	Connectors ①, ④, ⑤
(3)	Electrical Connection Check Mechanism	Connectors ①, ②, ⑥
(4)	Connector Twin-Lock Mechanism	Connectors ④, ⑤

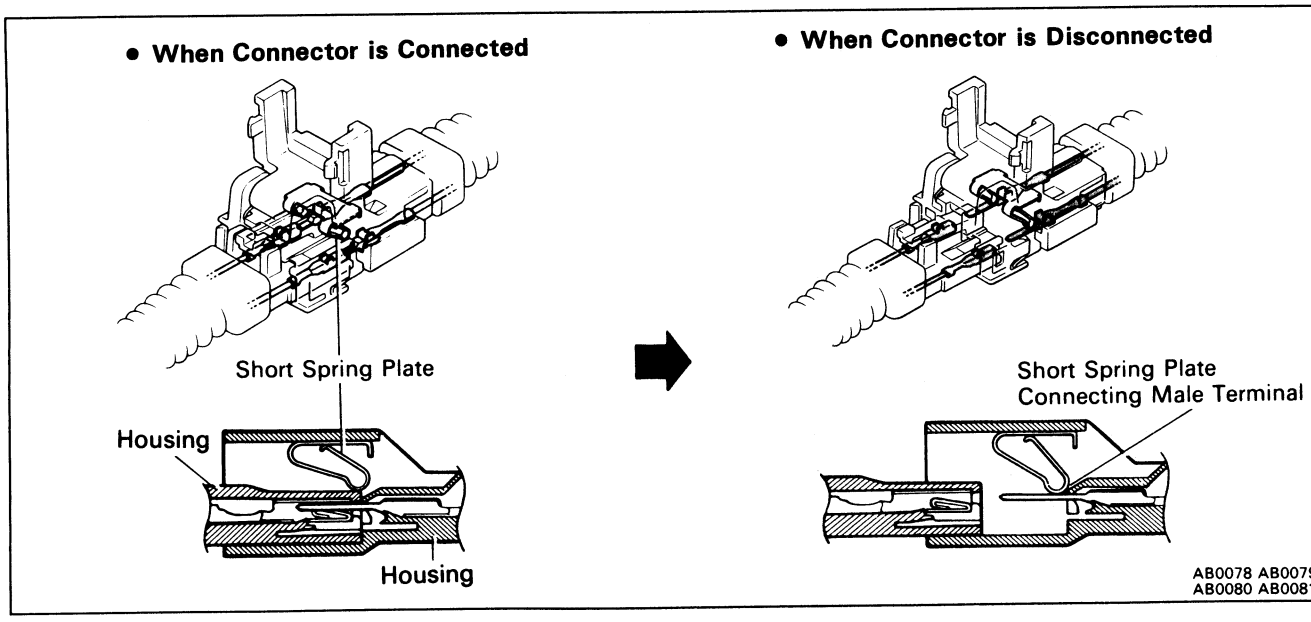
(1) Terminal Twin-Lock Mechanism

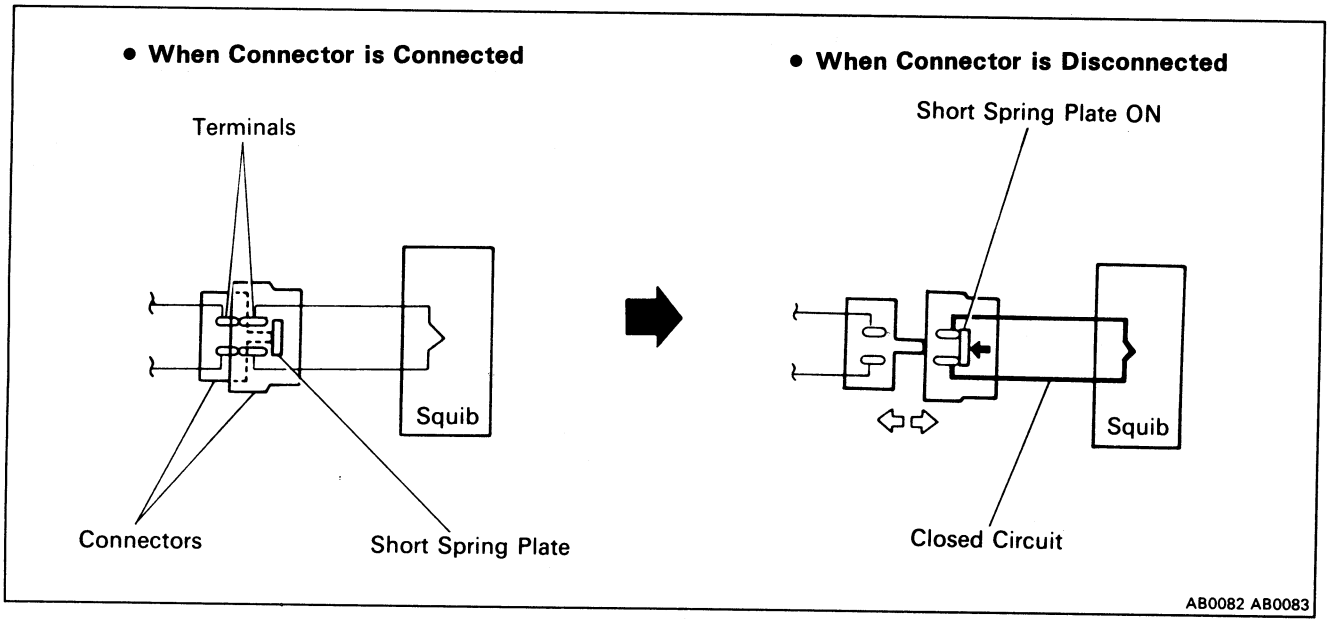
Each connector has a two-piece construction consisting of a housing and a spacer. This design secures the locking of the terminal by two locking devices (the spacer and the lance) to prevent terminals from coming out.



(2) Airbag Activation Prevention Mechanism

Each connector contains a short spring plate. When the connector is disconnected, the short spring plate automatically connects the power source and grounding terminals of the squib.

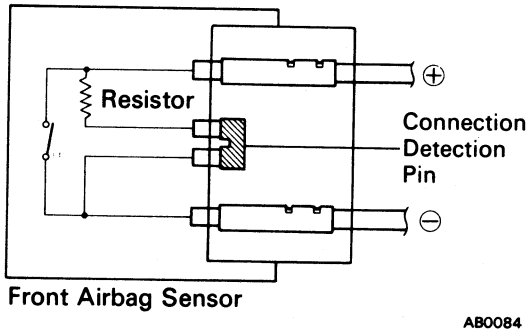


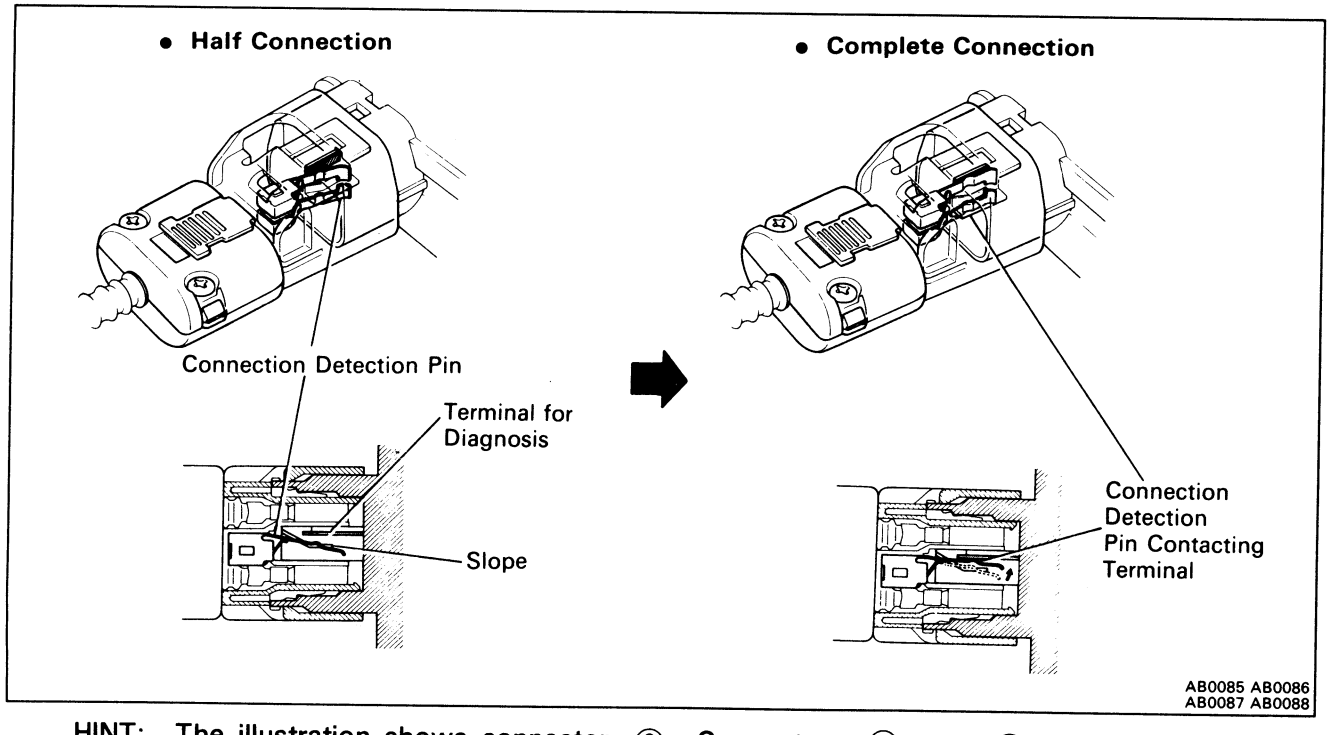


HINT: The illustration shows connectors ④ and ⑤ . Connector ① has a short spring plate on the female terminal side, but the operating principle is the same.

(3) Electrical Connection Check Mechanism

This mechanism is designed to electrically check if connectors are connected correctly and completely. The electrical connection check mechanism is designed so that the connection detection pin connects with the diagnosis terminals when the connector housing lock is in the locked condition.

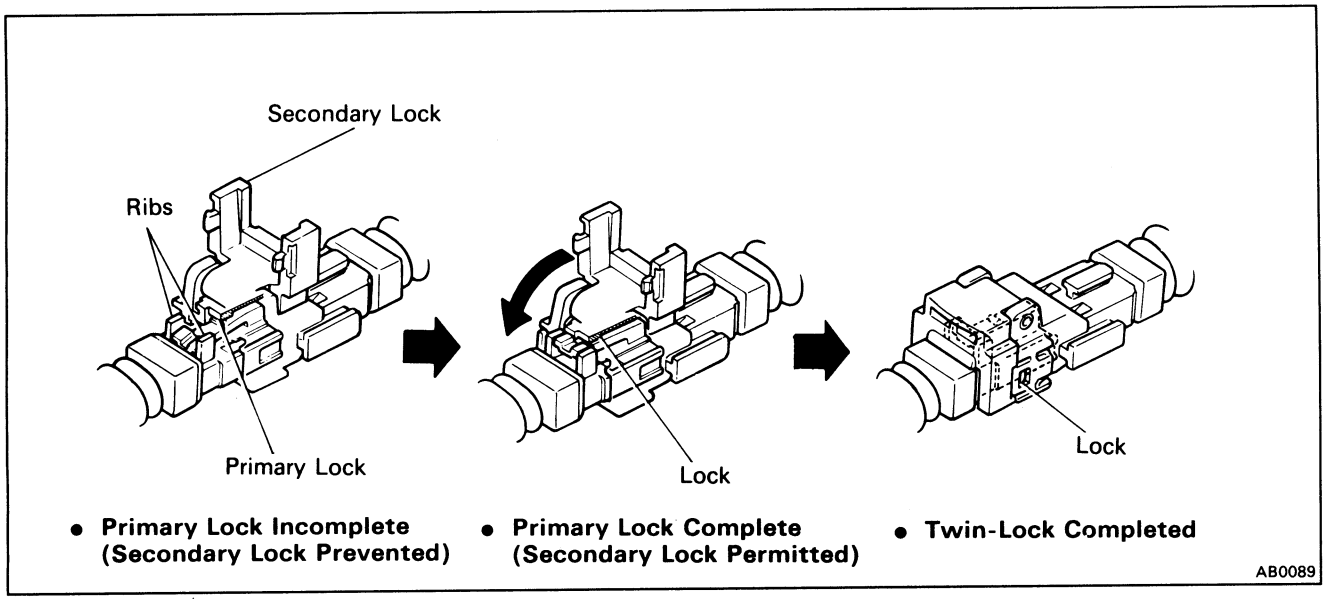




HINT: The illustration shows connector ⑥ . Connectors ① and ② also have the same operating principle.

(4) Connector Twin-Lock Mechanism

With this mechanism connectors (male and female connectors) are locked by two locking devices to increase connection reliability.
If the primary lock is incomplete, ribs interfere and prevent the secondary lock.



When the vehicle is involved in a frontal collision in the hatched area (Fig. 1) and the shock is larger than a predetermined level, the airbag is activated automatically. Safing sensors are designed to go on at a smaller deceleration rate than the front and center airbag sensors. As illustrated in Fig. 2 below, ignition is caused when current flows to the squib, which happens when a safing sensor and a front airbag sensor and/or the center airbag sensor go on simultaneously.

When a deceleration force acts on the sensors, it causes the squib to ignite. Gas is then generated, increasing the pressure inside the bag rapidly. The inflated bag breaks open the steering wheel pad. Bag inflation then ends, and the gas is discharged through discharge holes provided behind the bag. The bag becomes deflated as a result.

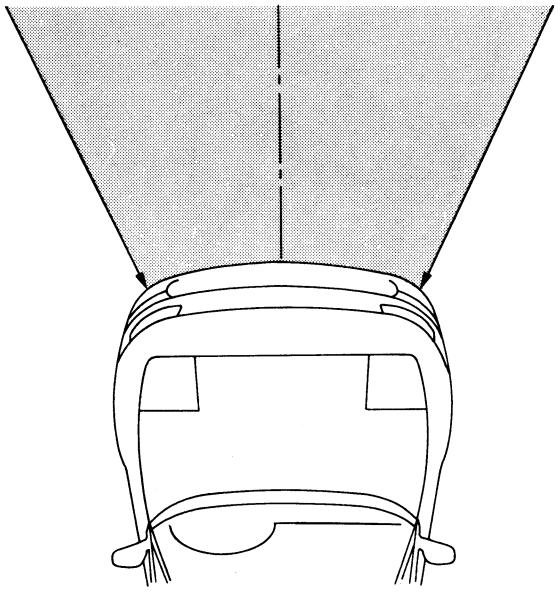


Fig. 1 AB0262

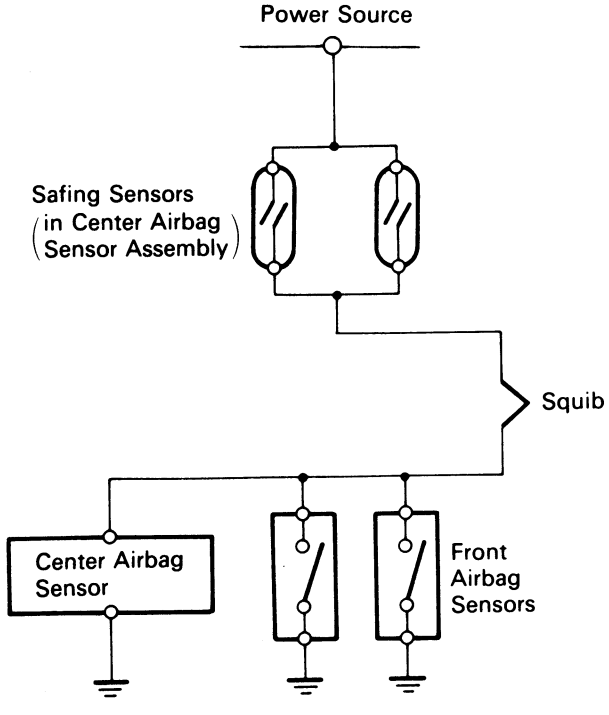


Fig. 2

INSPECTION ITEMS AND REPLACEMENT REQUIREMENTS

If a vehicle is brought in for an airbag system inspection, or if a vehicle which has been involved in a collision is inspected, perform the inspection in accordance with the following procedure. If any problems are discovered, replace the affected part with a new one.

Steering Wheel Pad (with Airbag), Steering Wheel and Spiral Cable

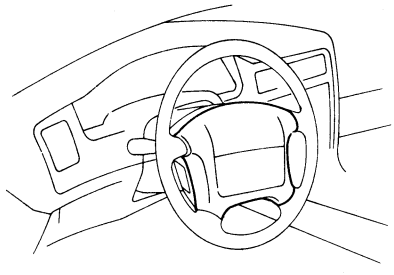
INSPECTION ITEMS

1. VEHICLES NOT INVOLVED IN A COLLISION

(a) Perform a diagnostic system check (See page AB-29).

(b) Perform a visual check which includes the following items with the steering wheel pad (with airbag) installed in the vehicle.

- Check for cuts, minute cracks or marked discoloration of the steering wheel pad top surface and grooved portion.



AB0259

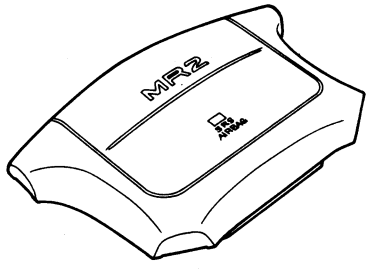
2. VEHICLES INVOLVED IN A COLLISION

(IF THE AIRBAG IS NOT DEPLOYED)

(a) Perform a diagnostic system check (See page AB-29).

(b) Perform a visual check which includes the following items with the steering wheel pad (with airbag) removed from the vehicle.

- Check for cuts or cracks in, or marked discoloration of the steering wheel pad top surface and grooved portion.
- Check for cuts and cracks in, or chipping of connectors and wire harnesses.
- Check for deformation of the horn button contact plate of the steering wheel.

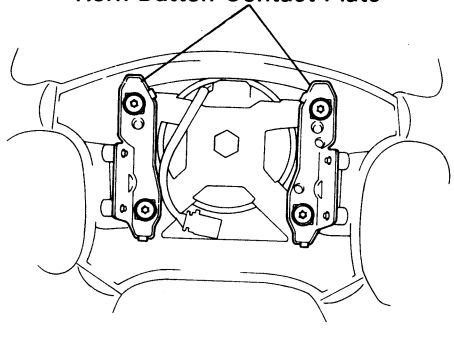


AB0263

HINT:

- If the horn button contact plate of the steering wheel is deformed, never repair it. Always replace the steering wheel with a new one.
- There should be no interference between the steering wheel pad and the steering wheel, and the clearance should be uniform all the way around when the new steering wheel pad is installed on the steering wheel.

Horn Button Contact Plate



AB0204

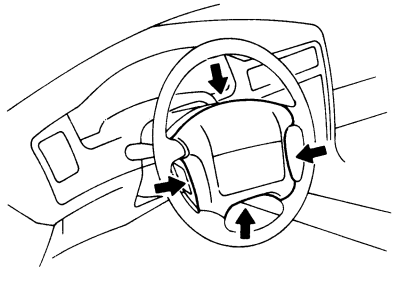
CAUTION: For removal and installation of the steering wheel pad, see page AB-15, "REMOVAL AND INSTALLATION" and be sure to follow the correct procedure.

(IF THE AIRBAG IS DEPLOYED)

(a) Perform a diagnostic system check (See page AB-29).

(b) Perform a visual check which includes the following items with the steering wheel pad (with airbag) removed from the vehicle.

- Check for deformation of the horn button contact plate of the steering wheel.
- Check for damage to the spiral cable connector and wire harness.



AB0259

HINT:
- If the horn button contact plate of the steering wheel is deformed, never repair it. Always replace the steering wheel with a new one.
- There should be no interference between the steering wheel pad and the steering wheel, and the clearance should be uniform all the way around when the new steering wheel pad is installed on the steering wheel.

REPLACEMENT REQUIREMENTS

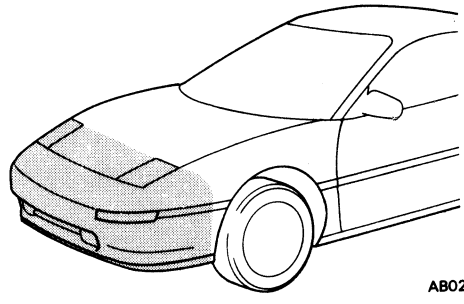
In the following cases, replace the steering wheel pad, steering wheel or spiral cable.

CAUTION: For replacement of the steering wheel pad, see page AB-15, "REMOVAL AND INSTALLATION" and be sure to follow the correct procedure.

- If the airbag has been deployed.
- If the steering wheel pad or spiral cable has been found to be faulty in troubleshooting.
- If the steering wheel pad, steering wheel or spiral cable has been found to be faulty during the check in item **1.** – (b) or **2.** – (b).
- If the steering wheel pad has been dropped.

Front Airbag Sensor

INSPECTION ITEMS



AB0264

1. VEHICLES NOT INVOLVED IN A COLLISION

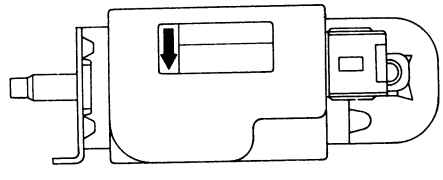
- Perform a diagnostic system check (See page AB-29).

2. VEHICLES INVOLVED IN A COLLISION

(a) Perform a diagnostic system check (See page AB-29).

(b) If the front bumper of the car or its periphery is damaged, perform visual check for damage to the front airbag sensor, which includes the following items even if the airbag was not deployed:

- Bracket deformation.
- Peeling of paint from the bracket.
- Cracks, dents or chips in the case.
- Cracks and dents in, or chipping and scratches of the connector.
- Peeling off of the label or damage to the series number.



AB0255

Also refer to the body dimension drawings on page BO-78 and check the dimensions and mounting surface angle of the body area where the front airbag sensors are mounted. (The airbag may malfunction, or may not work, if the mounting angle or dimensions of the sensor mount are not correct.)

REPLACEMENT REQUIREMENTS

In the following cases, replace the front airbag sensor.

NOTICE: For replacement of the front airbag sensor, see page AB-17, "REMOVAL AND INSTALLATION".

- If the airbag has been deployed in a collision.
  (Replace both the left and right airbag sensors.)
- If the front airbag sensor has been found to be faulty in troubleshooting.
- If the front airbag sensor has been found to be faulty during the check in item **2.** – (b).
- If the front airbag sensor has been dropped.

Center Airbag Sensor Assembly

INSPECTION ITEMS

1. VEHICLES NOT INVOLVED IN A COLLISION

- Perform a diagnostic system check (See page AB-29).

2. VEHICLES INVOLVED IN A COLLISION

(IF THE AIRBAG IS NOT DEPLOYED)

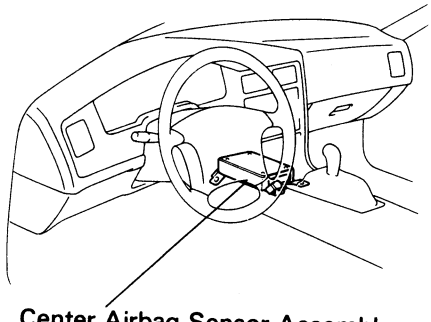
- Perform a diagnostic system check (See page AB-29).

(IF THE AIRBAG IS DEPLOYED)

(a) Perform a diagnostic system check (See page AB-29).

(b) Check the following items in the center airbag sensor assembly:

- Deformation of the bracket or case.
- Vinyl seat broken.
- Damage to the connector.



Center Airbag Sensor Assembly

AB0261

NOTICE: If the center airbag sensor assembly interferes with any other parts, perform a check after repairs.

REPLACEMENT REQUIREMENTS

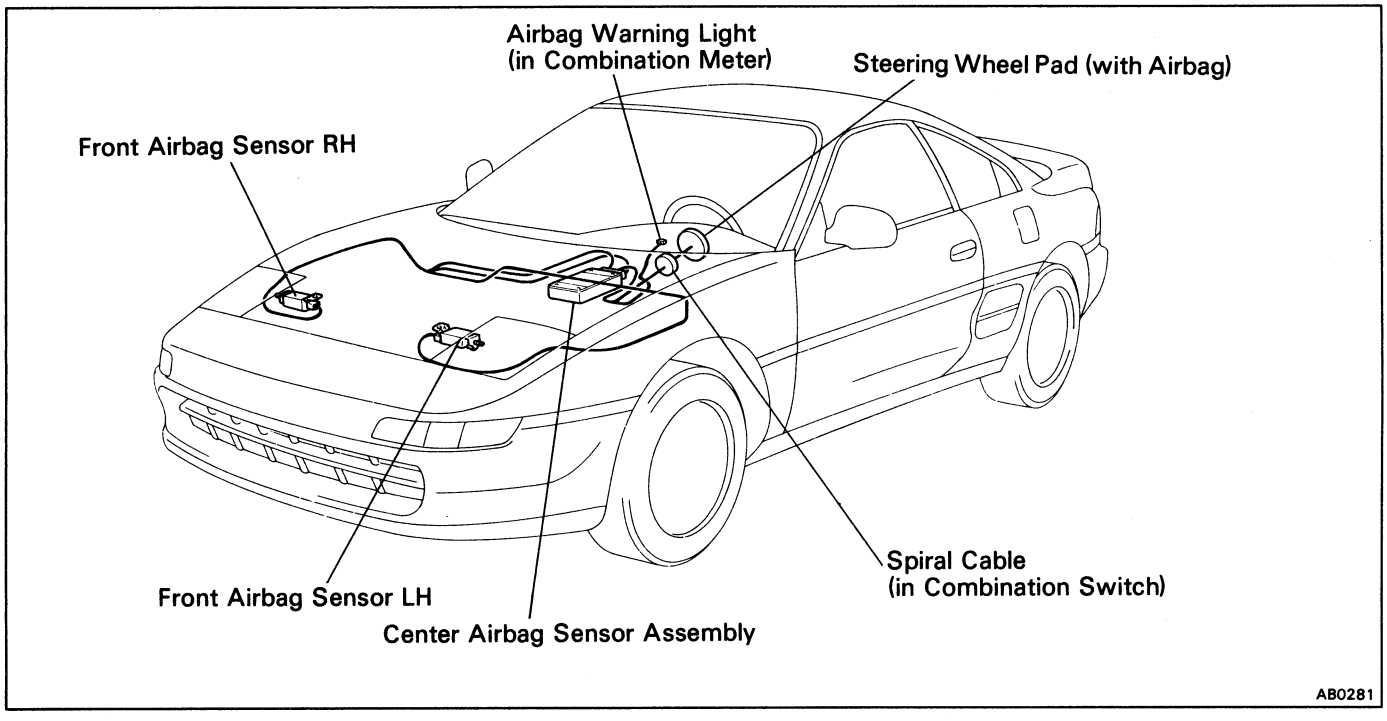
In the following cases, replace the center airbag sensor assembly.

NOTICE: For replacement of the center airbag sensor assembly, see page AB-19, "REMOVAL AND INSTALLATION".

- If the center airbag sensor assembly has been found to be faulty in troubleshooting.
- If the center airbag sensor assembly has been found to be faulty during the check in item **2.** – (b).
- If the center airbag sensor assembly has been dropped.

Wire Harness and Connector

HINT: The airbag system wire harness is integrated with the cowl wire harness assembly and luggage compartment wire harness assembly. The wires for the airbag wire harness are encased in a yellow corrugated tube and all the connectors in the system are a standard yellow color.



INSPECTION ITEMS

1. **VEHICLES NOT INVOLVED IN A COLLISION**
   - Perform a diagnostic system check (See page AB-29).

2. **VEHICLES INVOLVED IN A COLLISION**
   (a) Perform a diagnostic system check (See page AB-29).
   (b) If there is a break in any of the wires in the airbag system wire harness, or if conductors are exposed.
   (c) If the airbag system wire harness connectors are cracked or chipped.

REPLACEMENT REQUIREMENTS

In the following cases, replace the wire harness or connector.

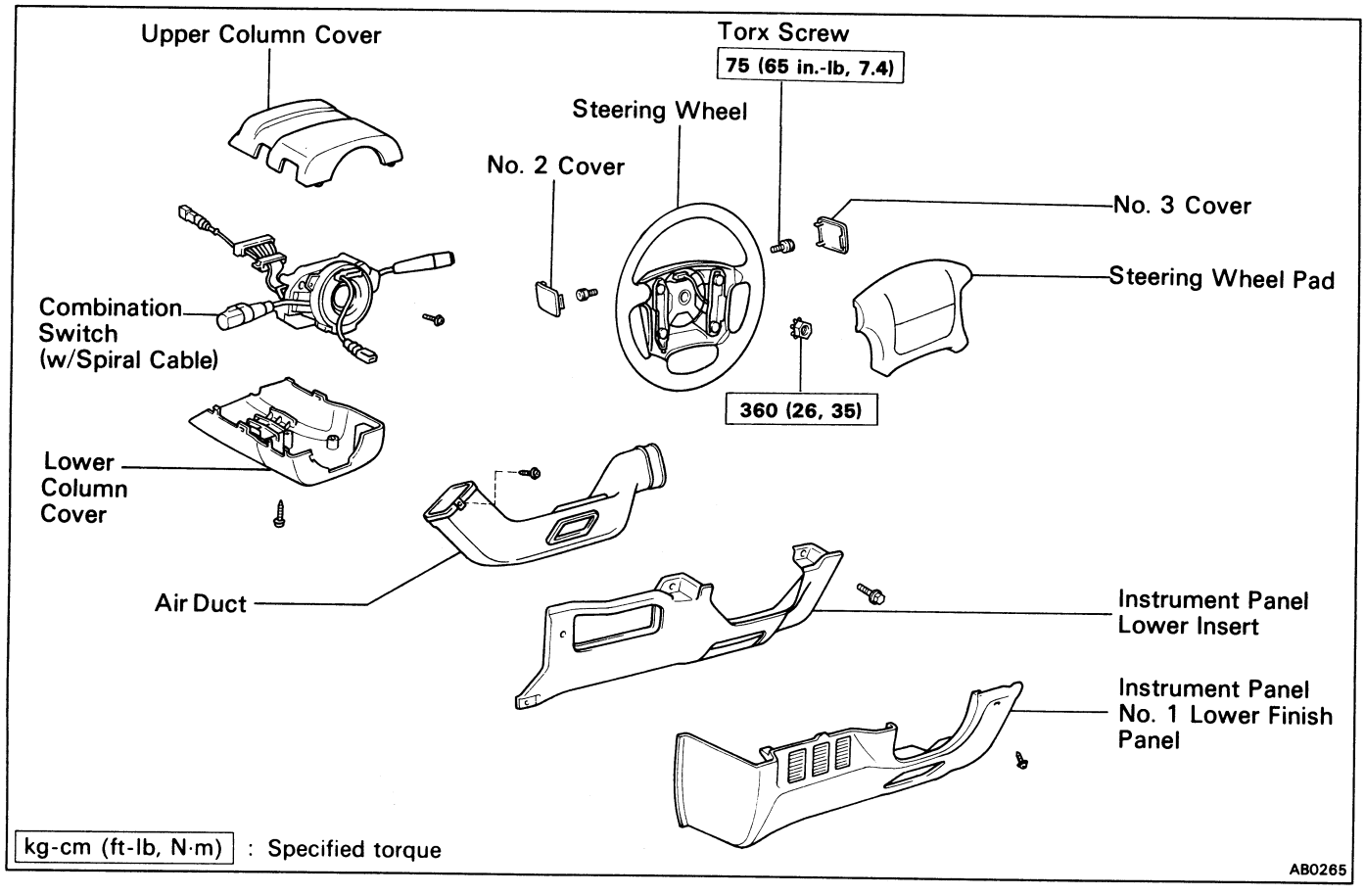
- If any part of the airbag system wire harness or any connector has been found to be faulty in troubleshooting.
- If any part of the airbag system wire harness or any connector has been found to be faulty during the check in item **2.** – (b) or (c).

NOTICE: If the wire harness used in the airbag system is damaged, replace the whole wire harness assembly.
When the connector to the front airbag sensors can be repaired alone (when there is no damage to the wire harness), use the repair wire specially designed for the purpose (See page AB-21).

REMOVAL AND INSTALLATION OF COMPONENT PARTS

Steering Wheel Pad and Spiral Cable

Remove and install the parts as shown.

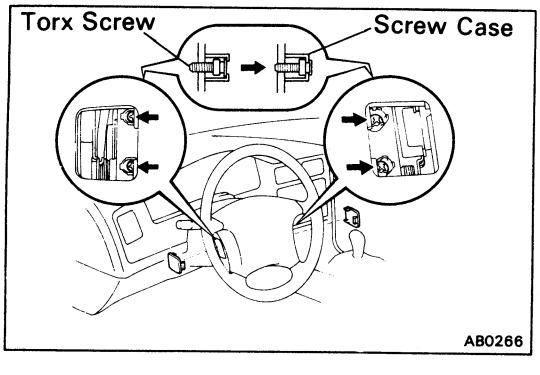


(MAIN POINTS OF REMOVAL AND INSTALLATION)

CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the LOCK position and the negative (–) terminal cable is disconnected from the battery (See page AB-2).

NOTICE:

- **If the wiring connector of the airbag system is disconnected with the ignition switch at ON or ACC, diagnostic codes will be recorded.**
- **Never use airbag parts from another vehicle. When replacing parts, replace with new parts.**



1. **REMOVE STEERING WHEEL PAD**

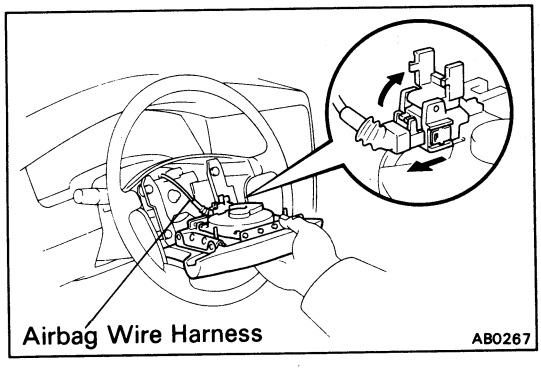
(a) Remove negative terminal (–) from the battery.

(b) Place the front wheels facing straight ahead.

(c) Using a torx wrench, loosen the four screws.

Torx wrench: T30 (Part No. 09042-00010 or locally manufactured tool)

(d) Loosen the torx screws until the groove along the screw circumference catches on the screw case.



(e) Pull the wheel pad out from the steering wheel and disconnect the airbag connector.

NOTICE: When removing the wheel pad, take care not to pull the airbag wire harness.

CAUTION:
- **When storing the wheel pad, keep the upper surface of the pad facing upward (See pages AB-3, 4).**
- **Never disassemble the wheel pad.**

2. REMOVE STEERING WHEEL

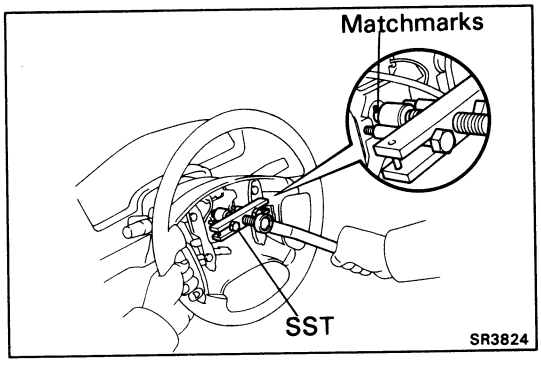
(a) Disconnect the connector.

(b) Remove the set nut.

(c) Place matchmarks on the steering wheel and main shaft.

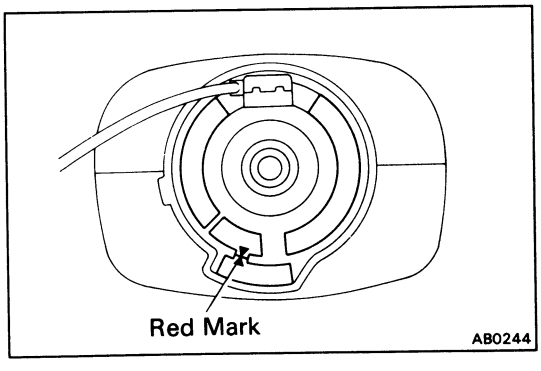
(d) Using SST, remove the steering wheel.

SST 09213-31021



3. REMOVE AND INSTALL SPIRAL CABLE FROM/TO COMBINATION SWITCH
(See page BE-30)

NOTICE: Do not disassemble the spiral cable or apply oil to it.



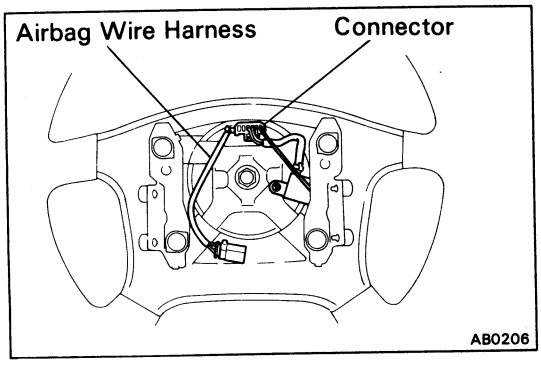
4. CENTER SPIRAL CABLE

(a) Check that the front wheels are facing straight ahead.

(b) Turn the spiral cable counterclockwise by hand until it becomes harder to turn the cable.

(c) Then rotate the spiral cable clockwise about 2 1/2 turns to align the red mark.

HINT: The spiral cable will rotate about 2 1/2 turns to either left or right of the center.



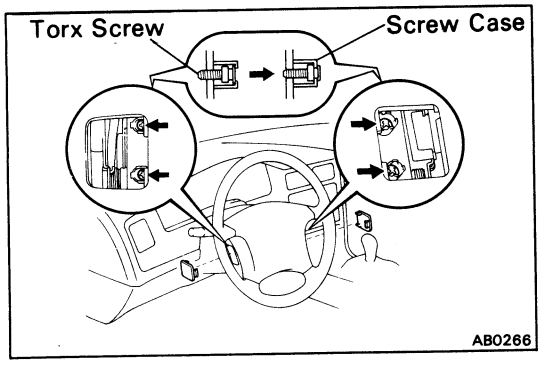
5. INSTALL STEERING WHEEL

(a) Align matchmarks on the steering wheel and main shaft, and install the steering wheel to the main shaft.

(b) Install and torque the set nut.

Torque: 360 kg-cm (26 ft-lb, 35 N·m)

(c) Connect the connector.



6. INSTALL STEERING WHEEL PAD

(a) Connect the airbag connector.

(b) Install the wheel pad after confirming that the circumference groove of the torx screws is caught on the screw case.

(c) Using a torx wrench, tighten the four screws.

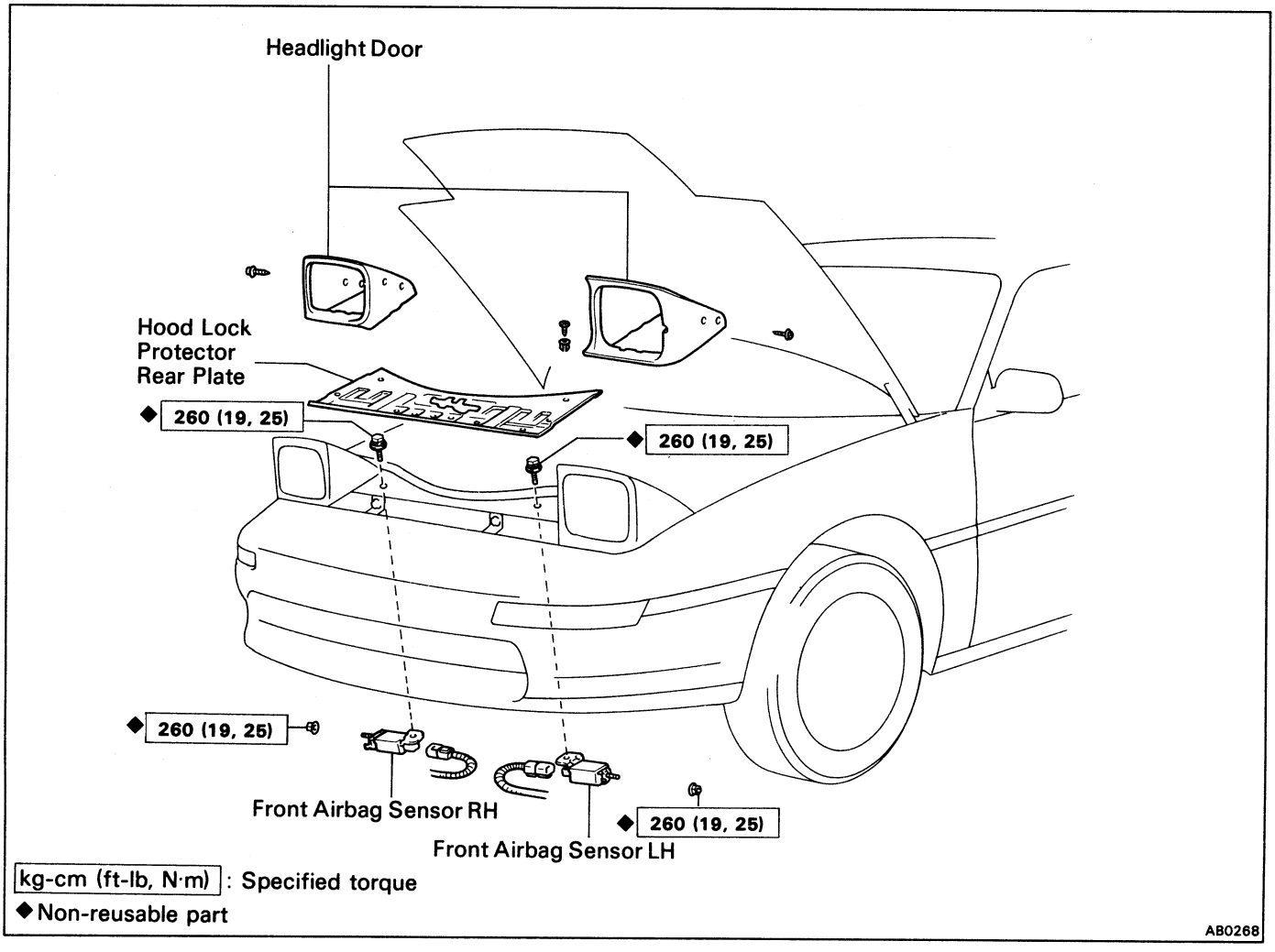
Torque: 75 kg-cm (65 in.-lb, 7.4 N·m)

NOTICE:
- **Make sure the wheel pad is installed to the specified torque.**
- **If the wheel pad has been dropped, or there are cracks, dents or other defects in the case or connector, replace the wheel pad with a new one.**
- **When installing the wheel pad, take care that the wirings do not interfere with other parts and are not pinched between other parts.**

7. CHECK STEERING WHEEL CENTER POINT

Front Airbag Sensor

Remove and install the parts as shown.

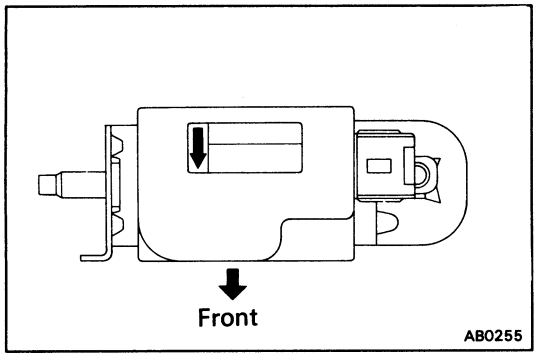


(MAIN POINTS OF REMOVAL AND INSTALLATION)

CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the LOCK position and the negative (–) terminal cable is disconnected from the battery (See page AB-2).

NOTICE:

- **If the wiring connector of the airbag system is disconnected with the ignition switch at ON or ACC, diagnostic codes will be recorded.**
- **Never use airbag parts from another vehicle. When replacing parts, replace with new parts.**
- **Never reuse the sensor involved in a collision when the airbag has deployed.**
- **Never repair a sensor in order to reuse it.**



INSTALL FRONT AIRBAG SENSOR

Install the sensor with the arrow on the sensor facing toward the front of the vehicle.

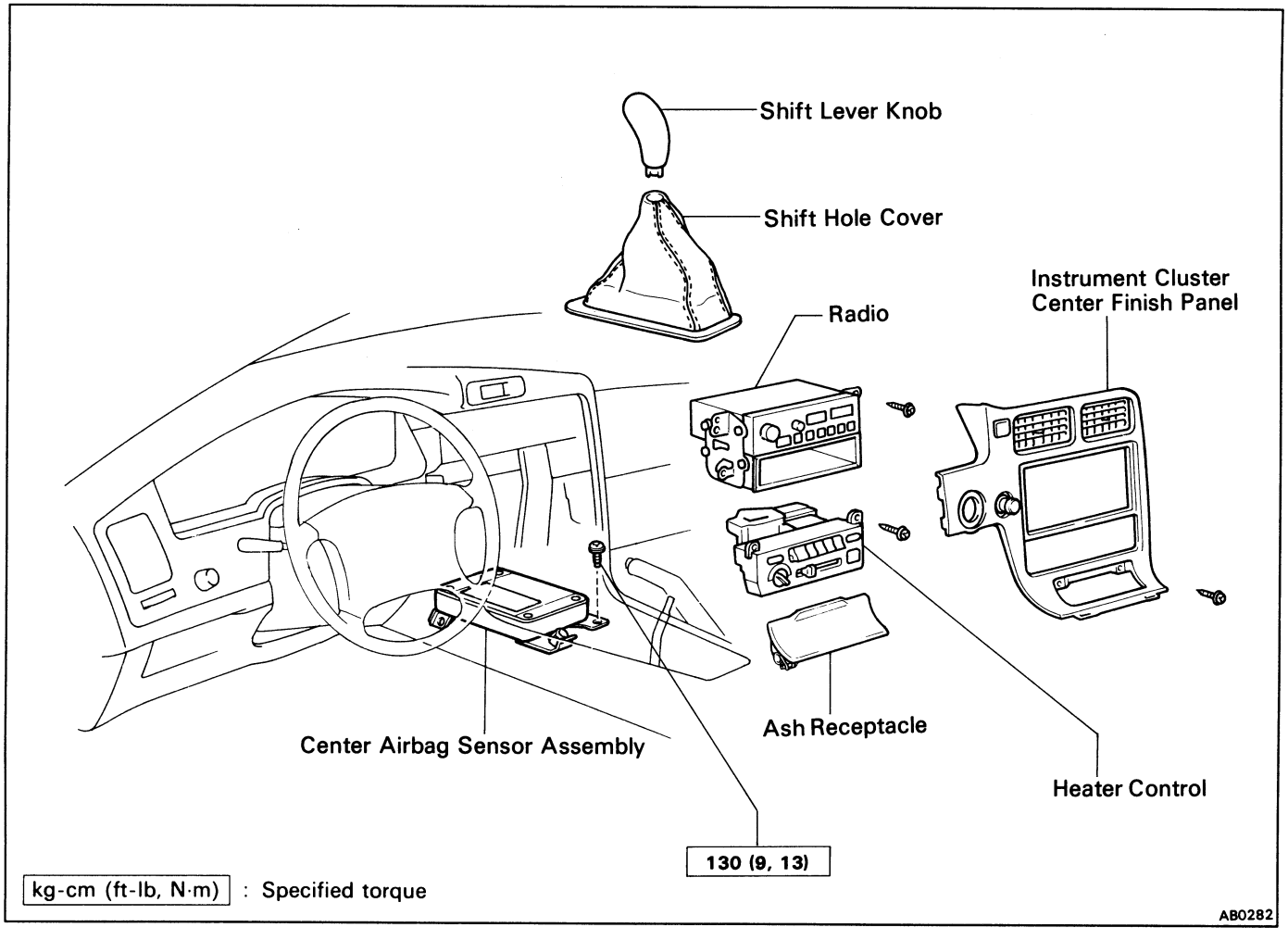
Torque: 260 kg-cm (19 ft-lb, 25 N·m)

NOTICE:

- **Make sure the sensor is installed to the specified torque.**
- **If the sensor has been dropped, or there are cracks, dents or other defects in the case, bracket or connector, replace the sensor with a new one.**
- **The sensor set bolts and nuts have been anti-rust treated.**
  When the sensor is removed, always replace the set bolt and nut with new ones.
- **After installation, shake the sensor to check that there is no looseness.**
- **The front sensor is equipped with an electrical connection check mechanism. Be sure to lock this mechanism securely when connecting the connector. If the connector is not securely locked, a malfunction code will be detected by the diagnosis system.**
- **Check that the dimensions of the body where the front airbag sensor is installed match those in the body dimension drawings on page BO-78.**
  (The airbag may malfunction, or may not work, if the mounting angle or dimensions of the sensor mount are not correct.)

Center Airbag Sensor Assembly

Remove and install the parts as shown.

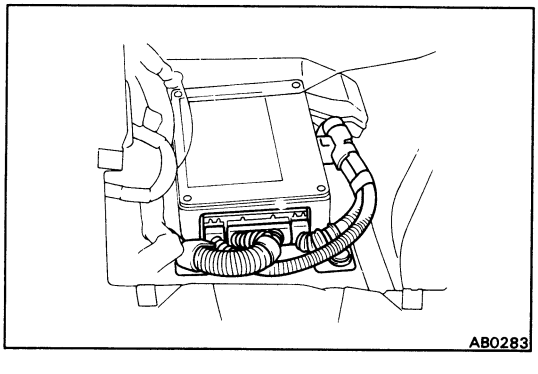


(MAIN POINTS OF REMOVAL AND INSTALLATION)

CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the LOCK position and the negative (–) terminal cable is disconnected from the battery (See page AB-2).

NOTICE:

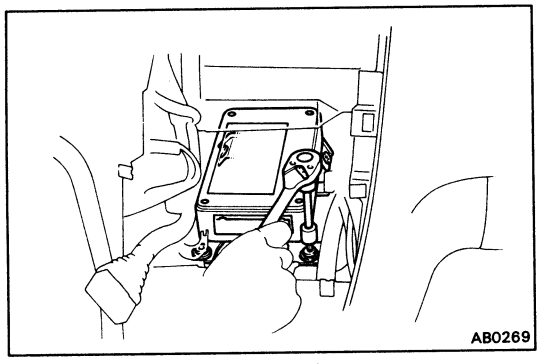
- **Do not open the cover or the case of the ECU and various computers unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)**
- **Never use airbag parts from another vehicle. When replacing parts, replace with new parts.**
- **Never repair a sensor in order to reuse it.**



REMOVE AND INSTALL CENTER AIRBAG SENSOR ASSEMBLY

(a) Disconnect and connect the connectors.

NOTICE: Removal and installation of the connectors is done with the sensor assembly installed.



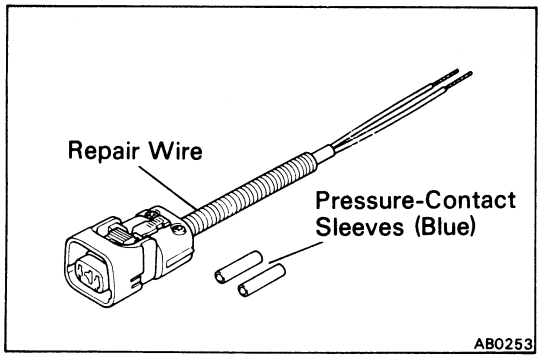
(b) Using a torx wrench, loosen and tighten the four screws.

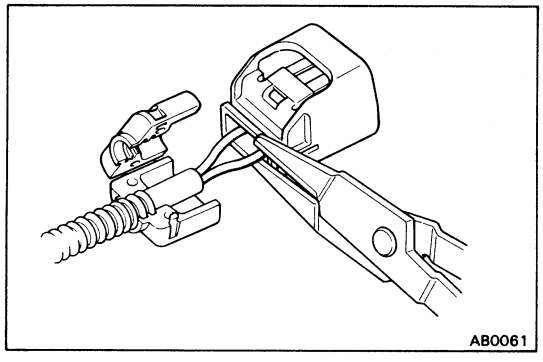
Torx wrench: T40 (Part No. 09042-00020 or locally manufactured tool)

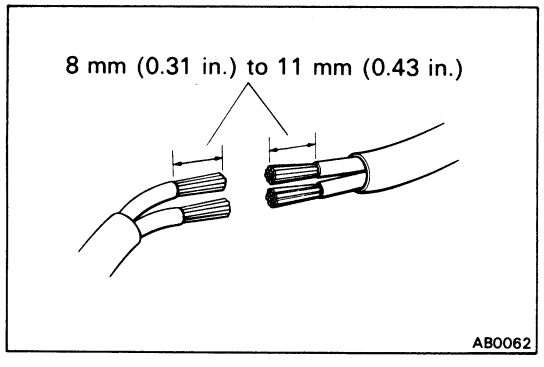
Torque: 130 kg-cm (9 ft-lb, 13 N·m)

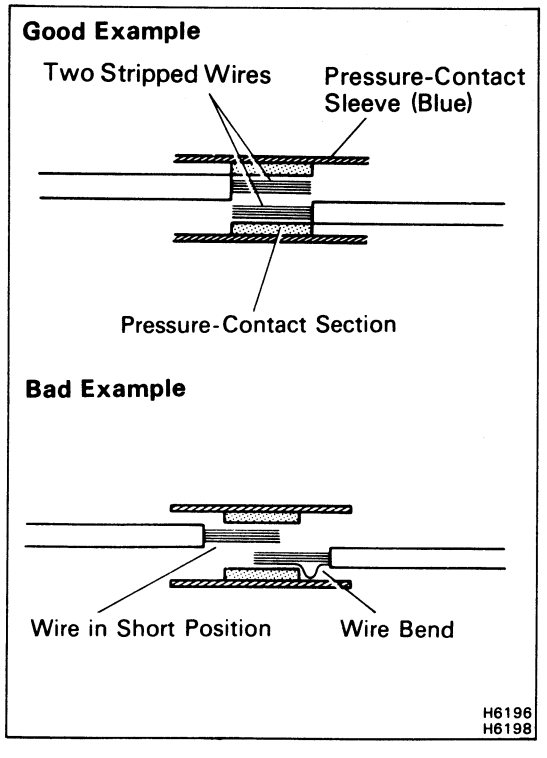
NOTICE:

- **Make sure the sensor assembly is installed to the specified torque.**
- **If the sensor assembly has been dropped, or there are cracks, dents or other defects in the case, bracket or connector, replace the sensor assembly with a new one.**
- **When installing the sensor assembly, take care that the airbag wirings do not interfere with other parts and are not pinched between other parts.**
- **After installation, shake the sensor assembly to check that there is no looseness.**









REPLACEMENT OF REPAIR WIRE FOR FRONT AIRBAG SENSOR

Repair wire with two pressure-contact sleeves (Part No. 82988-50010) has been prepared for exclusive use in repairing connector damage etc. caused by frontal collision of the vehicle.

When repairing the front airbag sensor connector on the wire harness side, always use the special repair wire.

NOTICE: Do not replace the connector housing or terminal only.

REPLACEMENT OF AIRBAG REPAIR WIRE

CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.

1. DISCONNECT WIRE HARNESS AT VEHICLE SIDE

(a) Remove the cover at the rear of the connector housing and expose the wire harness.

(b) Cut the wire harness behind the connector housing.

HINT: The operation is performed more easily if the wire harness is left as long as possible.

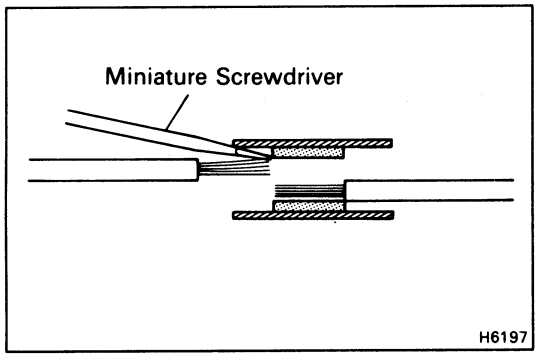
2. CONNECT FRONT AIRBAG SENSOR WIRE HARNESS AT VEHICLE SIDE AND REPAIR WIRE

(a) Start stripping at least 8 mm (0.31 in.) to 11 mm (0.43 in.) away from the end of the existing harness at vehicle side and also from the end of the repair wire.

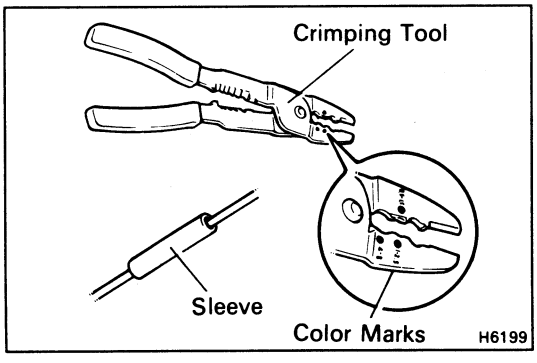
NOTICE: Take care not to damage the wire when stripping the wire harness lead. After finishing the operation, visually inspect the wire. If there is any damage, perform the operation again.

(b) Overlap the two stripped wire ends inside of the pressure-contact sleeve as illustrated on the left.

HINT: The blue pressure-contact sleeve (Part No. 82999-12020) is available as a solitary spare part.

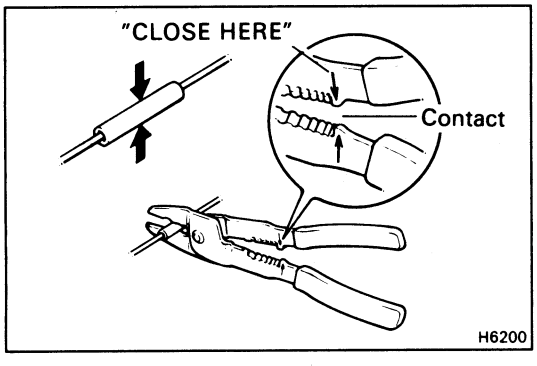


HINT: You might find it easier if you use a miniature screwdriver as a guide as you insert wires into the sleeve.



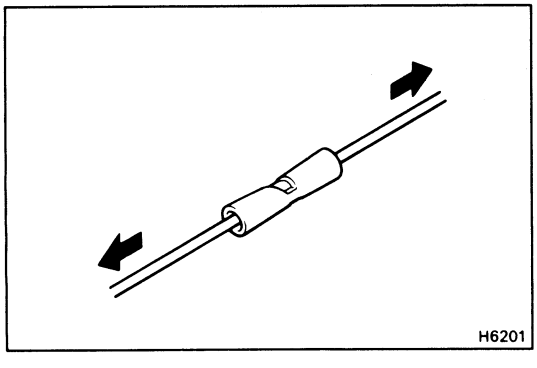
(c) The crimping tool (AMP Parts No. 169060) has color marks on it. Place the sleeve in the correct section of the tool according to the color of the sleeve itself.

HINT: As the crimping tool, AMP "Part No. 169060" is convenient to use.



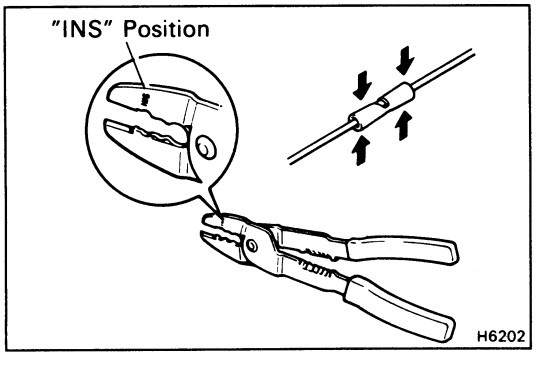
(d) With the center of the sleeve correctly placed between the crimping jaws, squeeze the crimping tool until either end comes into contact at the section marked by "CLOSE HERE".

HINT: Check to see that the sleeve and wires are still in the correct position before closing the crimping tool ends with steady pressure.

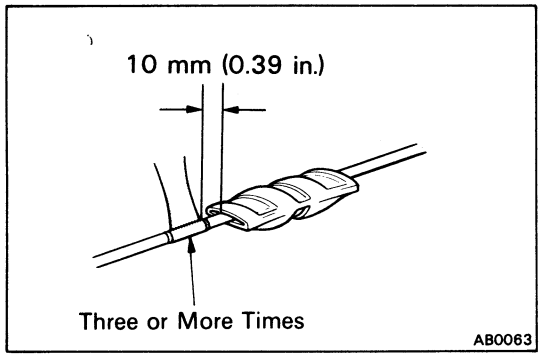


(e) Pull the joined wires to either end. Make sure that they are joined firmly by the sleeve.

NOTICE: If the joined wires come loose the splice is defective, so replace the sleeve and repeat the procedure.



(f) Crimp both ends of the sleeve with the crimping tool at the "INS" position.



3. PROTECT JOINED SECTION

Wrap silicon tape around the joins to protect them from water.

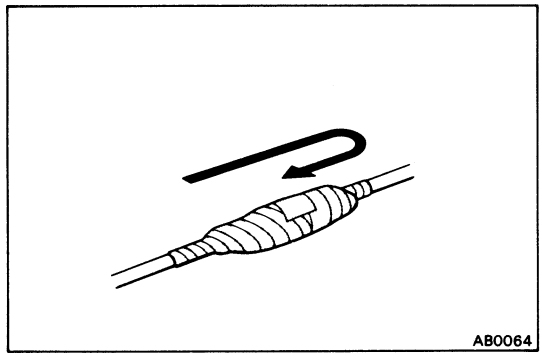
HINT:

- Before starting the operation, thoroughly wipe dirt and grease off the sections to be joined.
- If the adhesive surfaces of two tapes come in contact they will stick together and will not come apart, so do not remove the backing film except when using the tape.
- Do not let oil and dust, ect. get on the tape surface.

(a) Ready about 100 mm (3.94 in.) of silicon tape (Part No. 08231-00045) and peel off the film.

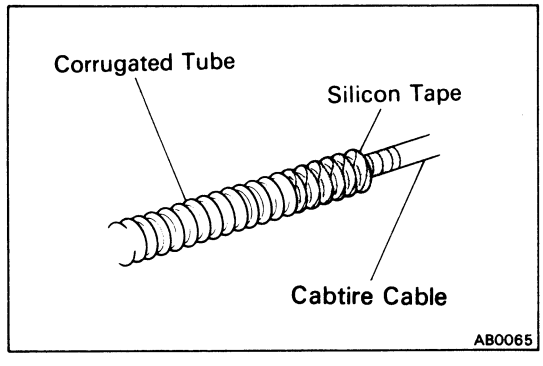
(b) Stretch the silicon tape until its width is reduced by half.

(c) About 10 mm (0.39 in.) from the end of the pressure-contact sleeve, wrap the silicon tape around the sleeve three or more times while stretching the tape.

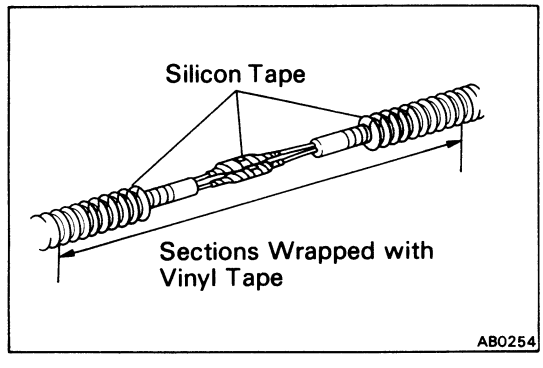


(d) Wrap the remaining part of sleeve with half of the tape overlapping at each turn.

(e) Firmly wrap the tape two times or more about 10 mm (0.39 in.) from the other end of the pressure-contact sleeve, then wrap the tape back towards the start again and firmly finish winding the tape around the center of the sleeve.



(f) Fix the corrugated tube to the cabtire cable using silicon tape.



(g) After applying the silicon tape, apply vinyl tape on the corrugated tube of repair wire side over to the corrugated tube of vehicle wire harness side.

TROUBLESHOOTING

How To Proceed With Troubleshooting

Malfunction symptoms of the airbag system are difficult to confirm, so the diagnostic codes become the most important source of information when troubleshooting.
Perform troubleshooting of the airbag system in accordance with the following procedure:

HINT: Do not disconnect the battery negative (–) terminal cable until step [3], Diagnostic Code Check and Recording, has been completed.

[1] CUSTOMER PROBLEM ANALYSIS

Using the CUSTOMER PROBLEM ANALYSIS CHECK SHEET (See page AB-28) for reference, ask the customer in as much detail as possible about the problem.

[2] WARNING LIGHT CHECK

Check the airbag warning light. If the light remains on, a malfunction is stored in the center airbag sensor assembly, so proceed to step [3]. If the airbag warning light is not on, a malfunction has occurred in the airbag warning light circuit, so perform troubleshooting for code 22.

HINT: Code 22 is recorded when a malfunction occurs in the airbag warning light system.
If an open malfunction occurs in the airbag warning light system, the airbag warning light does not light up, so that until the malfunction is repaired, the diagnostic codes (including code 22) cannot be confirmed.

[3] DIAGNOSTIC CODE CHECK AND RECORDING

Check the diagnostic codes and make a note of any malfunction codes which are output. If a normal code is output, an abnormality in the power source circuit may have occurred, so perform troubleshooting for source voltage in step [8].

If code 22 is output, skip steps [4] and [5] and proceed to step [7].

[4] CLEARING OF MALFUNCTION CODE (EXCEPT CODE 41)

Clear the malfunction code.

HINT: The malfunction code output in step [3] indicates that a malfunction has occurred in the circuit designated by the malfunction code, but does not indicate whether the malfunction is still occurring or whether it was in the past.
Accordingly, it is necessary to find out the present condition of the malfunction occurrence by clearing the malfunction code and performing the diagnostic code check again. If this operation is neglected and troubleshooting is performed using only the malfunction code confirmed in step [3], isolating the problem component becomes difficult and invites mistaken diagnosis.

[5] DIAGNOSTIC CODE CHECK AND RECORDING [6] SYMPTOM SIMULATION

After repeating ignition switch ON – OFF operation (ON: wait 20 secs., OFF: wait 20 secs.) 5 times, check the diagnostic code. If any code other than code 41 is output, the malfunction is still occurring, so proceed to step [7].

If code 41 only is output, the following three cases are possible:

- Intermittent trouble occurred previously, but it is now normal.
- The problem has been corrected, but clearing of code 41 has been forgotten.
- There is a malfunction in the circuit for code 41.

Focusing on the circuit of the malfunction code stored in step [3], use the simulation method in step [6] in order to simulate the malfunction. If the malfunction occurs, proceed to step [7]; if not, proceed to step [12].

NOTICE: When connecting the battery after clearing the malfunction code, always do it with the ignition switch in LOCK position.
When the battery has been reconnected, turn the ignition switch to ACC or ON position after at least 2 seconds have elapsed.
If the battery is reconnected with the ignition switch in ACC or ON position, or the ignition switch is turned to ACC or ON within 2 seconds of connecting the battery, it is possible that the diagnosis system will not operate normally.

HINT: Determine the malfunction in the airbag system in step [6] by whether or not a malfunction code other than code 41 is output.

[7] DIAGNOSTIC CODE CHART

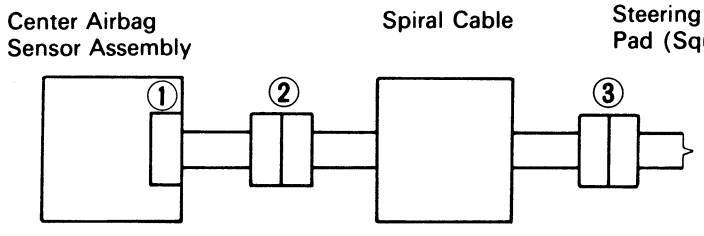
Proceed to the appropriate flow chart in step [8] in accordance with the malfunction code found in step [5] or [6].

[8] CIRCUIT INSPECTION [9] REPAIR

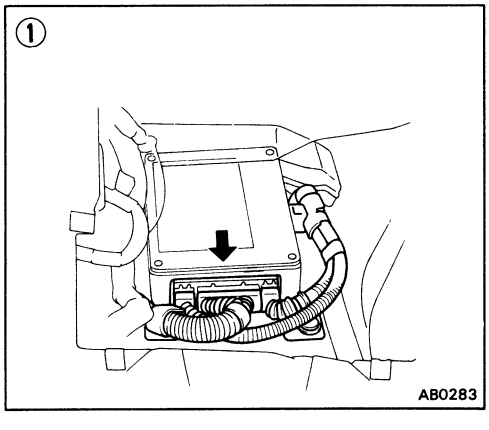
Find out if the problem lies in a sensor, actuator or wire harness and connector, and repair the problem. After the problem part is repaired, reinstall the disassembled parts. Do not start work until at least 20 seconds after the ignition switch is turned to the LOCK position and the negative (–) terminal cable is disconnected.

CAUTION: If incorrect procedure is used, a malfunction may occur in the system or there is the danger that the airbag may be accidentally activated during the repair operation. Carefully read the GENERAL DESCRIPTION (See page AB-2) and the cautions for each operation, and perform repairs in the correct order using the correct methods.

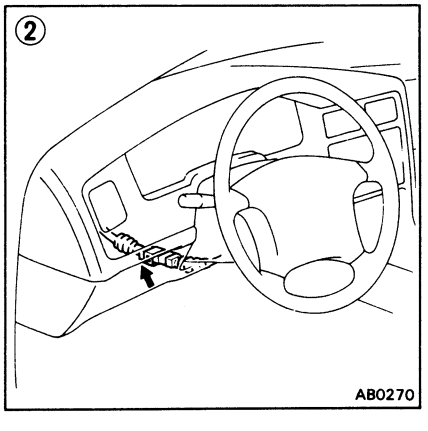
HINT: The following illustration for the CIRCUIT INSPECTION shows each connector for the circuit from the center airbag sensor assembly to the steering wheel pad (squib).



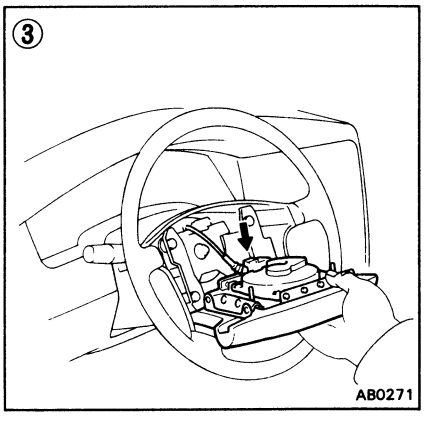
AB0091



AB0283



AB0270



AB0271

[10] CLEARING OF MALFUNCTION CODE (EXCEPT CODE 41)

When all the malfunction codes found in steps [5] and [6] have been repaired, clear the malfunction codes.

11 DIAGNOSTIC CODE CHECK

After repeating ignition switch ON – OFF operation (ON: wait 20 secs., OFF: wait 20 secs.) 5 times, check the diagnostic codes. If only code 41 is displayed, proceed to step 12 . If a code other than 41 is displayed, return to step 7 and troubleshoot the displayed malfunction code.

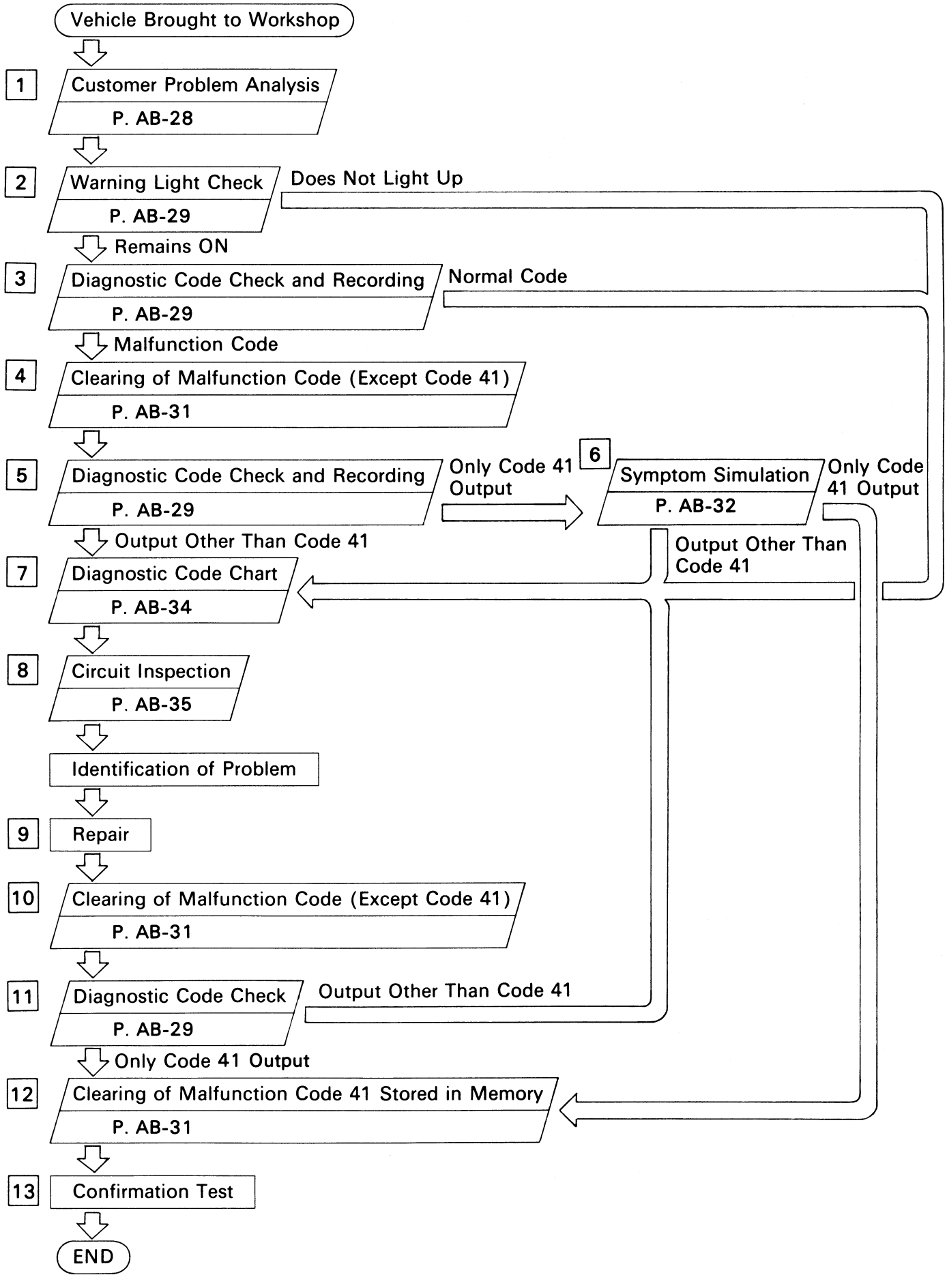
NOTICE: When connecting the battery after clearing the malfunction code, always do it with the ignition switch in LOCK position.
When the battery has been reconnected, turn the ignition switch to ACC or ON position after at least 2 seconds have elapsed.
If the battery is reconnected with the ignition switch in ACC or ON position, or the ignition switch is turned to ACC or ON within 2 seconds of connecting the battery, it is possible that the diagnosis system will not operate normally.

12 CLEARING OF MALFUNCTION CODE 41 STORED IN MEMORY

Clear malfunction code 41 stored in memory. This operation is not necessary only in case that the power source voltage returns to normal.

13 CONFIRMATION TEST

Check the warning light again and confirm that all the malfunctions have been repaired. If the warning light indicates an abnormality, repeat the operation again from step 2 . If code 41 is output at step 3 , skip steps 4 and 5 and proceed to step 7 .


Vehicle Brought to Workshop
1
Customer Problem Analysis
P. AB-28
2
Warning Light Check
P. AB-29
Does Not Light Up
Remains ON
3
Diagnostic Code Check and Recording
P. AB-29
Normal Code
Malfunction Code
4
Clearing of Malfunction Code (Except Code 41)
P. AB-31
5
Diagnostic Code Check and Recording
P. AB-29
Only Code 41 Output
6
Symptom Simulation
P. AB-32
Only Code 41 Output
Output Other Than Code 41
Output Other Than Code 41
7
Diagnostic Code Chart
P. AB-34
8
Circuit Inspection
P. AB-35
Identification of Problem
9
Repair
10
Clearing of Malfunction Code (Except Code 41)
P. AB-31
11
Diagnostic Code Check
P. AB-29
Output Other Than Code 41
Only Code 41 Output
12
Clearing of Malfunction Code 41 Stored in Memory
P. AB-31
13
Confirmation Test
END

Customer Problem Analysis Check Sheet

SRS AIRBAG System Check Sheet

Inspector's Name :

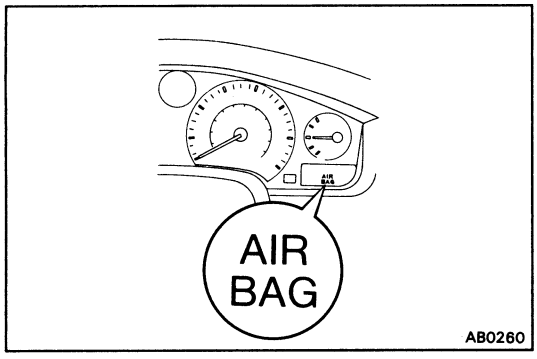
Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	Miles

Date of Problem Occurrence		/ /
Conditions at Time of Problem Occurrence	Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Other
	Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °C (°F))
	Vehicle Operation	☐ Starting ☐ Idling ☐ Driving [☐ Constant speed ☐ Acceleration ☐ Deceleration ☐ Other ( )]
	Condition of road	

Details of Problem	
Vehicle Inspection, Repair History Prior to Occurrence of Malfunction (Including Airbag System)	

(Diagnosis System Inspection)

Airbag Warning Light Inspection	1st Time	☐ Remains On ☐ Sometimes Lights Up ☐ Does Not Light Up
	2nd Time	☐ Remains ON ☐ Sometimes Lights Up ☐ Does Not Light Up
Diagnostic Code Inspection	1st Time	☐ Normal Code ☐ Malfunction Code [Code.]
	2nd Time	☐ Normal Code ☐ Malfunction Code [Code.]



Diagnosis Inspection

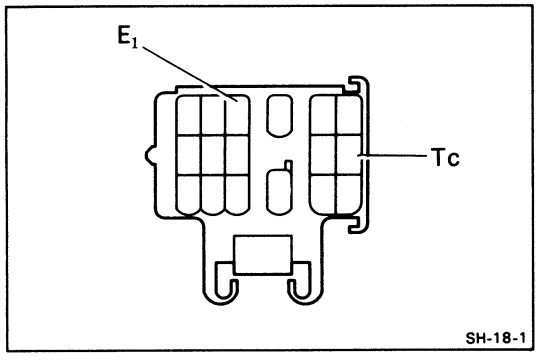
AIRBAG WARNING LIGHT CHECK

(a) Turn the ignition switch to ACC or ON and check that the airbag warning light lights up.

(b) Check that the airbag warning light goes out after approx. 6 seconds.

HINT:

- When the ignition switch is at ACC or ON and the airbag warning light remains on, the center airbag sensor assembly has detected a malfunction code.
- If, after approx. 6 seconds have elapsed, the airbag warning light sometimes lights up or the airbag warning light lights up even when the ignition switch is OFF, a short in the airbag warning light circuit can be considered likely.
  Proceed to "Airbag warning light system (always lit up)" on page AB-75.



DIAGNOSTIC CODE CHECK

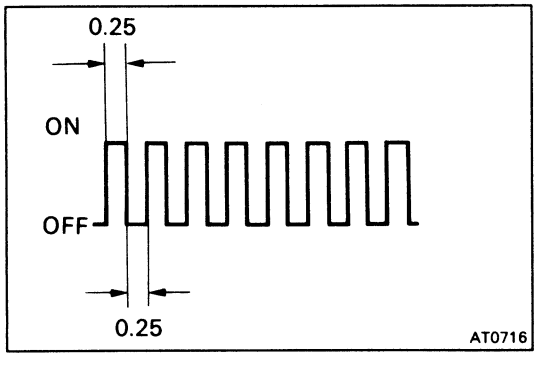
1. OUTPUT DIAGNOSTIC CODE

(a) Turn the ignition switch to ACC or ON position and wait approx. 20 seconds.

(b) Using SST, connect terminals T_C and E_1 of the check connector.

SST 09843-18020

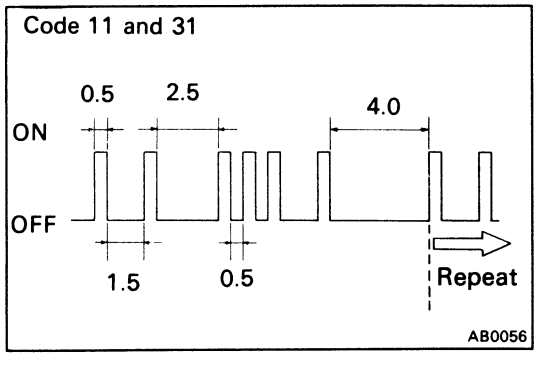
NOTICE: Never make a mistake with the terminal connection position as this will cause a malfunction.



2. READ DIAGNOSTIC CODE

Read the diagnostic code as indicated by the number of times the airbag warning light blinks.

- **Normal code indication**
  The light will blink 2 times per second.
- **Malfunction code indication**
  In the even of a malfunction, the light will blink.
  The first number of the code No. will equal the first digit of a 2-digit diagnostic code, and after a 1.5 second pause, the 2nd number of the code No. will equal the 2nd digit. If there are two or more codes, there will be a 2.5 second pause between each.
  After all the codes have been output, there will be a 4.0 second pause and they will all be repeated.
  HINT:
  - In the event of a number of trouble codes, indication will begin from the smaller numbered code to the larger.
  - If a diagnostic code is not output or is continuously output, proceed to the Tc terminal circuit inspection on page AB-77.

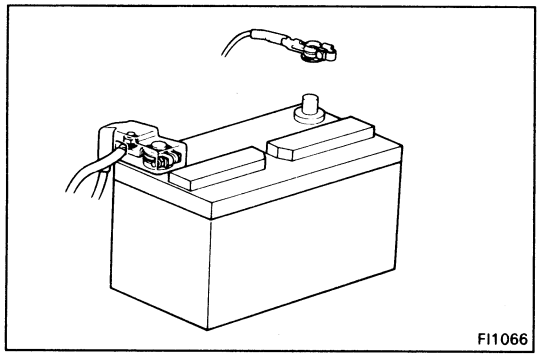


DIAGNOSTIC CODES

Code No.	Blink Pattern	Diagnosis	Trouble Area	AIRBAG Warning Light
(Normal)	 FI1401	• System normal	–	OFF
		• Source voltage drop	• Battery • Center airbag sensor assembly	ON
11	 AB0057	• Short in squib circuit or front airbag sensor circuit (to ground)	• Steering wheel pad (squib) • Front airbag sensor • Spiral cable • Center airbag sensor assembly • Wire harness	ON
12	 FI1389	• Short in squib circuit or front airbag sensor circuit (to +B)	• Steering wheel pad (squib) • Front airbag sensor • Spiral cable • Center airbag sensor assembly • Wire harness	ON
13	 FI1390	• Short in squib circuit (between D^+ wire harness and D^- wire harness)	• Steering wheel pad (squib) • Spiral cable • Center airbag sensor assembly • Wire harness	ON
14	 FI1391	• Open in squib circuit	• Steering wheel pad (squib) • Spiral cable • Center airbag sensor assembly • Wire harness	ON
15	 AB0058	• Open in front airbag sensor circuit	• Front airbag sensor • Center airbag sensor assembly • Wire harness	ON
22	 FI1392	• Airbag warning light system malfunction	• Airbag warning light • Center airbag sensor assembly • Wire harness	ON
31	 FI1394	• Center airbag sensor assembly malfunction	• Center airbag sensor assembly	ON
41	 FI1396	• Malfunction stored in memory	• (Center airbag sensor assembly)	ON

HINT:

- When the airbag warning light remains lit up and the diagnostic code is the normal code, this means a source voltage drop.
  This malfunction is not stored in memory by the center airbag sensor assembly and if the power source voltage returns to normal, after approx. 10 seconds the airbag warning light will automatically go out.
- Code 22 is recorded when a malfunction occurs in the airbag warning light system.
  If an open malfunction occurs in the airbag warning light system, the airbag warning light does not light up, so that until the malfunction is repaired, the diagnostic codes (including code 22) cannot be confirmed.
- When a malfunction occurs in the airbag system, malfunction codes 11 to 31 are output. After repairing the malfunction indicated by malfunction codes 11 to 31, codes 11 to 31 are cleared from the memory, but code 41 is output instead.
  Once the malfunction has been detected, the airbag warning light will remain lit up until code 41 is cleared, even though the malfunction has been repaired.
- When two or more codes are indicated, the lowest numbered code will appear first.
- If a code not listed on the chart is displayed, then the center airbag sensor assembly is faulty.



CLEARING OF DIAGNOSTIC CODE

1. CLEARING OF MALFUNCTION CODE (EXCEPT CODE 41)

Remove the battery negative terminal or ECU-B fuse for 10 seconds or more with the ignition switch OFF.

NOTICE: When connecting the battery after cancelling the malfunction code, always do it with the ignition switch in LOCK position. If the battery is connected with the ignition switch in ACC or ON position, there are cases when the diagnosis system does not operate normally.

HINT:

- Code 41 cannot be cleared by this method.
- The lower the temperature, the longer the battery negative terminal must be left off.
- Other memory systems (clock, audio system) will also be cancelled out (See page AB-2).

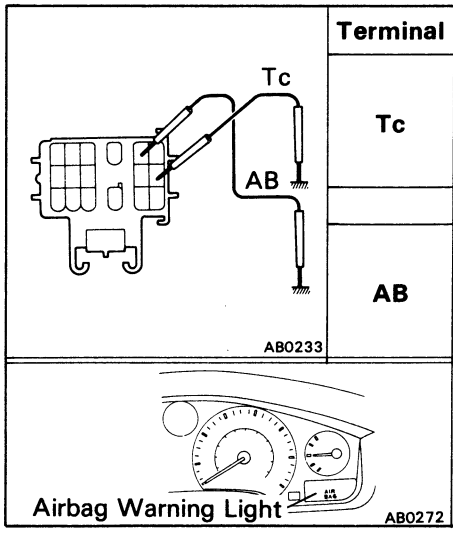
2. CLEARING OF MALFUNCTION CODE 41 STORED IN MEMORY

(a) Connect service wires to terminals Tc and AB of the check connector.

(b) Turn the ignition switch ACC or ON and wait approx. 6 seconds.

(c) Starting with the Tc terminal, apply body ground alternately to terminal Tc and terminal AB twice each in cycles of 1.0 ± 0.5 seconds.
Finally, keep applying body ground to terminal Tc.

HINT: When alternating between body ground of terminals Tc and AB release one from body ground while applying it to the other terminal. The time interval in between must be within the following conditions. If it is out of the conditions, code 41 will not be cleared.



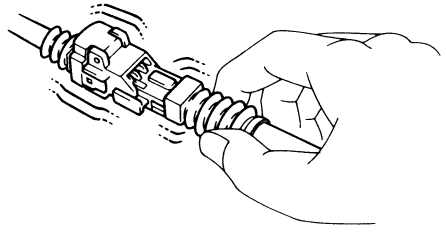
(d) After several seconds, when the airbag warning light starts to blink in a 64 msec. cycle, cancellation is completed.

HINT: This method clears not only code 41, but also other malfunction codes all at once.
Except when instructed by the troubleshooting procedure, use this method only when the repair procedure is completed (See page AB-24).

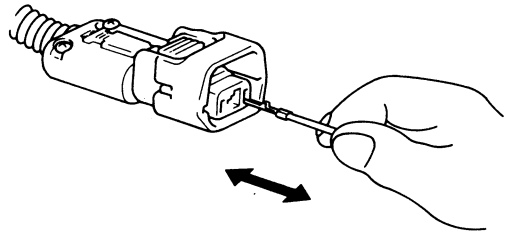
Symptom Simulation

"Intermittent troubles or problems" are the malfunctions about which the customer has a complaint, but which do not occur and can not be confirmed in the workshop. The intermittent problems also include complaints about the airbag warning light going on and off erratically.
The self-diagnostic system stores the circuit of the intermittent problem in memory even if the ignition switch is turned off.
And, for accurate diagnosis of the problems, ask the customer to obtain information as much as possible following the customer problem analysis check sheet (See page AB-28), and try to reproduce the intermittent problem.
The problem simulation methods described below are the effective ways for this nature of problem to produce the problem conditions by applying vibration, heat, and humidity.

1 VIBRATION METHOD: When vibration seems to be the major cause.



AB0245



K9464

CONNECTORS

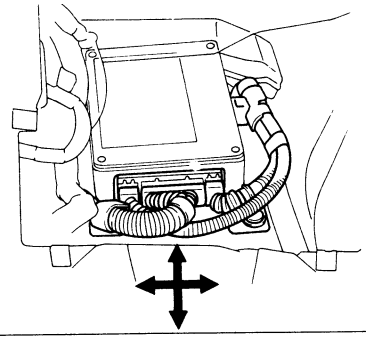
Slightly shake the connector vertically and horizontally.

(Inspection of connectors)

(a) Does the wire harness connecting with its corresponding part have insufficient slack?

(b) Are the terminals dirty?

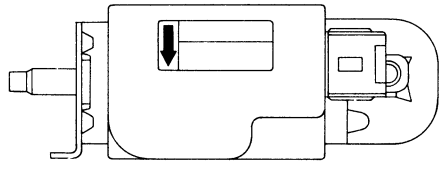
(c) Are the terminals making loose contact due to terminals spread?



AB0283

WIRE HARNESS

Slightly shake the wire harness vartically and horizontally. The connector joint, fulcrum of the vibration, and body through portion are the major areas to be checked thoroughly.



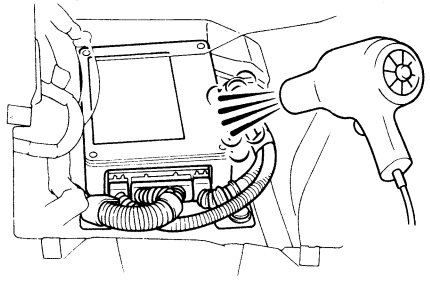
AB0255

PARTS AND SENSORS

Apply vibration slightly by a finger to the part or sensor considered to be the problem cause and check if the malfunction will occur.

CAUTION: Do not apply vibration to the center airbag sensor.

2 HEAT METHOD: When the problem seems to occur when the suspect area is heated.



AB0273

Heat the component that is likely the cause of the malfunction with a hair dryer or similar object. Check to see if the malfunction will occur.

NOTICE:

- **Do not heat to more than 60°C (140°F) (Temperature limit that the component can be touched with a hand.).**
- **Do not apply heat directly to part in the ECU.**

3 WATER SPRINKLING METHOD: When the malfunction seems to occur on a rainy day or in a high-humidity condition.



AB0274

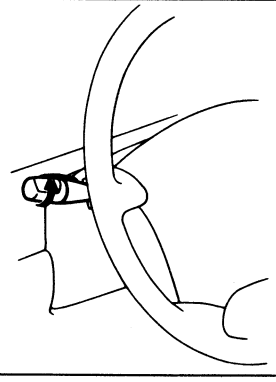
Sprinkle water onto the vehicle and check to see if the malfunction will occur.

NOTICE: Never apply water directly onto the electronic components.

HINT:

- If a vehicle is subject to water leakage, the leaked water may contaminate the ECU. When testing a vehicle with a water leakage problem, special caution must be paid.

4 OTHER: When a malfunction seems to occur when electrical load is excessive.



AB0234

Turn on all electrical loads including the heater blower, headlights, rear window defogger, etc. and check to see if the malfunction will occur.

Diagnostic Code Chart

If a malfunction code is displayed during the diagnostic code check, check the circuit listed for that code in the table below (Proceed to the page given for that circuit).

Code No.	Diagnosis	Page
(Normal) *1	• Source voltage drop	AB-35
11	• Short in squib circuit or front airbag sensor circuit (to ground)	AB-37
12	• Short in squib circuit or front airbag sensor circuit (to +B)	AB-43
13	• Short in squib circuit (between D^+ wire harness and D^- wire harness)	AB-48
14	• Open in squib circuit	AB-55
15	• Open in front airbag sensor circuit	AB-60
22 *2	• Airbag warning light system malfunction	AB-65
31	• Center airbag sensor assembly malfunction	AB-71
41 *3	• Malfunction stored in memory	AB-73

HINT:

*1 When the airbag warning light remains lit up and the diagnostic code is the normal code, this means a source voltage drop.

*2 Code 22 is recorded when a malfunction occurs in the airbag warning light system.
If an open malfunction occurs in the airbag warning light system, the airbag warning light does not light up, so that until the malfunction is repaired, the diagnostic codes (including code 22) cannot be confirmed.

*3 When a malfunction occurs in the airbag system, malfunction codes 11 to 31 are output. After repairing the malfunction indicated by malfunction codes 11 to 31, codes 11 to 31 are cleared from the memory, but code 41 is output instead.
Once the malfunction has been detected, the airbag warning light will remain lit up until code 41 is cleared, even though the malfunction has been repaired.

Problem Symptom Chart

Proceed with troubleshooting of each circuit in the table below.

Problem Symptom	Inspection Item	Page
• With the ignition switch at ACC or ON, the airbag warning light sometimes light up after approx. 6 seconds have elapsed. • Airbag warning light lights up even when ignition switch is in the LOCK position.	• Airbag warning light system (Always lit up)	AB-75
• Diagnostic code not displayed. • Diagnostic code continuously displayed.	• Tc terminal circuit	AB-77

Circuit Inspection

Diag. Code	(Normal)	Source Voltage Drop

CIRCUIT DESCRIPTION

The airbag system is equipped with a voltage-increase circuit (DC-DC converter) in the center airbag sensor assembly in case the source voltage drops.
When the battery voltage drops, the voltage-increase circuit (DC-DC converter) functions to increase the voltage of the airbag system to normal voltage.
The diagnosis system malfunction display for this circuit is different to other circuits — when the airbag warning light remains lit up and the diagnostic code is a normal code, source voltage drop is indicated.
Malfunction in this circuit is not recorded in the center airbag sensor assembly, and approx. 10 seconds after the source voltage returns to normal, the airbag warning light automatically goes off.

Code No.	Diagnosis
(Normal)	Source voltage drop.

DIAGNOSTIC CHART

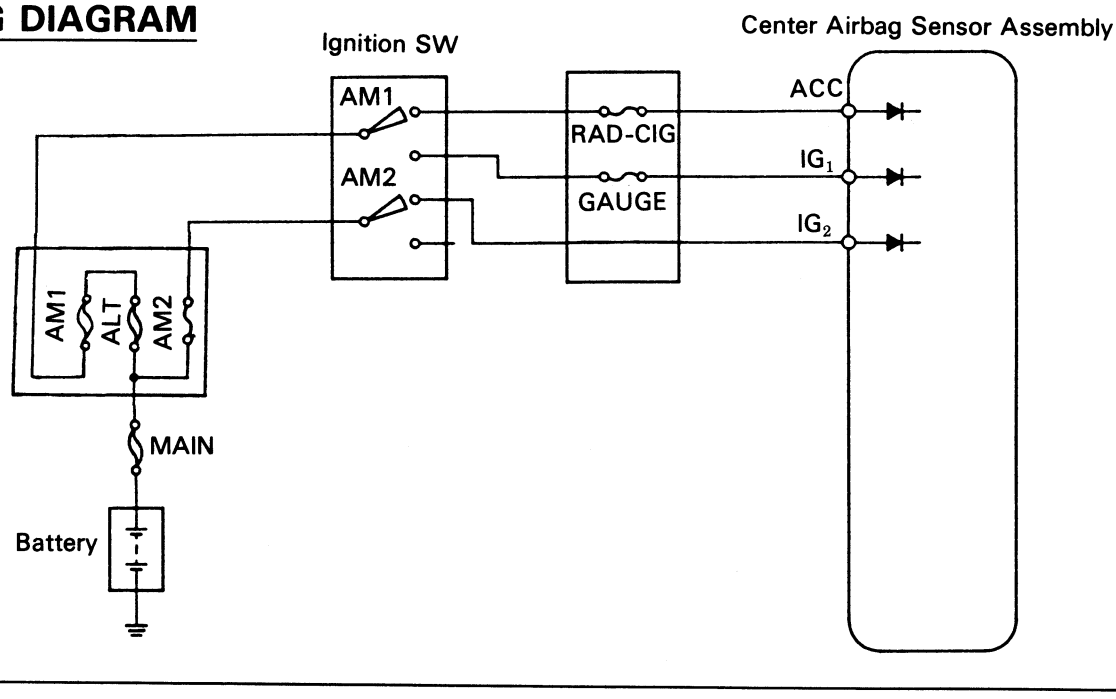
1 Preparation.

2 Does airbag warning light turn off after approx. 10 seconds?

No → Check diagnostic code, and if a malfunction code is output, perform troubleshooting according to malfunction code. If a normal code is output, replace center airbag sensor assembly.

Yes → Check battery and charging system (See page CH-1).

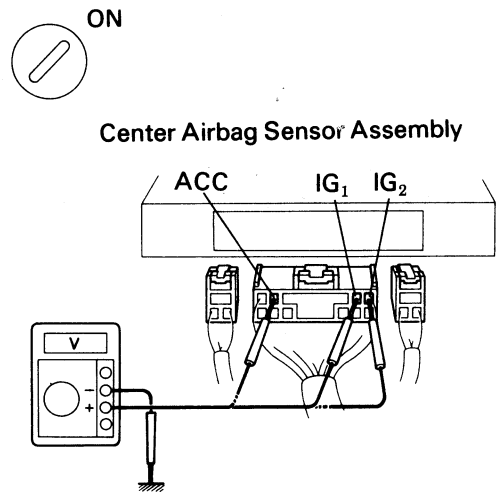
WIRING DIAGRAM



INSPECTION PROCEDURES

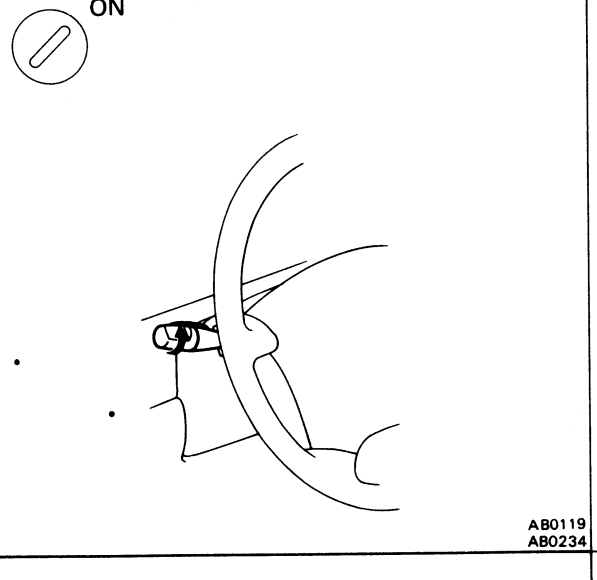
P Preparation C Check

1 Preparation.



P (1) Turn ignition switch LOCK.
(2) Disconnect center airbag sensor assembly connector.
(3) Turn ignition switch ON. But do not start engine.
(4) Measure voltage at IG_1, IG_2 or ACC on connector wire harness side of center airbag sensor assembly and operate electric system (defogger, wiper, headlight, heater blower, etc.).
Voltage: 6V – 11.5V at IG_1, IG_2 and ACC.
(5) Turn electric system switch OFF.
(6) Turn ignition switch LOCK.
(7) Remove voltmeter and connect center airbag sensor assembly connector.

2 Does airbag warning light turn off after approx. 10 seconds?



P Turn ignition switch ON.

C Operate electric system checked in 1 (4) and check that airbag warning light goes off after approx. 10 seconds.

YES

NO **Check diagnostic code, and if a malfunction code is output, perform troubleshooting according to malfunction code. If a normal code is output, replace center airbag sensor assembly.**

Check battery and charging system (See page CH-1).

Diag. Code	11	Short in Squib Circuit or Front Airbag Sensor Circuit (to Ground)

CIRCUIT DESCRIPTION

The squib circuit consists of the center airbag sensor assembly, spiral cable and the steering wheel pad (squib). It causes the airbag to deploy when the airbag deployment conditions are satisfied.
The front airbag sensor detects the deceleration force in a frontal collision and is located in the radiator upper support.
For details of the function of each component, see FUNCTION OF COMPONENTS on page AB-7.
Diagnostic code 11 is recorded when occurrence of ground short is detected in the squib circuit or front airbag sensor circuit.

Code No.	Diagnosis
11	· Short circuit in squib wire harness (to ground). · Squib malfunction. · Short circuit in front airbag sensor +S wire harness (to ground). · Front airbag sensor malfunction. · Short circuit between +S wire harness and −S wire harness of front airbag sensor. · Spiral cable malfunction. · Center airbag sensor assembly malfunction.

DIAGNOSTIC CHART

1 Preparation.

↓

2 Check front airbag sensor circuit. (Measure resistance between terminals +SR and −SR, +SL and −SL of center airbag sensor assembly connector.)
NG → Go to step 7 on next page.

↓ OK

3 Check front airbag sensor circuit. (Measure resistance between terminals + SR, +SL of center airbag sensor assembly connector and body ground.)
NG → Repair or replace harness or connector between center airbag sensor assembly and front airbag sensor (See page AB-21).

↓ OK

4 Check squib circuit.
NG → Go to step 8 on next page.

↓ OK

5 Check center airbag sensor assembly.
NG → Replace center airbag sensor assembly.

↓ OK

6 Check squib.
NG → Replace steering wheel pad.

↓ OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DIAGNOSTIC CHART (Cont'd)

7 Check front airbag sensor.

NG → Replace front airbag sensor.

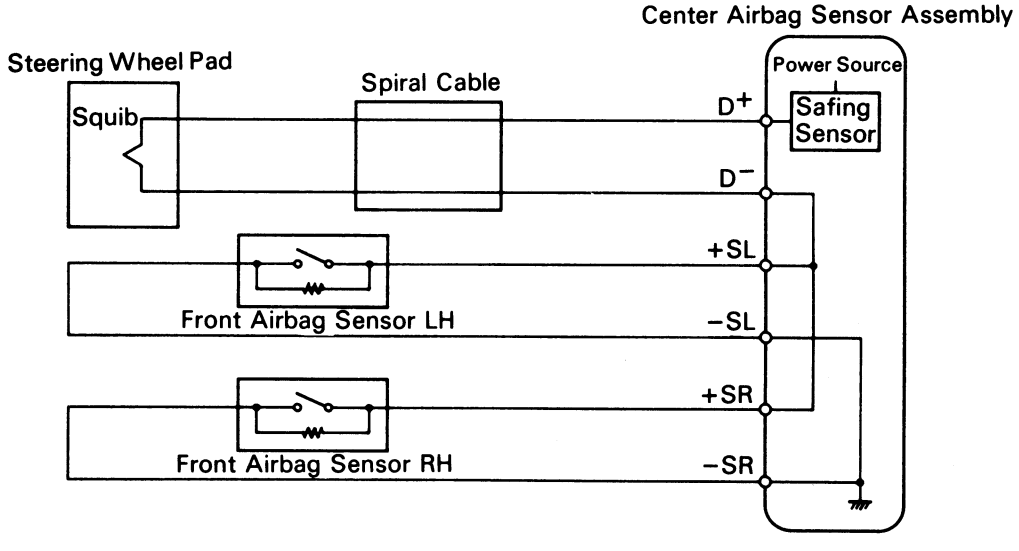
OK → Repair or replace harness or connector between center airbag sensor assembly and front airbag sensor (See page AB-21).

8 Check spiral cable.

NG → Repair or replace spiral cable.

OK → Repair or replace harness or connector between center airbag sensor assembly and spiral cable.

WIRING DIAGRAM

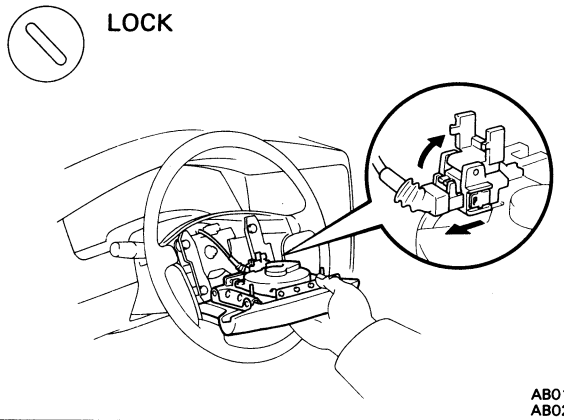


AB0190

INSPECTION PROCEDURES

P Preparation C Check

1 Preparation.



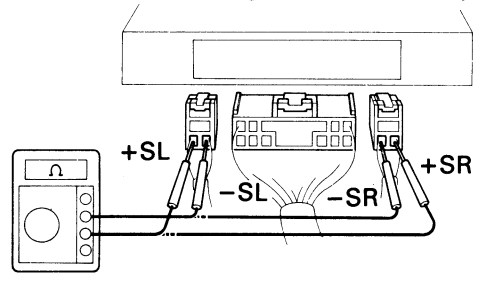
AB0117
AB0267

P (1) Disconnect battery negative (–) terminal cable, and wait at least 20 seconds.
(2) Remove steering wheel pad (See page AB-15).

Caution
When storing steering wheel pad, keep upper surface of the pad facing upward.

2 Check front airbag sensor circuit. (Measure resistance between terminals +SR and –SR, +SL and –SL of center airbag sensor assembly connector.)

Center Airbag Sensor Assembly



AB0097

P Disconnect center airbag sensor assembly connectors.

C Measure resistance between terminals +SR and –SR, +SL and –SL of harness side connector of center airbag sensor assembly.

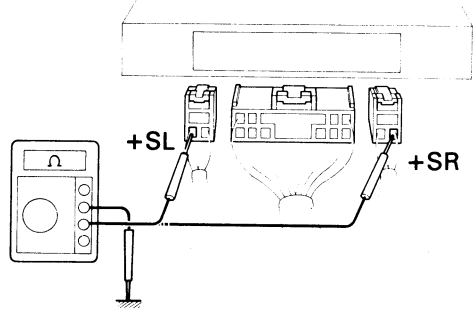
OK Resistance: 755 Ω – 885 Ω

OK

NG Go to step 7 .

3 Check front airbag sensor circuit. (Measure resistance between terminals +SR, +SL of center airbag sensor assembly connector and body ground.)

Center Airbag Sensor Assembly



AB0096

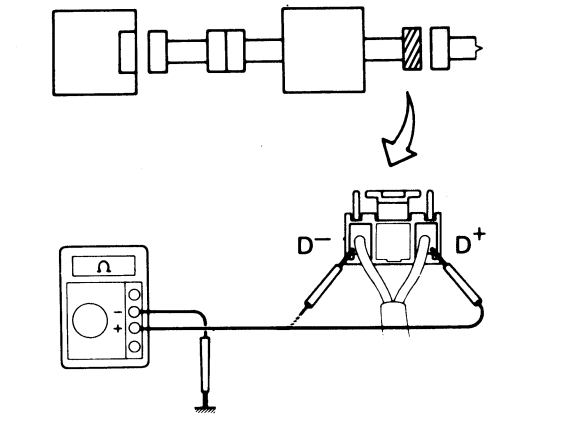
C Measure resistance between terminals +SR, +SL of harness side connector of center airbag sensor assembly and body ground.

OK Resistance: ∞ Ω

OK

NG Repair or replace harness or connector between center airbag sensor assembly and front airbag sensor (See page AB-21).

4 Check squib circuit.



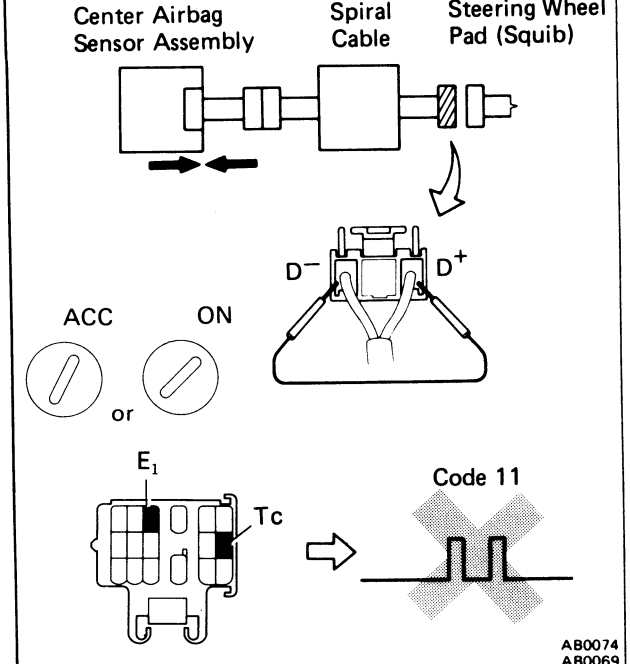
C Measure resistance between D^+, D^- on spiral cable side of connector between spiral cable and steering wheel pad and body ground.

OK **Resistance:** ∞ Ω

OK

NG > **Go to step 8.**

5 Check center airbag sensor assembly.



P (1) Connect connectors to center airbag sensor assembly.
(2) Using a service wire, connect D^+ and D^- on spiral cable side of connector between spiral cable and steering wheel pad.
(3) Connect negative (−) terminal cable to battery, and wait at least 2 seconds.

C (1) Turn ignition switch ACC or ON and wait at least 20 seconds.
(2) Using SST, connect terminals Tc and E_1 of check connector.
SST 09843-18020
(3) Check diagnostic code.

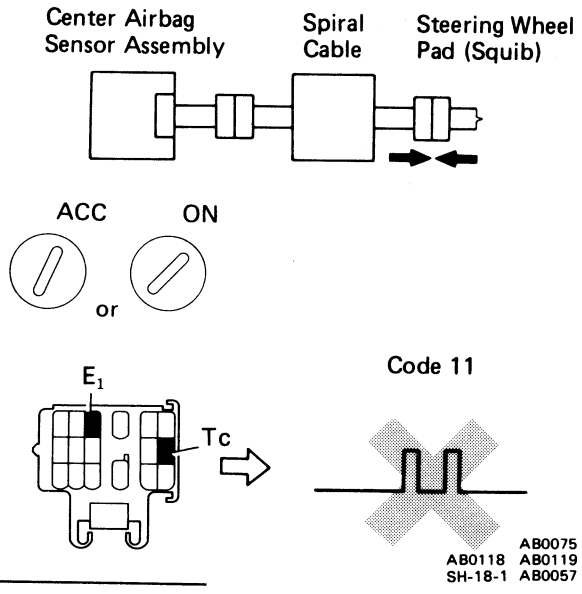
OK **Diagnostic code 11 is not output.**

Hint Codes other than code 11 may be output at this time, but this is not relevant to this check.

OK

NG > **Replace center airbag sensor assembly.**

6 Check squib.



P (1) Turn ignition switch LOCK.
(2) Disconnect battery negative (–) terminal cable, and wait at least 20 seconds.
(3) Connect steering wheel pad (squib) connector.
(4) Connect negative (–) terminal cable to battery, and wait at least 2 seconds.

C (1) Turn ignition switch ACC or ON, and wait at least 20 seconds.
(2) Using SST, connect terminals Tc and E_1 of check connector.
SST 09843-18020
(3) Check diagnostic code.

OK **Diagnostic code 11 is not output.**

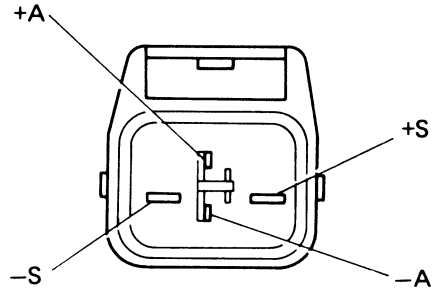
Hint Codes other than code 11 may be output at this time, but this is not relevant to this check.

OK

NG > **Replace steering wheel pad.**

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

7 Check front airbag sensor.



P Disconnect front airbag sensor connector.

C Measure resistance between each terminal of front airbag sensor.

OK

Terminal	Resistance
⊕ S – ⊕ A	755 Ω – 885 Ω
⊕ S – ⊖ S	∞
⊖ S – ⊖ A	Less than 1 Ω

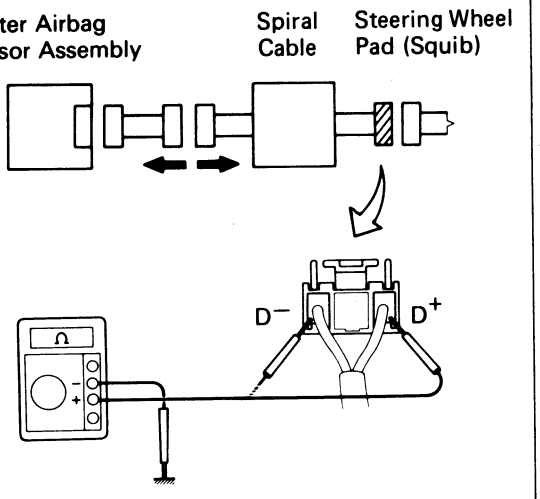
Notice
- **Do not touch ohmmeter probes strongly against terminals of front airbag sensor.**
- **Make sure the front airbag sensor connector is properly connected.**

OK

NG > **Replace front airbag sensor.**

Repair or replace harness or connector between center airbag sensor assembly and front airbag sensor (See page AB-21).

8 Check spiral cable.



AB0071
AB0070

P Disconnect connector between center airbag sensor assembly and spiral cable.

C Measure resistance between D^+, D^- on spiral cable side of connector between spiral cable and steering wheel pad and body ground.

OK **Resistance:** ∞ Ω

NG → **Repair or replace spiral cable.**

OK

Repair or replace harness or connector between center airbag sensor assembly and spiral cable.

Diag. Code	12	Short in Squib Circuit or Front Airbag Sensor Circuit (to +B)

CIRCUIT DESCRIPTION

The squib circuit consists of the center airbag sensor assembly, spiral cable and the steering wheel pad (squib). It causes the airbag to deploy when the airbag deployment conditions are satisfied.
The front airbag sensor detects the deceleration force in a frontal collision and is located in the radiator upper support.
For details of the function of each component, see FUNCTION OF COMPONENTS on page AB-7.
Diagnostic code 12 is recorded when a +B short is detected in the squib circuit or the front airbag sensor circuit.

Code No.	Diagnosis
12	· Short circuit in squib wire harness (to +B). · Squib malfunction. · Short circuit in front airbag sensor +S wire harness (to +B). · Open circuit in RH and LH front airbag sensor harness. · Spiral cable malfunction. · Center airbag sensor assembly malfunction.

DIAGNOSTIC CHART

1 Preparation.

↓

2 Check front airbag sensor circuit. (Measure resistance between terminals +SR and −SR, +SL and −SL of center airbag sensor assembly connector.)

NG → Go to Code 15(See page AB-60).

↓ OK

3 Check front airbag sensor circuit. (Measure voltage between terminal +SR or +SL of center airbag sensor assembly connector and body ground.)

NG → Repair or replace harness or connector between center airbag sensor assembly and front airbag sensor (See page AB-21).

↓ OK

4 Check squib circuit.

NG → Go to step 7.

↓ OK

5 Check center airbag sensor assembly.

NG → Replace center airbag sensor assembly.

↓ OK

6 Check squib.

NG → Replace steering wheel pad.

↓ OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

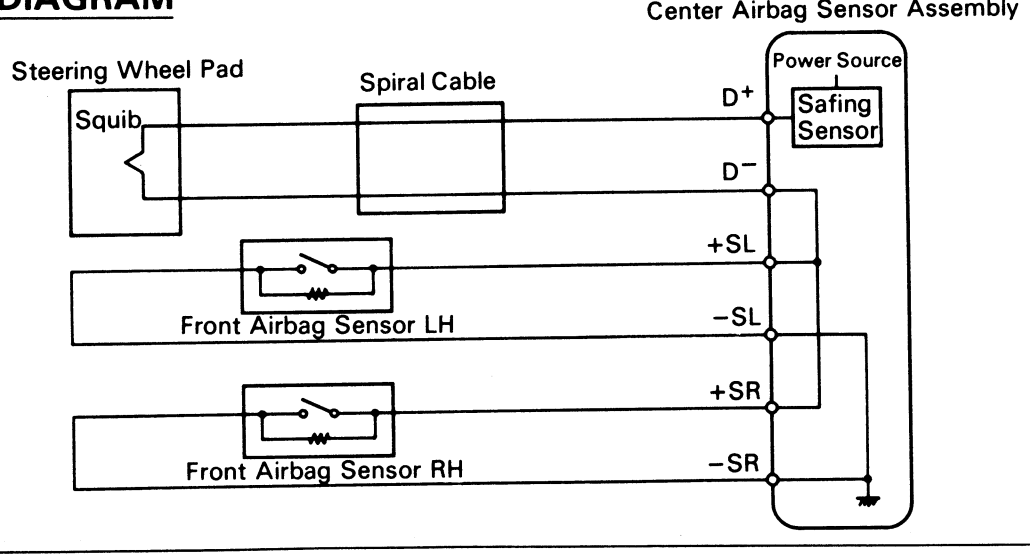
7 Check spiral cable.

NG → Repair or replace spiral cable.

↓ OK

Repair or replace harness or connector between center airbag sensor assembly and spiral cable.

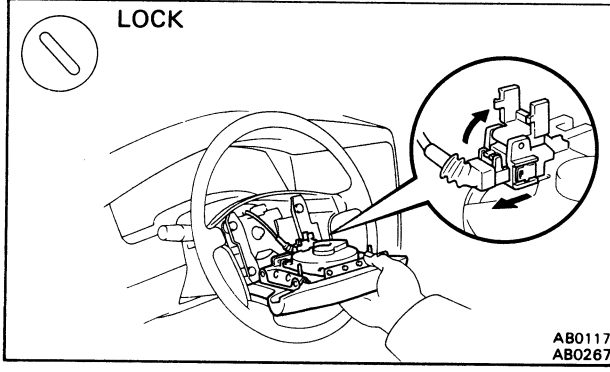
WIRING DIAGRAM



INSPECTION PROCEDURES

P Preparation C Check

1 Preparation.



AB0117
AB0267

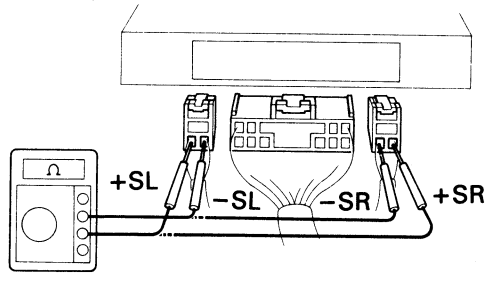
P (1) Disconnect battery negative (—) terminal cable, and wait at least 20 seconds.
(2) Remove steering wheel pad (See page AB-15).

Caution

When storing steering wheel pad, keep upper surface of the pad facing upward.

2 Check front airbag sensor circuit. (Measure resistance between terminals +SR and —SR, +SL and —SL of center airbag sensor assembly connector.)

Center Airbag Sensor Assembly



AB0097

P Disconnect center airbag sensor assembly connectors.

C Measure resistance between terminals +SR and —SR, +SL and —SL of harness side connector of center airbag sensor assembly.

OK **Resistance: 755 Ω — 885 Ω**

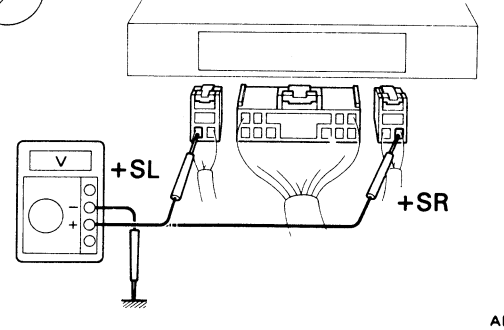
OK

NG Go to Code 15 (See page AB-60).

3 Check front airbag sensor circuit. (Measure voltage between terminal +SR or +SL of center airbag sensor assembly connector and body ground.)

ON

Center Airbag Sensor Assembly



AB0119
AB0095

P (1) Connect negative (—) terminal cable to battery.
(2) Turn ignition switch ON.

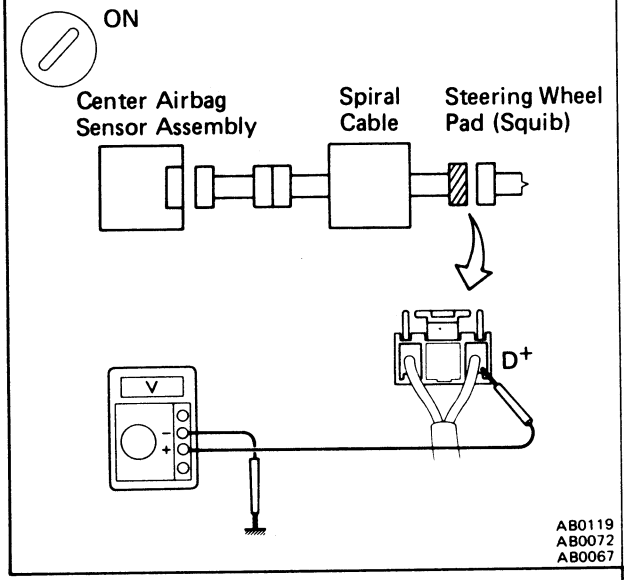
C Measure voltage between terminals +SR or +SL of harness side connector of center airbag sensor assembly and body ground.

OK **Voltage: 0 V**

OK

NG Repair or replace harness or connector between center airbag sensor assembly and front airbag sensor (See page AB-21).

4 Check squib circuit.



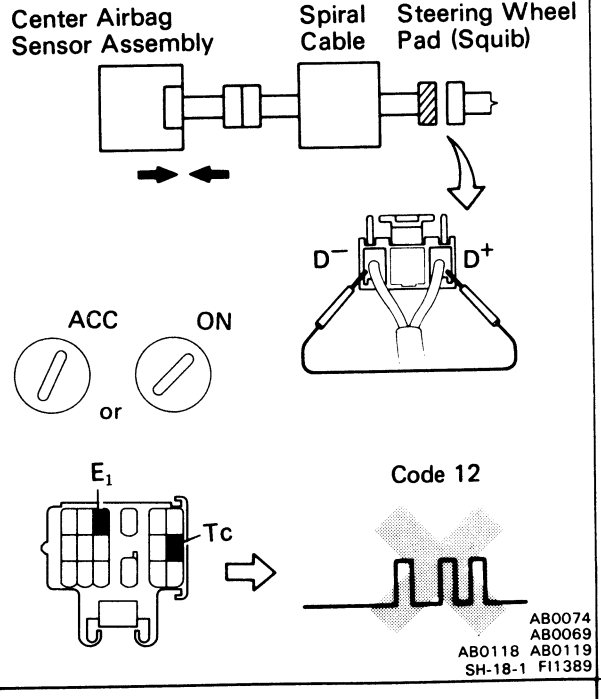
C Measure voltage at D^+ on spiral cable side of connector between spiral cable and steering wheel pad.

OK **Voltage: 0 V**

OK

NG Go to step 7 .

5 Check center airbag sensor assembly.



P (1) Turn ignition switch LOCK.
(2) Disconnect negative (−) terminal cable from battery.
(3) Connect connectors to center airbag sensor assembly.
(4) Using a service wire, connect D^+ and D^- on spiral cable side of connector between spiral cable and steering wheel pad.
(5) Connect negative (−) terminal cable to battery, and wait at least 2 seconds.

C (1) Turn ignition switch ACC or ON, and wait at least 20 seconds.
(2) Using SST, connect terminals Tc and E_1 of check connector.
SST 09843-18020
(3) Check diagnostic code.

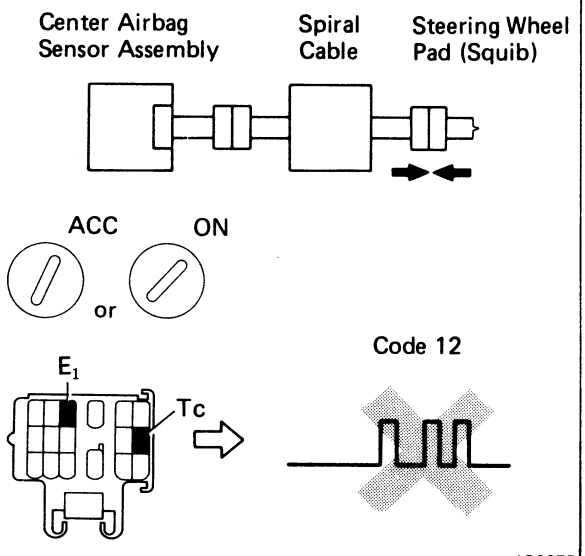
OK **Diagnostic code 12 is not output.**

Hint Codes other than code 12 may be output at this time, but this is not relevant to this check.

OK

NG **Replace center airbag sensor assembly.**

6 Check squib.



AB0075
AB0118 AB0119
SH-18-1 FI1389

P (1) Turn ignition switch LOCK.
(2) Disconnect battery negative (–) terminal cable, and wait at least 20 seconds.
(3) Connect steering wheel pad (squib) connector.
(4) Connect negative (–) terminal cable to battery, and wait at least 2 seconds.

C (1) Turn ignition switch ACC or ON, and wait at least 20 seconds.
(2) Using SST, connect terminals Tc and E_1 of check connector.
SST 09843-18020
(3) Check diagnostic code.

OK **Diagnostic code 12 is not output.**

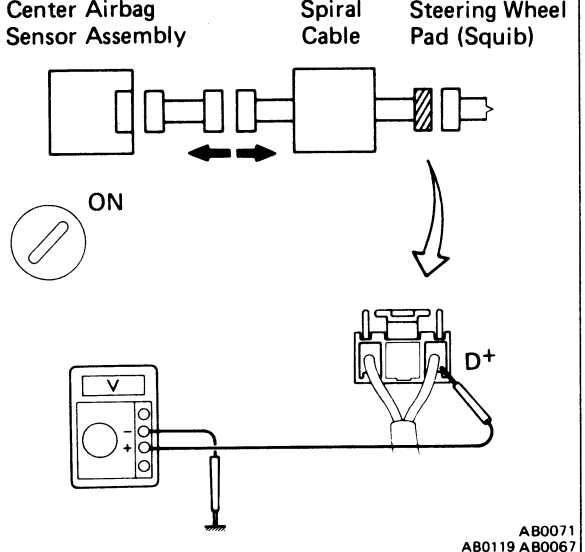
Hint Codes other than code 12 may be output at this time, but this is not relevant to this check.

OK

NG **Replace steering wheel pad.**

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

7 Check spiral cable.



AB0071
AB0119 AB0067

P (1) Turn ignition switch LOCK.
(2) Disconnect connector between center airbag sensor assembly and spiral cable.
(3) Turn ignition switch ON.

C Measure voltage at D^+ on spiral cable side of connector between spiral cable and steering wheel pad.

OK **Voltage: 0 V**

OK

NG **Repair or replace spiral cable.**

Repair or replace harness or connector between center airbag sensor assembly and spiral cable.

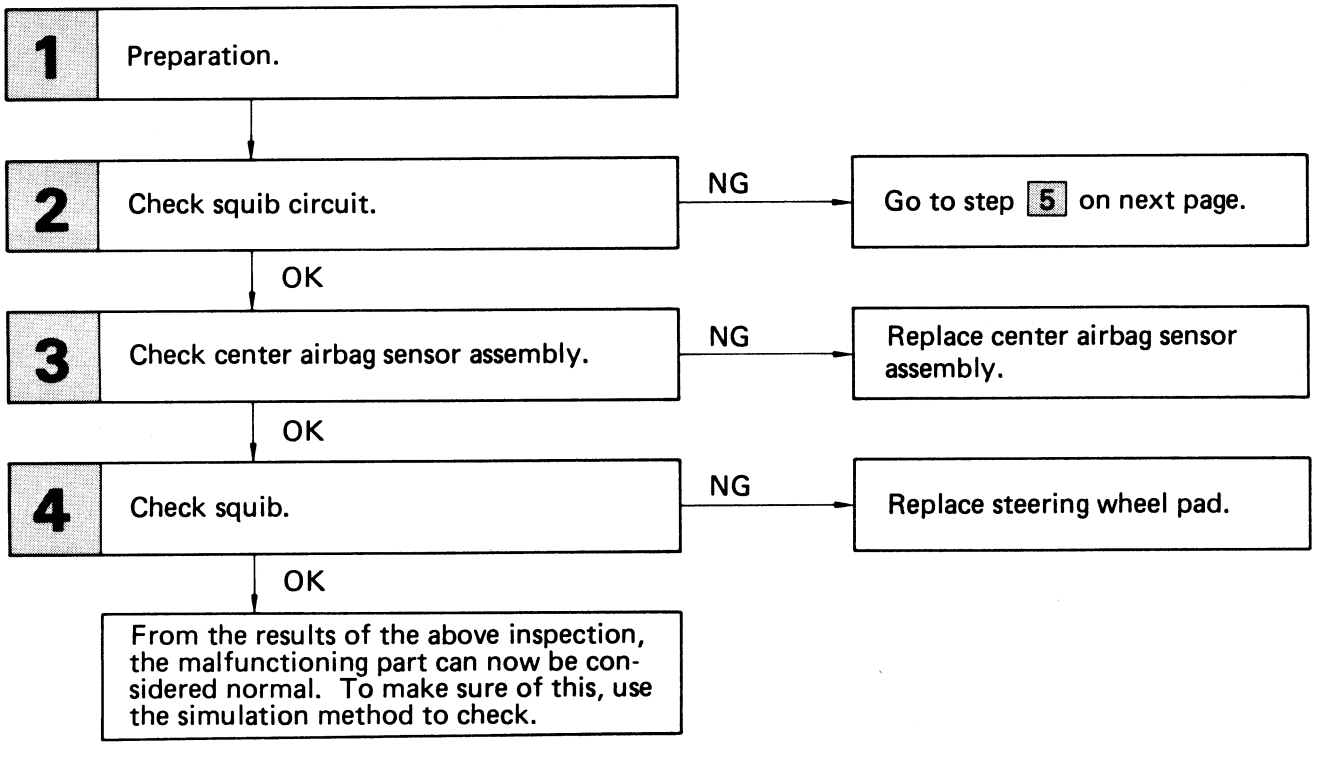
Diag. Code	13	Short in Squib Circuit (Between D^+ Wire Harness and D^- Wire Harness)

CIRCUIT DESCRIPTION

The squib circuit consists of the center airbag sensor assembly, spiral cable and the steering wheel pad (squib). It causes the airbag to deploy when the airbag deployment conditions are satisfied.
For details of the function of each component, see FUNCTION OF COMPONENTS on page AB-7.
Diagnostic code 13 is recorded when a short is detected in the D^+ wire harness and D^- wire harness of the squib circuit.

Code. No.	Diagnosis
13	· Short circuit between D^+ wire harness and D^- wire harness of squib. · Squib malfunction. · Spiral cable malfunction. · Center airbag sensor assembly malfunction.

DIAGNOSTIC CHART



DIAGNOSTIC CHART (Cont'd)

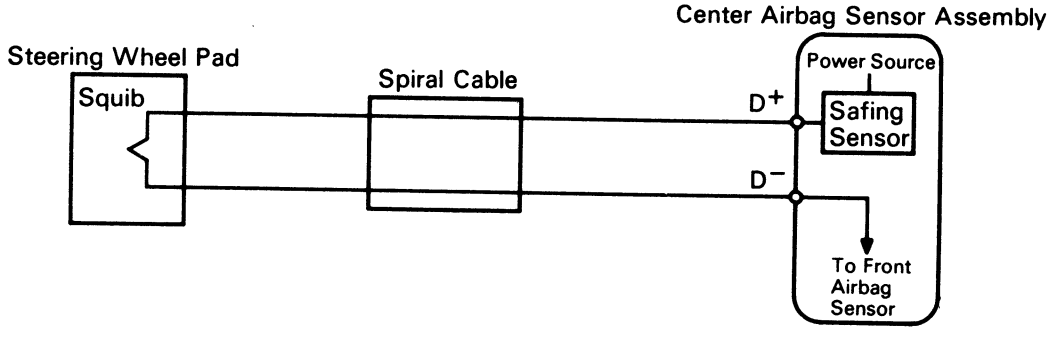
5 Check spiral cable.
- NG → Repair or replace spiral cable.
- OK ↓

6 Check harness between center airbag sensor assembly and spiral cable.
- NG → Repair or replace harness or connector between center airbag sensor assembly and spiral cable.
- OK ↓

7 Check center airbag sensor assembly.
- NG → Replace center airbag sensor assembly.
- OK ↓

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

WIRING DIAGRAM



AB0191

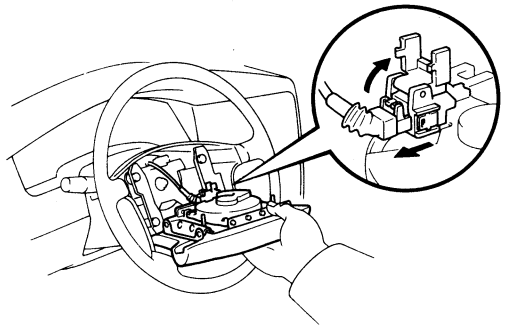
INSPECTION PROCEDURES

P Preparation C Check

1 Preparation.



LOCK



AB0117
AB0267

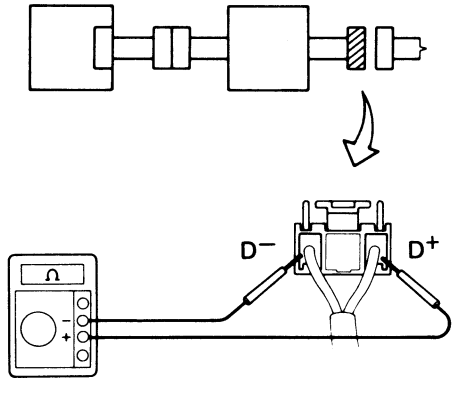
P (1) Disconnect battery negative (−) terminal cable, and wait at least 20 seconds.
(2) Remove steering wheel pad (See page AB-15).

Caution

When storing steering wheel pad, keep upper surface of the pad facing upward.

2 Check squib circuit.

Center Airbag Sensor Assembly | Spiral Cable | Steering Wheel Pad (Squib)



AB0074
AB0068

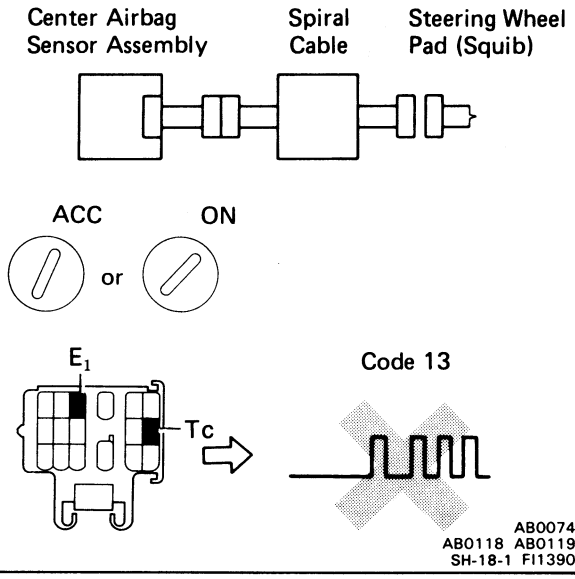
C Measure resistance between D^+ and D^- on spiral cable side of connector between spiral cable and steering wheel pad.

OK **Resistance: 1 kΩ or more**

OK

NG Go to step 5 .

3 Check center airbag sensor assembly.



P (1) Connect negative (–) terminal cable to battery.
(2) Clear malfunction code 41 stored in memory (See page AB-31).

C (1) Turn ignition switch LOCK, and wait at least 2 seconds.
(2) Turn ignition switch ACC or ON, and wait at least 20 seconds.
(3) Using SST, connect terminals Tc and E_1 of check connector.
SST 09843-18020
(4) Check diagnostic code.

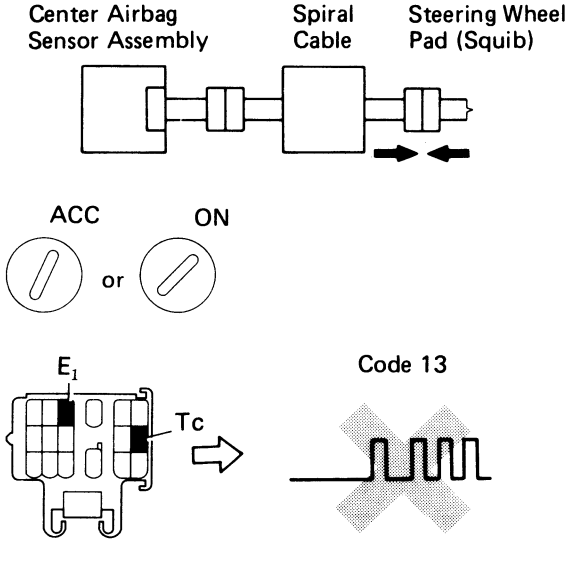
OK **Diagnostic code 13 is not output.**

Hint Codes other than code 13 may be output at this time, but this is not relevant to this check.

OK

NG > **Replace center airbag sensor assembly.**

4 Check squib.



P (1) Turn ignition switch LOCK.
(2) Disconnect battery negative (–) terminal cable, and wait at least 20 seconds.
(3) Connect steering wheel pad (squib) connector.
(4) Connect negative (–) terminal cable to battery.
(5) Clear malfunction code 41 stored in memory (See page AB-31).

C (1) Turn ignition switch LOCK, and wait at least 2 seconds.
(2) Turn ignition switch ACC or ON, and wait at least 20 seconds.
(3) Using SST, connect terminals Tc and E_1 of check connector.
SST 09843-18020
(4) Check diagnostic code.

OK **Diagnostic code 13 is not output.**

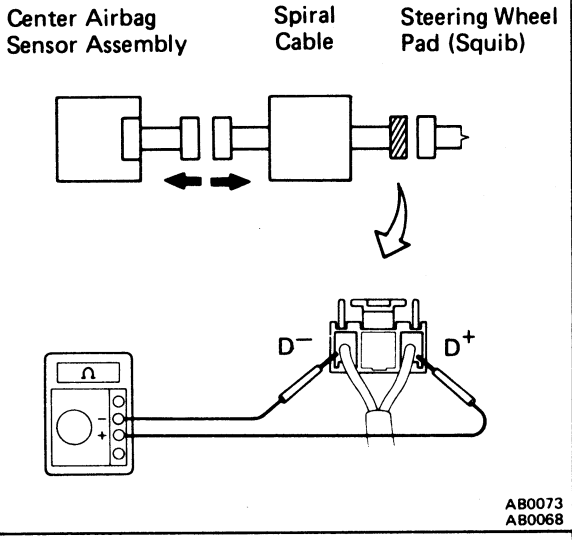
Hint Codes other than code 13 may be output at this time, but this is not relevant to this check.

OK

NG > **Replace steering wheel pad.**

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

5 Check spiral cable.



P (1) Disconnect connector between center airbag sensor assembly and spiral cable.
(2) Release airbag activation prevention mechanism on center airbag sensor assembly side of spiral cable connector (See page AB-54).

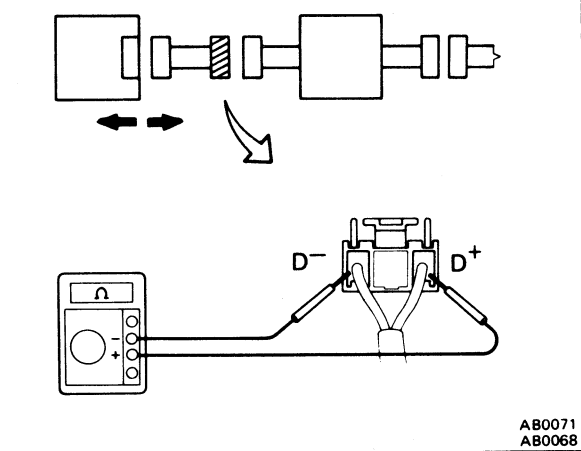
C Measure resistance between D^+ and D^- on spiral cable side of connector between spiral cable and steering wheel pad.

OK **Resistance:** ∞ Ω

OK

NG **Repair or replace spiral cable.**

6 Check harness between center airbag sensor assembly and spiral cable.



P (1) Disconnect center airbag sensor assembly connector.
(2) Release airbag activation prevention mechanism on center airbag sensor assembly connector (See page AB-54).

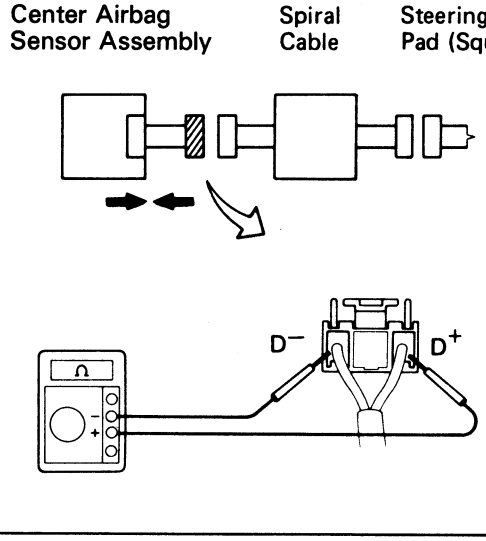
C Measure resistance between D^+ and D^- on center airbag sensor assembly side of connector between center airbag sensor assembly and spiral cable.

OK **Resistance:** ∞ Ω

OK

NG **Repair or replace harness or connector between center airbag sensor assembly and spiral cable.**

7 Check center airbag sensor assembly.



P Connect center airbag sensor assembly connector.

C Measure resistance between D^+ and D^- on center airbag sensor assembly side of connector between center airbag sensor assembly and spiral cable.

OK **Resistance: 1 kΩ or more**

OK

NG → **Replace center airbag sensor assembly.**

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

RELEASE METHOD OF AIRBAG ACTIVATION PREVENTION MECHANISM

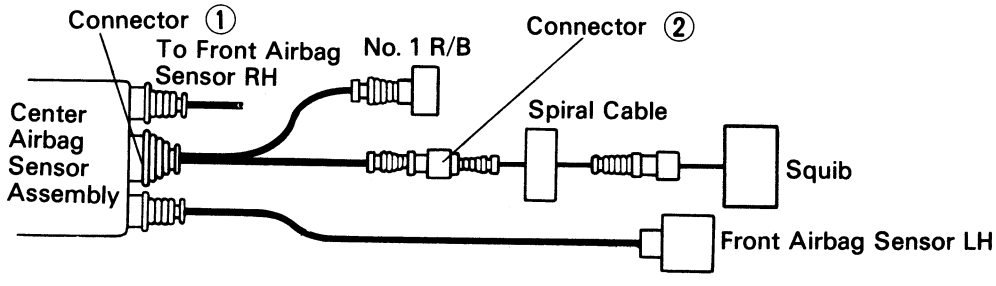
An airbag activation prevention mechanism is built into the connector for the squib circuit of the airbag system. When release of the airbag activation prevention mechanism is directed in the troubleshooting procedure, as shown in the illustration of the connectors ① and ② below, insert paper which is the same thickness as the male terminal, between the terminal and the short spring.

CAUTION:

- **NEVER RELEASE the airbag activation prevention mechanism on the steering wheel pad connector.**

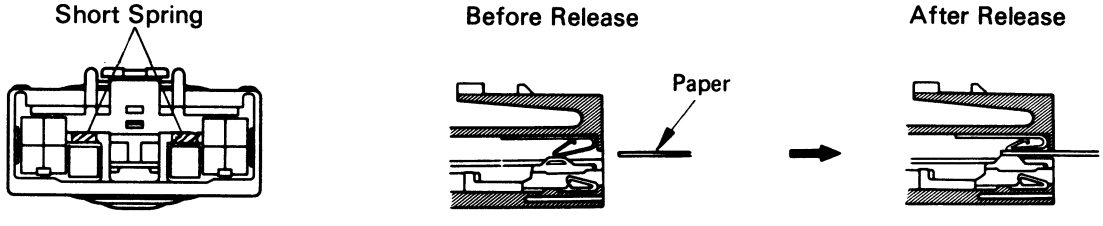
NOTICE:

- **Do not release the airbag activation prevention mechanism unless specifically directed by the troubleshooting procedure.**
- **If the paper inserted is too thick the terminal and short spring may be damaged, so always use paper the same thickness as the male terminal.**



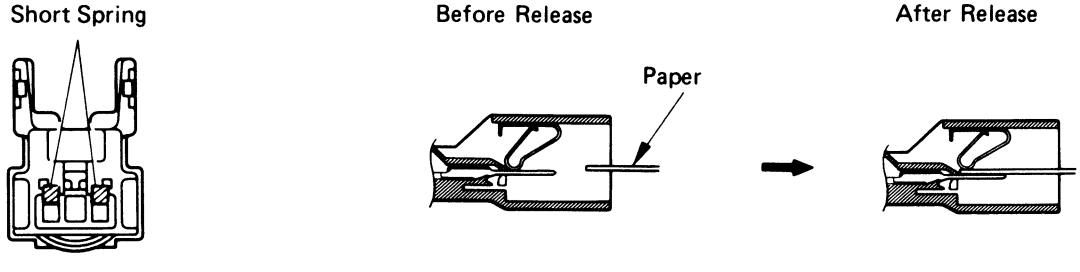
AB0123

Center Airbag Sensor Assembly Connector (Connector ①)



AB0129 AB0042 AB0043

Spiral Cable Connector (Connector ②)



AB0130 AB0045 AB0046

Diag. Code	14	Open in Squib Circuit

CIRCUIT DESCRIPTION

The squib circuit consists of the center airbag sensor assembly, spiral cable and the steering wheel pad (squib). It causes the airbag to deploy when the airbag deployment conditions are satisfied.
For details of the function of each component, see FUNCTION OF COMPONENTS on page AB-7.
Diagnostic code 14 is recorded when an open is detected in the squib circuit.

Code. No.	Diagnosis
14	· Open circuit in D^+ wire harness or D^- wire harness of squib. · Squib malfunction. · Spiral cable malfunction. · Center airbag sensor assembly malfunction.

DIAGNOSTIC CHART

1 Preparation.

2 Check squib circuit.
- OK → Go to step **5**.
- NG

3 Check spiral cable.
- NG → Repair or replace spiral cable.
- OK

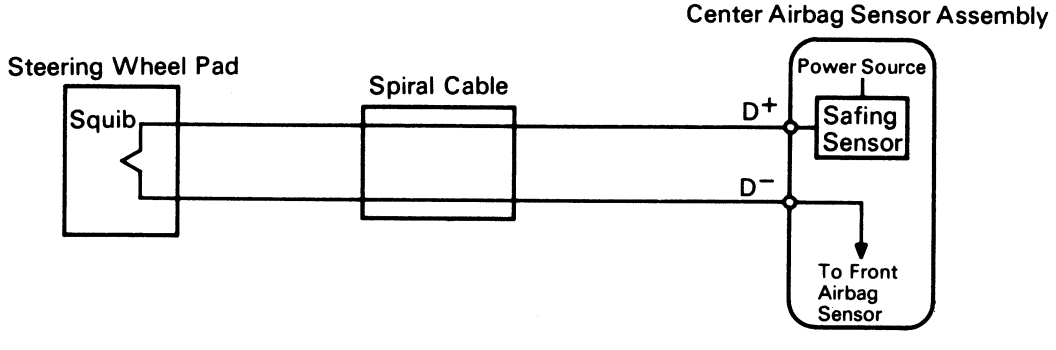
4 Check harness between center airbag sensor assembly and spiral cable.
- NG → Repair or replace harness or connector between center airbag sensor assembly and spiral cable.
- OK

5 Check center airbag sensor assembly.
- NG → Replace center airbag sensor assembly.
- OK

6 Check squib.
- NG → Replace steering wheel pad.
- OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

WIRING DIAGRAM



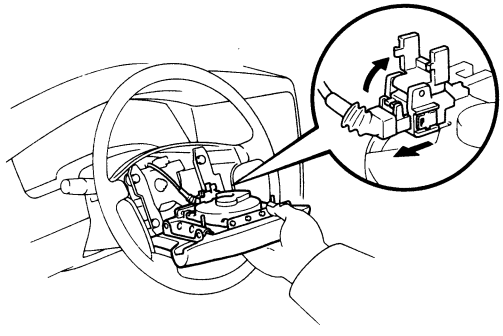
AB0191

INSPECTION PROCEDURES

P Preparation C Check

1 Preparation.





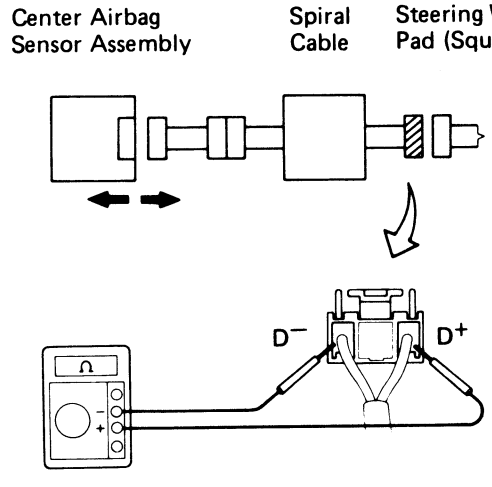
AB0117
AB0267

P (1) Disconnect battery negative (–) terminal cable, and wait at least 20 seconds.
(2) Remove steering wheel pad (See page AB-15).

Caution

When storing steering wheel pad, keep upper surface of the pad facing upward.

2 Check squib circuit.



AB0072
AB0068

P Disconnect center airbag sensor assembly connector.

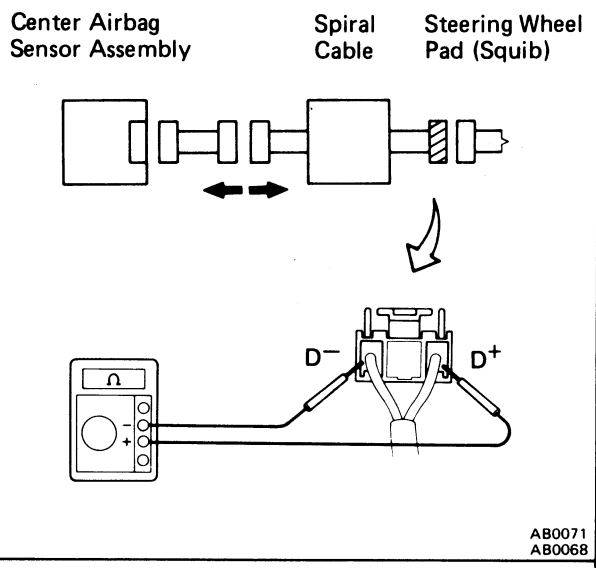
C Measure resistance between D^+ and D^- on spiral cable side of connector between spiral cable and steering wheel pad.

OK **Resistance: Less than 1 Ω**

NG

OK Go to step 5 .

3 Check spiral cable.



AB0071
AB0068

P Disconnect connector between center airbag sensor assembly and spiral cable.

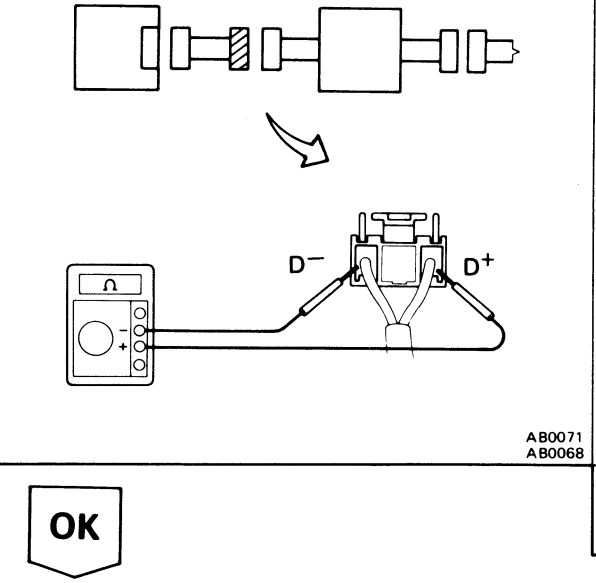
C Measure resistance between D^+ and D^- on spiral cable side of connector between spiral cable and steering wheel pad.

OK **Resistance: Less than 1 Ω**

OK

NG **Repair or replace spiral cable.**

4 Check harness between center airbag sensor assembly and spiral cable.



AB0071
AB0068

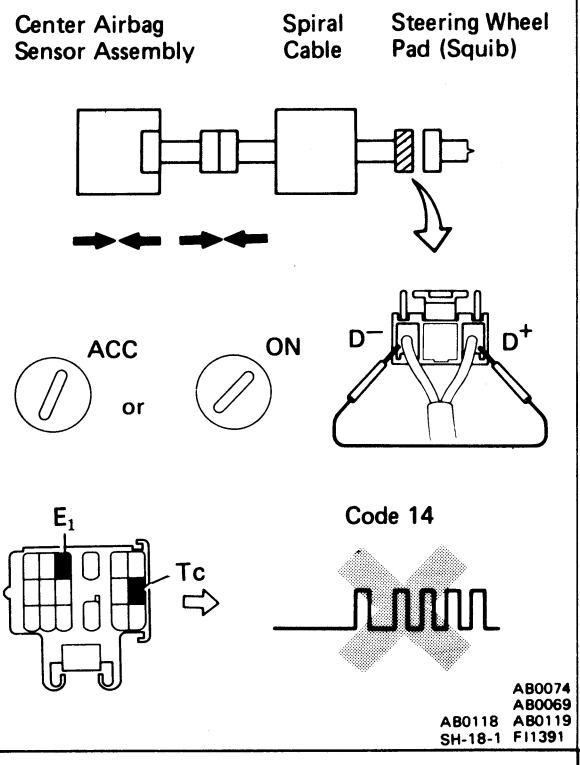
C Measure resistance between D^+ and D^- on center airbag sensor assembly side of connector between center airbag sensor assembly and spiral cable.

OK **Resistance: Less than 1 Ω**

OK

NG **Repair or replace harness or connector between center airbag sensor assembly and spiral cable.**

5 Check center airbag sensor assembly.



P (1) Connect connector to center airbag sensor assembly.
(2) Connect connector between center airbag sensor assembly and spiral cable.
(3) Using a service wire, connect D^+ and D^- on spiral cable side of connector between spiral cable and steering wheel pad.
(4) Connect negative (−) terminal cable to battery, and wait at least 2 seconds.

C (1) Turn ignition switch ACC or ON, and wait at least 20 seconds.
(2) Using SST, connect terminals Tc and E_1 of check connector.
SST 09843-18020
(3) Check diagnostic code.

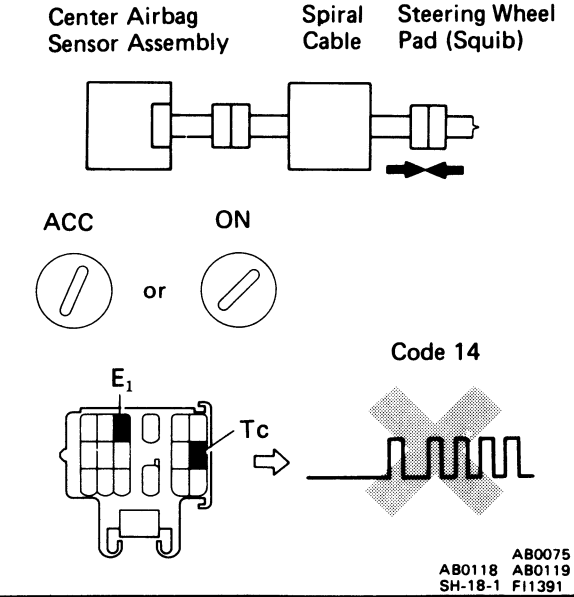
OK **Diagnostic code 14 is not output.**

Hint Codes other than code 14 may be output at this time, but this is not relevant to this check.

OK

NG > **Replace center airbag sensor assembly.**

6 Check squib.



P (1) Turn ignition switch LOCK.
(2) Disconnect battery negative (−) terminal cable, and wait at least 20 seconds.
(3) Connect steering wheel pad (squib) connector.
(4) Connect negative (−) terminal cable to battery, and wait at least 2 seconds.

C (1) Turn ignition switch ACC or ON, and wait at least 20 seconds.
(2) Using SST, connect terminals Tc and E_1 of check connector.
SST 09843-18020
(3) Check diagnostic code.

OK **Diagnostic code 14 is not output.**

Hint Codes other than code 14 may be output at this time, but this is not relevant to this check.

OK

NG > **Replace steering wheel pad.**

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

Diag. Code	15	Open in Front Airbag Sensor Circuit

CIRCUIT DESCRIPTION

The front airbag sensor detects the deceleration force in a frontal collision and is located in the radiator upper support.
For details of the function of each component, see FUNCTION OF COMPONENTS on page AB-7.
Diagnostic code 15 is recorded when an open is detected in the front airbag sensor circuit.

NOTICE: The front airbag sensor connector is equipped with an electrical connection check mechanism for the purpose of detecting an open in the front airbag sensor (See page AB-9). This mechanism is constructed so that when the terminals of the front airbag sensor have been connected (when the connector housing lock is in the locked condition), the connection detection pin on the wire harness side connects with the terminals for diagnosis use on the sensor side. If the connector is not properly connected, the diagnosis system may detect only a malfunction code, even though the airbag system is functioning normally.
When connecting the front airbag sensor connector, make sure it is connected properly. If diagnostic code 15 is displayed after the front airbag sensor connector has been connected, check again that it is properly connected.

Code No.	Diagnosis
15	· Open circuit in +S wire harness or –S wire harness of front airbag sensor. · Front airbag sensor malfunction. · Malfunction of electrical connection check mechanism of front airbag sensor. · Center airbag sensor assembly malfunction.

DIAGNOSTIC CHART

1 Preparation.

2 Check front airbag sensor circuit (Measure resistance between terminals +SR and −SR, +SL and −SL of center airbag sensor assembly connector).
- NG → Go to step 4 .
- OK ↓

3 Check center airbag sensor assembly.
- NG → Replace center airbag sensor assembly.
- OK ↓

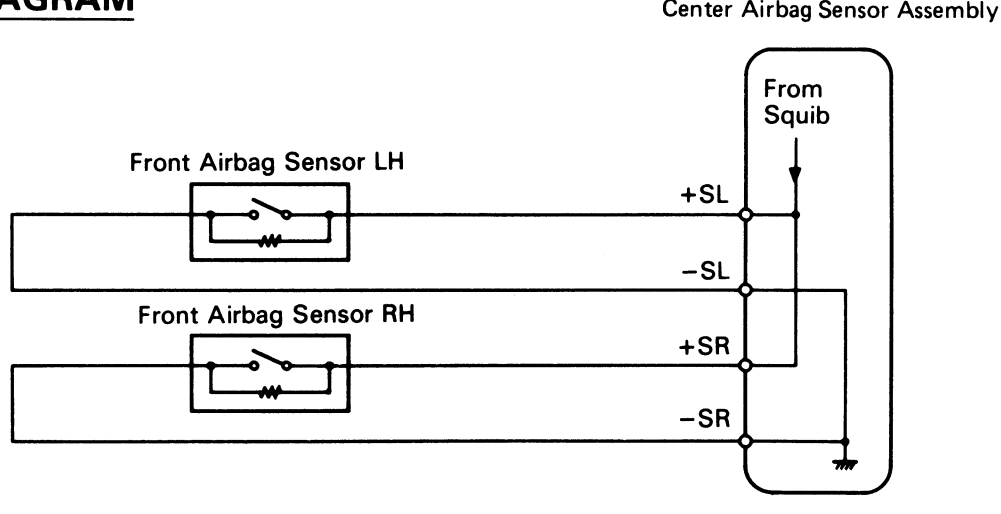
From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

4 Check front airbag sensor.
- NG → Replace front airbag sensor.
- OK ↓

5 Check harness between center airbag sensor assembly and front airbag sensor.
- NG → Repair or replace harness or connector between center airbag sensor assembly and front airbag sensor (See page AB-21).
- OK ↓

Replace front airbag sensor connector (See page AB-21).

WIRING DIAGRAM



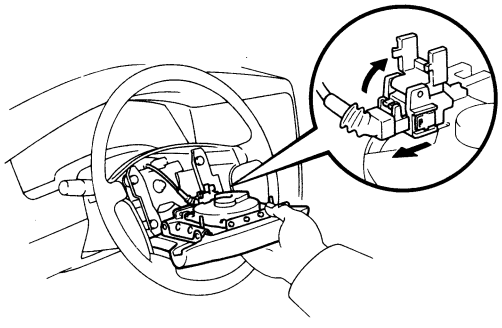
AB0192

INSPECTION PROCEDURES

P Preparation C Check

1 Preparation.

LOCK



AB0117
AB0267

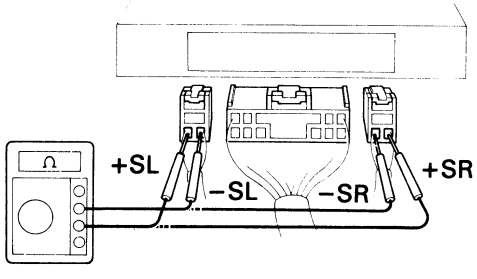
P (1) Disconnect battery negative (–) terminal cable, and wait at least 20 seconds.
(2) Remove steering wheel pad (See page AB-15).

Caution

When storing steering wheel pad, keep upper surface of pad facing upward.

2 Check front airbag sensor circuit (Measure resistance between terminals +SR and –SR, +SL and –SL of center airbag sensor assembly connector.).

Center Airbag Sensor Assembly



AB0097

P Disconnect center airbag sensor assembly connectors.

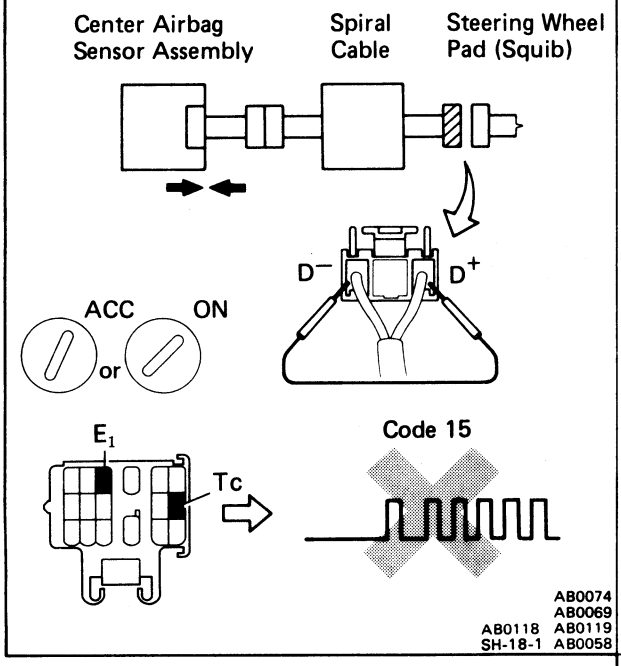
C Measure resistance between terminals +SR and –SR, +SL and –SL of harness side connector of center airbag sensor assembly.

OK **Resistance: 755Ω – 885Ω**

OK

NG Go to step 4 .

3 Check center airbag sensor assembly.



P (1) Connect connectors to center airbag sensor assembly.
(2) Using a service wire, connect D^+ and D^- on spiral cable side of connector between spiral cable and steering wheel pad.
(3) Connect negative (−) terminal cable to battery, and wait at least 2 seconds.

C (1) Turn ignition switch ACC or ON, and wait at least 20 seconds.
(2) Using SST, connect terminals Tc and E_1 of check connector.
SST 09843-18020
(3) Check diagnostic code.

OK **Diagnostic code 15 is not output.**

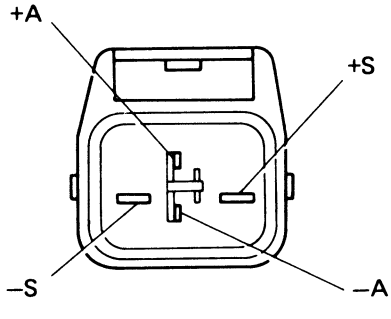
Hint Codes other than code 15 may be output at this time, but this is not relevant to this check.

OK

NG **Replace center airbag sensor assembly.**

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

4 Check front airbag sensor.



P Disconnect front airbag sensor connector.

C Measure resistance between each terminal of front airbag sensor.

OK

Terminal	Resistance
⊕S − ⊕A	755 Ω − 885 Ω
⊕S − ⊖S	∞
⊖S − ⊖A	Less than 1 Ω

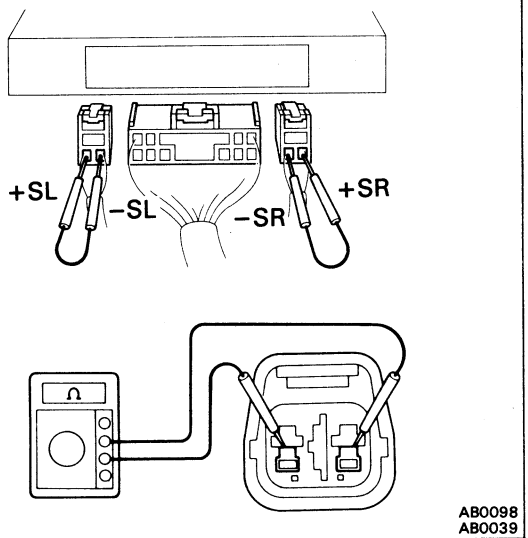
Notice
- **Do not touch ohmmeter probes strongly against terminals of front airbag sensor.**
- **Make sure the front airbag sensor connector is properly connected.**

OK

NG **Replace front airbag sensor.**

5 **Check harness between center airbag sensor assembly and front airbag sensor.**

Center Airbag Sensor Assembly



AB0098
AB0039

P (1) Disconnect center airbag sensor assembly connectors.
(2) Using service wires, connect +SR and −SR, +SL and −SL on the wire harness side of the center airbag sensor assembly connectors.

C Measure resistance between terminals +SR and −SR, +SL and −SL of harness side connector of front airbag sensor.

OK **Resistance: Less than 1 Ω**

Notice

- **Lightly touch ohmmeter probes at position shown in illustration.**
- **Make sure the front airbag sensor connector is properly connected.**

OK

NG → **Repair or replace harness or connector between center airbag sensor assembly and front airbag sensor (See page AB-21).**

Replace front airbag sensor connector (See page AB-21).

Diag. Code	22	Airbag Warning Light System Malfunction

CIRCUIT DESCRIPTION

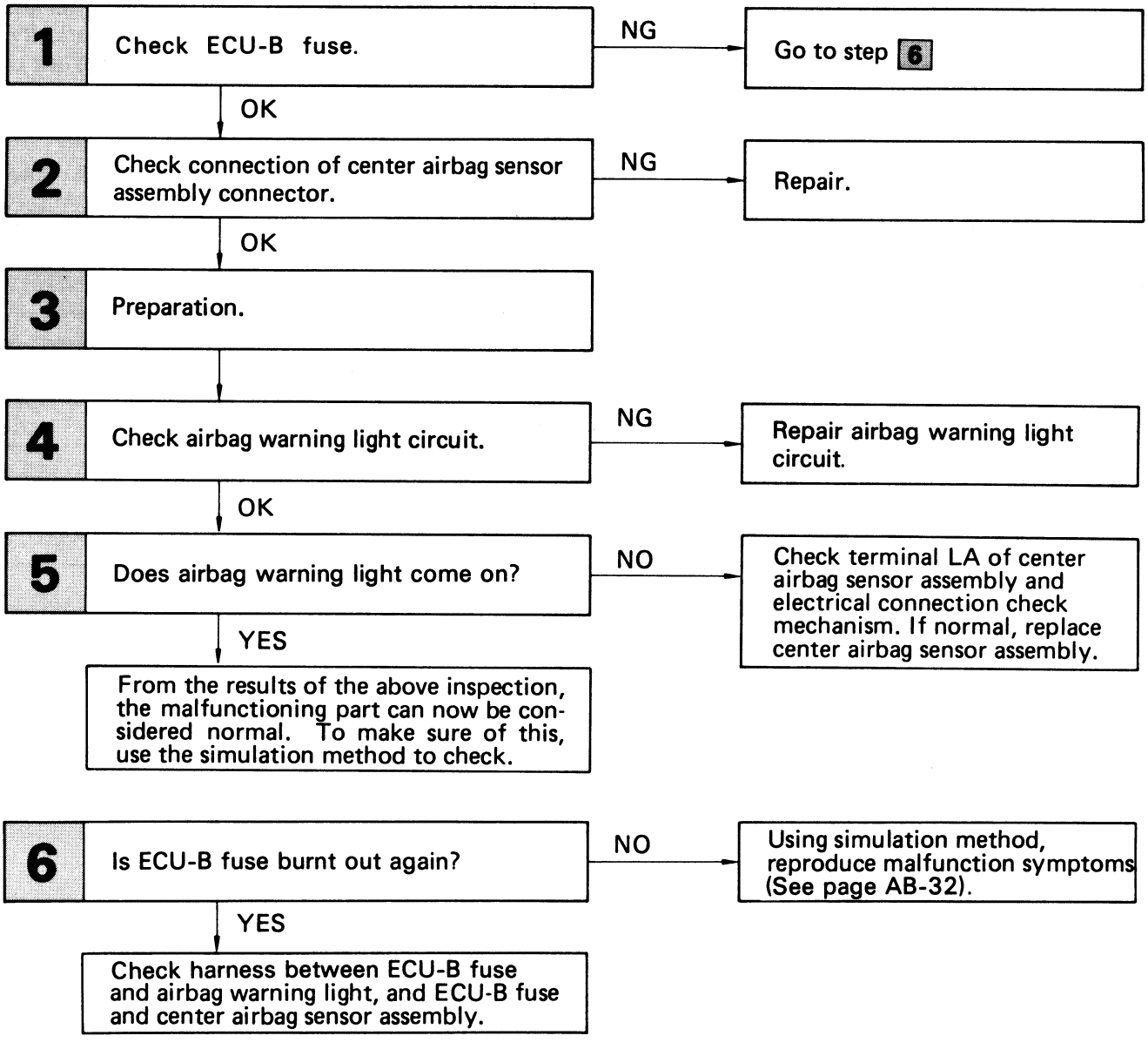
The airbag warning light is located on the combination meter.
When the airbag system is normal, the airbag warning light lights up for approx. 6 seconds after the ignition switch is turned from LOCK position to ACC or ON position, and then turns off automatically.
If there is a malfunction in the airbag system, the airbag warning light lights up to inform the driver of the abnormality.
When terminals Tc and E_1 of the check connector are connected, the diagnostic code is displayed by the blinking of the airbag warning light.
The airbag warning light circuit is equipped with an electrical connection check mechanism which detects when the connector to the center airbag sensor assembly is not properly connected.
If the connector to the center airbag sensor assembly is not properly connected, the airbag warning light will not light up.
Diagnostic code 22 is recorded when a malfunction occurs in the airbag warning light system.
If an OPEN malfunction occurs in the airbag warning light system, the airbag warning light does not light up, so that until the malfunction is repaired, the diagnostic codes (including code 22) cannot be confirmed.

Code No.	Diagnosis
22	· Open circuit in airbag warning light system. · Center airbag sensor assembly malfunction.

DIAGNOSTIC CHART

Troubleshooting for this system is different for when the airbag warning light does not light up and for when diagnostic code 22 is output. Confirm the problem symptoms first before selecting the appropriate troubleshooting procedure.

HINT: If airbag warning light does not light up, perform the following troubleshooting:

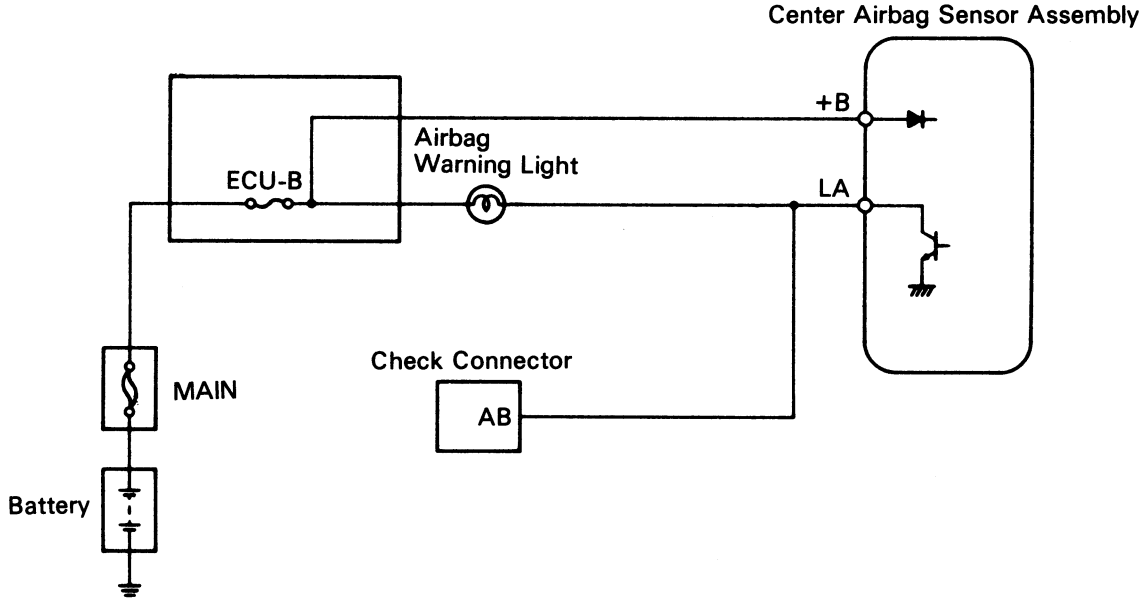


DIAGNOSTIC CHART

HINT: If diagnostic code 22 is output, perform the following troubleshooting:

1	Is diagnostic code 22 output again?	NO	Using simulation method, reproduce malfunction symptoms (See page AB-32).
	YES		
	Replace center airbag sensor assembly.		

WIRING DIAGRAM

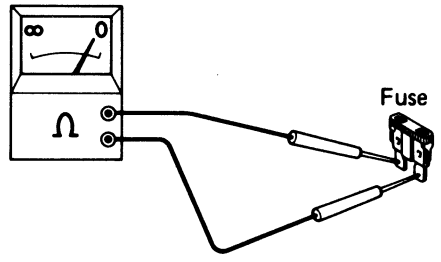


INSPECTION PROCEDURES

P Preparation C Check

HINT: If airbag warning light does not light up, perform the following troubleshooting:

1 Check ECU-B fuse.



F10044

P Remove ECU-B fuse.

C Check continuity of ECU-B fuse.

OK **Continuity.**

Hint · Fuse may be burnt out even if it appears to be OK during visual inspection.
· If fuse is OK, install it.

OK

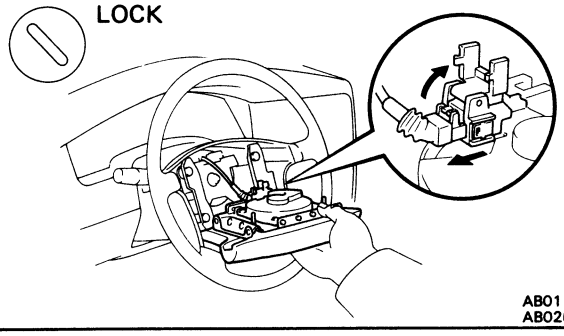
NG > Go to step 6 .

2 Check connection of center airbag sensor assembly connector.

OK

NG > Repair.

3 Preparation.

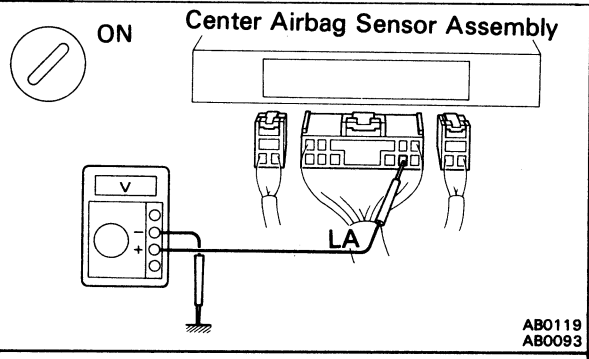


AB0117
AB0267

P (1) Disconnect battery negative (—) terminal cable, and wait at least 20 seconds.
(2) Remove steering wheel pad (See page AB-15).

Caution
When storing steering wheel pad, keep upper surface of pad facing upward.

4 Check airbag warning light circuit.



P (1) Disconnect center airbag sensor assembly connector.
(2) Connect negative (–) terminal cable to battery.
(3) Turn ignition switch ACC or ON.

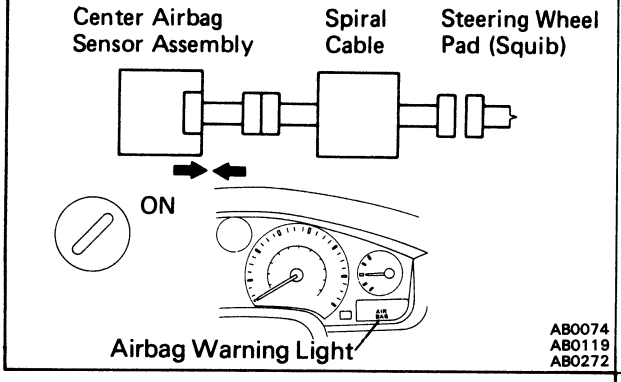
C Measure voltage LA terminal of harness side connector of center airbag sensor assembly.

OK **Voltage: Battery voltage.**

OK

NG **Repair airbag warning light circuit.**

5 Does airbag warning light come on?



P (1) Disconnect negative (–) terminal cable from battery.
(2) Connect center airbag sensor assembly connector.
(3) Connect negative (–) terminal cable to battery.
(4) Turn ignition switch ACC or ON.

C Check operation of airbag warning light.

YES

NO **Check terminal LA of center airbag sensor assembly and electrical connection check mechanism. If normal, replace center airbag sensor assembly.**

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

6 Is new ECU-B fuse burnt out again ?

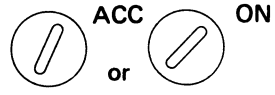
YES

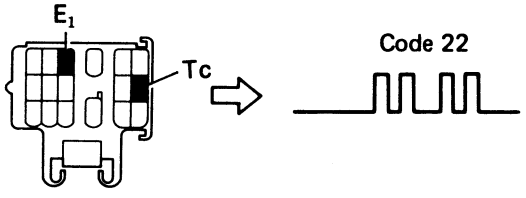
NO **Using simulation method, reproduce malfunction symptoms (See page AB-32).**

Check harness between ECU-B fuse and airbag warning light, and ECU-B fuse and center airbag sensor assembly.

HINT: If diagnostic code 22 is output, perform the following troubleshooting:

1 Is diagnostic code 22 output again?





AB0118 AB0119
SH-18-1 FI1392

P Clear malfunction code 41 stored in memory (See page AB-31).

C (1) Turn ignition switch LOCK, and wait at least 2 seconds.
(2) Turn ignition switch ACC or ON, and wait at least 20 seconds.
(3) Using SST, connect terminals Tc and E_1 of check connector.
SST 09843-18020
(4) Check diagnostic code.

YES

NO → **Using simulation method, reproduce malfunction symptoms (See page AB-32).**

Replace center airbag sensor assembly.

Diag. Code	31	Center Airbag Sensor Assembly Malfunction

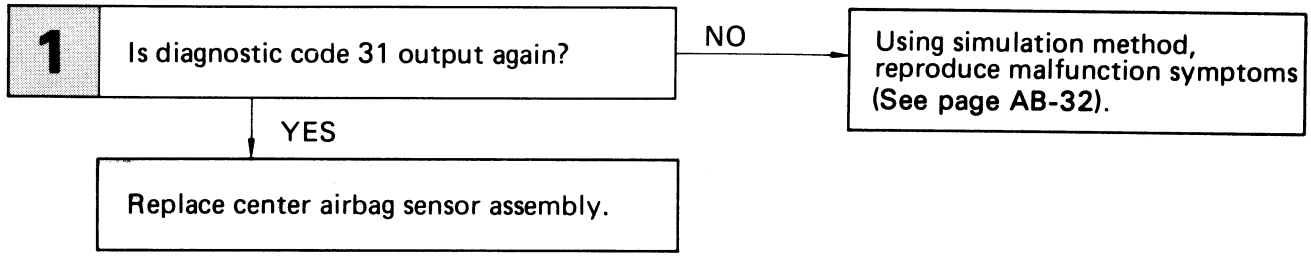
CIRCUIT DESCRIPTION

The center airbag sensor assembly consists of a center airbag sensor, safing sensors, ignition control and drive circuit, diagnosis circuit, etc.
It receives signals from the airbag sensors, judges whether or not the airbag must be activated, and diagnoses system malfunction.
Diagnostic code 31 is recorded when occurrence of a malfunction in the center airbag sensor assembly is detected.

Code No.	Diagnosis
31	· Center airbag sensor assembly malfunction.

DIAGNOSTIC CHART

HINT: When a malfunction code other than code 31 is displayed at the same time, first repair the malfunction indicated by the malfunction code other than code 31.

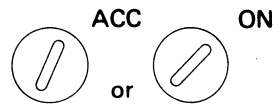


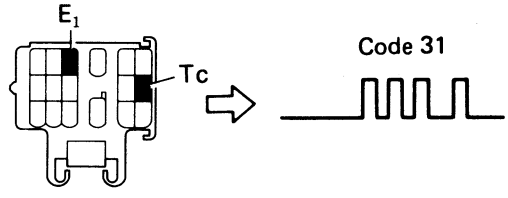
INSPECTION PROCEDURES

HINT: When a malfunction code other than code 31 is displayed at the same time, first repair the malfunction indicated by the malfunction code other than code 31.

P Preparation C Check

1 Is diagnostic code 31 output again ?





AB0118 AB0119
SH-18-1 FI1394

P Clear malfunction code 41 stored in memory (See page AB-31).

C
(1) Turn ignition switch LOCK, and wait at least 20 seconds.
(2) Turn ignition switch ACC or ON, and wait at least 20 seconds.
(3) Repeat operation in step (1) and (2) at least 5 times.
(4) Using SST, connect terminals Tc and E_1 of check connector.
SST 09843-18020
(5) Check diagnostic code.

YES

NO → **Using simulation method, reproduce malfunction symptoms (See page AB-32).**

Replace center airbag sensor assembly.

Diag. Code	41	Malfunction Stored in Memory

CIRCUIT DESCRIPTION

If a malfunction occurs in the airbag system, malfunction codes 11 to 31 may be output, and when the battery is disconnected after the malfunction is repaired, malfunction codes 11 to 31 will be cleared, but code 41 will be output instead.
So long as the cancellation operation for a malfunction recorded in memory (See page AB-31) is not performed, code 41 recorded in the center airbag sensor assembly and the airbag warning light remains lit up.

Code No.	Diagnosis
41	· Malfunction recorded in memory. · Center airbag sensor assembly malfunction.

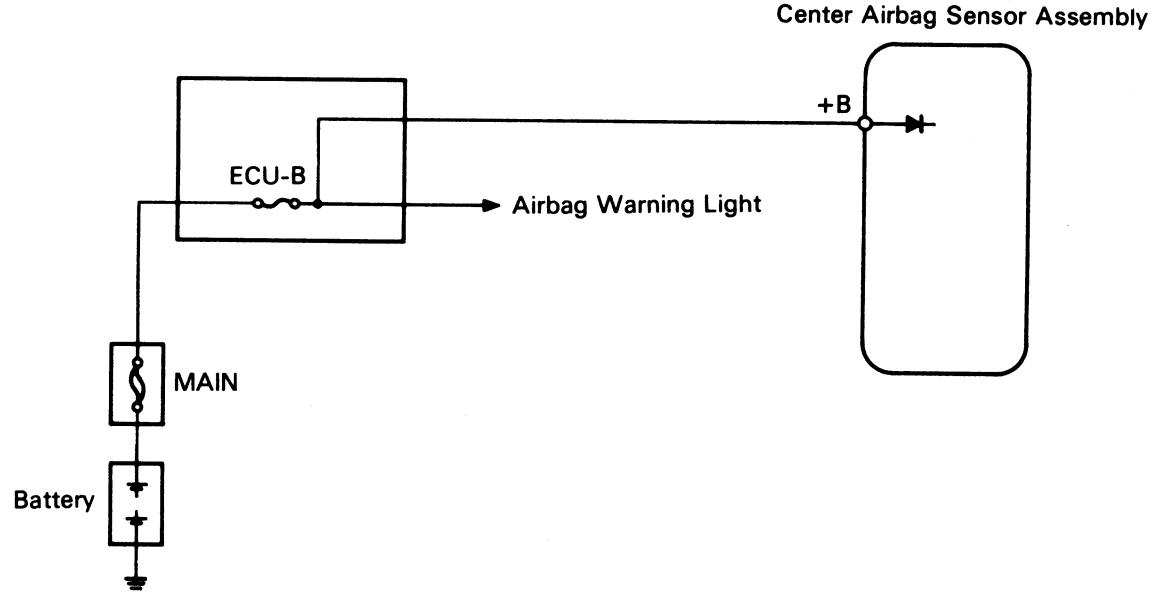
DIAGNOSTIC CHART

1 Check operation of airbag warning light.
- OK → System is normal.
- NG ↓

2 Is diagnostic code 41 output again?
- YES → Check harness between ECU-B fuse and center airbag sensor assembly. If normal, replace center airbag sensor assembly.
- NO ↓

Perform troubleshooting according to malfunction code output.

WIRING DIAGRAM

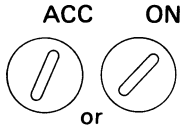


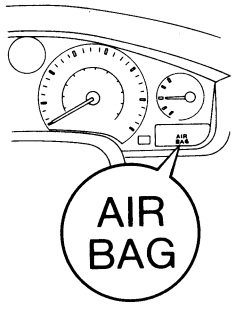
AB0194

INSPECTION PROCEDURES

P Preparation C Check

1 Check operation of airbag warning light.





AB0118 AB0119
AB0260

P Clear malfunction code 41 stored in memory (See page AB-31).

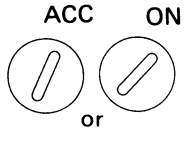
C (1) Turn ignition switch LOCK, and wait at least 2 seconds.
(2) Turn ignition switch ACC or ON, and wait at least 20 seconds.
(3) Check operation of airbag warning light.

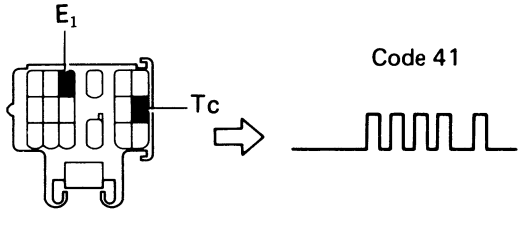
OK **Airbag warning light turns off.**

NG

OK → **System is normal.**

2 Is diagnostic code 41 output again ?





AB0118 AB0119
SH-18-1 FI1396

C (1) Turn ignition switch ACC or ON, and wait at least 20 seconds.
(2) Using SST, connect terminals Tc and E_1 of check connector.
SST 09843-18020
(3) Check diagnostic code.

NO

YES → **Check harness between ECU-B fuse and center airbag sensor assembly. If normal, replace center airbag sensor assembly.**

Perform troubleshooting according to malfunction code output.

Airbag Warning Light System (Always Lit Up)

CIRCUIT DESCRIPTION

The airbag warning light is located on the combination meter.
When the airbag system is normal, the airbag warning light lights up for approx. 6 seconds after the ignition switch is turned from LOCK position to ACC or ON position, and then turns off automatically.
If there is a malfunction in the airbag system, the airbag warning light lights up to inform the driver of the abnormality.
When terminals Tc and E_1 of the check connector are connected, the diagnostic code is displayed by the blinking of the airbag warning light.

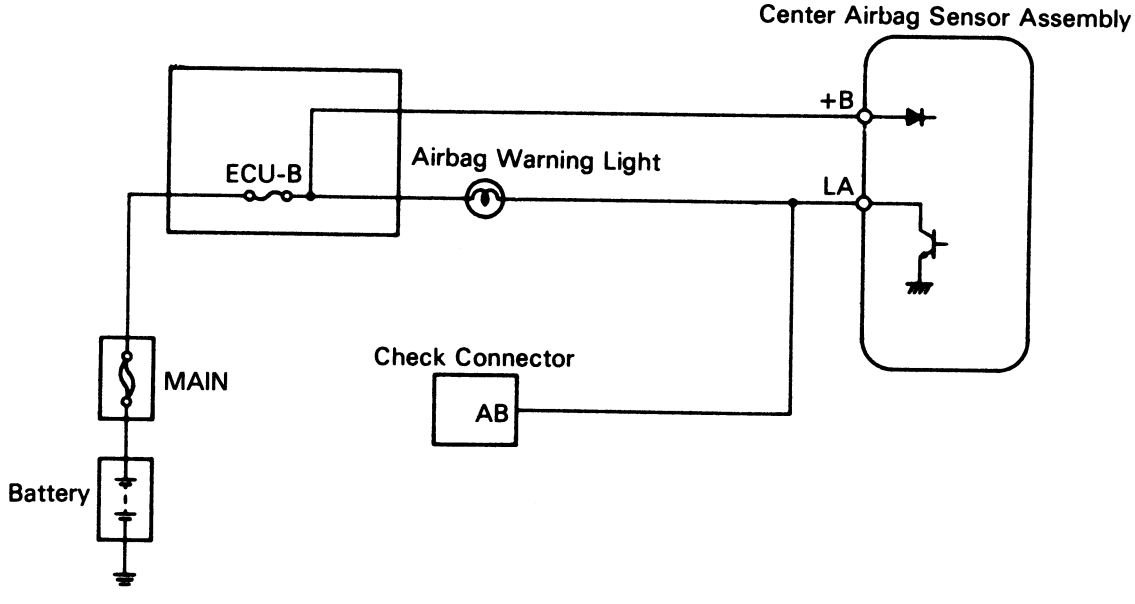
DIAGNOSTIC CHART

1 Does airbag warning light turn off?

NO → Check airbag warning light circuit or terminal AB circuit of check connector.

YES → Replace center airbag sensor assembly.

WIRING DIAGRAM



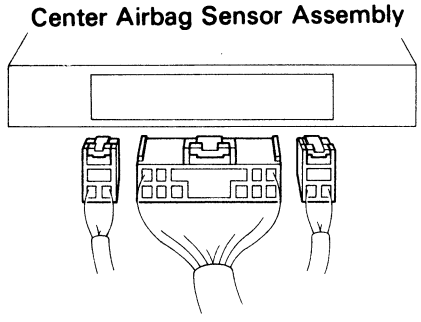
AB0240

INSPECTION PROCEDURES

P Preparation C Check

1 **Does airbag warning light turn off ?**





AB0117
AB0092

P (1) Turn ignition switch LOCK.
(2) Disconnect negative (–) terminal cable from battery.
(3) Disconnect center airbag sensor assembly connector.
(4) Connect negative (–) terminal cable to battery.

C Check operation of airbag warning light.

YES

Replace center airbag sensor assembly.

NO **Check airbag warning light circuit or terminal AB circuit of check connector.**

Tc Terminal Circuit

CIRCUIT DESCRIPTION

By connecting terminals Tc and E_1 of the check connector, the center airbag sensor assembly is set in the diagnostic code output mode. The diagnostic codes are displayed by the blinking of the airbag warning light.

DIAGNOSTIC CHART

Troubleshooting for this system is different depending on whether the diagnostic code is not displayed or is continuously displayed. Confirm the problem symptoms first before selecting the appropriate troubleshooting procedure.

HINT: If the diagnostic code is not displayed, perform the following troubleshooting:

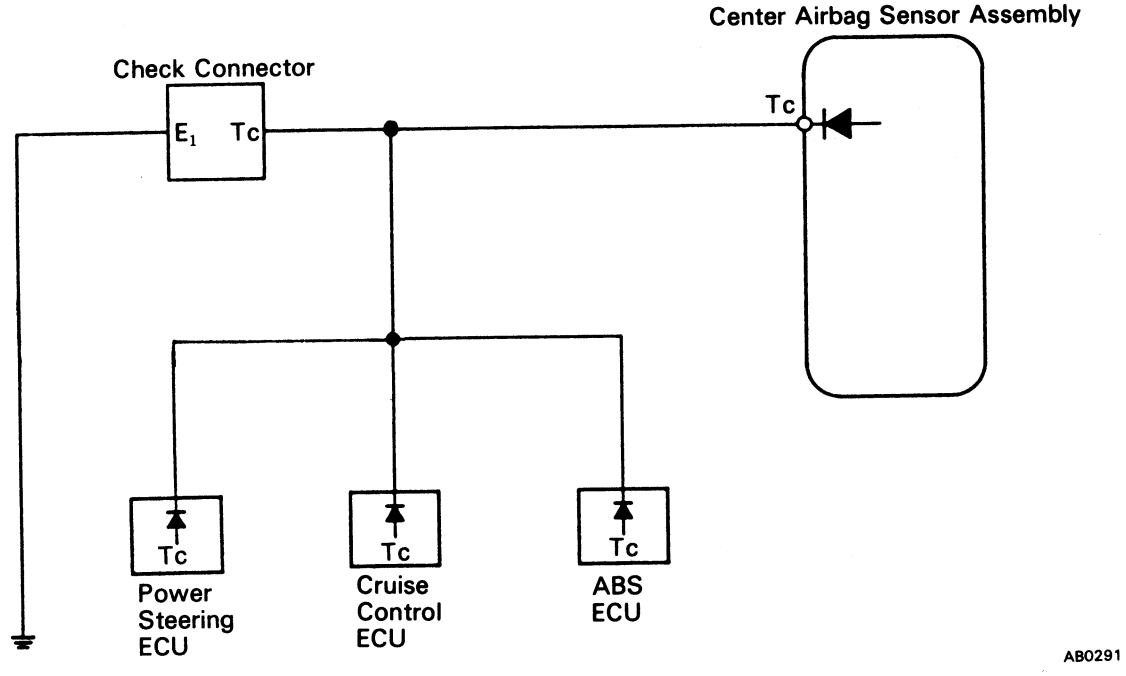
1	Check voltage between terminals Tc and E_1 of check connector.	OK	Go to step 3.
NG			
2	Check voltage between terminal Tc of check connector and body ground.	OK	Check harness between terminal E_1 of check connector and body ground.
NG			
3	Check center airbag sensor assembly.	OK	Check harness between center airbag sensor assembly and check connector.
NG			
Replace center airbag sensor assembly.			

HINT: If the diagnostic code is continuously displayed, perform the following troubleshooting:

1	Check resistance between terminal Tc of center airbag sensor assembly and body ground.	OK	Replace center airbag sensor assembly.
NG			
Repair or replace harness or connector.			

DIAGNOSTIC CHART

WIRING DIAGRAM

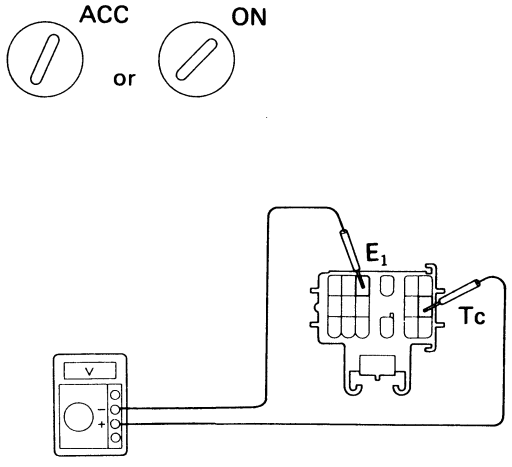


INSPECTION PROCEDURES

P Preparation C Check

HINT: If the diagnostic code is not displayed, perform the following troubleshooting:

1 Check voltage between terminals Tc and E_1 of check connector.



AB0118 AB0119 AB0221

P Turn ignition switch ACC or ON.

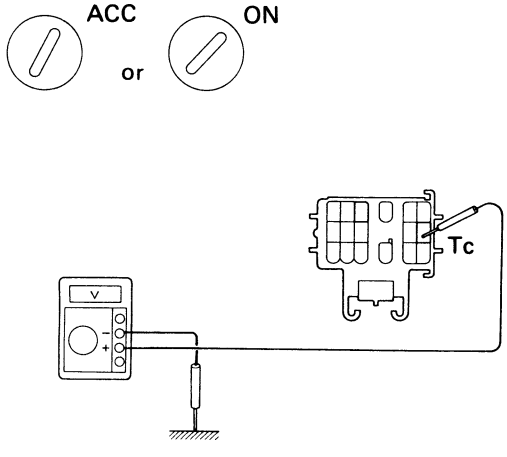
C Measure voltage between terminals Tc and E_1 of check connector.

OK **Voltage: Battery voltage**

NG

OK → Go to step 3.

2 Check voltage between terminal Tc of check connector and body ground.



AB0118 AB0119 AB0222

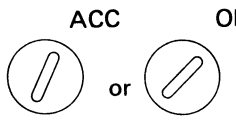
C Measure voltage between terminal Tc of check connector and body ground.

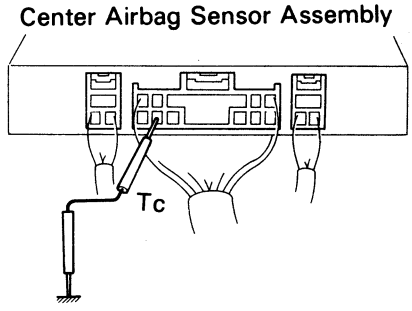
OK **Voltage: Battery voltage**

NG

OK → **Check harness between terminal E_1 of check connector and body ground.**

3 Check center airbag sensor assembly.





AB0118 AB0119 AB0188

P Using a service wire, connect terminal Tc of center airbag sensor assembly connector to body ground.

C Check operation of airbag warning light.

OK **Airbag warning light comes on.**

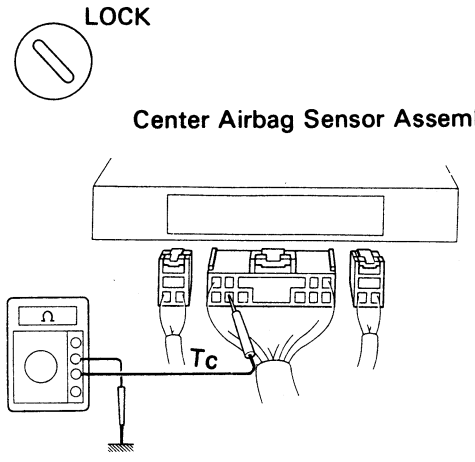
NG

Replace center airbag sensor assembly.

OK **Check harness between center airbag sensor assembly and check connector.**

HINT: If the diagnostic code is continuously displayed, perform the following troubleshooting.

1 Check resistance between terminal Tc of center airbag sensor assembly and body ground.



P (1) Turn ignition switch LOCK.
(2) Disconnect center airbag sensor assembly connector.

C Check resistance between terminal Tc of center airbag sensor assembly and body ground.

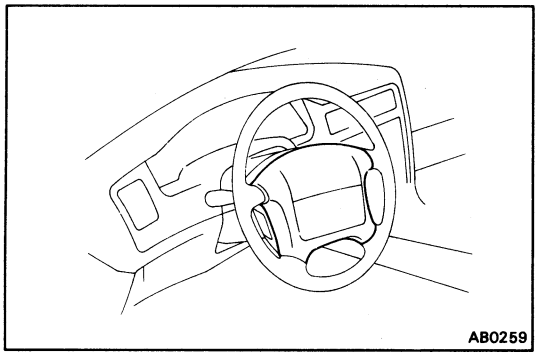
OK **Resistance:** ∞ Ω

NG

Repair or replace harness or connector.

OK

Replace center airbag sensor assembly.


AB0259

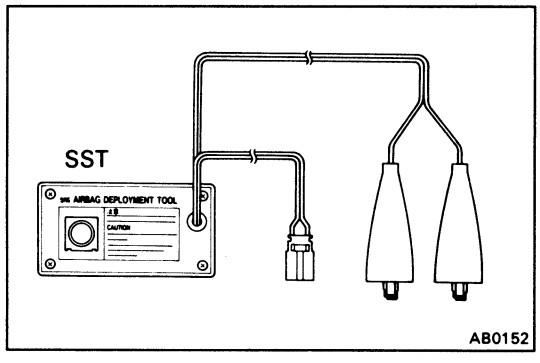
DISPOSAL OF STEERING WHEEL PAD (WITH AIRBAG)

When scrapping vehicles equipped with an airbag system or disposing of a steering wheel pad (with airbag), always first deploy the airbag in accordance with the procedure described below.

If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A., INC..

Never dispose of a steering wheel pad which has an undeployed airbag.

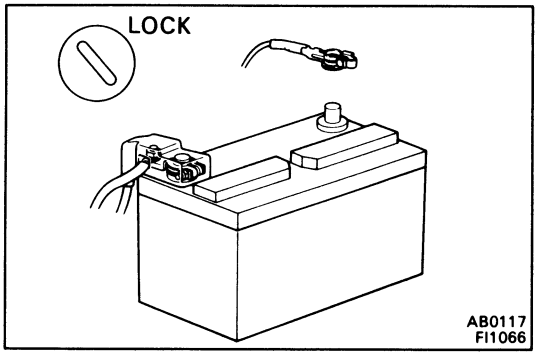
When disposing of a steering wheel pad with an airbag deployed in a collision, follow the same procedure given under "AIRBAG DEPLOYMENT PROCEDURE (WHEN SCRAPPING THE VEHICLE), part 5, DISPOSAL OF STEERING WHEEL PAD (WITH AIRBAG) "(See page AB-84).



AB0152

PRECAUTIONS FOR AIRBAG DEPLOYMENT

1. **The airbag produces a sizeable exploding sound when it deploys, so perform the operation out-of-doors and where it will not create a nuisance to nearby residents.**
2. **When deploying the airbag, always use the specified SST: SRS AIRBAG DEPLOYMENT TOOL (SST 09082-00700). Perform the operation in a place away from electrical noise.**
3. **When deploying an airbag, perform the operation from at least 10 m (33 ft) away from the steering wheel pad.**
4. **The steering wheel pad is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
5. **Use gloves and safety glasses when handling a steering wheel pad with deployed airbag.**
6. **Always wash your hands with water after completing the operation.**
7. **Do not apply water, etc. to a steering wheel pad with deployed airbag.**



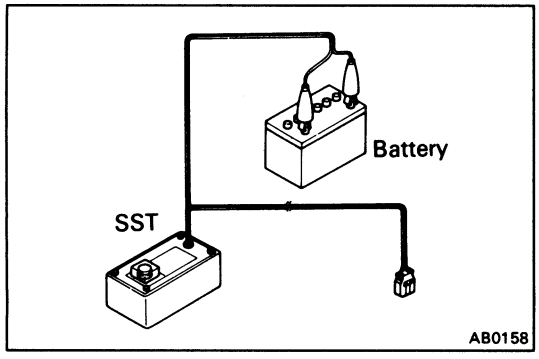
AB0117
FI1066

AIRBAG DEPLOYMENT PROCEDURE (WHEN SCRAPPING VEHICLE)

HINT: Have a battery ready as the power source to deploy the airbag.

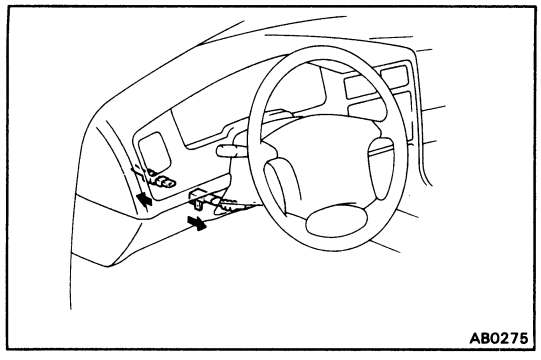
1. **DISCONNECT NEGATIVE (–) TERMINAL CABLE FROM BATTERY**

   CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the LOCK position and the negative (–) terminal cable is disconnected from the battery (See page AB-2).



2. CONFIRM FUNCTIONING OF SST (SEE PAGE AB-88)

SST 09082-00700

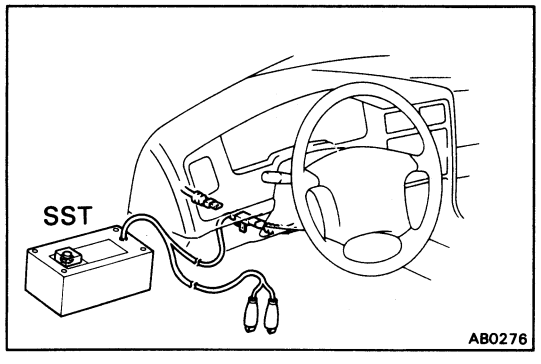


3. INSTALL SST

CAUTION: Check that there is no looseness in the steering wheel and steering wheel pad.

(a) Remove the instrument panel lower finish panel.

(b) Disconnect the airbag connector of the spiral cable.



(c) Connect the SST connector to the airbag connector of the spiral cable.

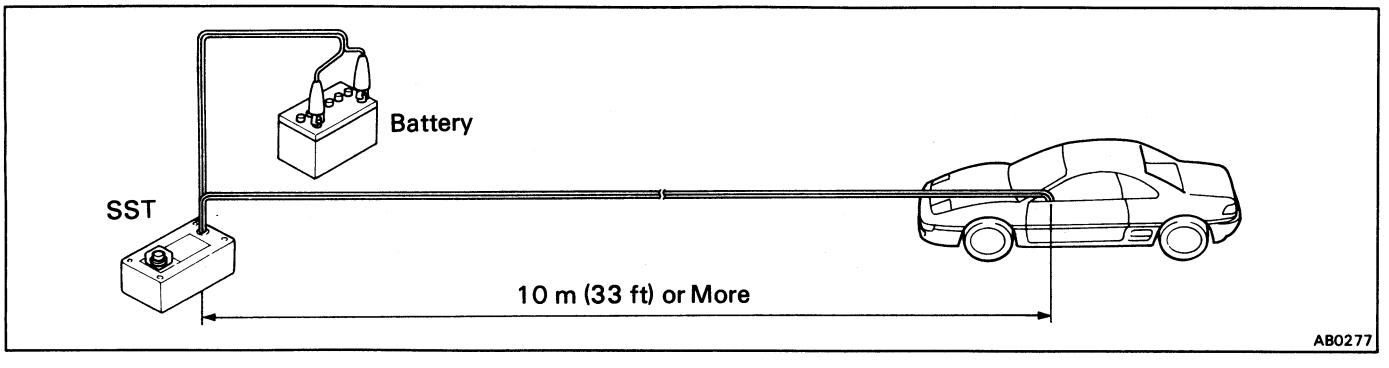
SST 09082-00700

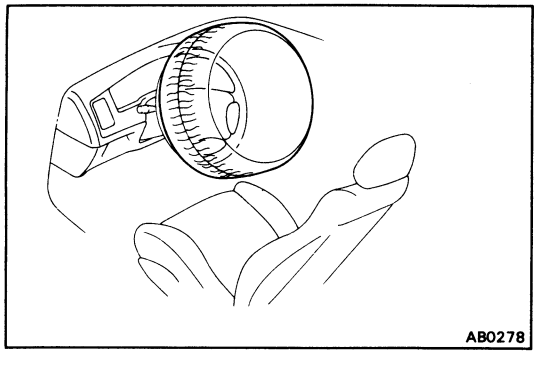
(d) Move the SST to at least 10 m (33 ft) from the front of the vehicle.

(e) Close all the doors and windows of the vehicle.

NOTICE: Take care not to damage the SST wire harness.

(f) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery nagative (–) terminal.





4. DEPLOY AIRBAG

(a) Confirm that no-one is inside the vehicle or within 10 m (33 ft) of the vehicle.

(b) Press the SST activation switch and deploy the airbag.

HINT: The airbag deploys simultaneously as the LED of the SST activation switch lights up.

5. DISPOSAL OF STEERING WHEEL PAD (WITH AIRBAG)

CAUTION:

- **The steering wheel pad is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a steering wheel pad with deployed airbag.**
- **Do not apply water, etc. to a steering wheel pad with deployed airbag.**
- **Always wash your hands with water after completing the operation.**

(a) When scrapping a vehicle, deploy the airbag and scrap the vehicle with the steering wheel pad still installed.

(b) When moving a vehicle for scrapping which has a steering wheel pad with deployed airbag, use gloves and safety glasses.

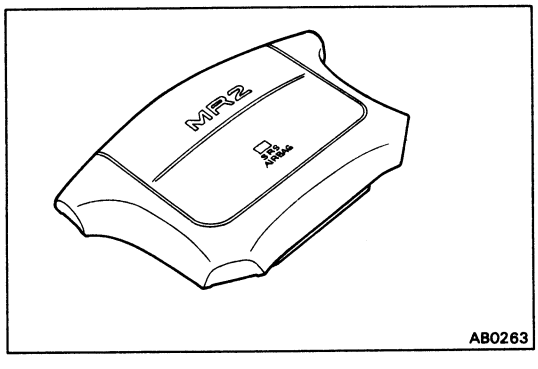
AIRBAG DEPLOYMENT PROCEDURE (PROCEDURE FOR DISPOSAL OF STEERING WHEEL PAD ONLY)

When disposing of the steering wheel pad (with airbag) only, never use the customer's vehicle to deploy the airbag.

Remove the steering wheel pad from the vehicle and be sure to follow the procedure given below when deploying the airbag.

HINT:

- Have a battery ready as the power source to deploy the airbag.

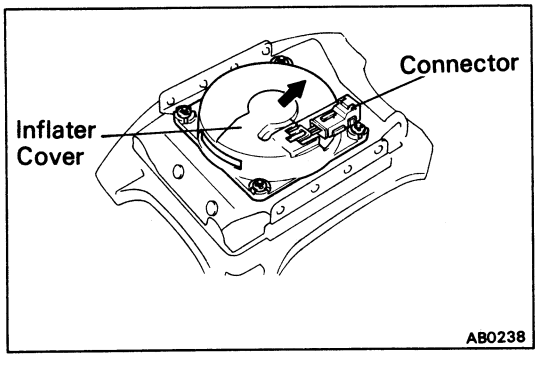


AB0263

1. REMOVE STEERING WHEEL PAD (SEE PAGE AB-15)

CAUTION:

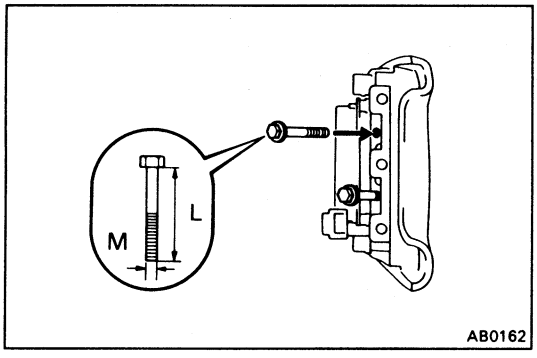
- **When removing the steering wheel pad (with airbag), work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the LOCK position and the nagative (–) terminal cable is disconnected from the battery.**
- **When storing the steering wheel pad, keep the upper surface of the pad facing upward.**



AB0238

2. REMOVE STEERING WHEEL PAD CONNECTOR

Remove the connector on the steering wheel pad rear surface from the inflater cover.

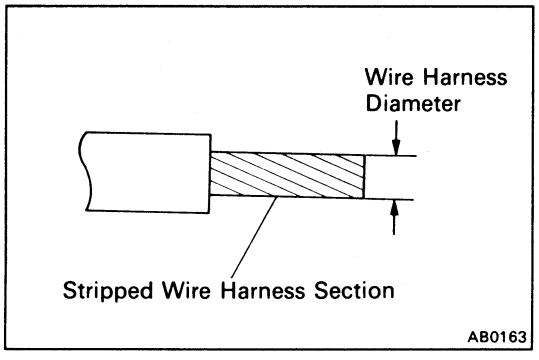


3. **FIX STEERING WHEEL PAD TO DISC WHEEL WITH TIRE**

(a) Install bolts with washers in the four bolt holes in the steering wheel pad.

Bolt: L 35.0 mm (1.378 in.)
M 6.0 mm
Pitch 1.0 mm

NOTICE: Tighten the bolts by hand until the bolts become difficult to turn.
Do not tighten the bolts too much.



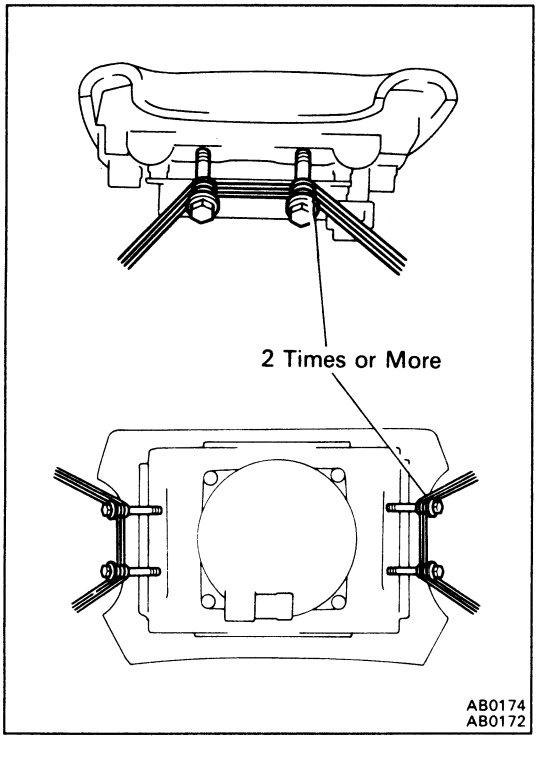
(b) Using a service-purpose wire harness for vehicle, tie down the steering wheel pad to the disc wheel.

Wire harness: Stripped wire harness section 1.25 mm^2 or more (0.002 $in.^2$ or more)

HINT: To calculate the square of the stripped wire harness section –

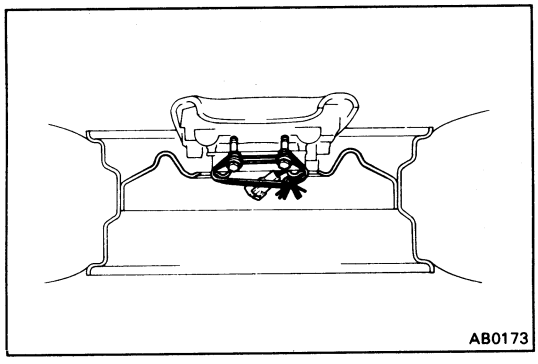
$$\text{Square} = \frac{3.14 \times (\text{Diameter})^2}{4}$$

CAUTION: If a wire harness which is too thin or some other thing is used to tie down the steering wheel pad, it may be snapped by the shock when the airbag is deployed, this is highly dangerous.
Always use a wire harness for vehicle use which is at least 1.25 mm^2 (0.002 $in.^2$).



(1) Using 3 wire harnesses, wrap the wire harnesses at least 2 times each around the bolts installed on the left and right sides of the steering wheel pad.

CAUTION: Tightly wind the wire harness around the bolts so that there is no slack.
If there is slackness in the wire harness, the steering wheel pad may come loose due to the shock when the airbag is deployed, this is highly dangerous.

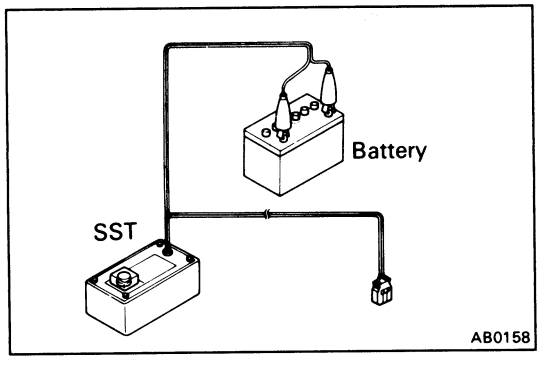

AB0173

(2) Face the upper surface of the steering wheel pad upward. Separately tie the left and right sides of the steering wheel pad to the disc wheel through the hub nut holes.
Position the steering wheel pad connector so that it hangs downward through a hub hole in the disc wheel.

CAUTION:

- **Always tie down the steering wheel pad with the pad side facing upward. It is very dangerous if the steering wheel pad is tied down with the metal surface facing upward, as the wire harness will be cut by the shock of the airbag deploying and the steering wheel pad will be thrown into the air.**
- **Make sure that the wire harness is tight.**
  It is very dangerous if looseness in the wire harness results in the steering wheel pad coming free through the shock of the airbag deploying.

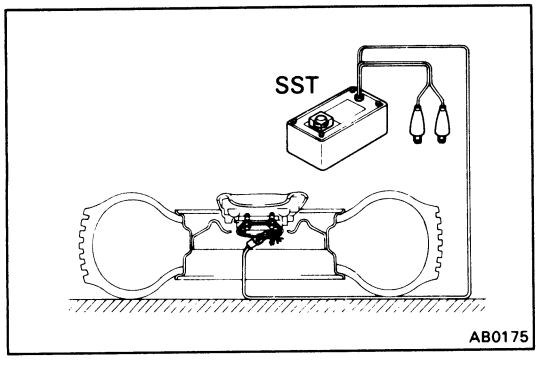
NOTICE: The disc wheel will be marked by airbag deployment, so use a redundant disc wheel.



AB0158

4. CONFIRM FUNCTIONING OF SST (SEE PAGE AB-88)

SST 09082-00700



AB0175

5. INSTALL SST

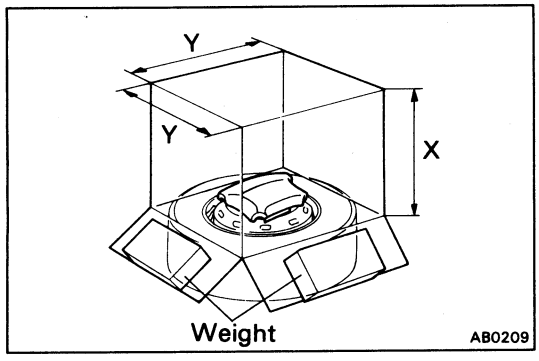
CAUTION: Place the disc wheel on level ground.

(a) Connect the SST connector to the steering wheel pad connector.

SST 09082-00700

NOTICE: To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock. Also, provide some slack for the SST wire harness inside the disc wheel.

(b) Move the SST to at least 10 m (33 ft) away from the steering wheel pad tied down on the disc wheel.



6. COVER STEERING WHEEL PAD WITH CARDBOARD BOX OR TIRES

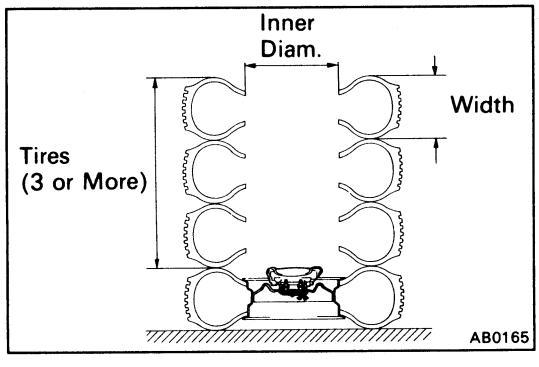
(Covering Method Using Cardboard Box)

Cover the steering wheel pad with the cardboard box and weigh the cardboard box down in four places with a at least 20 kg (44 lb, 196 N).

Size of cardboard box: Must exceed the following dimensions –

X = 460 mm (18.11 in.)
When dimension Y of the cardboard box exceeds the diameter of the disc wheel with tire the steering wheel pad is tied to –
X = 460 mm (18.11 in.) + width of tire
Y = 650 mm (25.59 in.)

NOTICE: If a cardboard box smaller than the size specified is used, the cardboard box will be broken by the shock of the airbag deployment.



(Covering Method Using Tires)

Place at least three tires without disc wheel on top of the disc wheel with tire to which the steering wheel pad is tied.

Tire size: Must exceed the following dimensions –
Width 185 mm (7.28 in.)
Inner diam. 360 mm (14.17 in.)

CAUTION: Do not use tires with disc wheels.

NOTICE: The tires may be marked by the airbag deployment, so use redundent tires.

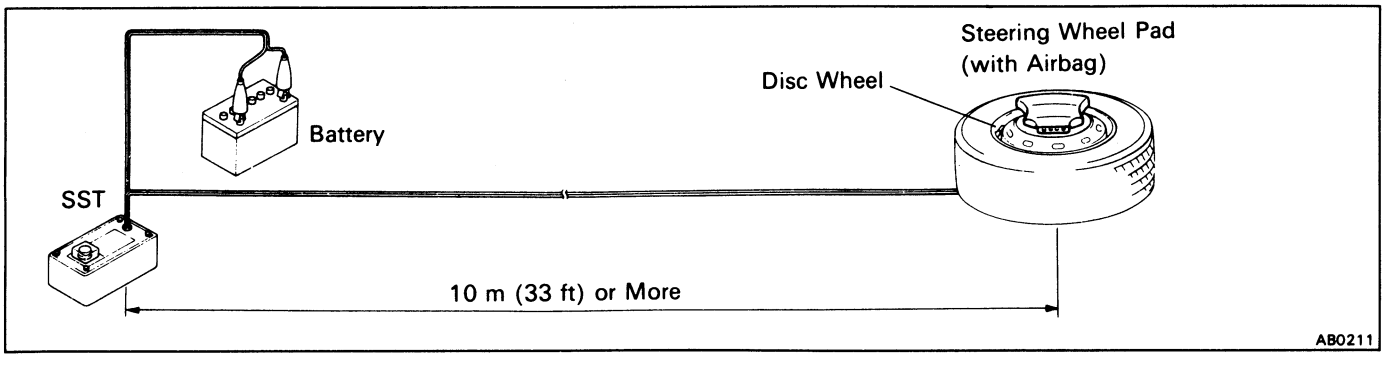
7. AIRBAG DEPLOYMENT

(a) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.

(b) Confirm that no-one is within 10 m (33 ft) of the disc wheel the steering wheel pad is tied to.

(c) Press the SST activation switch and deploy the airbag.

HINT: The airbag deploys simultaneously as the LED of the SST activation switch lights up.



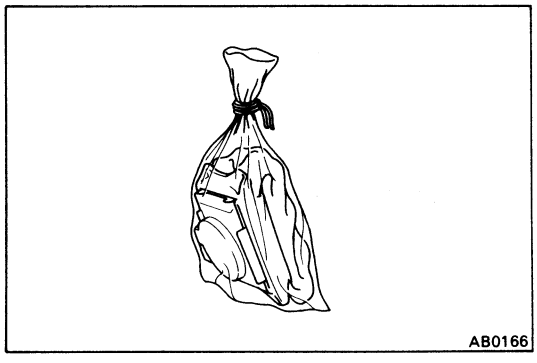
8. DISPOSAL OF STEERING WHEEL PAD (WITH AIRBAG)

CAUTION:

- **The steering wheel pad is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a steering wheel pad with deployed airbag.**
- **Do not apply water, etc. to a steering wheel pad with deployed airbag.**
- **Always wash your hands with water after completing the operation.**

(a) Remove the steering wheel pad from the disc wheel.

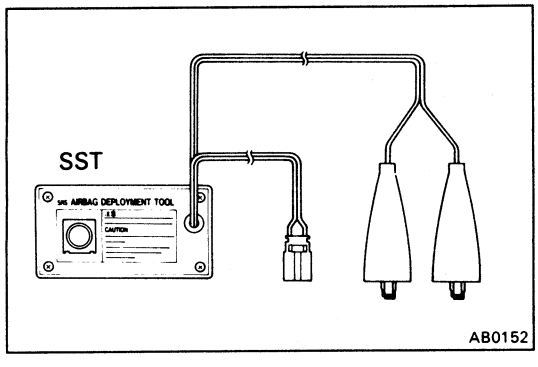
(b) Place the steering wheel pad in a vinyl bag, tie the end tightly and dispose of it the same way as other general parts.


AB0166

CONFIRM FUNCTIONING OF SST

When deploying the airbag, always use the specified SST: SRS AIRBAG DEPLOYMENT TOOL.

SST 09082-00700

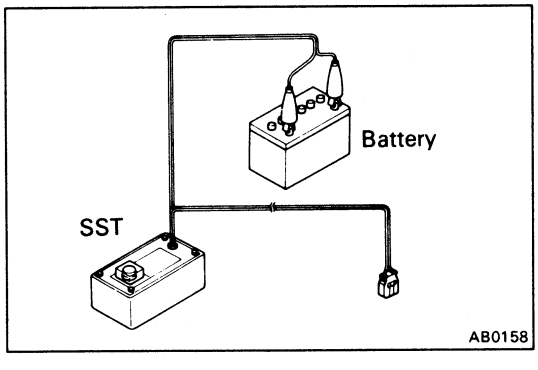


AB0152

1. CONNECT SST TO BATTERY

Connect the red clip of the SST to the battery positive (+) terminal and the black clip to the battery negative (−) terminal.

HINT: Do not connect the yellow connector which connects with the airbag system.

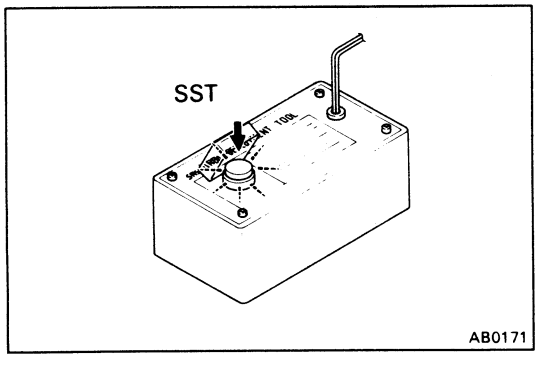


AB0158

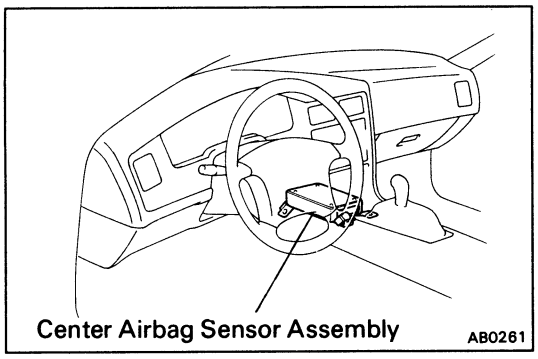
2. CONFIRM FUNCTIONING OF SST

Press the SST activation switch, and confirm the LED of the SST activation switch lights up.

CAUTION: If the LED lights up when the activation switch is not being pressed, SST malfunction is probable, so definitely do not use the SST.



AB0171

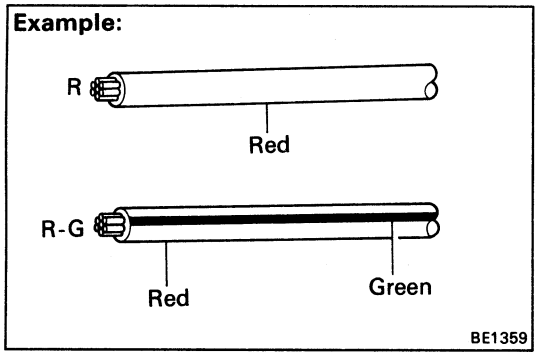


DISPOSAL OF CENTER AIRBAG SENSOR ASSEMBLY

The center airbag sensor assembly contains mercury.
After performing replacement, do not destroy the old part. When scrapping the vehicle or replacing the center airbag sensor assembly itself, remove the center airbag sensor assembly and dispose of it as toxic waste.

BODY ELECTRICAL SYSTEM

	Page
GENERAL INFORMATION	BE-2
POWER SOURCE	BE-6
IGNITION SWITCH	BE-10
LIGHTING SYSTEM	BE-13
WIPER AND WASHER SYSTEM	BE-43
COMBINATION METER	BE-48
DEFOGGER SYSTEM	BE-63
POWER WINDOW CONTROL SYSTEM	BE-67
POWER DOOR LOCK CONTROL SYSTEM	BE-73
POWER MIRROR CONTROL SYSTEM	BE-80
CRUISE CONTROL SYSTEM	BE-82
THEFT DETERRENT SYSTEM	BE-115
AUDIO	BE-132
CLOCK	BE-160



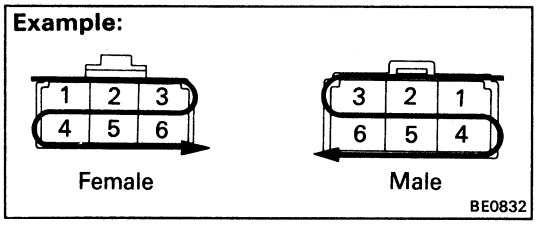
GENERAL INFORMATION

Wiring color code

Wire colors are indicated by an alphabetical code.

B	= Black	L	= Blue	R	= Red
BR	= Brown	LG	= Light Green	V	= Violet
G	= Green	O	= Orange	W	= White
GR	= Gray	P	= Pink	Y	= Yellow

The first letter indicates the basic wire color and the second letter indicates the color of the stripe.



Connector

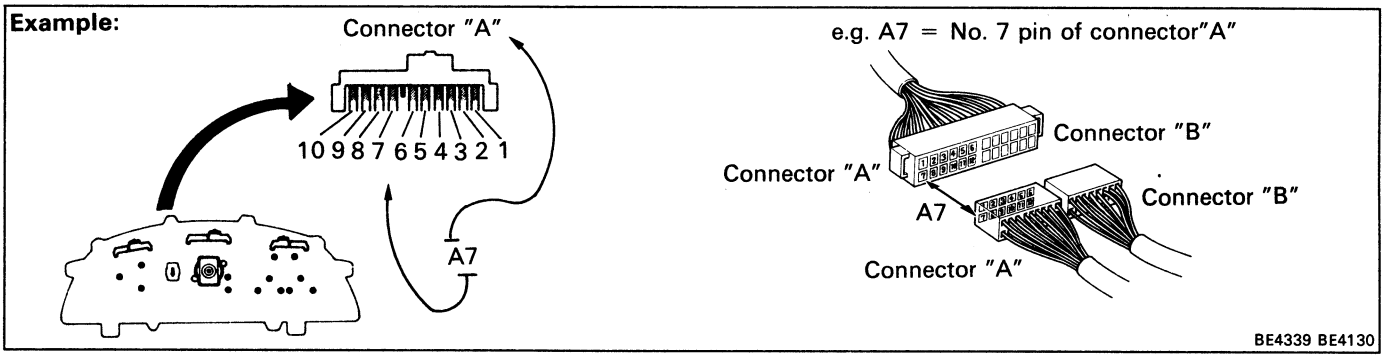
1. PIN NUMBER OF FEMALE CONNECTOR

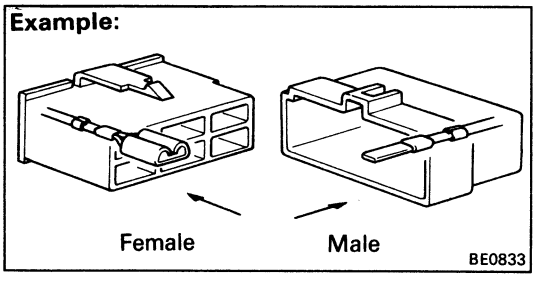
Numbered in order from upper left to lower right.

2. PIN NUMBER OF MALE CONNECTOR

Numbered in order from upper right to lower left.

HINT: When connectors with different or the same number of terminals are used with the same parts, each connector name (letter of the alphabet) and pin number is specified.





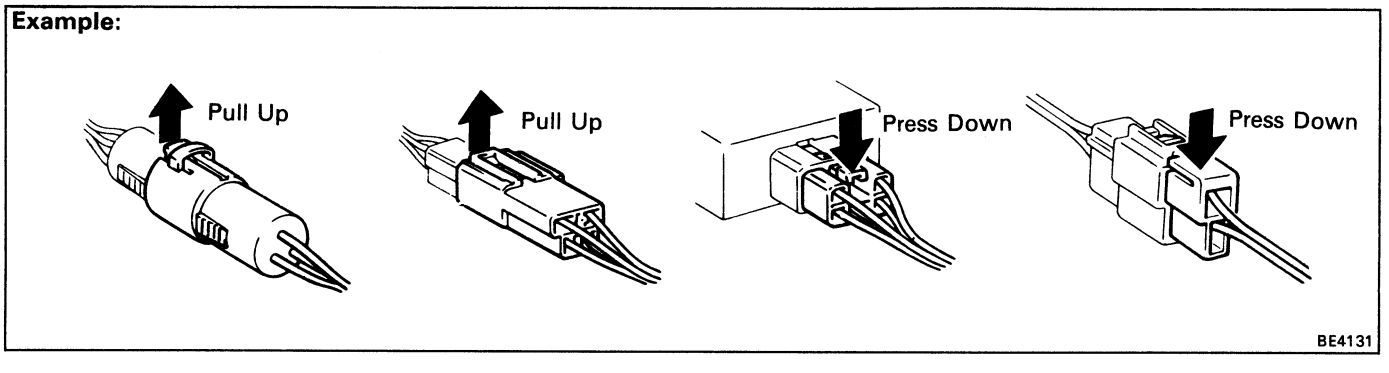
3. DISTINCTION OF MALE AND FEMALE CONNECTORS

Male and female connectors are distinguished by shape of their internal pins.

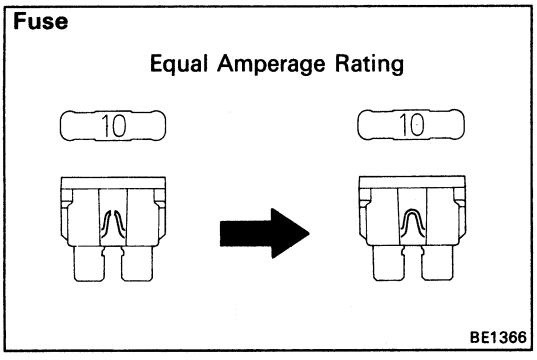
(a) All connectors are shown from the open end, and the lock is on top.

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

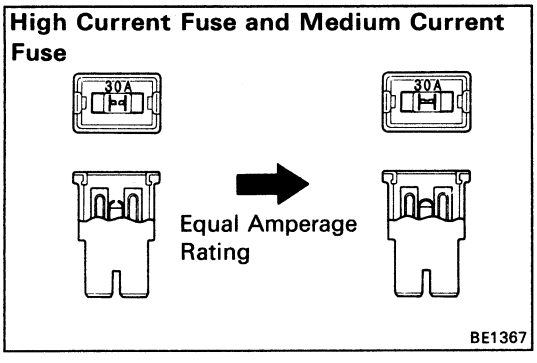
HINT: Check to see what kind of connector you are disconnecting before pulling apart.

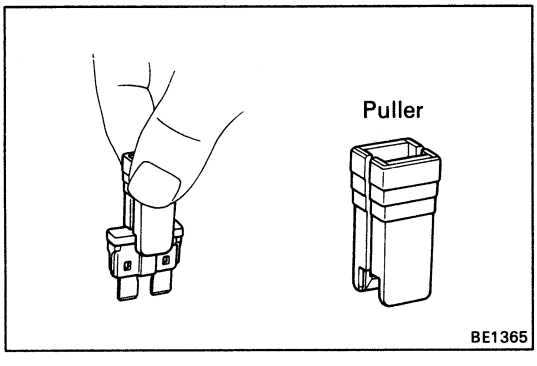


Fuse



High Current Fuse and Medium Current Fuse





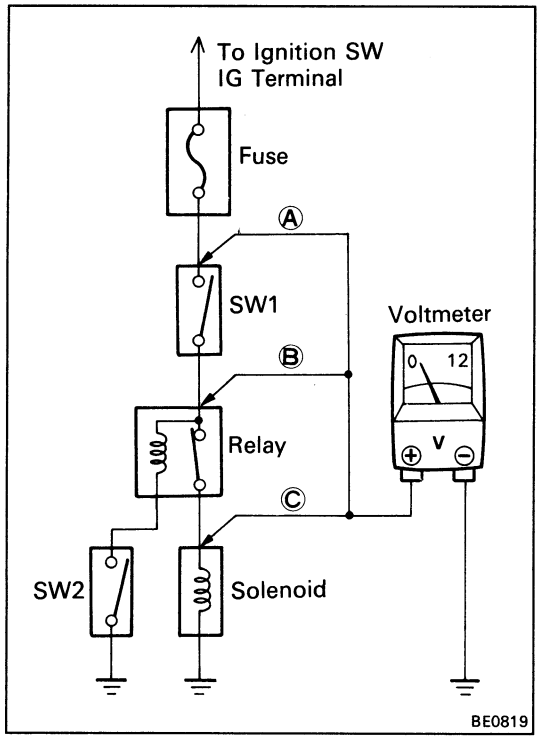
Replacement of Fuse

HINT: If replacing the fuse be sure to replace it with a fuse with and equal amperage rating.

NOTICE:

1. **Turn off all electrical components and the ignition switch before replacing a fuse. Do not exceed the fuse amperage 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 bed connection.**

If a fuse continues to blow, a short circuit is indicated. The system must be checked by a qualified technician.

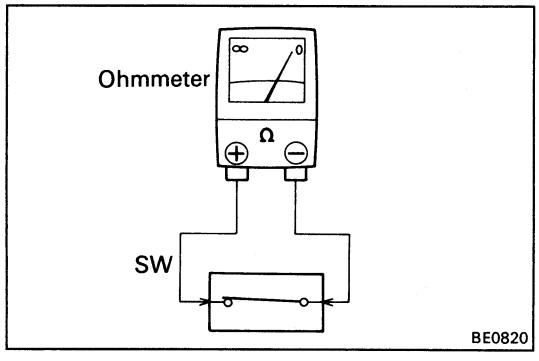


Check for Voltage

(a) Establish conditions in which voltage is present at the check point.

Example:
Ⓐ – Ignition switch on.
Ⓑ – Ignition switch and switch 1 (SW1) on.
Ⓒ – Ignition switch, switch 1 (SW1) and relay on (switch 2 (SW2) off).

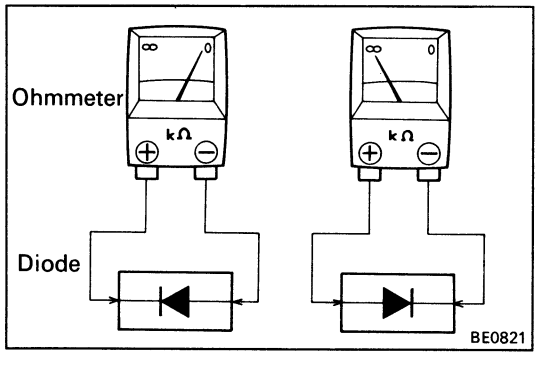
(b) Using a voltmeter, connect the negative (–) lead to a good ground point or negative (–) battery terminal and the positive (+) lead to the connector or component terminal. This check can be done with a test bulb instead of a voltmeter.



Check for Continuity and Resistance

(a) Disconnect the battery terminal or wire so there is no voltage between the check points.

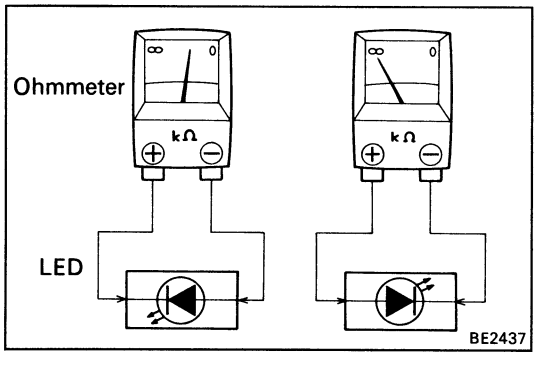
(b) Contact the two leads of an ohmmeter to each of the check points.



If the circuit has diodes, reverse the two leads and check again.

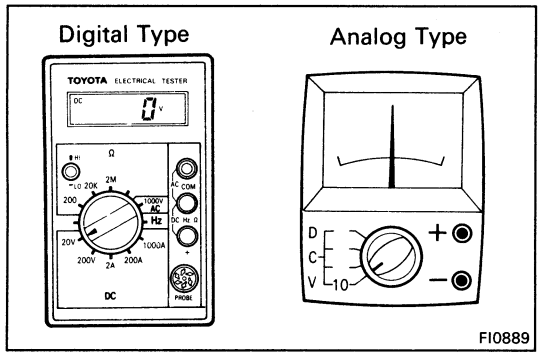
When contacting the negative (–) lead to the diode positive (+) side and the positive (+) lead to the negative (–) side, there should be continuity. When contacting the two leads in reverse, there should be no continuity.

HINT: Specifications may vary depending on the type of tester, so refer to the tester's instruction manual before performing the inspection.

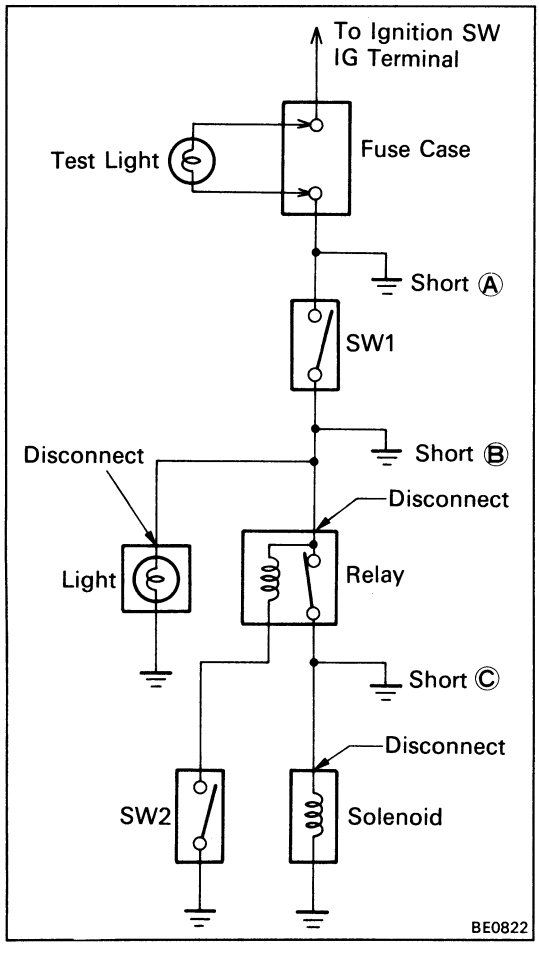


Check LED (Light Emitting Diode) in the same manner as that for diodes.

- Use a tester with a power source of 3V or greater to overcome the circuit resistance.
- If a suitable tester is not available, apply battery voltage and check that the LED that the LED lights up.



(c) Use a volt/ohmmeter with high impedance (10 k/V minimum) for troubleshooting of the electrical circuit.



Check for Short Circuit

(a) Remove the blown fuse and eliminate all loads from the fuse.

(b) Connect a test bulb in place of the fuse.

(c) Establish conditions in which the test bulb comes on.

Example:
Ⓐ – Ignition switch on.
Ⓑ – Ignition switch and switch 1 (SW1) on.
Ⓒ – Ignition switch, switch 1 (SW1) and relay on (connect the relay) and switch 2 (SW2) off (or disconnect switch 2 (SW2)).

(d) Disconnect and reconnect the connectors while watching the test bulb.

The short lies between the connector where the test bulb stays lit and the connector where the bulb goes out.

(e) Find the exact location of the short by lightly shaking the problem wire along the body.

Electrical Parts

Before removing and inspecting the electrical parts, set the ignition switch to the LOCK position and disconnect the negative (–) terminal cable from the battery.

CAUTION: Work must not be started until after at least 20 seconds or longer from the time the negative (–) terminal cable is disconnected.

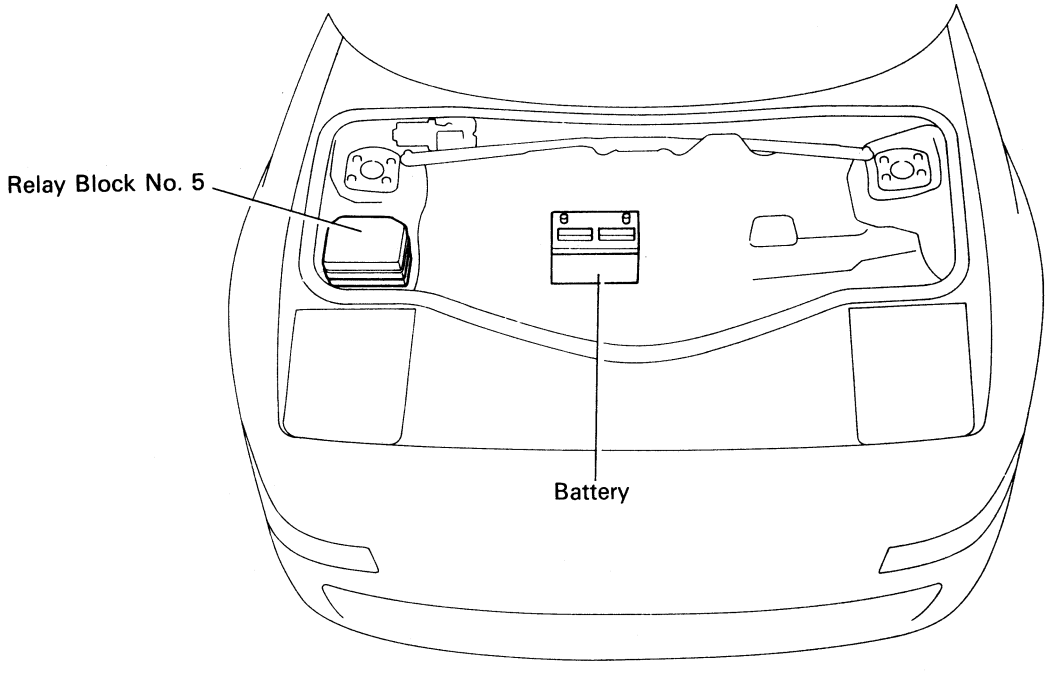
SRS Airbag System

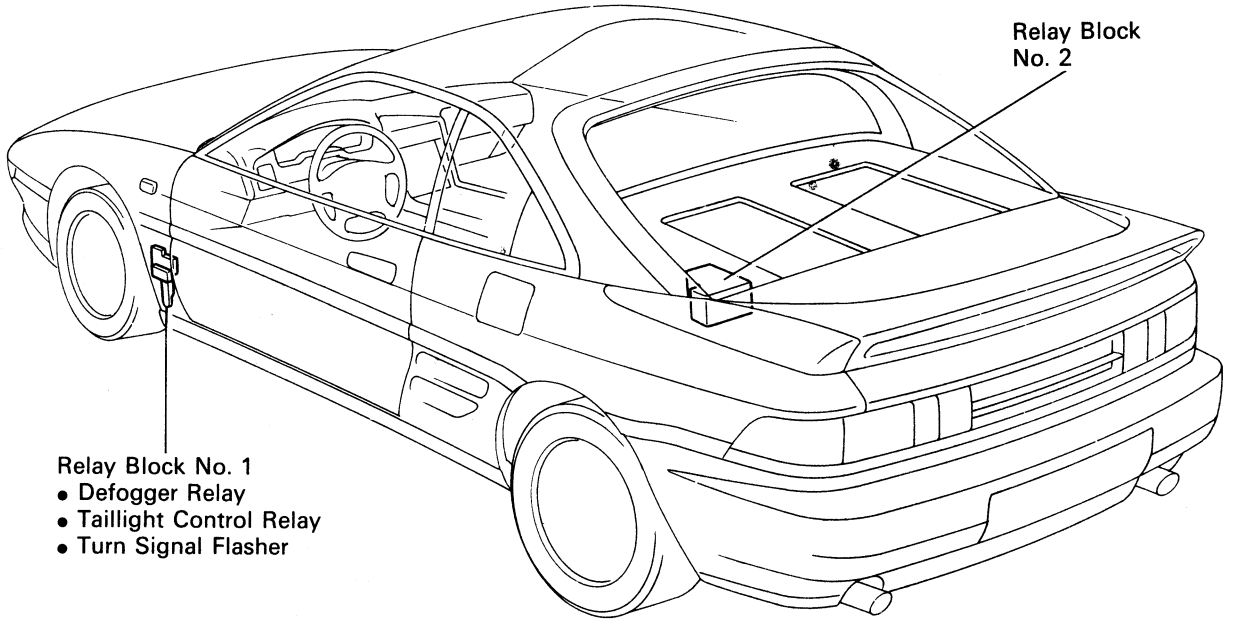
Failure to carry out service operations in the correct sequence could cause the airbag system to deploy, possibly leading to a serious accident.

When removal or installation of the parts and the yellow wire harness and connector for the airbag is necessary, refer to the precautionary notices in the AB section before performing the operation.

POWER SOURCE

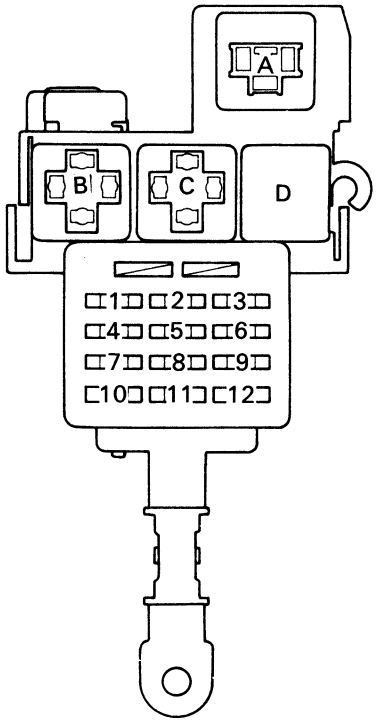
Parts Location





BE4932
BE4933

RELAY BLOCK NO. 1

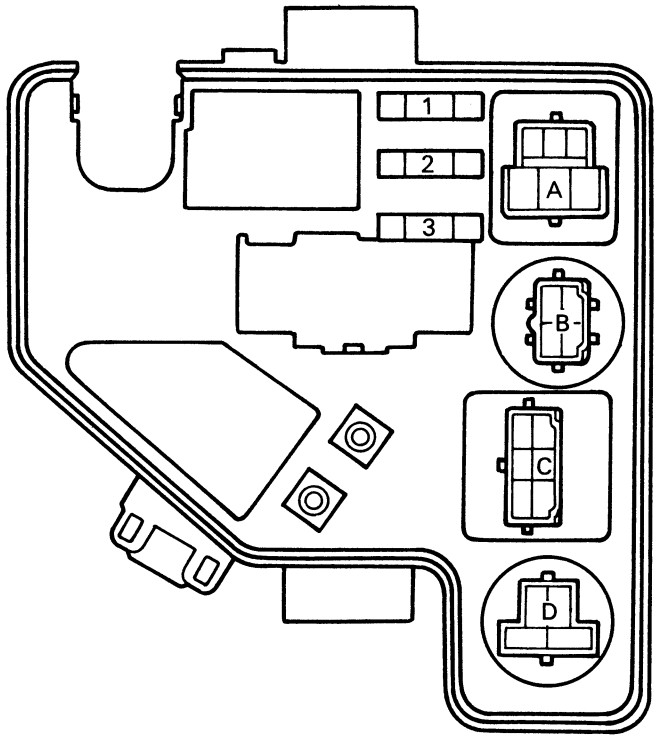


	Fuse	
1.	TAIL	15 A
2.	GAUGE	7.5 A
3.	STOP	15 A
4.	–	
5.	TURN	7.5 A
6.	DOOR	20 A
7.	–	
8.	WIPER	20 A
9.	PWR	30 A
10.	RAD CIG	15 A
11.	DEFOG	20 A
12.	–	

Relays

A. TURN SIGNAL FLASHER
B. DEFOGGER
C. TAIL (Taillight Control)
D. –

RELAY BLOCK NO. 2



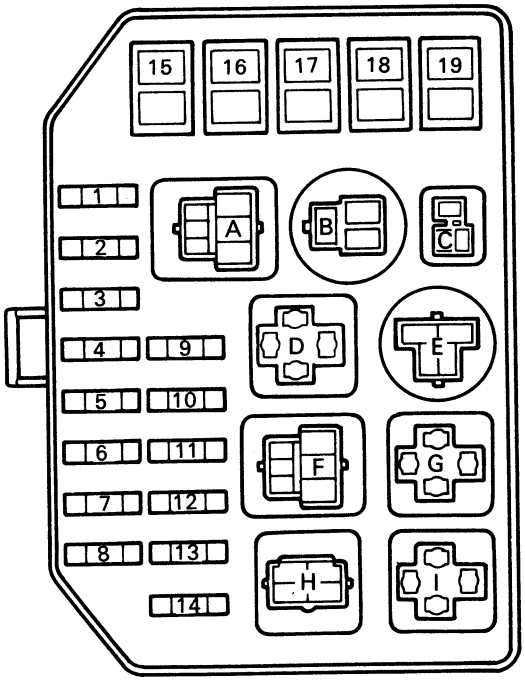
	Fuses	
1.	EFI	15 A
2.	VENT	20 A
3.	ECU-IG	7.5 A

Relays

A. IGN
B. EFI
C. C/OPN
D. VENT

BE5066
BE4934

RELAY BLOCK NO. 5



Fuses and High Current Fuses

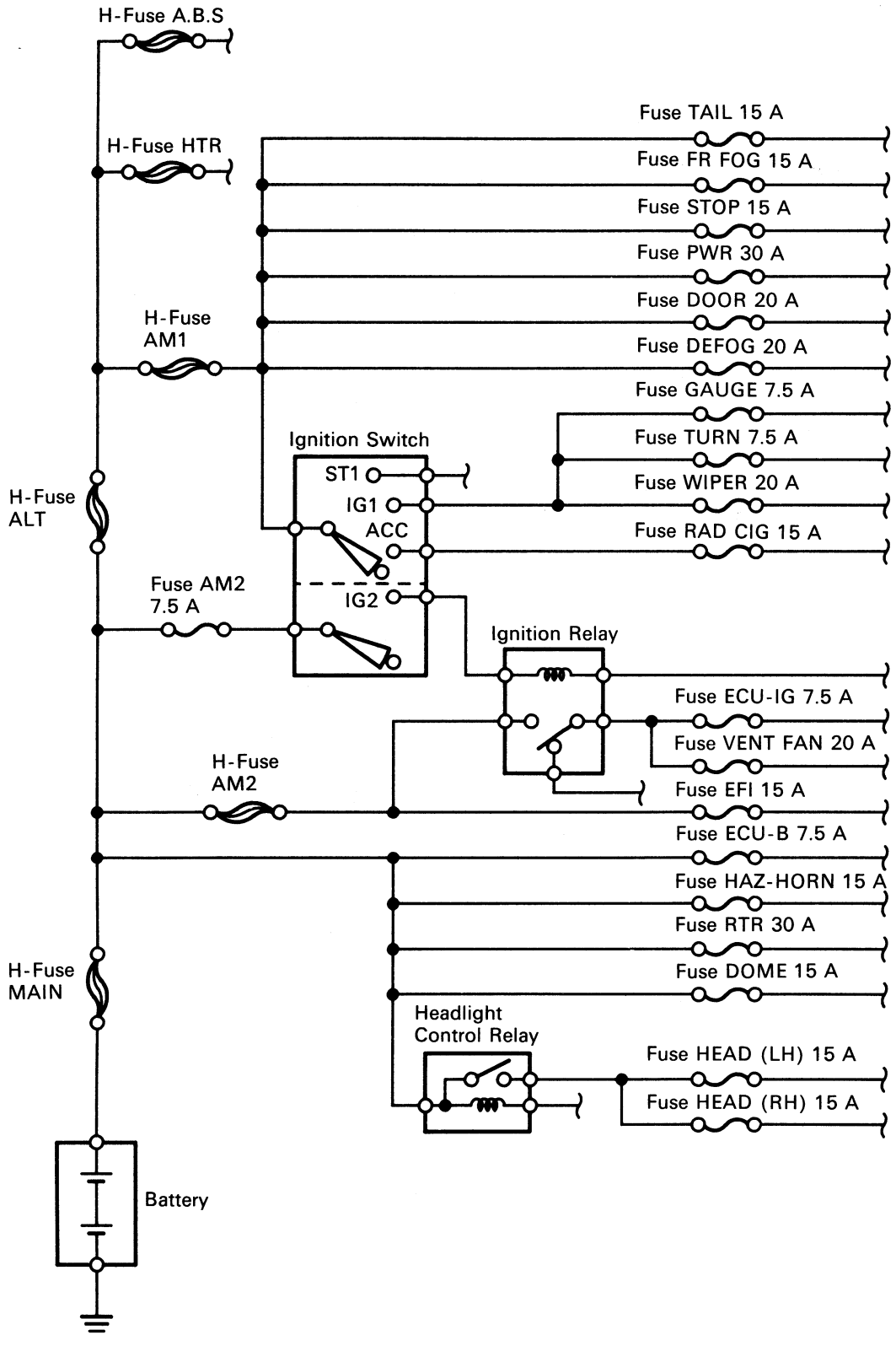
1.	ALT SENCING	7.5 A	
2.	CDS FAN	30 A	
3.	RAD FAN	30 A	
4.	FR FOG	15 A	
5.	–		
6.	–		
7.	HEAD (LH)	15 A	
8.	HEAD (RH)	15 A	
9.	A.C	10 A	
10.	ECU-B	7.5 A	
11.	AM2	7.5 A	
12.	HAZ-HORN	15 A	
13.	RTR	30 A	
14.	DOME	15 A	
15.	AMI	50 A	H-Fuse
16.	HTR	40 A	H-Fuse
17.	A.B.S.	80 A	H-Fuse
18.	ALT	120A	H-Fuse
19.	AM2	40A	H-Fuse

Relays

A. HTR
B. H-LP
C. HORN
D. FAN NO. 2
E. FAN NO. 1
F. FAN MAIN
G. FAN NO. 3
H. –
I. FR FOG

BE4937

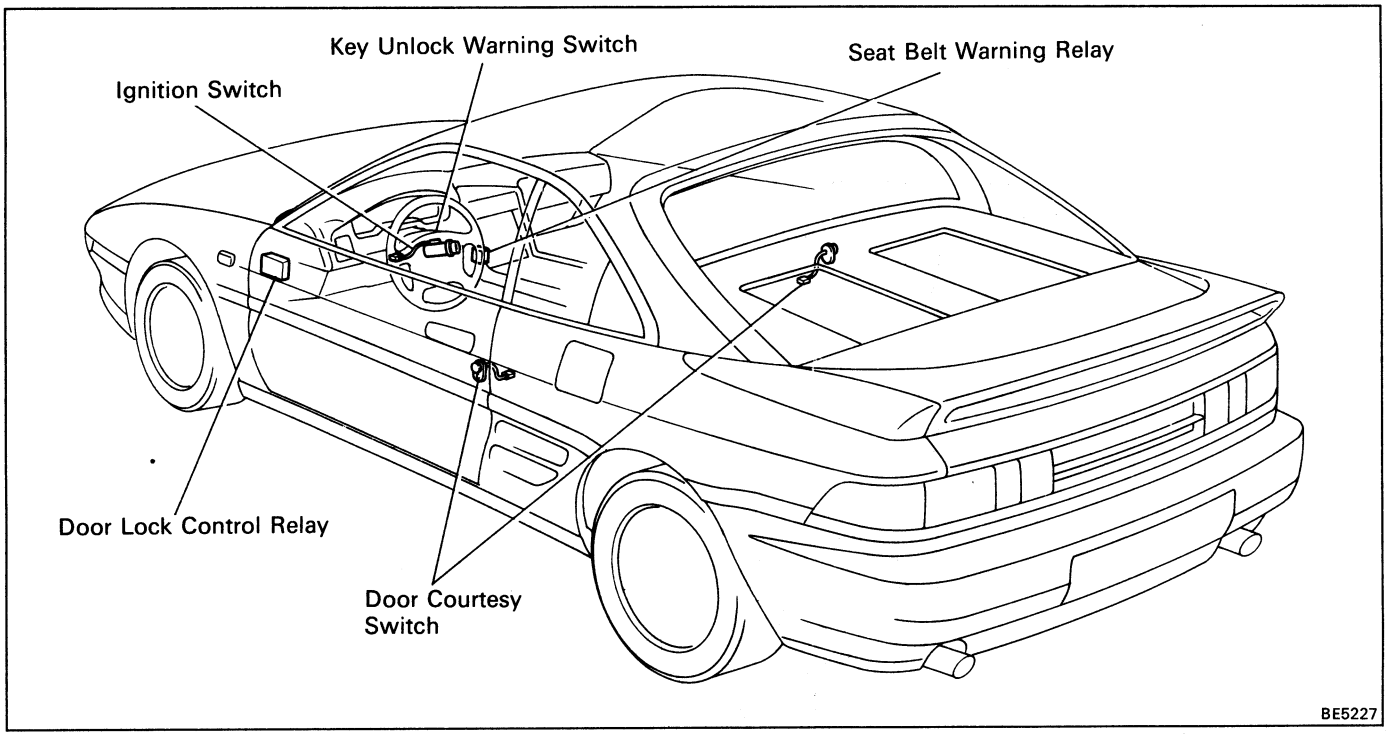
Wiring Diagram



BE5226

IGNITION SWITCH

Parts Location



Wiring Diagram

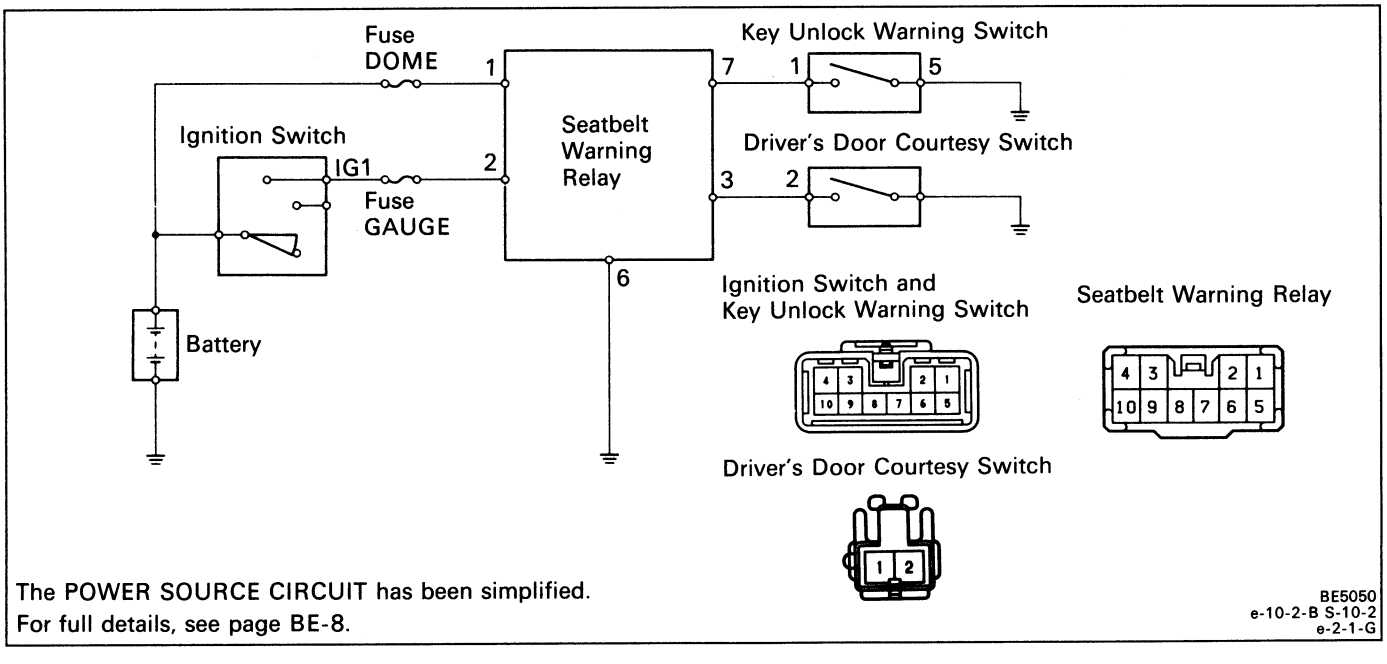
IGNITION SWITCH

See Power Source Section on page BE-9.

KEY CONFINE PREVENTION SYSTEM

See Power Door Lock Control System on page BE-74.

KEY UNLOCK WARNING SYSTEM



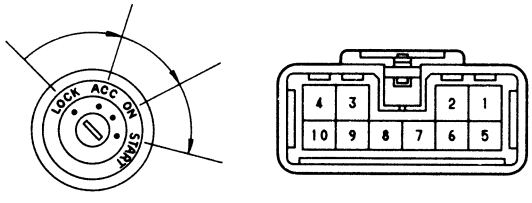
Troubleshooting

Problem	Possible cause	Remedy	Page
Ignition switch is not seat to each position	Ignition switch faulty Power source circuit faulty	Check switch Repair as necessary	BE-11 BE-9
Key confine prevention system does not operate	Key unlock warning switch faulty Door courtesy switch faulty Door lock control relay faulty Wiring faulty	Check switch Check switch Check relay Repair as necessary	BE-11 BE-11 BE-11
Key unlock warning system does not operate	Key unlock warning switch faulty Door courtesy switch faulty Seatbelt Warning Relay faulty Wiring faulty	Check switch Check switch Check relay Repair as necessary	BE-11 BE-11 BE-12

Parts Inspection

Ignition System

INSPECT SWITCH (Ignition Switch /Continuity)



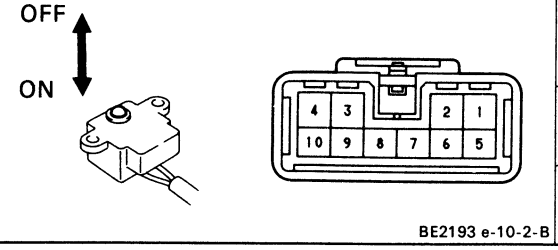
BE0900 e-10-2-B

Terminal / Switch position	2 IG1	3 ACC	4 AM1	6 ST2	7 ST1	9 IG2	10 AM2
LOCK							
ACC		○—○					
ON	○	○—○	○			○—○	
START	○		○	○	○	○—○	

If continuity is not as specified, replace the switch.

Key Confine Prevention System

1. **INSPECT SWITCHES (Key Unlock Warning Switch/Continuity)**



BE2193 e-10-2-B

Terminal / Switch position	1	5
OFF (Ignition Key removed)		
ON (Ignition Key set)	○—○	

If continuity is not as specified, replace the switch.

(Door Courtesy Switch)

See Step 1 on page BE-41.

2. **INSPECT DOOR LOCK CONTROL RELAY**

See Step 3 on page BE-78.

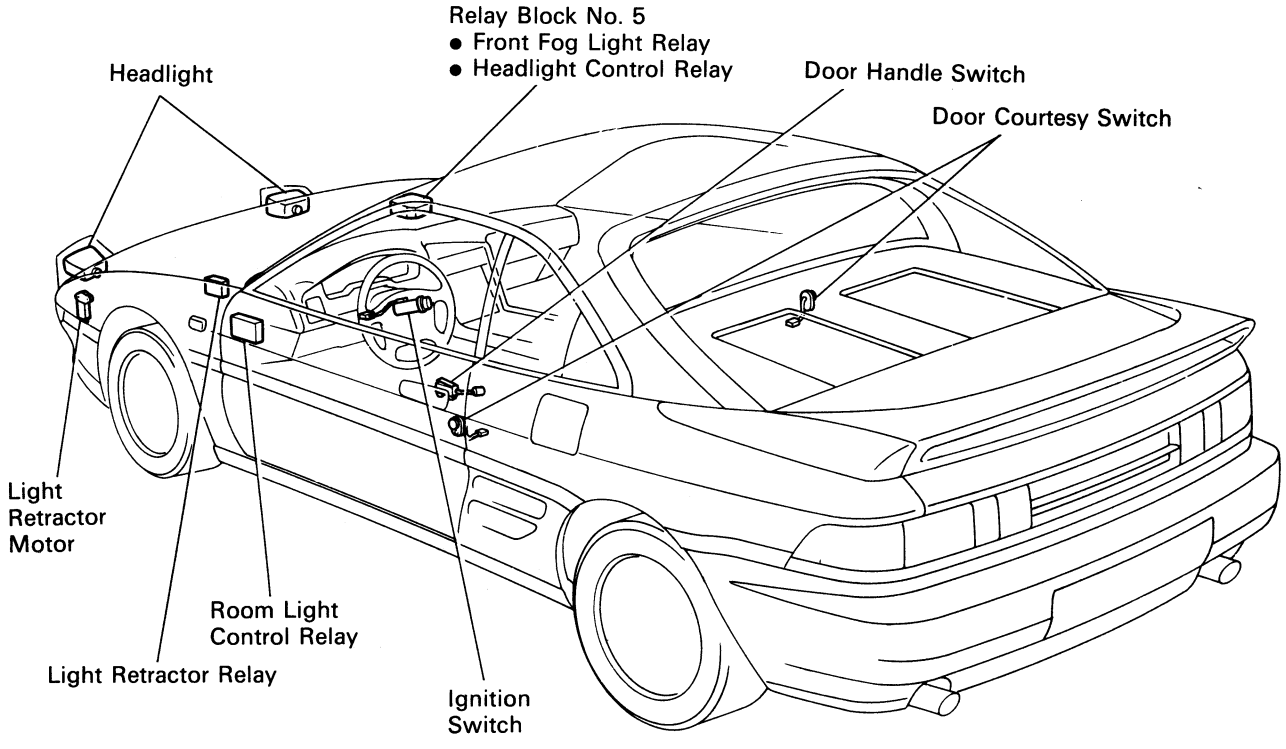
Key Unlock Warning System

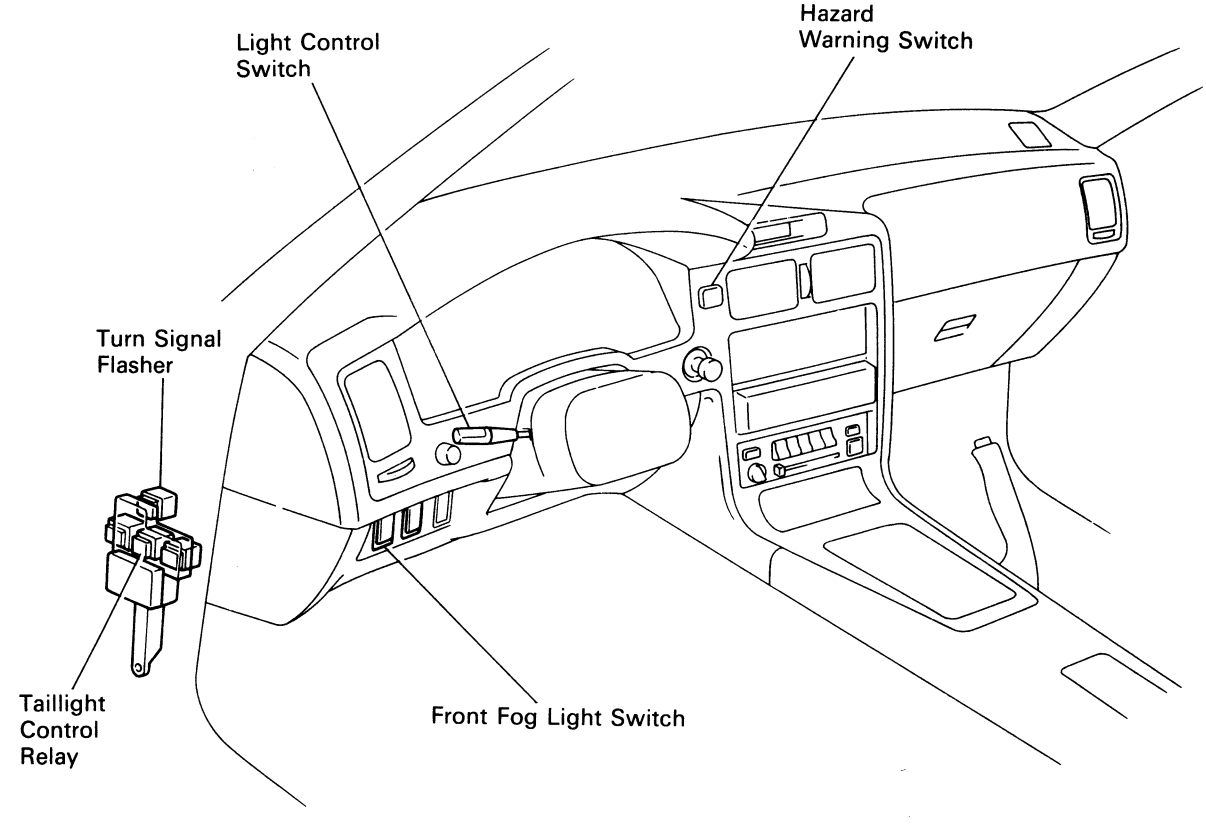
1. **INSPECT SWITCHES**
   (Key Unlock Warning Switch)
   See Step 1 on page BE-11.
   (Door Courtesy Switch)
   See Step 1 on page BE-41.

2. **INSPECT RELAY**
   (Seatbelt Warning Relay 1 Relay Circuit)
   See step 3 on page BE-59.

LIGHTING SYSTEM

Parts Location





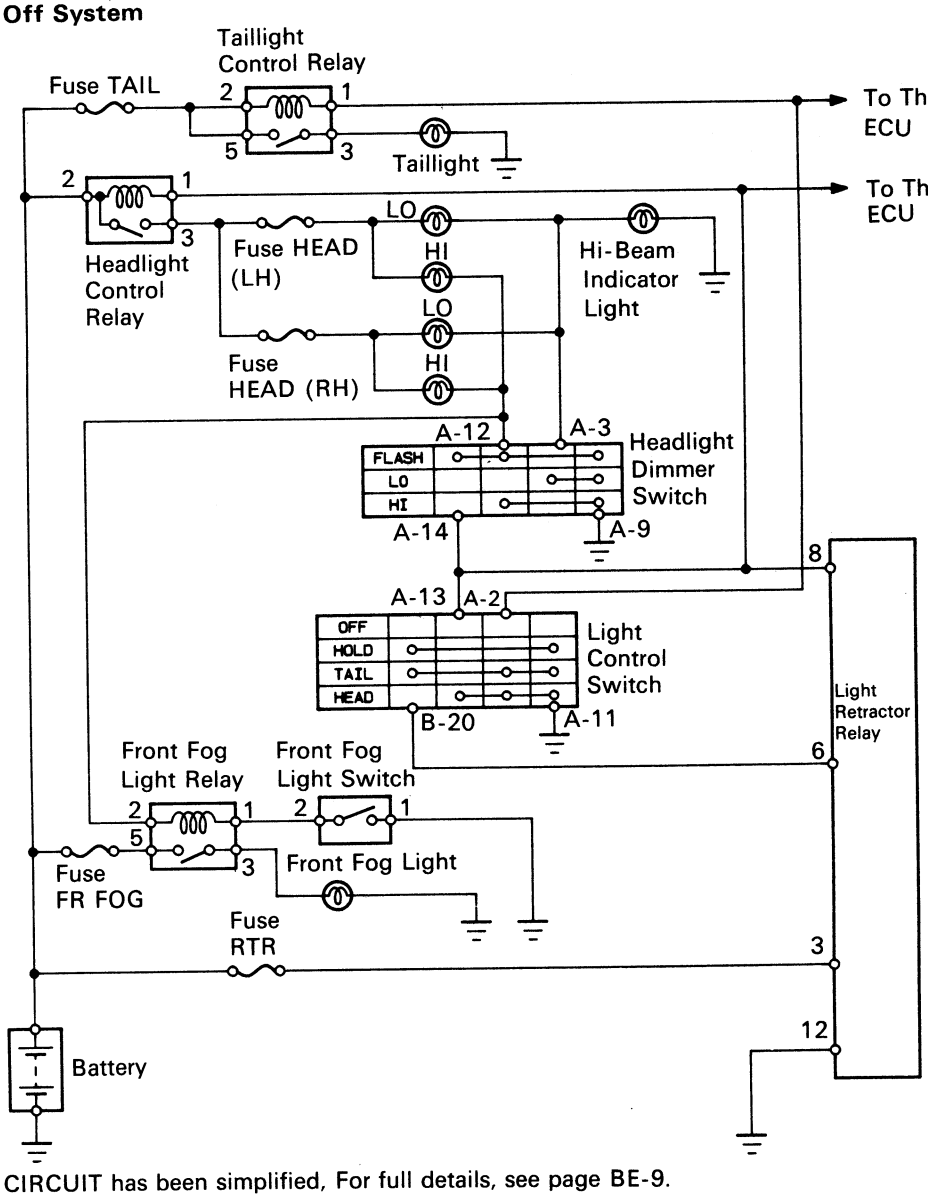
BE5228
BE5229

Wiring and Connector Diagrams

Lighting System (Headlight, Taillight and Front Fog Light System)

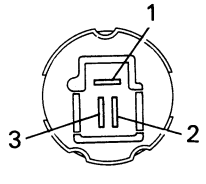
(USA)

w/o Light Auto Turn Off System

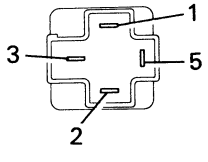


The POWER SOURCE CIRCUIT has been simplified, For full details, see page BE-9.

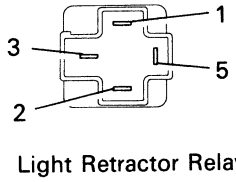
Headlight Control Relay



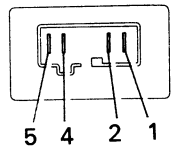
Taillight Control Relay



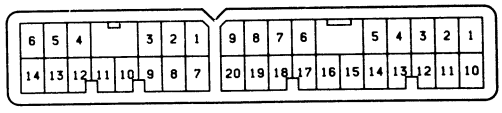
Front Fog Light Relay



Front Fog Light Switch

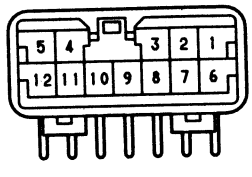


Light Control Switch Headlight Dimmer Switch



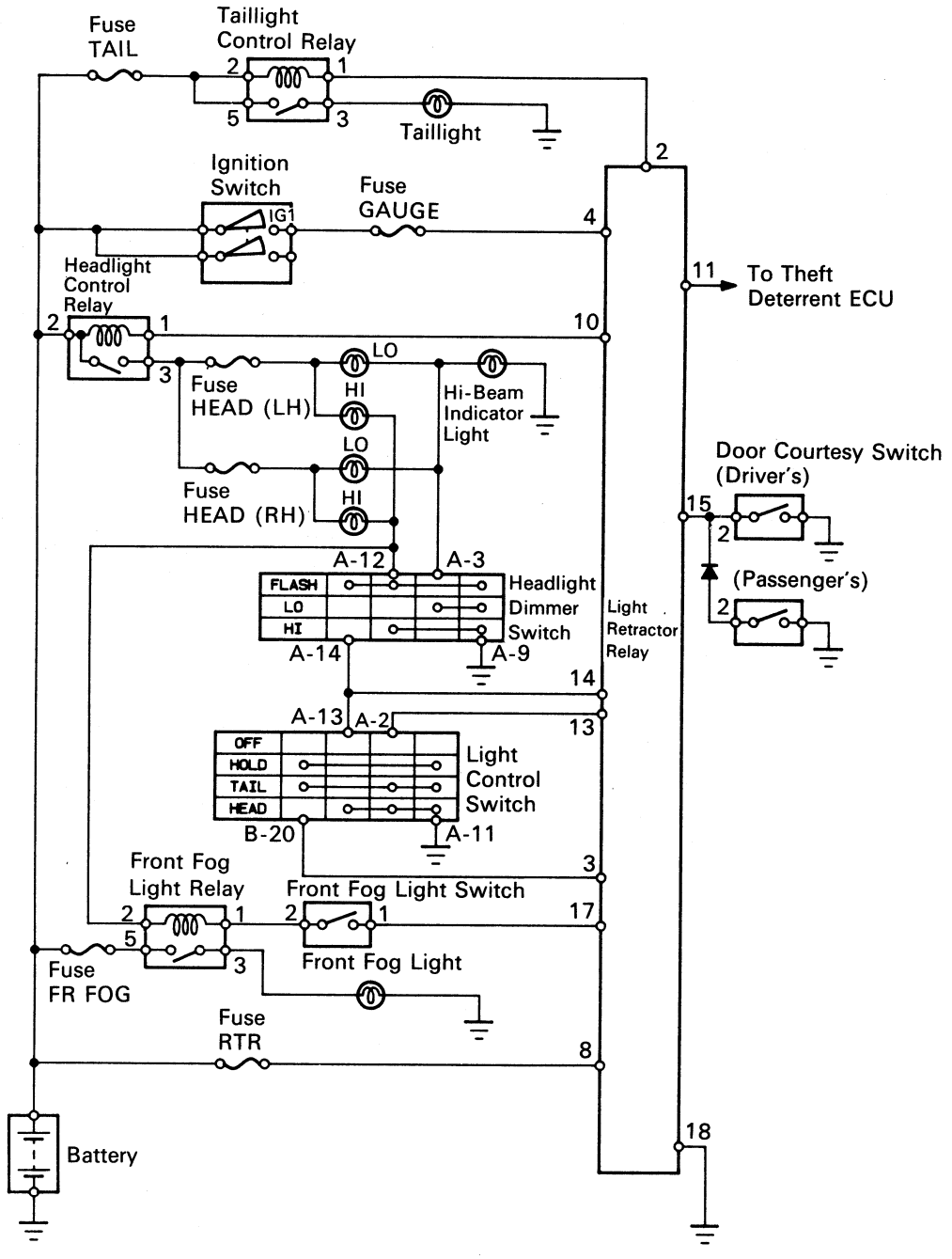
Connector "A" Connector "B"

Light Retractor Relay



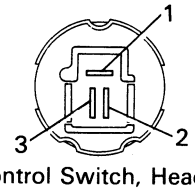
BE5230
BE2763 BE4049 BE4049 BE4707
V-34-2 e-12-2-A

w/ Light Auto Turn Off System

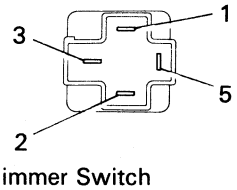


The POWER SOURCE CIRCUIT has been simplified, For full details, see page BE-9.

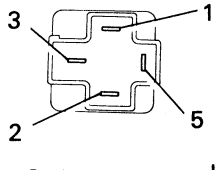
Headlight Control Relay



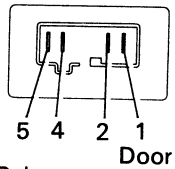
Taillight Control Relay



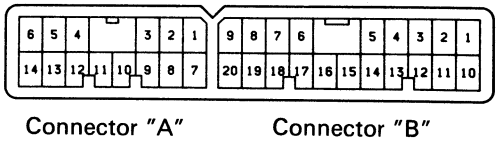
Front Fog Light Relay



Front Fog Light Switch

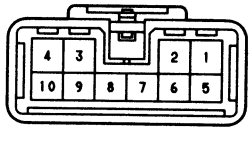


Light Control Switch, Headlight Dimmer Switch

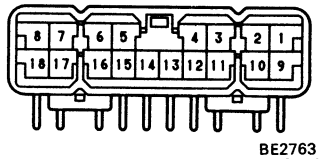


Connector "A" Connector "B"

Ignition Switch



Light Retractor Relay



Door Courtesy Switch

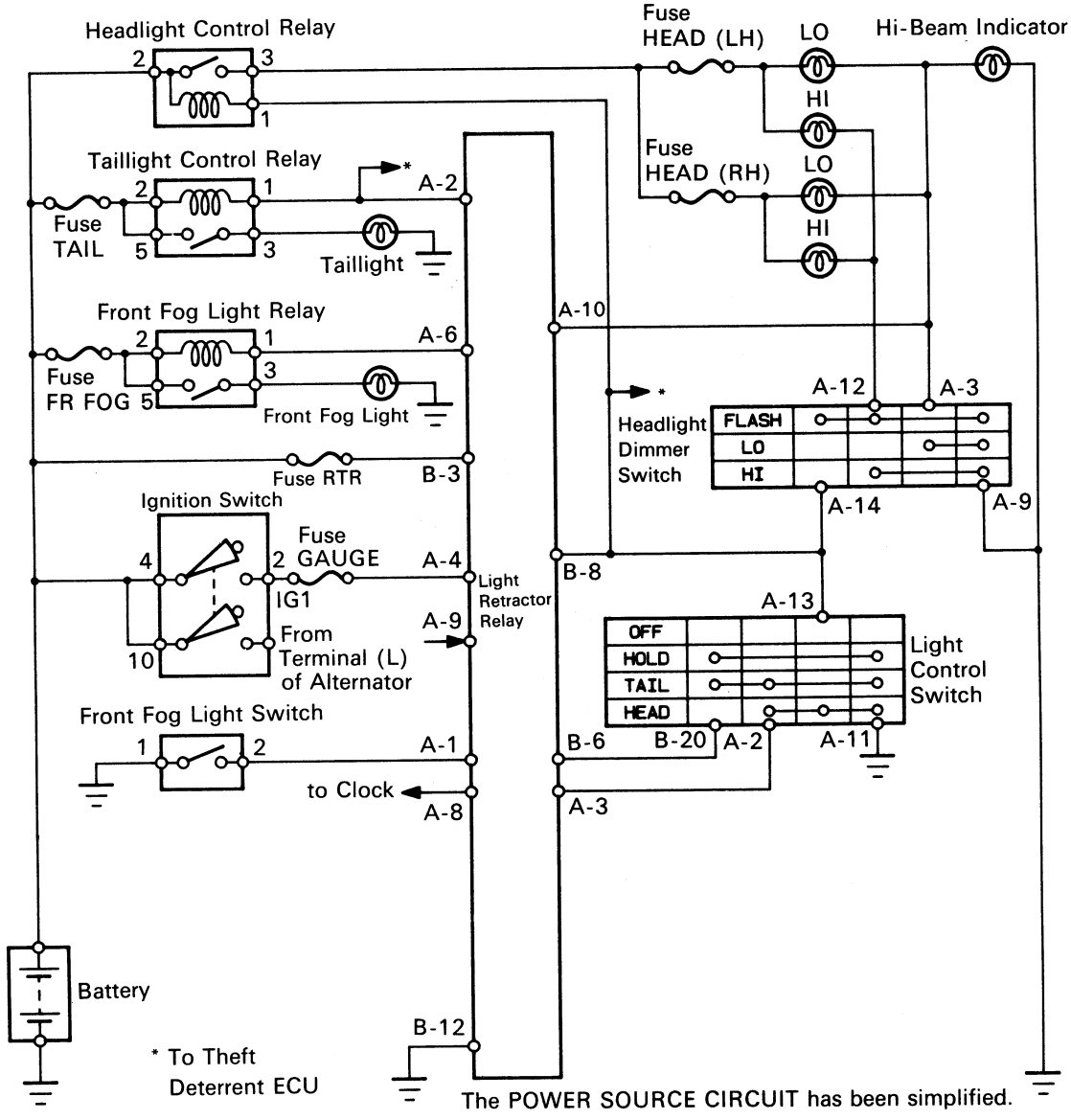


BE5231
BE2763 BE4049 BE4049 BE4707
V-34-2 e-10-2-B e-18-2-A e-2-1-G

Daytime Running Light System (Headlight, Taillight and Front Fog Light System)

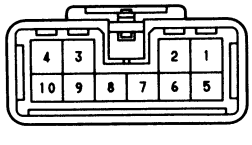
(CANADA)

w/o Light Auto Turn Off System

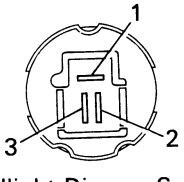


The POWER SOURCE CIRCUIT has been simplified.
For full details, see page BE-9.

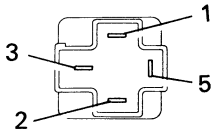
Ignition Switch



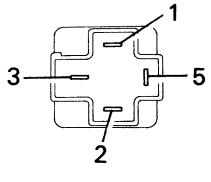
Headlight Control Relay



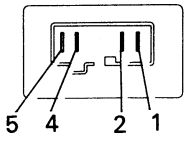
Taillight Control Relay



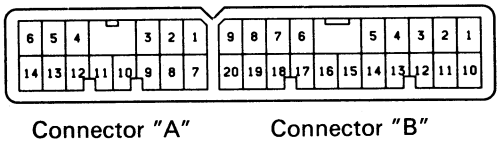
Front Fog Light Relay



Front Fog Light Switch

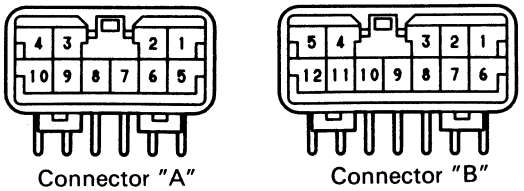


Light Control Switch, Headlight Dimmer Switch



Connector "A" Connector "B"

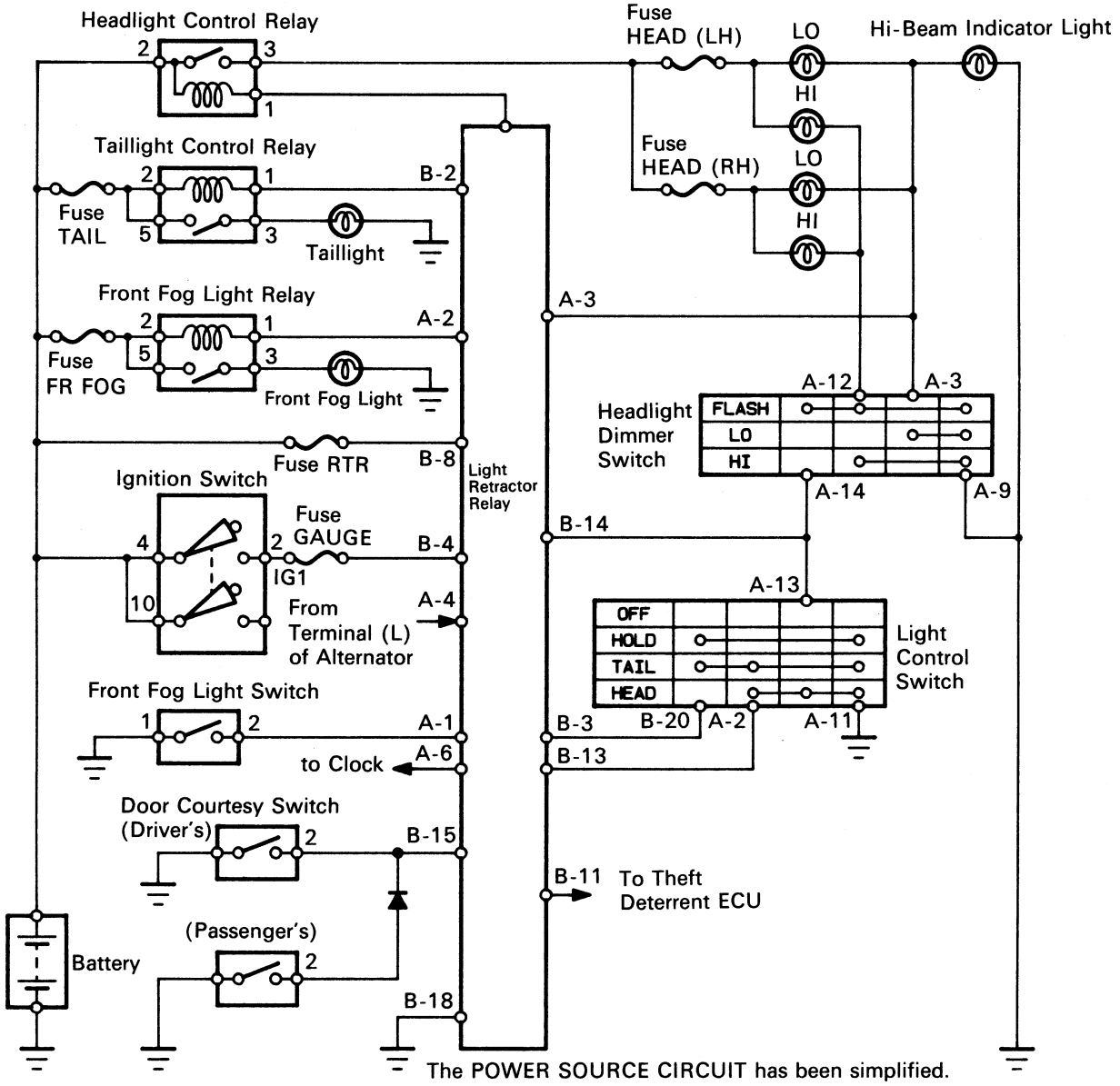
Light Retractor Relay



Connector "A" Connector "B"

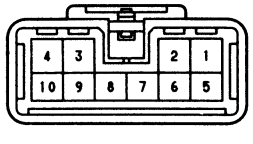
BE5232
e-10-2-B BE2763 BE4049 BE4049 BE4707
V-34-2 e-10-2-A e-12-2-A

w/ Light Auto Turn Off System

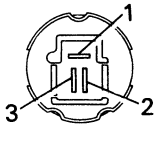


The POWER SOURCE CIRCUIT has been simplified.
For full details, see page BE-9.

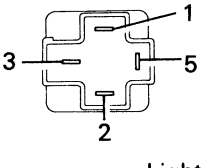
Ignition Switch



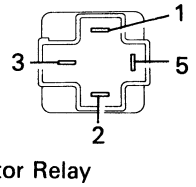
Headlight Control Relay



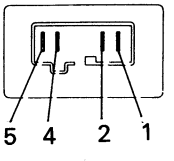
Taillight Control Relay



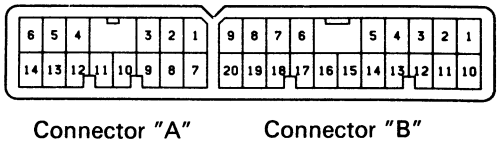
Front Fog Light Relay



Front Fog Light Switch

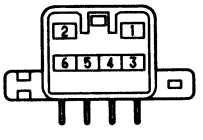


Light Control Switch, Headlight Dimmer Switch

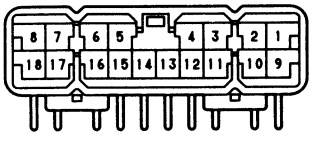


Connector "A" Connector "B"

Light Retractor Relay



Connector "A"

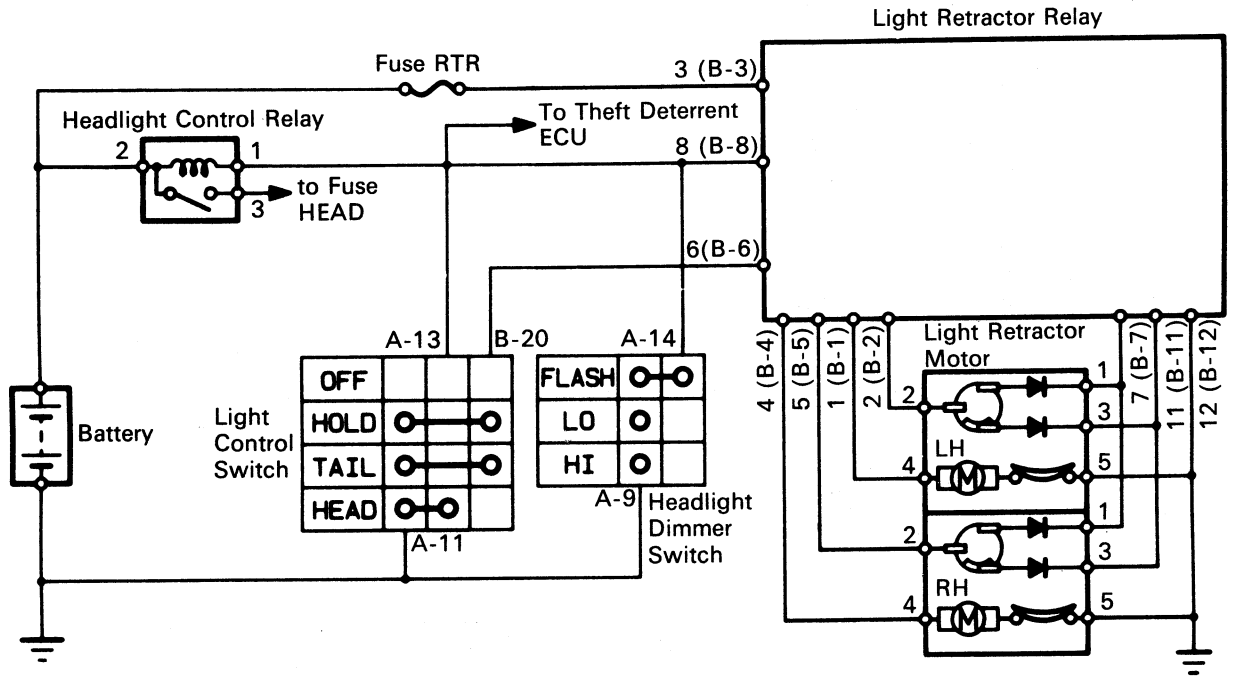


Connector "B"

Door Courtesy Switch

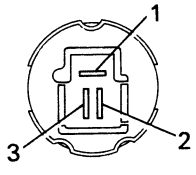


Light Retractable System (w/o Light Auto Turn Off System)

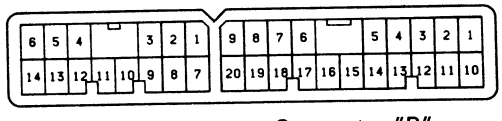


The terminals indicated in brackets ( ) are for CANADA models.
The POWER SOURCE CIRCUIT has been simplified. For full details, see page BE-9.

Headlight Control Relay

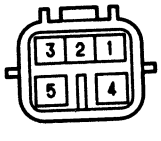


Light Control Switch, Headlight Dimmer Switch

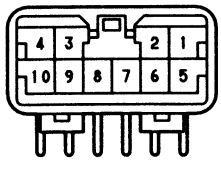


Connector "A" Connector "B"

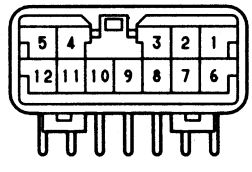
Light Retractor Motor



Light Retractor Relay

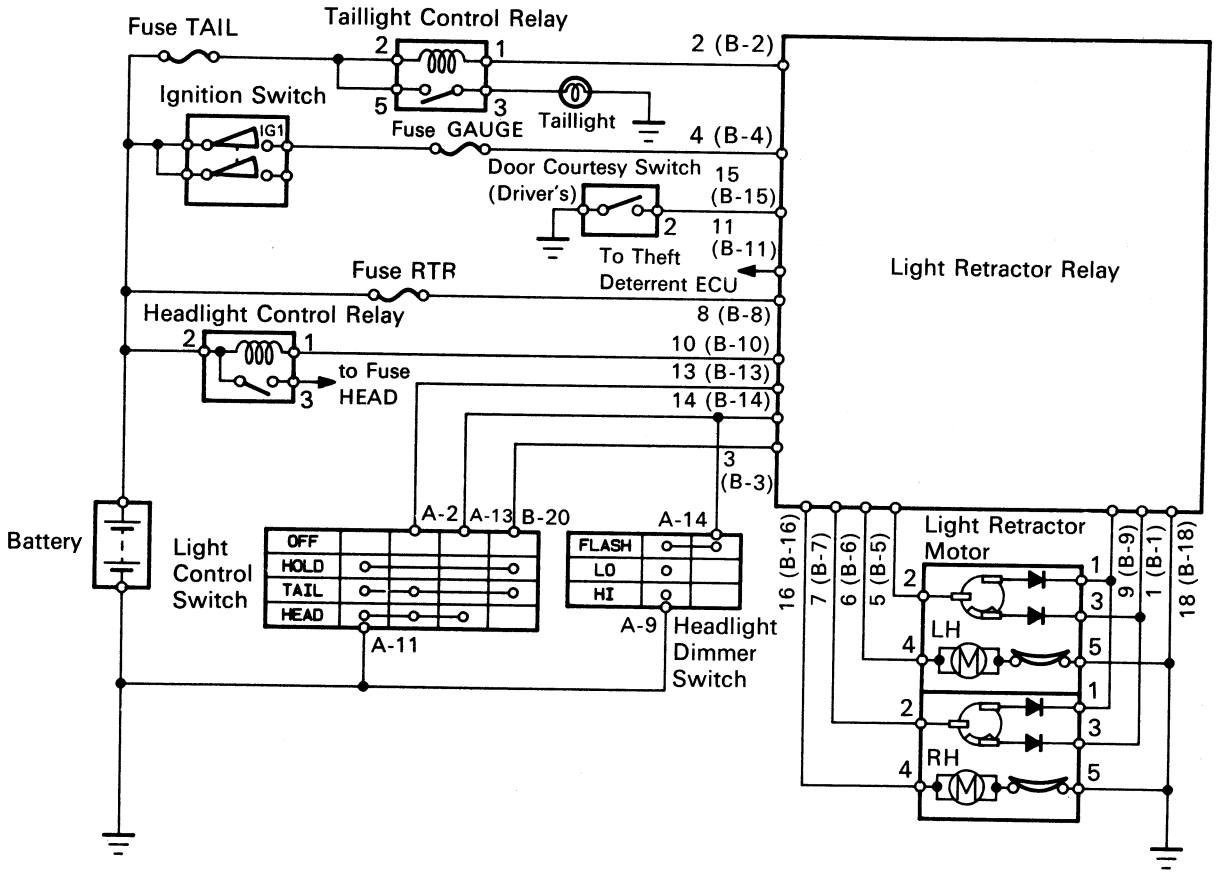


(USA)



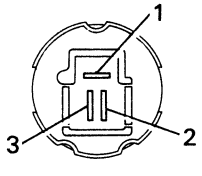
Connector "B" (CANADA)

(w/ Light Auto Turn Off System)

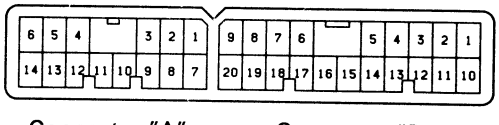


The terminals indicated in brackets ( ) are for CANADA models.
The POWER SOURCE CIRCUIT has been simplified. For full details, see page BE-9.

Headlight Control Relay

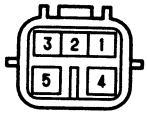


Light Control Switch, Headlight Dimmer Switch

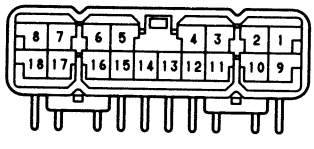


Connector "A" Connector "B"

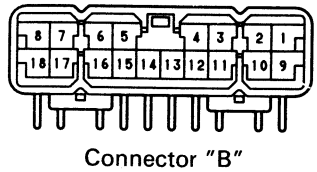
Light Retractor Motor



Light Retractor Relay

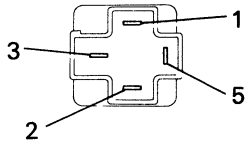


(USA)

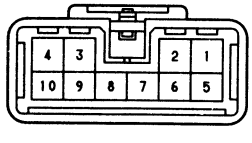


Connector "B" (CANADA)

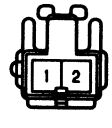
Taillight Control Relay



Ignition Switch

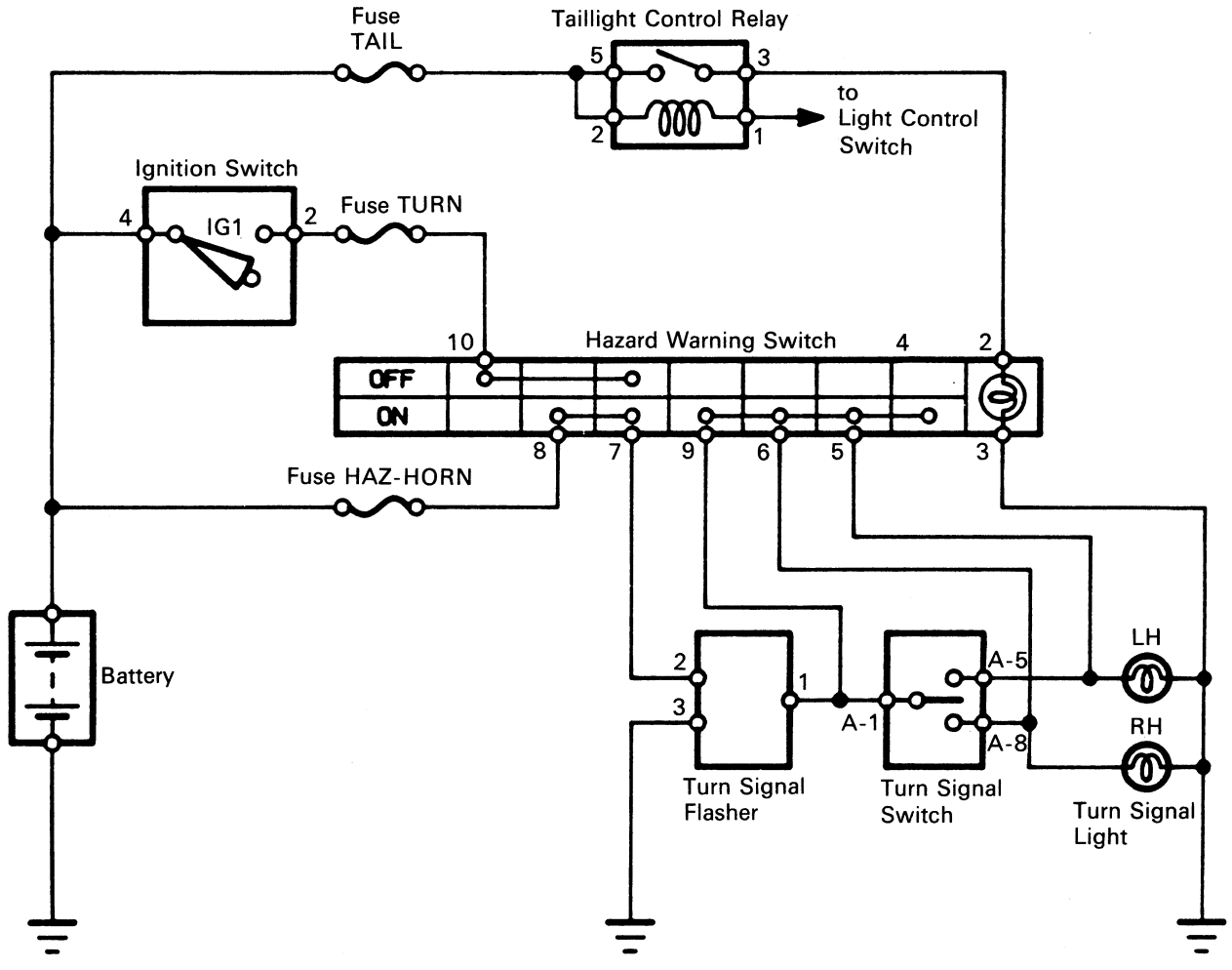


Door Courtesy Switch



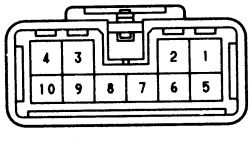
BE5234
BE2763 V-34-2
IJ-5-2-A e-18-2-A e-18-2-A
BE4049 e-10-2-B e-2-1-G

Turn Signal and Hazard Warning System

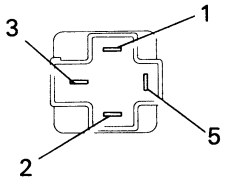


The POWER SOURCE CIRCUIT has been simplified. For full details, see page BE-9.

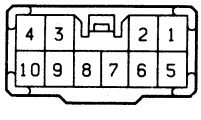
Ignition Switch



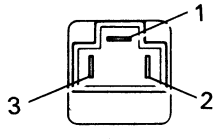
Taillight Control Relay



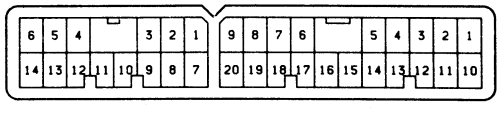
Hazard warning Switch



Turn Signal Flasher



Turn Signal Switch

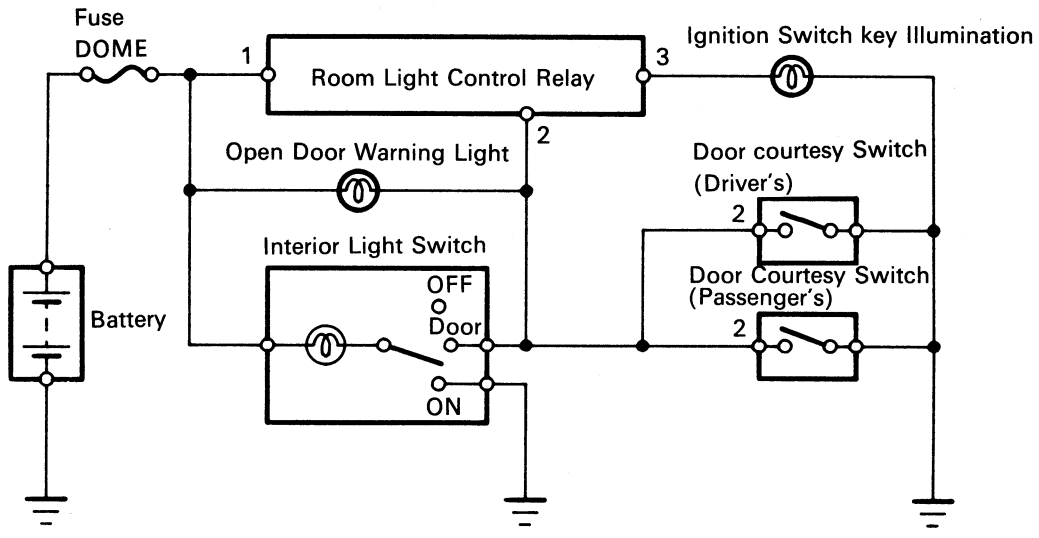


Connector "A" Connector "B"

BE5067
e-10-2-B BE4049 S-10-2
BE2896 V-34-2

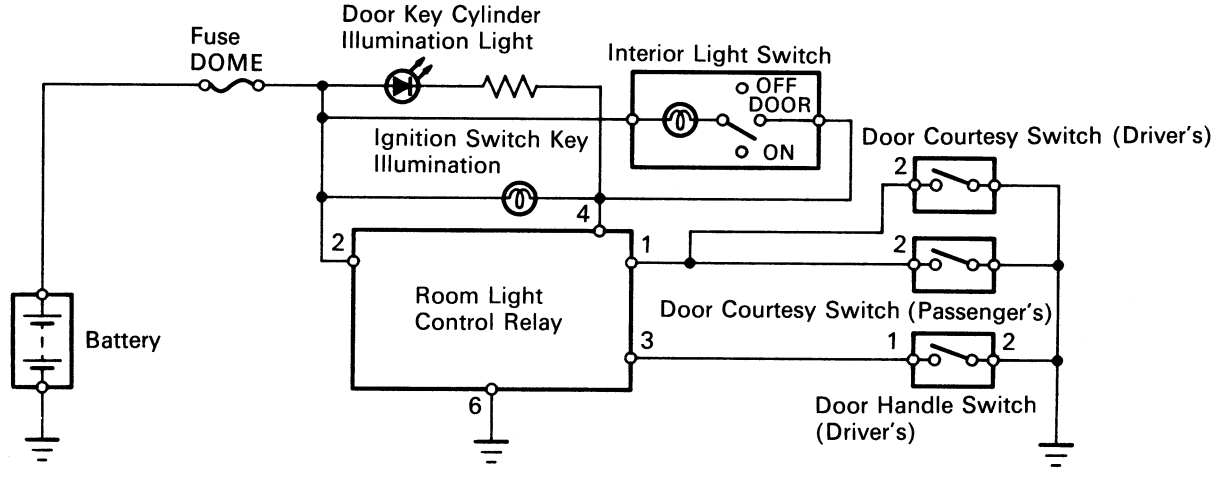
Illuminated Entry System

w/o Door Key Cylinder Illumination Light



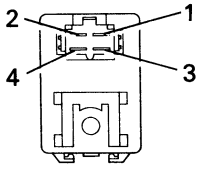
The POWER SOURCE CIRCUIT has been simplified. For full details, see page BE-9.

w/ Door Key Cylinder Illumination Light

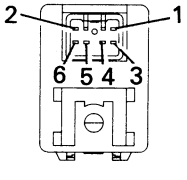


The POWER SOURCE CIRCUIT has been simplified. For full details, see page BE-9.

Room Light Control Relay

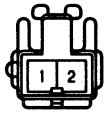


(w/o Door Key Cylinder Illumination Light)



(w/ Door Key Cylinder Illumination Light)

Door Courtesy Switch



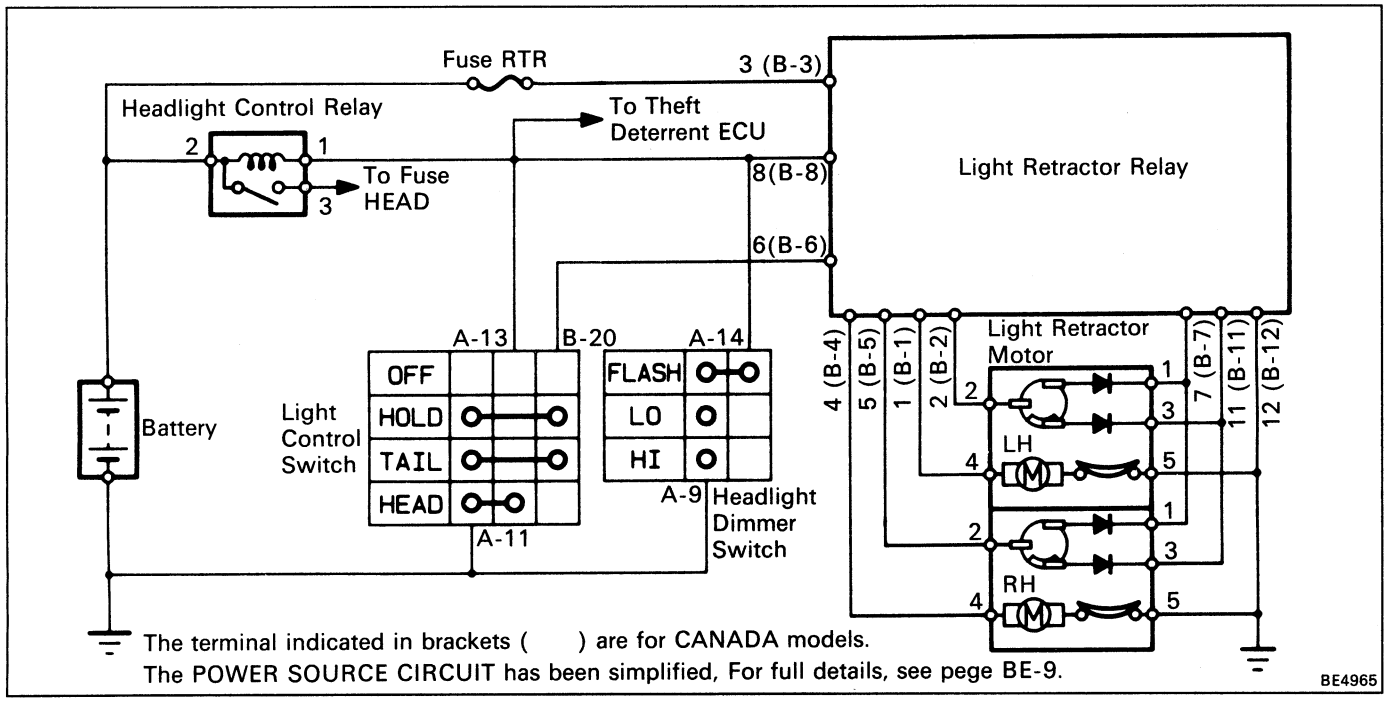
Door Handle Switch



BE4664
BE5055
BE4851 BE5056 e-2-1-G
1Y-2-1-A

System Discription

Light Retractable System (w/o Light Auto Turn Off System)



Current flows from the battery to terminals 3 (B-3) of the light retractor relay.

Operation examples of the switch are shown below;

HINT: The number in [ ] are for the left side headlight.

1. LIGHT CONTROL SWITCH IN "HEAD"

When the switch is set, continuity is produced between terminal 8 (B-8) of the light retractor relay (hereafter called LRR) and the body ground. Also continuity is made between terminals 7 (B-7) and 12 (B-12) of the LRR. Then the LRR operates so that current flows from terminal 3 (B-3) of the LRR → terminal 4 (B-4) [1 (B-1)] of the LRR → terminal 4 of the light retractor motor → terminal 5 of the motor → the body ground, and the motor starts to run in order to raise the headlights.

When the headlights rise, the limit switch operates, so that continuity is broken between terminals 2 and 1 of the motor, and continuity is produced between terminals 2 and 3.

As a result, because the LRR is interrupted, the headlights stay in position.

2. LIGHT CONTROL SWITCH CHANGED FROM "HEAD" TO "TAIL" OR "HOLD"

When the switch is set, continuity is broken between terminal 8 (B-8) of the LRR and the body ground, and continuity is produced between terminal 6 (B-6) of the LRR and the body ground.

As a result, the headlights are kept in position.

3. LIGHT CONTROL SWITCH CHANGED FROM "TAIL" OR "HOLD" TO "OFF"

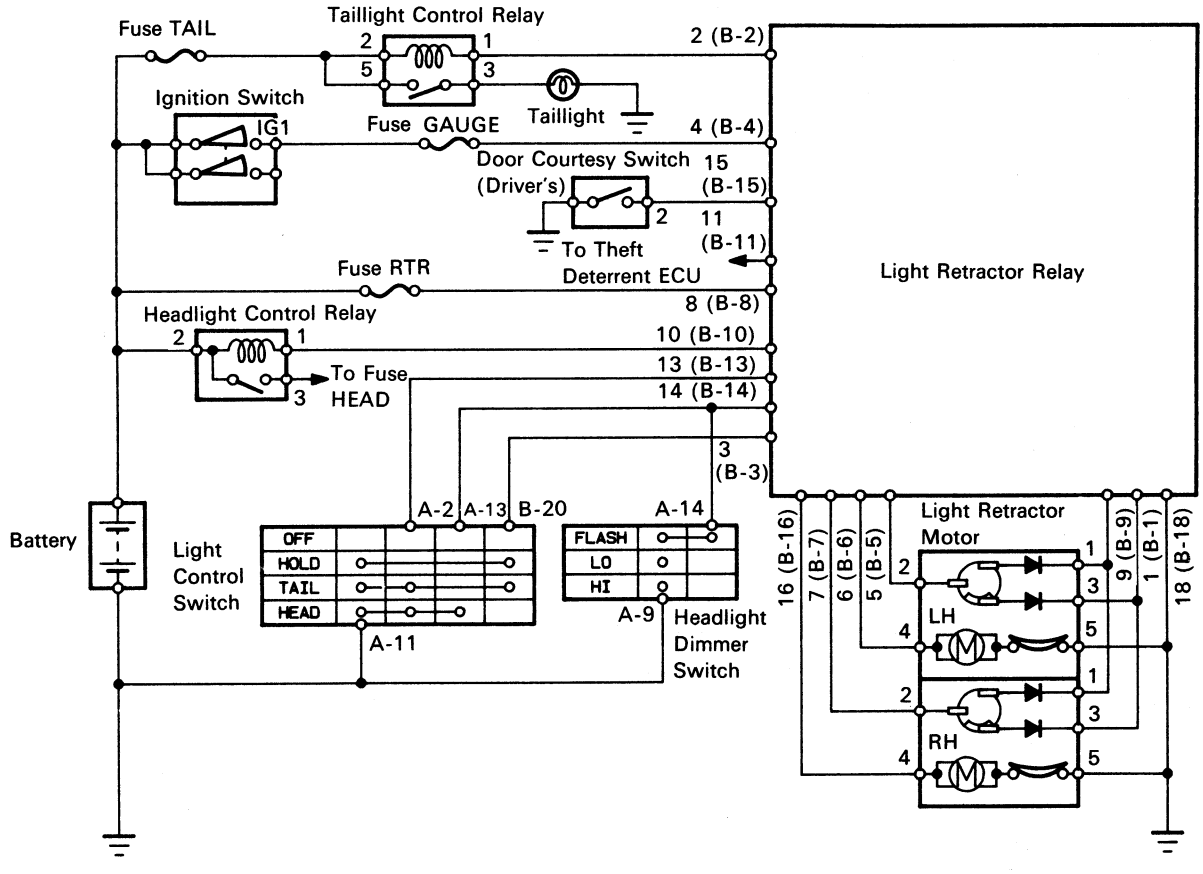
When the switch is set, continuity is also broken between terminal 6 (B-6) and the body ground.

Then continuity is produced between terminals 11 (B-11) and 12 (B-12) of the LRR, so that the LRR operates so that current flows from terminal 3 (B-3) → terminal 4 (B-4) [1 (B-1)] of the LRR → terminal 4 of the light retractor motor → terminal 5 of the motor → the body ground, and the motor starts to run in order to retract the headlights.

When the headlights are retracted, the limit switch operates, so that continuity is broken between terminals 2 and 3 of the motor, and continuity is produced terminals 2 and 1.

As a result, because the LRR interrupted, the headlights stay in position.

(w/ Light Auto Turn Off System)



The terminals indicated in brackets ( ) are for CANADA models.
The POWER SOURCE CIRCUIT has been simplified. For full details, see page BE-9.

BE5234

- Current flows from the battery to terminal 8 (B-8) of the light retractor relay.
- Battery voltage is applied to terminal 5 (B-5) and 7 (B-7) of the light retractor relay.

Operation examples of the switch are shown below;

HINT: The numbers in [ ] are for the left side headlight.

1. LIGHT CONTROL SWITCH IN "TAIL"

When the switch is set continuity is produced between terminal 13 (B-13) of the light retractor relay (hereafter called LRR) and the body ground. Also, because continuity is produced between terminal 2 (B-2) of the LRR and the body ground, the taillight control relay (hereafter called TCR) is turned on. Then the taillights light up.

2. LIGHT CONTROL SWITCH IN "HEAD"

When the switch is set, continuity is produced between terminal 13 (B-13) of the LRR and the body ground, and 14 (B-14) of the LRR and the body ground of the LRR.

- Also continuity is produced between terminals 9 (B-9) and 18 (B-18) of the LRR. Then the LRR operates to lead current from terminal 8 → terminal 16 (B-16) [6 (B-6)] of the LRR → terminal 4 of the light retractor motor → terminal 5 of the motor → the body ground, and the motor starts, to run in order to raise the headlights.

When the headlights rise, the limit switch operates, so that continuity is broken between terminals 2 and 1 of the motor, and continuity is produced between terminals 2 and 3.

As a result, because the LRR is interrupted, the headlights stay in position.

- Also, because continuity is produced between terminal 2 (B-2) of the LRR and the body ground, and 10 (B-10) of the LRR and the body ground, the TCR and the headlight control relay (hereafter called HCR) are turned on.

  Then the taillights and the headlights light up.

3. LIGHT CONTROL SWITCH CHANGED FROM "HEAD" TO "TAIL"

When the switch is set continuity is broken between terminal 14 (B-14) of the LRR and the body ground, and continuity is produced between terminal 3 (B-3) of the LRR and body ground.

- As a result, the headlights are kept in position.
- By breaking continuity between terminal 14 (B-14) of the LRR and the body ground, continuity is broken between terminal 10 (B-10) and the body ground.

  Then the headlights go out.

4. LIGHT CONTROL SWITCH CHANGED FROM "TAIL" TO "HOLD"

When the switch is set, continuity is broken between terminal 13 (B-13) of the LRR and the body ground. Also, because continuity is broken between terminal 2 (B-2) of the LRR and the body ground, the TCR is turned off.

Then the taillights go out.

The headlights are kept in position, because continuity is kept between terminal 3 (B-3) of the LRR and the body ground.

5. LIGHT CONTROL SWITCH CHANGED FROM "HOLD" TO "OFF"

When the switch is set, continuity is broken between terminal 3 (B-3) of the LRR and the body ground, so that continuity is produced between terminal 1 (B-1) and 18 (B-18) of the LRR.

Then the LRR operates so that the current flows from terminal 8 (B-8) → terminal 16 (B-16) [6 (B-6)] of the LRR → terminal 4 of the light retractor motor → terminal 5 of the motor → the body ground, and the motor starts to run in order to retract the headlights.

When the headlights are retracted, the limit switch operates, so that continuity is broken between terminals 2 and 3 of the motor, and continuity is produced between terminals 2 and 1.

As a result, because the LRR is interrupted, the headlights stay in position.

6. IGNITION SWITCH TURNED FROM "ON" TO "ACC" OR "LOCK" AND DRIVER'S DOOR OPEN WITH LIGHT CONTROL SWITCH IN "HEAD" (Light Auto Turn Off system)

When the switches are set, current does not flow from the battery to terminal 4 (B-4) of the LRR, and continuity is produced between terminal 15 (B-15) of the LRR and the body ground. Also, because continuity is broken between terminals 2 (B-2) of the LRR and the body ground, and 10 (B-10) of the LRR and the body ground, the TCR and the HCR are turned off.

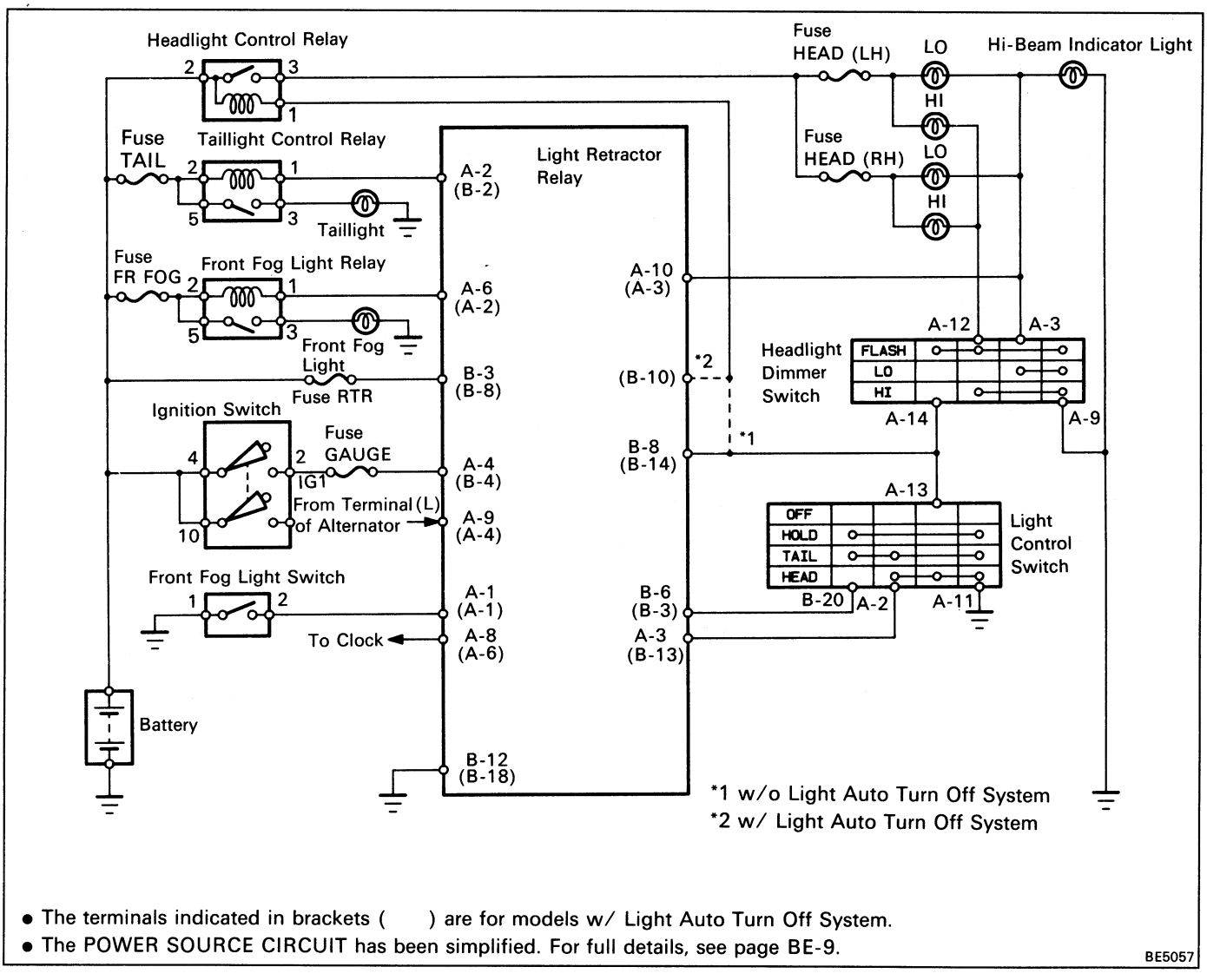
Then the taillights and the headlights go out.

Also with the light control switch in "TAIL", the taillights go out.

When the ignition switch is turned on again, the taillights and headlights light normally.

During light auto turn off operation, if the light switch is turned first to "HOLD" or "OFF", then turned to "TAIL" or "HEAD", both sets of lights will come on again.

Daytime Running Light System (CANADA)



- The terminals indicated in brackets ( ) are for models w/ Light Auto Turn Off System.
- The POWER SOURCE CIRCUIT has been simplified. For full details, see page BE-9.

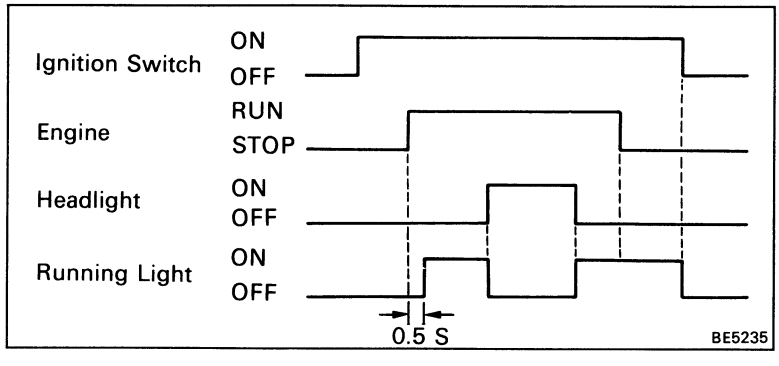
BE5057

DESCRIPTION

The daytime running light system has front fog lights and taillights that go on automatically when the engine is started. This system is standard equipment on all grade models for Canada. The daytime running lights are controlled by the light retractor relay.

Standby Operation

The daytime running light system is activated when the ignition switch is turned on and the engine is started. The lights are turned on and off, as shown below, depending on the condition on applicable switches. (Lights do not go on when the ignition switch is merely turned on. Lights remain on when the running engine stalls.)



BE5235

OPERATION

Operation examples of the switch are shown below;

1. **IGNITION SWITCH "ON" AND LIGHT CONTROL SWITCH "OFF"**

   When the switches are set, current is led from the battery to terminal A-4 (B-4) and terminal A-9 (A-4) of the light retractor relay. After engine running, because continuity is made between terminal A-2 (B-2) of the light retractor relay and the body ground, and terminal A-6 (A-2) of the light retractor relay and the body ground of the light retractor relay, the taillight control relay and running light control relay are turned on, so the taillights and running lights will come on.

2. **LIGHT CONTROL SWITCH "HEAD"**

   When the switch is set, continuity is made between terminal B-8 (B-14) of the light retractor relay and the body ground. Also, because the continuity between terminal A-6 (A-2) and terminal B-12 (B-18) of the light retractor relay is cut off, so the running lights will go off.

   HINT: If the light control switch is turned to "TAIL" or "HOLD" or "OFF", because continuity is made between terminal A-6 (A-2) and the body ground of the light retractor relay, so the running lights will come on again.

3. **ENGINE STOPS (IGNITION SWITCH "ON")**

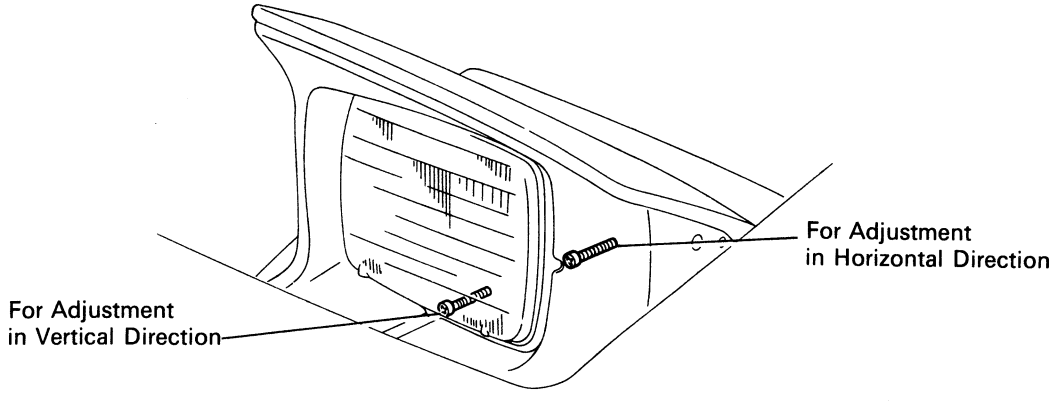
   When the engine is stopped, because the continuity between terminal A-6 (A-2) and terminal B-12 (B-18) of the light retractor relay remains, so the running lights also remain.

   HINT: If ignition switch is turned to "OFF", because the continuity between terminal A-6 (A-2) and terminal B-12 (B-18) of the light retractor relay is cut off, so running lights will go off.

   If light control switch is in "HOLD" or "OFF", because the continuity between terminal A-2 (B-2) and terminal B-12 (B-18) of the light retractor relay is also cut off, so taillights will also go off.

Part Adjustment

Adjustment of Light Aiming



BE4708

Troubleshooting

Problem	Possible cause	Remedy	Page
Only one light comes ON	Light bulb burned out	Replace bulb	
	Socket, wire or ground faulty	Repair as necessary	
Headlights do not light	Fusible link blown	Replace fusible link	
	HEAD fuse blown	Replace fuse and check for short	BE-3
	Headlight control relay faulty	Check relay	BE-34
	Light control/dimmer switch faulty	Check switch	BE-34
	Light retractor relay faulty (w/ Light auto turn off system)	Check relay	BE-36, 39
	Wiring or ground faulty	Repair as necessary	
High beam headlights or headlight flashers do not operate	Light control/dimmer switch faulty	Check switch	BE-34
	Wiring faulty	Repair as necessary	
Tail, parking and license light do not Light	Fusible link blown	Replace fusible link	
	TAIL fuse blown	Replace fuse and check for short	BE-3
	Taillight control relay faulty	Check relay	BE-34
	Light control switch faulty	Check switch	BE-34
	Light retractor relay faulty (w/ Light auto turn off system or w/ Daytime running right system)	Check relay	BE-35, 36, 39
	Wiring or ground faulty	Repair as necessary	

Troubleshooting (Cont'd)

Problem	Possible cause	Remedy	Page
Stop light do not light	STOP fuse blown	Replace fuse and check for short	BE-3
	Stop light switch faulty	Adjust or replace switch	
	Wiring or ground faulty	Replace as necessary	
Stop lights stay on	Stop light switch faulty	Adjust or replace switch	
Turn signal does not flash on one side	Turn signal switch faulty	Check switch	BE-34
	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-40
	Turn signal switch faulty	Check switch	BE-34
	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-40
	Hazard warning switch faulty	Check switch	BE-40
	Wiring or ground faulty	Repair as necessary	
Light retractable system does not operate	RTR fuse blown	Replace fuse and check for short	BE-3
	Headlight control relay faulty	Check relay	BE-34
	Light retractor relay faulty	Check relay	BE-38,39
	Light retractor motor faulty	Check motor	BE-39
	Light control/dimmer switch faulty	Check switch	BE-34
	Wiring or ground faulty	Repair as necessary	
Daytime running light system does not operate	GAUGE fuse blown	Replace blown fuse and check for short	BE-3
	RTR fuse blown		
	FR FOG fuse blown		
	ECU-B fuse blown		
	TAIL fuse blown		
	HEAD fuse blown		
	Front fog light relay faulty	Check relay	BE-37
	Taillight control relay faulty	Check relay	BE-34
	Headlight control relay faulty	Check relay	BE-34
	Light retractor relay faulty	Check relay	BE-38,39
	Ignition switch faulty	Check switch	BE-11
	Front fog light switch faulty	Check switch	BE-37
	Light control/dimmer switch faulty	Check switch	BE-34
	Wiring or ground faulty	Repair as necessary	

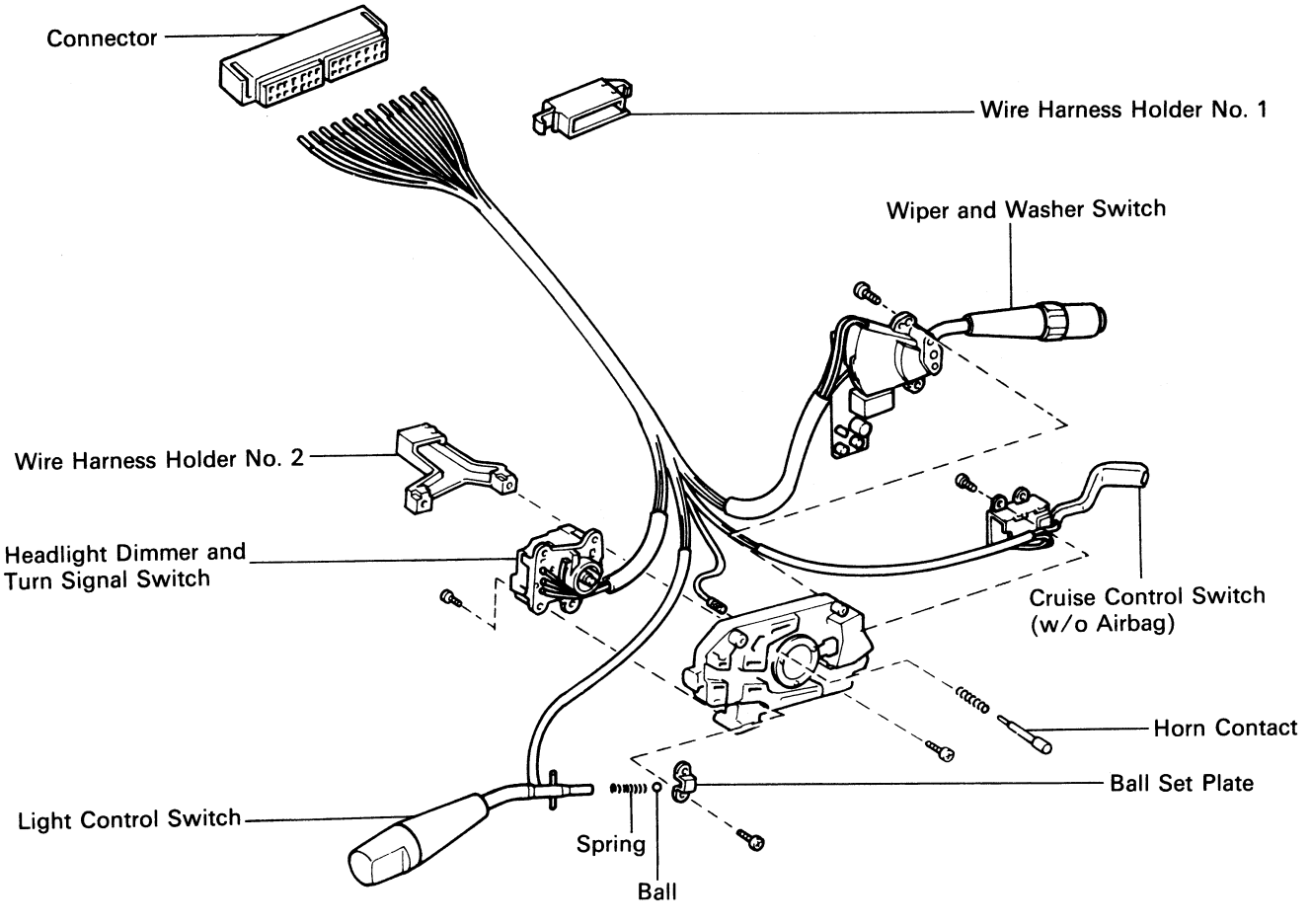
Troubleshooting (Cont'd)

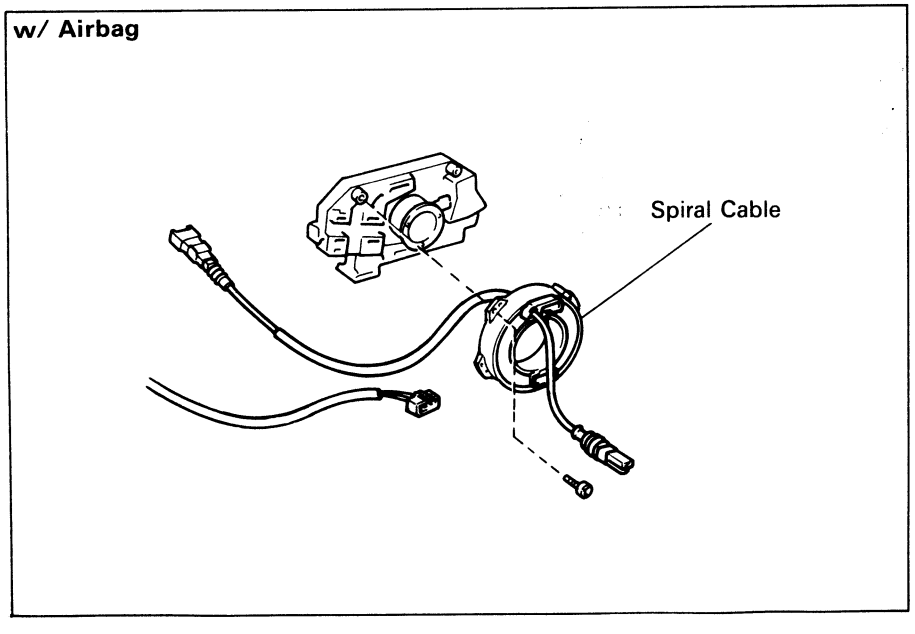
Problem	Possible cause	Remedy	Page
Front fog light system does not operate	FR FOG fuse blown	Replace blown fuse and check for short.	BE-3
	HEAD fuse blown (w/o Daytime running light system)	Replace blown fuse and check for short	BE-3
	Front fog light relay faulty	Check relay	BE-37
	Headlight control relay faulty (w/o Daytime running light system)	Check relay	BE-34
	Light retractor relay faulty (w/ Daytime running light system or w/ Light auto turn off system)	Check relay	BE-35, 36, 39
	Front fog light switch faulty	Check switch	BE-37
	Wiring or ground faulty	Repair as necessary	
Illuminated entry system does not operate	DOME fuse blown	Replace fuse and check for short.	BE-3
	Room light control relay faulty	Check relay	
	Door courtesy switch faulty	Check switch	
	Door handle switch faulty (w/ Door key cylinder illumination light)	Check switch	
	Wiring or ground faulty	Repair as necessary	

Parts Replacement

Components

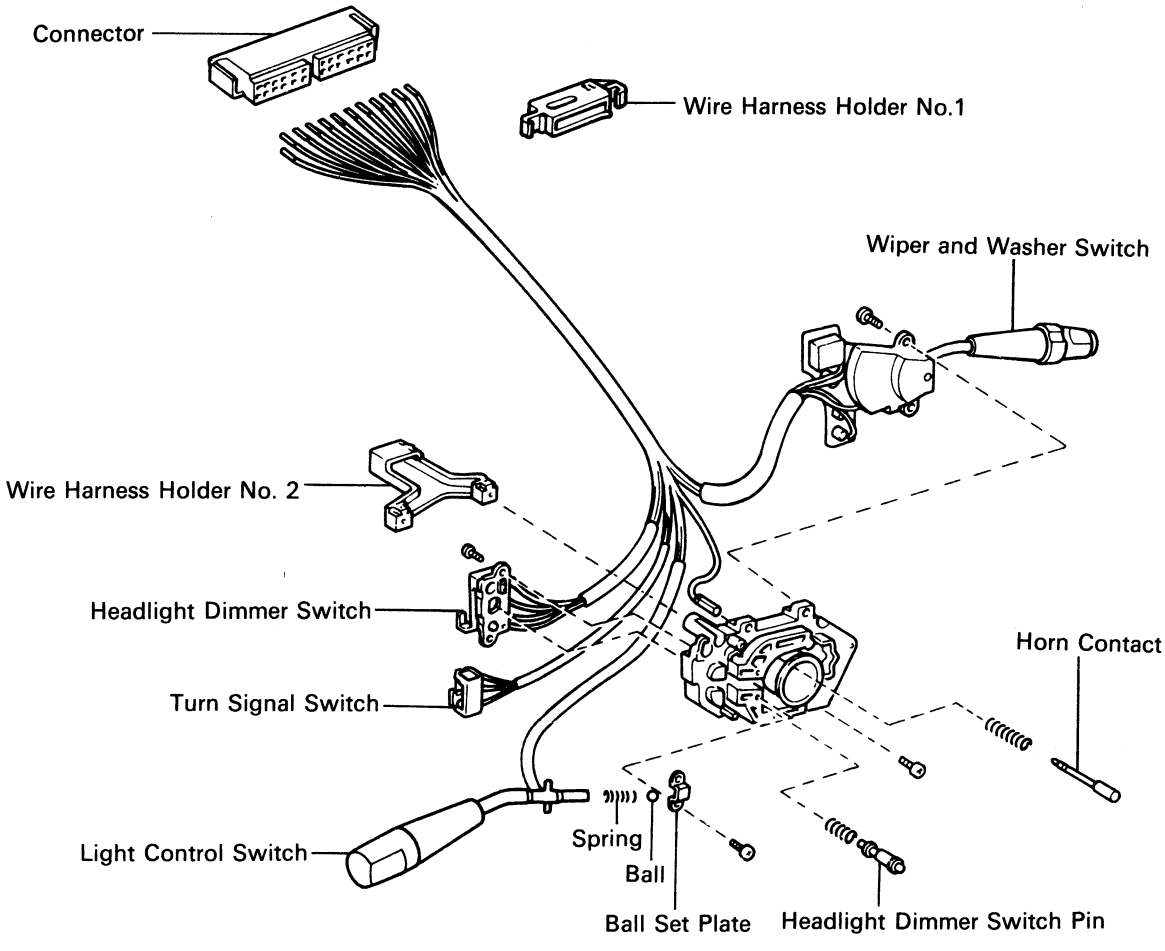
(A Type)

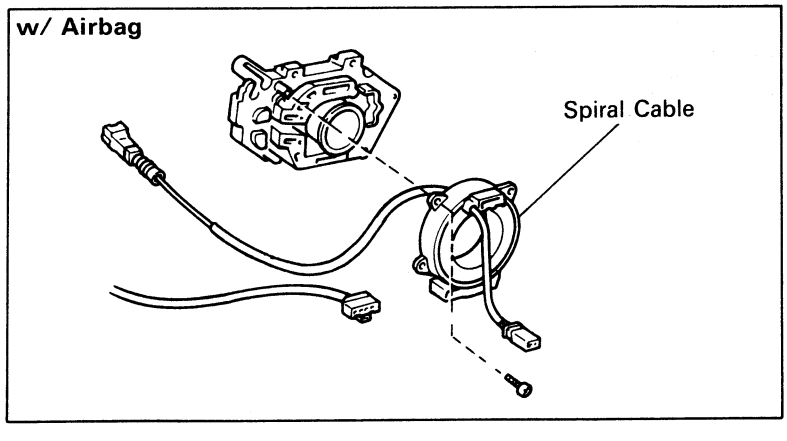




BE4886
BE4966

(B Type)





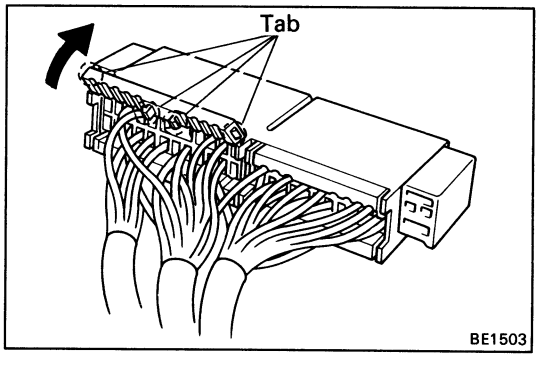
BE4372
BE4967

Disassembly of Combination Switch

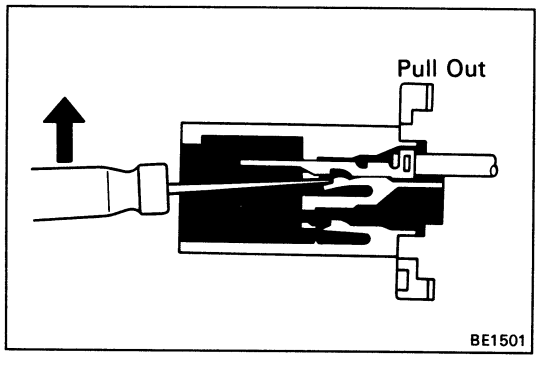
1. **REMOVE WIRE HARNESS HOLDER NO. 1**

2. **REMOVE WIRE HARNESS HOLDER NO. 2**

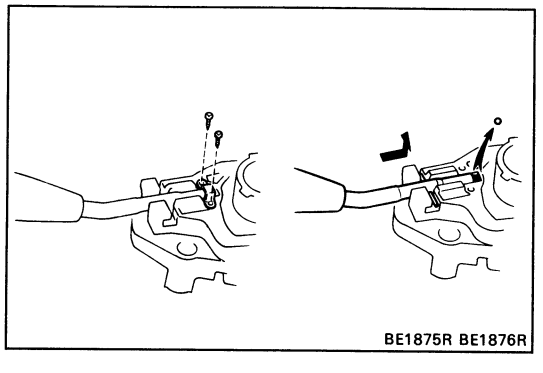
3. **(w/Airbag)**
   REMOVE SPIRAL CABLE SUBASSEMBLY
   (a) Remove the four screws.
   (b) Disconnect the connector and remove the spiral cable subassembly.



4. **REMOVE TERMINALS FROM CONNECTOR**
   (a) Release four tabs and open the terminal cover.



   (b) From the open end, insert a miniature screwdriver between the locking lug and terminal.
   (c) Pry down the locking lug with the screwdriver and pull the terminal out from the rear.



5. **REMOVE LIGHT CONTROL SWITCH**
   (a) Remove two screws and the ball set plate from the switch body.
   (b) Remove the ball and side out the switch from the switch body with the spring.

6. **REMOVE HEADLIGHT DIMMER AND TURN SIGNAL SWITCH**
(A Type)

Remove four screws and the switch from the switch body.

(B Type)

(a) Pry loose two locking lugs and remove the turn signal switch from the switch body.

(b) Remove two screws and the headlight dimmer switch from the switch body.

(c) Remove the headlight dimmer switch pin from the switch body with the spring.

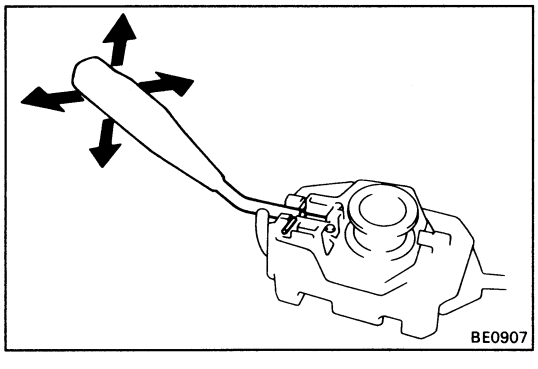
7. **REMOVE WIPER AND WASHER SWITCH**

Remove two screws and the switch from the switch body.

8. **(A Type)**
REMOVE CRUISE CONTROL SWITCH

Remove two screws and the switch from the body.

9. **REMOVE HORN CONTACT**

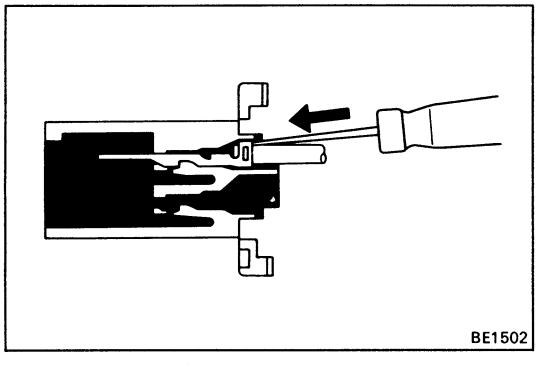

BE0907

Assembly of Combination Switch

INSTALL PARTS OF COMBINATION SWITCH IN REVERSE SEQUENCE OF DISASSEMBLY

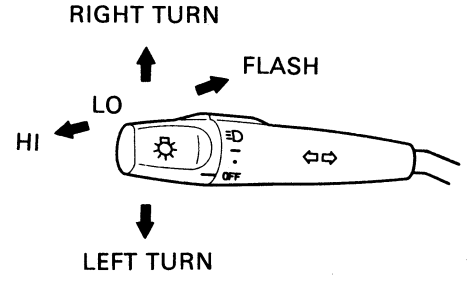
HINT:

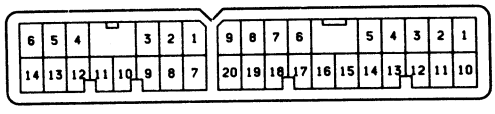
- After installing the light control switch to the switch body, insure that the switch operation is smoothly.


BE1502

- Push in the terminal until it is securely locked in the connector lug.

Reference:





Connector "A" Connector "B"

BE4888
V-34-2

Parts Inspection

Headlight and Taillight System

1. INSPECT COMBINATION SWITCH (Light Control Switch/Continuity)

Terminal (Color) / Switch position	A-2 (Clear)	A-11 (W)	A-13 (R)	B-20 (G)
OFF				
HOLD (●)		○		○
TAIL (–)	○	○		○
HEAD (≡D)	○	○	○	

(Headlight Dimmer and Turn Signal Switch/ Continuity)

Headlight Dimmer Switch

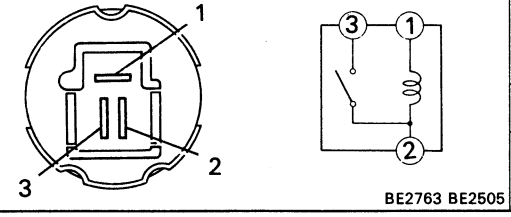
Terminal (Color) / Switch position	A-3 (R-G)	A-9 (W-B)	A-12 (R-Y)	A-14 (R-W)
Flash		○	○	○
Low beam	○	○		
High beam		○	○	

Turn Signal Switch

Terminal (Color) / Switch position	A-1 (G-W)	A-5 (G-B)	A-8 (G-Y)
Left turn	○	○	
Neutral			
Right turn	○		○

If continuity is not as specified, replace the switch.

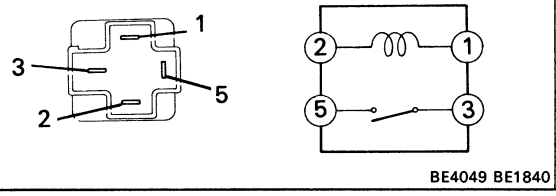
2. INSPECT RELAYS (Headlight Control Relay/Continuity)



BE2763 BE2505

Terminal / Condition	1	2	3
Constant	○	○	
Apply battery voltage to terminals 1 and 2.		○	○

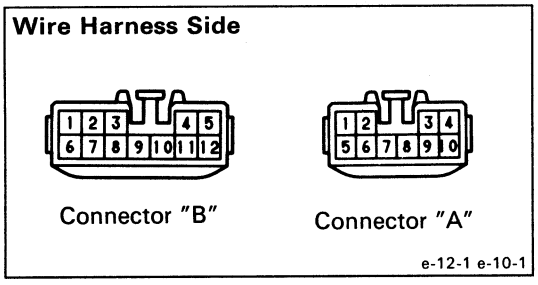
(Taillight Control Relay/Continuity)



BE4049 BE1840

Terminal / Condition	1	2	3	5
Constant	○	○		
Apply battery voltage to terminals 1 and 2.			○	○

Daytime Running Light System (w/o Light Auto Turn Off System)

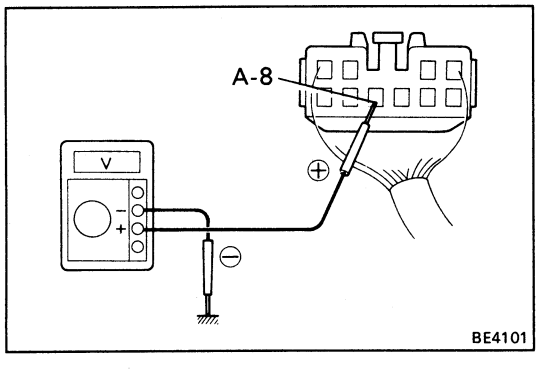


INSPECT LIGHT RETRACTOR RELAY (Relay Circuit)

Disconnect the connector from the relay and inspect the connector on the wire harness side as shown in the chart.

Check for	Tester connection	Condition		Specified value
Continuity	A-1 – Ground	Front fog light switch position	OFF	No continuity
			ON	Continuity
	A-3 – Ground	Light control switch position	OFF or HOLD	No continuity
			TAIL or HEAD	Continuity
	A-10 – Ground	Constant		Continuity
	B-6 – Ground	Light control switch position	OFF or HEAD	No continuity
			HOLD or TAIL	Continuity
	B-12 – Ground	Constant		Continuity
Voltage	A-2 – Ground	Constant		Battery voltage
	A-4 – Ground	Ignition switch position	LOCK or ACC	No voltage
			ON	Battery voltage
	A-6 – Ground	Constant		Battery voltage
	A-9 – Ground	Engine	Stop	No voltage
			Running	Battery voltage
	B-3 – Ground	Constant		Battery voltage
	B-8 – Ground	Light control switch position: OFF, HOLD or TAIL		
		Headlight dimmer switch position	Low beam or High beam	Battery voltage
			Flash	No voltage
		Light control switch position: HEAD		No voltage

If circuit is as specified, inspect relay operation.



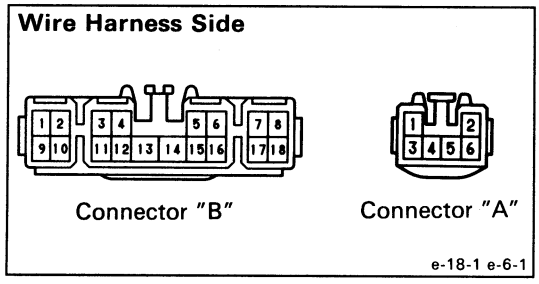
(Relay Operation)

(a) Connect the positive (+) lead from the voltmeter to terminal A-8 and negative (–) lead to the ground.

(b) Check that there is battery voltage with light control switch is turned on.

If operation is not as specified, replace the relay.

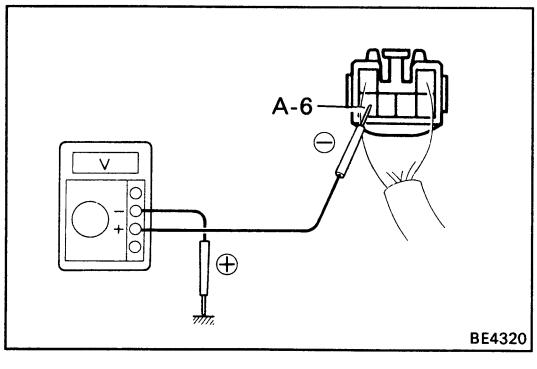
(w/ Light Auto Turn Off System)



INSPECT LIGHT RETRACTOR RELAY (Relay Circuit)

Disconnect the connector from the relay and inspect the connector on the wire harness side as shown in the chart.

Check for	Tester Connection	Condition		Specified value
Continuity	A-1 – Ground	Front fog light Switch position	OFF	No continuity
			ON	Continuity
	B-3 – Ground	Light control switch position	OFF or HEAD	No continuity
			HOLD or TAIL	Continuity
	B-13 – Ground	Light Control switch position	OFF or HOLD	No continuity
			TAIL or HEAD	Continuity
	B-14 – Ground	Light control switch position: OFF, HOLD or TAIL		
		Headlight dimmer switch position	Low beam or High beam	No continuity
			Flash	Continuity
		Light control switch position: HEAD		Continuity
	B-18 – Ground	Constant		Continuity
Voltage	A-2 – Ground	Constant		Battery voltage
	A-3 – Ground	Light control switch HEAD and Dimmer switch LO		No voltage
		Light control switch HEAD and Dimmer switch HI		Battery voltage
	A-4 – Ground	Engine	Stop	No voltage
			Running	Battery voltage
	B-2 – Ground	Constant		Battery voltage
	B-4 – Ground	Ignition switch position	LOCK or ACC	No voltage
			ON	Battery voltage
	B-8 – Ground	Constant		Battery voltage
	B-10 – Ground	Constant		Battery voltage



If circuit is specified, inspect relay operation.

(Relay Operation)

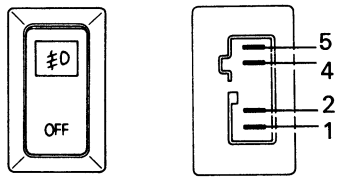
(a) Connect the positive (+) lead from the voltmeter to terminal A-6 and negative (–) lead to the ground.

(b) Check that there is battery voltage with light control switch is turned on.

If operation is not as specified, replace the relay.

Front Fog Light System

1. INSPECT FRONT FOG LIGHT SWITCH (Continuity)

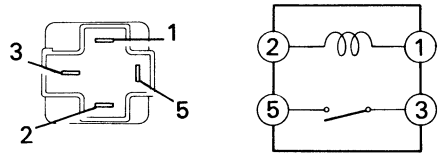


BE4702 BE4703

Terminal / Switch position	1	2	Illumination 4	Illumination 5
OFF				
ON	○——○			

If continuity is not as specified, replace the switch.

2. INSPECT FRONT FOG LIGHT RELAY (Continuity)



BE4049 BE1840

Terminal / Condition	1	2	3	5
Constant	○—ᔓᔓᔓ—○			
Apply battery voltage to terminals 1 and 2.			○——○	

If continuity is not as specified, replace the relay.

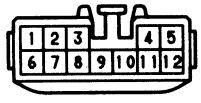
Light Retractable System

1. INSPCT LIGHT RETRACTOR RELAY

Disconnect the connector from the relay and inspect the connector on wire harness side as shown in the chart.

Wire Harness Side

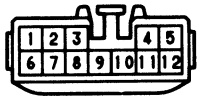
(w/o Light Auto Turn Off System)



(USA)



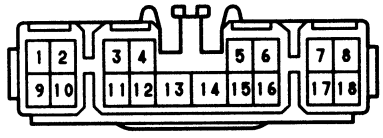
Connector "A"



Connector "B"

(CANADA)

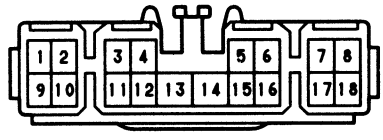
(w/ Light Auto Turn Off System)



(USA)



Connector "A"



Connector "B"

(CANADA)

e-12-1 e-18-1
e-10-1 e-12-1 e-6-1 e-18-1

(w/o Light Turn Off System)

Check for	Tester connection	Condition		Specified value
Continuity	1(B-1) – Ground 4(B-4) – Ground	Constant		*1 Continuity
	*2 2(B-2) – 7(B-7)	Headlight position	Any position ex. uppermost	Continuity
	*2 5(B-5) – 7(B-7)		Uppermost	No continuity
	*2 2(B-2) – 11(B-11)	Headlight position	Any position ex. lowermost	Continuity
	*2 5(B-5) – 11(B-11)		Lowermost	No continuity
	6(B-6) – Ground	Light control switch position	OFF or HEAD	No continuity
			HOLD or TAIL	Continuity
	12(B-12) – Ground	Constant		Continuity
Voltage	3(B-3) – Ground	Constant		Battery voltage
	8(B-8) – Ground	Light control switch position: OFF, HOLD or TAIL		
		Headlight dimmer switch position	Low beam or High beam	Battery voltage
			Flash	No voltage
		Light control switch position: HEAD		No voltage

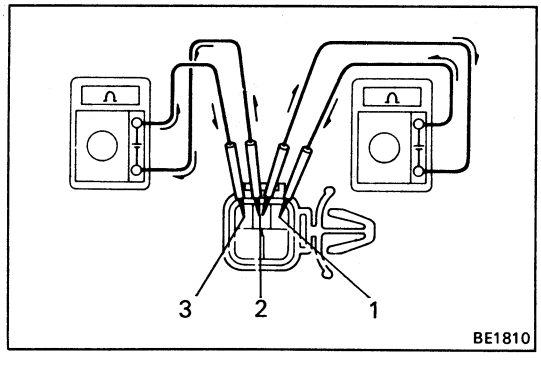
The number in ( ) mean for CANADA vehicle.
*1: There is resistance because this circuit is grounded through the motor.
*2: Connect the test leads so that the current from the ohmmeter can flow according to the above orders.

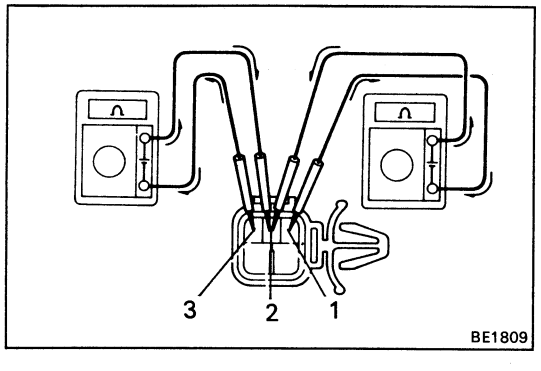
If circuit is as specified, replace the relay.

(w/ Light Auto Turn Off System)

Check for	Tester connection	Condition		Specified value
Continuity	3(B-3) – Ground	Light control switch position	OFF or HEAD	No continuity
			HOLD or TAIL	Continuity
	6(B-6) – Ground 16(B-16) – Ground	Constant		*1 Continuity
	13(B-13) – Ground	Light control switch position	OFF or HOLD	No continuity
			TAIL or HEAD	Continuity
	14(B-14) – Ground	Light control switch position: OFF, HOLD or TAIL		
		Headlight dimmer switch position	Low beam or Hight beam	No continuity
			Flash	Continuity
		Light control switch position: HEAD		Continuity
	18(B-18) – Ground	Constant		Continuity
	*2 5(B-5) – 1(B-1)	Headlight position	Any position ex. lowermost	Continuity
	*2 7(B-7) – 1(B-1)		Lowermost	No continuity
	*2 5(B-5) – 9(B-9)	Headlight position	Any position ex. uppermost	Continuity
	7(B-7) – 9(B-9)		Uppermost	No continuity
Voltage	2(B-2) – Ground	Constant		Battery voltage
	4(B-4) – Ground	Ignition switch position	LOCK or ACC	No Voltage
			ON	Battery voltage
	8(B-8) – Ground	Constant		Battery voltage
	10(B-10) – Ground	Constant		Battery voltage
	15(B-15) – Ground	Door position	Closed (Courtesy switch OFF)	Battery voltage
			Opened (Courtesy switch ON)	No voltage

The number in ( ) mean for CANADA vehicles.
*1: There is resistance because this circuit is grounded through the motor.
*2: Connect the test leads so that the current from the ohmmeter can flow according to the above orders.





If circuit is as specified, replace the relay.

2. INSPECT LIGHT RETRACTOR MOTOR (Diode/Continuity)

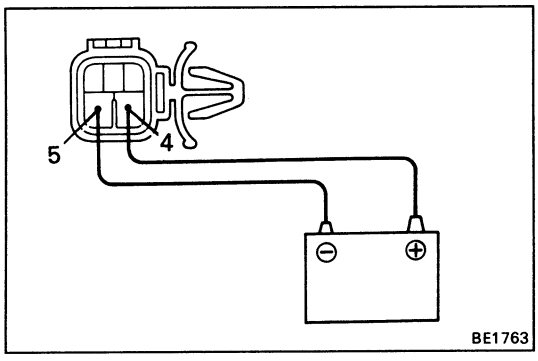
(a) Set the motor to any position except the uppermost or lowermost position.

(b) Connect the ohmmeter test lead so that the current from the meter can flow from terminal 1 to 2, check that there is no continuity.

(c) Connect the ohmmeter test lead so that the current from the meter can flow from terminal 3 to 2, check that there is no continuity.

(d) Reverse the test leads of ohmmeter, check that there is continuity.

If continuity is not as specified, replace the motor.



(Operation)

Connect the positive (+) lead from the battery to terminal 4 and the negative (–) lead to terminal 5, check that the motor operates.

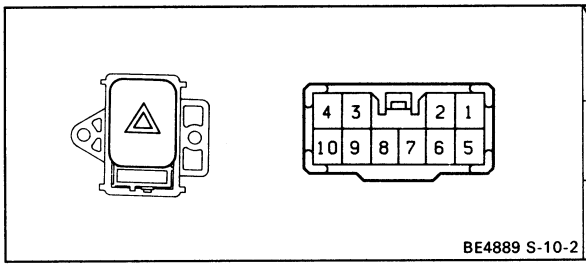
If operation is not as specified, replace the motor.

Turn Signal and Hazard Warning System

1. INSPECT SWITCHES
(Turn Signal Switch/Continuity)

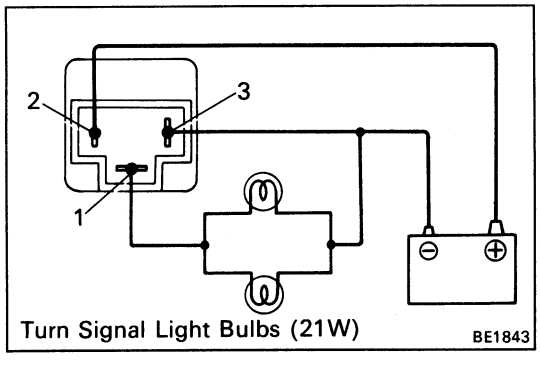
See Headlight Dimmer and Turn Signal Switch on page BE-34.

(Hazard Warning Switch/Continuity)



Terminal / Switch position	4	5	6	7	8	9	10	Illumination 2	Illumination 3
OFF				○	—	—	○	○	○
ON	○	○	○	○	—	○			

If continuity is not as specified, replace the switch.



2. INSPECT TURN SIGNAL FLASHER
(Operation)

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 3.

(b) Connect the two turn signal light bulbs parallel to each other to terminals 1 and 3, check that the bulbs flash.

HINT: The turn signal lights should flash 60 to 120 times per minute.

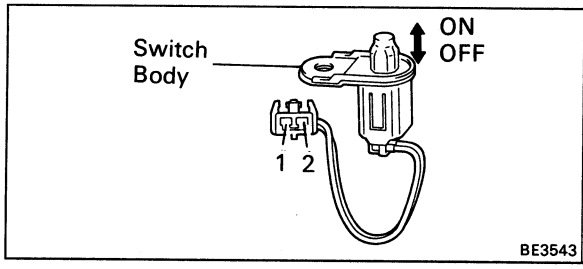
If one of the front or rear turn signal lights has an open circuit, the flash rate will be more than 140 times per minute.

If operation is not as specified, replace the flasher.

Illuminated Entry System

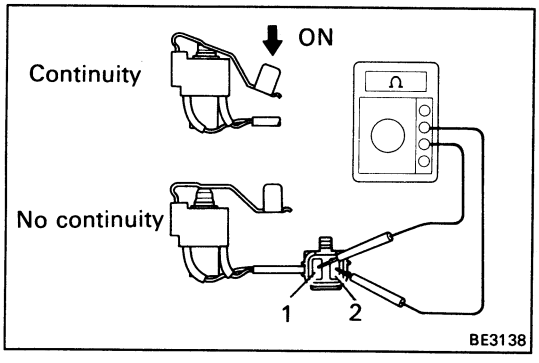
1. INSPECT DOOR COURTESY SWITCH

(Continuity)



Terminal / Switch position	1	2	Switch body
ON (Switch pin released)	○	○	○
		○	○
OFF (Switch pin pushed in)			

If continuity is not as specified, replace the switch.

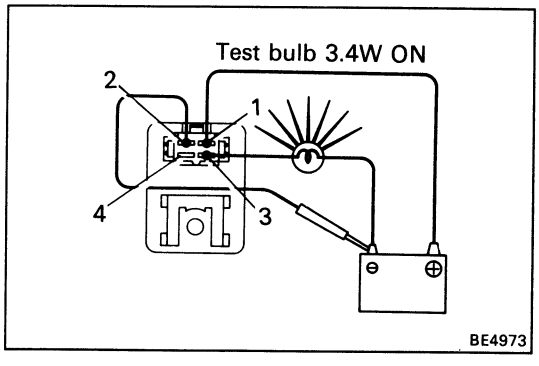


2. INSPECT DOOR OUTSIDE HANDLE SWITCH

(Continuity)

(a) Check that there is continuity between terminals 1 and 2 when door outside handle is pulled.

(b) Check that there is no continuity between terminals 1 and 2 when door outside handle is released.

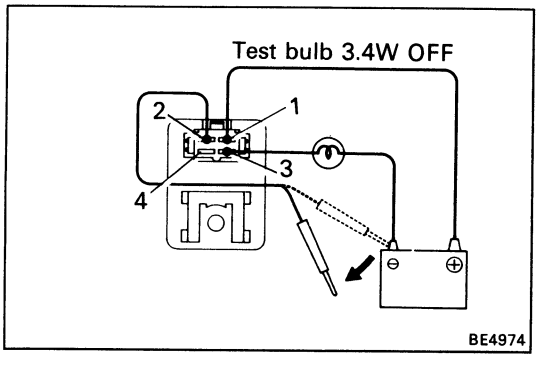


3. (w/o Door Key Cylinder Illumination Light) INSPECT ROOM LIGHT CONTROL RELAY

(Operation)

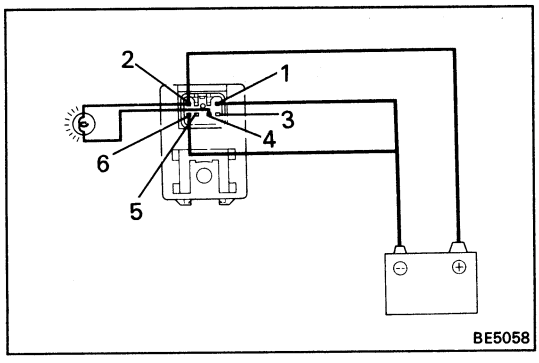
Connect the positive (+) lead from the battery to terminal 1. Connect the negative (–) lead to terminal 2. Connect a 3.4 W test bulb between terminal 3 and the negative (–) lead.

(a) Check that the bulb lights.



(b) Disconnect the negative (–) lead from the battery and check that the bulb goes out 5 seconds later.

If operation is not as specified, replace the relay.

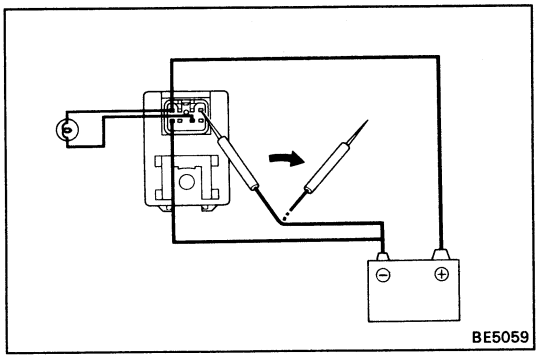


4. **(w/ Door Key Cylinder Illumination Light)**
INSPECT ROOM LIGHT CONTROL RELAY

(Courtesy switch circuit/Operation)

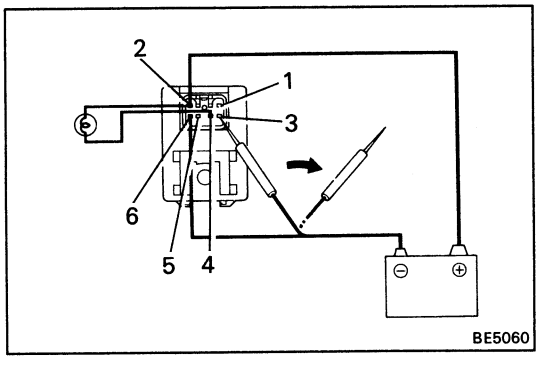
Connect the positive (+) lead from the battery to terminal 2. Connect the negative (–) lead to terminals 1 and 6. Connect a 3.4W test bulb between terminals 2 and 4.

(a) Check that the bulb lights.



(b) Disconnect the negative (–) lead from terminal 1, and check that the bulb fades out about 8.5 seconds later.

If operation is not as specified, replace the relay.



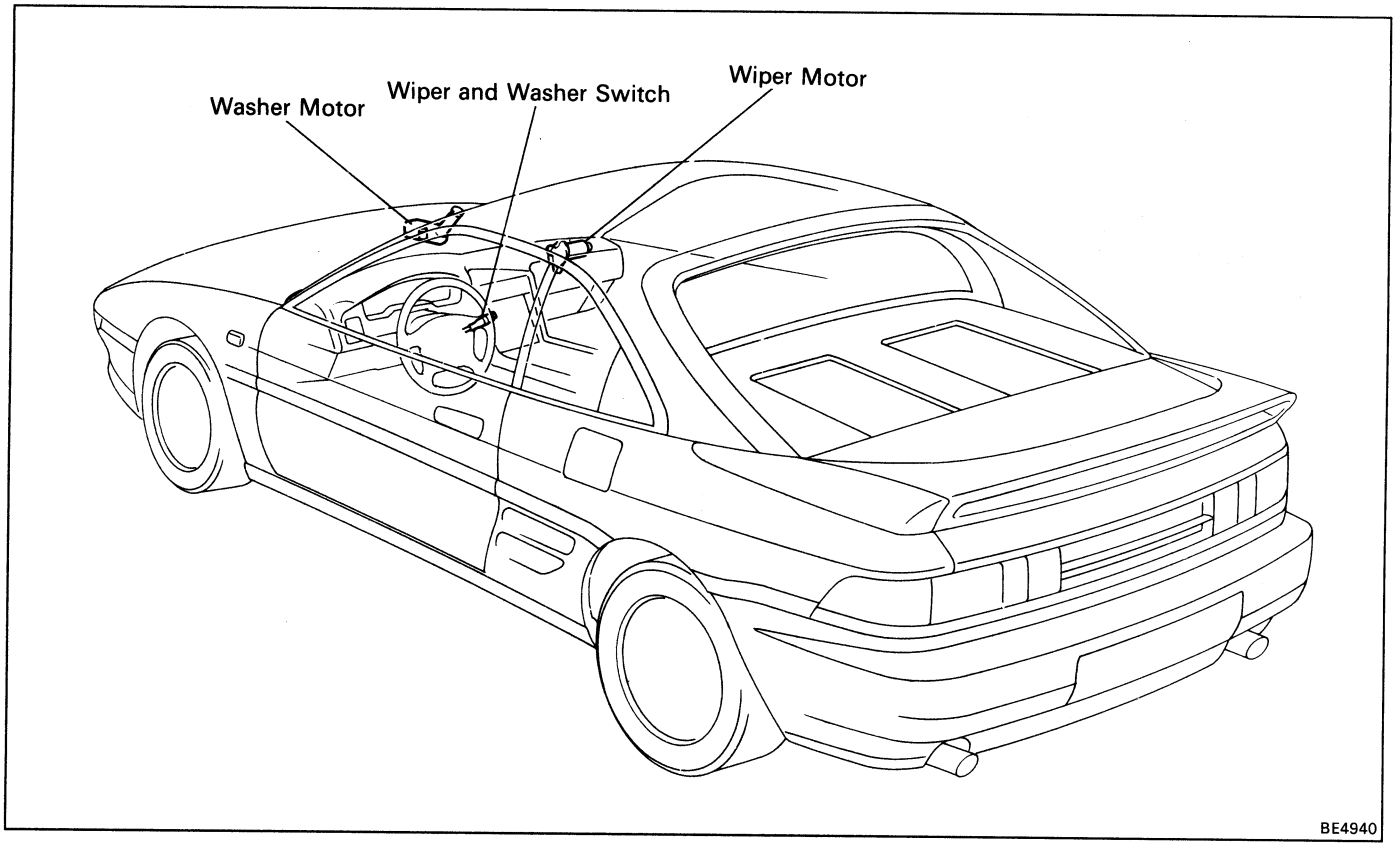
(Outside handle switch circuit/Operation)

Connect the positive (+) lead from battery to terminal 2. Connect the negative (–) lead to terminals 3 and 6. Connect a 3.4W test bulb between terminals 2 and 4. Disconnect the negative (–) lead from terminal 3, and check that the bulb fades out about 8.5 seconds later.

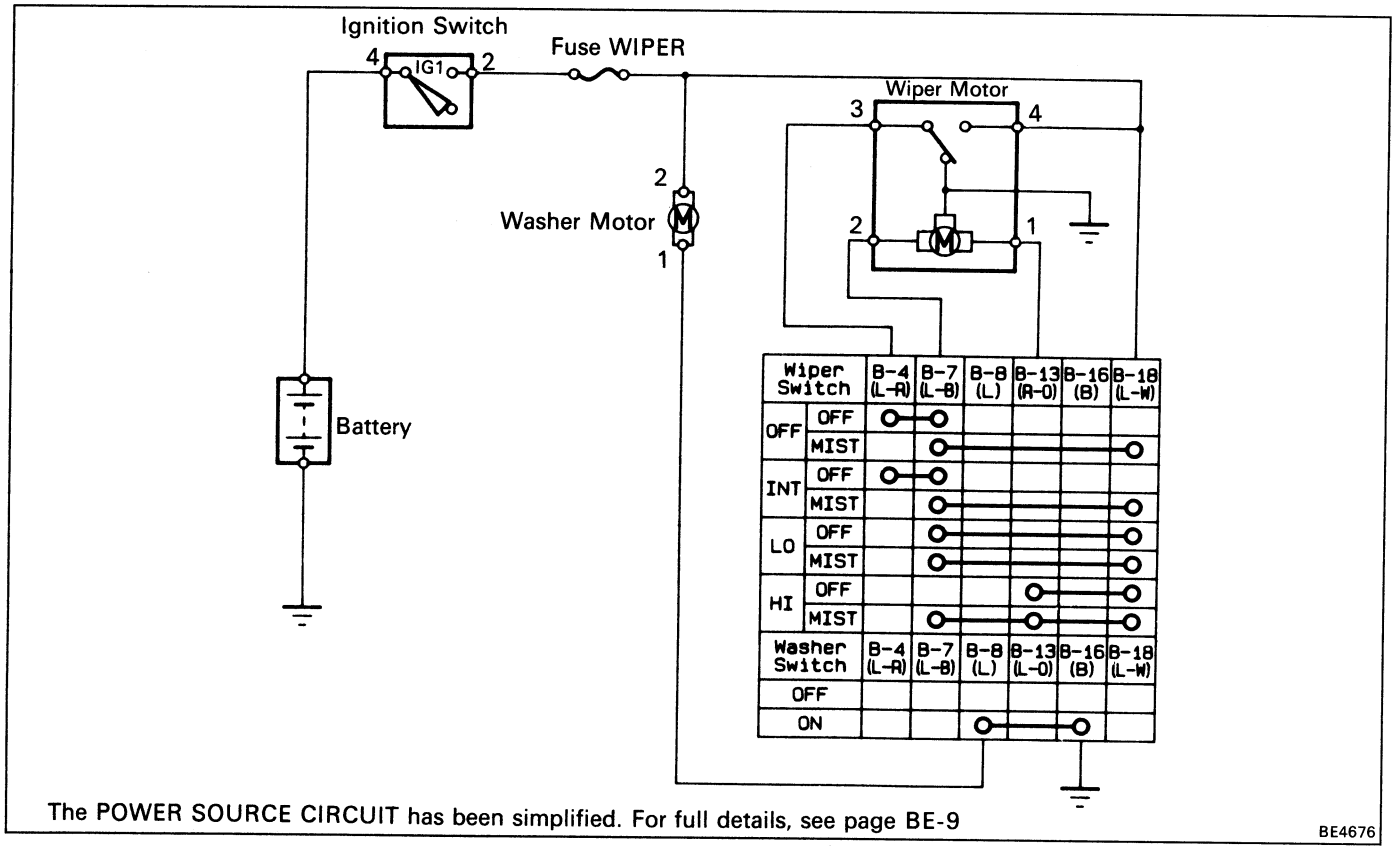
If operation is not as specified, replace the relay.

WIPER AND WASHER SYSTEM

Parts Location



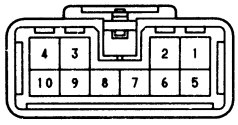
Wiring Diagram



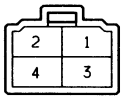
The POWER SOURCE CIRCUIT has been simplified. For full details, see page BE-9

Connector Diagrams

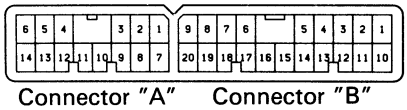
Ignition Switch



Wiper Motor



Wiper and Washer Switch



Connector "A" Connector "B"

Washer Motor

(All vehicles for CANADA, USA vehicles w/ Cold Area Spec.)



(USA vehicles w/o Cold Area Spec.)



e-10-2-B H-4-2 V-34-2
BE4107 IS-2-2-E

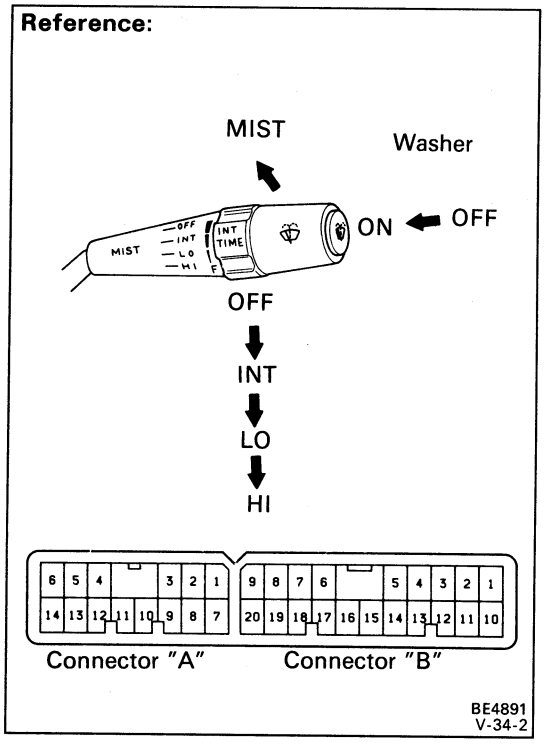
Troubleshooting

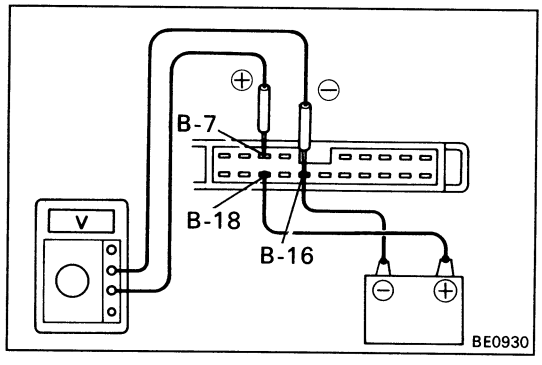
Problem	Possible cause	Remedy	Page
Wipers do not operate or return to off position	WIPER fuse blown Wiper motor faulty Wiper switch faulty Wiper or ground faulty	Replace fuse and check for short Check motor Check switch Repair as necessary	BE-3 BE-46 BE-45
Wiper do not operate in INT position	Wiper switch faulty Wiper motor faulty Wiring or ground faulty	Check switch Check motor Repair as necessary	BE-45 BE-46
Washers do not operate	Washer hose or nozzle clogged Washer motor faulty Wiper switch faulty Wiring faulty	Repair as necessary Replace motor Check switch Repair as necessary	 BE-47 BE-45

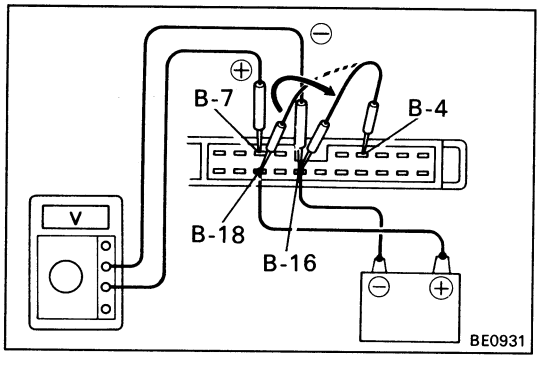
Parts Replacement

See Parts Replacement of Combination Switch on page BE-30.

Reference:







Parts Inspection

Wiper System

1. INSPECT SWITCH

(Wiper and Washer Switch/Continuity)

Terminal (Color) / Switch position			B-4 (L-R)	B-7 (L-B)	B-8 (L)	B-13 (R-O)	B-16 (B)	B-18 (L-W)
Wiper	OFF	OFF	O	O				
		MIST		O				O
	INT	OFF	O	O				
		MIST		O				O
	LO	OFF		O				O
		MIST		O				O
	HI	OFF				O		O
		MIST		O		O		O
Washer	OFF							
	ON				O		O	

If continuity is not as specified, replace the switch.

(Wiper and Washer Switch/Intermittent Wiper operation)

(a) Turn the wiper switch to INT position.

(b) (Variable Type)
Turn the intermittent time control switch to FAST position.

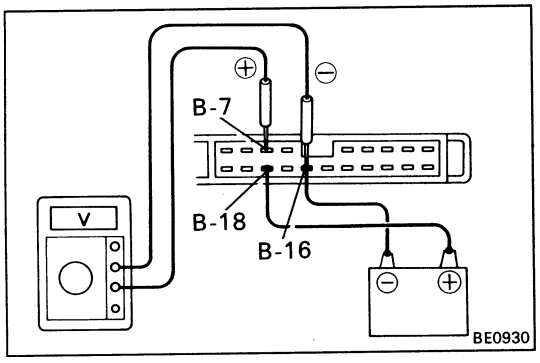
(c) Connect the positive (+) lead from the battery to terminal B-18 and the negative (–) lead to terminal B-16.

(d) Connect the positive (+) lead from the voltmeter to terminal B-7 and the negative (–) lead to terminal B-16, check that the meter needle indicates battery voltage.

(e) After connecting terminal B-4 to terminal B-18, connect to terminal B-16.
Then, check that the voltage rises from 0 volts to battery voltage within the times as shown in the table.

INT time control switch position	Voltage
FAST	1.6 ± 1 sec. — Battery voltage / 0 volts
SLOW	10.7 ± 5 sec. — Battery voltage / 0 volts
Non variable type	3.3 ± 1 sec. — Battery voltage / 0 volts

If operation is not as specified, replace the switch.

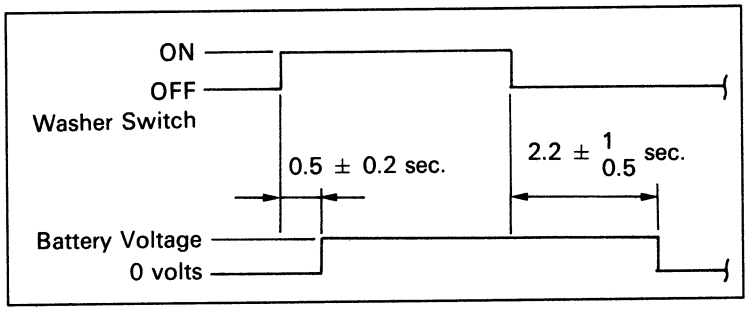


(Wiper and Washer Switch/Washer Linked Wiper Operation)

(a) Connect the positive (+) lead from the battery to terminal B-18 and the negative (–) lead to terminal B-16.

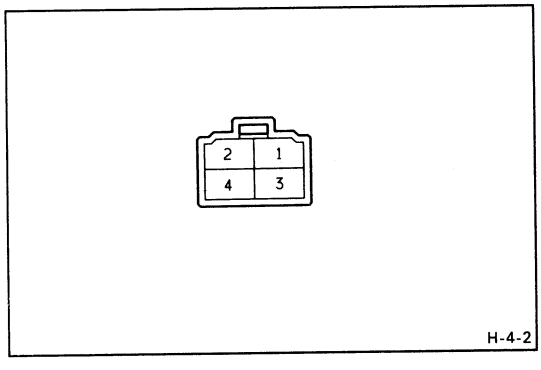
(b) Connect the positive (+) lead from the voltmeter to terminal B-7 and the negative (–) lead to terminal B-16.

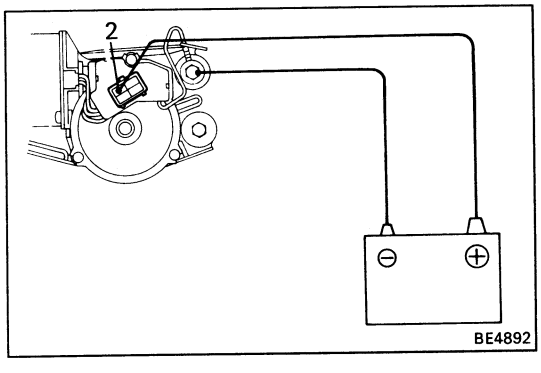
(c) Push in the washer switch. Check that the voltage changes as shown in the table.



If operation is not as specified, replace the switch.

2. INSPECT MOTOR

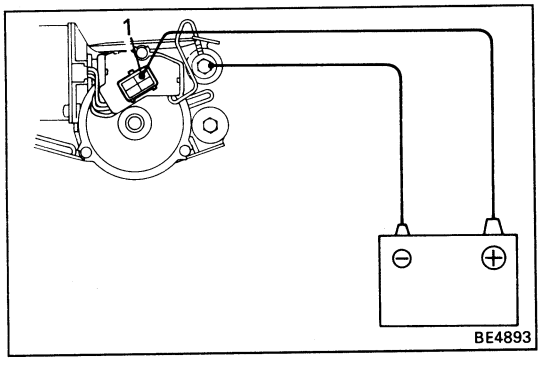




(Operation at Low Speed)

Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to the motor body, check that the motor operates at low speed.

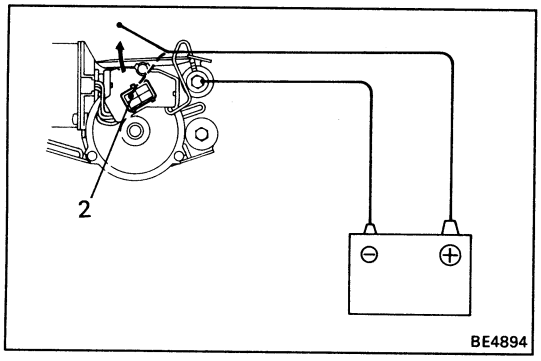
If operation is not as specified, replace the motor.



(Operation at High Speed)

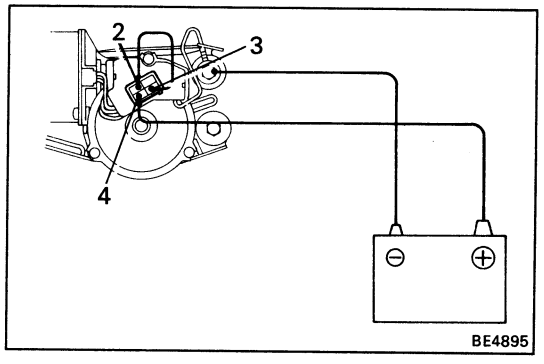
Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to the motor body, check that the motor operates at high speed.

If operation is not as specified, replace the motor.



(Operation, Stopping at Stop Position)

(a) Operate the motor at low speed and stop the motor operation anywhere except at the stop position by disconnecting positive (+) lead from terminal 2.



(b) Connect terminals 2 and 3.

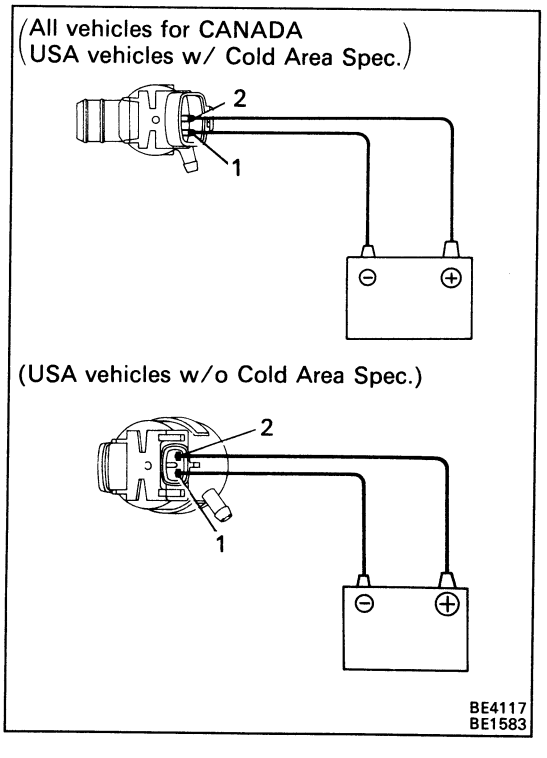
(c) Connect the positive (+) lead from the battery to terminal 4 and the negative (–) lead to the motor body, check that the motor stops running at the stop position after the motor operates again.

If operation is not as specified, replace the motor.

Washer System

1. INSPECT WASHER SWITCH

See (Wiper and Washer Switch/Continuity) on page BE-45.



2. INSPECT WASHER MOTOR

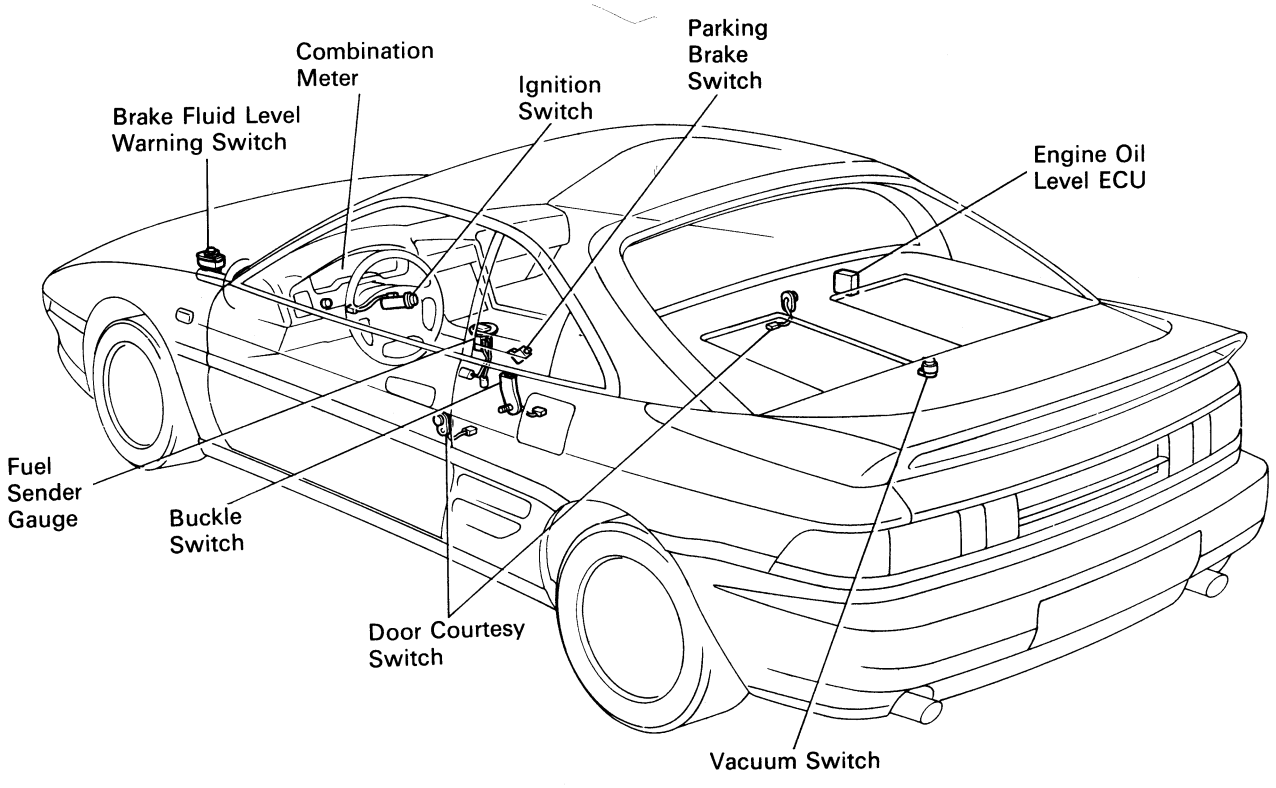
Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, check that the motor operates.

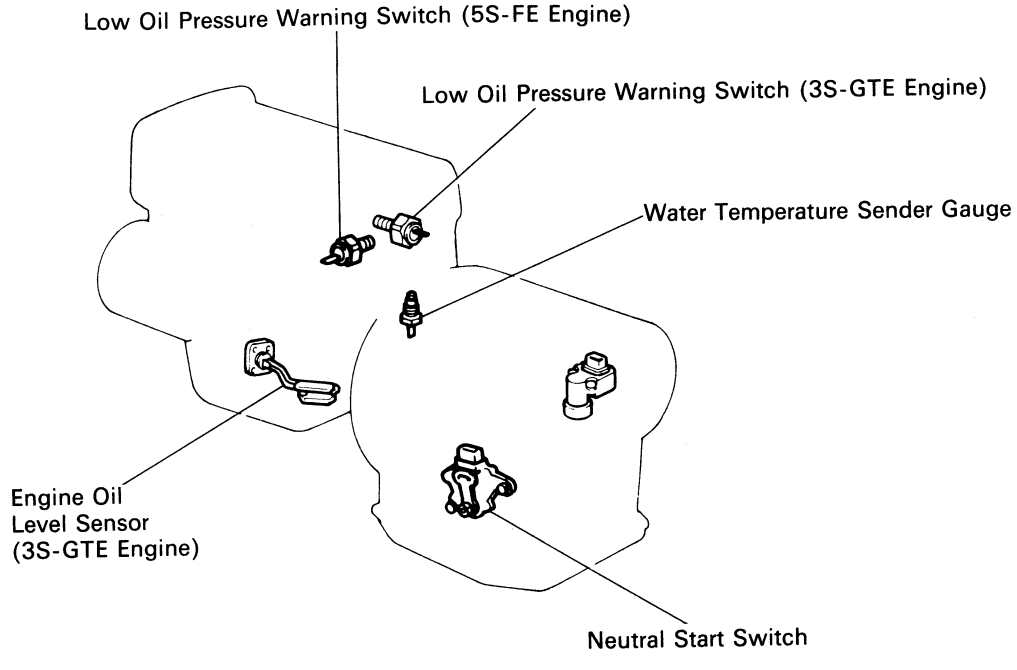
NOTICE: These tests must be performed quickly (within 20 seconds) to prevent the coil from burning out.

If operation is not as specified, replace the motor.

COMBINATION METER

Parts Location



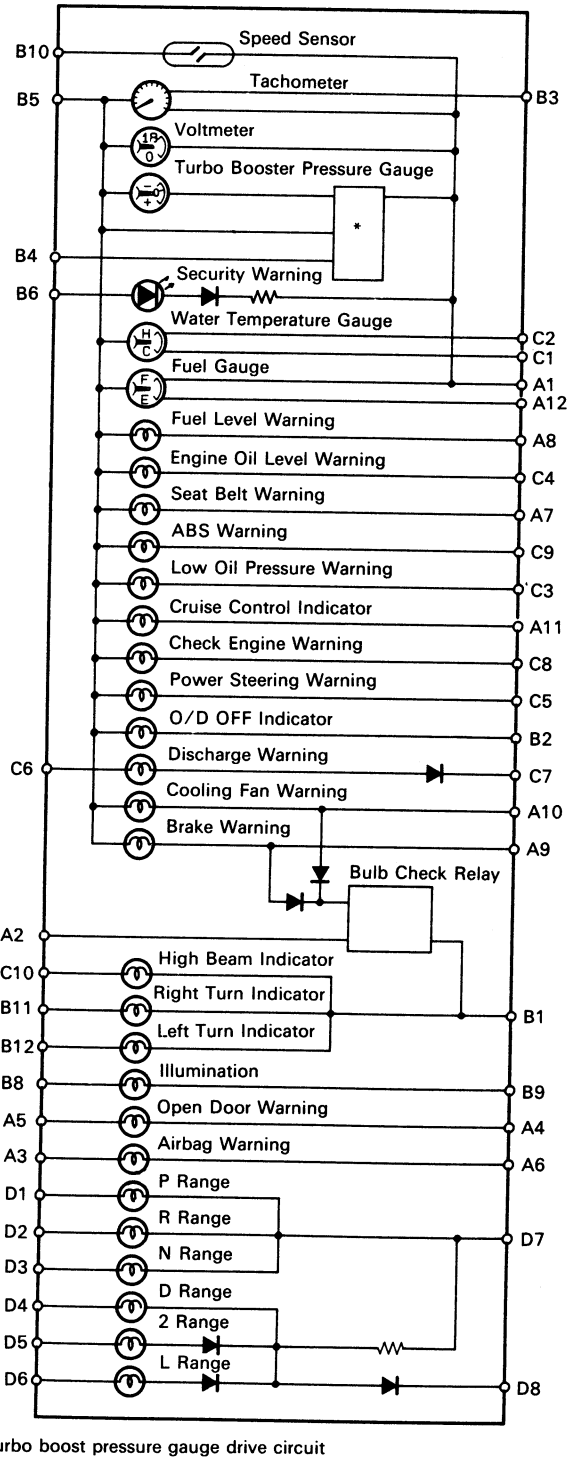


BE5236
BE5237

Meter Circuit

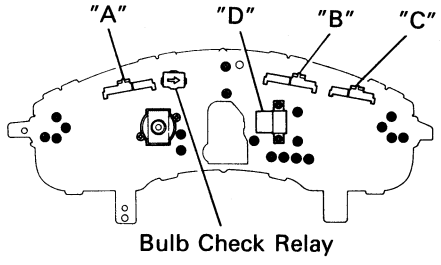
Connector "A" Connector "B" Connector "C" Connector "D"





* Turbo boost pressure gauge drive circuit

BE1266 BE1267 BE1270 S-10-2
BE5062 BE5061



No.		Wiring connector side
A	1	Ground
	2	Starter Relay
	3	Fuse ECU-B
	4	Door Courtesy Switch – terminal 2
	5	Fuse DOME
	6	Airbag ECU
	7	Seatbelt Warning Relay
	8	Fuel Sender Gauge – terminal 2
	9	Brake Fluid Level Warning Switch – terminal 1, and Parking Brake Switch
	10	Cooling FAN ECU
	11	Cruise Control ECU
	12	Fuel Sender Gauge – terminal 1
B	1	Ground
	2	O/D OFF
	3	Igniter
	4	Turbo Pressure Sensor
	5	Fuse GAUGE
	6	Theft Deterrent ECU
	8	Taillight Control Relay
	9	Light Control Rheostat – terminal 3
	10	Speed Control Unit
	11	Turn Signal Switch
	12	Turn Signal Switch
C	1	Water Temperature Sender Gauge
	2	Ground
	3	Low Oil Pressure Warning Switch
	4	Engine Oil Level ECU
	5	Power Steering ECU
	6	Fuse IGN
	7	Alternator – terminal "L"
	8	Engine ECU
	9	ABS ECU
	10	Headlight Dimmer Switch
D	1	Neutral Start Switch
	2	Neutral Start Switch
	3	Neutral Start Switch
	4	Neutral Start Switch
	5	Neutral Start Switch
	6	Neutral Start Switch
	7	Ground
	8	Taillight Control Relay

Troubleshooting

Problem	Possible cause	Remedy	Page
*Gauges and indicator lights do not operate	GAUGE fuse faulty Wiring or ground faulty	Replace fuse and check for short Repair as necessary	BE-3
Speedometer does not operate	Speedometer cable faulty Speedometer faulty	Check cable Check speedometer	BE-52
Tachometer does not operate	Tachometer faulty Wiring or ground faulty	Check tachometer Repair as necessary	BE-52
Turbo boost pressure gauge does not operate	Turbo boost pressure gauge faulty Turbo pressure sensor faulty Turbo meter drive circuit faulty Wiring or ground faulty	Check turbo boost pressure faulty Check sensor Check drive circuit Repair as necessary	BE-60 BE-60 BE-61
Voltmeter does not operate	Voltmeter faulty Wiring or ground faulty	Check voltmeter Repair as necessary	BE-53
Fuel gauge does not operate	Receiver gauge faulty Sender gauge faulty Wiring or ground faulty	Check gauge Check gauge Repair as necessary	BE-53 BE-53
Fuel level warning light does not light up	Bulb burned out Warning switch faulty Wiring or ground faulty	Replace bulb Check gauge Repair as necessary	BE-54
Water temperature gauge does not operate	Receiver gauge faulty Sender gauge faulty Wiring or ground faulty	Check gauge Check gauge Repair as necessary	BE-55 BE-55
Engine oil level warning light does not light up	Bulb burned out Engine oil level sensor faulty Engine oil level ECU faulty Wiring or ground faulty	Replace bulb Check sensor Check ECU Repair as necessary	BE-56 BE-56
Low oil pressure warning light does not light up	Bulb burned out Low oil pressure warning switch faulty Wiring or ground faulty	Replace bulb Check switch Repair as necessary	BE-57

* Tachometer, Voltmeter, Turbo boost pressure gauge, Fuel gauge, Fuel level warning light, Water temperature gauge, Engine oil level warning light, Low oil pressure warning light, Brake warning light, ABS warning light, Check engine warning light, O/D OFF indicator light, Cooling fan warning light, Power steering warning light, Seat belt warning light and Cruise control indicator light.

Troubleshooting (Cont'd)

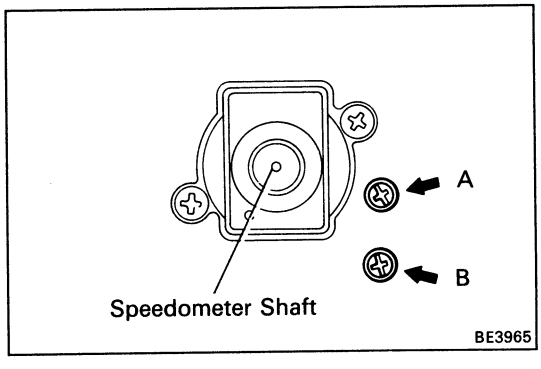
Problem	Possible cause	Remedy	Page
Brake warning light does not light up	Bulb burned out Brake fluid level warning switch faulty Parking brake switch faulty Wiring or ground faulty	Replace bulb Check switch Check switch Repair as necessary	 BE-58 BE-58
Seat belt warning light does not light up	Bulb burned out Buckle switch faulty Seat belt warning relay faulty	Replace bulb Check switch Check relay	 BE-59 BE-59
Open door warning light does not light up	DOME fuse faulty Bulb burned out Door courtesy switch faulty Wiring or ground faulty	Replace fuse and check for short Replace bulb Check switch Repair as necessary	BE-3 BE-58
Meter illumination lights do not light up	Bulbs burned out Light control rheostat faulty Wiring or ground faulty	Replace bulbs Check rheostat Repair as necessary	 BE-62

(mph)

Standard indication	Allowable range
20	20 – 23
40	40 – 43.5
60	60 – 64
80	80 – 84.5
100	100 – 105
120	120 – 125.5
140	140 – 146

(km/h)

Standard indication	Allowable range
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
180	180 – 188
200	200 – 209
220	220 – 230
240	240 – 251



DC 13.5V, 25°C (77°F) rpm	
Standard indication	Allowable range
700	610 – 750
3,000	2,800 – 3,200
5,000	4,800 – 5,200
7,000	6,700 – 7,300

Parts Inspection

Speedometer System

1. INSPECT SPEEDOMETER (ON-VEHICLE)

(a) Using a speedometer tester, inspect the speedometer for allowable indication error and check the operation of the odometer.

HINT: The wear and tire over or under inflation will increase the indication error.

If error is excessive, replace the speedometer.

(b) Check the speedometer for pointer vibration and abnormal noise.

HINT: Pointer vibration can be caused by a loose speedometer cable.

2. INSPECT SPEED SENSOR

Check that there is continuity between terminals A and B four times per each revolution of the speedometer shaft.

If operation is not as specified, replace the speedometer.

Tachometer System

INSPECT TACHOMETER (ON-VEHICLE)

(a) Connect a tune-up test tachometer, and start the engine.

NOTICE:

- **Reversing the connection of the tachometer will damage the transistors and diodes inside.**
- **When removing or installing the tachometer, be careful not to drop or subject it to heavy shocks.**

(b) Compere the tester and tachometer indications.

If error is excessive, replace the tachometer.

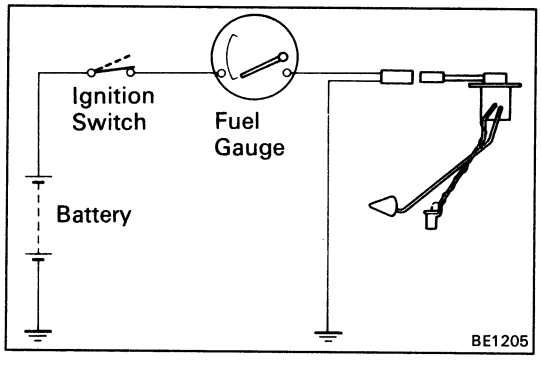
Voltmeter System

INSPECT VOLTMETER (ON-VEHICLE)

Compare the tester and voltmeter indications.

If error is excessive, replace the voltmeter.

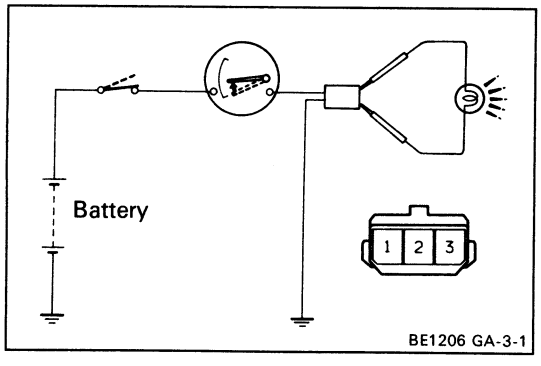
Fuel Gauge System



1. INSPECT RECEIVER GAUGE (Operation)

(a) Disconnect the connector from the sender gauge.

(b) Turn the ignition switch ON, check that the receiver gauge needle indicates EMPTY.

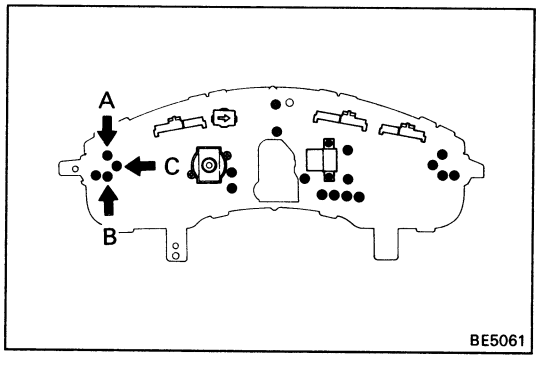


(c) Connect terminals 1 and 3 on the wire harness side connector through a 3.4 W test bulb.

(d) Turn the ignition switch ON, check that the bulb lights up and receiver gauge needle moves toward the full side.

HINT: Because of the silicon oil in the gauge, it will take a short time for the needle to stabilize.

If operation is not as specified, inspect the receiver gauge resistance.

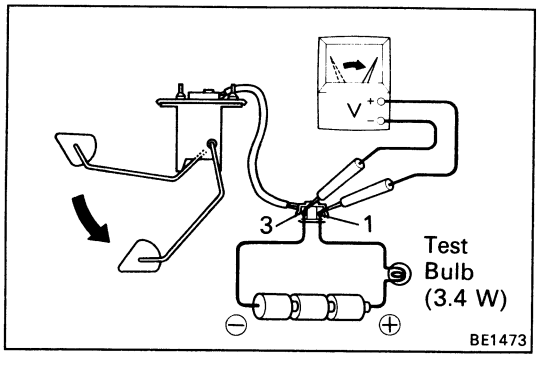


(Resistance)

Measure the resistance between terminals.

Between terminals	Resistance (Ω)
A – B	Approx. 101.9
A – C	Approx. 203.2
B – C	Approx. 101.3

If resistance value is not as specified, replace the receiver gauge.

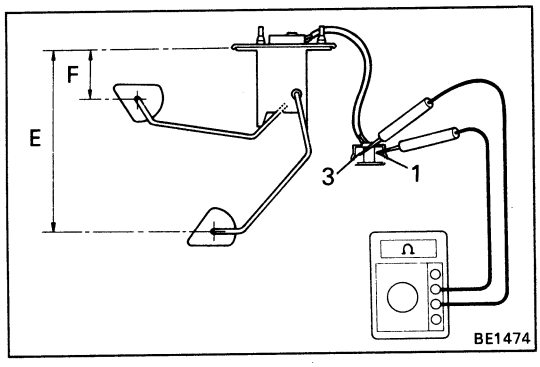


2. INSPECT SENDER GAUGE (Operation)

(a) Connect a series of three 1.5V dry cell batteries.

(b) Connect the positive (+) lead from the dry cell batteries to terminal 1 through a 3.4 W test bulb and the negative (–) lead to terminal 3.

(c) Check that the voltage rises between terminals 1 and 3 as the float is moved from the top to bottom position.



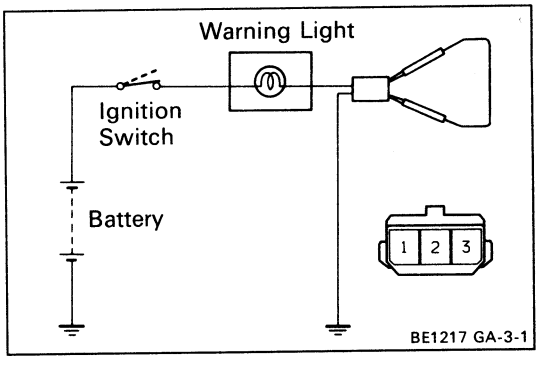
(Resistance)

Measure the resistance between terminals 1 and 3 for each float position.

Float position mm (in.)		Resistance (Ω)
F	Approx. 59.9 (2.358)	3 ± 1.0
E	Approx. 228.1 (8.980)	110 ± 7.7

If resistance value is not as specified, replace the sender gauge.

Fuel Level Warning System



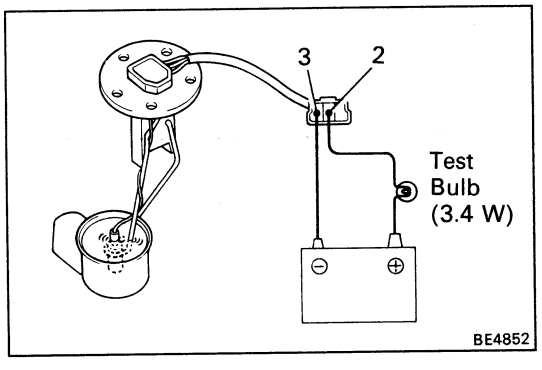
1. INSPECT WARNING LIGHT

(a) Disconnect the connector from the sender gauge.

(b) Connect terminals 2 and 3 on the wire harness side connector.

(c) Turn the ignition switch ON, check that the warning light lights up.

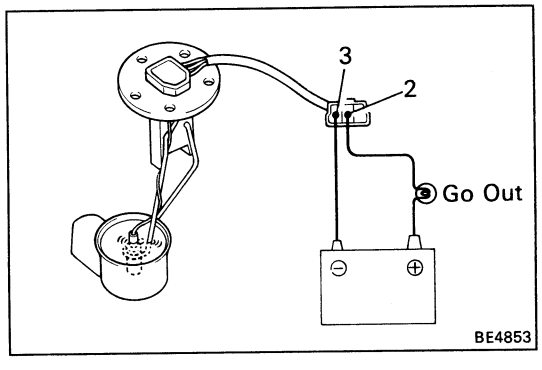
If the warning light does not light up, test the bulb.



2. INSPECT WARNING SWITCH

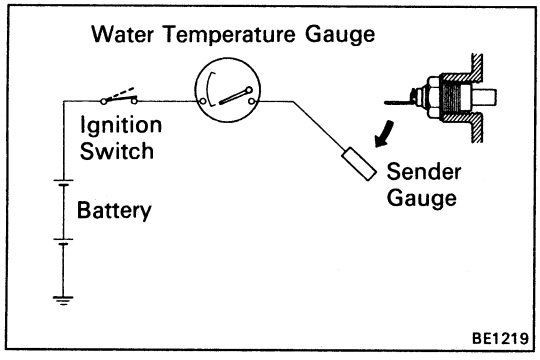
(a) Apply battery voltage between terminals 2 and 3 through a 3.4W test bulb, check that the bulb lights up.

HINT: It will take a short time for the bulb to light up.



(b) Submerge the switch in fuel, check that the bulb goes out.

If operation is not as specified, replace the sender gauge.



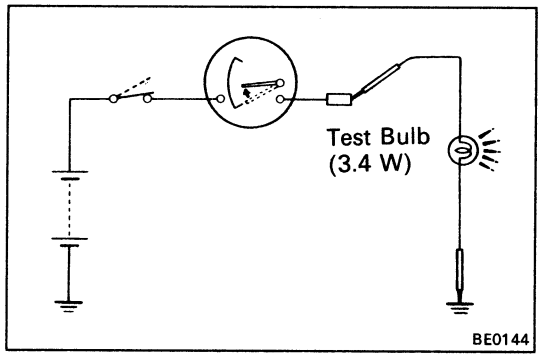
Water Temperature Gauge System

INSPECT RECEIVER GAUGE

(Operation)

(a) Disconnect the connector from the sender gauge.

(b) Turn the ignition switch ON, check that the receiver gauge needle indicates COOL.

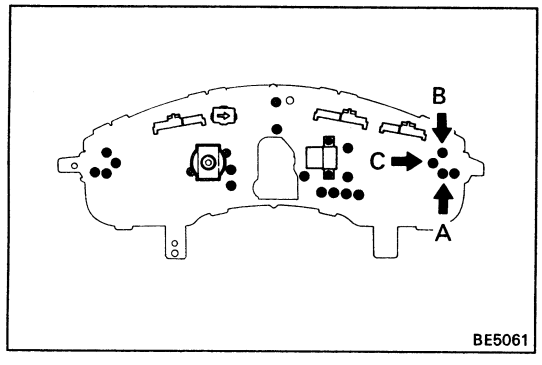


(c) Ground terminal on the wire harness side connector through a 3.4 W test bulb.

(d) Turn the ignition switch ON, check that the bulb lights up and receiver gauge needle moves toward the hot side.

If operation is as specified, replace the sender gange. Then, recheck the system.

If operation is not as specified, measure the receiver gauge resistance.



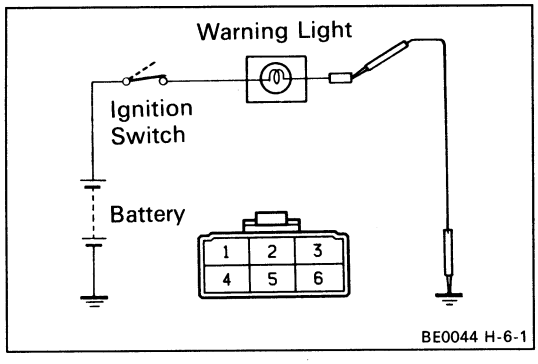
(Resistance)

Measure the resistance between terminals.

HINT: Connect the test leads so that the current from the ohmmeter can flow according to the chart order.

Between terminals	Resistance (Ω)
A – B	Approx. 54
A – C	Approx. 146.2
B – C	Approx. 200.2

If resistance value is not as specified, replace the receiver gauge.



Engine Oil Level Warning System

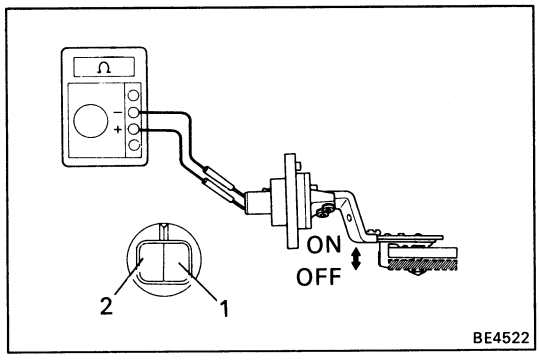
1. INSPECT WARNING LIGHT

(a) Disconnect the connector from the engine oil level ECU.

(b) Ground terminal 1 on the wire harness side connector.

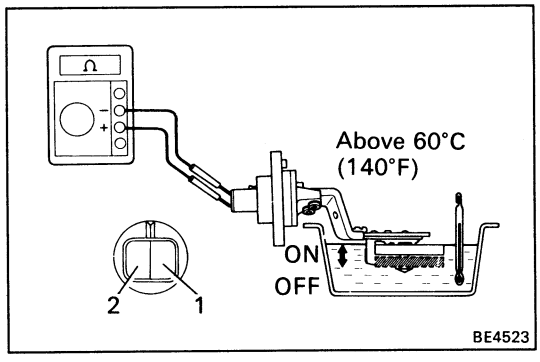
(c) Turn the ignition switch ON, check that the warning light lights up.

If the warning light does not light up, test the bulb.



2. INSPECT ENGINE OIL LEVEL SENSOR

(a) Check that there is continuity between terminal with the switch each position.

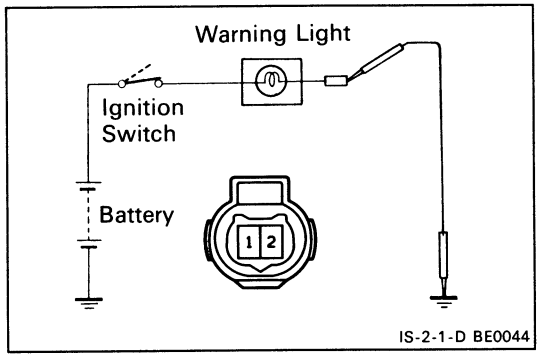


(b) Heat the switch to above 60°C (140°F) in an oil bath.

(c) Check that there is continuity between terminals with the switch ON (float up).

(d) Check that there is no continuity between terminals with the switch OFF (float down).

If operation is not as specified, replace the switch.



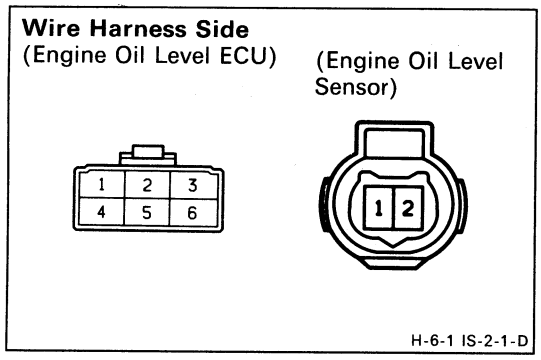
3. INSPECT ENGINE OIL LEVEL ECU (Operation)

(a) Disconnect the connector from the engine oil level sensor.

(b) Ground terminal 1 on the wire harness side connector.

(c) Turn the ignition switch ON, check that the warning light lights up approximately 40 seconds later.

If operation is not as specified, inspect the relay circuit.



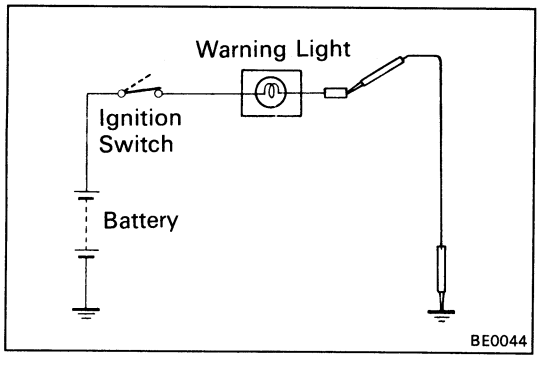
(Relay Circuit)

(a) Disconnect the connectors from the engine oil level ECU and engine oil level sensor.

(b) Inspect the connectors on the wire harness side as shown in the chart.

Check for	Tester connection	Condition		Specified value
Continuity	2/6 – 1/2	Constant		Continuity
	5/6 – 2/2	Constant		Continuity
Voltage	3/6 – Ground	Engine condition	Stopped	No voltage
			Running	Battery voltage
	6/6 – Ground	Ignition switch position	LOCK or ACC	No voltage
			ON	Battery voltage

If circuit is as specified, replace the engine oil level ECU.



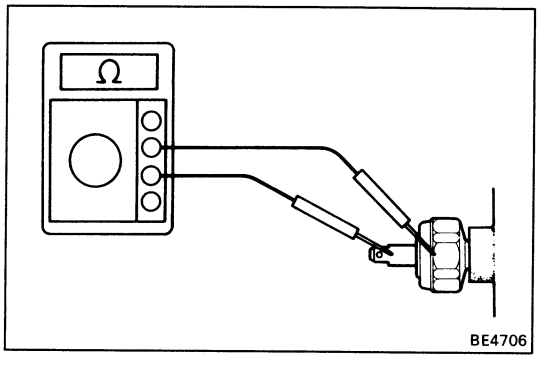
Low Oil Pressure Warning System

1. INSPECT WARNING LIGHT

(a) Disconnect the connector from the warning switch and ground terminal on the wire harness side connector.

(b) Turn the ignition switch ON, check that the warning light lights up.

If the warning light does not light up, test the bulb.



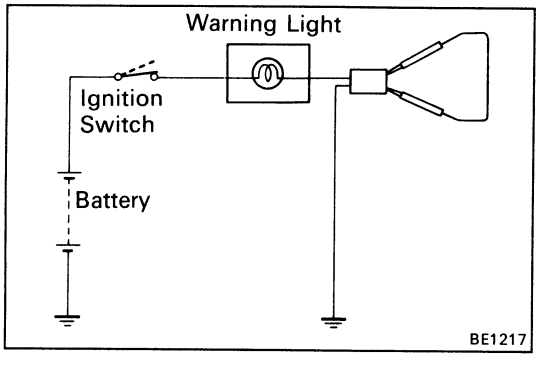
2. INSPECT LOW OIL PRESSURE WARNING SWITCH

(a) Check that there is continuity between terminal and ground with the engine stopped.

(b) Check that there is no continuity between terminal and ground with the engine running.

HINT: Oil pressure should be over 0.5 kg/cm^2 (7.1 psi, 49 kPa).

If operation is not as specified, replace the switch.



Brake Warning System

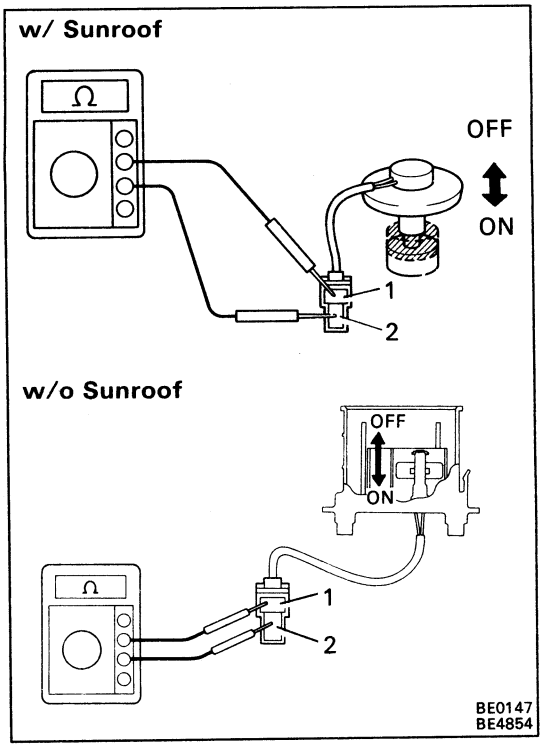
1. INSPECT WARNING LIGHT

(a) Disconnect the connectors from the brake fluid level warning switch and parking brake switch.

(b) Connect terminals on the wire harness side of the level warning switch connector.

(c) Turn the ignition switch ON, check that the warning light lights up.

If the warning light does not light up, test the bulb.

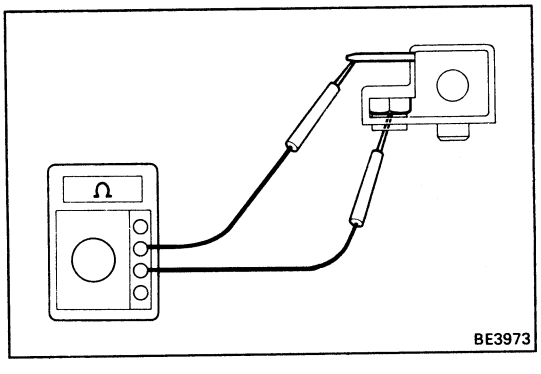


2. **INSPECT SWITCHES**
(Brake Fluid Level Warning Switch)

(a) Check that there is no continuity between terminals with the switch OFF (float up).

(b) Check that there is continuity between terminals with the switch ON (float down).

If operation is not as specified, replace the switch.



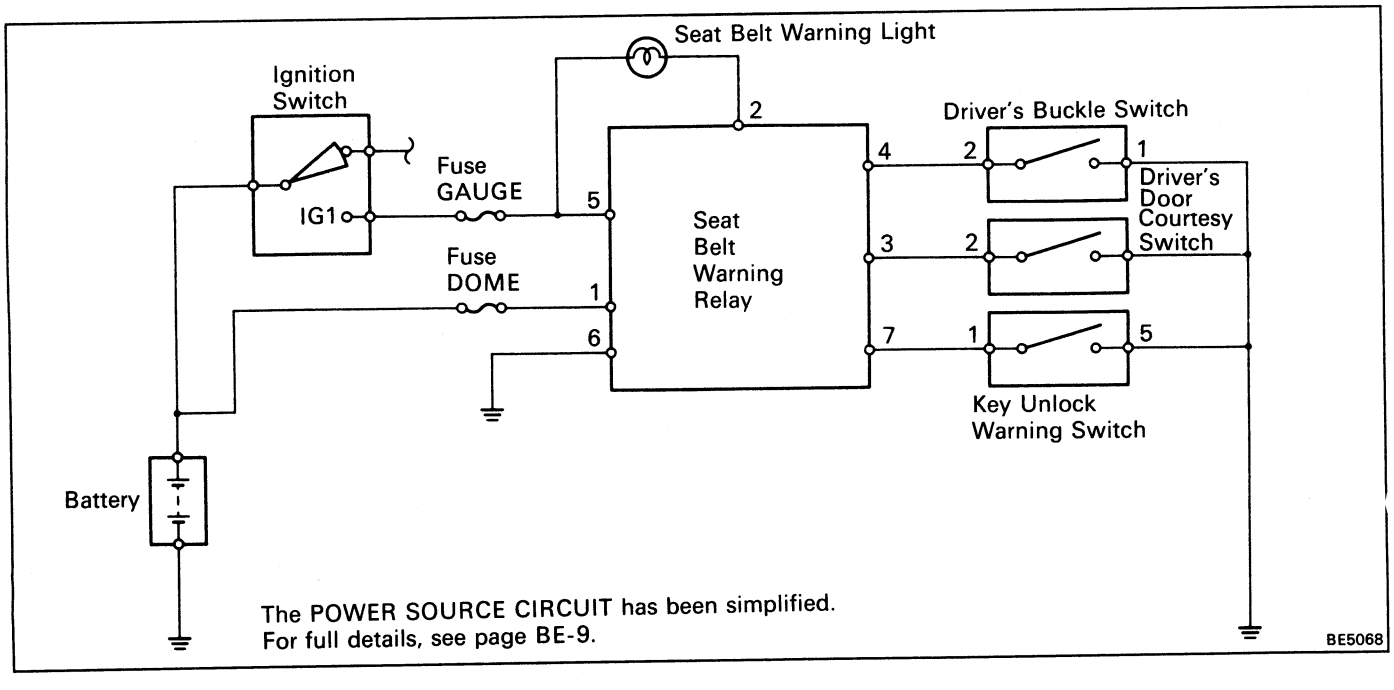
(Parking Brake Switch)

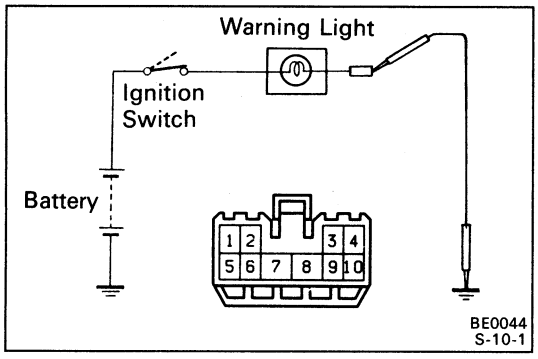
(a) Check that there is continuity between terminals with the switch ON (switch pin released).

(b) Check that there is no continuity between terminals with the switch OFF (switch pin pushed in).

Seat Belt Warning System

(Wiring Diagram)





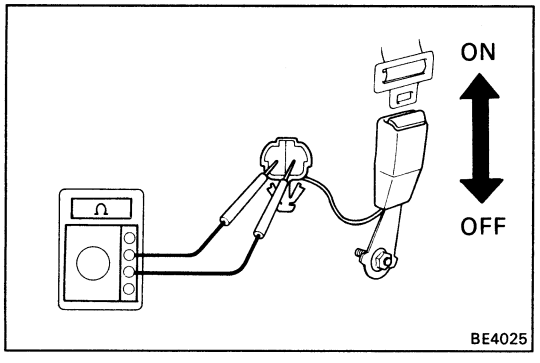
1. INSPECT WARNING LIGHT

(a) Disconnect the connector from the seat belt warning relay.

(b) Ground terminal 5 on the wire harness side.

(c) Turn the ignition switch ON, check that the warning light lights up.

If the warning lights does not light up, test the bulb.

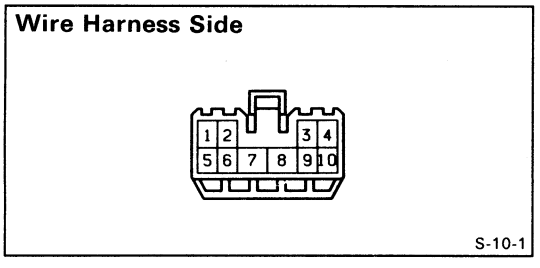


2. INSPECT BUCKLE SWITCH

(a) Check that there is continuity between terminals on the switch side connector with the switch ON (belt fastened).

(b) Check that there is no continuity between terminals on the switch side connector with the switch OFF (belt unfastened).

If operation is not as specified, replace the seat belt inner.

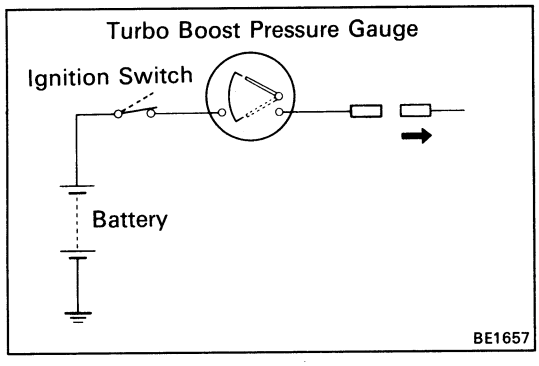


3. INSPECT SEAT BELT WARNING RELAY (Relay Circuit)

Disconnect connector and inspect connector on wire harness side as shown in the chart.

Check for	Tester connector	Condition		Specified value
Continuity	3 – Ground	Driver's door courtesy switch position	OFF (door closed)	No continuity
			ON (door opened)	Continuity
	4 – Ground	Driver's buckle switch position	OFF (seat belt unfastened)	No continuity
			ON (seat belt fastened)	Continuity
	6 – Ground	Constant		Continuity
	7 – Ground	Key unlock warning switch position	OFF (ignition key removed)	No continuity
			ON (ignition key set)	Continuity
Voltage	1 – Ground	Constant		Battery voltage
	2 – Ground 5 – Ground	Ignition switch position	LOCK or ACC	No voltage
			ON	Battery voltage

If circuit is as specified, replace the relay.

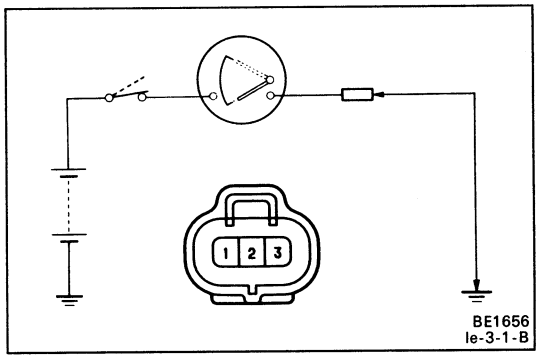


Turbo Boost Pressure Gauge System

1. INSPECT TURBO BOOST PRESSURE GAUGE (Operation)

(a) Disconnect the connector from the pressure sensor.

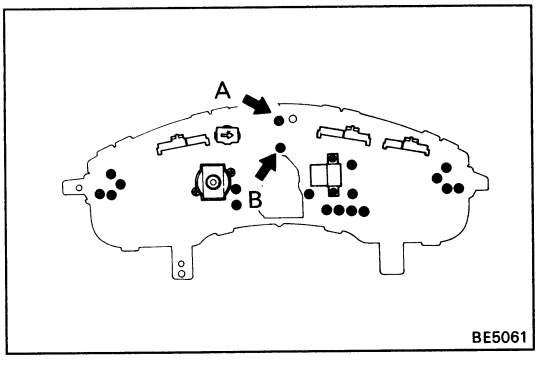
(b) Turn the ignition switch ON, check that the gauge needle moves to upper position.



(c) Ground terminal 2 on the wire harness side.

Check that the gauge needle moves to lower position.

If operation is not as specified, inspect the turbo boost pressure gauge drive circuit and resistance.



(Resistance)

Measure the resistance between terminals A and B.

Resistance: Approx. 72 Ω

If resistance value is not as specified, replace the turbo boost pressure gauge.

2. INSPECT TURBO PRESSURE SENSOR

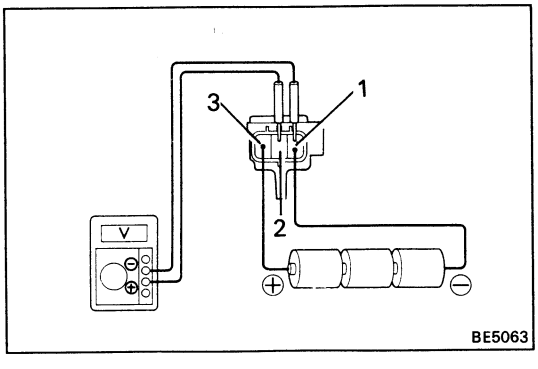
(a) Connect a series of three 1.5 V dry cell batteries.

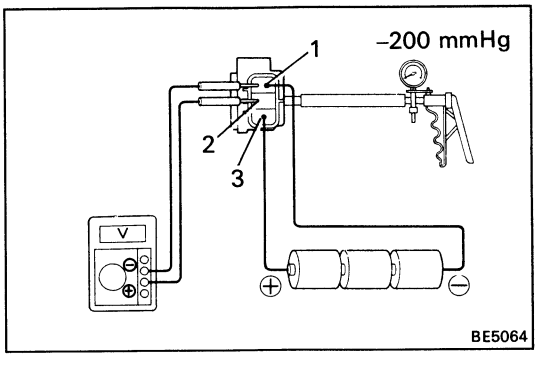
(b) Connect the positive (+) lead from the dry cell batteries to terminal 3 and the negative (–) lead to terminal 1.

(c) Connect the positive (+) lead from the voltmeter to terminal 2 and the negative (–) lead to terminal 1.

(d) Check that the voltage between terminals 2 and 1.

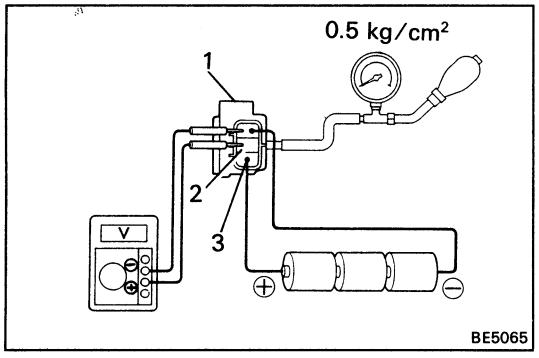
Voltage: Approx. 2.4 V





(e) Apply 200 mmHg (7.87 in.Hg. 26.7 kPa) of vacuum.

Check that the voltage drops below approximately 2.4 V.

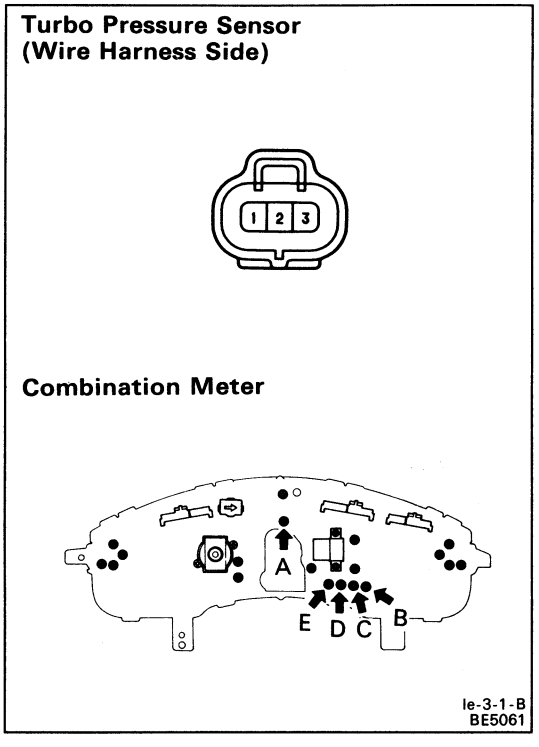


(f) Using SST, apply 0.5 kg/cm² (7.1 psi, 49 kPa) of pressure.

Check that the voltage rises approximately 2.4 V.

SST 09992-00241

If operations are not as specified. replace the sensor.



3. INSPECT TURBO BOOST PRESSURE GAUGE DRIVE CIRCUIT

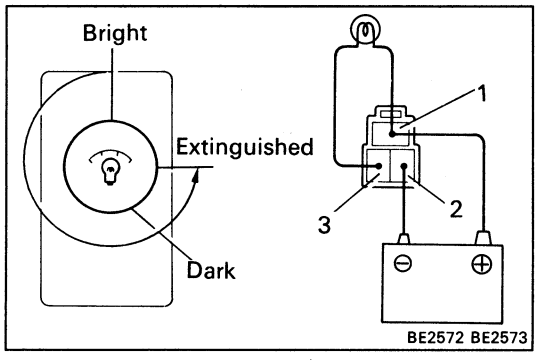
(a) Disconnect the connector from the turbo pressure sensor.

(b) Remove the combination meter with connected three connectors.

(c) Inspect the connector on the wire harness side and terminals of the turbo boost pressure gauge drive circuit as shown in the chart.

Check for	Tester connection	Condition		Specified value
Continuity	A – B	Constant		Continuity
	C – 2	Constant		Continuity
	D – Ground	Constant		Continuity
	1 – Ground	Constant		Continuity
Voltage	E – Ground	Ignition Switch position	LOCK or ACC	No voltage
			ON	Battery voltage
	3 – Ground	Ignition Switch position	LOCK or ACC	No voltage
			ON	Battery voltage

If circuit is as specified, replace the drive circuit.



Meter Illumination Control System

INSPECT LIGHT CONTROL RHEOSTAT

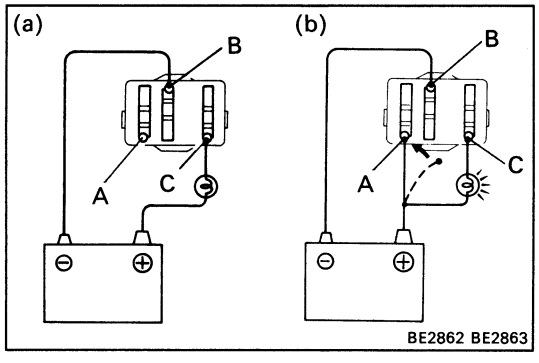
(a) Connect terminals 1 and 3 through a 3.4 W test bulb.

(b) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2.

(c) Turn the rheostat knob to fully counterclockwise, check that the test bulb goes out.

(d) Gradually turn the rheostat knob to clockwise, check that the test bulb brightness changes from dark to bright.

If operation is not as specified, replace the rheostat.



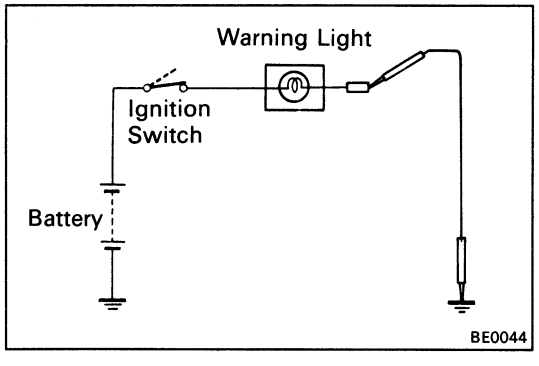
Bulb Check System

INSPECT BULB CHECK RELAY

(a) Connect the positive (+) lead from the battery to terminal C through a 1.4 W test bulb and the negative (–) lead to terminal B, check that the test bulb does not light up.

(b) Connect the positive (+) lead from the battery to terminal A, check that the test bulb lights up.

If operation is not as specified, replace the relay.



Open Door Warning System

1. INSPECT WARNING LIGHT

(a) Disconnect the connector from the door courtesy switch and groung terminal on the wire harness side connector.

(b) Turn the ignition switch ON, check that the warning light lights up.

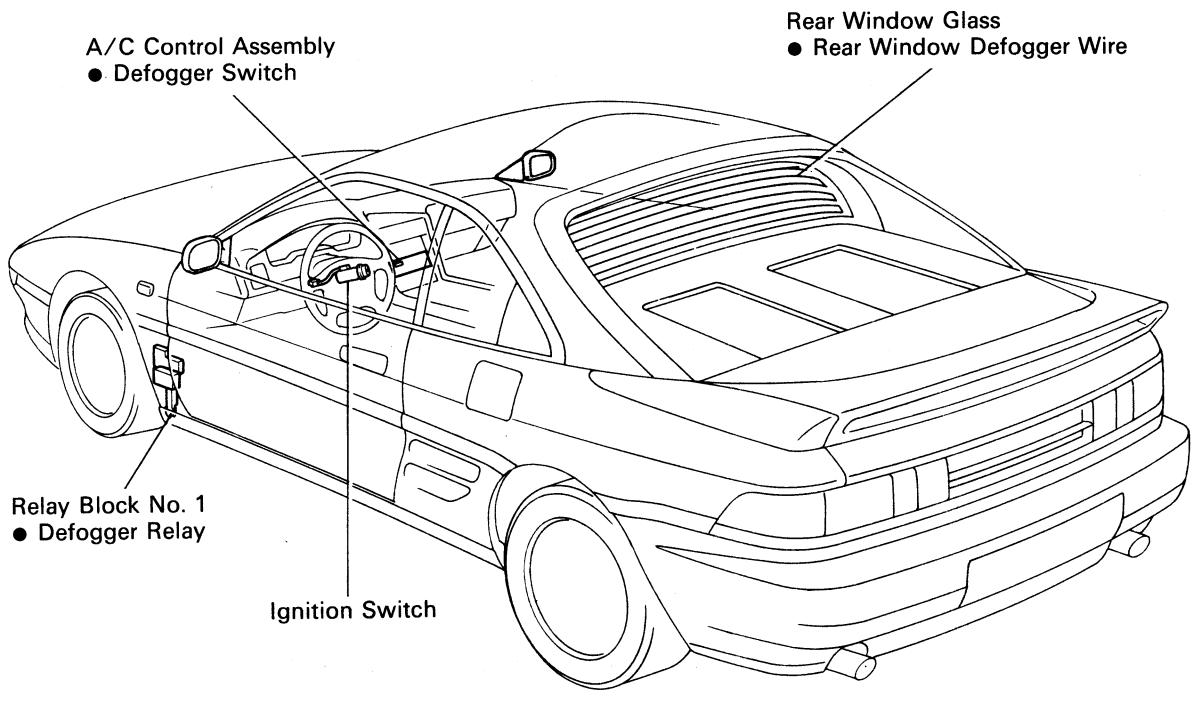
If the warning does not light up, test the bulb.

2. INSPECT DOOR COURTESY SWITCH

See step 1 of Illuminated Entry Sysatem on page BE-41.

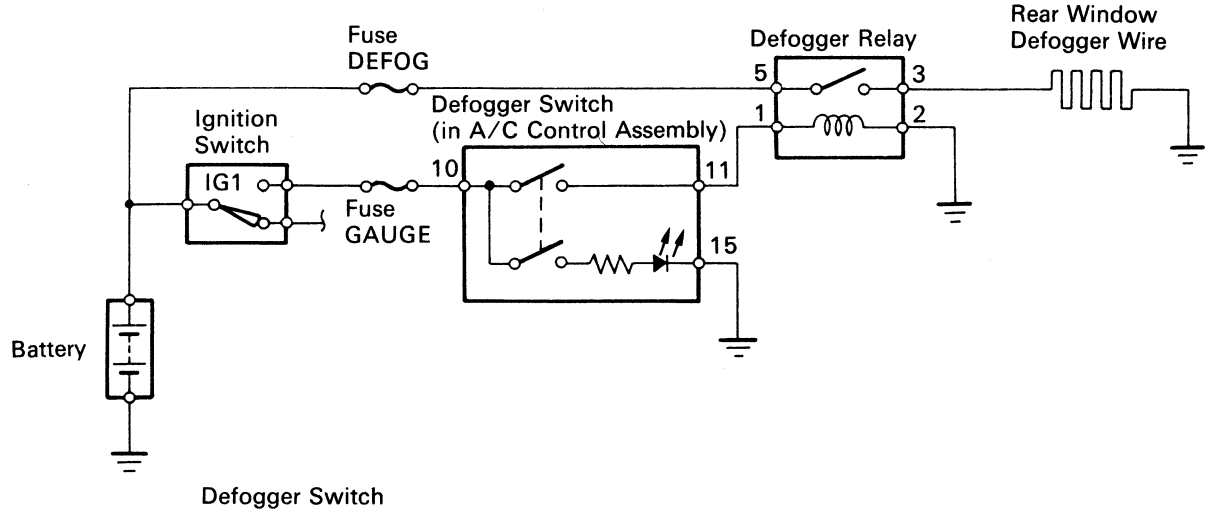
DEFOGGER SYSTEM

Parts Location

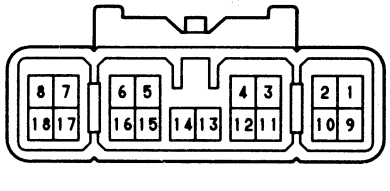


BE5238

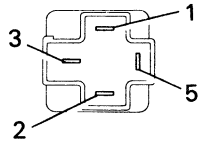
Wiring and Connector Diagrams



Defogger Switch
(in A/C Control Assembly)



Defogger Relay



The POWER SOURCE CIRCUIT has been simplified. For full details, see page BE-9.

BE4968
e-18-2 BE4049

Troubleshooting

Problem	Possible cause	Remedy	Page
All defogger systems do not operate	DEFOG fuse faulty	Replace fuse and check for short	BE-3
	GAUGE fuse faulty	Replace fuse and check for short	BE-3
	Defogger switch faulty	Check switch	BE-64
	Defogger relay faulty	Check relay	BE-65
	Wiring or ground faulty	Repair as necessary	
Rear window defogger system does not operate	Defogger wires broken	Check wires	BE-65
	Wiring or ground faulty	Repair as necessary	
Indicator light does not light up	Bulb burned out	Replace bulb	
	Wiring or ground faulty	Repair as necessary	

On-Vehicle Inspection

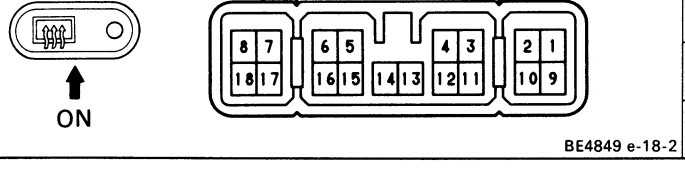
Defogger Idle-Up System

Set the defogger switch ON, check that the engine revolutions increase.

Parts Inspection

Rear Window Defogger System

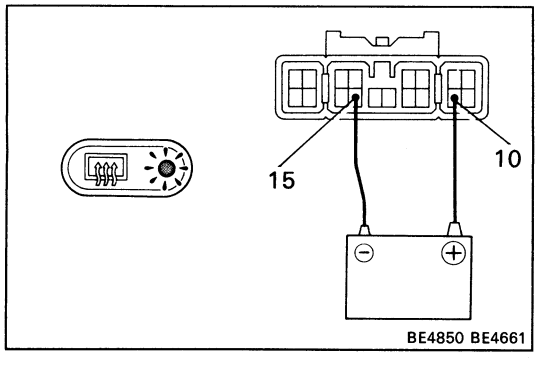
1. **INSPECT DEFOGGER SWITCH (Continuity)**



BE4849 e-18-2

Terminal / Switch Position	10	11
OFF		
ON	○———	———○

If continuity is not as specified, replace the switch.



BE4850 BE4661

(Indicator Light Operation)

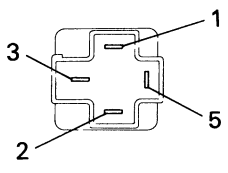
(a) Connect the positive (+) lead from the battery to terminal 10 and the negative (–) lead to terminal 15.

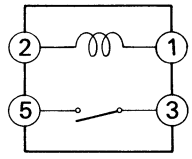
(b) Push the defogger switch ON.

(c) Check that the indicator light lights up.

If the indicator light does not light up, replace the switch.

2. INSPECT DEFOGGER RELAY (Continuity)





BE4049 BE1840

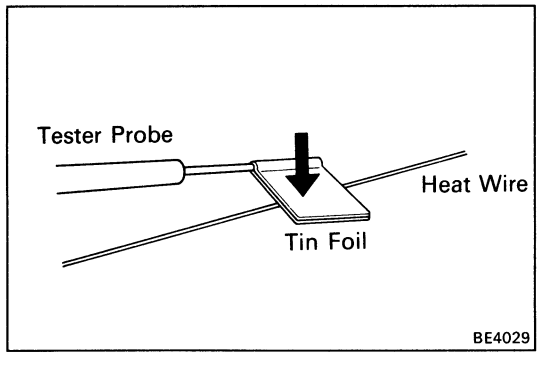
Terminal / Condition	1	2	3	5
Constant	○—⏦—○			
Apply battery voltage to terminals 1 and 2.			○	○

If continuity is not as specified, replace the relay.

3. INSPECT DEFOGGER WIRES

NOTICE:

- **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 top of the negative probe and press the foil against the wire with your finger as shown.**



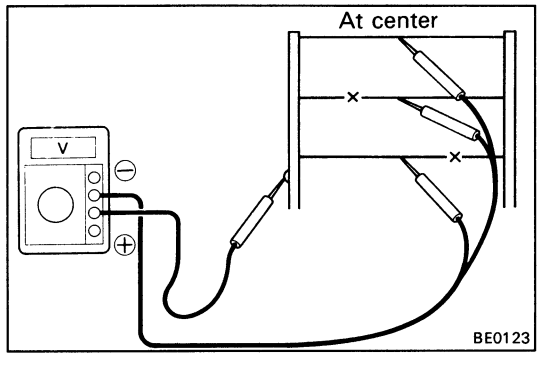
BE4029

(Wire Breakage)

(a) Turn the ignition switch ON.

(b) Push in the defogger switch.

(c) Inspect the voltage at the center of each heat wire as shown.



BE0123

Voltage	Criteria
Approx. 5V	Okay (No break in wire)
Approx. 10V or 0V	Broken Wire

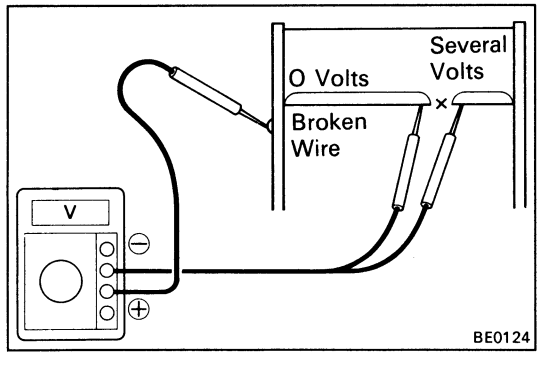
HINT: If there is approximately 10 volts, the wire is broken between the center of the wire and the positive (+)end. If there is no voltage, the wire is broken between the center of the wire and ground.

(Wire Breakage Point)

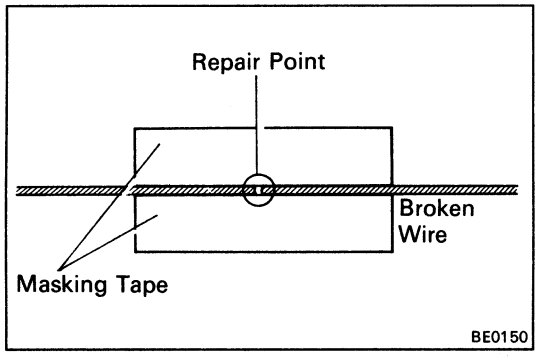
(a) Place the voltmeter positive (+) lead against the defogger positive (+) terminal.

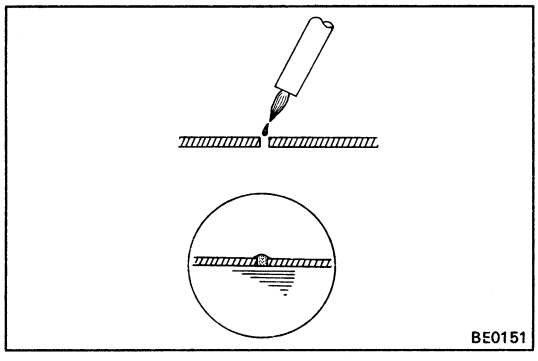
(b) Place the voltmeter negative (–) lead with the foil strip against the heat wire at the positive (+) terminal end and slide it toward the negative (–) terminal end.

(c) The point where the voltmeter deflects from zero to several volts is the place where the heat wire is broken.



BE0124





HINT: If the heat wire is not broken, the voltmeter indicates 0 volts at the positive (+) end of the heat wire but gradually increases to about 12 volts as the meter probe is moved to the other end.

4. REPAIR DEFOGGER WIRES

(a) Clean the broken wire tips with a grease, wax and silicone remover.

(b) Place the masking tape along both sides of the wire to be repaired.

(c) Thoroughly mix the repair agent (Dupont paste No. 4817).

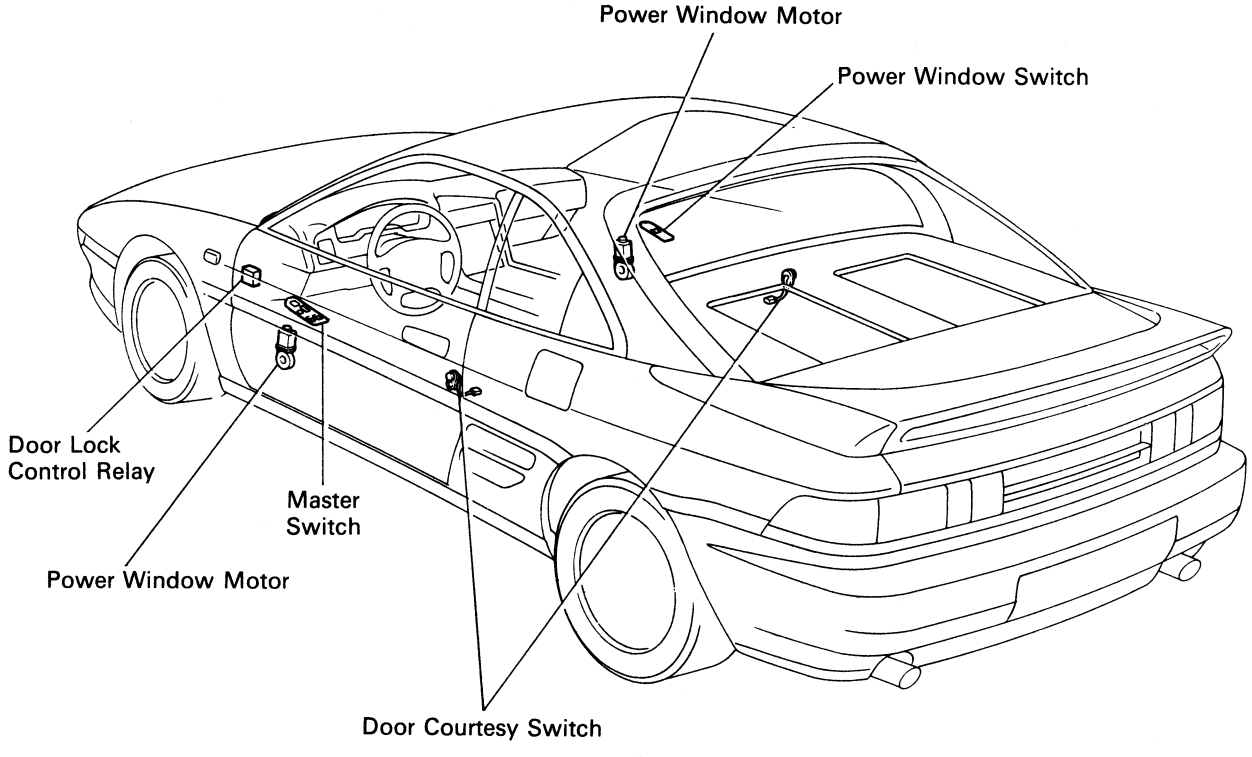
(d) Using a fine tip brush, apply a small amount to the wire.

(e) After a few minutes, remove the masking tape.

(f) Allow the repair to stand at least 24 hours.

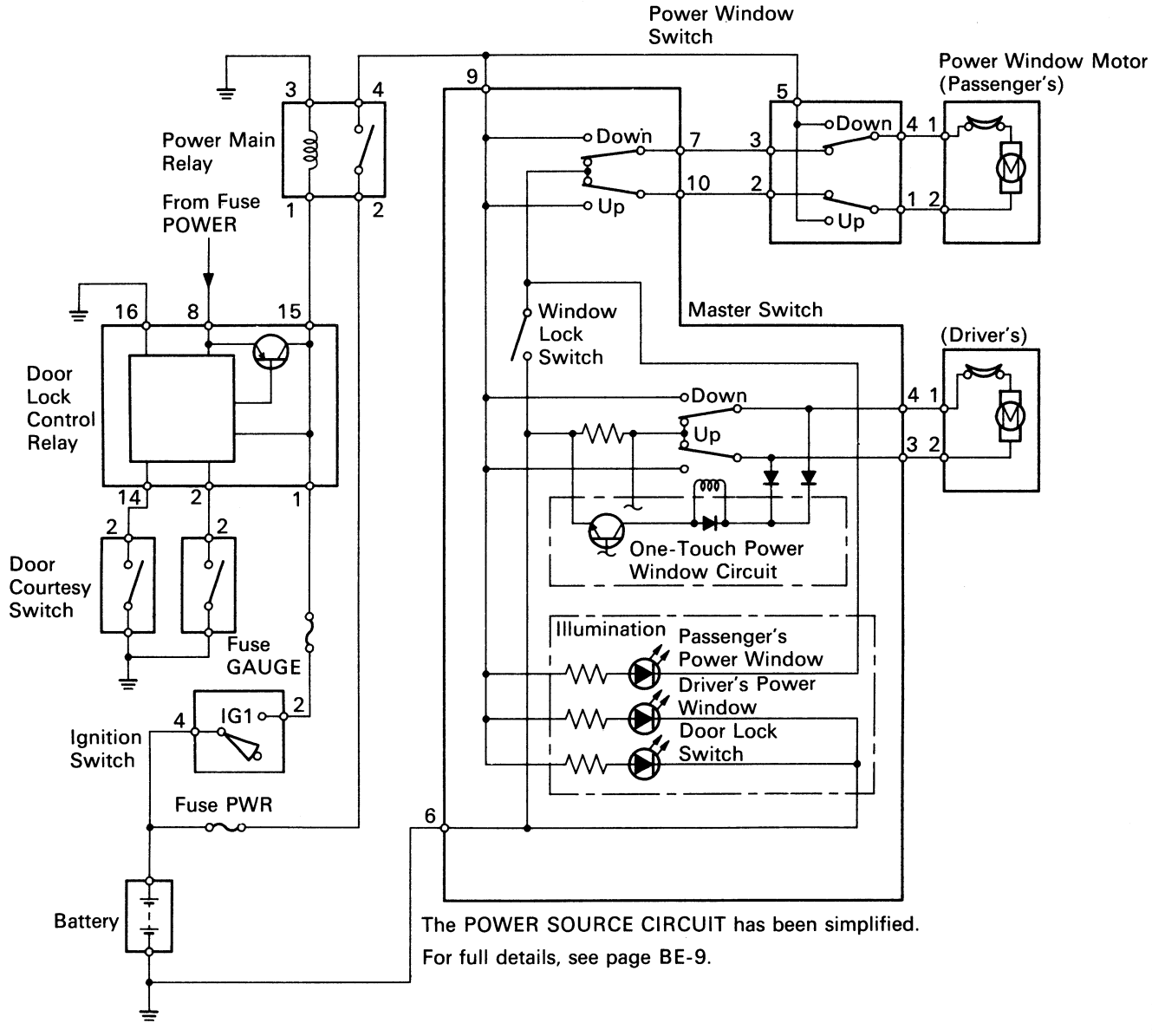
POWER WINDOW CONTROL SYSTEM

Parts Location

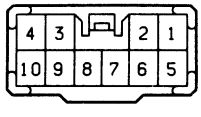


BE5239

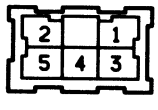
Wiring and Connector Diagrams



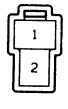
Master Switch



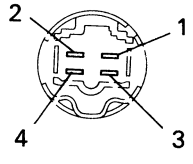
Power Window Switch



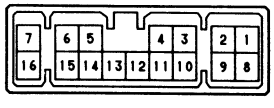
Power Window Motor



Power Main Relay



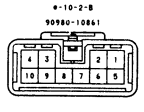
Door Lock Control Relay



Door Courtesy Switch



Ignition Switch



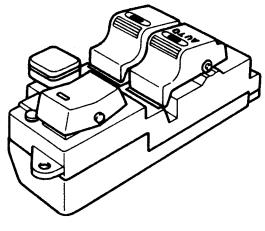
BE5240
S-10-2 G-5-2-A H-2-2 BE1647
S-16-2-A e-2-1-G e-10-2-B

Troubleshooting

Problem	Possible cause	Remedy	Page
Power window does not operate at all	GAUGE fuse blown PWR fuse blown Power main relay faulty Wiring or ground faulty	Replace fuse and check for short Replace fuse and check for short Check relay Repair as necessary	BE-3 BE-3 BE-72
One-touch power window does not operate	Power window master switch faulty	Check Switch	BE-69
Key-off power window does not operate	Door lock control relay faulty Wiring faulty	Check relay Repair as necessary	BE-72

Parts Inspection

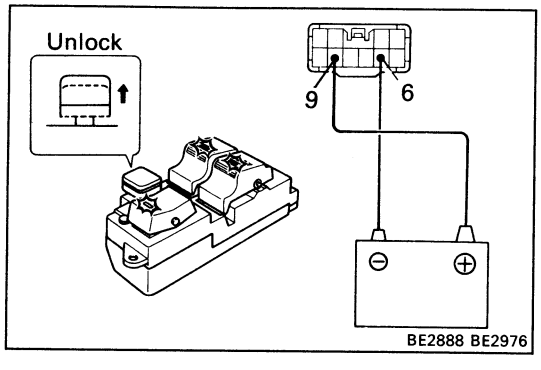
1. INSPECT SWITCHES (Master Switch/Continuity)



BE2877
S-10-2

Window operation		Driver's				Passenger's			
Terminal / Switch position		3	4	6	9	6	7	9	10
Window unlock	UP	○	○	○	○	○		○	○
	OFF	○	○	○		○	○		○
	DOWN	○		○	○	○		○	○
Window lock	UP	○	○	○	○			○	○
	OFF	○	○	○			○		○
	DOWN	○		○	○		○		

If continuity is not as specified, replace the switch.

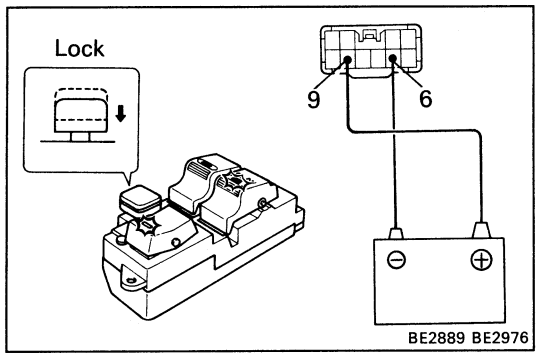


BE2888 BE2976

(Master Switch: Illumination)

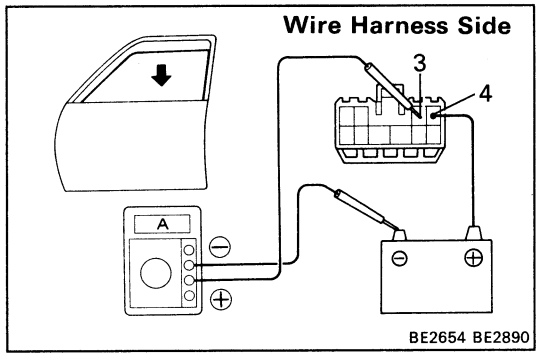
(a) Set the window lock switch to the unlock position.

(b) Connect the positive (+) lead from the battery to terminal 9 and the negative (–) lead to terminal 6, check that all the illuminations light up.



(c) Set the window lock switch to the lock position, check that the passenger's power window switch illumination goes out.

If operation is not as specified, replace the master switch.



(Master Switch: One Touch Power Window System)

Inspection using an ammeter:

(a) Disconnect the connector from the master switch.

(b) Connect the positive (+) lead from the ammeter to terminal 3 on the wire harness side connector and the negative (–) lead to negative terminal of the battery.

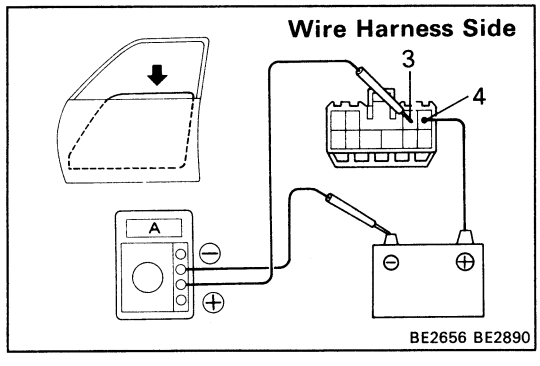
(c) Connect the positive (+) lead from the battery to terminal 4 on the wire harness side connector.

(d) As the window goes down, check that the current flows approximately 7 amperes.

(e) Check that the current increases approximately 14.5 amperes or more when the window stops going down.

HINT: The circuit breaker opens some 4 – 40 seconds after the window stops going down, so that check must be made before the circuit breaker operates.

If operation is as specified, replace the master switch.



Inspection using an ammeter with a current-measuring probe:

(a) Remove the master switch with connector connected.

(b) Attach a current-measuring probe to terminal 3 of the wire harness.

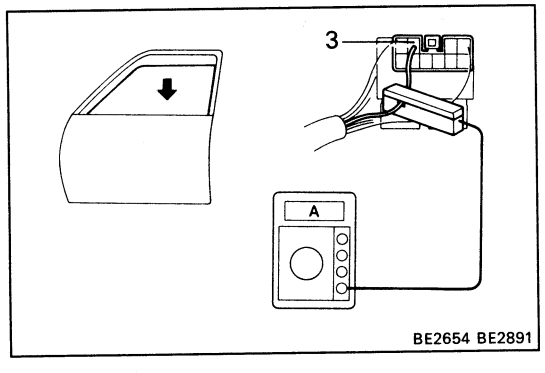
(c) Turn the ignition switch ON and set the power window switch in the down position.

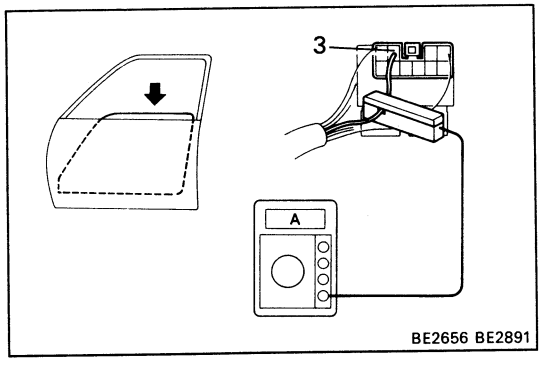
(d) As the window goes down, check that the current flows approximately 7 amperes.

(e) Check that the current increases approximately 14.5 amperes or more when the window stops going down.

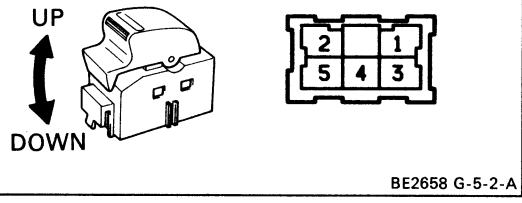
HINT: The circuit breaker opens some 4 – 40 seconds after the window stops going down, so that check must be made before the circuit breaker operates.

If operation is as specified, replace the master switch.



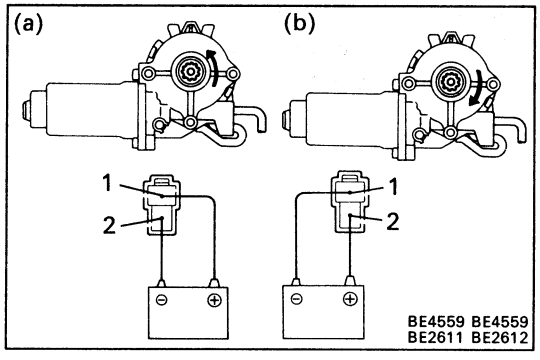


(Power Window Switch/Continuity)



Switch position \ Terminal	1	2	3	4	5
UP	○				○
			○	○	
OFF	○	○	○	○	
DOWN	○	○		○	○

If continuity is not as specified, replace the switch.



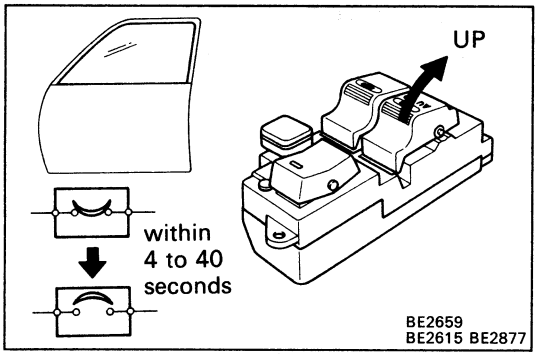
2. INSPECT POWER WINDOW MOTOR

(Left Side Door Motor/Motor Operation)

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns counterclockwise.

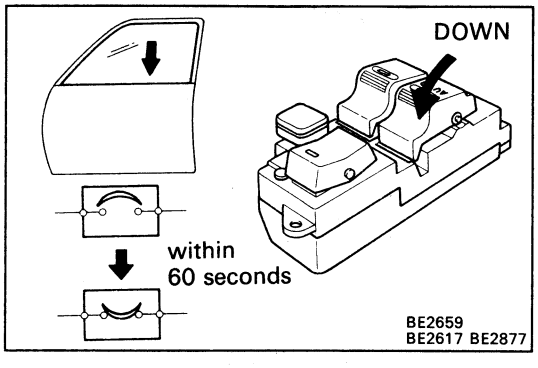
(b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the motor.



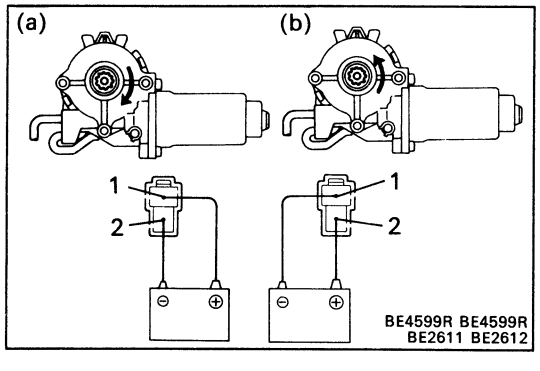
(Left Side Door Motor/Circuit Breaker Operation)

(a) With the window in the full closed position, hold the power window switch in "UP" position and check that there is a circuit breaker operation noise within 4 to 40 seconds.



(b) With the window in the full closed position, hold the switch in "DOWN" and check that the window begins to descend within 60 seconds.

If operation is not as specified, replace the motor.

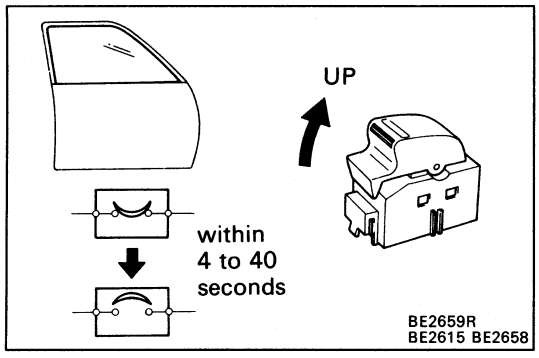


(Right Side Door Motor/Motor Operation)

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns clockwise.

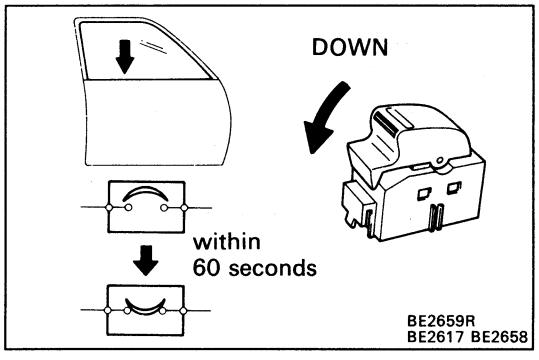
(b) Reverse the polarity, check that the motor turns counterclockwise.

If operation is not as specified, replace the motor.



(Right Side Door Motor/Circuit Breaker Operation)

(a) With the window in the full closed position, hold the power window switch in "UP" position and check that there is a circuit breaker operation noise within 4 to 40 seconds.



(b) With the window in the full closed position, hold the switch in "DOWN" and check that the window begins to descend within 60 seconds.

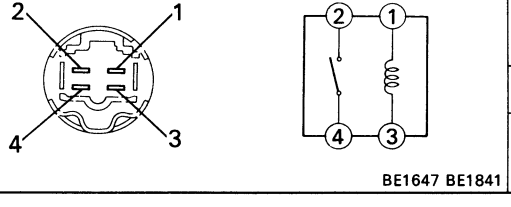
If operation is not as specified, replace the motor.

3. INSPECT DOOR LOCK CONTROL RELAY

See Step 3 of Power Door Lock Control System on page BE-78

4. INSPECT POWER MAIN RELAY

(Continuity)

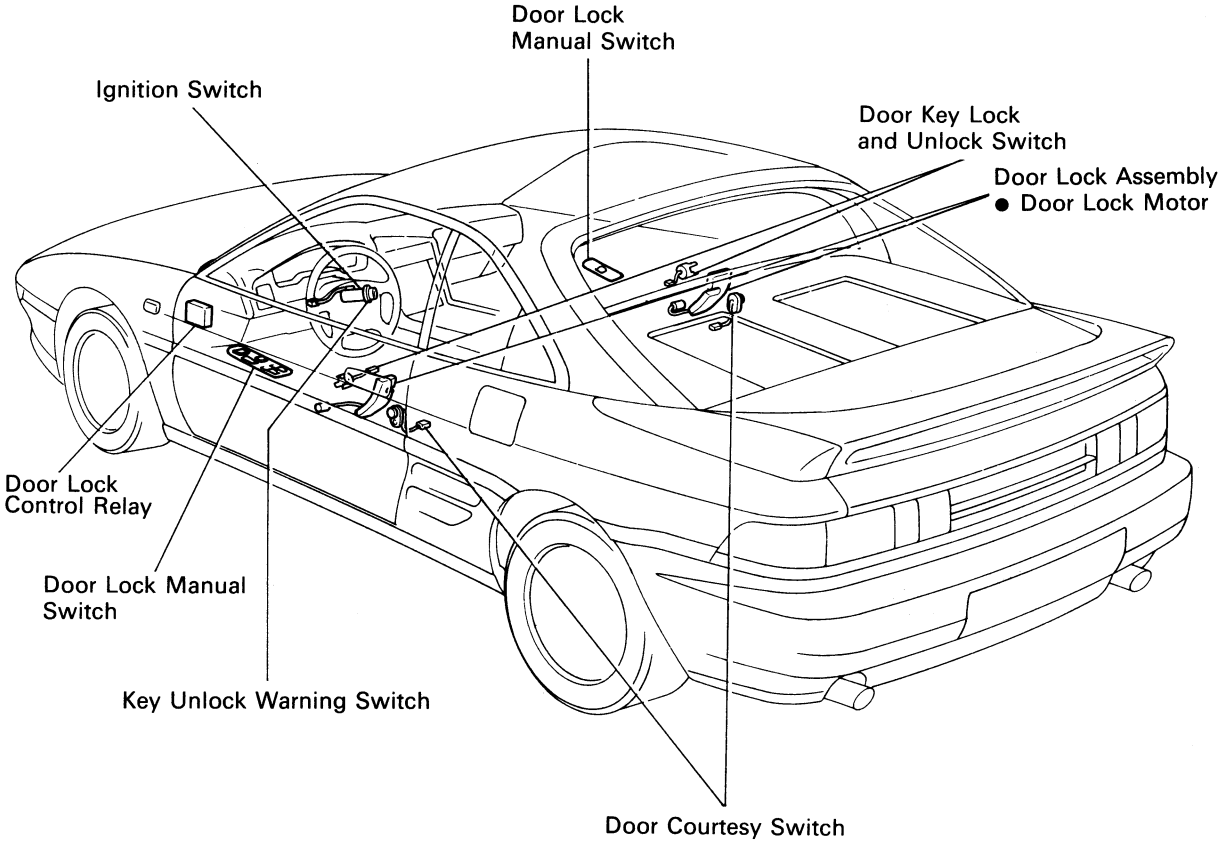


Terminal / Condition	1	2	3	4
Constant	○	∿	○	
Apply battery voltage to terminals 1 and 3.		○		○

If continuity is not as specified, replace the relay.

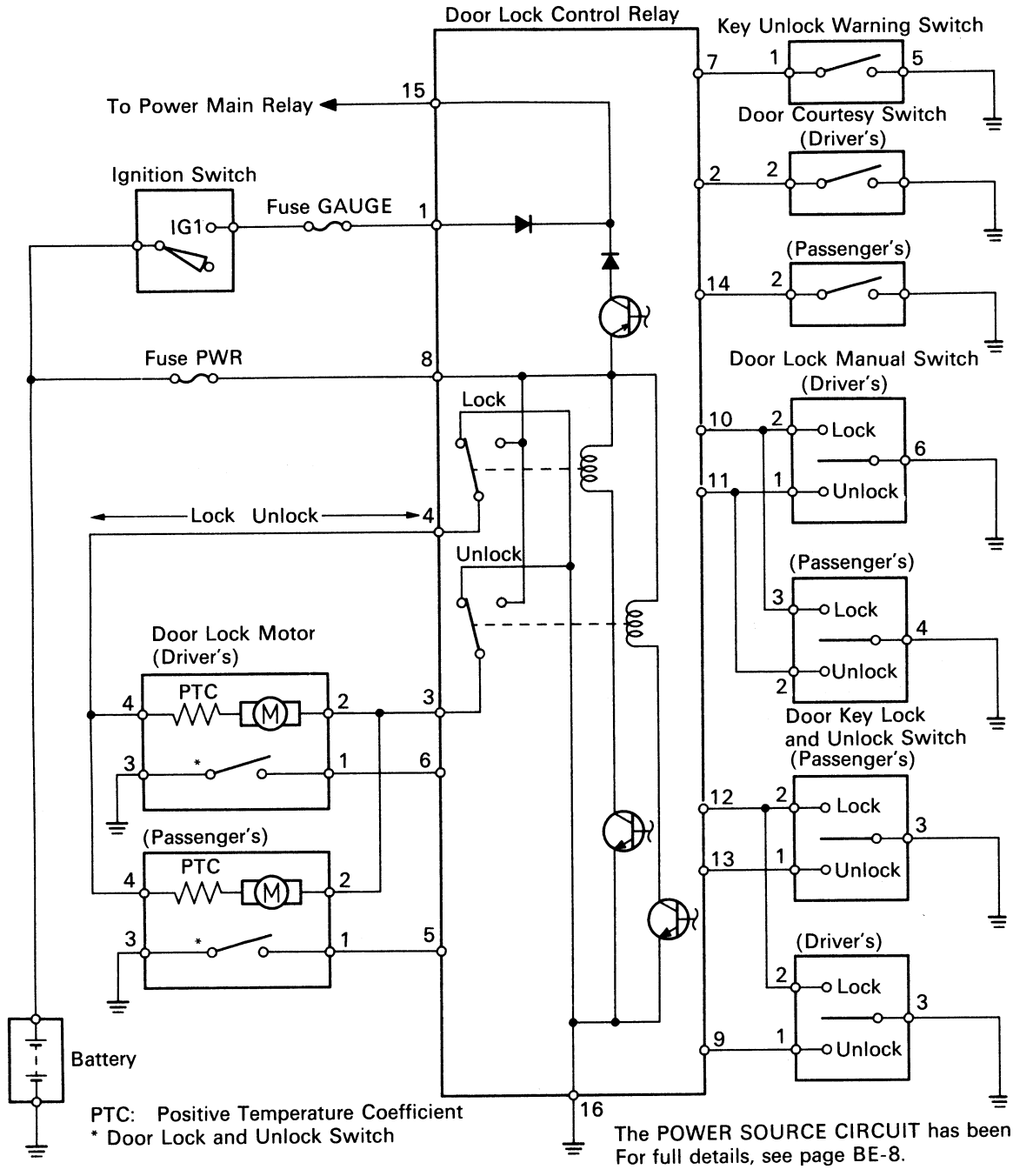
POWER DOOR LOCK CONTROL SYSTEM

Parts Location

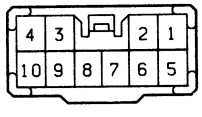


BE5241

Wiring and Connector Diagrams



Door Lock Manual Switch (Driver's)



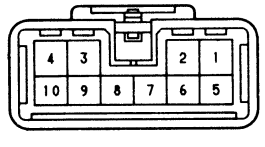
(Passenger's)



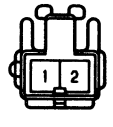
Door Key Lock and Unlock Switch



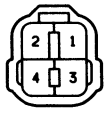
Key Unlock Warning Switch



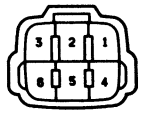
Door Courtesy Switch



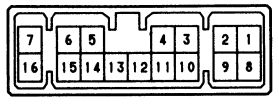
Door Lock Motor (w/o Theft Deterrent System)



(w/Theft Deterrent System)



Door Lock Control Relay



BE5242
S-10-2 S-4-2-C Ie-3-1 e-10-2-B e-2-1-G
IS-4-2-B IS-6-2-B S-16-2-A

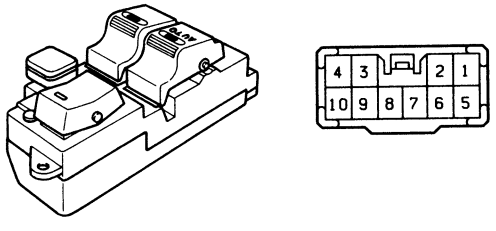
Troubleshooting

Problem	Possible cause	Remedy	Page
Door lock system does not operate at all	POWER fuse blown Door lock motor faulty Door lock control relay faulty Wiring or ground faulty	Replace fuse and check for short Check motor Check relay Repair as necessary	BE-3 BE-76 BE-78
Door lock system does not operate by manual switch	Door lock manual switch faulty Door lock control relay faulty Wiring faulty	Check switch Check relay Repair as necessary	BE-75 BE-78
Door lock system does not operate by door key	Door key lock and unlock switch faulty Door lock control relay faulty Wiring faulty	Check switch Check relay Repair as necessary	BE-78 BE-78

Parts Inspection

1. INSPECT SWITCHES

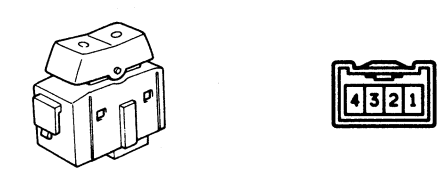
(Driver's Door Lock Manual Switch: in Master Switch/Continuity)



BE2877 S-10-2

Terminal / Switch position	1	2	5	6
LOCK	○		○	
		○		○
OFF				
UNLOCK	○			○
		○	○	

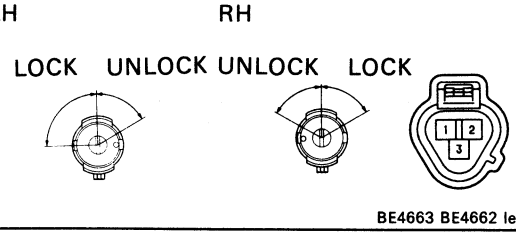
(Passenger's Door Lock Manual Switch/Continuity)



BE2595 S-4-2-C

Terminal / Switch position	2	3	4
LOCK		○	○
OFF			
UNLOCK	○		○

(Door Key Lock and Unlock Switch/Continuity)



BE4663 BE4662 le-3-1

Terminal / Switch Position	1	2	3
LOCK		○	○
OFF			
UNLOCK	○		○

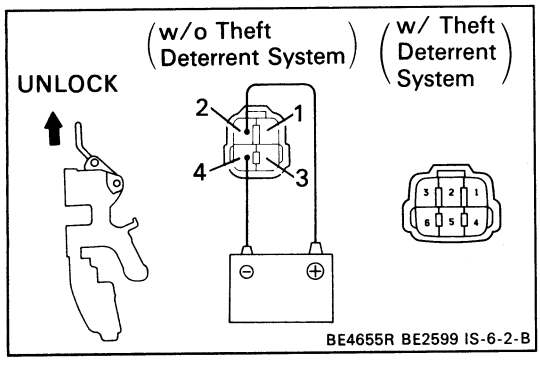
If continuity is not as specified, replace the switch.

(Key Unlock Warning Switch/Continuity)

See Step 1 of Key Confine Prevension System on page BE-11.

(Door Courtesy Switch/Continuity)

See Step 1 of Illuminated Entry System on page BE-41.

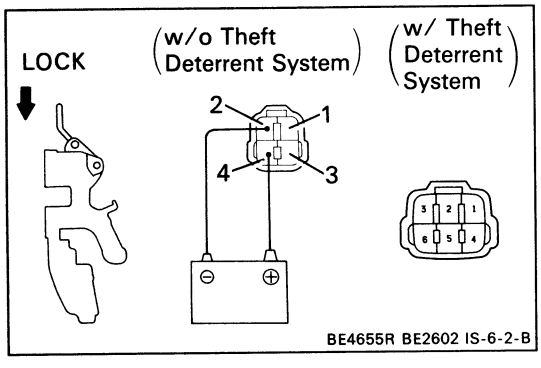


2. INSPECT DOOR LOCK MOTOR

(Motor Operation)

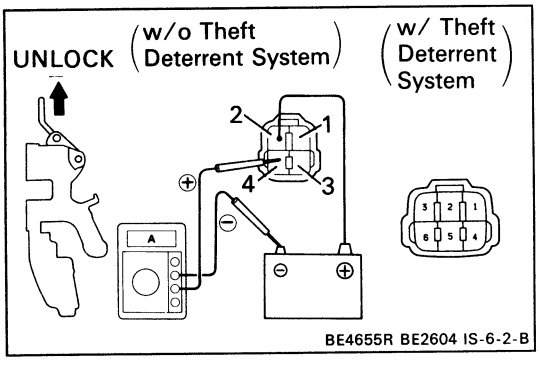
(a) Connect the positive (+) lead from the battery to terminal 2 (2) and the negative (–) lead to terminal 4 (5), check that the door lock link moves to UNLOCK position.

HINT: The number in brackets ( ) applies to vehicles w/ Theft Deterrent System.



(b) Reverse the polarity, check that the door lock link moves to LOCK position.

If operation is not as specified, replace the door lock assembly.

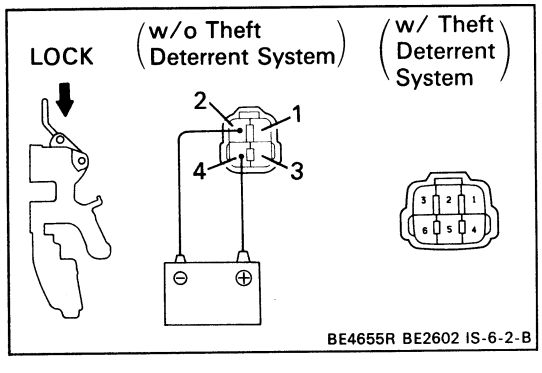


(PTC Thermistor Operation)

Inspection using an ammeter.

(a) Connect the positive (+) lead from the battery to terminal 2 (2).

(b) Connect the positive (+) lead from the ammeter to terminal 4 (5) and the negative (–) lead to battery negative (–) terminal, check that the current changes from approximately 3.2 ampere to less than 0.5 ampere within 10 to 60 seconds.

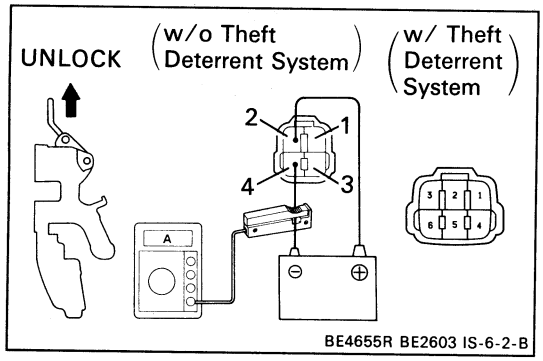


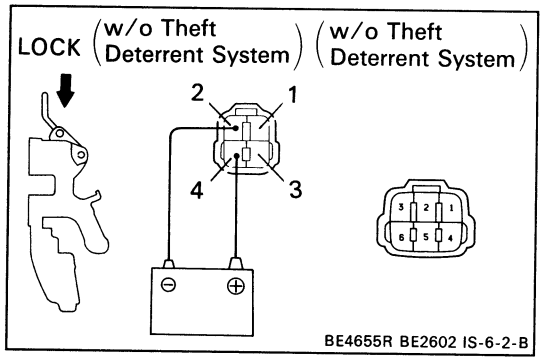
(c) Disconnect the leads from terminals.

(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 4 (5) and the negative (–) lead to terminal 2 (2), check that the door lock moves to LOCK position.

HINT: The number in brackets ( ) applies to vehicles w/ Theft Deterrent System.

If operation is not as specified, replace the door lock assembly.





Inspection using an ammeter with a current-measuring probe.

(a) Connect the positive (+) lead from the battery to terminal 2 (2) and the negative (–) lead to terminal 4 (5).

(b) Attach a current-measuring probe to either the positive (+) lead or the negative (–) lead, check that the current changes from approximately 3.2 ampere to less than 0.5 ampere within 10 to 60 seconds.

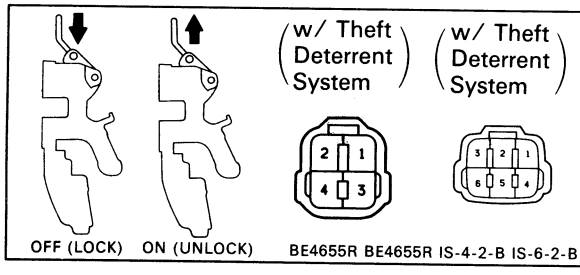
HINT: The number in brackets ( ) applies to vehicles w/ Theft Deterrent System.

(c) Disconnect the leads from terminals.

(d) Approximately 60 seconds later, reverse the polarity, check that the door lock moves to LOCK position.

If operation is not as specified, replace the door lock assembly.

(Door Lock and Unlock Switch/Continuity)

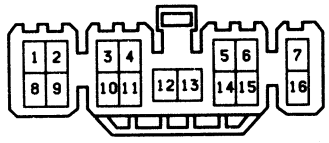


Terminal / Switch position	1 (1)	3 (4)
OFF (Door lock set to LOCK)		
ON (Door lock set to UNLOCK)	O	O

HINT: The number in brackets ( ) applies to vehicles w/ Theft Deterrent System.

If continuity is not as specified, replace the door lock assembly.

Wire Harness Side



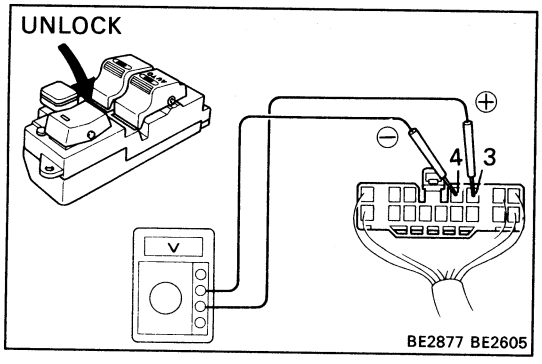
S-16-1-A

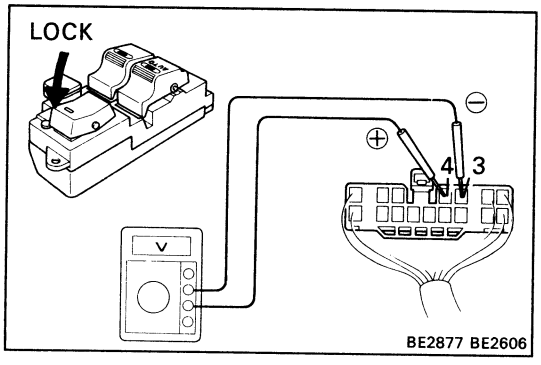
3. INSPECT DOOR LOCK CONTROL RELAY (Relay Circuit)

Disconnect the connector from the relay and inspect the connector on the wire harness side as shown in the chart.

Check for	Tester connection	Condition		Specified value
Continuity	2 – Ground	Driver's door courtesy switch position	OFF (Door closed)	No continuity
			ON (Door opened)	Continuity
	5 – Ground	Passenger's door lock and unlock switch position	OFF (Door locked)	No continuity
			ON (Door unlocked)	Continuity
	6 – Ground	Driver's door lock and unlock switch position	OFF (Door locked)	No continuity
			ON (Door unlocked)	Continuity
	7 – Ground	Key unlock warning switch position	OFF (Ignition key removed)	No continuity
			ON (Ignition key set)	Continuity
	9 – Ground	Driver's door key lock and unlock switch position	OFF or LOCK (Door key free or turned to lock)	No continuity
			UNLOCK (Door key turned to unlock)	Continuity
	10 – Ground	Door lock manual switch position	OFF or UNLOCK	No continuity
			LOCK	Continuity
	11 – Ground	Door lock manual switch position	OFF or LOCK	No continuity
			UNLOCK	Continuity
	12 – Ground	Door key lock and Unlock switch position	OFF or UNLOCK (Door key free or turned to unlock	No continuity
			LOCK (Door key turned to lock)	Continuity
	13 – Ground	Passenger's door key lock and unlock switch position	OFF or LOCK (Door key free or turned to lock)	No continuity
			UNLOCK (Door key turned to unlock)	Continuity
	14 – Ground	Passenger's door courtesy switch position	OFF (Door closed)	No continuity
			ON (Door opened)	Continuity
	16 – Ground	Constant		Continuity
Voltage	1 – Ground	Ignition switch position	LOCK or ACC	No voltage
			ON	Battery voltage
	8 – Ground	Constant		Battery voltage
Resistance	15 – Ground	Constant		Approx. 60Ω

If circuit is as specified, inspect the door lock signal.





(Door Lock Signal)

HINT: When the relay circuit is as specified, inspect the door lock signal.

(a) Connect the connector to the relay.

(b) Connect the positive (+) lead from the voltmeter to terminal 3 and the negative (–) lead to terminal 4.

(c) Set the door lock manual switch to UNLOCK, check that the voltage rises from 0 volts to battery voltage for approximately 0.2 seconds.

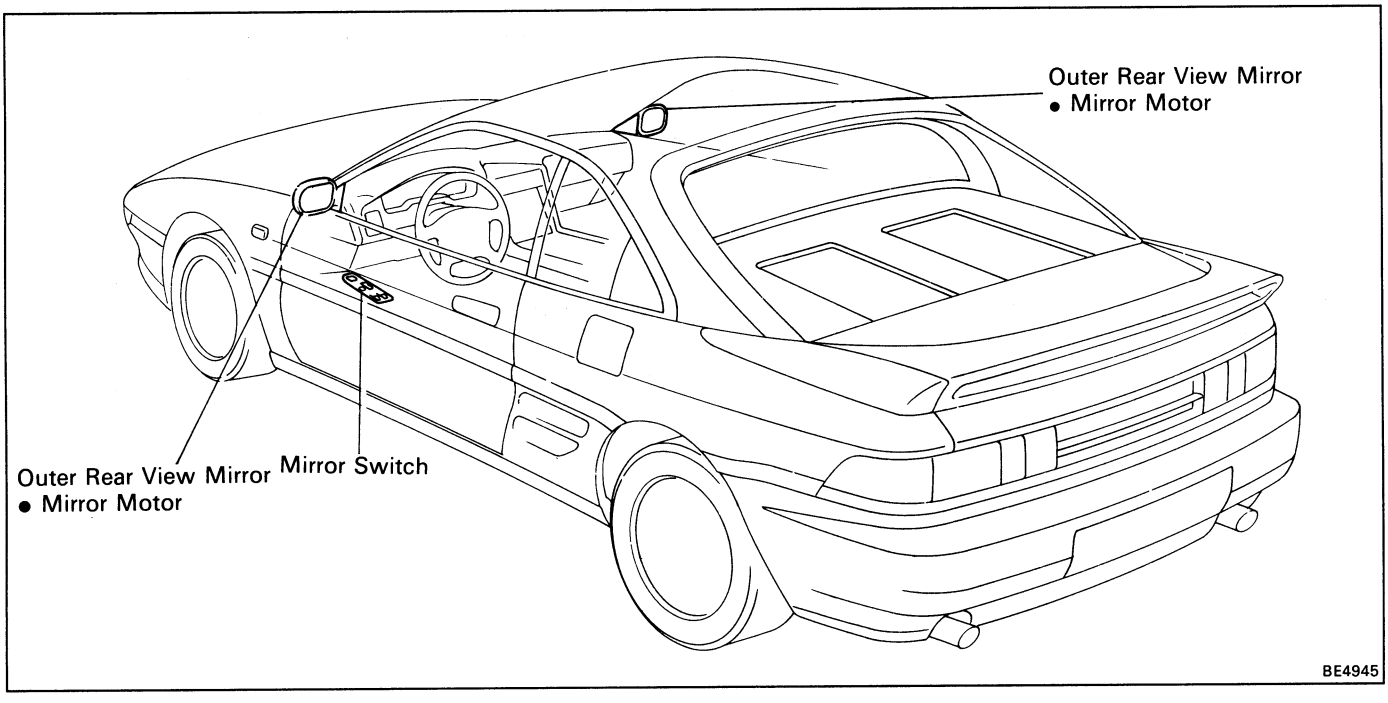
(d) Reverse the polarity of the voltmeter leads.

(e) Set the door lock manual switch to LOCK, check that the voltage rises from 0 volts to battery voltage for approximately 0.2 seconds.

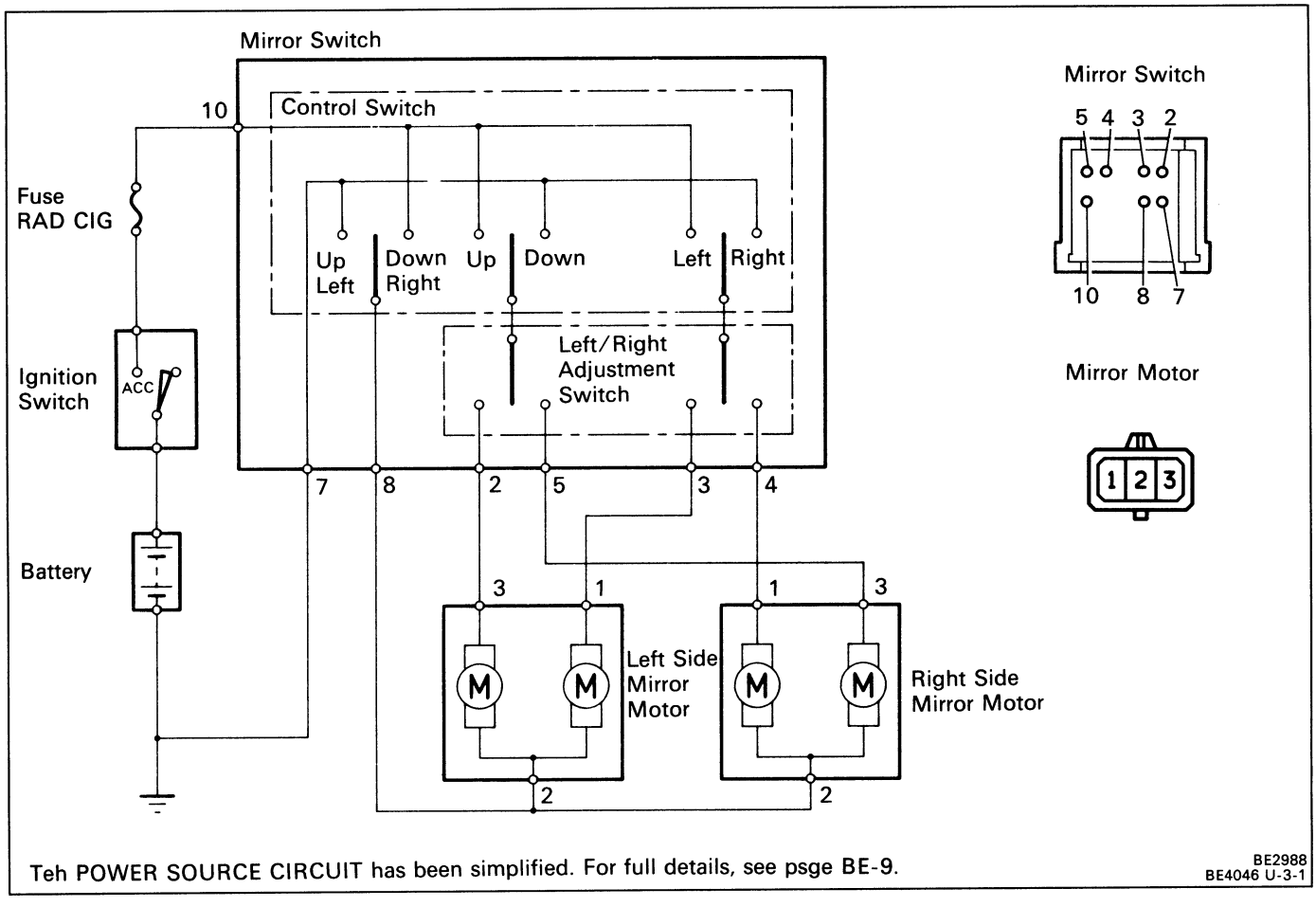
If operation is not as specified, replace the relay.

POWER MIRROR CONTROL SYSTEM

Parts Location



Wiring and Connector Diagrams



Teh POWER SOURCE CIRCUIT has been simplified. For full details, see psge BE-9.

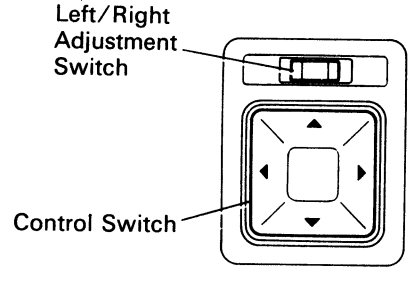
BE2988
BE4046 U-3-1

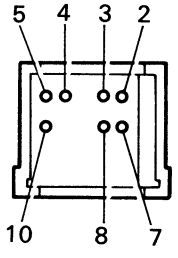
Troubleshooting

Problem	Possible cause	Remedy	Page
Remote control mirror system does not operate	RAD CIG fuse faulty Mirror switch faulty Mirror motor faulty Wiring or ground faulty	Replace fuse and check for short Check switch Check motor Repair as necessary	BE-3 BE-81 BE-81

Parts Inspection

1. INSPECT MIRROR SWITCH (Continuity)





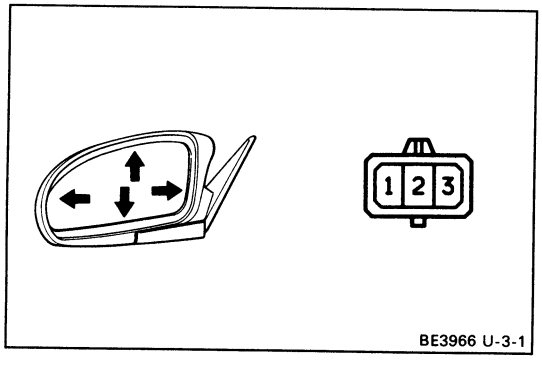
BE4657 BE2989

Left/Right adjustment switch position	LEFT SIDE					OFF			RIGHT SIDE				
Terminal / Control switch position	2	3	7	8	10	7	8	10	4	5	7	8	10
OFF													
UP	○				○		○				○		○
			○	○		○				○		○	
DOWN	○			○	○			○			○	○	○
		○	○				○	○		○			
LEFT		○			○				○				○
			○	○		○	○				○	○	
RIGHT		○	○	○	○		○	○	○		○	○	○

If continuity is not as specified, replace the switch.

2. INSPECT MIRROR MOTOR

Connect the positive (+) lead from the battery to terminal is column "A" and the negative (–) lead to terminal in column "B", check that the mirror operates in column "C".



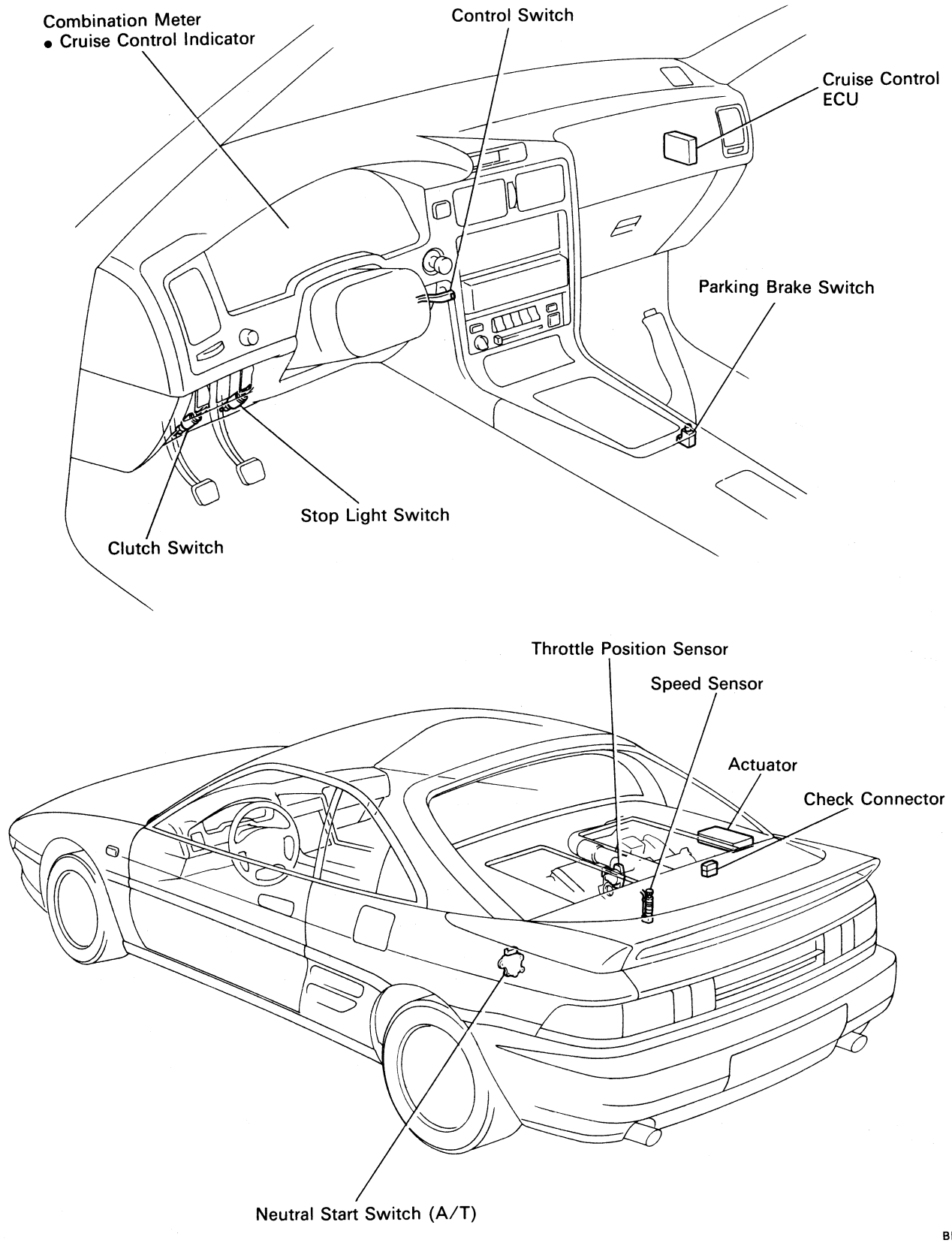
BE3966 U-3-1

A (+)	B (–)	C (Operation)
3	2	Mirror turns upward
2	3	Mirror turns downward
1	2	Mirror turns to left side
2	1	Mirror turns to right side

If operation is not as specified, replace the mirror assembly.

CRUISE CONTROL SYSTEM

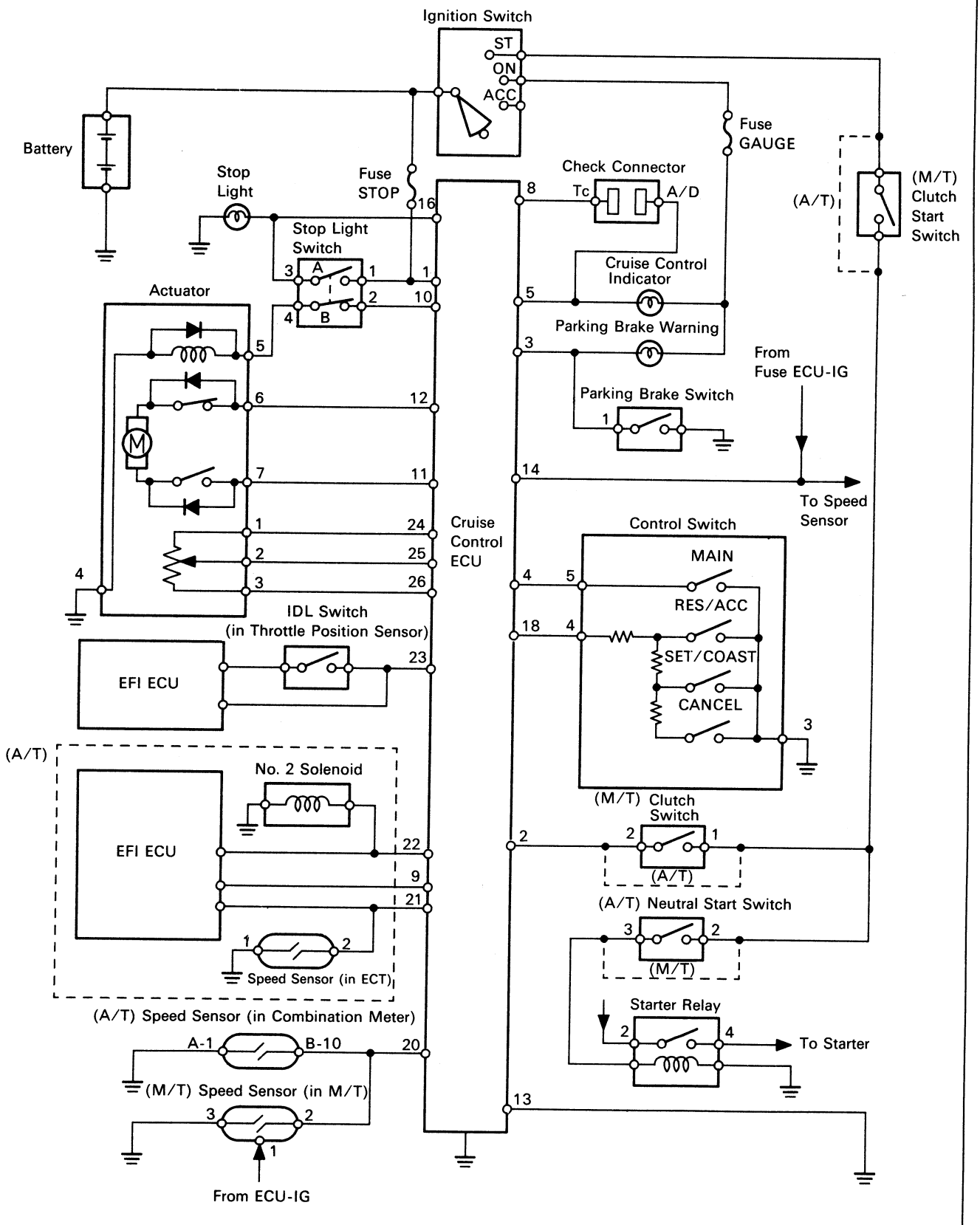
Parts Location



BE5243
BE4947

Wiring Diagram

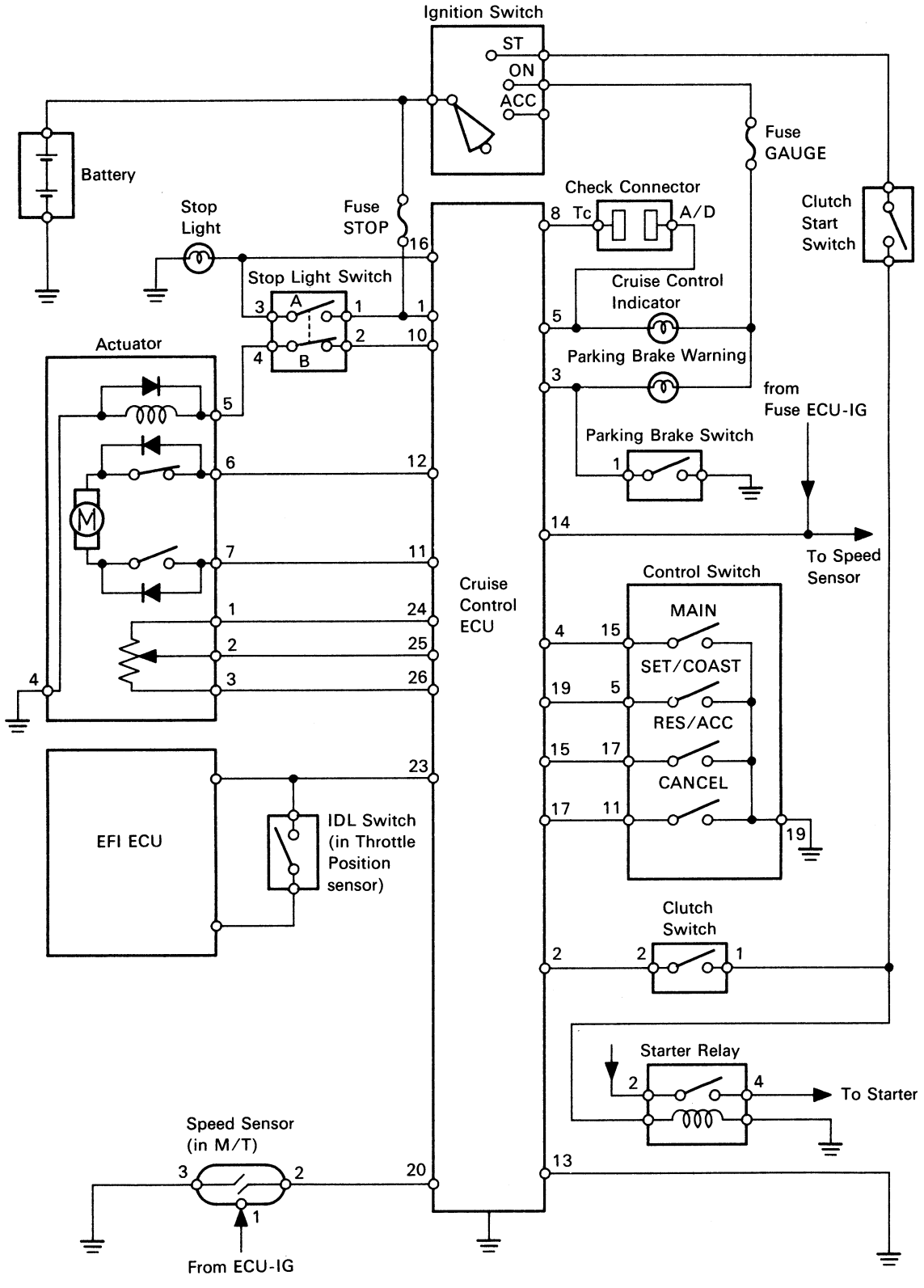
(USA)



The POWER SOURCE CIRCUIT has been simplified. For full details, see page BE-9.

BE5244

(CANADA)



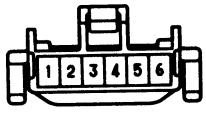
The POWER SOURCE CIRCUIT has been simplified. For full details, see page BE-9.

BE5245

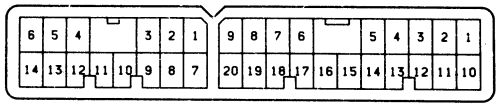
Connector Diagrams

Cruise Control Switch

(USA)

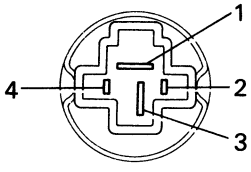


(CANADA)

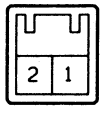


Connector "A" Connector "B"

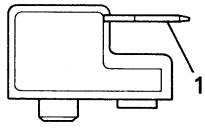
Stop Light Switch



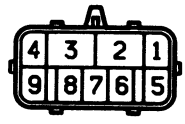
Clutch Switch (M/T)



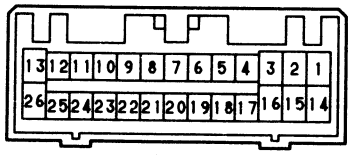
Parking Brake Switch



Neutral Start Switch (A/T)



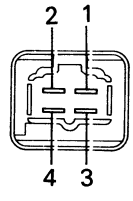
Cruise Control ECU



Actuator

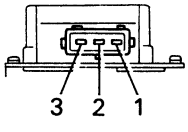


Starter Relay

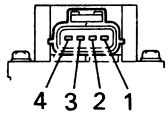


Throttle Position Sensor

(3-pin Type)



(4-Pin Type)



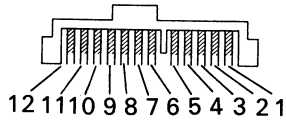
Speed Sensor

(M/T)

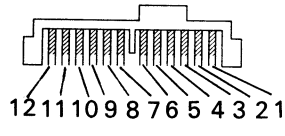


(A/T: Combination Meter)

Connector "A"



Connector "B"



Speed Sensor

(A/T: ECT)



e-6-1-C V-34-2
BE0336 G-2-2 BE1412 SH-9-2-A
Vd-26-2-B Ie-7-2 ST0280
AC2241 IS-3-2-A BE1266 BE1267
IS-2-2-B

System Description

- When the ignition switch is turned ON, current flows from the battery to terminal 14 of the cruise control (CC) ECU.
- Terminal 13 of the CC ECU is always grounded.

Basic Operation

HINT: For all explanations below, the ignition switch is in the ON position.

1. CONTROL SWITCH OPERATION

- The CC switch controls MAIN switch, SET/COAST, RESUME/ACCEL and CANCEL functions.

(USA)

(a) MAIN switch
When the main switch is pushed ON, current flows from terminal 4 of the CC ECU → terminal 5 of the control switch → terminal 3 of the switch → ground.

As a result, the CC ECU is on standby and terminal 5 of the CC ECU is grounded. Therefore the CC indicator lights up.

(b) SET/COAST, RESUME/ACCEL and CANCEL switch
The control switch controls the SET, COAST, RESUME, ACCEL and CANCEL functions. When the control switch is turned to each position, current flows from terminal 18 of the CC ECU → terminal 4 of the control switch → (each resistance) → terminal 3 of the switch → ground.

In the way, the CC ECU detects each position the control switch is turned to, and starts operation.

HINT: The SET function is detected by the CC ECU when the control switch released from SET/COAST.

(CANADA)

(a) MAIN switch
When the main switch is pushed ON, current flows from terminal 4 of the CC ECU → terminal 15 of the control switch → terminal 19 of the switch → ground.

As a result, the CC ECU is on standby and terminal 5 of the CC ECU is grounded. Therefore the CC indicator lights up.

(b) SET/COAST switch
When the control switch is turned to SET/COAST position, the current flows from terminal 19 of the CC ECU → terminal 5 of the CC switch → terminal 19 of the CC switch → ground.

(c) RESUME/ACCEL switch
When the control switch is turned to RES/ACC position, the current flows from terminal 18 of the CC ECU → terminal 17 of the CC switch → terminal 19 of the CC switch → ground.

(d) CANCEL switch
When the control switch is turned to CANCEL position, the current flows from terminal 17 of the CC ECU → terminal 11 of the CC switch → terminal 19 of the CC switch → ground.

2. SPEED CONTROL OPERATION

When the vehicle speed is set by the control switch, the ECU sends signal from terminal 10 → terminal 2 of the stop light switch → terminal 4 of the switch → terminal 5 of the actuator → (safety magnetic clutch) → terminal 4 of the actuator → ground.

When the actual vehicle speed drops below the set speed, the CC ECU sends a signal (voltage) from terminal 12 → terminal 6 of actuator → (motor) → terminal 7 of actuator → terminal 11 of CC ECU. This causes the motor to rotate the actuator arm in the throttle opening direction, increasing the vehicle speed. Then, when the arm reaches the prescribed angle, the CC ECU detects this at terminal 25 and stops the signal from 12.

When the actual vehicle speed rises above the set speed, the CC ECU sends a signal from terminal 11, turning the motor in the opposite direction so that the vehicle speed is reduced.

The CC ECU sends approx. 5 V from terminal 24 → terminal 1 of the actuator → (position sensor) → terminal 3 of the actuator → terminal 26 of the CC ECU. When the occurs, the position sensor sends the position of the actuator arm as a signal (voltage) from terminal 2 of the actuator to terminal 25 of the CC ECU.

3. MANUAL CANCEL OPERATION

The CC system has the following methods of cancellation:

- **Speed Control Switch (CANCEL)**

  When the control switch is turned to CANCEL position.

- **Parking Brake Switch**

  When the parking brake lever is pulled, the parking brake switch is turned ON and sends a cancellation signal (ground voltage) to terminal 3 of the CC ECU.

- **Neutral Start Switch (A/T)**

  When the shift lever is set to "N" or "P" range, the neutral start switch is turned ON and sends a cancellation signal (ground voltage) to terminal 2 of the CC ECU.

- **Clutch Switch (M/T)**

  When the clutch pedal is depressed, the clutch switch is turned ON and sends a cancellation signal (ground voltage) to terminal 2 of the CC ECU.

- **Stop Light Switch**

  When the brake pedal is depressed, SW B of the stop light switch is turned OFF, the safety magnetic clutch (in actuator) is released, and SW A of the stop light switch is turned ON and sends a cancellation signal (battery voltage) to terminal 16 of the CC ECU.

When the CC ECU detects any of the above signals, it stops output of signals to the actuator, and cancels cruise control.

cc: Cruise Control

Diagnosis System

Output of Diagnostic Code

READ DIAGNOSTIC CODE

(Type A)

(a) Turn the ignition switch on.

(b) Turn the control switch to SET/COAST position, and keep it there.

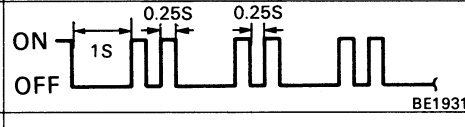
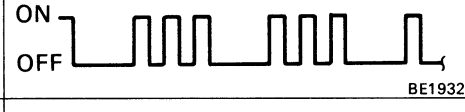
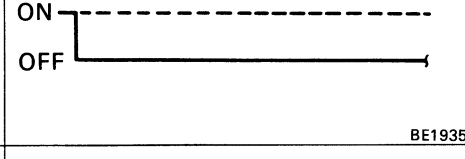
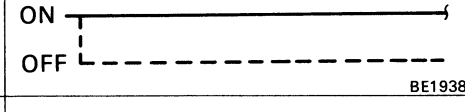
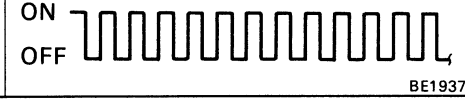
(c) Push the MAIN switch ON.

(d) Check that the indicator light "CRUISE" lights-up in the combination meter.

(e) Turn the SET/COAST switch off.

(f) Meet the conditions listed in the table below.

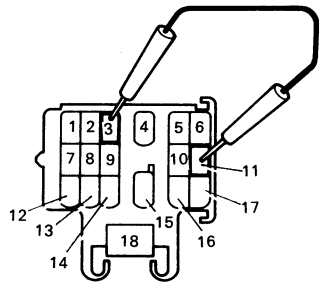
(g) Read the diagnosis code on the cruise control indicator light.

No.	Conditions	Indication code	Diagnosis
1	Turn the control switch to SET/COAST position.		SET/COAST circuit is normal.
2	Turn the control switch to RES/ACC position.		RES/ACC circuit is normal.
3	Each cancel switch is turned ON. ● Control switch (to CANCEL) ● Stop light switch ● Parking brake switch ● Clutch Switch (M/T) ● Neutral Start Switch (A/T)		Each cancel switch is normal.
4	Drive at approx. 40 km/h (25 mph) or below.		Speed sensor circuit is normal.
	Drive at approx. 40 km/h (25 mph) or over		Speed sensor circuit is normal.

HINT:

- Indication codes appear in order from No. 1.
- If there is no indication code, perform troubleshooting and inspection. (See page BE-90)
- Indication is stopped when the MAIN switch is re-pushed.

Diagnosis Check Connector



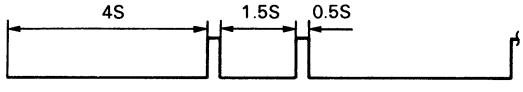
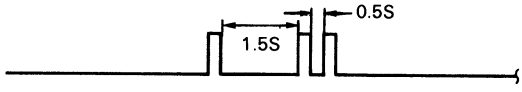
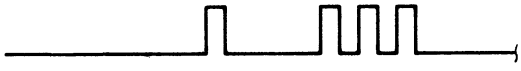
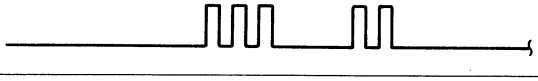
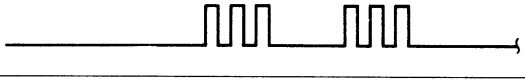
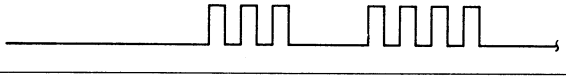
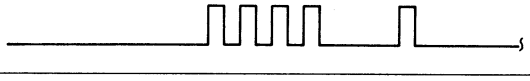
(Type B)

(a) If while driving with the cruise control on, the system is canceled by a malfunction in either the actuator, speed sensor or speed control switch circuit, the cruise control indicator light "CRUISE" will blink 5 times.

(b) While stopped, connect terminals 3 and 11 of the check connector.

HINT: If the ignition switch is turned off, the diagnostic code will be erased from the computer memory.

(c) Read the diagnostic code on the indicator light "CRUISE".

	Indication code	Diagnosis
	 BE1939	Normal
11	 BE1940	Excessive current flowed to motor or safety magnetic clutch drive circuit.
12	 BE2711	Open circuit in safety magnetic clutch circuit.
13	 BE4344	• Position sensor circuit abnormal. • Open circuit in motor.
21	 BE1941	Vehicle speed signal not sent for 140 msec. or longer
22	 BE1942	(A/T) Speed sensor (in ECT) circuit is abnormal.
23	 BE1943	* Vehicle speed has decreased by 16 km/h (10 mph) or more from the set speed during cruising.
31	 BE1944	(CANADA) RESUME/ACCEL switch is ON always when MAIN switch is pushed ON.
32	 BE1945	(USA) Short circuit in control switch circuit.
33	 BE2712	(CANADA) SET/COAST switch signal and RES/ACC switch signal turned on simultaneously.
34	 BE4342	(USA) Control switch does not turn off before switching.
41	 BE4345	ECU malfunction.

* If the set speed can be maintained when the speed control switch is again set at SET/COAST, there is no malfunction.

HINT:

- Indication codes appear in order from No. 11.
- If there is no indication code, perform troubleshooting and inspection. (See page BE-90).

Troubleshooting

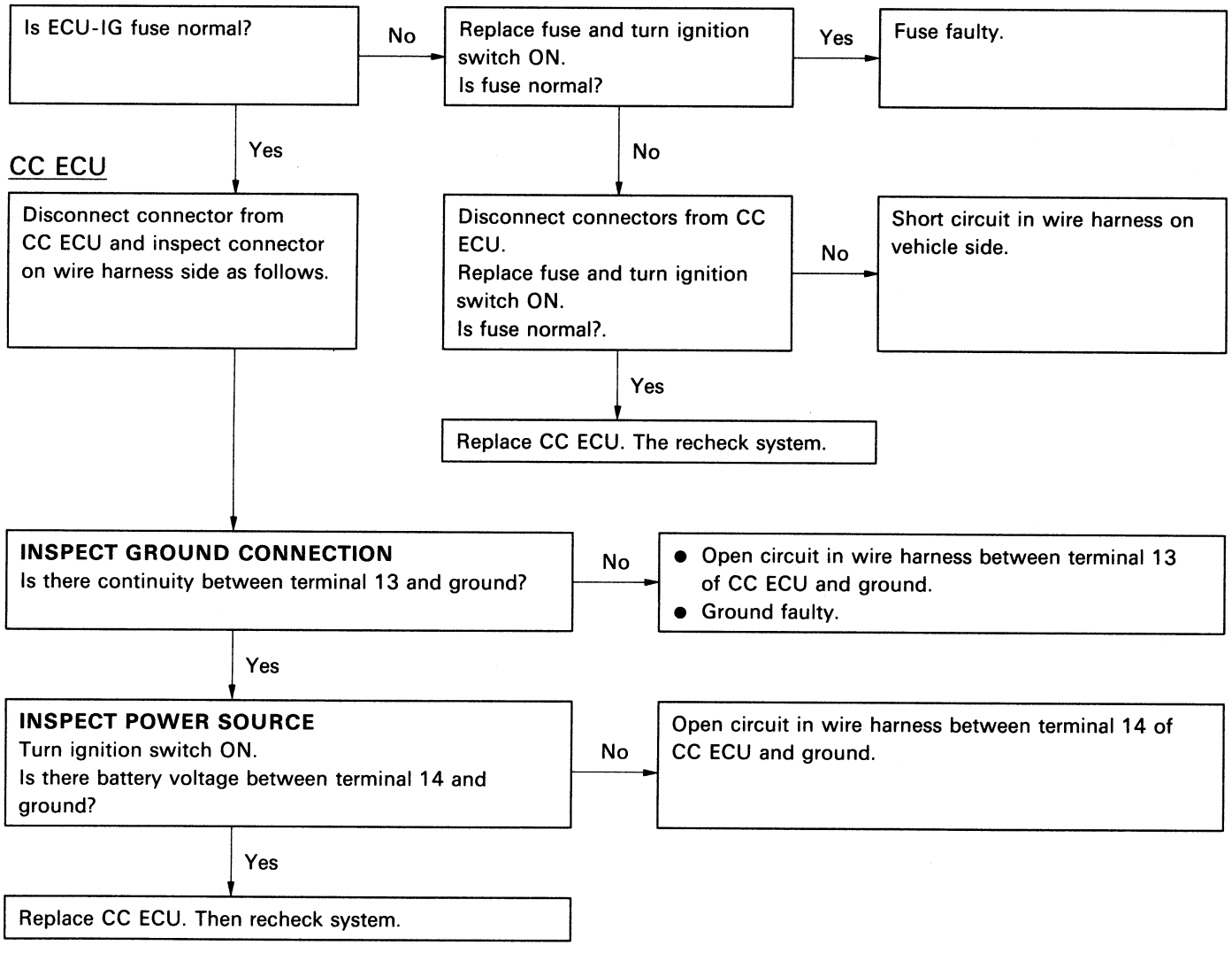
You will find the source of the trouble more easily be properly using the table shown below. In this table, the numbers indicate the order of priority of the causes of trouble. Check each part in the order shown.

Chart No.					H	*1	*2	L	N,O	M	*3	P	Q		
Inspection Item / Diagnosis Code / Problem	Type B	Type A		CC ECU	Actuator	Main Switch (in Control Switch)	Control Switch	Stop light Switch	Clutch Switch or Neutral Start Switch	Parking Brake Switch	Speed Sensor, or Speedometer Cable	ECT Solenoid No. 2 Circuit	Throttle Position Sensor (IDL)	Speed Control Cable Function	Wire Harness
● "CRUISE" Indicator light blinks 5 times. ● Cruise control system does not set. ● Cruise control system does not operate.	11			3	2										1
	12			4	2			3							1
	13			3	2										1
	21			3							2				1
	22			2							1				
	23			4	3						2			1	
	31			3			2								1
	32			2			1								
	33			3			2								1
	34			2			1								
	41			1											
	Normal	4	OK	9	8	2	3	4	5	6				7	1
			NG	2							7				
Set speed deviates on high or low side.				4	3						1			2	
Large speed drop when the speed control switch turned to SET.				4	3								2	1	
Vehicle speed fluctuates when speed control switch turned to SET.				4	3						1			2	
Acceleration response is sluggish when speed control switch turned to "ACCEL" or "RESUME"				4	3						2			1	
During autodrive operation, shift operation ocuurs frequently without control				2								1			
Set speed does not cancel when brake pedal depressed.	3	OK		1											
		NG		2				1							
Set speed does not cancel when parking brake lever pulled	3	OK		1											
		NG		2						1					
Set speed does not cancel when clutch pedal depressed.	3	OK		1											
		NG		2					1						
Set speed does not cancel when speed control switch turned to CANCEL.	3	OK		1											
		NG		2			1								
Vehicle speed does not decrease when speed control switch turned to COAST.	1	OK		4	1						3			2	
		NG		2			1								
Vehicle speed does not accelerate when speed control switch turned to ACCEL.	2	OK		4	1						3			2	
		NG		2			1								
Vehicle speed does not return to memorized speed when control switch turned on RESUME	2	OK		4	1						3			2	
		NG		2			1								
Speed can be set below about 40 km/h (25 mph.)	4	OK		1											
		NG		2							1				
Cruise control will not disengage even at about 40 km/h (25 mph).	4	OK		1											
		NG		3							1			2	

*1 USA : C
CANADA : D
*2 USA : C
CANADA : E,F,G
*3 M/T : I
A/T : J, K

A POWER SOURCE CIRCUIT

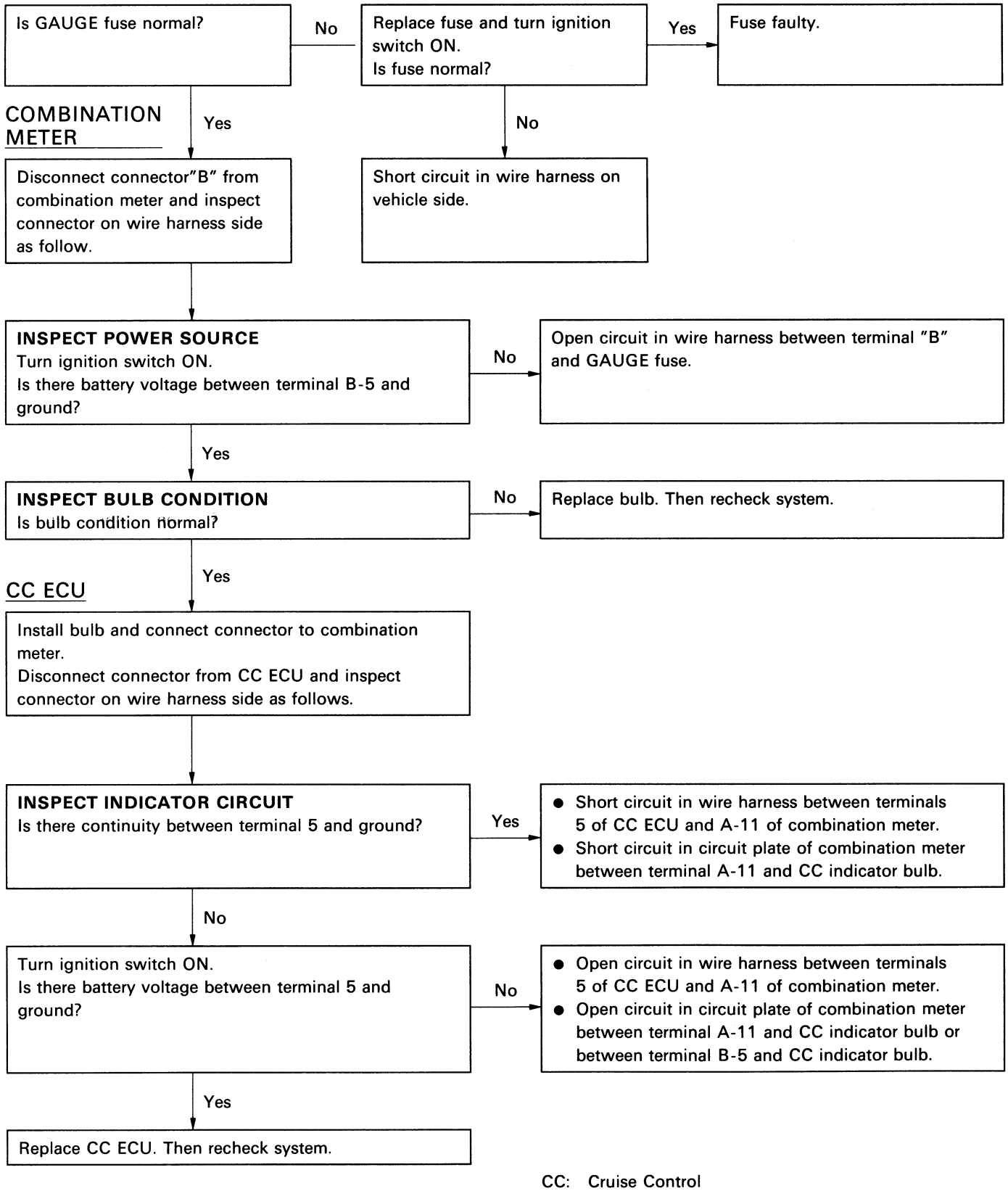
HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



CC: Cruise Control

B CRUISE CONTROL INDICATOR CIRCUIT

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



CC: Cruise Control

C CONTROL SWITCH CIRCUIT (USA)

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

CONTROL SWITCH

Disconnect connector from control switch and inspect connector on wire harness side as follows.

↓

INSPECT GROUND CONNECTION
Is there continuity between terminal 3 and ground?

No → ● Open circuit in wire harness between terminal 3 of control switch and ground.
● Ground faulty.

Yes ↓

INSPECT CONTROL SWITCH (See page BE-111)
Is control switch operation normal?

No → Replace control switch. Then recheck system.

Yes ↓

CC ECU

Connect connector to control switch.
Disconnect connectors from CC ECU and inspect connectors on wire harness side as follows.

↓

INSPECT MAIN SWITCH CIRCUIT
Is there continuity between terminal 4 and ground with main switch OFF?

Yes → Short circuit in wire harness between terminals 4 of CC ECU and 5 of control switch.

No ↓

Is there continuity between terminal 4 and ground with main switch ON?

No → Open circuit in wire harness between terminals 4 of CC ECU and 5 of control switch.

Yes ↓

INSPECT CONTROL SWITCH CIRCUIT
Is there continuity between terminal 18 and ground with control switch OFF?

Yes → Short circuit in wire harness between terminals 18 of CC ECU and 4 of control switch.

No ↓

Is there resistance as shown in table below between terminal 18 and ground when control switch is turned to each position?

Position	Resistance (Ω)
RES/ACC	Approx. 68
SET/COAST	Approx. 198
CANCEL	Approx. 418

No → Open circuit in wire harness between terminals 18 of CC ECU and 4 of control switch.

Yes ↓

Replace CC ECU. Then recheck system.

CC: Cruise Control

D MAIN SWITCH CIRCUIT (CANADA)

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

CONTROL SWITCH

Disconnect connector from control switch and inspect connector on wire harness side as follows.

↓

INSPECT GROUND CONNECTION
Is there continuity between terminal 19 and ground?

No → ● Open circuit in wire harness between terminal 19 of control switch and ground.
● Ground faulty.

↓ Yes

INSPECT CONTROL SWITCH (See page BE-111)
Is control switch operation normal?

No → Replace control switch. Then recheck system.

↓ Yes

CC ECU

Connect connector to control switch.
Disconnect connector from CC ECU and inspect connector on wire harness side as follows.

↓

INSPECT MAIN SWITCH CIRCUIT
Is there continuity between terminal 4 and ground with MAIN switch ON.

No → Open circuit in wire harness between terminal 4 of CC ECU and terminal 15 of control switch.

↓ Yes

Is there continuity between terminal 4 and ground when MAIN switch OFF.

Yes → Short circuit in wire harness between terminal 4 of CC ECU and terminal 15 of control switch.

↓ No

Replace CC ECU.
Then recheck system.

CC: Cruise Control

E SET/COAST SWITCH CIRCUIT (CANADA)

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

CONTROL SWITCH

Disconnect connector from control switch and inspect connector on wire harness side as follows.

↓

INSPECT GROUND CONNECTION
Is there continuity between terminal 19 and ground?

No → ● Open circuit in wire harness between terminal 19 of control switch and ground.
● Ground faulty.

↓ Yes

INSPECT CONTROL SWITCH
(See page BE-111)
Is control switch operation normal?

No → Replace control switch. Then recheck system.

↓ Yes

CC ECU

Connect connector to control switch.
Disconnect connector from CC ECU and inspect connector on wire harness side as follows.

↓

INSPECT SET/COAST CIRCUIT
Is there continuity between terminal 19 and ground with control switch turned to SET/COAST position?

No → Open circuit in wire harness between terminal 19 of CC ECU and terminal 5 of control switch.

↓ Yes

Is there continuity between terminal 19 and ground when control switch released?

Yes → Short circuit in wire harness between terminal 19 of CC ECU and terminal 5 of control switch.

↓ No

Replace CC ECU.
Then recheck system.

CC: Cruise Control

F RES/ACC SWITCH CIRCUIT (CANADA)

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

CONTROL SWITCH

Disconnect connector from control switch and inspect connector on wire harness side as follows.

↓

INSPECT GROUND CONNECTION
Is there continuity between terminal 19 and ground?

No → ● Open circuit in wire harness between terminal 19 of control switch and ground.
● Ground faulty.

↓ Yes

INSPECT CONTROL SWITCH
(See page BE-111)
Is control switch operation normal?

No → Replace control switch. Then recheck system.

↓ Yes

CC ECU

Connect connector to control switch.
Disconnect connector from CC ECU and inspect connector on wire harness side as follows.

↓

INSPECT RESUME/ACCEL CIRCUIT
Is there continuity between terminal 18 and ground with control switch turned to RES/ACC position?

No → Open circuit in wire harness between terminal 18 of CC ECU and terminal 17 of control switch.

↓ Yes

Is there continuity between terminal 18 and ground when control switch released?

Yes → Short circuit in wire harness between terminal 18 of CC ECU and terminal 17 of control switch.

↓ No

Replace CC ECU.
Then recheck system.

CC: Cruise Control

G CANCEL SWITCH CIRCUIT (CANADA)

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

CONTROL SWITCH

Disconnect connector from control switch and inspect connector on wire harness side as follows.

↓

INSPECT GROUND CONNECTION
Is there continuity between terminal 19 and ground?

No → ● Open circuit in wire harness between terminal 19 of control switch and ground.
● Ground faulty.

Yes ↓

INSPECT CONTROL SWITCH
(See page BE-111)
Is control switch operation normal?

No → Replace control switch. Then recheck system.

Yes ↓

CC ECU

Connect connector to control switch.
Disconnect connector from CC ECU and inspect connector on wire harness side as follows.

↓

INSPECT CANCEL CIRCUIT
Is there continuity between terminal 17 and ground with control switch turned to CANCEL position?

No → Open circuit in wire harness between terminal 17 of CC ECU and terminal 11 of control switch.

Yes ↓

Is there continuity between terminal 17 and ground when control switch released?

Yes → Short circuit in wire harness between terminal 17 of CC ECU and terminal 11 of control switch.

No ↓

Replace CC ECU.
Then recheck system.

CC: Cruise Control

H ACTUATOR CIRCUIT

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

ACTUATOR

Disconnect connector from actuator and inspect connector on wire harness side as follows.

↓

INSPECT GROUND CONNECTION
Is there continuity between terminal 4 and ground?

No → ● Open circuit in wire harness between terminal 4 of actuator and ground.
● Ground faulty.

Yes ↓

INSPECT ACTUATOR (See page BE-113)
Is actuator operation normal?

No → Replace actuator. Then recheck system.

Yes ↓

STOP LIGHT SWITCH

INSPECT STOP LIGHT SWITCH INSTALLATION
Is stop light switch installed properly?

No → Reinstall stop light switch properly. Then recheck system.

Yes ↓

Connect connector to actuator.
Disconnect connector from stop light switch and inspect connector on wire harness side as follows.

↓

INSPECT SAFETY MAGNETIC CLUTCH CIRCUIT
Is there approx. 38.5 Ω between terminal 4 and ground?

No → Open or short circuit in wire harness between terminals 4 of stop light and 5 of actuator.

Yes ↓

INSPECT STOP LIGHT SWITCH (See page BE-111)
Is stop light switch operation normal?

No → Replace stop light switch. Then recheck system.

Yes ↓

CONTINUED ON NEXT PAGE

CC: Cruise Control

CONTINUED FROM PREVIOUS PAGE

CC ECU

Connect connector to stop light switch.
Disconnect connectors from CC ECU and inspect connector on wire harness side as follows.

INSPECT SAFETY MAGNETIC CLUTCH CIRCUIT
Is there approx. 38.5 Ω between terminal 10 and ground?

No → Open or short circuit in wire harness between terminals 10 of CC ECU and 4 of actuator.

Yes

INSPECT MOTOR CIRCUIT
Is there continuity between terminal 12 and ground?

Yes → Short circuit in wire harness between terminals 12 of CC ECU and 6 of actuator.

No

Is there continuity between terminal 11 and ground?

Yes → Short circuit in wire harness between terminals 11 of CC ECU and 7 of actuator.

No

Is there continuity between terminals 11 and 12 with actuator arm in a position except max. open or max. close?

No → Open circuit in wire harness between terminals 12 of CC ECU and 6 of actuator or between terminals 11 of CC ECU and 7 of actuator.

Yes

INSPECT POSITION SENSOR CIRCUIT
Is there continuity between terminal 24 and ground?

Yes → Short circuit in wire harness between terminals 24 of CC ECU and 1 of actuator.

No

Is there approx. 2 kΩ between terminals 24 and 26?

No →
- Open circuit in wire harness between terminals 26 of CC ECU and 3 of actuator.
- Open circuit in wire harness between terminals 24 of CC ECU and 1 of actuator.

Yes

Does resistance change even between terminals 25 and 26?

No → Open or short circuit in wire harness between terminals 25 of CC ECU and 2 of actuator.

Yes

Replace CC ECU. Then recheck system.

CC: Cruise Control

I SPEED SENSOR CIRCUIT (with M/T)

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

SPEED SENSOR

Disconnect connector from speed sensor and inspect connector on wire harness side as follows.

↓

INSPECT GROUND CONNECTION
Is there continuity between terminal 3 and ground?

No → ● Open circuit in wire harness between terminal 3 of speed sensor and ground.
● Ground faulty.

Yes ↓

INSPECT SPEED SENSOR (See page BE-112)
Is speed sensor operation normal?

No → Replace speed sensor. Then recheck system.

Yes ↓

CC ECU

Connect connector to speed sensor.
Disconnect connector from CC ECU and inspect connector on wire harness side as follows.

↓

INSPECT SPEED SENSOR CIRCUIT
Is there continuity repeatedly between terminal 20 and ground?

No → ● Open or short circuit in wire harness between terminals 20 of CC ECU and 2 of speed sensor.

Yes ↓

Replace CC ECU. Then recheck system.

CC: Cruise Control

J SPEED SENSOR CIRCUIT (with A/T: COMBINATION METER)

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

SPEED METER CABLE

Does meter fluctuate when driving at steady speed?

Yes → Replace meter cable. Then recheck system.

No

COMBINATION METER

Disconnect connector "A" from combination meter and inspect connector on wire harness side as follows.

INSPECT GROUND CONNECTION
Is there continuity between terminal A-1 and ground?

No →
- Open circuit in wire harness between terminal A-1 of combination meter and ground.
- Ground faulty.

Yes

INSPECT SPEED SENSOR (See page BE-112)
Is speed sensor operation normal?

No → Replace speedometer. Then recheck system.

Yes

CC ECU

Connect connector "A to combination meter.
Disconnect connector from CC ECU and inspect connector on wire harness side as follows.

INSPECT SPEED SENSOR CIRCUIT
Is there continuity repeatedly between terminal 20 and ground?

No →
- Open or short circuit in wire harness between terminals 20 of CC ECU and B-10 of combination meter.
- Open or short circuit in circuit plate of combination meter between terminal B-10 and speed sensor.
- Open circuit in circuit plate of combination meter between terminal A-1 and speed sensor.

Yes

Replace CC ECU. Then recheck system.

CC: Cruise Control

K SPEED SENSOR CIRCUIT (with A/T: ECT)

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

SPEED SENSOR

Disconnect connector from speed sensor and inspect connector on wire harness side as follows.

↓

INSPECT GROUND CONNECTION
Is there continuity between terminal 1 and ground?

No → ● Open circuit in wire harness between terminal 1 of speed sensor and ground.
● Ground faulty.

↓ Yes

INSPECT SPEED SENSOR (See page BE-112)
Is speed sensor operation normal?

No → Replace speed sensor. Then recheck system.

↓ Yes

CC ECU

Connect connector to speed sensor.
Disconnect connector from CC ECU and inspect connector on wire harness side as follows.

↓

INSPECT SPEED SENSOR CIRCUIT
Is there continuity repeatedly between terminal 21 and ground?

No → ● Open or short circuit in wire harness between terminals 21 of CC ECU and of speed sensor.

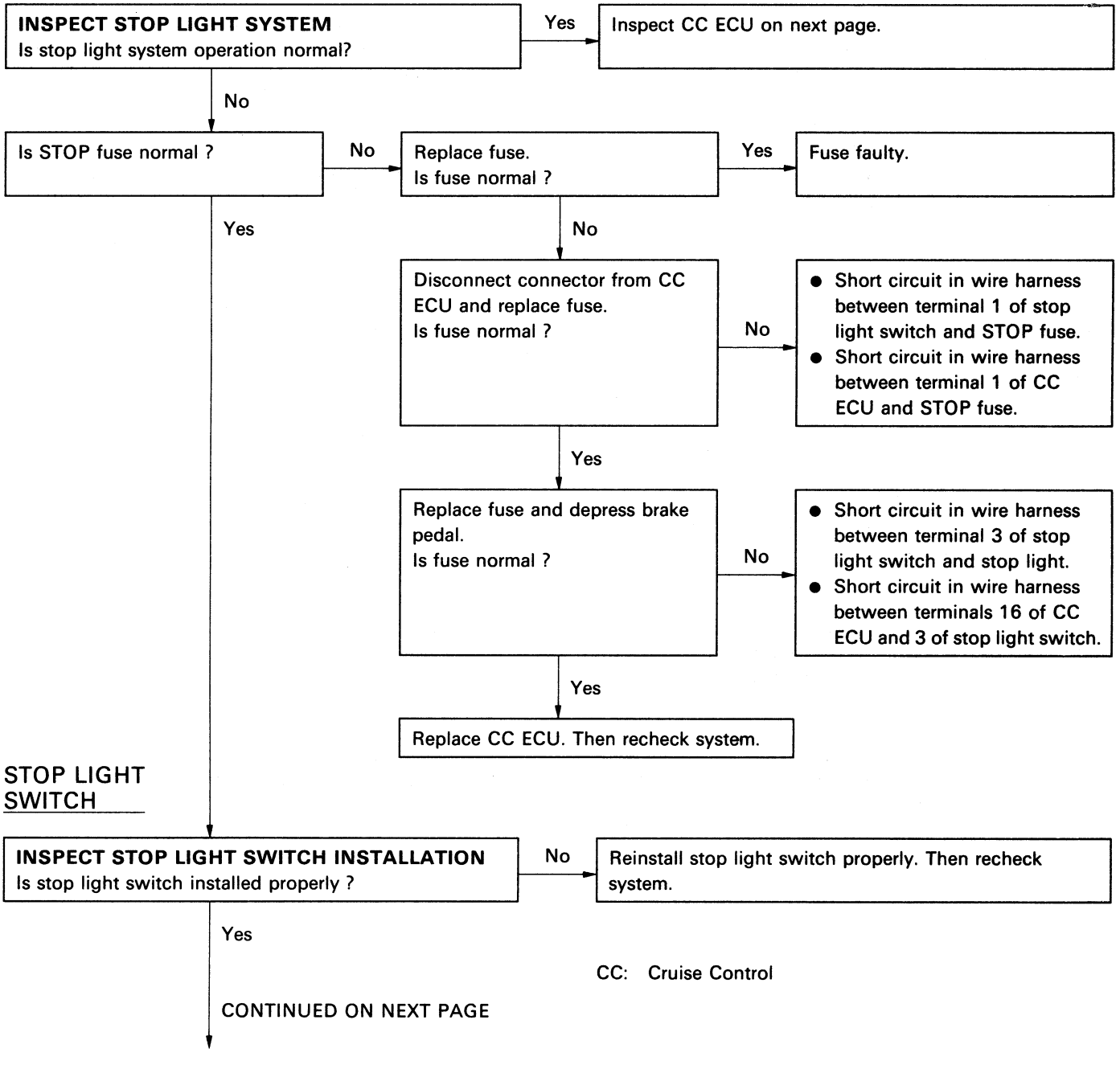
↓ Yes

Replace CC ECU. Then recheck system.

CC: Cruise Control

L STOP LIGHT SWITCH CIRCUIT

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



CONTINUED FROM PREVIOUS PAGE

STOP LIGHT SWITCH

Disconnect connector from stop light switch and inspect connector on wire harness side as follows.

INSPECT POWER SOURCE
Is there battery voltage between terminal 1 and ground?

No → Open circuit in wire harness between terminal 1 of stop light switch and STOP fuse.

Yes

INSPECT STOP LIGHT CIRCUIT
Connect terminals 1 and 3.
Do stop light lights up?

No →
- Open circuit in wire harness between terminal 3 of stop light switch and ground.
- Ground faulty.

Yes

INSPECT STOP LIGHT SWITCH
(See page BE-111)
Is stop light switch operation normal?

No → Replace stop light switch. Then recheck system.

Yes

CC ECU

Connect connector to stop light switch.
Disconnect connector from CC ECU and inspect connector on wire harness side as follows.

← If stop light system operation is normal, start inspection from this step.

INSPECT STOP LIGHT SWITCH CIRCUIT
Is there battery voltage between terminal 1 and ground?

No → Open circuit in wire harness between terminal 1 of CC ECU and STOP fuse.

Yes

Is there battery voltage between terminal 16 and ground when brake pedal depressed?

No → Open circuit in wire harness between terminals 16 of CC ECU and 3 of stop light switch.

Yes

Replace CC ECU. Then recheck system.

CC: Cruise Control

M PARKING BRAKE SWITCH CIRCUIT

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

INSPECT PARKING BRAKE SWITCH
(See page BE-111)
Is parking brake switch operation normal?

No → Replace parking brake switch. Then recheck system.

Yes

CC ECU

Connect connector to parking brake switch.
Disconnect connector from CC ECU and inspect connector on wire harness side as follows.

INSPECT PARKING BRAKE SWITCH CIRCUIT
Is there continuity between terminal 3 and ground when parking brake lever is released?

Yes → Short circuit in wire harness between terminal 3 of CC ECU and parking brake switch.

No

Is there continuity between terminal 3 and ground when parking brake lever is pulled?

No → Open circuit in wire harness between terminal 3 of CC ECU and parking brake switch.

Yes

Replace CC ECU. Then recheck system.

CC: Cruise Control

N CLUTCH SWITCH CIRCUIT (with M/T)

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

CLUTCH SWITCH

INSPECT CLUTCH SWITCH INSTALLATION
Is clutch switch installed properly?

No → Reinstall clutch switch properly. Then recheck system.

Yes ↓

Disconnect connector from clutch switch and inspect connector on wire harness side as follows.

INSPECT GROUND CONNECTION
Is there continuity between terminal 1 and ground?

No → ● Open circuit in wire harness between terminal 1 of clutch switch and ground.
● Ground faulty.

Yes ↓

INSPECT CLUTCH SWITCH (See page BE-112)
Is clutch switch operation normal?

No → Replace clutch switch. Then recheck system.

Yes ↓

CC ECU

Connect connector to clutch switch.
Disconnect connector from CC ECU and inspect connector on wire harness side as follows.

INSPECT CLUTCH SWITCH CIRCUIT
Is there continuity between terminal 2 and ground when clutch pedal released?

Yes → Short circuit in wire harness between terminals 2 of CC ECU and 2 of clutch switch.

No ↓

Is there continuity between terminal 2 and ground when clutch pedal depressed?

No → Open circuit in wire harness between terminal 2 of CC ECU and 2 of clutch switch.

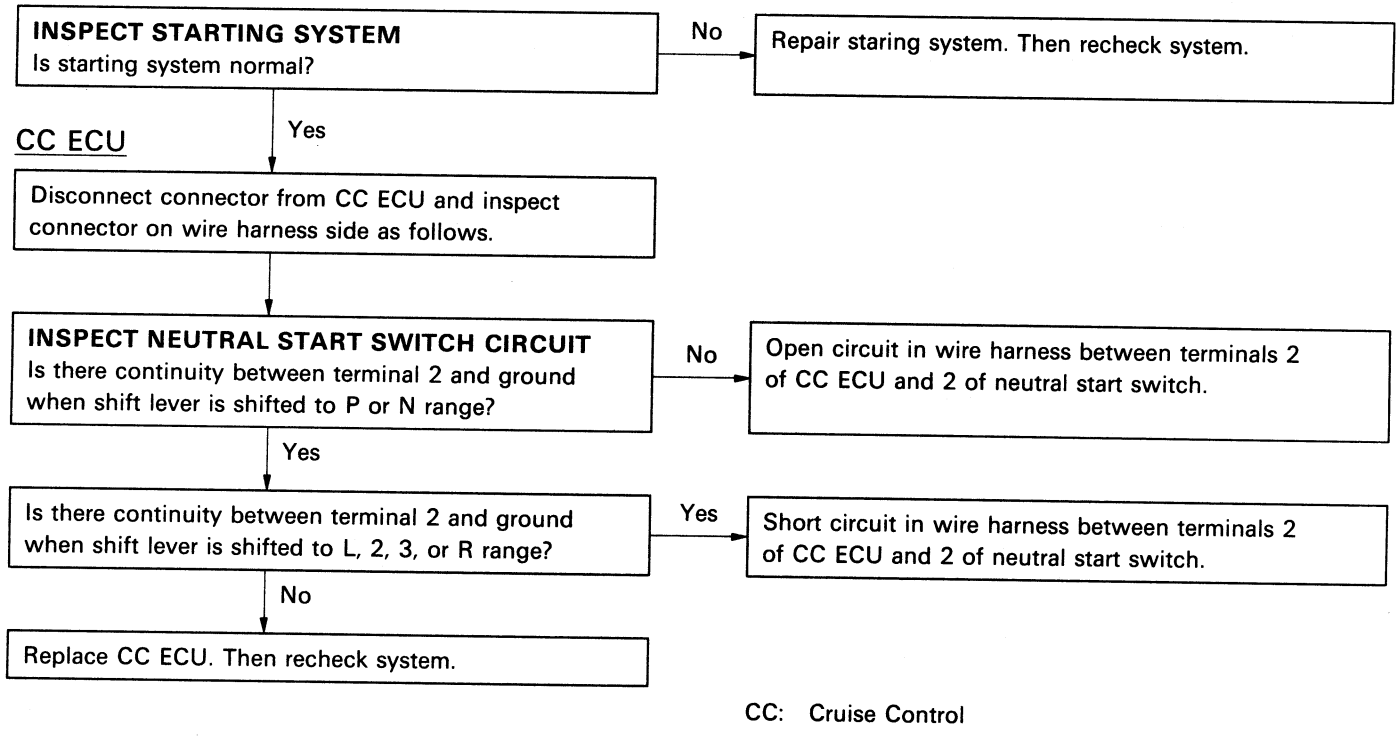
Yes ↓

Replace CC ECU. Then recheck system.

CC: Cruise Control

O NEUTRAL START SWITCH CIRCUIT (with A/T)

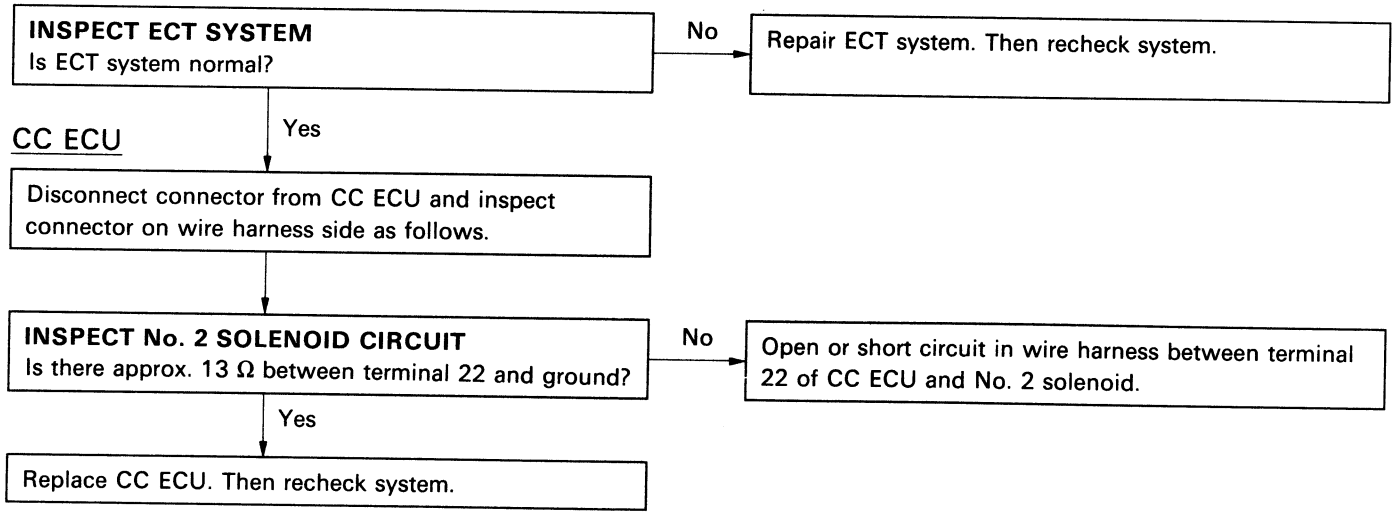
HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



CC: Cruise Control

P ECT SOLENOID No. 2 CIRCUIT (with A/T)

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



CC: Cruise Control

Q IDL SIGNAL CIRCUIT

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

THROTTLE POSITION SENSOR

INSPECT THROTTLE POSITION SENSOR ADJUSTMENT
Is throttle position sensor adjustment normal?

No → Adjust position sensor position. Then recheck system.

Yes ↓

INSPECT THROTTLE POSITION SENSOR
Is throttle position sensor operation normal?

No → Replace throttle position sensor. Then recheck system.

Yes ↓

CC ECU

Connect connector to throttle position sensor.
Disconnect connector from CC ECU and inspect connector on wire harness side as follows.

↓

INSPECT IDL SIGNAL CIRCUIT
Is there continuity between terminal 23 and ground when acceleration pedal is released?

No → Open circuit in wire harness between terminals 23 of CC ECU and 2 of throttle position sensor.

Yes ↓

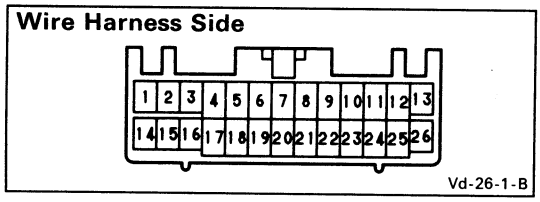
Is there continuity between terminal 23 and ground when acceleration pedal is depressed?

Yes → Short circuit in wire harness between terminals 23 of CC ECU and 2 of throttle position sensor.

No ↓

Replace CC ECU. Then recheck system.

CC: Cruise Control



Cruise Control ECU Circuit

INSPECT ECU CIRCUIT

Disconnect connector and inspect connector on wire harness side as shown in the chart.

(USA)

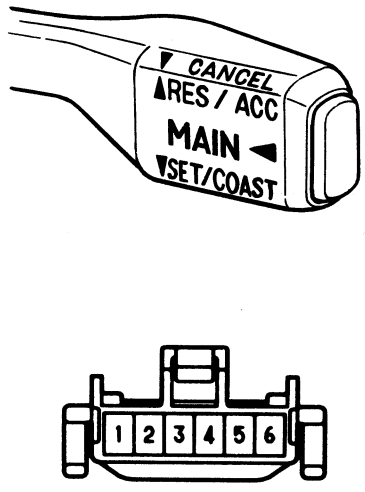
Check for	Measured item	Tester connection	Condition		Specified Value
Continuity	Clutch Switch (M/T)	2 – ground	Clutch pedal Position	released	No continuity
				depressed	Continuity
	Neutral start switch (A/T)	2 – ground	Shift lever position	N or P	Continuity
				L,2,D or R	No continuity
	Parking brake switch	3 – ground	Parking brake lever position	released	No continuity
				pulled	Continuity
	Control switch	4 – ground	Main switch position	pushed	Continuity
				released	No continuity
	Actuator (motor)	11 – 12	Actuator arm position: max. OPEN		(12→11) Continuity
					(11→12) No continuity
			Actuator arm position: max. CLOSE		(11→12) Continuity
					(12→11) No continuity
			Actuator arm position: any position except above position		(11→12) Continuity
	Ground connection	13 – ground	Constant		Continuity
Resistance	Actuator (Safety magnetic clutch)	10 – ground	Brake pedal position	released	Approx. 38.5 Ω
				depressed	No continuity
	Control switch	18 – ground	Control switch position	OFF	No continuity
				RES/ACC	Approx. 68 Ω
				SET/COAST	Approx. 198 Ω
				CANCEL	Approx. 418 Ω
	ECT No. 2 solenoid valve (A/T)	22 – ground	Constant		Approx. 13 Ω
	Actuator (position sensor)	24 – 26	Constant		Approx. 2 kΩ
		25 – 26	Actuator arm turned		Resistance change even
Voltage	STOP fuse	1 – ground	Constant		Battery voltage
	Power source	14 – ground	Ignition switch position	LOCK or ACC	No voltage
				ON	Battery voltage
	Stop light	16 – ground	Brake pedal position	released	No voltage
				depressed	Battery voltage
	Speed sensor	20 – ground	With ignition switch ON, speedometer shaft or speed sensor shaft turned.		Voltage changes repeatedly

(CANADA)

Check for	Measured item	Tester connection	Condition		Specified value
Continuity	Clutch switch	2 – ground	Clutch pedal position	released	No continuity
				depressed	Continuity
	Parking brake switch	3 – ground	Parking brake lever position	released	No continuity
				pulled	Continuity
	MAIN switch*1	4 – ground	Main switch position	pushed	Continuity
				released	No continuity
	Actuator (motor)	11 – 12	Actuator arm position: max. OPEN		(12→11) Continuity
					(11→12) No continuity
			Actuator arm position: max. CLOSE		(11→12) Continuity
					(12→11) No continuity
			Actuator arm position: any position except above position		(11↔12) Continuity
	Ground connection	13 – ground	Constant		Continuity
	CANCEL switch*1	17 – ground	Cruise control switch position	turned to "CANCEL"	Continuity
				released	No continuity
	RES/ACC switch*1	18 – ground		turned to "RES/ACC"	Continuity
				released	No continuity
	SET/COAST switch*1	19 – ground		turned to "SET/COAST"	Continuity
				released	No continuity
Resistance	Actuator (Safety magnetic clutch)	10 – ground	Brake pedal position	released	Approx. 38.5 Ω
				depressed	No continuity
	Actuator (position sensor)	24 – 26	Constant		Approx. 2 kΩ
		25 – 26	Actuator arm turned		Resistance change even
Voltage	STOP fuse	1 – ground	Constant		Battery voltage
	Power source	14 – ground	Ignition switch position	LOCK or ACC	No voltage
				ON	Battery voltage
	Stop light	16 – ground	Brake pedal position	released	No voltage
				depressed	Battery voltage
	Speed Sensor	20 – ground	With ignition switch ON, speedometer shaft or speed sensor shaft turned.		Voltage changes repeatedly

*1 There is on cruise control switch.

USA



BE4009
e-6-1-C

Parts Inspection

1. **INSPECT SWITCHES**
(Control Switch: USA)

(a) Check continuity between terminals 3 and 5.

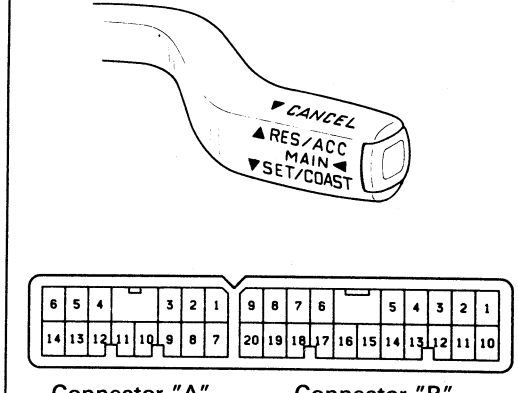
Main switch position	Condition
OFF	No continuity
ON	Continuity

(b) Measure resistance between terminals 3 and 4.

Control switch position	Resistance (Ω)
OFF	∞ (No continuity)
RES/ACC	Approx. 68
SET/COAST	Approx. 198
CANCEL	Approx. 418

If resistance value is not as specified, replace the control switch.

CANADA



BE4909
V-34-2

(Control Switch: CANADA/Continuity)

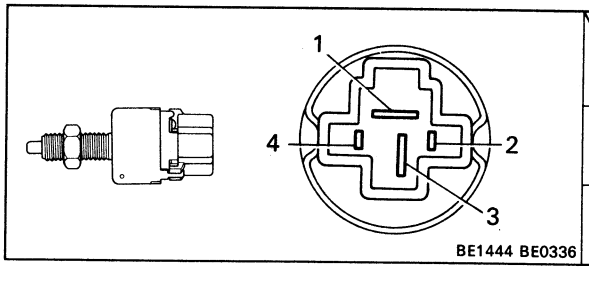
Terminal / Switch Position	B-5 (V)	B-11 (Y)	B-15 (R)	B-17 (Or)	B-19 (B)
OFF					
RES/ACC				○	○
MAIN			○		○
SET/COAST	○				○
CANCEL		○			○

If continuity is not as specified, replace the switch.

(Parking Brake Switch)

See Step 2 of Brake Warning System on page BE-58

(Stop Light Switch/Continuity)

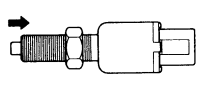


BE1444 BE0336

Terminal / Switch position	1	2	3	4
Switch pin free (Brake pedal depressed)	○		○	
Switch pin pushed in (Brake pedal released)		○		○

If continuity is not as specified, replace the stop light switch.

(Clutch Switch: M/T/Continuity)



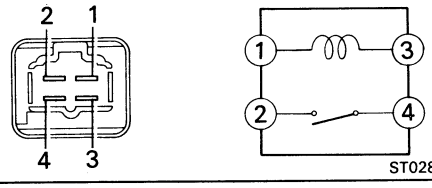
BE2737 G-2-2

Terminal / Condition	1	2
Switch pin free (Clutch pedal depressed)	O	O
Switch pin pushed in (Clutch pedal released)		

If continuity is not as specified, replace the switch.

(Neutral Start Switch : A/T)
See page AT-29.

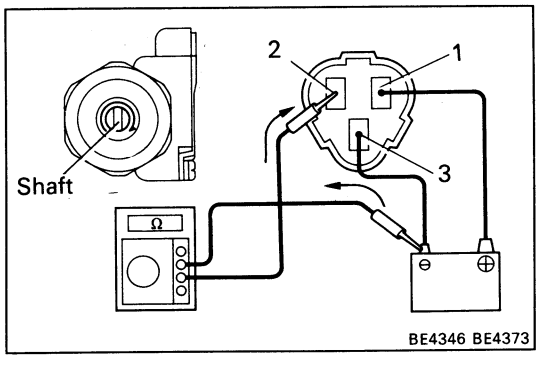
2. INSPECT RELAY
(Starter Relay/Continuity)



ST0280 BE1840

Terminal / Condition	1	2	3	4
Constant	O	∿	O	
Apply battery voltage to terminals 1 and 3.		O		O

If continuity is not as specified, replace the relay.



BE4346 BE4373

3. INSPECT SPEED SENSOR
(M/T)

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 3.

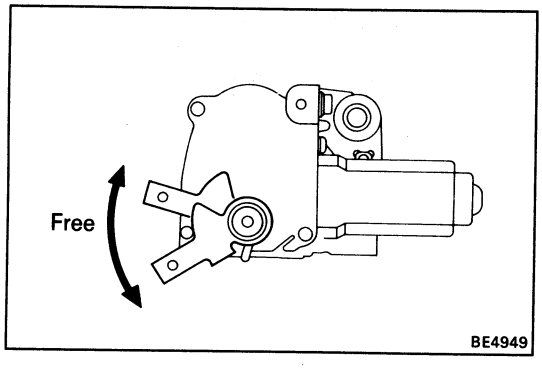
(b) Check that there is continuity between terminal 2 and the battery negative (–) terminal four times per each revolution of the shaft.

HINT: Connect the test leads so that the current from the ohmmeter can flow from terminal 2 to the battery negative (–) terminal.

If operation is not as specified, replace the speed sensor.

(A/T : Combination Meter)
See page BE-52

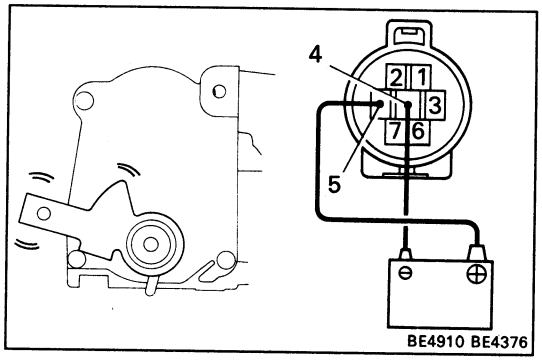
(A/T : ECT)
See page AT-29



4. INSPECT ACTUATOR

Safety Magnetic Clutch

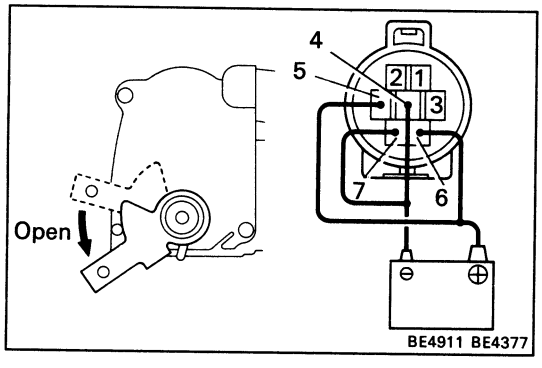
(a) Check that the arm moves smoothly by hand.



(b) Connect the positive (+) lead from the battery to terminal 5 and the negative (–) lead to terminal 4. (Safety Magnetic Clutch turned ON)

(c) Check that the arm does not move by hand.

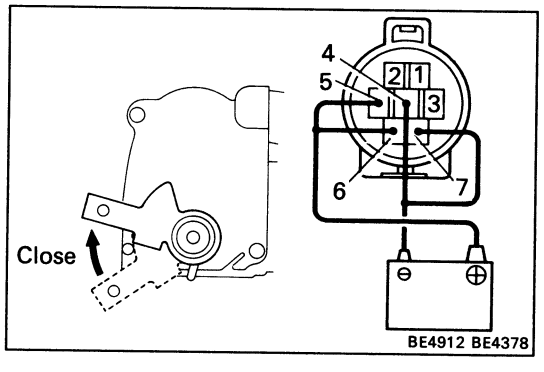
If operation is not as specified, replace the motor.



Motor

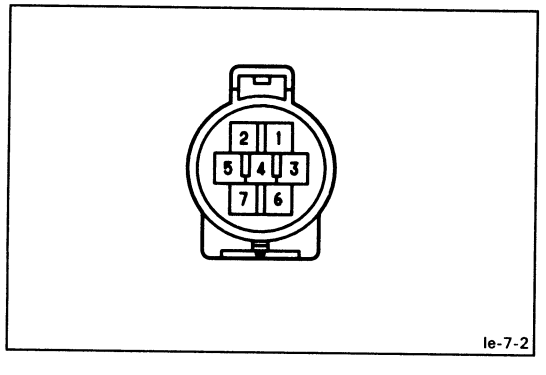
(a) With the safety magnetic clutch ON, connect the positive (+) lead from the battery to terminal 6 and the negative (–) lead to terminal 7, check that the arm moves to the open side.

(b) When the arm reached to the open position, check that the motor operation stops.



(c) With the safety magnetic clutch ON, connect the positive (+) lead from the battery to terminal 7 and the negative (–) lead to terminal 6, check that the arm moves to the close side.

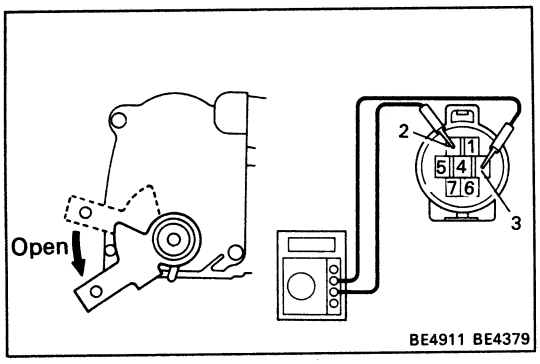
(d) When the arm reaches to the closed position, check that the motor operation stops.



Position Sensor

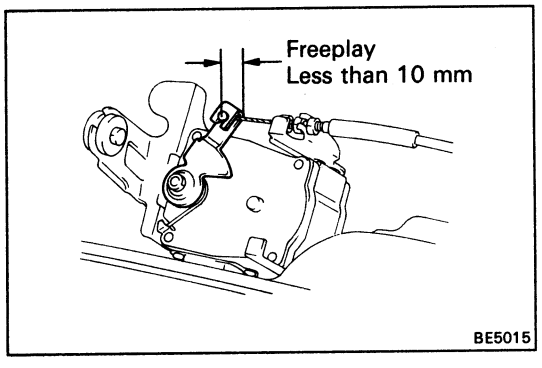
(a) Measure the resistance between terminals 1 and 3.

Resistance: Approx. 2 kΩ



(b) When the arm is moving from the closed to open position, check that resistance between terminals 2 and 3 increases from approx. 0.5 to 1.7 kΩ.

If operation is not as specified, replace the motor.



Cruise Control Cable

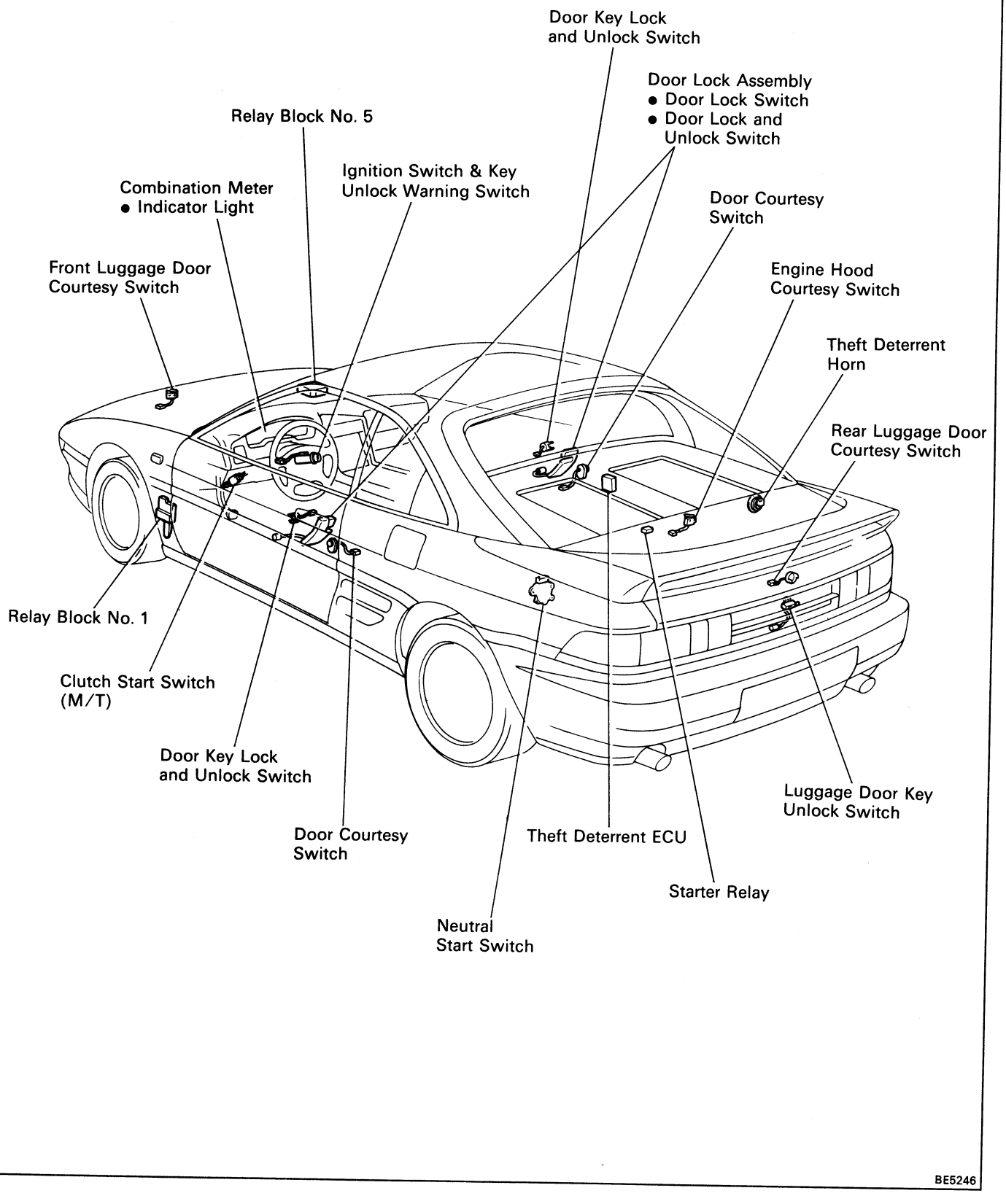
(a) Check that the cruise control cable freeplay is less than 10 mm (0.39 in.).

(b) If necessary adjust the cruise control cable freeplay.

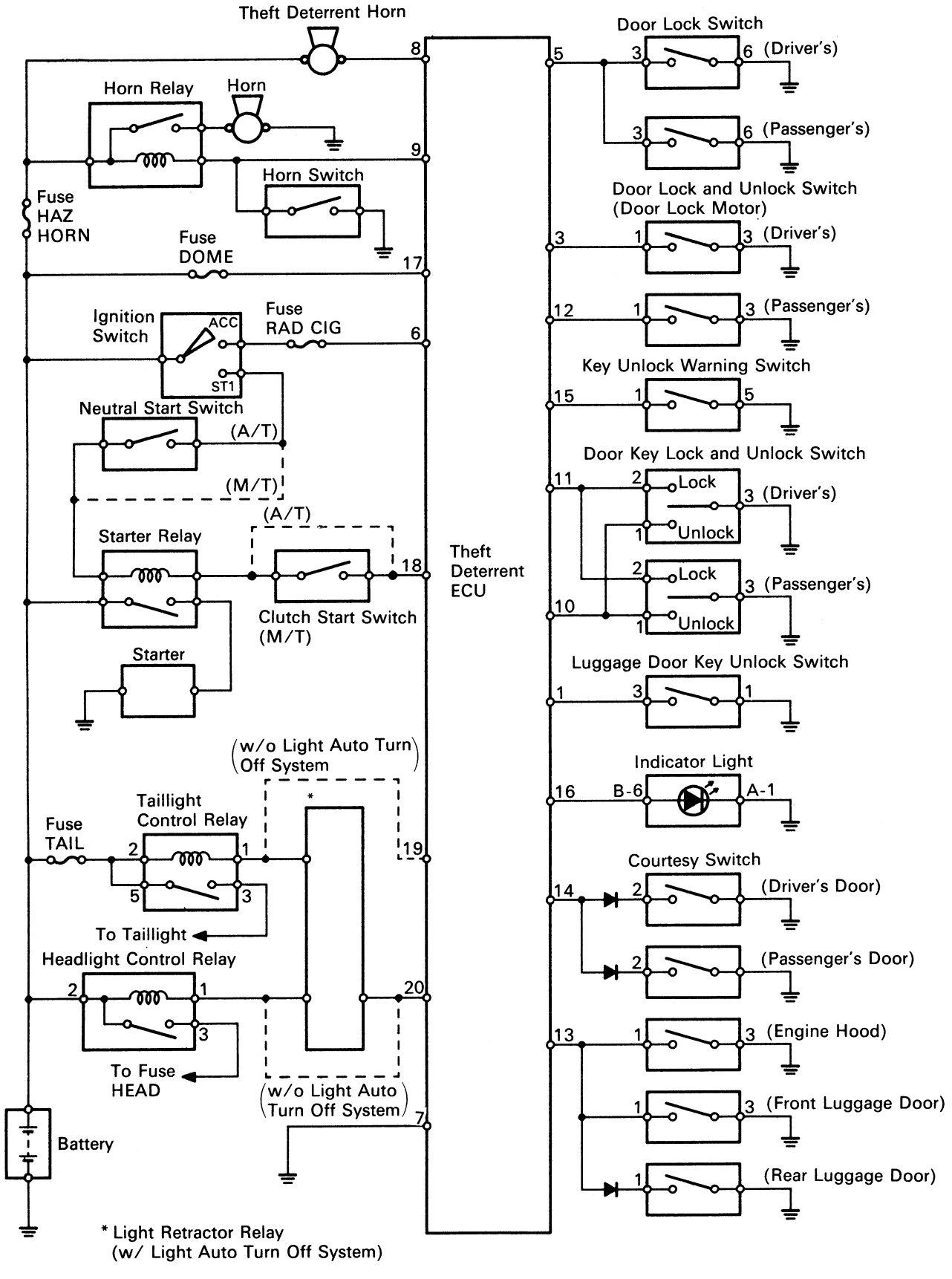
5. INSPECT THROTTLE POSITION SENSOR
See pages FI-134 and FI-141.

THEFT DETERRENT SYSTEM

Parts Location

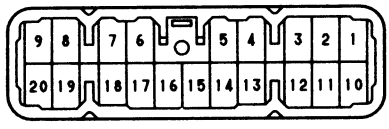


Wiring Diagrams



Connector Diagrams

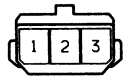
Theft Deterrent ECU



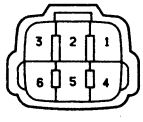
Door Key Lock and Unlock Switch



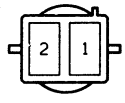
Luggage Door Key Unlock Switch



Door Lock Assembly



Theft Deterrent Horn



Courtesy Switch (Engine Hood)



(Front Luggage Door)



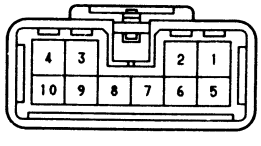
(Rear Luggage Door)



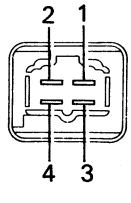
(Door)



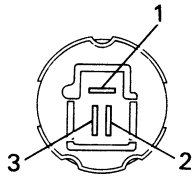
Ignition Switch
Key Unlock Warning Switch



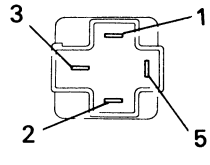
Starter Relay



Headlight Control Relay



Taillight Control Relay



e-20-2-C Ie-3-1 GA-3-1
IS-6-2-B IA-2-2
IU-3-2 IU-3-2 e-1-1 e-2-1-G
e-10-2-B ST0280 BE2763 BE4049

Troubleshooting

- Check that the operation of Power Door Lock Control System is normal.
- When the system is not operating, lower the door glass and confirm under what conditions it does not operate, or malfunctions.

Problem	Inspection Item	Section
Theft deterrent system can not be set.	Power source circuit	A
Indicator light does not light even if theft deterrent system operated.	Indicator light circuit	B
Theft deterrent system does not operate when driver's and passenger's doors opened.	Door Lock and unlock switch circuit Door lock switch circuit Door courtesy switch circuit	C D E
Theft deterrent system does not operate when front and rear luggage doors opened.	Luggage door courtesy switch circuit	E
Theft deterrent system does not operate when engine hood opened.	Engine hood courtesy switch circuit	E
Theft deterrent system does not cancel when driver's and passenger's doors unlocked with key.	Door key lock and unlock switch circuit	F
Theft deterrent system does not cancel when rear luggage door unlocked with key.	Luggage door key unlock switch circuit	G
Theft deterrent system does not cancel when ignition switch turned to ON or ACC position.	Ignition switch circuit Key unlock warning switch circuit	H I
Starter cut system does not operate even if theft deterrent system operated.	Starter cut system circuit	J
Starter cut system does not cancel even if theft deterrent system canceled.	Starter cut system circuit	J
Horn does not blow even if theft deterrent system operated	Theft deterrent horn circuit Standard equipment horns circuit	K
Theft deterrent horn blows even if system is not set.	Theft deterrent horn circuit	K
Headlights do not flash even if theft deterrent system operated.	*1 Light retractor relay circuit *2 Headlight control relay circuit	L M
Taillights do not flash even if theft deterrent system operated.	*1 Light retractor relay circuit *2 Taillight control relay circuit	L N
Headlights flash even if system is not set.	*1 Light retractor relay circuit *2 Headlight control relay circuit	L M
Taillights flash even if system is not set.	*1 Light retractor relay circuit *2 Taillight control relay circuit	L N

*1 w/ Light Auto Turn Off System
*2 w/o Light Auto Turn Off System

A POWER SOURCE CIRCUIT

Turn ignition switch off.

Is DOME fuse normal?
- No → Replace fuse. Is operation normal?
  - No → Short circuit in wire harness between fuse and terminal 17 of TD ECU.
  - Yes → Fuse faulty.
- Yes

TD ECU

Disconnect TD ECU connector and inspect connector on wire harness side as follows.

INSPECT POWER SOURCE
Is there battery voltage between terminal 17 and ground.
- No → Open circuit in wire harness between fuse and terminal 17 of TD ECU.
- Yes

INSPECT GROUND CONNECTION
Is there continuity between terminal 7 and ground.
- No →
  - Open circuit in wire harness between terminal 7 of TD ECU and ground.
  - Ground faulty.
- Yes

INSPECT FOLLOWING SECTIONS:

Door Lock and Unlock Switch Circuit	Section C
Door Lock Switch Circuit	Section D
Courtesy Switch Circuit	Section E
Door Key Lock and Unlock Switch Circuit	Section F
Luggage Door Key Unlock Switch Circuit	Section G
Ignition Switch Circuit	Section H
Key Unlock Warning Switch Circuit	Section I

Yes

Replace TD ECU. Then recheck system.

TD: Theft Deterrent

B INDICATOR LIGHT CIRCUIT

Turn ignition switch off.

TD ECU

Disconnect TD ECU connector and inspect connector on wire harness side as follows.

INSPECT INDICATOR LIGHT CIRCUIT
Connect the negative lead from the ohmmeter to terminal 16 and positive lead to ground.
* Is there continuity between terminal 16 and ground?

No → Open circuit in indicator light circuit.

Yes

Replace TD ECU. Then recheck system.

*: This circuit includes the LED. If the circuit shows no continuity, change the positive and negative probes and recheck the circuit.

TD: Theft Deterrent

C DOOR LOCK AND UNLOCK SWITCH CIRCUIT

Turn ignition switch off.

TD ECU

Disconnect TD ECU connector and inspect connector on wire harness side as follows.

INSPECT DRIVER'S DOOR LOCK AND UNLOCK SWITCH CIRCUIT
Is there continuity between terminal 3 and ground with driver's door unlocked?

No → Open circuit in driver's door lock and unlock switch circuit.

Yes

INSPECT PASSENGER'S DOOR LOCK AND UNLOCK SWITCH CIRCUIT
Is there continuity between terminal 12 and ground with passenger's door unlocked?

No → Open circuit in passenger's door lock and unlock switch circuit.

Yes

Replace TD ECU. Then recheck system.

TD: Theft Deterrent

D DOOR LOCK SWITCH CIRCUIT

Turn ignition switch off.

TD ECU

Disconnect TD ECU connector and inspect connector on wire harness side as follows.

INSPECT DRIVER'S DOOR LOCK SWITCH CIRCUIT
Is there continuity between terminal 5 and ground with driver's door opened?

No → Open circuit in driver's door lock switch circuit.

Yes

INSPECT PASSENGER'S DOOR LOCK SWITCH CIRCUIT
Is there continuity between terminal 5 and ground with passenger's door opened?

No → Open circuit in passenger's door lock switch circuit.

Yes

Replace TD ECU. Then recheck system.

TD: Theft Deterrent

E COURTESY SWITCH CIRCUIT

Turn ignition switch off.

*: This circuit includes the diode. If the circuit shows no continuity, change the positive and negative probes and recheck the circuit.

TD ECU

Disconnect TD ECU connector and inspect connector on wire harness side as follows.

Driver's and Passenger's Door

INSPECT DRIVER'S DOOR COURTESY SWITCH CIRCUIT
Close passenger's door.
* Is there continuity between terminal 14 and ground with driver's door opened?

No → Open circuit in driver's door courtesy switch circuit.

Yes

INSPECT PASSENGER'S DOOR COURTESY SWITCH CIRCUIT
Close driver's door.
* Is there continuity between terminal 14 and ground with passenger's door opened?

No → Open circuit in passenger's door courtesy switch circuit.

Yes

Engine Hood

INSPECT ENGINE HOOD COURTESY SWITCH CIRCUIT
Close front and rear luggage doors.
Is there continuity between terminal 13 and ground with engine hood opened?

No → Open circuit in engine hood courtesy switch circuit.

Yes

Luggage Door

INSPECT FRONT LUGGAGE DOOR COURTESY SWITCH CIRCUIT
Close engine hood and rear luggage door.
Is there continuity between terminal 13 and ground with front luggage door opened?

No → Open circuit in front luggage door courtesy switch circuit.

Yes

INSPECT REAR LUGGAGE DOOR COURTESY SWITCH CIRCUIT
Close engine hood and front luggage door.
* Is there continuity between terminal 13 and ground with rear luggage door opened?

No → Open circuit in rear luggage door courtesy switch circuit.

Yes

Replace TD ECU. Then recheck system.

TD: Theft Deterrent

F DOOR KEY LOCK AND UNLOCK SWITCH CIRCUIT

Turn ignition switch off.

TD ECU

Disconnect TD ECU connector and inspect connector on wire harness side as follows.

DRIVER'S DOOR

INSPECT KEY LOCK SWITCH CIRCUIT
Is there continuity between terminal 11 and ground with driver's door locked with key?
- No → Open circuit in driver's door key lock switch circuit.
- Yes →

Is there continuity between terminal 11 and ground with driver's door unlocked with key?
- Yes → Short circuit in driver's door key lock switch circuit.
- No →

INSPECT KEY UNLOCK SWITCH CIRCUIT
Is there continuity between terminal 10 and ground with driver's door unlocked with key?
- No → Open circuit in driver's door key unlock switch circuit.
- Yes →

Is there continuity between terminal 10 and ground with driver's door locked with key?
- Yes → Short circuit in driver's door key unlock switch circuit.
- No →

PASSENGER'S DOOR

INSPECT KEY LOCK SWITCH CIRCUIT
Is there continuity between terminal 11 and ground with passenger's door locked with key?
- No → Open circuit in passenger's door key lock switch circuit.
- Yes →

Is there continuity between terminal 11 and ground with passenger's door unlocked with key?
- Yes → Short circuit in passenger's door key lock switch circuit.
- No →

INSPECT KEY UNLOCK SWITCH CIRCUIT
Is there continuity between terminal 10 and ground with passenger's door unlocked with key?
- No → Open circuit in passenger's door key unlock switch circuit.
- Yes →

Is there continuity between terminal 10 and ground with passenger's door locked with key?
- Yes → Short circuit in passenger's door key unlock switch circuit.
- No →

Replace TD ECU. Then recheck system.

TD: Theft Deterrent

G LUGGAGE DOOR KEY UNLOCK SWITCH CIRCUIT

Turn ignition switch off.

TD ECU

Disconnect TD ECU connector and inspect connector on wire harness side as follows.

INSPECT LUGGAGE DOOR KEY UNLOCK SWITCH CIRCUIT
Is there continuity between terminal 1 and ground with luggage door key free?

Yes → Short circuit in luggage door key unlock switch circuit.

No

Is there continuity between terminal 1 and ground with luggage door unlocked with key?

No → Open circuit in luggage door key unlock switch circuit.

Yes

Replace TD ECU. Then recheck system.

TD: Theft Deterrent

H IGNITION SWITCH CIRCUIT

Turn ignition switch OFF.

Is RAD CIG fuse normal?

No → Replace fuse. Is operation normal?

No → Short circuit in wire harness between fuse and terminal 6 of TD ECU.

Yes

Yes → Fuse faulty.

TD ECU

Disconnect TD ECU connector and inspect connector on wire harness side as follows.

INSPECT IGNITION SWITCH CIRCUIT
Is there battery voltage between terminal 6 and ground with ignition switch turned to ACC or ON.

No → Open circuit in wire harness between fuse and terminal 6 of TD ECU.

Yes

Replace TD ECU. Then recheck system.

TD: Theft Deterrent

I KEY UNLOCK WARNING SWITCH CIRCUIT

Turn ignition switch OFF.

TD ECU

Disconnect TD ECU connector and inspect connector on wire harness side as follows.

INSPECT KEY UNLOCK WARNING SWITCH CIRCUIT
Ignition key set to ignition switch.
Is there continuity between terminal 15 and ground?

No → Open circuit in key unlock warning switch circuit.

Yes

Ignition key removed from ignition switch.
Is there continuity between terminal 15 and ground?

Yes → Short circuit in key unlock warning switch circuit.

No

Replace TD ECU, Then recheck system.

TD: Theft Deterrent

J STARTER CUT SYSTEM CIRCUIT

Turn ignition switch to ST.

HINT: If starter does not operate, even when system is cancelled, before checking the circuit, use the key to turn the door lock to the unlock position and recheck starter operation.

TD ECU

Disconnect TD ECU connector and inspect connector on wire harness side as follows.

INSPECT STARTER CUT SYSTEM CIRCUIT
Turn ignition switch to ST position (*1 with shift lever at N or P position or *2 with clutch pedal depressed). Is there battery voltage between terminal 18 and ground?

No → Short or open circuit in starter relay circuit.

Yes

Replace TD ECU. Then recheck system.

TD: Theft Deterrent
*1 A/T
*2 M/T

K THEFT DETERRENT HORN CIRCUIT

Turn ignition switch off.

THEFT DETERRENT HORN

INSPECT THEFT DETERRENT HORN OPERATION
Disconnect connector from horn.
Is horn operation normal? (See page BE-130)

No → Replace theft deterrent horn.

Yes

TD ECU

Disconnect TD ECU connector and inspect connector on wire harness side as follows.

INSPECT THEFT DETERRENT HORN CIRCUIT
Is there battery voltage between terminal 8 and ground.

No → Open or short circuit in theft deterrent horn circuit.

Yes

INSPECT STANDARD EQUIPMENT HORN CIRCUIT
Is there battery voltage between terminal 9 and ground.

No → Open or short circuit in standard horn circuit.

Yes

Replace TD ECU. Then recheck system.

TD: Theft Deterrent

L LIGHT RETRACTOR RELAY CIRCUIT

Turn ignition switch off.

TD ECU

Disconnect TD ECU connector and inspect connector on wire harness side as follows.

INSPECT LIGHT RETRACTOR RELAY CIRCUIT
Ground the terminal 20 and check that the headlights and taillights light up.

No →
- Open circuit in light retractor relay circuit.
- Check the light retractor relay.

Yes

Replace TD ECU.

TD: Theft Deterrent

M HEADLIGHT CONTROL RELAY CIRCUIT (w/o LIGHT AUTO TURN OFF SYSTEM)

Turn ignition switch off.

TD ECU

Disconnect TD ECU connector and inspect connector on wire harness side as follows.

INSPECT HEADLIGHT CONTROL RELAY CIRCUIT
If there battery voltage between terminal 20 and ground.

No → Open or short circuit in headlight control relay circuit.

Yes

INSPECT HEADLIGHT CIRCUIT
(See pages BE-14 and 16)

No → Replace parts as necessary.

Yes

Replace TD ECU. Then recheck system

TD: Theft Deterrent

N TAILLIGHT CONTROL RELAY CIRCUIT (w/o LIGHT AUTO TURN OFF SYSTEM)

Turn ignition switch off.

TD ECU

Disconnect TD ECU connector and inspect connector on wire harness side as follows.

INSPECT TAILLIGHT CONTROL RELAY CIRCUIT
Is there battery voltage between terminal 19 and ground.

No → Open or short circuit in taillight control relay circuit.

Yes

INSPECT TAILLIGHT CIRCUIT
(See pages BE-14 and 16)

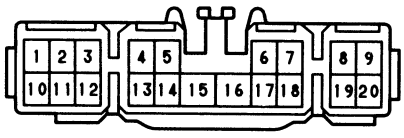
No → Replace as necessary part.

Yes

Replace TD ECU. Then recheck system.

TD: Theft Deterrent

Wire Harness Side



e-20-1

Parts Inspection

1. INSPECT THEFT DETERRENT ECU CIRCUIT

Disconnect the ECU and inspect the connector on the wire harness side as shown in the chart below.

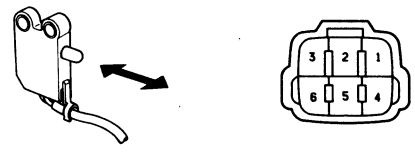
Check for	Tester connection	Condition	Specified value
Continuity	1 – ground	Luggage door unlocked with key	Continuity
		Other position	No continuity
	3 – ground	Driver's door lock lever unlocked	Continuity
		Driver's door lock lever locked	No continuity
	5 – ground	Driver's and passenger's door closed	No continuity
		Others	Continuity
	7 – ground	Constant	Continuity
	10 – ground	Driver's or passenger's door unlocked with key	Continuity
		Others	No continuity
	11 – ground	Driver's or passenger's door locked with key	Continuity
		Others	No continuity
	12 – ground	Passenger's door lock lever unlocked	Continuity
		Passenger's door lock lever locked	No continuity
	*1 13 – ground	Engine hood, front luggage door and rear luggage door closed	No continuity
		Others	Continuity
	*1 14 – ground	Driver's and passenger's door closed	No continuity
		Others	Continuity
	15 – ground	Ignition key set to ignition switch	Continuity
		Ignition key removed from ignition switch	No continuity
	*1 16 – ground	Constant	Continuity
Voltage	6 – ground	Turn ignition switch to ACC or ON	Battery voltage
	8 – ground	Constant	Battery voltage
	9 – ground	Constant	Battery voltage
	17 – ground	Constant	Battery voltage
	18 – ground	(M/T) Turn ignition switch to START with clutch pedal depressed. (A/T) Turn ignition switch to START with shift lever at P or N position	Battery voltage
	*2 19 – ground	Constant	Battery voltage
	20 – ground	Constant	Battery voltage

*1 This circuit includes the LED or diode. If the circuit shows no continuity, change the positive and negative probes and recheck the circuit.

*2 w/o Light Auto Turn Off System

If circuit is correct, replace the theft deterrent ECU.

2. **INSPECT SWITCHES**
(Door Lock Switch: in Door Lock Assembly/ Continuity)



BE2587 IS-6-2-B

Terminal / Condition	3	6
Door closed (Switch pin pushed in)		
Door opened (Switch pin released)	O	O

If operation is not as specified, replace the door lock assembly.

(Door Lock and Unlock Switch/Continuity)

See Step 2 of Power Door Lock Control System on page BE-76.

(Key Unlock Warning Switch/Continuity)

See Step 1 of Key Confine Prevention System on page BE-11.

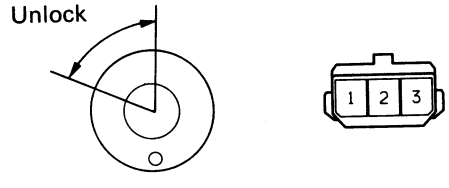
(Ignition Switch/Continuity)

See Ignition Switch on page BE-11.

(Door Key Lock and Unlock Switch/Continuity)

See Step 1 of Power Door Lock Control System on page BE-75.

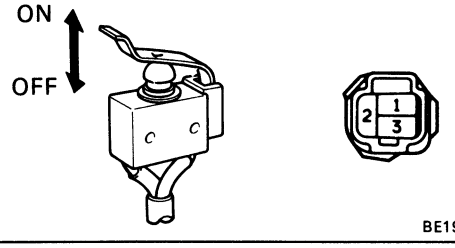
(Luggage Door Key Unlock Switch/Continuity)



BE4929 GA-3-1

Terminal / Condition	1	3
OFF		
UNLOCK	O	O

(Engine Hood Courtesy Switch/Continuity)



BE1974 IU-3-2

Terminal / Condition	1	2	3
OFF (Closed)			
ON (Opened)	O		O

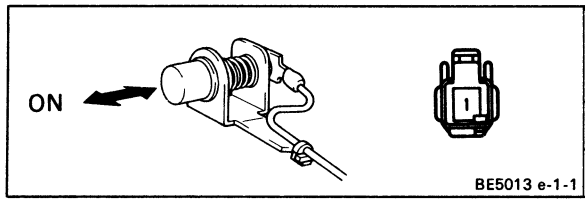
(Front Luggage Door Courtesy Switch/Continuity)

See Engine Hood Courtesy Switch on page BE-129.

(Door Courtesy Switch/Continuity)

See Step 1 of Illuminated Entry System on page BE-41.

(Rear Luggage Door Courtesy Switch/Continuity)



Terminal / Condition	1	Switch Body
OFF (closed)		
ON (Opened)	O———	———O

If operation is not as specified, replace the switch.

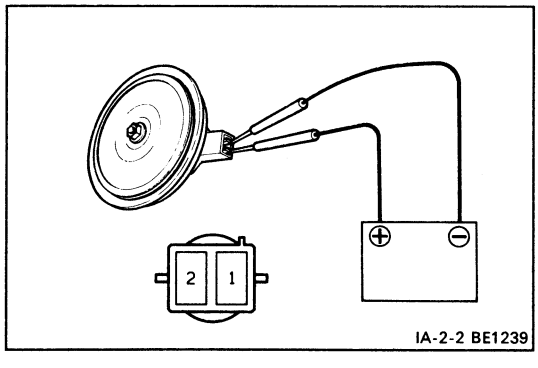
(Neutral Start Switch/Continuity)
See page AT-16.

(Clutch start switch/Continuity)
See page CL-5.

3. **INSPECT RELAY**
(Starter Relay/Continuity)
See page ST-18.

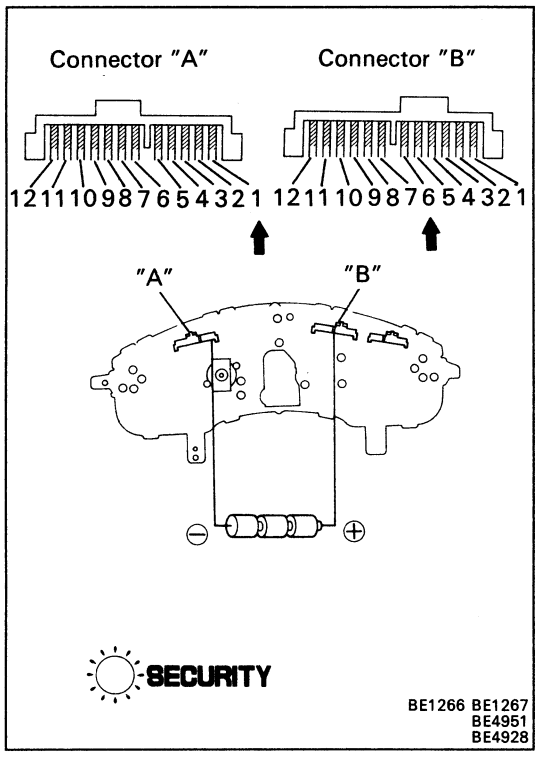
(Headlight Control Relay/Continuity)
See page BE-34.

(Taillight Control Relay/Continuity)
See page BE-34.



4. **INSPECT THEFT DETERRENT HORN**
(Operation)
(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2.
(b) Check that the horn blows.

If operation is not as specified, replace the horn.



5. INSPECT THEFT DETERRENT INDICATOR LIGHT

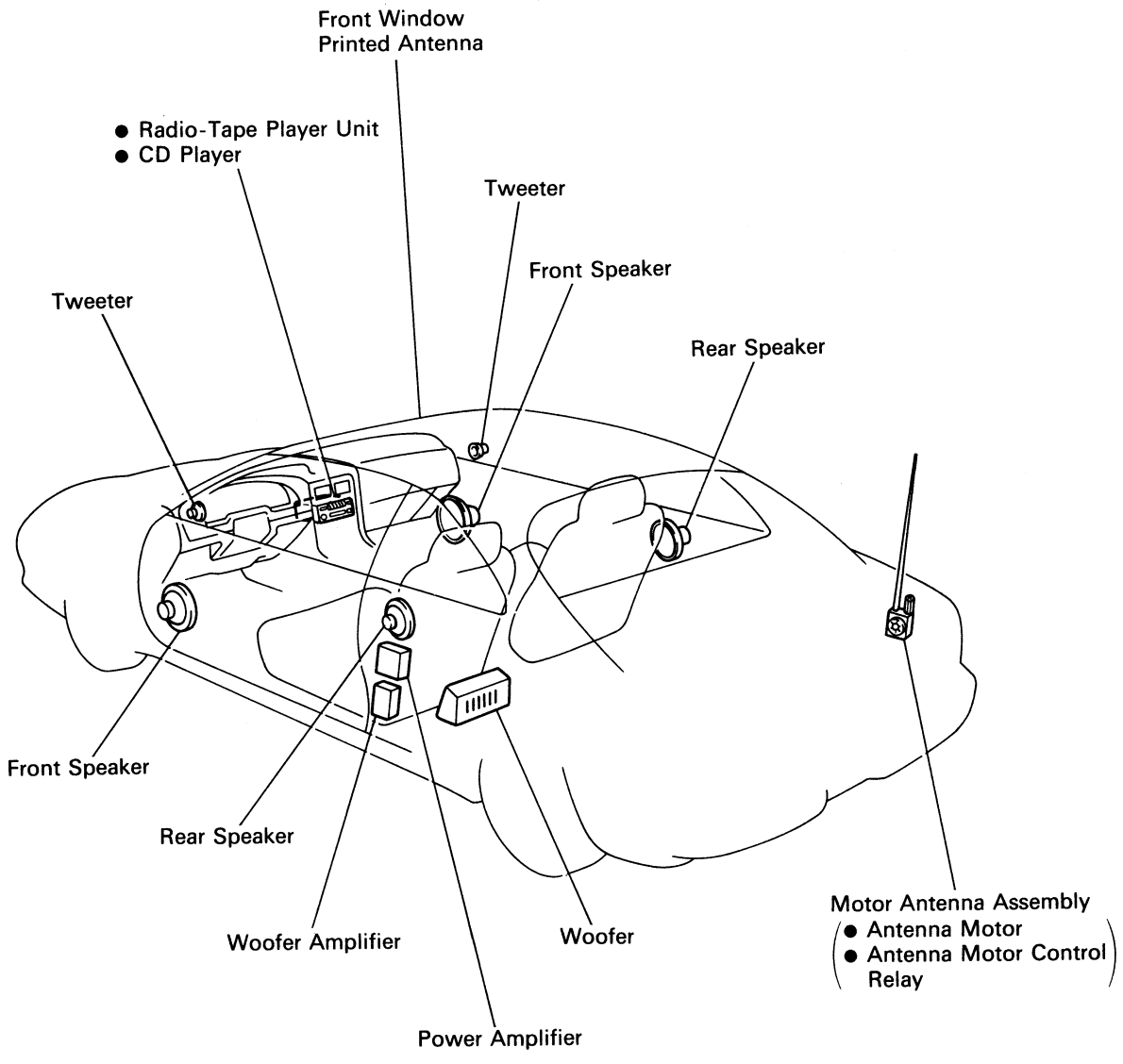
(a) Connect a series of three 1.5 V dry cell batteries.

(b) Connect the positive (+) lead from the dry cell batteries to terminal 6 of connector "B" and the negative (–) lead to terminal 1 of connector "A".

(c) Check that the indicator light lights up.

If the indicator light does not light up, replace the indicator light.

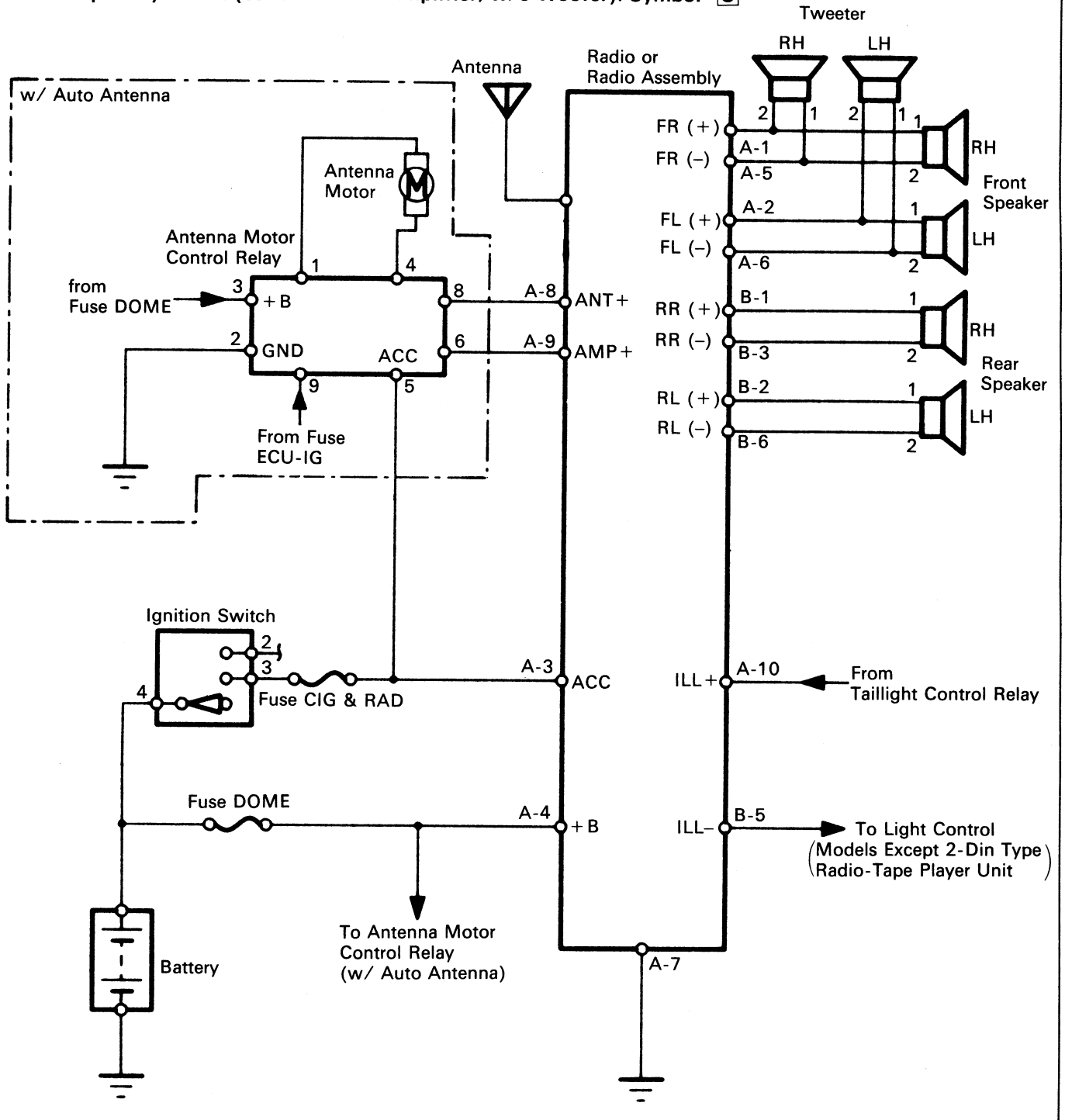
AUDIO SYSTEM
Parts Location



BE4700

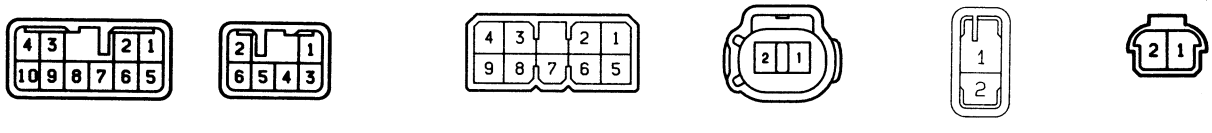
Wiring and Connector Diagrams

Radio: Symbol R
Radio-Tape Player Unit (built-in Power Amplifier, w/o Woofer): Symbol U



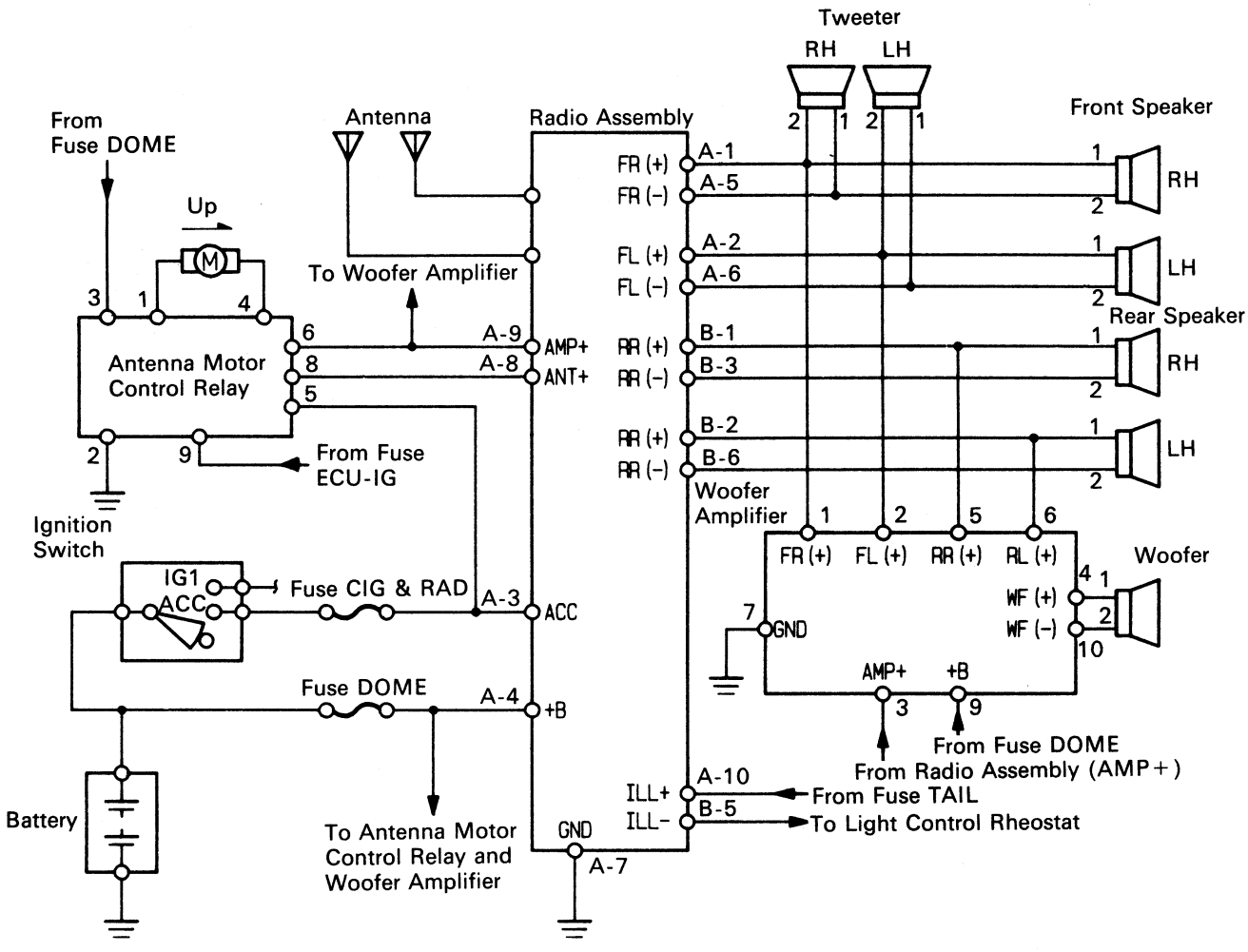
The POWER SOURCE CIRCUIT has been simplified. For full details, see page BE-9.

Radio Assembly Connector "A" | Connector "B" | Antenna Motor Control Relay | Front Speaker | Rear Speaker | Tweeter



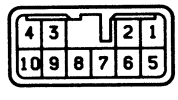
BE4686
S-10-2-A S-6-2-E G-9-2 Ie-2-2-J BE4123 GA-2-2-C

Radio-Tape Player Unit (built-in Power Amplifier, w/ Woofer): Symbol U

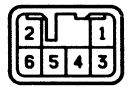


The POWER SOURCE CIRCUIT has been simplified. For full details, see page BE-9.

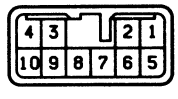
Radio Assembly Connector "A"



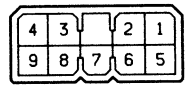
Connector "B"



Woofer Amplifier



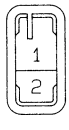
Antenna Motor Control Relay



Front Speaker



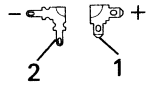
Rear Speaker



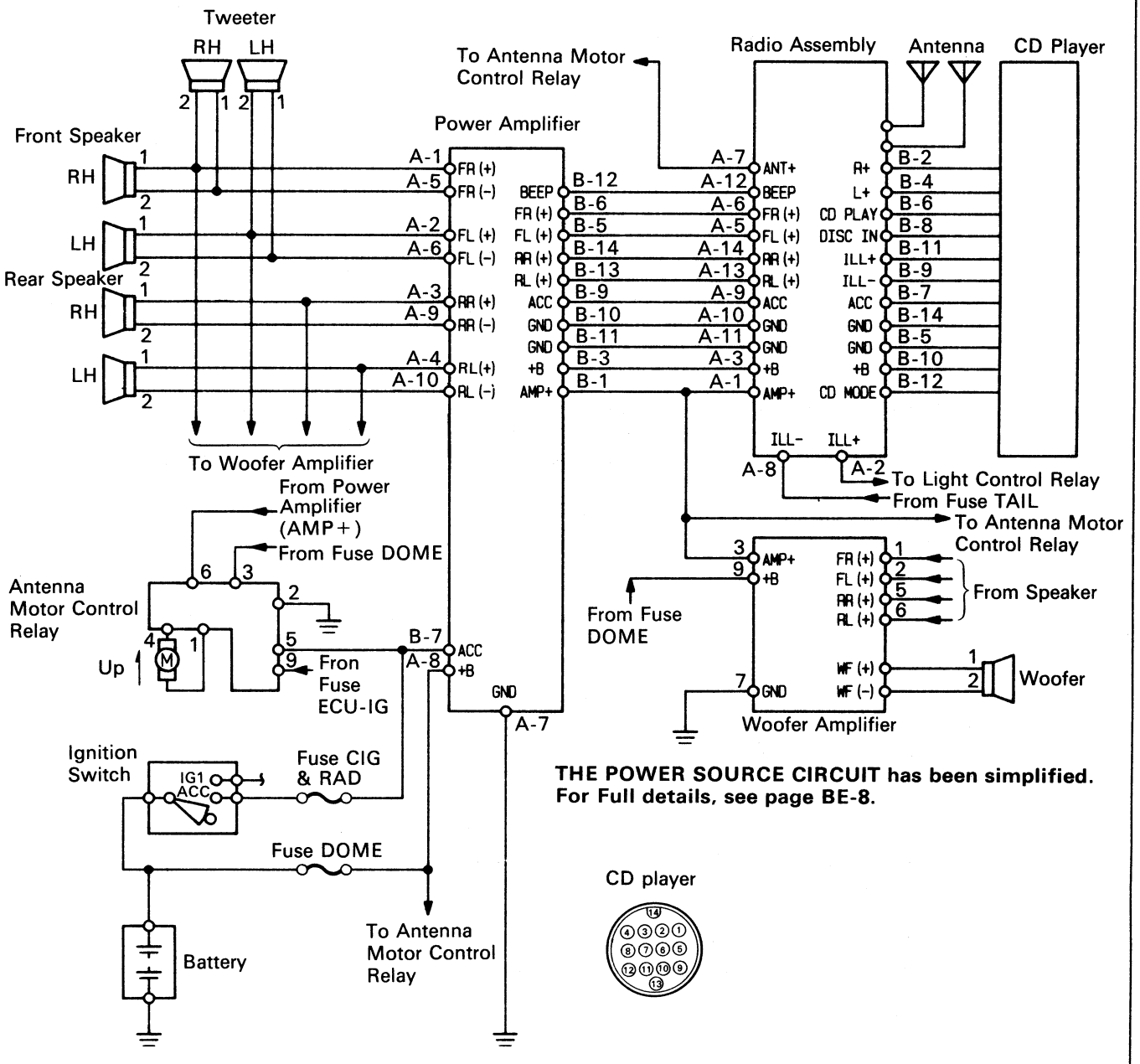
Tweeter



Woofer

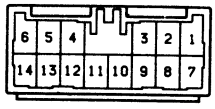


Radio-Tape Player Unit (Separate Power Amplifier, w/Woofer): Symbol [P]
Radio-Tape Player Unit + CD Player: Symbol [C]

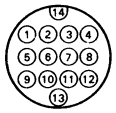


THE POWER SOURCE CIRCUIT has been simplified.
For Full details, see page BE-8.

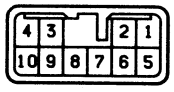
Radio Assembly Connector "A"



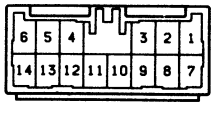
Connector "B"



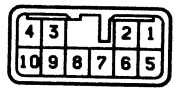
Power Amplifier Connector "A"



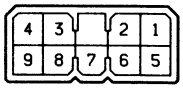
Connector "B"



Woofer Amplifier



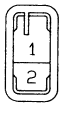
Antenna Motor Control Relay



Front Speaker



Rear Speaker



Tweeter



Woofer



BE4772
BE3308
Y-14-2 BE3309 S-10-2-A Y-14-2 S-10-2-A
G-9-2 Ie-2-2-J BE4123 GA-2-2-C BE4773

System Description

RADIO WAVE BAND

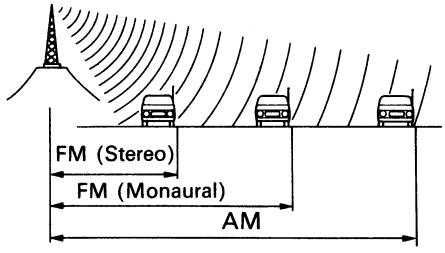
The radio wave bands used in radio broadcasting are as follows:

Frequency	30 kHz	300 kHz	3 MHz	30 MHz	300 MHz
Designation	LF	MF	HF	VHF	
Radio wave		AM ⟷		FM ⟷	
Modulation method	Amplitude modulation			Frequency modulation	

LF: Low Frequency MF: Medium Frequency HF: High Frequency VHF: Very High Frequency

SERVICE AREA

There is great difference in the size of the service area for AM, FM monaural, and FM stereo broadcasting. Thus it may happen that FM broadcast cannot be received even though AM comes in very clearly.
Not only does FM stereo have the smallest service area, but it also picks up static and other types of interference ("noise") the most easily.



BE2818

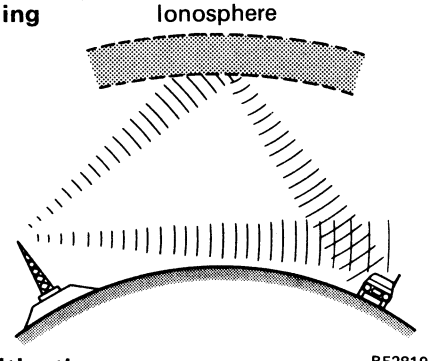
RECEPTION PROBLEMS

Besides the problem of static, there are also the problems called "fading", "multipath", and "fade out". These problems care caused not by electrical noise but by the nature of the radio waves themselves.

Fading

Besides electrical interference, AM broadcasts are also susceptible to other types of interference, especially at night. This is because AM radio waves bounce off the ionosphere at night. These radio waves then interfere with the signals from the same transmitter that reach the vehicle's antenna directly. This type of interference is called "fading".

Fading

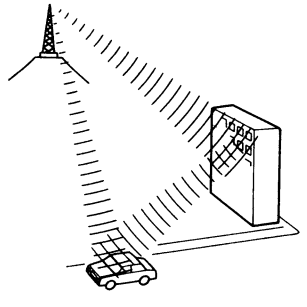


BE2819

Multipath

One type of interference caused by the bouncing of radio waves off of obstructions is called "multipath". Multipath occurs when a signal from the broadcast transmitter antenna bounces off of buildings and mountains and interferes with the signal that is received directly.

Multipath

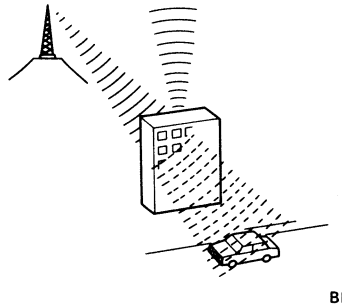


BE2820

Fade Out

Because FM radio waves are of higher frequencies than AM radio waves, they bounce off of buildings, mountains, and other obstructions. For this reason, FM signals often seem to gradually disappear or fade away as the vehicle goes behind a building or other obstruction. This is called "fade out".

Fade Out



BE2821

COMPACT DISC PLAYER

Compact Disc (hereafter called "CD") players use a laser beam pick-up to read the digital signals recorded on the CD and reproduce analog signals of the music, etc. There are 4.7 in. (12 cm) and 3.2 in. (8 cm) CD available.

HINT: Never attempt to disassemble or oil any part of the player unit. Do not insert any object other than a disc into the slot.

NOTICE: CD players use invisible laser beam which could cause hazardous radiation explosure if directed. Be sure to operate the player correctly as instructed.

MAINTENANCE

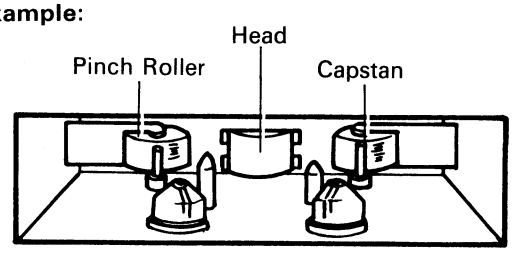
(Tape Player)

Head Cleaning

(a) Raise the cassette door with your finger.
Next using a pencil or like object, push in the guide.

(b) Using a cleaning pen or cotton applicator soaked in cleaner, clean the head surface, pinch rollers and capstans.

Example:



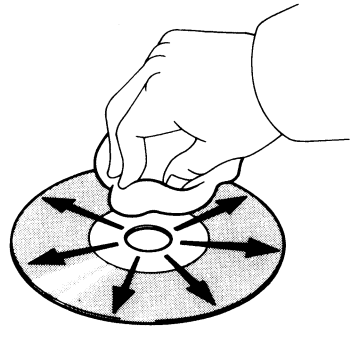
C0192

(CD Player)

Disc Cleaning

If the Disc gets dirty, clean the Disc by wiping the surfaces from the center to outside in the radial directions with a soft cloth.

NOTICE: Do not use a conventional record cleaner or anti-static record preservative.

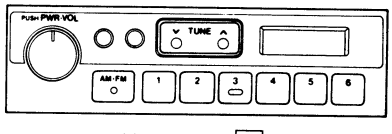


BE4331

AUDIO TYPES

Example:

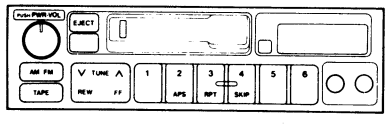
Radio



(Symbol: R)

BE4332

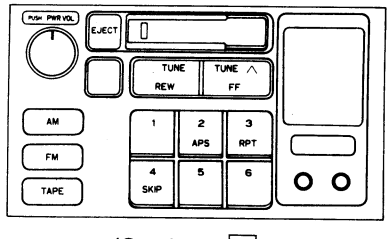
Radio-Tape Player Unit Radio
1-Din Type



(Symbol: Built-in Power Amplifier U
: Separate Power Amplifier P)

BE4336

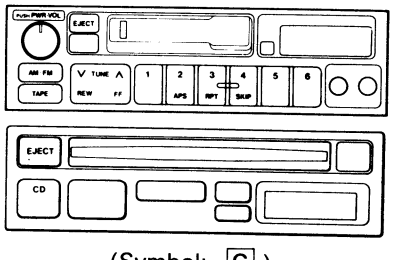
2-Din Type



(Symbol: U)

BE4333

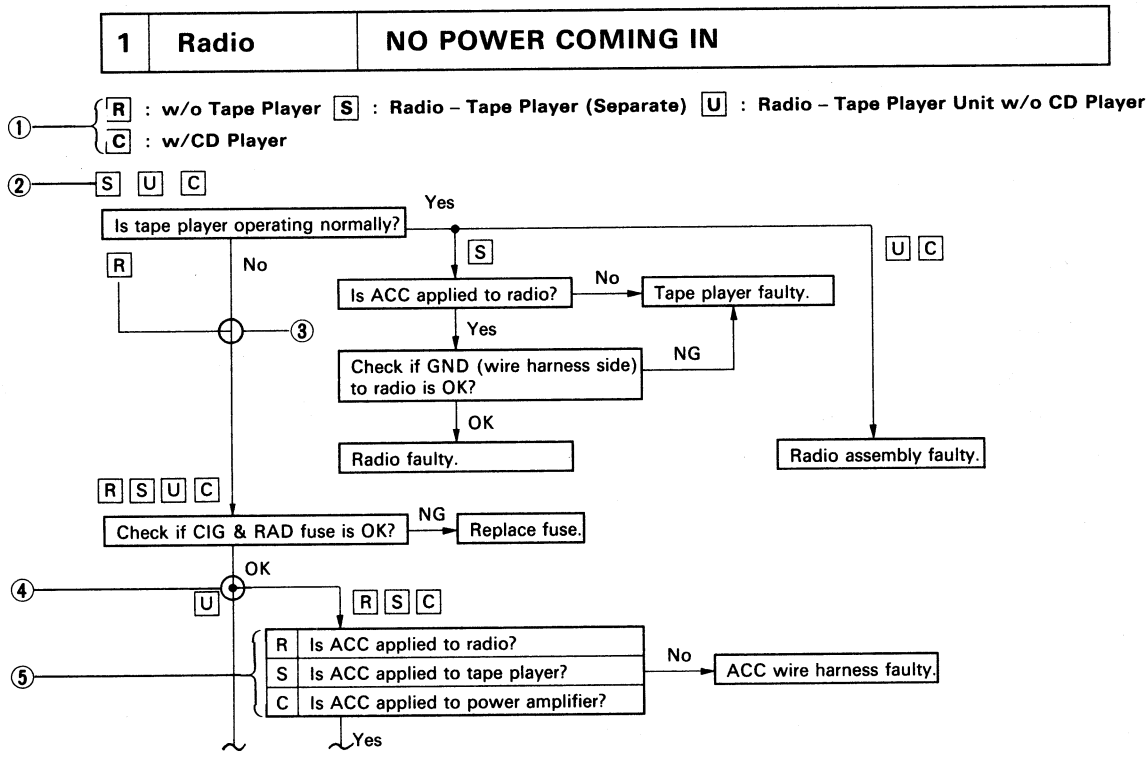
Radio-Tape Player Unit + CD Player



(Symbol: C)

BE4336
BE4335

HOW TO USE DIAGNOSTIC CHART



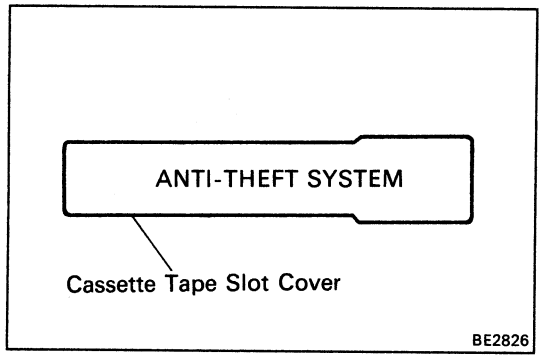
① Audio system type and symbol used.
HINT: Confirm the applicable type of audio system. (See page BE-137).

② Symbol for type of audio system the question applies to.
HINT: If the audio system type is not applicable, proceed to next question below.

③ Junction without black circle.
HINT: Proceed to next question below.

④ Junction with black circle.
HINT: Proceed to question for applicable audio system type.

⑤ HINT: Select question for applicable audio system type.



Anti-Theft System

The anti-theft system is only provided for audio systems equipped with an Acoustic Flavor function.

HINT: The words "ANTI-THEFT SYSTEM" are displayed on the cassette tape slot cover.
For operation instructions for the anti-theft system, please consult the audio system section in the Owner's Manual.

1. SETTING SYSTEM

The system is in operation once the customer has pushed the required buttons and entered the customer-selected 3-digit ID number.

(Refer to the Owner's Manual "SETTING THE ANTI-THEFT SYSTEM")

HINT:

- When the audio system is shipped the ID number has not been input, so the anti-theft system is not in operation.
- If the ID number has not been input, the audio system remains the same as a normal audio system.

2. ANTI-THEFT SYSTEM OPERATION

If the normal electrical power source (connector or battery terminal) is cut off, the audio system becomes inoperable, even if the power supply resumes.

3. CANCELLING SYSTEM

The ID number chosen by the customer is input to cancel the anti-theft system.

(Refer to the Owner's Manual "IF THE SYSTEM IS ACTIVATED")

HINT: To change or cancel the ID number, please refer to the owner's Manual "CANCELLING THE SYSTEM".

Troubleshooting

NOTICE: When replacing the internal mechanism (computer part) of the audio system, be careful that no part of your body or clothing comes in contact with the terminals of the leads from the IC, etc. of the replacement part (spare part).

HINT: This inspection procedure is a simple troubleshooting which should be carried out on the vehicle during system operation and was prepared on the assumption of system component troubles (except for the wires and connectors, etc.).
Always inspect the trouble taking the following items into consideration.

- Open or short circuit of the wire harness
- Connector or terminal connection fault
- For audio systems with anti-theft system, troubleshooting items marked (*) indicate that "Troubleshooting for ANTI-THEFT SYSTEM" should be carried out first.

Problem		No.
Radio	No power coming in.	*1
	Power coming in, but radio not operating.	*2
	Noise present, but AM – FM not operating.	3
	Either speaker does not work.	4
	Either AM or FM does not work.	5
	Reception poor (Volume faint).	5
	Few preset tuning bands.	5
	Sound quality poor.	6
	Cannot set station select button.	7
	Preset memory disappears.	7
Tape Player	Cassette tape cannot be inserted.	8
	Cassette tape inserts, but no power.	*9
	Power coming in, but tape player not operating.	10
	Either speaker does not work.	11
	Sound quality poor (Volume faint).	12
	Tape jammed, malfunction with tape speed or auto-reverse.	13
	APS, SKIP, RPT buttons not operating.	14
	Cassette tape will not eject.	*15
CD Player	CD cannot be inserted.	16
	CD inserts, but no power.	17
	Power coming in, but CD player not operating.	18
	Sound jumps.	19
	Sound quality poor (Volume faint).	20
	Either speaker does not work.	21
	CD will not eject.	22
Antenna	Antenna – related.	23
Noise	Noise produced by vibration or shock while driving.	24
	Noise produced when engine starts.	25

TROUBLESHOOTING FOR ANTI-THEFT SYSTEM

Turn ignition key from LOCK position to ACC position.

Display "A" showing?
- No → Radio switch turned ON.
  - Display "B" showing?
    - No → ID number not input. (Display "D")
      - Refer to each malfunction item.
    - Yes → While holding the 1, 4 and 6 buttons in. Push and hold the "PWR VOL" knob. Check display.
      - Display "B" → Go to No.1.
      - Display "E" → ANTI-THEFT SYSTEM operating condition. (ID number input error 5 times) Take to designated radio service station.
- Yes → ID number is set.

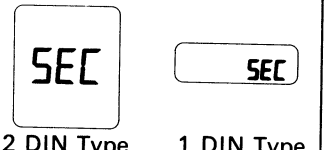
"SEC" display disappears after 1 second.
- Yes → Normal operation when radio switch turned ON.
  - Yes → Forgot to press switch.
  - No → Cancel ID number, refer to each malfunction item.
- No → ANTI-THEFT SYSTEM operating condition. (ID number input error 4 times or less)

Input ID number, check display.
- Display "D" → ANTI-THEFT SYSTEM cancelled. Check audio system again.
  - OK → ID number not input, or else input error.
  - NG → Cancel ID number, refer to each malfunction item.
- Display "A" or "B" → Take to designated radio service station.
- Display "C" → "A" (After 2 seconds)

ANTI-THEFT SYSTEM not cancelled. ID number input 5 times or more?
- No → Input ID number, check display.
- Yes → Take to designated radio service station.

(Liquid Crystal Display (LCD) for Audio System)

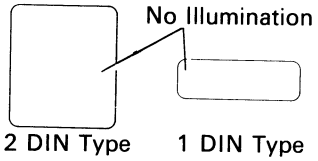
Display "A"



2 DIN Type 1 DIN Type

BE2810 BE2814

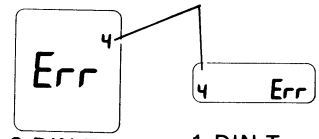
Display "B"



2 DIN Type 1 DIN Type

BE2811 BE2815

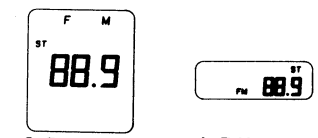
Display "C"



2 DIN Type 1 DIN Type

BE2812 BE2816

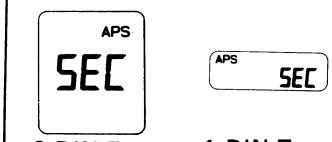
Display "D" Example:



2 DIN Type 1 DIN Type

BE2813 BE2817

Display "E"



2 DIN Type 1 DIN Type

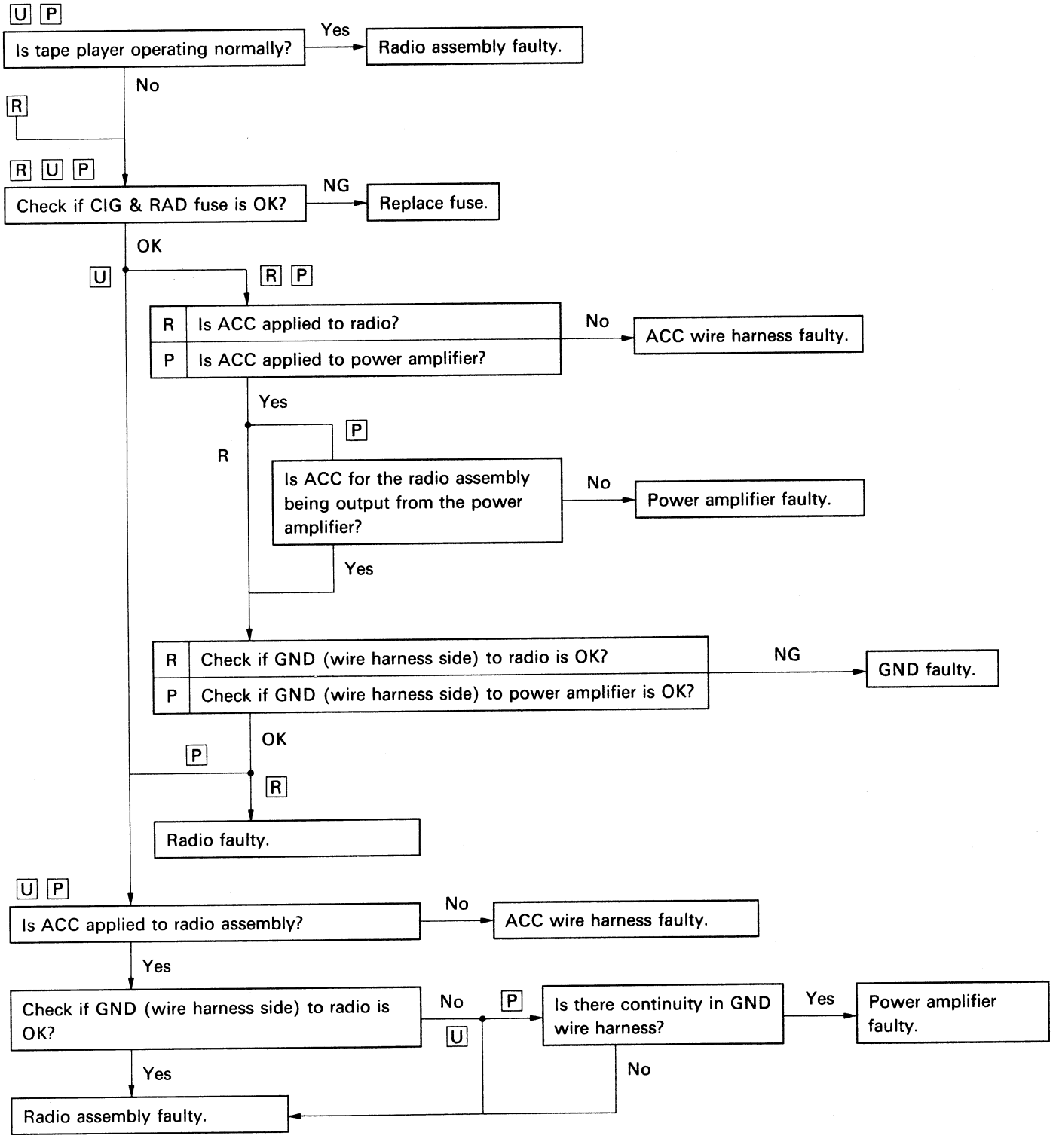
BE3922 BE3923

HINT:

- Refer to Owner's Manual for operation details of ANTI-THEFT SYSTEM.
- When the ID number has been cancelled, reset the same number after completing the operation, or inform the customer that it has been cancelled.

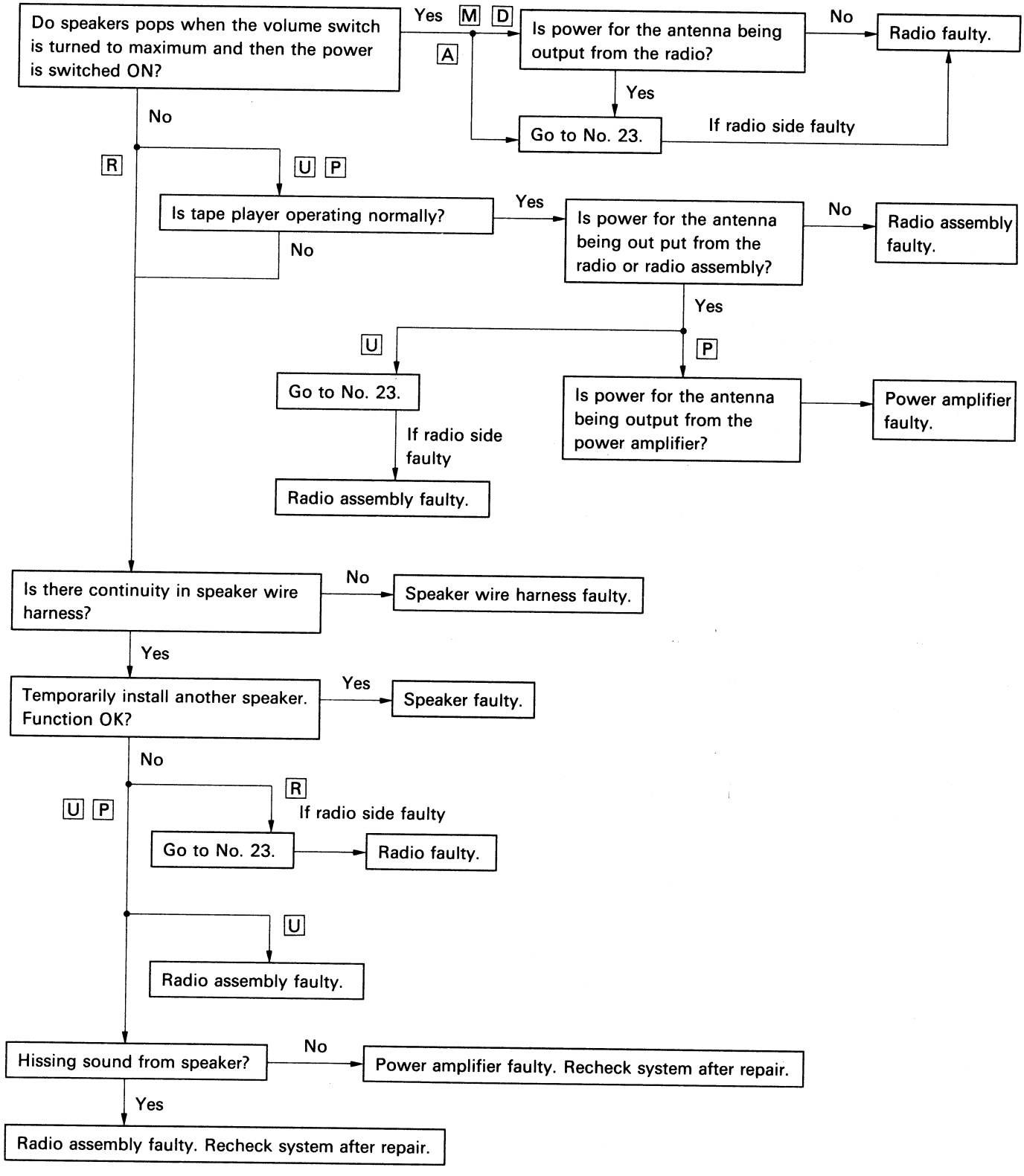
1 Radio — NO POWER COMING IN

[R] : Radio [U] : Radio – Tape Player Unit (Built-in Power Amplifier)
[P] : Radio – Tape Player Unit (Separate Power Amplifier)



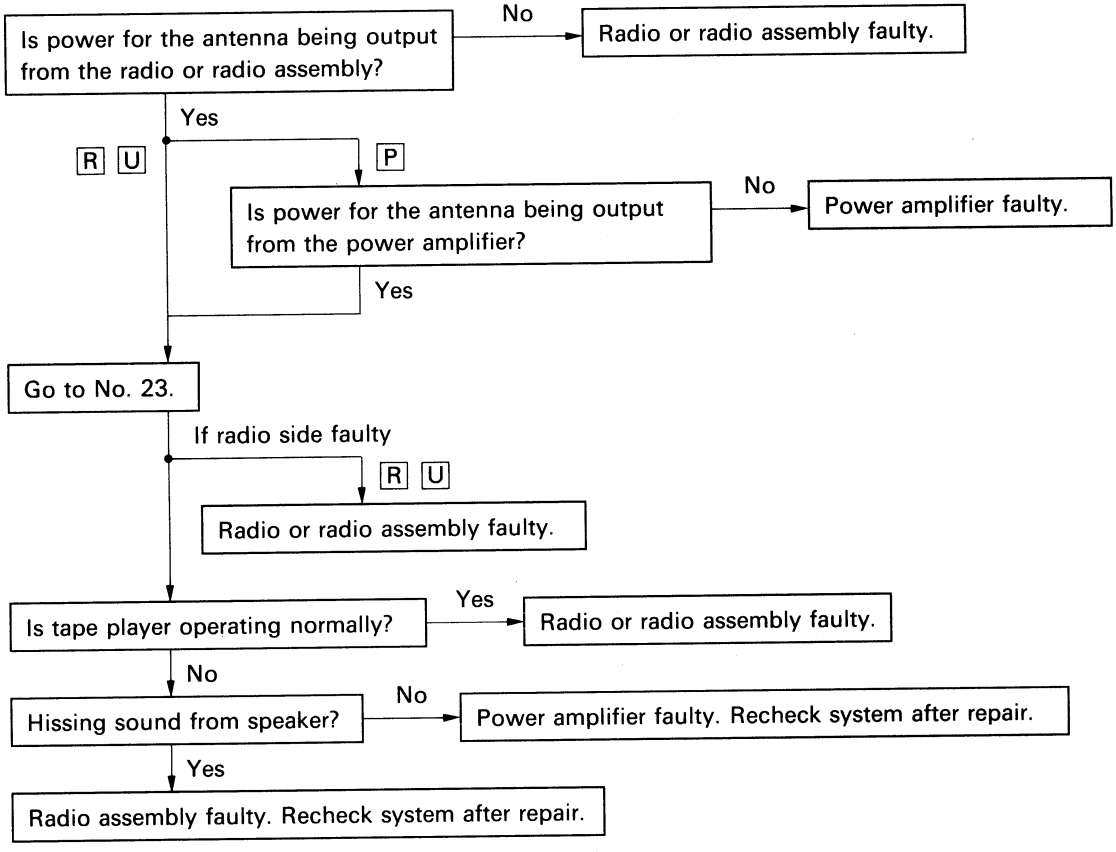
2 Radio — POWER COMING IN, BUT RADIO NOT OPERATING

[R] : Radio [U] : Radio – Tape Player Unit (Built-in Power Amplifier)
[P] : Radio – Tape Player Unit (Separate Power Amplifier)
[A] : Antena w/o Motor [M] : Motor Antenna [D] : Motor Antenna and Glass Printed Antenna



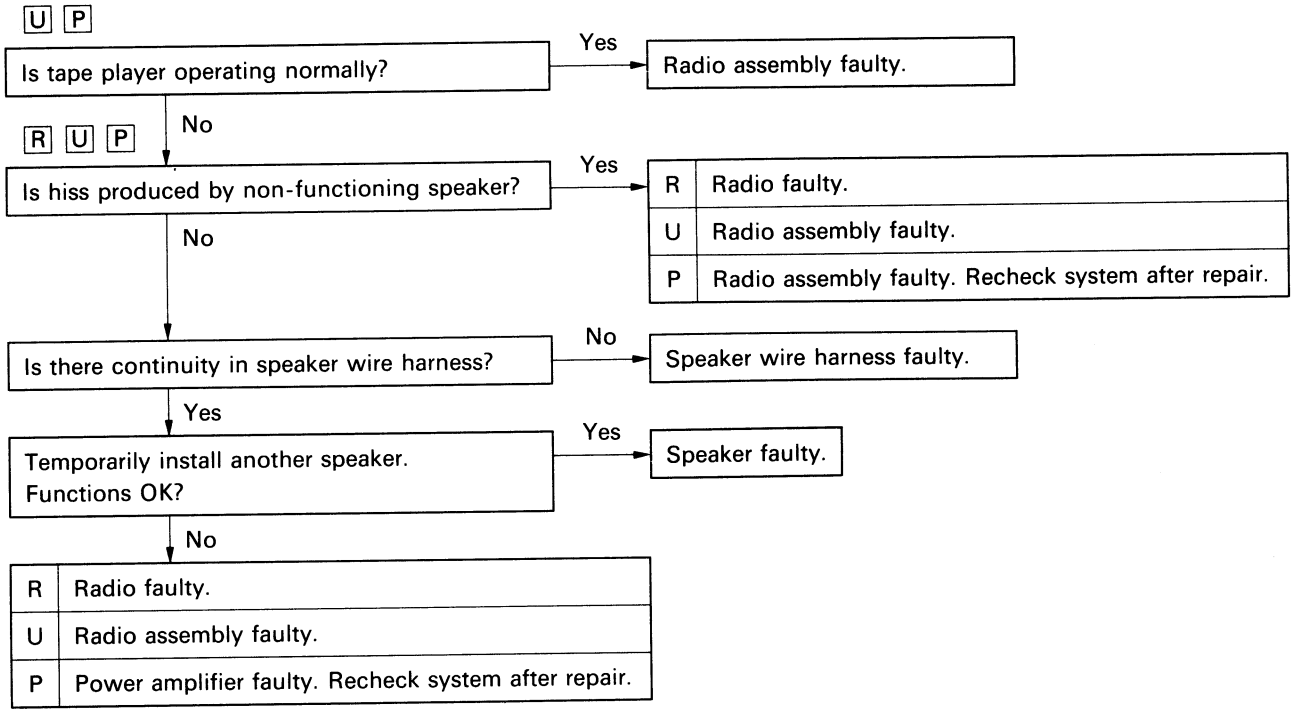
3 Radio — NOISE PRESENT, BUT AM-FM NOT OPERATING

[R] : Radio **[U] : Radio – Tape Player Unit (Built-in Power Amplifier)**
[P] : Radio – Tape Player Unit (Separate Power Amplifier)



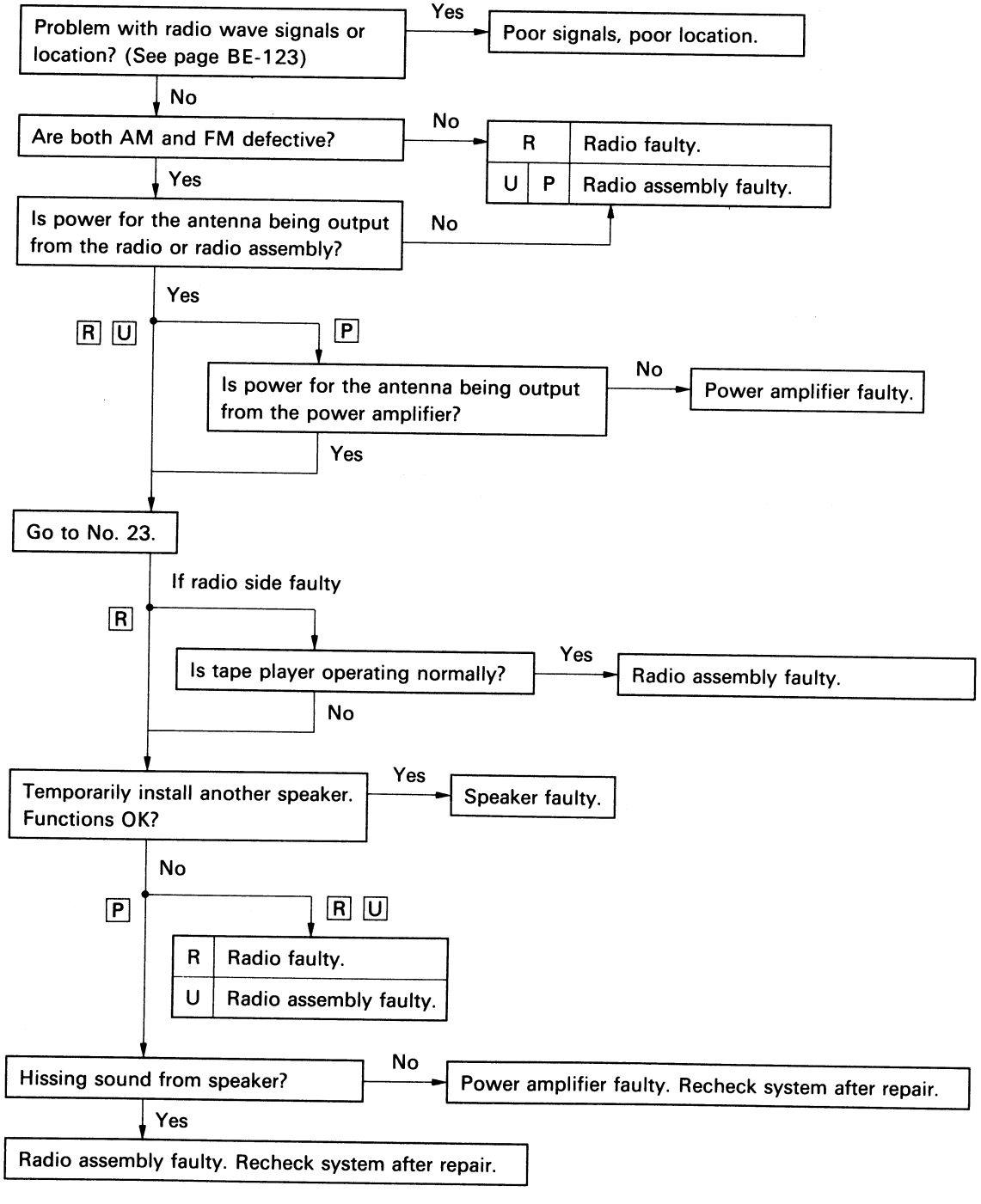
4 Radio — EITHER SPEAKER DOES NOT WORK

[R] : Radio **[U] : Radio – Tape Player Unit (Built-in Power Amplifier)**
[P] : Radio – Tape Player Unit (Separate Power Amplifier)



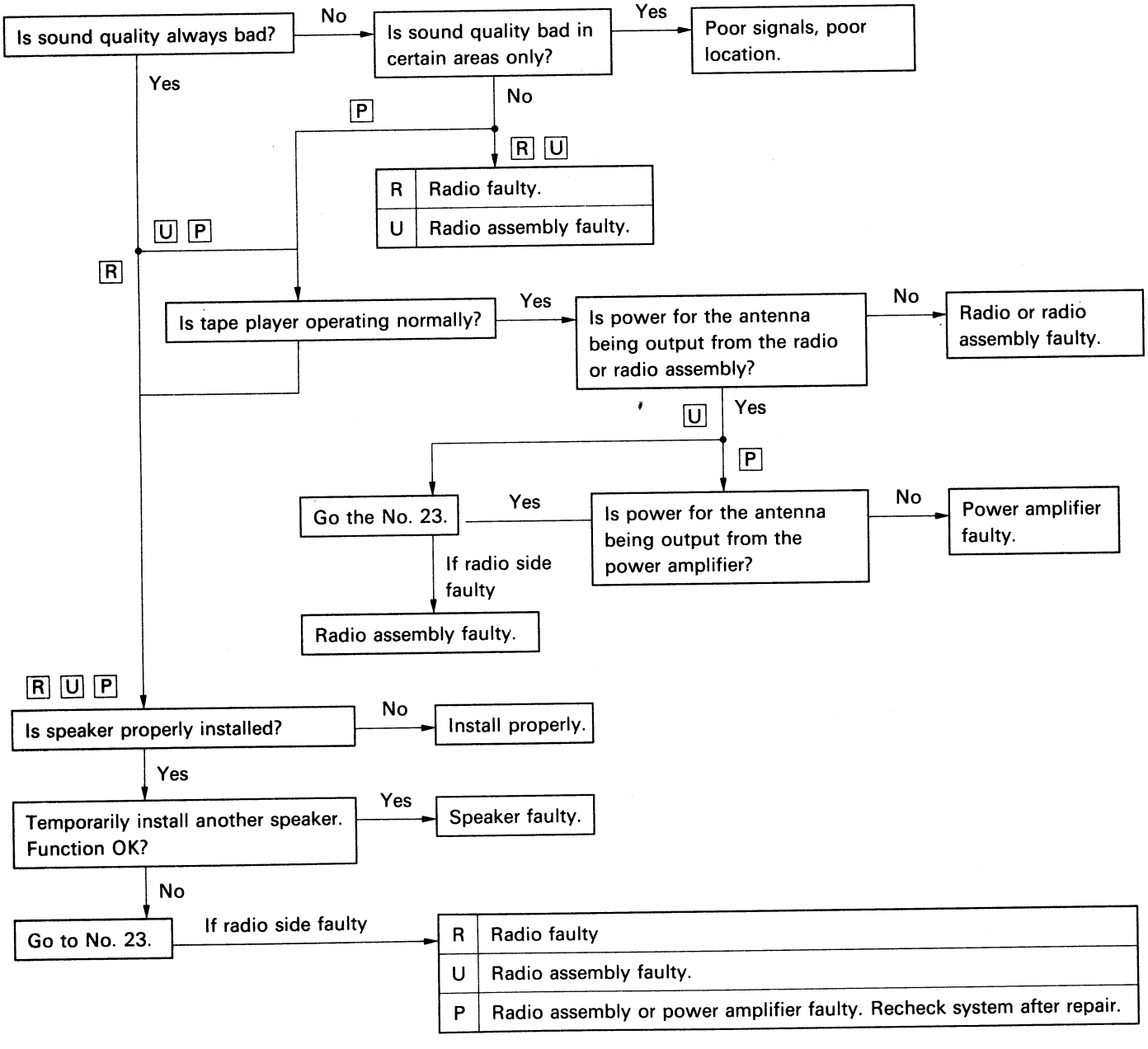
5	Radio	EITHER AM OR FM DOES NOT WORK, RECEPTION POOR (VOLUME FAINT), FEW PRESET TUNING BANDS

[R] : Radio [U] : Radio – Tape Player Unit (Built-in Power Amplifier)
[P] : Radio – Tape Player Unit (Separate Power Amplifier)



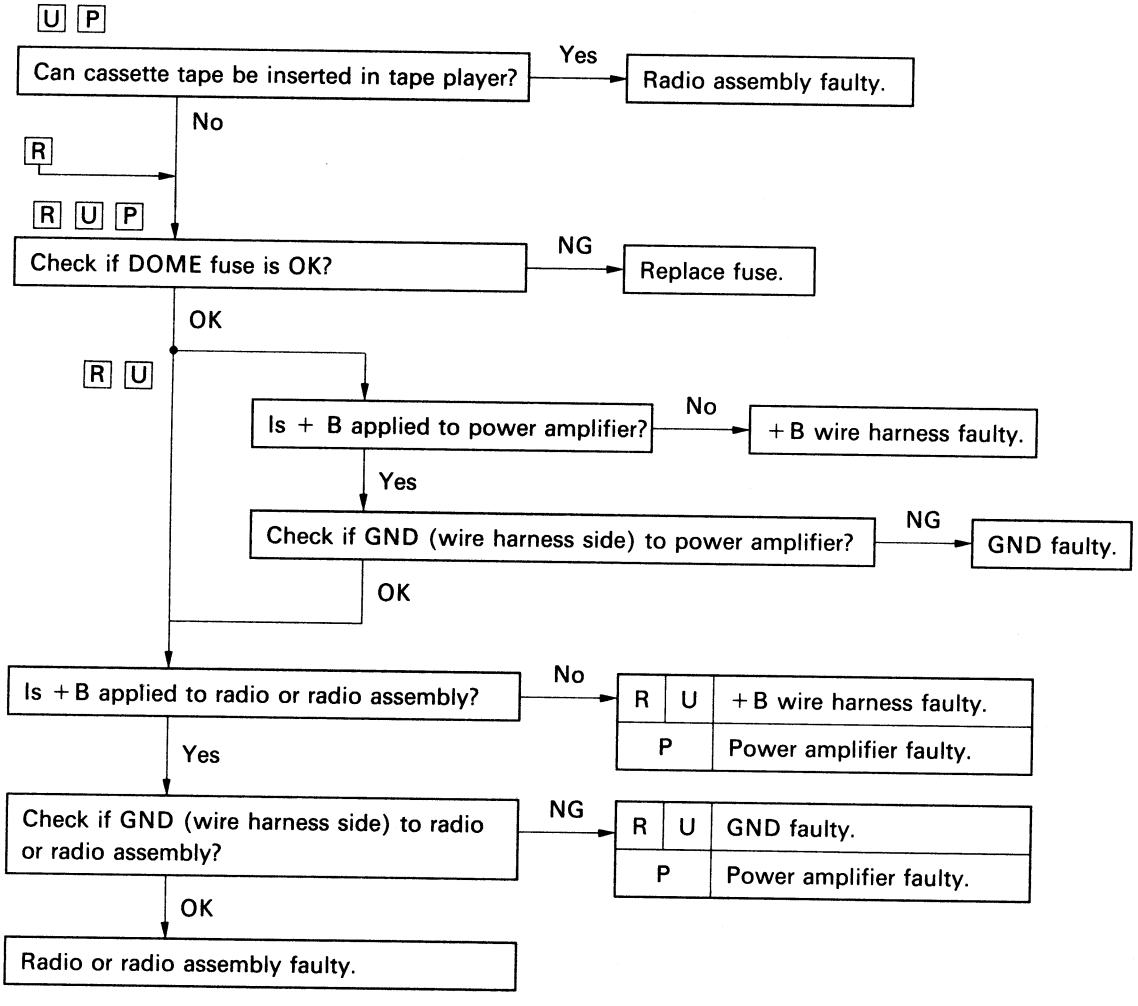
6 Radio — SOUND QUALITY POOR

[R] : Radio [U] : Radio – Tape Player Unit (Built-in Power Amplifier)
[P] : Radio – Tape Player Unit (Separate Power Amplifier)



7	Radio	CANNOT SET STATION SELECT BUTTON, PRESET MEMORY DISAPPEARS

[R] : Radio [U] : Radio – Tape Player Unit (Built-in Power Amplifier)
[P] : Radio – Tape Player Unit (Separate Power Amplifier)



8 Tape Player — CASSETTE TAPE CANNOT BE INSERTED

[U] : Radio – Tape Player Unit (Built-in Power Amplifier)
[P] : Radio – Tape Player Unit (Separate Power Amplifier)

[U] [P]

Is there a foreign object inside tape player?
- Yes → Remove foreign object.
- No →

Is auto search button of radio operating normally?
- Yes → Radio assembly faulty.
- No →

Check if DOME fuse is OK?
- NG → Replace fuse.
- OK →

[U] →

[P] → Is +B applied to power amplifier?
- No → +B wire harness faulty.
- Yes → Check if GND (wire harness side) to power amplifier is OK?
  - NG → GND faulty.
  - OK →

Is +B applied to radio assembly?
- No →

U	+B wire harness faulty.
P	Power amplifier faulty.

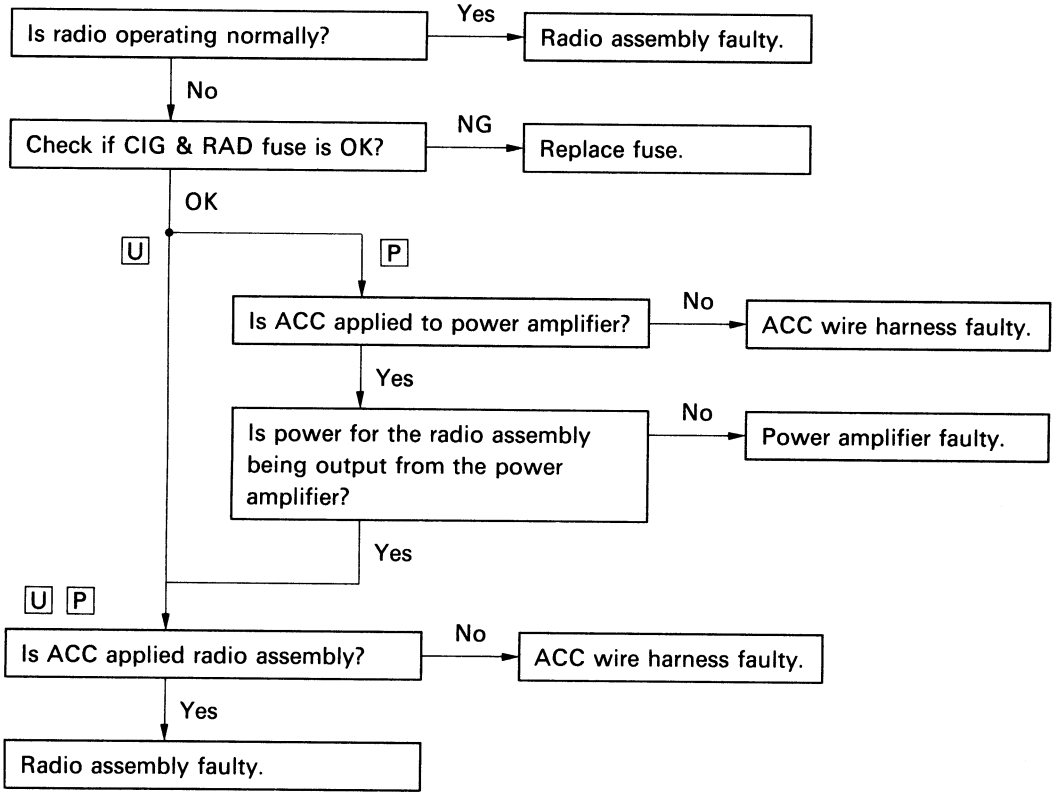
- Yes → Check if GND (mire harness side) to radio assembly is OK?
  - NG →

U	GND faulty.
P	Power amplifier faulty.

  - OK → Radio assembly faulty.

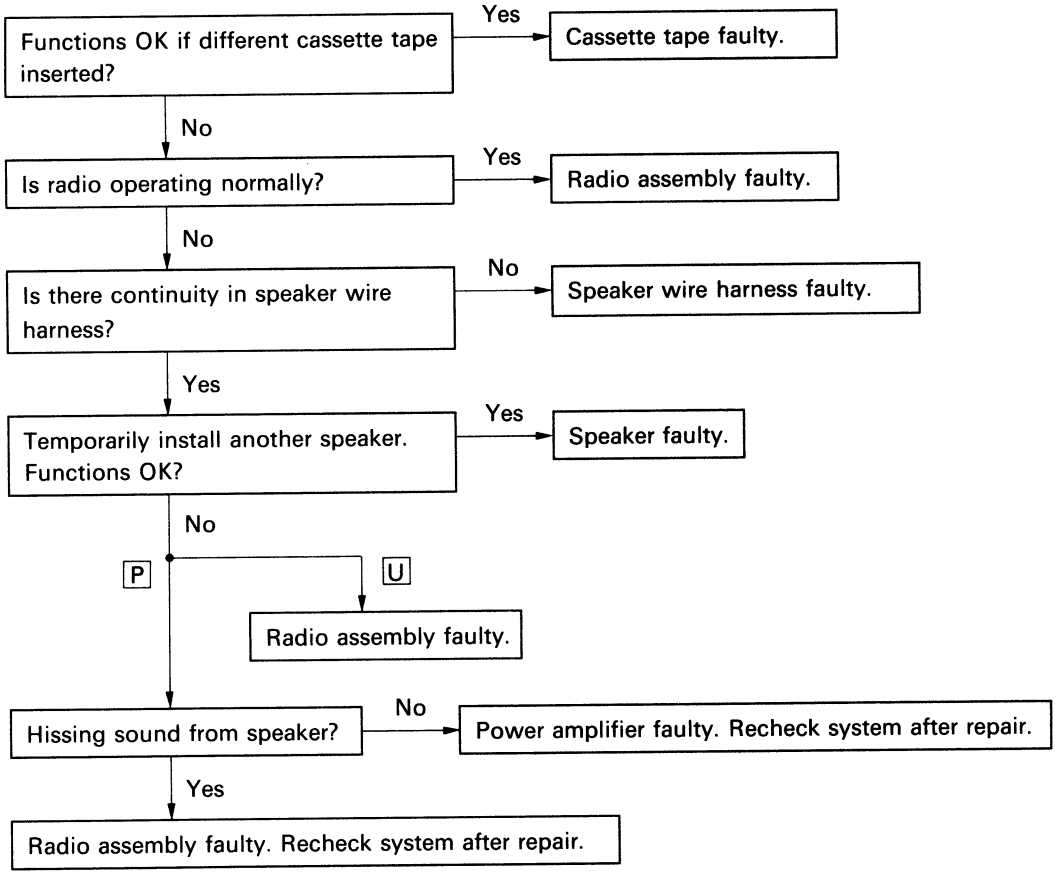
9 Tape Player CASSETTE TAPE INSERTS, BUT NO POWER

[U] : Radio – Tape Player Unit (Built-in Power Amplifier)
[P] : Radio – Tape Player Unit (Separate Power Amplifier)



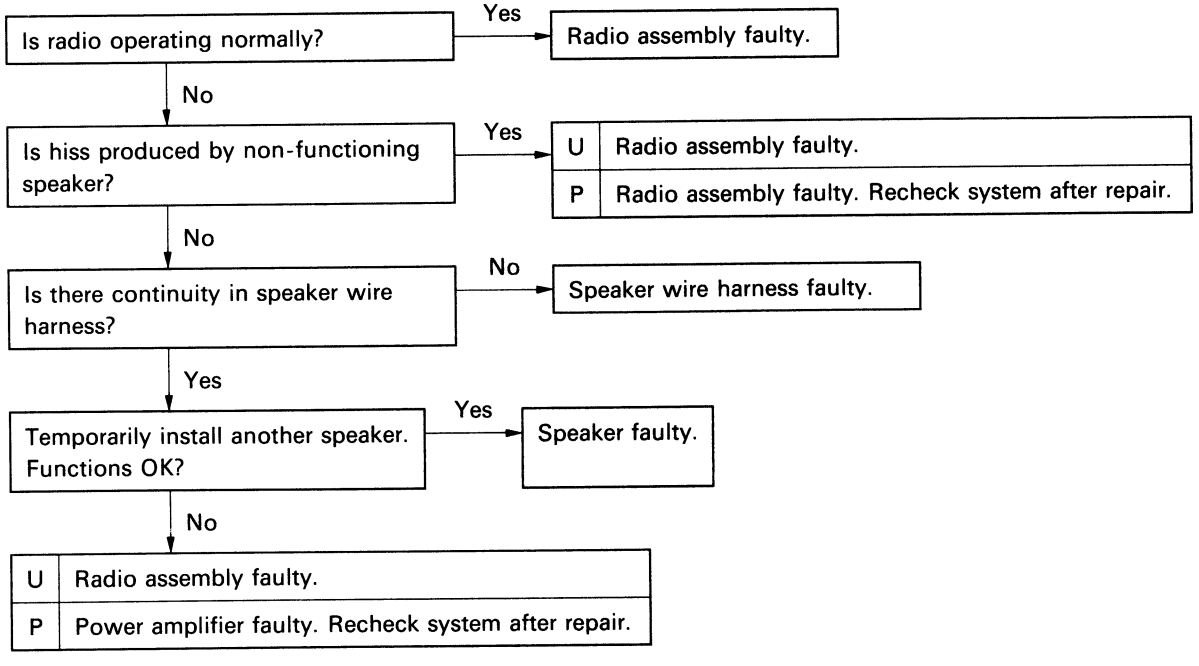
10 Tape Player — POWER COMING IN, BUT TAPE PLAYER NOT OPERATING

[U] : Radio – Tape Player Unit (Built-in Power Amplifier)
[P] : Radio – Tape Player Unit (Separate Power Amplifier)



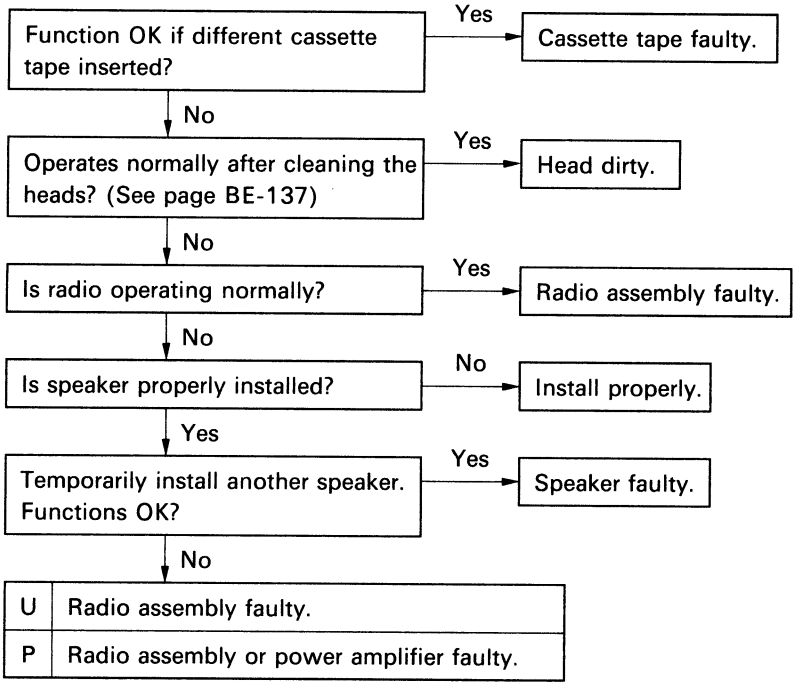
11 Tape Player — EITHER SPEAKER DOES NOT WORK

[U] : Radio – Tape Player Unit (Built-in Power Amplifier)
[P] : Radio – Tape Player Unit (Separate Power Amplifier)

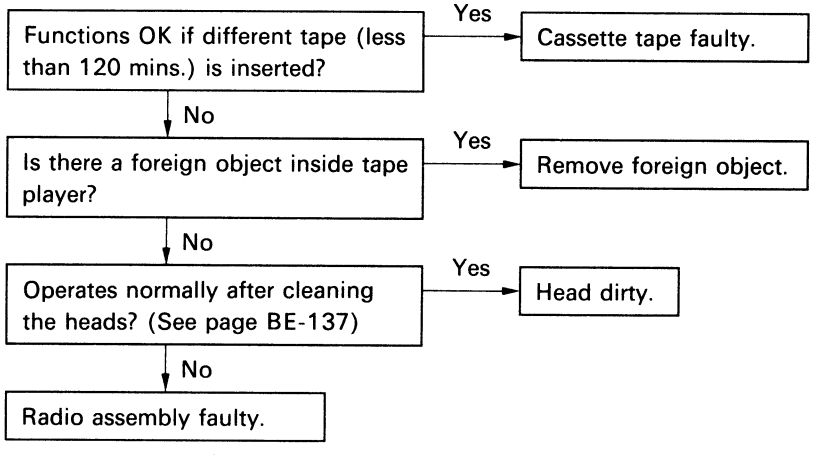


12 Tape Player SOUND QUALITY POOR (VOLUME PAINT)

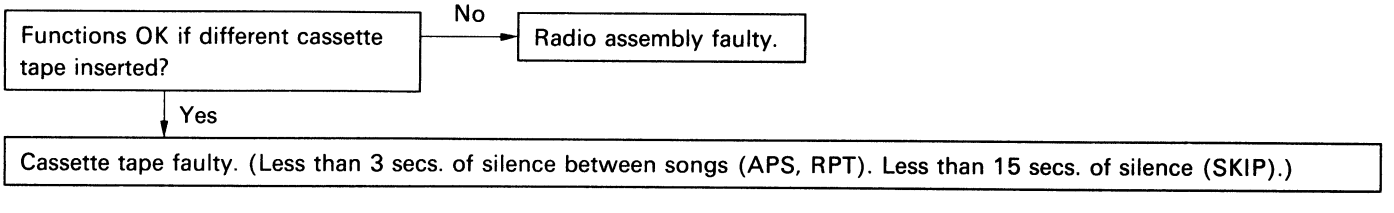
U : Radio – Tape Player Unit (Built-in Power Amplifier)
P : Radio – Tape Player Unit (Separate Power Amplifier)



13 Tape Player TAPE JAMMED, MALFUNCTION WITH TAPE SPEED OR AUTO-REVERSE

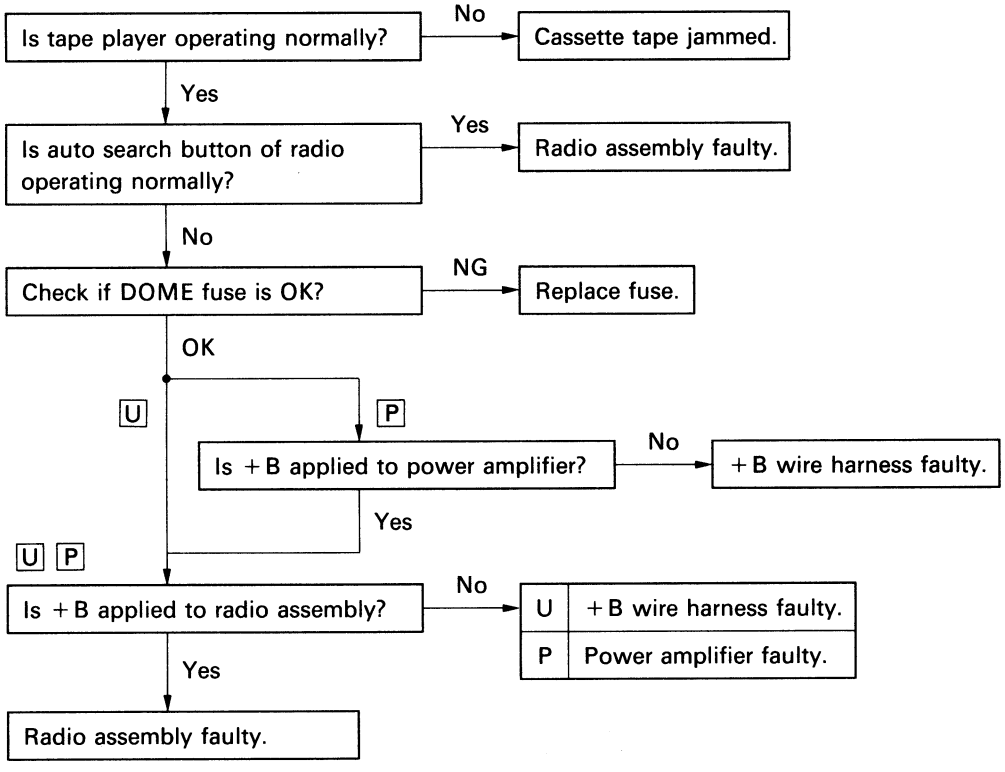


14 Tape Player APS, SKIP, RPT BUTTONS NOT OPERATING

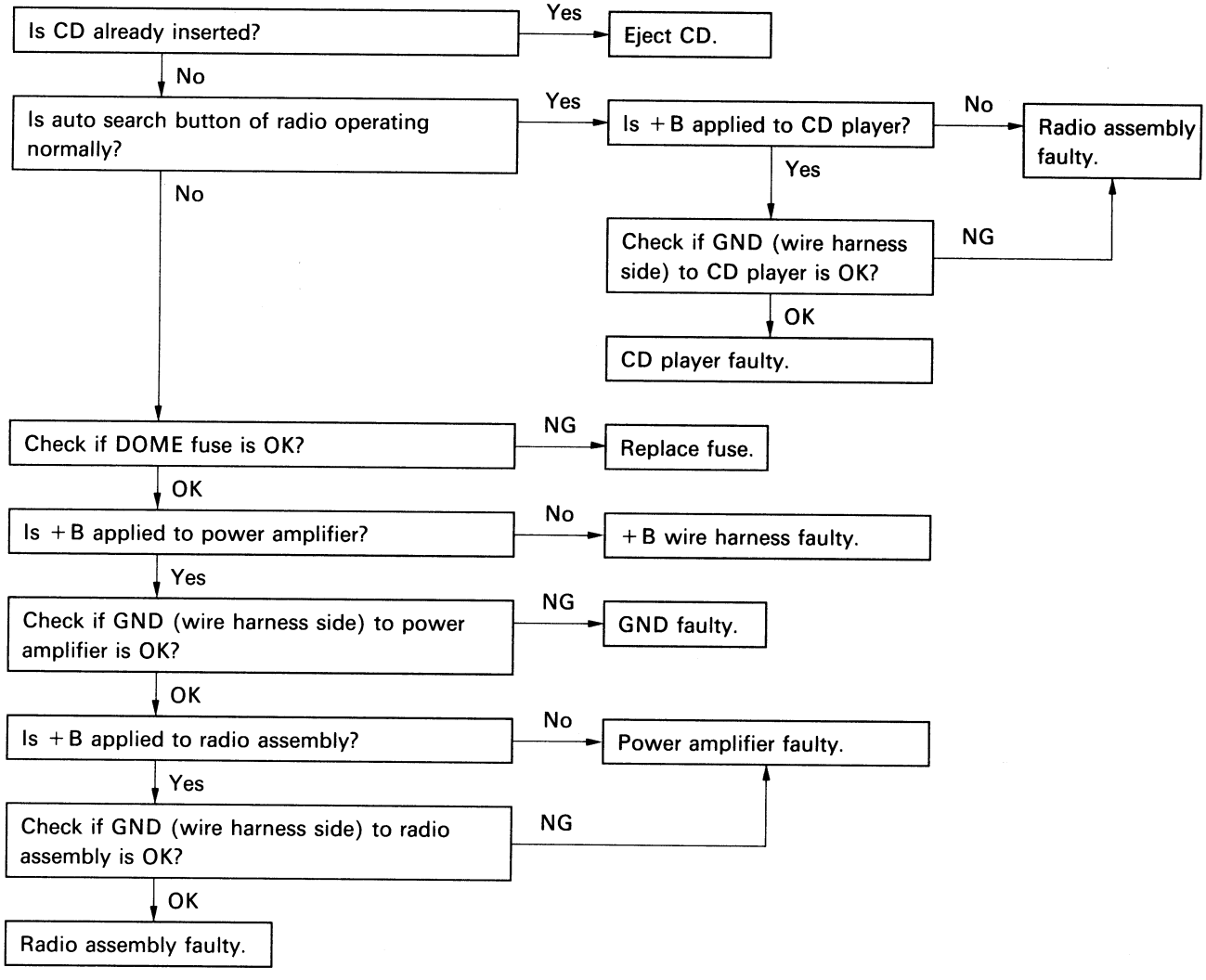


15	Tape Player	CASSETTE TAPE WILL NOT EJECT

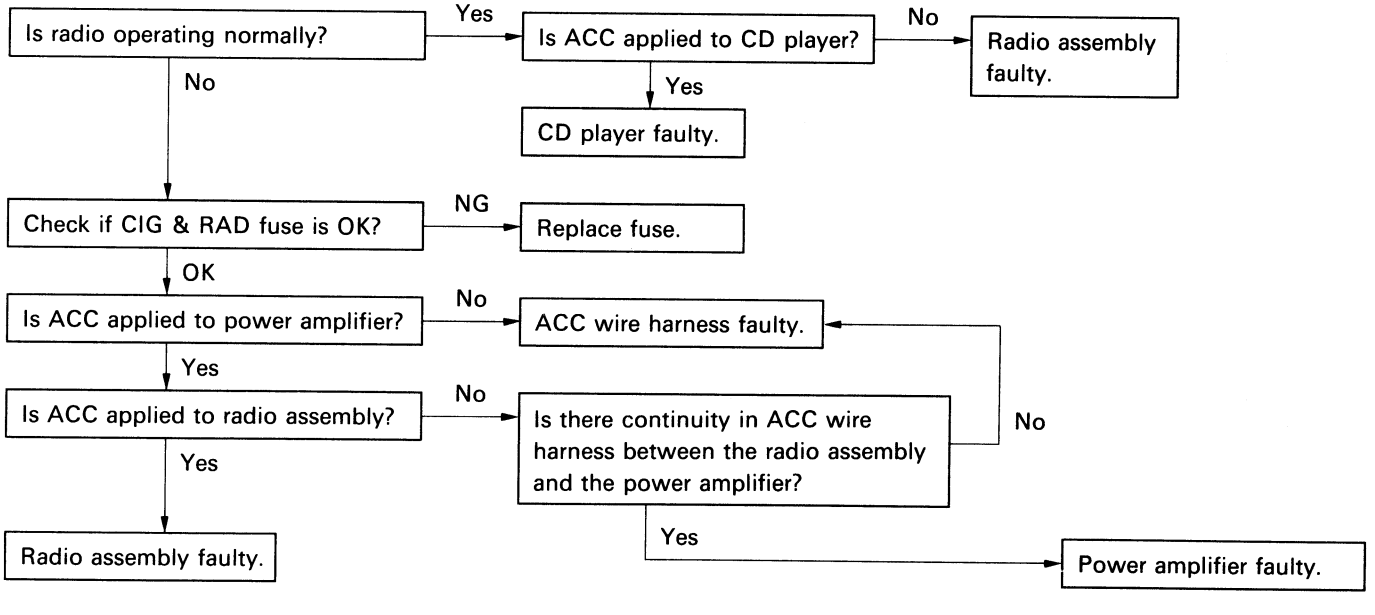
[U] : Radio – Tape Player Unit (Built-in Power Amplifier)
[P] : Radio – Tape Player Unit (Separate Power Amplifier)



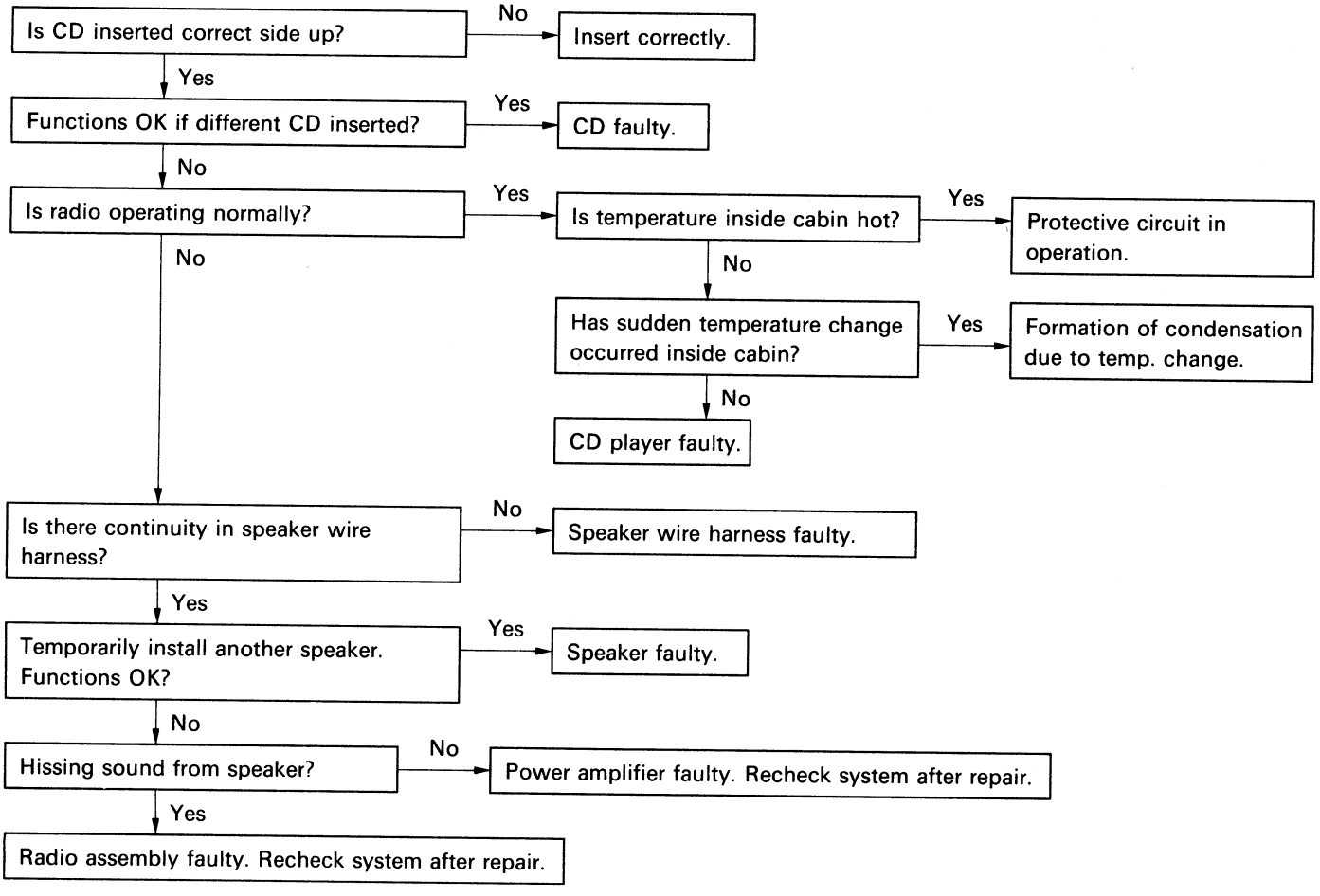
16 CD Player — CD CANNOT BE INSERTED



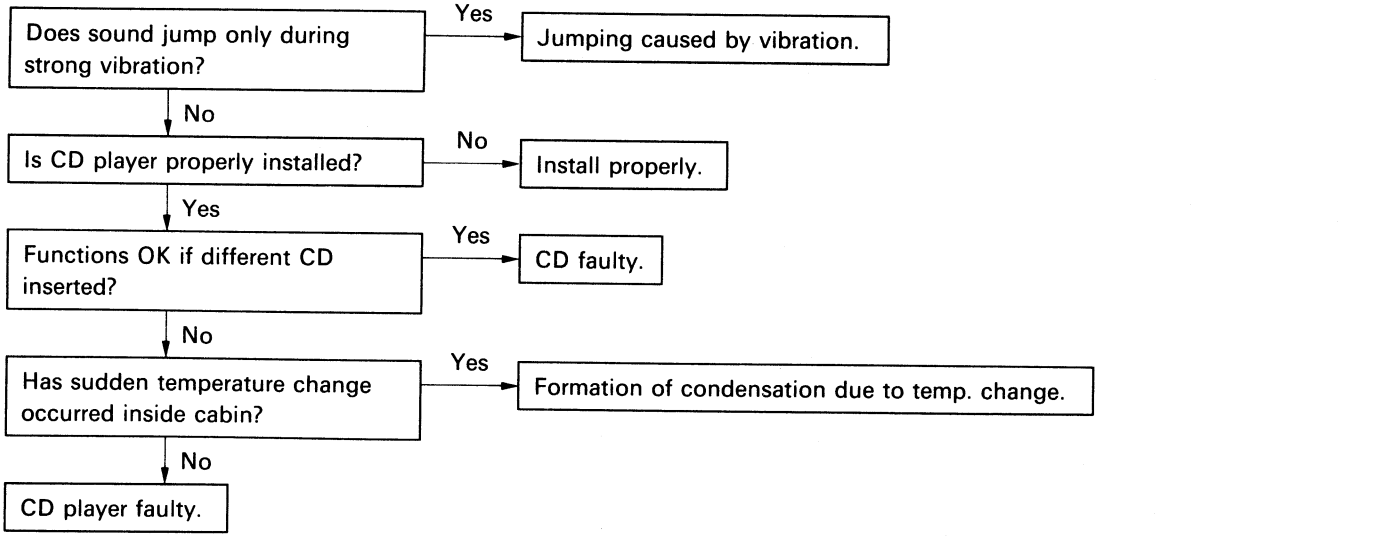
17 CD Player — CD INSERTS, BUT NO POWER



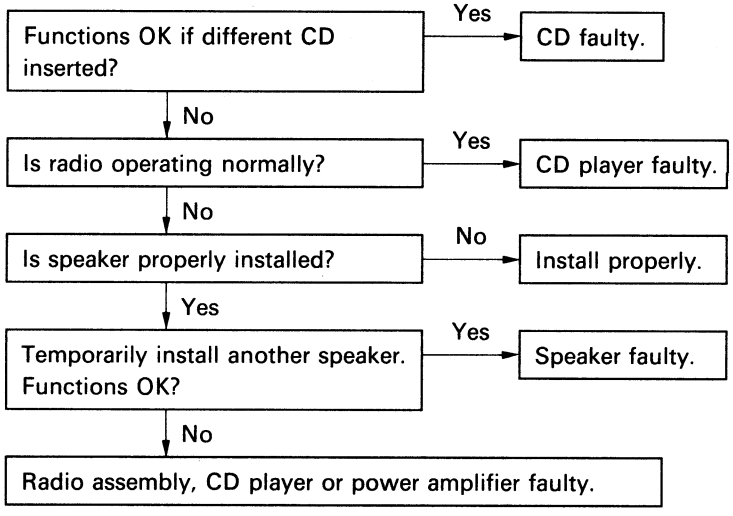
18 CD Player — POWER COMING IN, BUT CD PLAYER NOT OPERATING



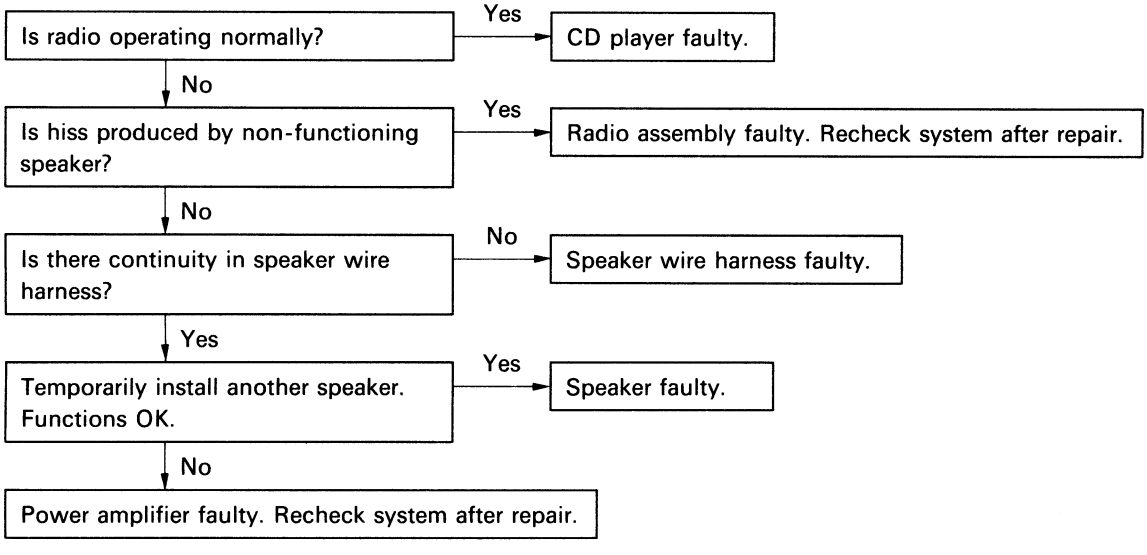
19 CD Player — SOUND JUMPS



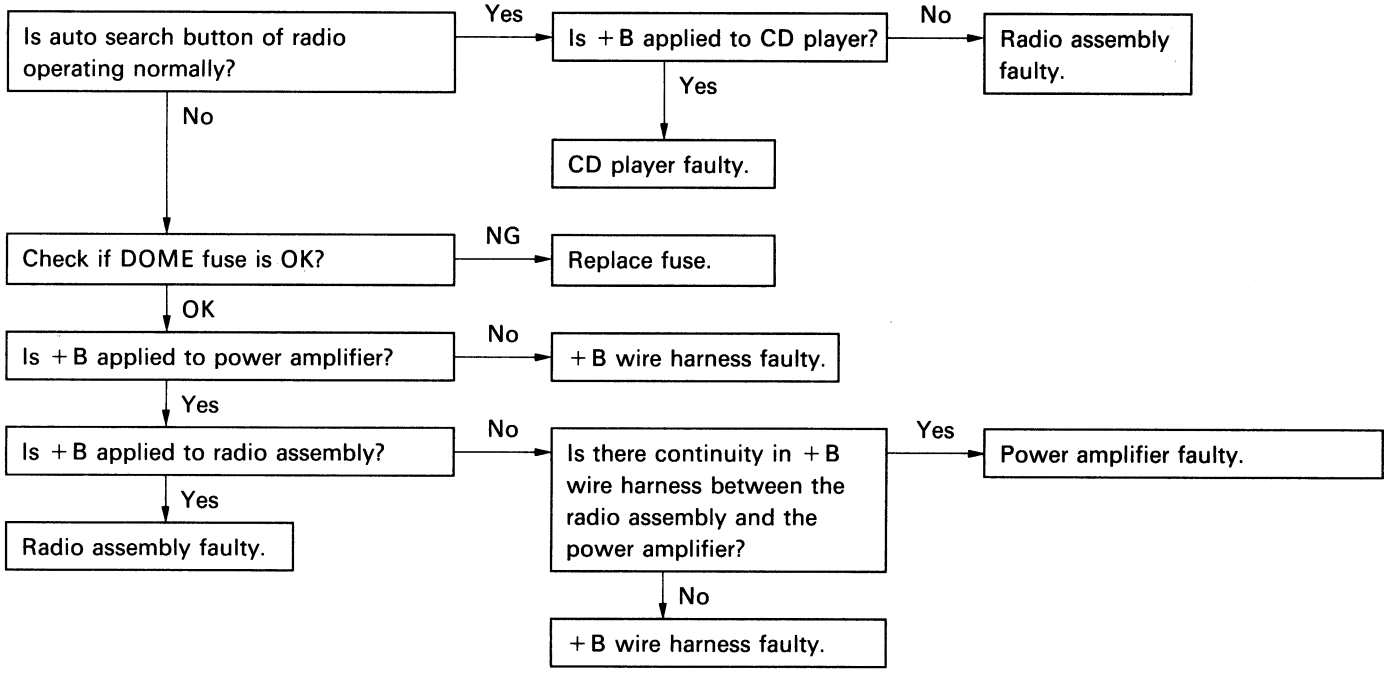
20 CD Player — SOUND QUALITY POOR (VOLUME FAINT)



21 CD Player — EITHER SPEAKER DOES NOT WORK

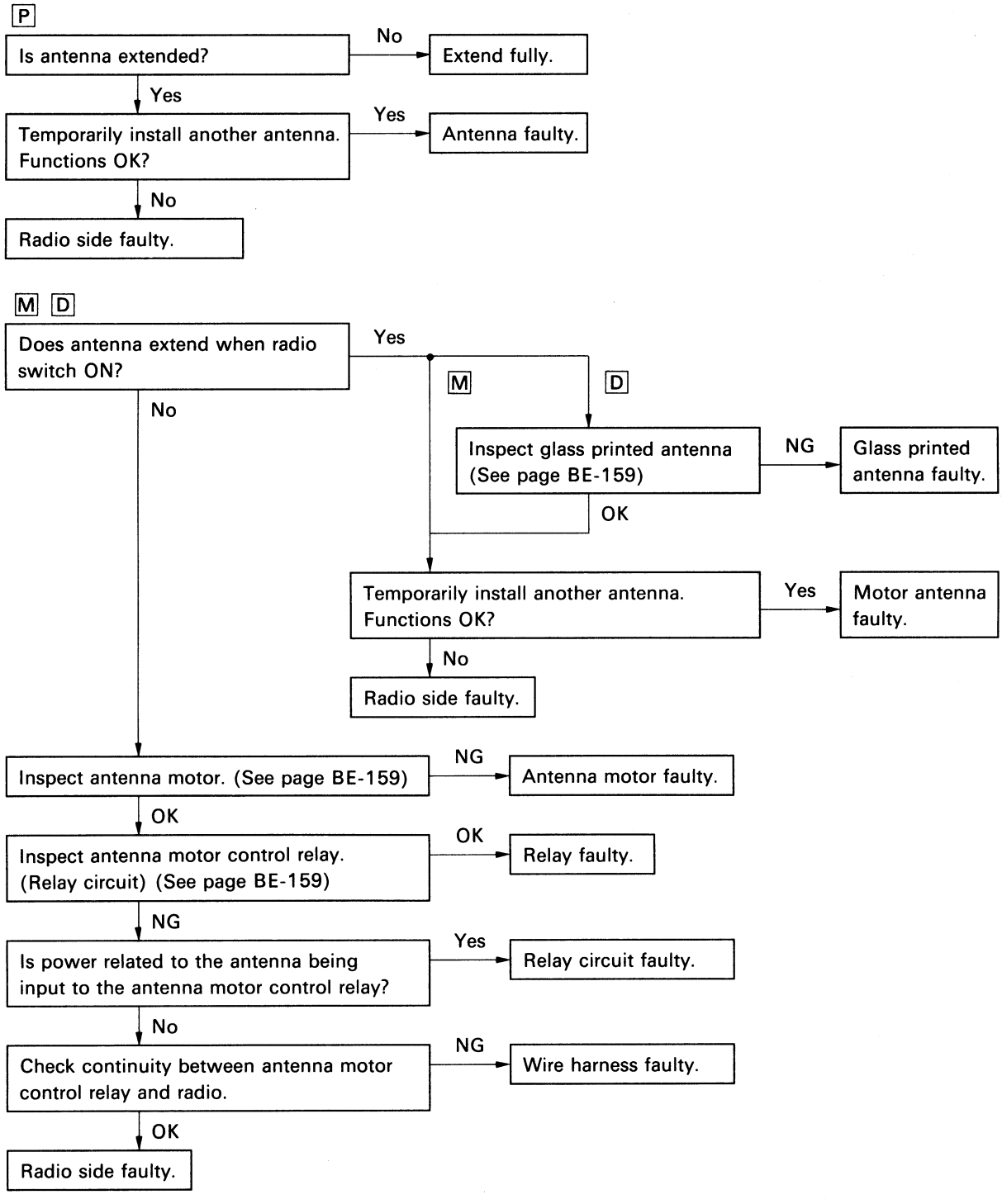


22 CD Player — CD WILL NOT EJECT

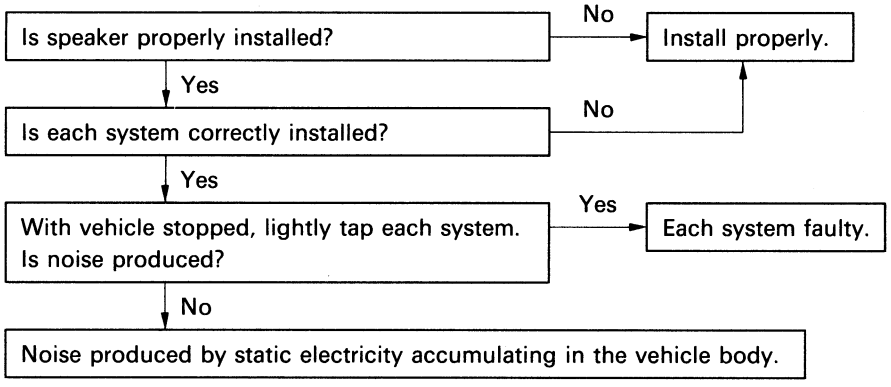


23	Antenna	ANTENNA-RELATED

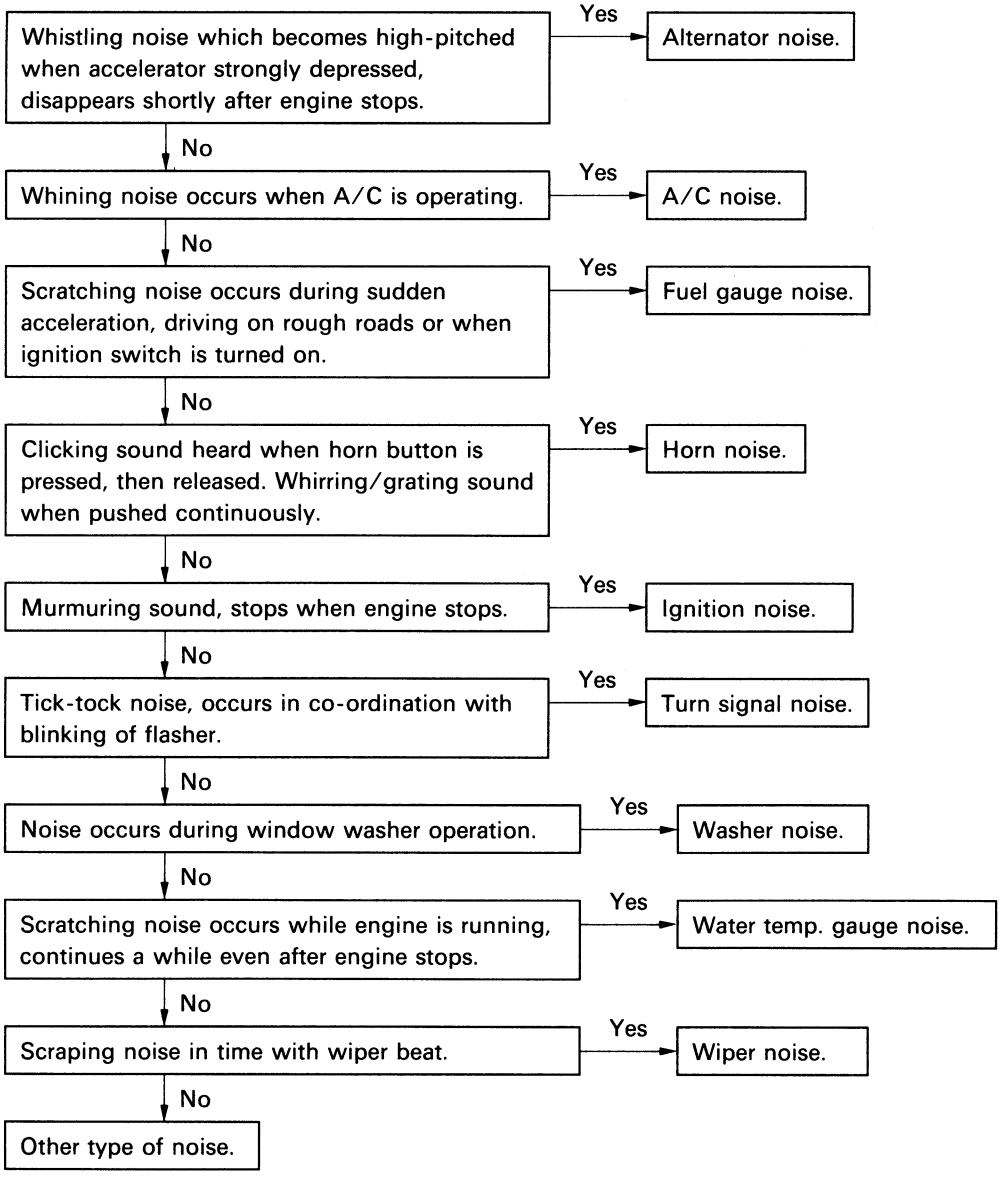
[P] : Antenna w/o Motor [M] : Motor Antenna [D] : Motor Antenna and Glass Printed Antenna

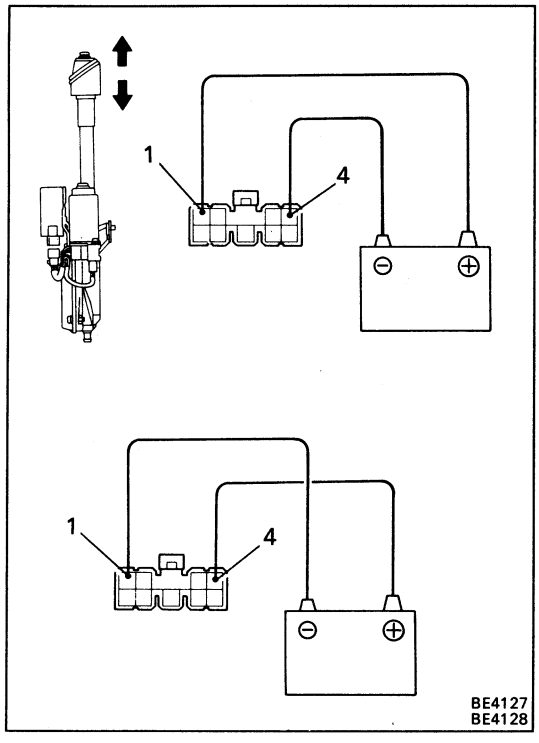


24 Noise — NOISE PRODUCED BY VIBRATION OR SHOCK WHILE DRIVING



25 Noise — NOISE PRODUCED WHEN ENGINE STARTS





Parts Inspection

1. INSPECT ANTENNA MOTOR

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 4.

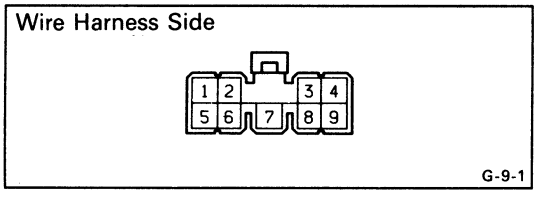
(b) Check that the motor turns (moves upward).

NOTICE: These tests must be performed quickly (within 3-5 seconds) to prevent the coil from burning out.

(c) Then, reverse the polarity, check that the motor turns the opposite way (moves downward).

NOTICE: These tests must be performed quickly (within 3-5 seconds) to prevent the coil from burning out.

If operation is not as specified, replace the motor.



2. INSPECT ANTENNA MOTOR CONTROL RELAY

(Relay Circuit)

Disconnect the connector from the relay and inspect the connector on wire harness side as shown in the chart.

Check for	Tester connection	Condition			Specified value
Continuity	1 – 4	Constant			Continuity
	2 – Ground	Constant			Continuity
Voltage	3 – Ground	Constant			Battery voltage
	5 – Ground	Ignition switch position	LOCK		No voltage
			ACC or ON		Battery voltage
	6 – Ground	Ignition switch position	LOCK		No voltage
			ACC or ON	Radio switch and cassette OFF	No voltage
				Radio switch or cassette ON	Battery voltage
	8 – Ground	Ignition switch position	LOCK		No voltage
			ACC or ON	Radio switch OFF or cassette ON	No voaltage
				Radio switch ON and cassette OFF	Battery voltage
	9 – Ground	Ignition switch position	LOCK or ACC		No voltage
			ON		Battery voltage

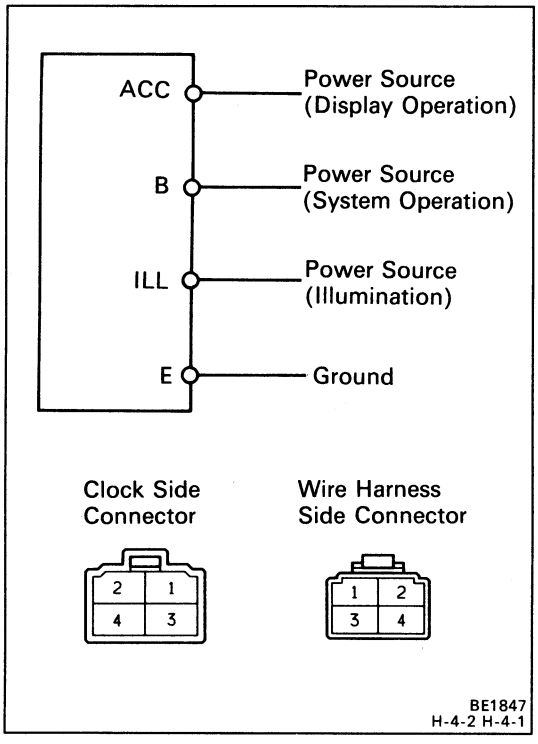
If circuit is as specified, replace the relay.

3. INSPECT GLASS PRINTED ANTENNA

(Use same procedure as for "INSPECT DEFOGGER WIRES" on page BE-65.)

4. REPAIR GLASS PRINTED ANTENNA

(Use same procedure as for "REPAIR DEFOGGER WIRES" on page BE-66.)



CLOCK

Troubleshooting

As shown in the illustration, those are clock circuit and connector diagrams. Inspect each terminal for applicable trouble.

Terminal		Condition	Specified value
1	E	Constant	Continuity
2	ILL	Turn light control switch ON	Battery Voltage
3	B	Constant	
4	ACC	Turn ignition switch ON	

Allowable error: ± 1.5 seconds/day

BODY

	Page
GENERAL INFORMATION	BO-2
HOOD	
Front Hood	BO-6
Engine Hood	BO-7
HEADLIGHT	BO-8
FRONT DOOR	BO-9
LUGGAGE COMPARTMENT DOOR	BO-22
MOULDING	
Windshield Moulding	BO-24
Body Outside Moulding	BO-26
Side Protection Moulding	BO-29
Back Window Moulding	BO-33
WINDSHIELD	BO-35
QUARTER WINDOW GLASS	BO-41
BACK WINDOW GLASS	BO-45
T-BAR ROOF	BO-48
MOON ROOF	BO-57
INSTRUMENT PANEL	BO-64
SEAT	BO-70
SEAT BELTS	BO-71
BODY DIMENSIONS	BO-73

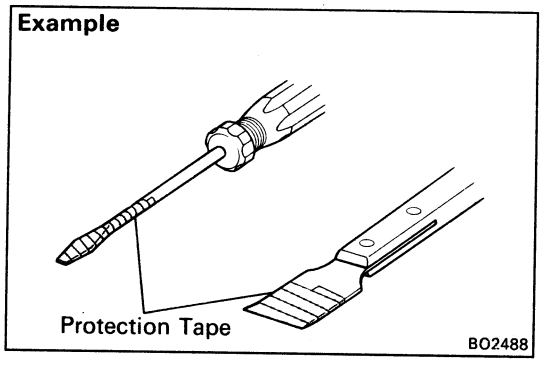
GENERAL INFORMATION

HANDLING PRECAUTIONS

If there is a possibility the body and/or parts may be damaged, first remove the danger before performing repair operations.

Example:

1. Apply protection tape to the body adjacent to the body parts when removing and installing.



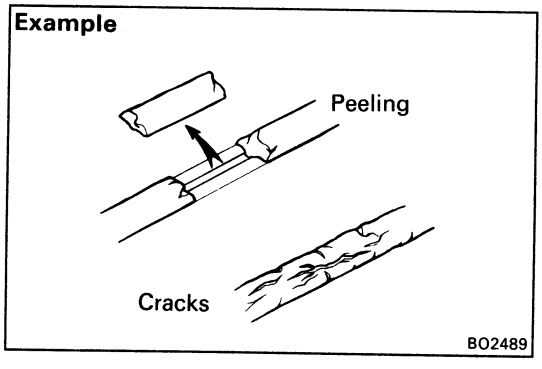
2. When prying off the body parts with a screwdriver or scraper etc., be sure to apply protection tape to the tip or blade to prevent damage to the paint film or body parts.

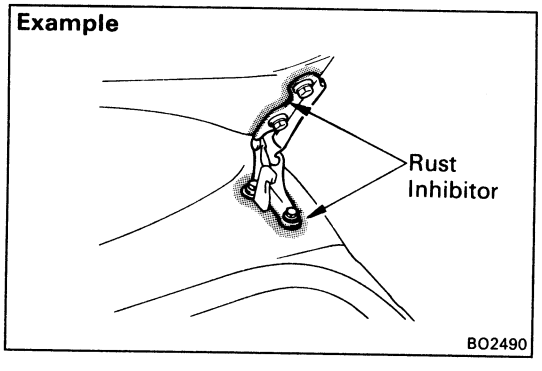
ANTI-RUST TREATMENT

If anti-rust agents are damaged while repairing other parts, be sure to repair the anti-rust agent.

Example:

1. If body sealant, paint film or undercoat are damaged by peeling, cracks, etc., be sure to repair each with an anti-rust agent.



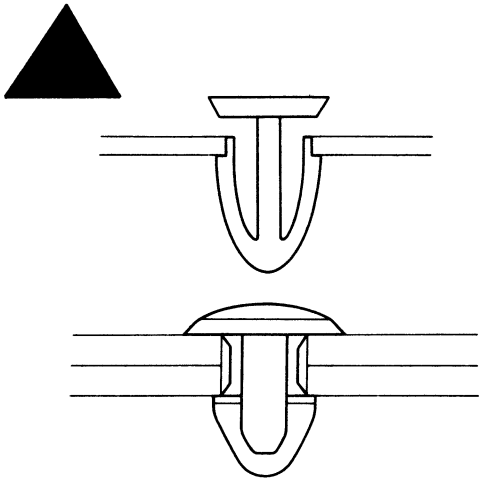
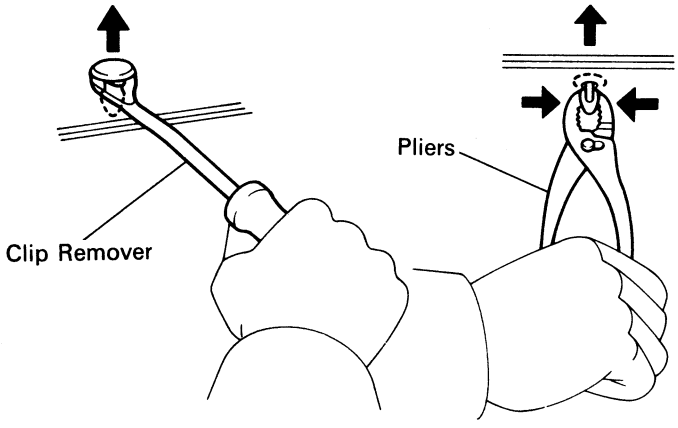
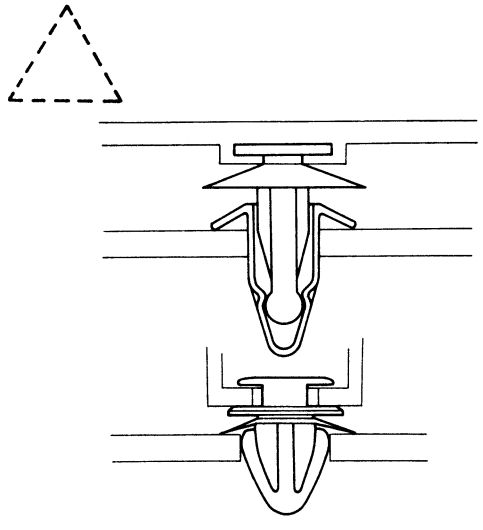
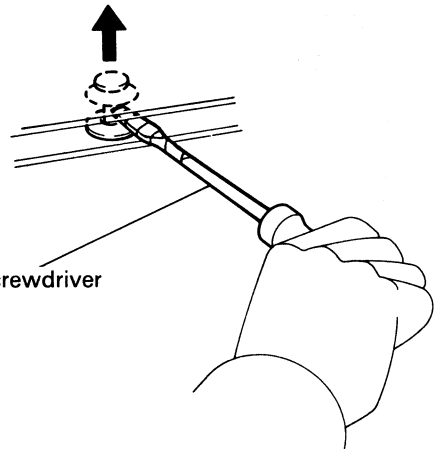
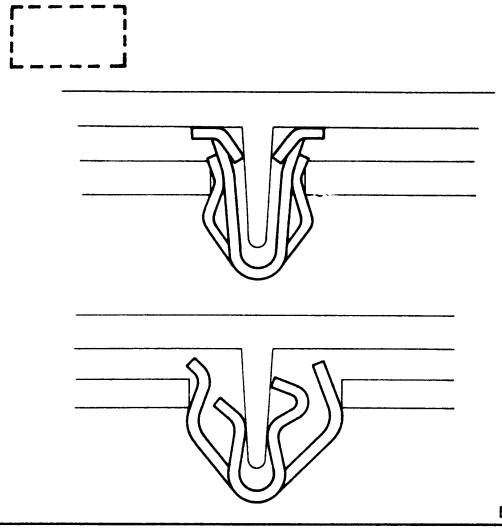
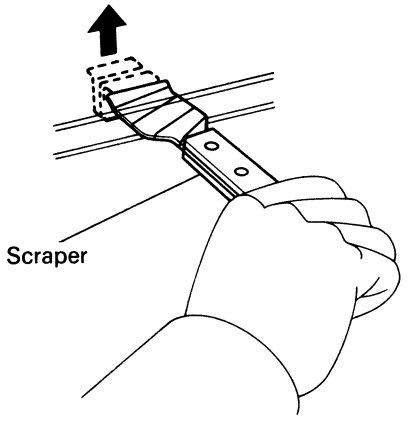


2. If a hinge or exterior body panel is loosened or removed, be sure apply rust inhibitor after repairs.

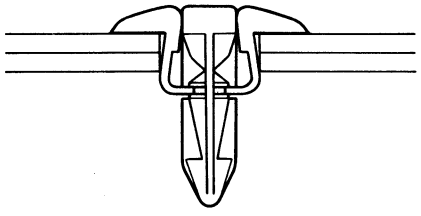
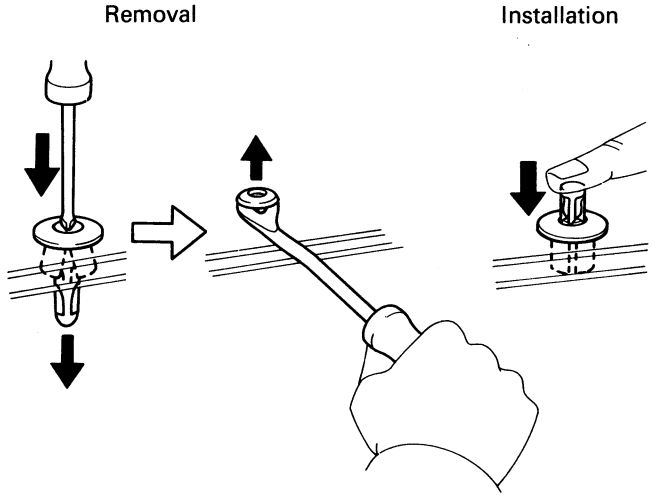
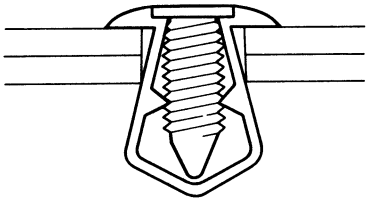
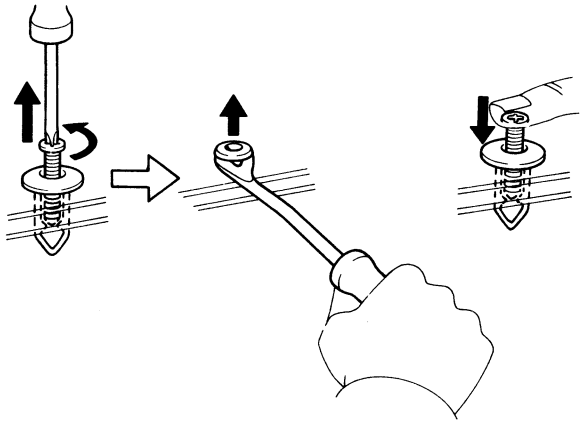
CLIPS

The removal and installation methods of typical clips used in body parts are shown in the table below.

HINT: If the clip is damaged during the operation, always replace it with a new clip.

Shape (Example)	Removal/Installation
 BE4116	 BO4117
 BO4118	 BO4119
 BO4120	 BO4121

CLIPS(Cont'd)

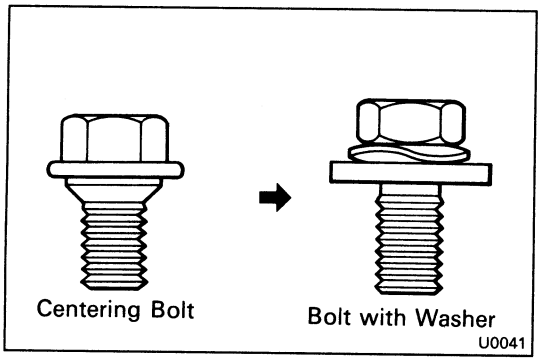
Shape (Example)	Removal/Installation
 BO4122	 BO4123
 BO4124	 BO4125

SRS AIRBAG

(See page AB-2)

When servicing vehicles with an srs (Supplement Restraint System) airbag installed, be sure to carefully observe the instructions given below.
Failure to carry out service operations in the correct sequence could cause the airbag system to deploy, possibly leading to a serious accident.
When removal or installation of airbag parts and the yellow wire harness and connector for the airbag is necessary, refer to the precautionary notices in the AB section before performing the operation.

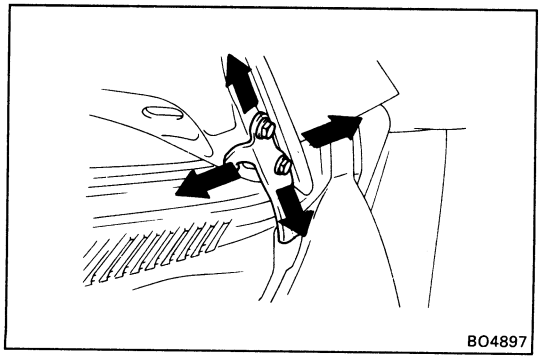
- Work must be started after 20 seconds or longer from the time the ignition switch is set to the LOCK position and the negative (–) terminal cable disconnected from the battery.
  (The airbag system is equipped with a back-up power source so that if work is started within 20 seconds of disconnecting the negative (–) terminal cable of the battery, the airbag may be deployed.)
- To avoid erasing the memory of each memory system, never use a back-up power supply from outside the vehicle.
- Before repairs, remove the airbag sensors if shocks are likely to be applied to the sensors during repaires.
- The front airbag sensor set bolt has been anti-rust treated. When the sensor is removed, always replace the set bolt with a new one.
- If the front airbag sensor, center airbag sensor or steering wheel pad have been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.
- Never use airbag parts from another vehicle. When replacing parts, replace them with new parts.
- Do not expose the front airbag sensor, center airbag sensor or steering wheel pad directly to hot air or flames.
- The airbag system's wire harness is integrated with the cowl wire harness assembly. The wires for the airbag wire harness are encased in a yellow corrugated tube. All the connectors for the system are also a standard yellow color. If the airbag system wire harness becomes disconnected or the connector becomes broken due to an accident, etc., repair or replace it as shown on page AB-21.
- The steering wheel must be fitted correctly to the steering column with the spiral cable at the neutral position; otherwise, cable disconnection and other troubles may result. Refer to page AB-16 of this manual concerning correct steering wheel installation.
- When removing the steering wheel pad or handling a new steering wheel pad, it should be placed with the pad top surface facing up. In this case, the twin-lock type connector lock lever should be in the locked state and care should be taken to place it so the connector will not be damaged. (Storing the pad with its metallic surface up may lead to a serious accident if the airbag inflates for some reason.)
- Grease should not be applied to the steering wheel pad and the pad should not be cleaned with detergents of any kind.
- Store the steering wheel pad where the ambient temperature remains below 93°C (200°F), without high humidity and away from electrical noise.
- Information labels are attached to the periphery of the airbag components. Follow the notices.
- When the ignition switch is at ACC or ON and the airbag warning light remains on, the center airbag sensor assembly has detected a malfunction code.(See page AB-29)



HOOD

ADJUSTMENT OF HOOD

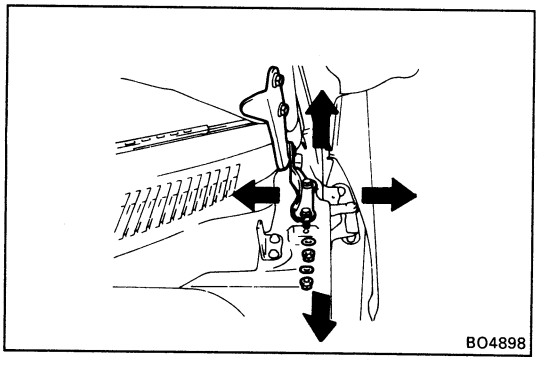
HINT: Since the centering bolt is used as the hood hinge set bolt, the hood cannot adjusted with it on. Substitute the bolt with the washer for the centering bolt.



Front Hood

1. **ADJUST FRONT HOOD IN FORWARD/REARWARD AND VERTICAL DIRECTIONS**

   Adjust the hood by loosening the hood side hinge bolts.

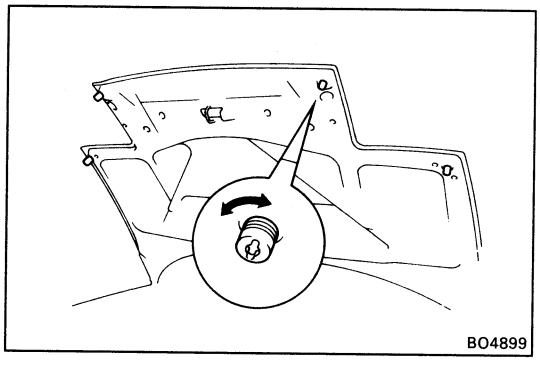


2. **ADJUST REAR EDGE OR FRONT HOOD IN LEFT/ RIGHT AND VERTICAL DIRECTIONS**

   (a) Remove front fender

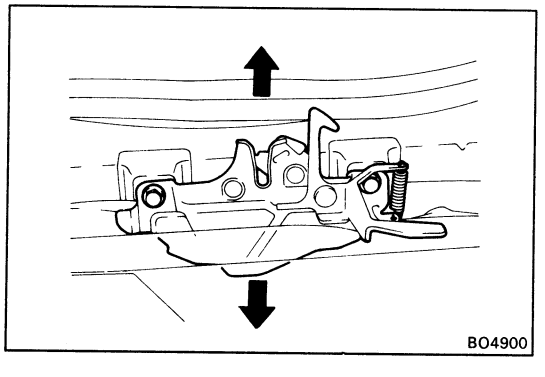
   (b) (Left/Right Direction)
   Adjust the hood by loosening the hood hinge bolts.

   (Vertical Direction)
   Adjust the hood by increasing or decreasing the number of the shims.



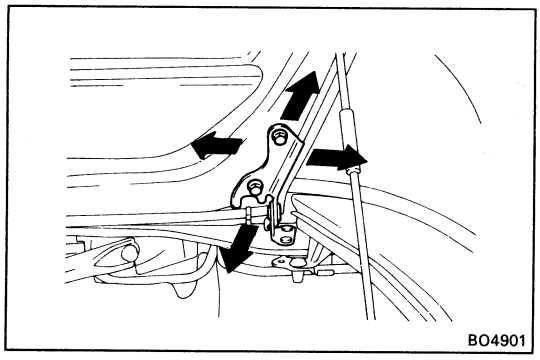
3. **ADJUST FRONT EDGE OF FRONT HOOD IN VERTICAL DIRECTION**

   Adjust the hood by turning the cushions.



4. **ADJUST FRONT HOOD LOCK**

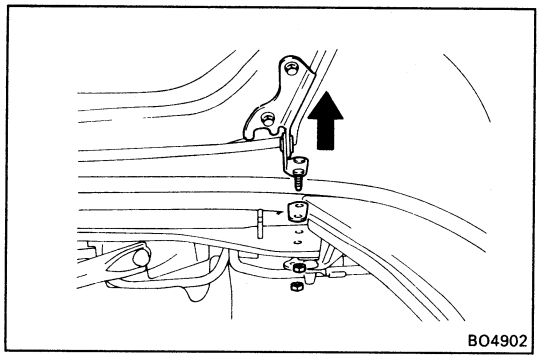
   Adjust the lock by loosening bolts.



Engine Hood

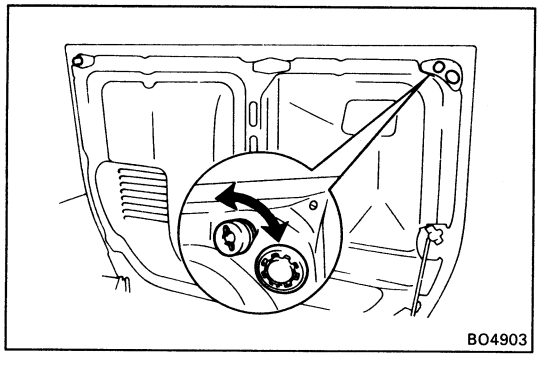
1. ADJUST ENGINE HOOD IN FORWARD/REARWARD AND LEFT/RIGHT DIRECTIONS

Adjust the hood by loosening the body side hings bolts.



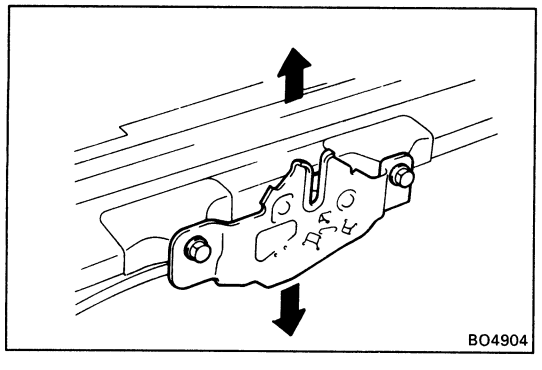
2. ADJUST FRONT EDGE OF ENGINE HOOD IN VERTICAL DIRECTION

Adjust the hood by increasing the number of shims.



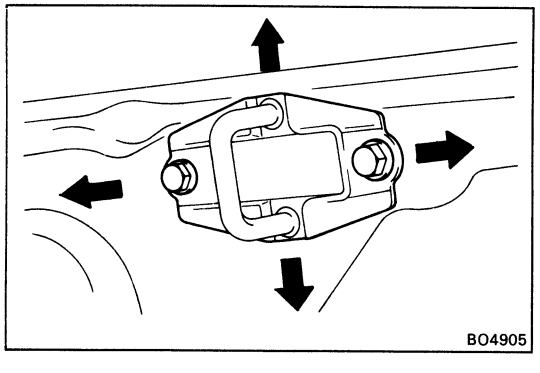
3. ADJUST REAR EDGE OF ENGINE HOOD IN VERTICAL DIRECTION

Adjust the hood by turning the cushions.



4. ADJUST ENGINE HOOD LOCK

Adjust the hood lock by loosening the mounting bolts.

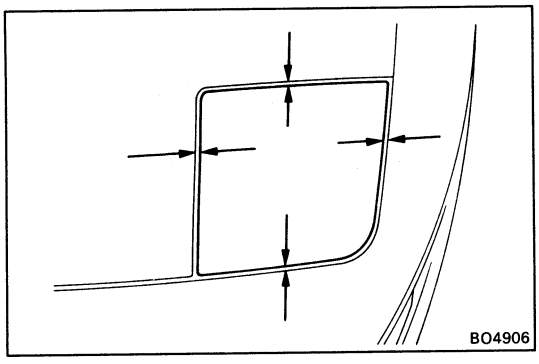


5. ADJUST ENGINE HOOD LOCK STRIKER

(a) Check that the hood fit and hood lock are adjusted correctly.

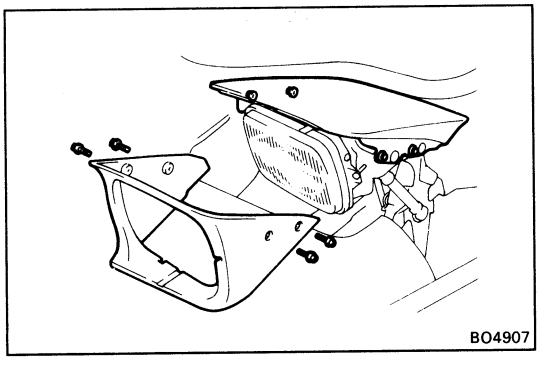
(b) Loosen the striker mounting bolts to adjust.

(c) Using a plastic hammer, top the striker to adjust it.



HEADLIGHT

CAUTION: When adjusting each section, raise or lower the headlight with the light control switch. But when adjusting each section, be sure to remove the RTR fuse (30A) before adjusting.

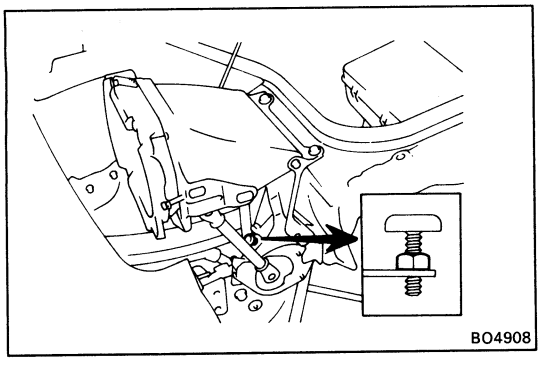


ADJUSTMENT OF HEADLIGHT

1. ADJUST HEADLIGHT HOOD IN FORWARD/ REARWARD AND LEFT/RIGHT DIRECTIONS

(a) Remove the headlight door.

(b) Adjust the headlight hood by loosening four cover set screws.



2. ADJUST HEADLIGHT SLANT

(a) Loosen the stopper lock nut.

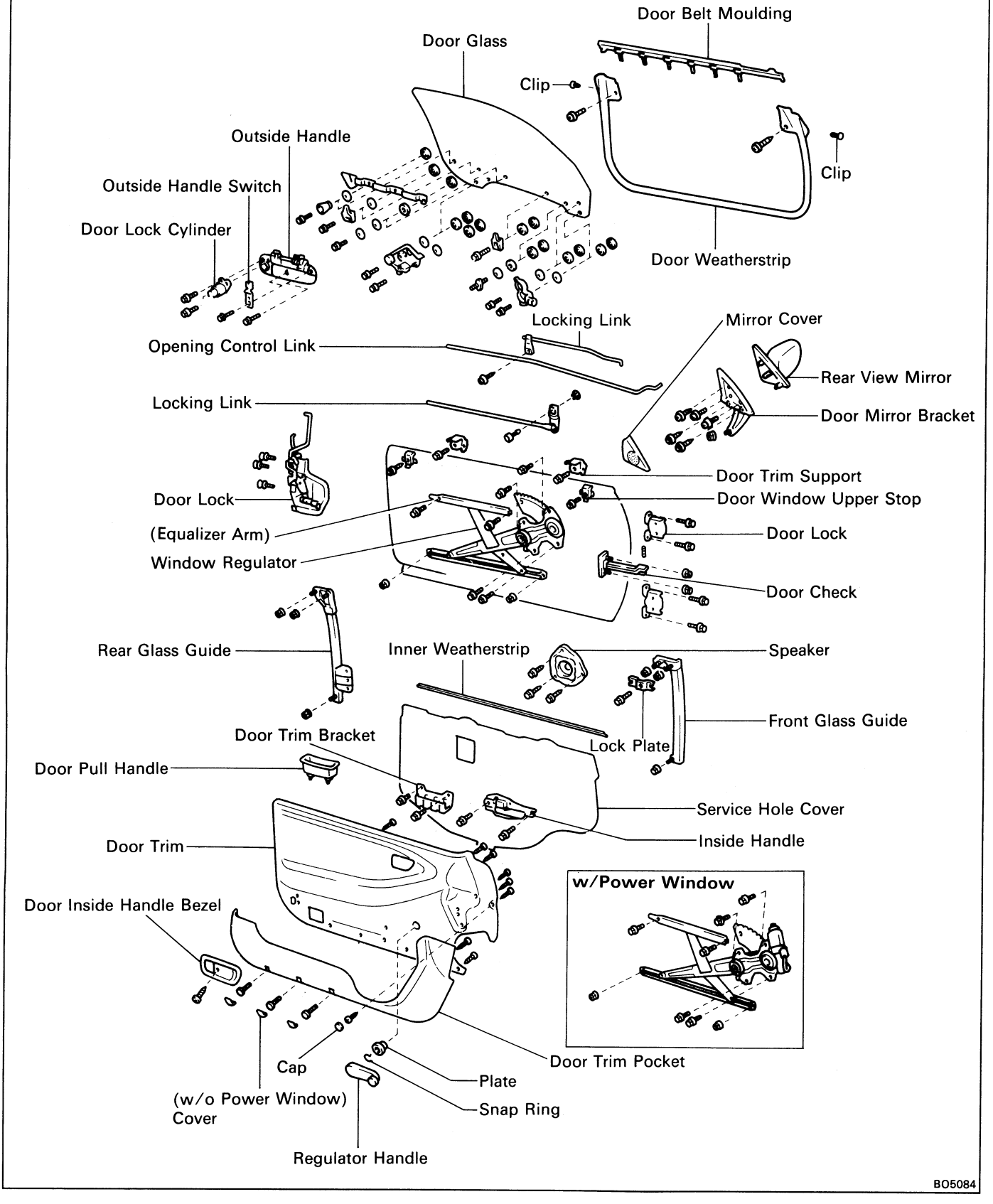
(b) Lower the headlight.

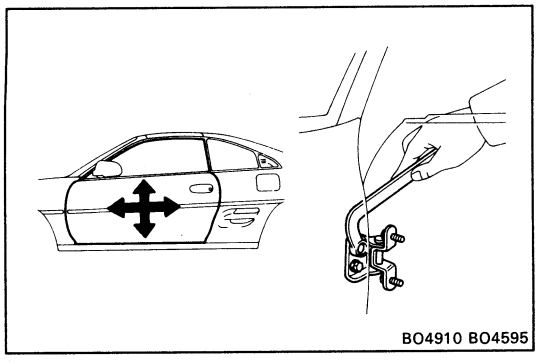
(c) Turn the manual operation knob to align the rod and the crank arm.

(d) Change the rod lengh to adjust the headlight slant.

FRONT DOOR

COMPONENTS



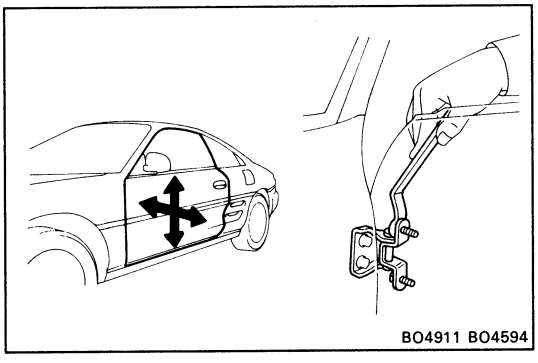

BO4910 BO4595

ADJUSTMENT OF FRONT DOOR

1. **ADJUST DOOR IN FORWARD/REARWARD AND VERTICAL DIRECTIONS**

   Using SST, adjust the door by loosening the body side hinge bolts.

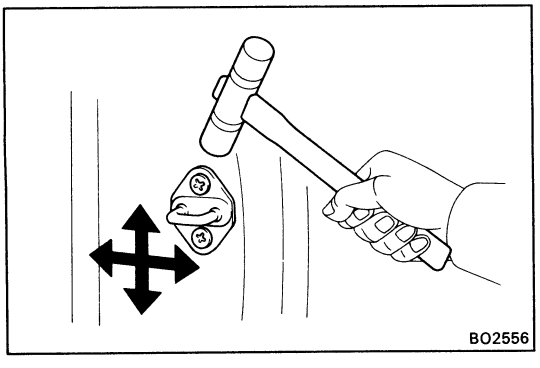
   SST 09812-00010


BO4911 BO4594

2. **ADJUST DOOR IN LEFT/RIGHT AND VERTICAL DIRECTIONS**

   Loosen the door side hinge bolts to adjust.

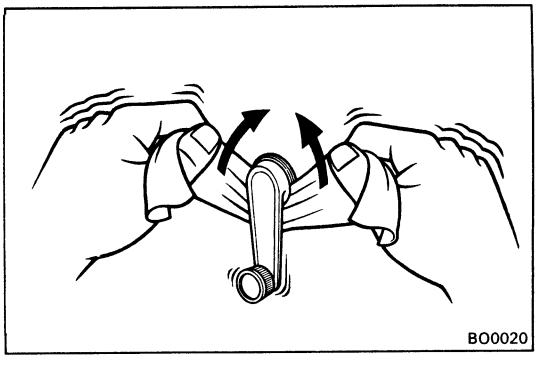
   HINT: Substitute the bolt for the centering bolt. (See page BO-6)


BO2556

3. **ADJUST DOOR LOCK STRIKER**
   (a) Check that the door fit and door lock linkages are adjusted correctly.
   (b) Loosen the striker mounting screws to adjust.
   (c) Using a plastic hammer, tap the striker to adjust it.

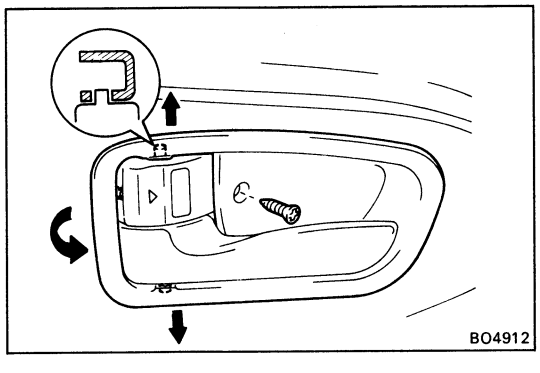
DISASSEMBLY OF FRONT DOOR

(See page BO-9)


BO0020

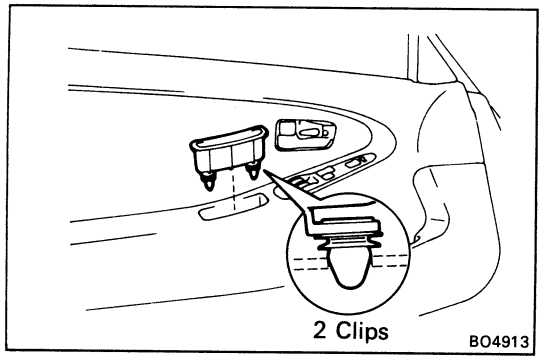
1. **(w/o Power Window)**
   REMOVE REGULATOR HANDLE

   Pull off the snap ring with a shop rag and remove the regulator handle and plate.


BO4912

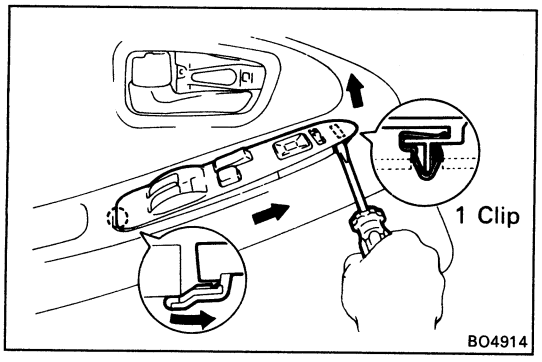
2. **REMOVE DOOR INSIDE HANDLE BEZEL**

   Remove the screw and pull the inside handle bezel.



3. REMOVE DOOR PULL HANDLE

Remove the pull handle by pulling

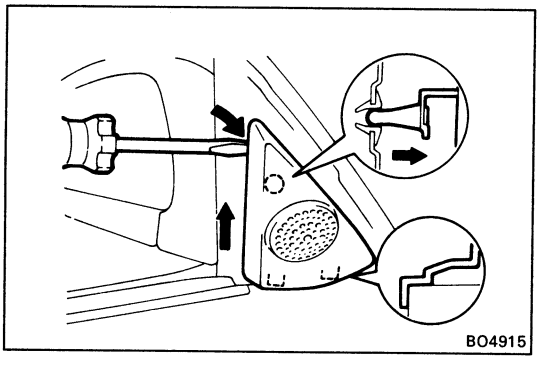


4. (w/Power Window)
REMOVE ARMREST PEDAL

(a) Insert the screwdriver between the door trim and the armrest panel to pry out.

HINT: Tape the screwdriver tip before use.

(b) Slide the armrest panel forward to remove it, then disconnect the connectors.

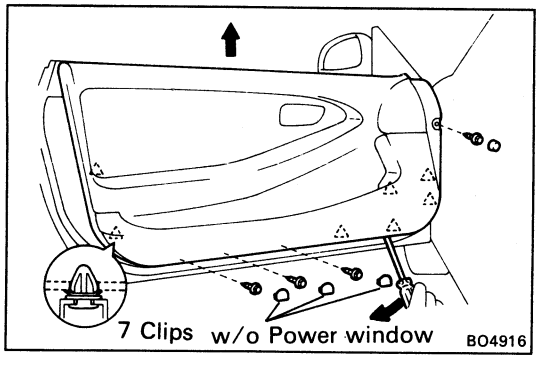


5. REMOVE MIRROR COVER

(a) Insert the screwdriver between the cover and the bracket to pry out.

HINT: Tape the screwdriver tip before use.

(b) Pull the cover upward to remove it.



6. REMOVE DOOR TRIM

HINT: Tape the screwdriver tip before use.

(a) Using the screwdriver, remove the screw cap.

(b) (w/o Power Window)
Using the screwdriver, remove three covers.

(c) Remove four bolts.

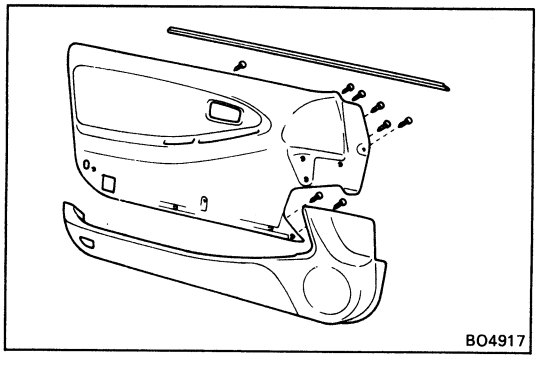
(d) Insert the screwdriver between the door and the door trim to pry out.

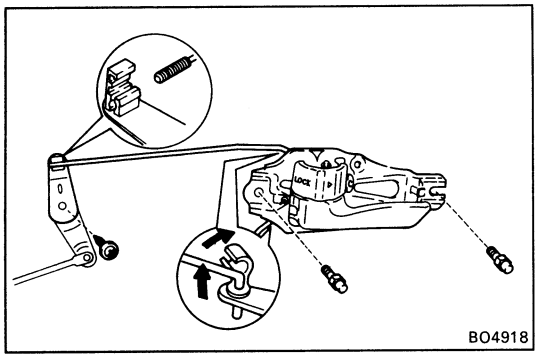
(e) Pull the trim upward to remove it.

(f) (w/Door Courtesy Light)
Disconnect the connector.

(g) Remove eight screws and the door trim pocket from the door trim.

(h) Remove inner weatherstrip from the door trim.





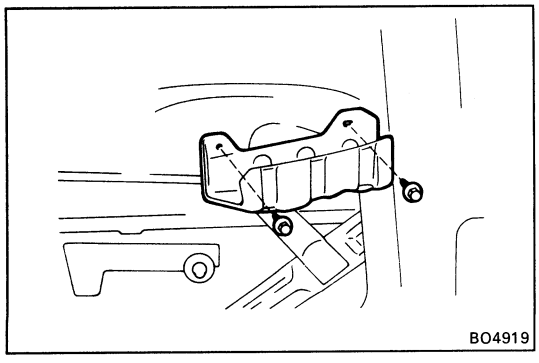
7. REMOVE DOOR INSIDE HANDLE

(a) Remove two bolts.

(b) Disconnect two links from the inside handle.

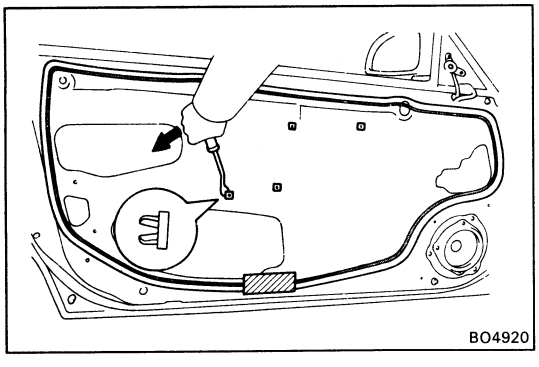
8. REMOVE LOCKING LINK

Remove the screw and the locking link.



9. REMOVE DOOR TRIM BRACKET

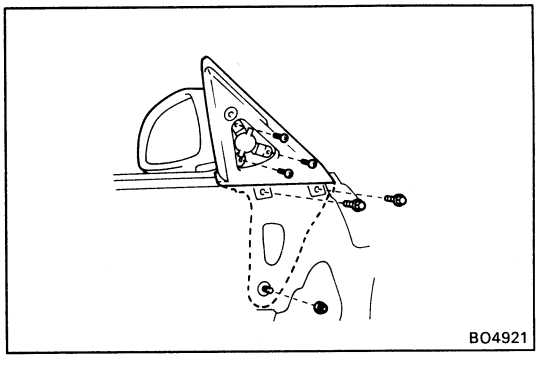
Remove two bolts and the bracket.



10. REMOVE SERVICE HOLE COVER

(a) Using the clip remover, remove four screw grommets.

(b) Remove service hole cover.



11. REMOVE REAR TRIM MIRROR

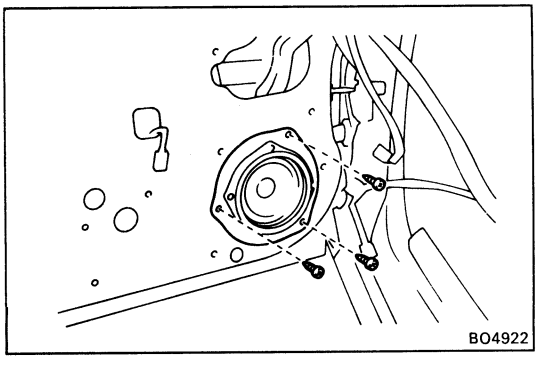
(a) (w/Remote Control Mirror)
Disconnect the connector.

(b) Remove three screws and the mirror.

12. REMOVE DOOR MIRROR BRACKET

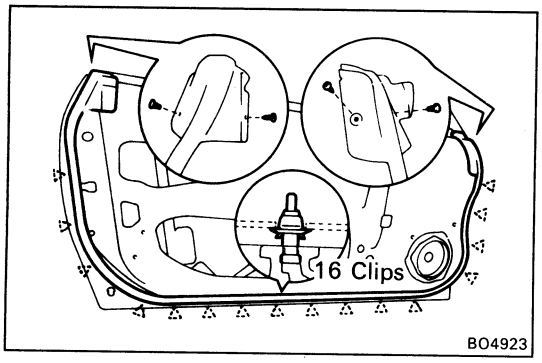
(a) Remove two bolts and the nut.

(b) Pull the bracket to remove it.



13. REMOVE SPEAKER

Remove three screws and the speaker, then disconnect the connector.

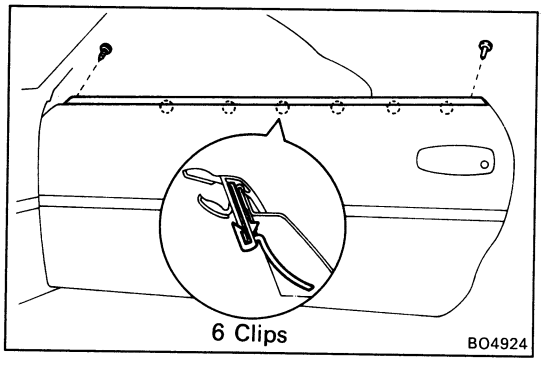


14. REMOVE DOOR WEATHERSTRIP

(a) Remove two screws and two clips.

(b) While pulling the weatherstrip by hand, remove the clips using the clip remover.

HINT: Do not pull strongly on the weatherstrip as it may tear.

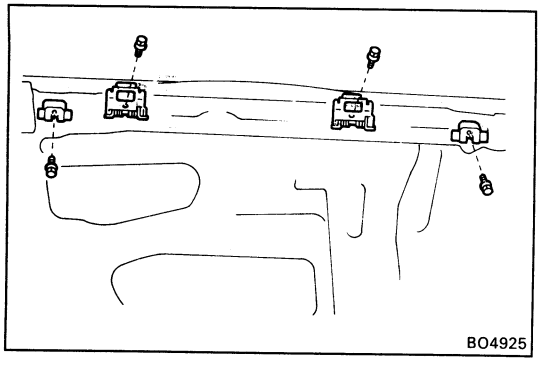


15. REMOVE DOOR BELT MOULDING

(a) Remove the screw from the front edge of the moulding.

(b) Remove the clip from the rear edge of the moulding.

(c) Pry out the clips from the edge of the moulding and remove the door belt moulding.

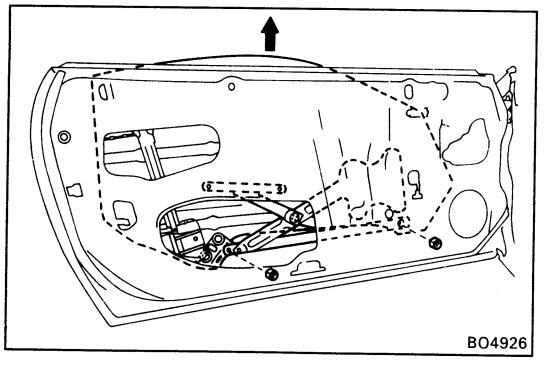


16. REMOVE DOOR WINDOW UPPER STOP

Remove two bolts and two upper stops.

17. REMOVE DOOR TRIM SUPPORT

Remove two bolts and two trim supports.

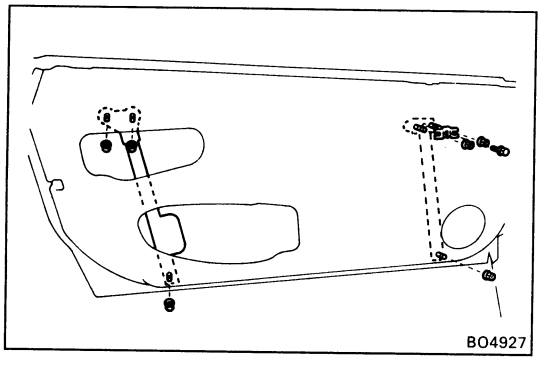


18. REMOVE DOOR GLASS

HINT: Insert a shop rag inside the panel to prevent scratching the glass.

(a) Remove two glass mounting nuts.

(b) Remove the door glass by pulling it upward.



19. REMOVE FRONT GLASS GUIDE

(a) Remove the bolt and the lock plate.

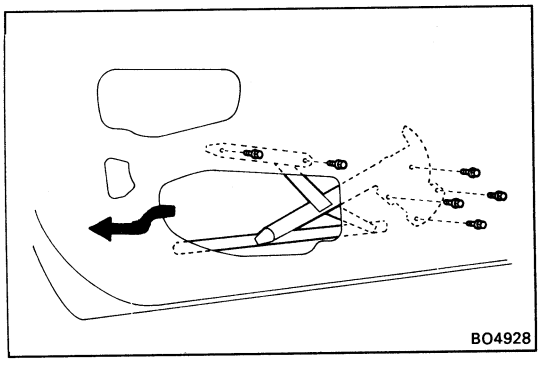
(b) Remove three nuts from the guide.

(c) Pull out the guide upward from the panel.

20. REMOVE REAR GLASS GUIDE

(a) Remove three nuts from the guide.

(b) Pull out the guide upward from the panel.



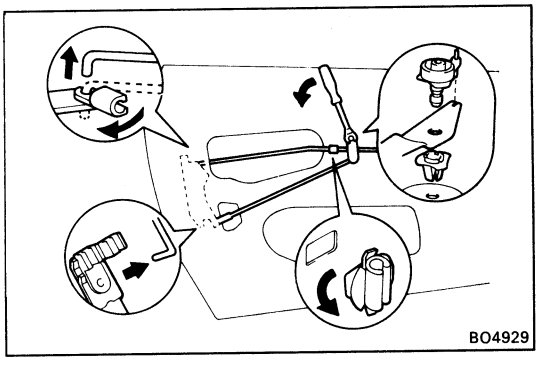
21. REMOVE WINDOW REGULATOR

(a) (w/Power Window)
Disconnect the connector.

(b) Remove two equalizer arm bracket mounting bolts.

(c) Remove four regulator mounting bolts.

(d) Remove the regulator through the service hole.



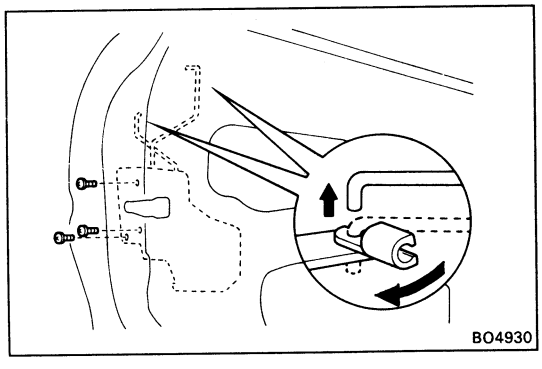
22. REMOVE LOCKING AND OPENING CONTROL LINK

(a) Disconnect two links from the door lock.

(b) Using the clip remover, remove the intermediate clip.

(c) Remove the locking and opening control link.

(d) Turn the clip, then pull it out.



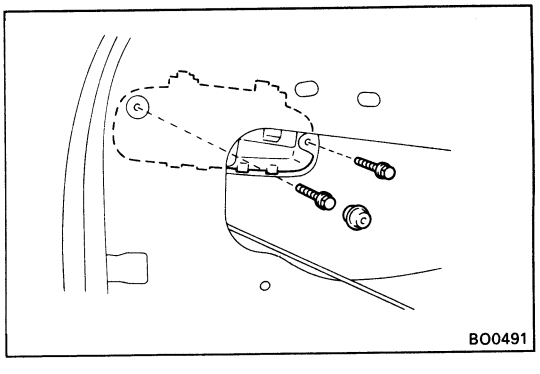
23. REMOVE DOOR LOCK

(a) Disconnect two links from the outside handle and the door lock cylinder

(b) (w/Power Door Lock)
Disconnect the connector.

(c) Remove three screws

(d) Remove the door lock through the service hole



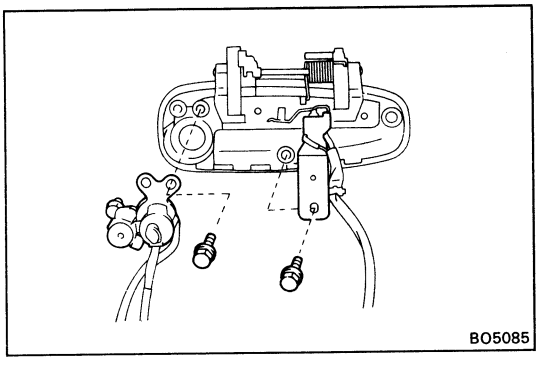
24. REMOVE OUTSIDE HANDLE WITH DOOR LOCK CYLINDER

(a) Remove the cushion.

(b) Remove two bolts and the outside handle with the lock cylinder.

(c) (w/ Power Door Lock)
Disconnect the connector.

(d) (w/ Door Key Cylinder Illumination Light)
Disconnect the connector.



25. REMOVE DOOR LOCK CYLINDER

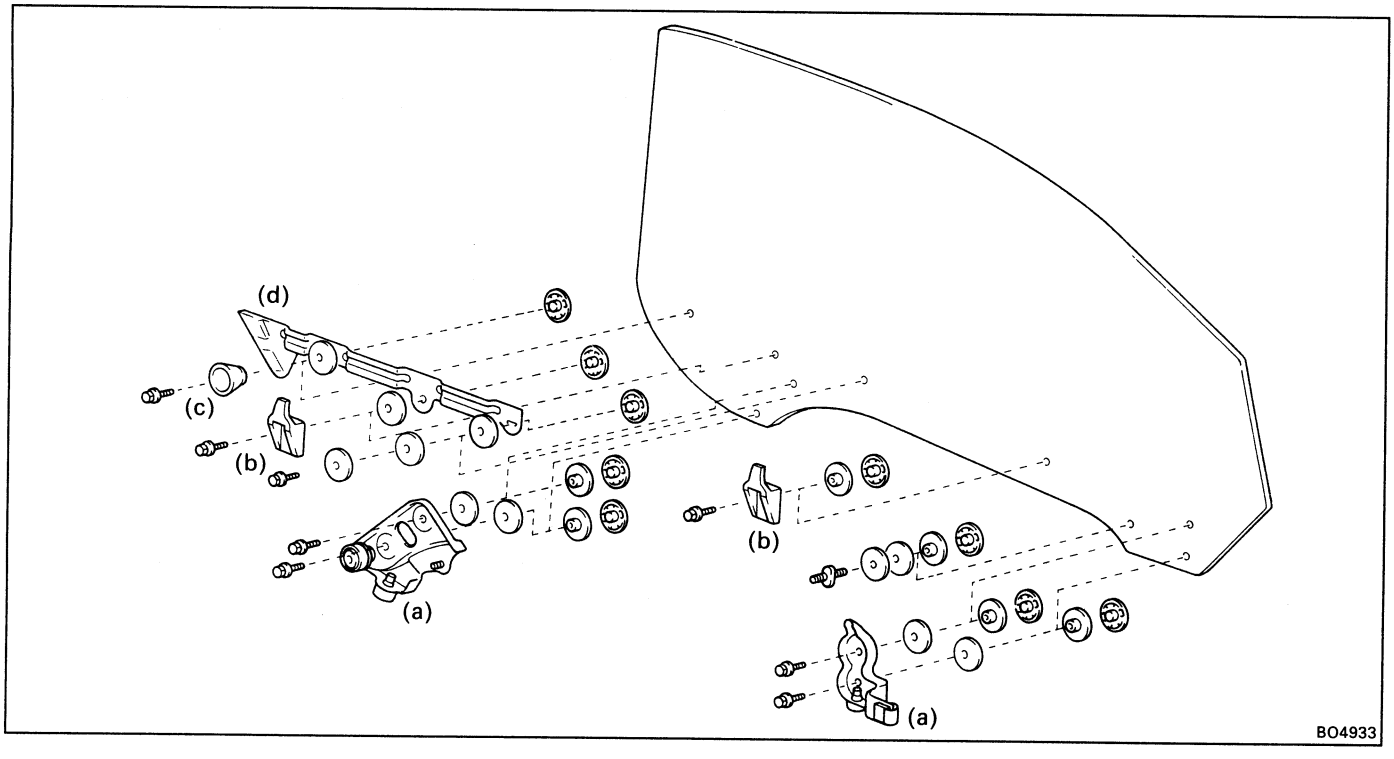
(a) (w/ Door Key Cylinder Illumination Light)
Remove the bolt and the outside handle switch from the outside handle.

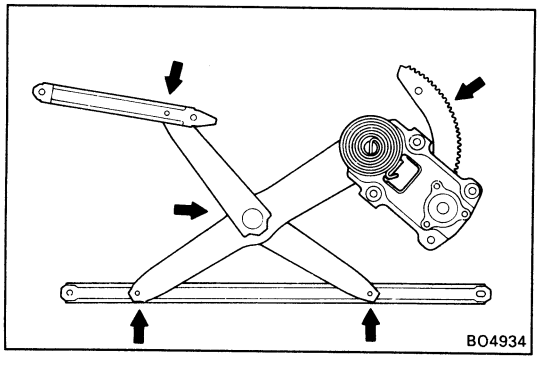
(b) Remove the bolt and the lock cylinder from the outside handle.

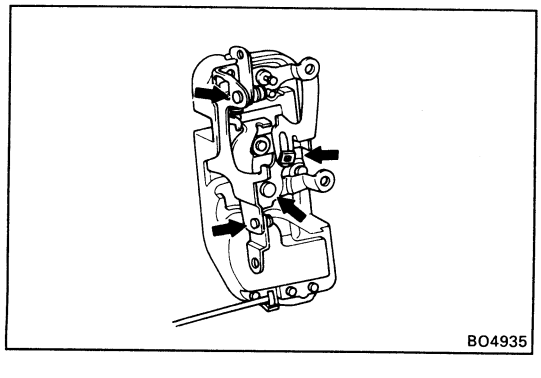
REPLACEMENT OF GLASS

REMOVE FOLLOWING PARTS

(a) Door glass brackets
(b) Stabilizers
(c) Stopper
(d) Door glass plate







ASSEMBLY OF FRONT DOOR

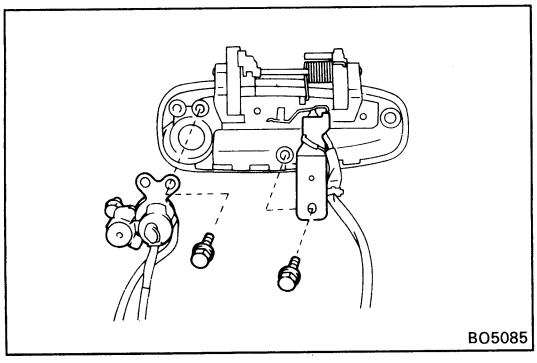
(See page BO-9)

1. **BEFORE INSTALLING PARTS, COAT THEM WITH MP GREASE**

   (a) Apply MP grease to the sliding surface and gears of the window regulator.

   NOTICE: Do not apply MP grease to the spring of the window regulator.

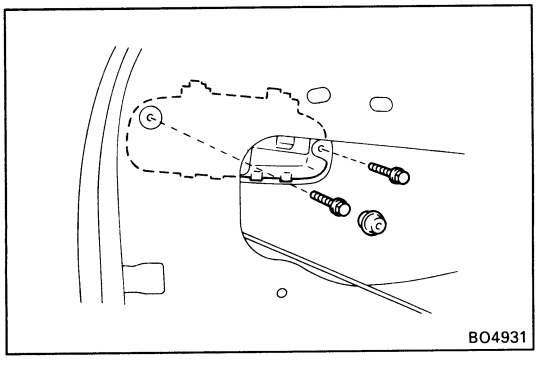
   (b) Apply MP grease to the sliding surface of the door lock.



2. INSTALL LOCK CYLINDER

(a) Install the lock cylinder with the bolt to the outside handle.

(b) (w/ Door Key Cylinder Illumination Light)
Install the outside handle switch with the bolt to the outside handle.



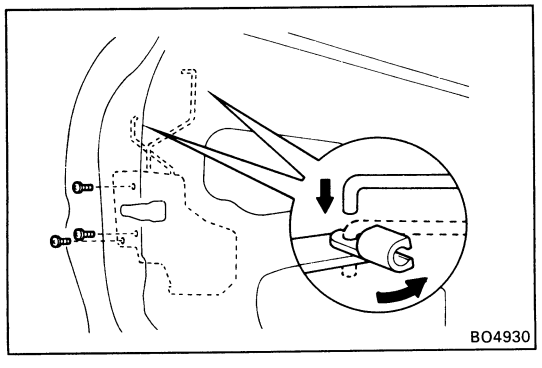
3. INSTALL OUTSIDE HANDLE WITH DOOR LOCK CYLINDER

(a) Install the outside handle with lock cylinder with two bolts.

(b) Install the cushion.

(c) (w/ Power Door Lock)
Connect the connector.

(d) (w/ Door Key Cylinder Illumination Light)
Connect the connector.

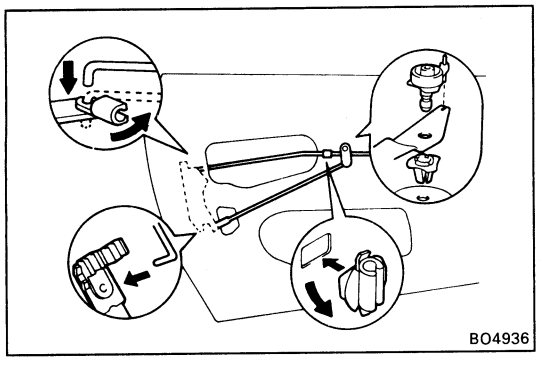


4. INSTALL DOOR LOCK

(a) Install the door lock with three screws.

(b) (w/Power Door Lock)
Connect the connector.

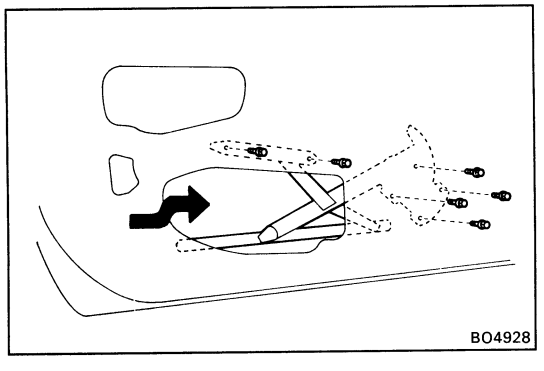
(c) Connect two links to the outside handle and the door lock cylinder.



5. INSTALL LOCKING AND OPENING CONTROL LINK

(a) Install the clips, and the locking and opening control link.

(b) Connect two links to the door lock.



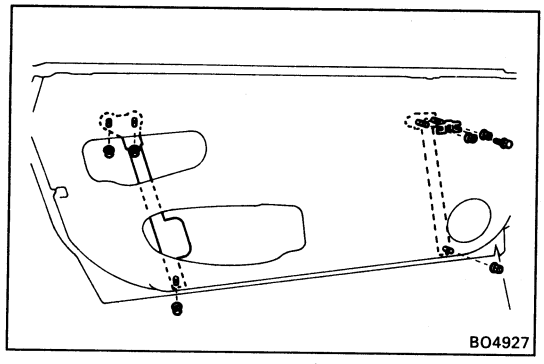
6. INSTALL WIND REGULATOR

(a) Place the regulator through the service hole.

(b) Install four regulator mounting bolts.

(c) Temporarily tighten two equalizer arm bracket bolts.

(d) (w/Power Window)
Connect the connector.



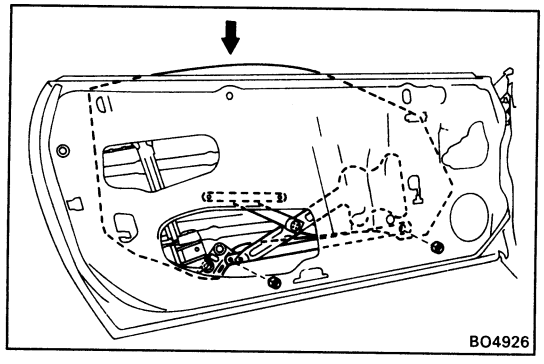
7. INSTALL REAR GLASS GUIDE

Install the rear glass guide with the lower nut and temporarity tighten two upper nuts.

8. INSTALL FRONT GLASS GUIDE

(a) Install the front glass guide with the lower nut and temporarily tighten two upper nuts.

(b) Install the lock plate and temporarily tighten the bolt.

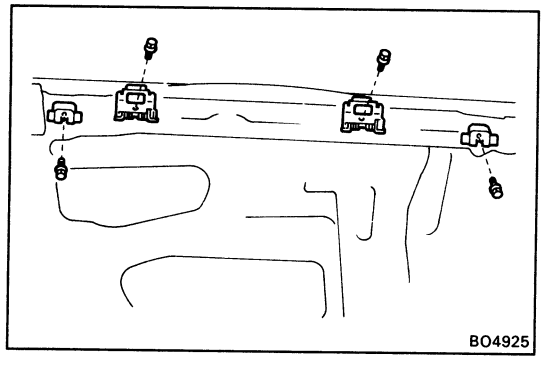


9. INSTALL DOOR GLASS

(a) Insert the glass to the glass guides.

(b) Install the glass to the regulator with two glass mounting nuts.

HINT: Insert a shop rag inside the panel to prevent scratching the glass.

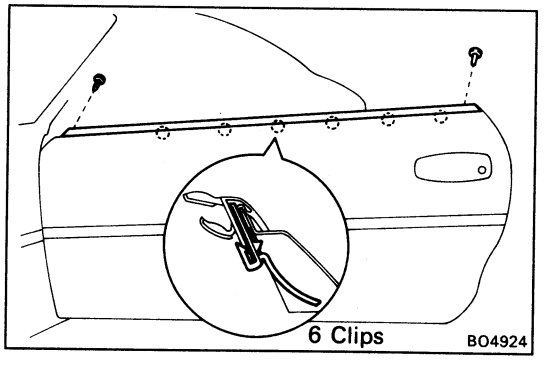


10. INSTALL DOOR TRIM SUPPORT

Install two trim supports and temporarily tighten two bolts.

11. INSTALL DOOR WINDOW UPPER STOP

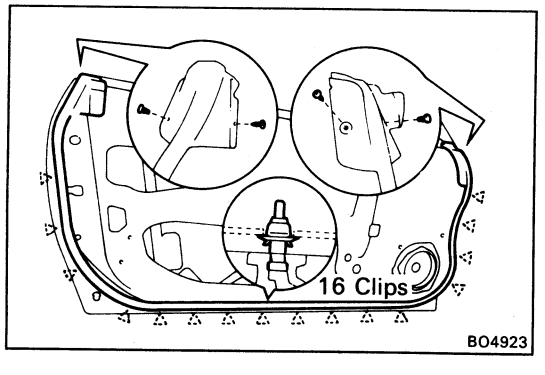
Install two upper stops and temporarily tighten two bolts.



12. INSTALL DOOR BELT MOULDING

(a) Insert the claw of the clips into the upper panel slit and push the moulding onto the panel.

(b) Install the clip and the screw.



13. INSTALL DOOR WEATHERSTRIP

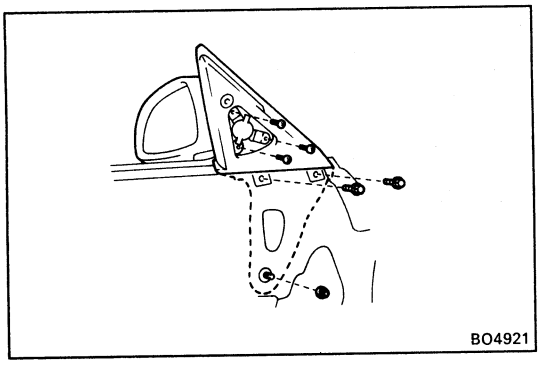
(a) Install the weatherstrip with clips to the panel.

(b) Install two clips and two screws.

14. INSTALL SPEAKER

(a) Connect the connector.

(b) Install the speaker with three screws.



15. INSTALL DOOR MIRROR BRACKET

(a) Place the bracket in the panel

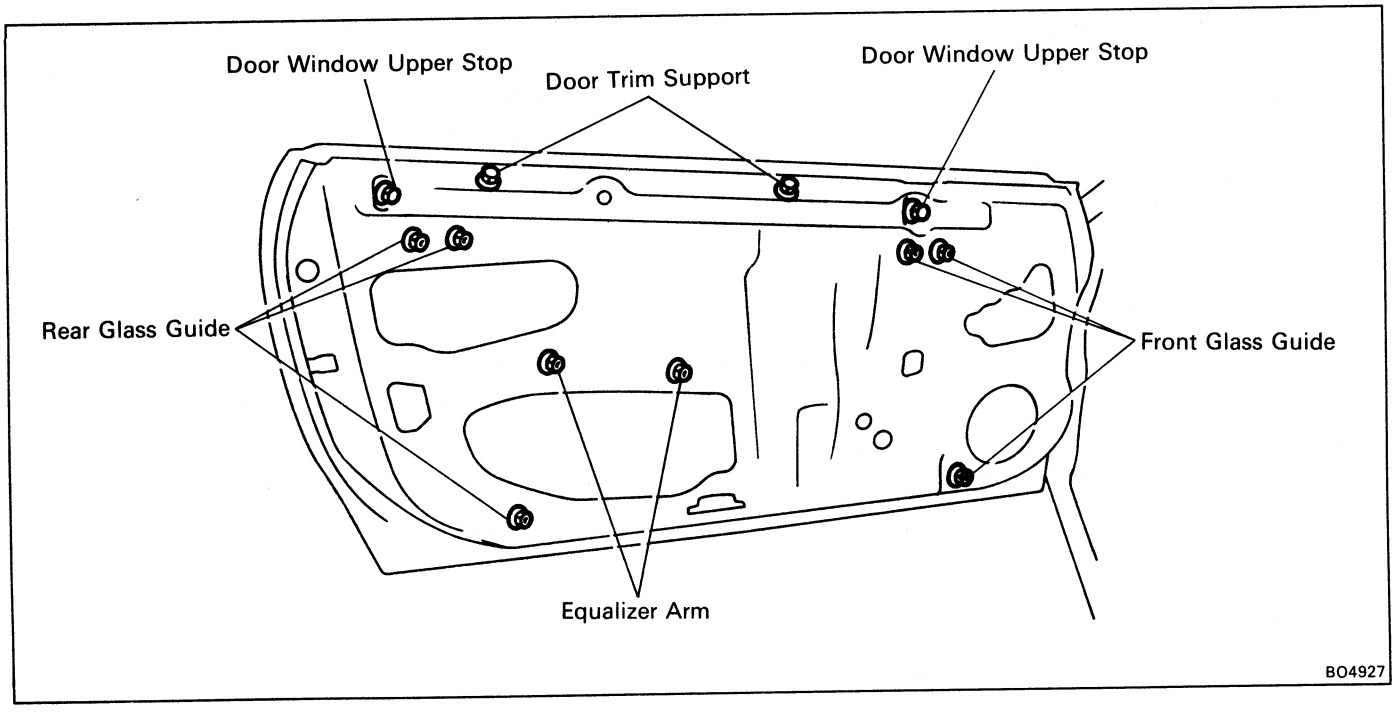
(b) Install the nut and two bolts.

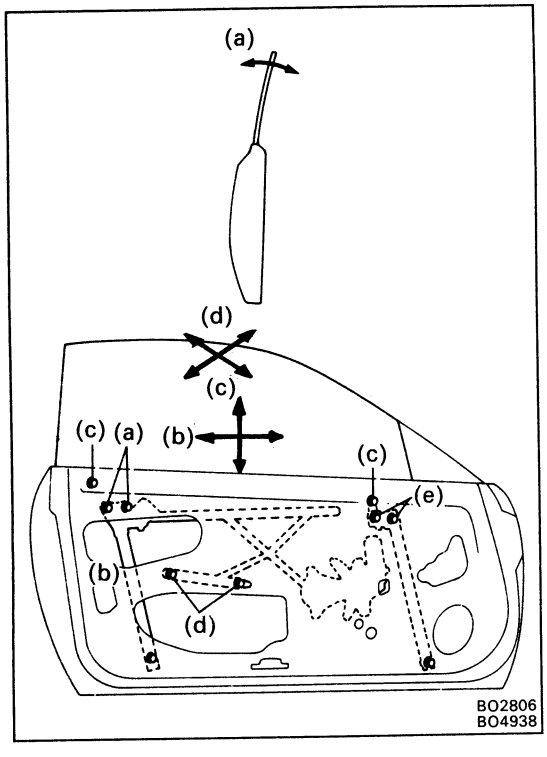
16. INSTALL REAR VIEW MIRROR

(a) Install the mirror with three screws.

(b) (w/Remote Control Mirror)
Connect the connector.

17. ADJUST DOOR GLASS





[In left/right direction-upperside of glass]

Using a hexagon wrench, adjust the stud bolts (a) of the rear glass guide. For example, if you turn right both stud bolts, the upper side of the glass move to outside.

HINT: Turn both stud bolts of the glass guide and equal amount.

[In forward/rearward direction]

Loosen the two nuts and slide the rear glass guide (b) forward or rearward to adjust the glass.

[In vertical direction]

Adjust the door window upper stop (c).

[In lean of forward/rearward direction]

Adjust the equalizer arm bracket mounting bolts (d).

18. TIGHTEN EACH BOLT, NUT OF EACH PART

HINT: When installing the front guide, after adjusting each part, temporarily tighten the two nuts (e) until they touch the inner panel surface.
Then install the lock plate and tighten the bolt.

19. CHECK DOOR GLASS

(a) When you close the door with the glass fully closed check that the A-A, B-B, C-C sections are in the same condition as shown in the illustration.

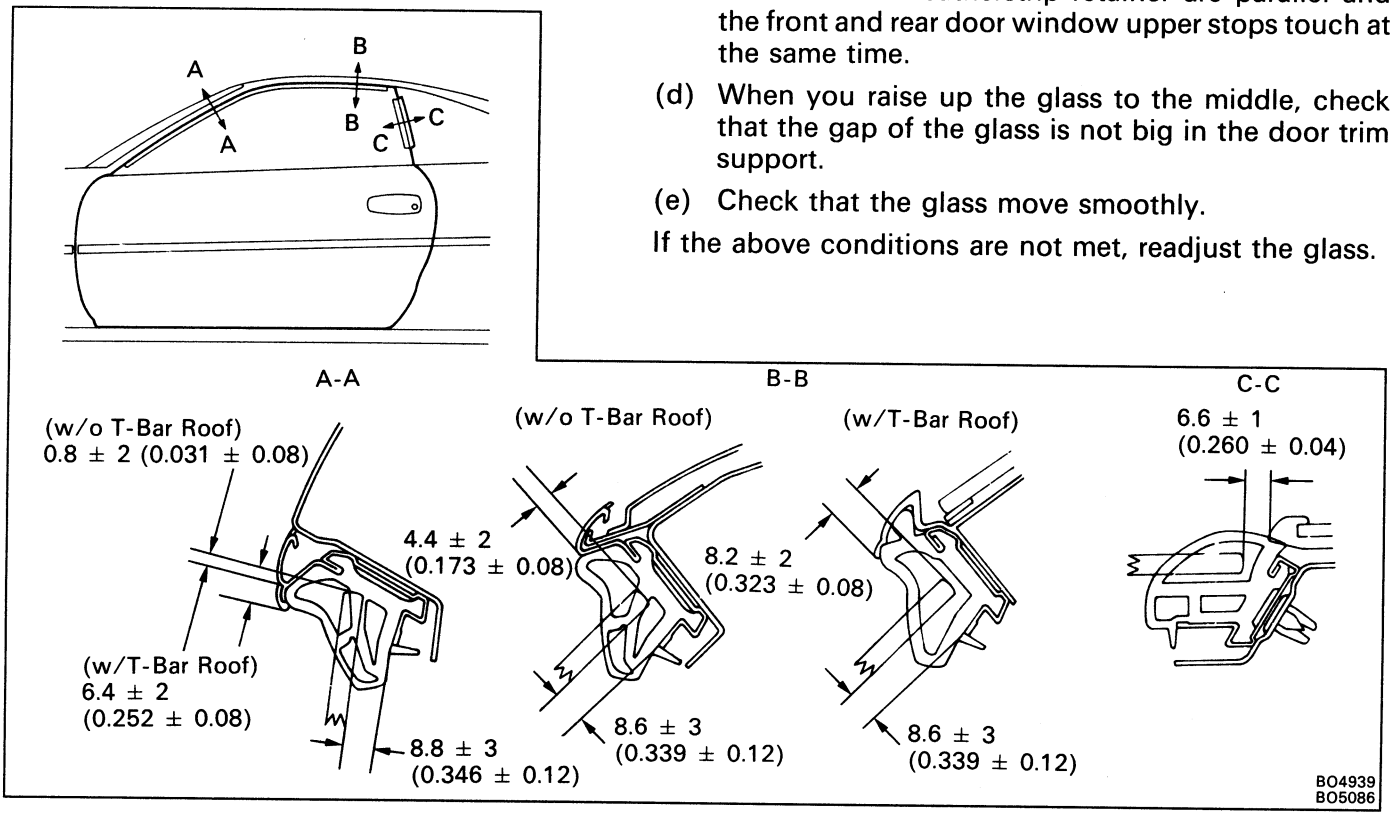
(b) When you close the door with the glass fully closed, be careful that the glass is not caught in the weatherstrip.

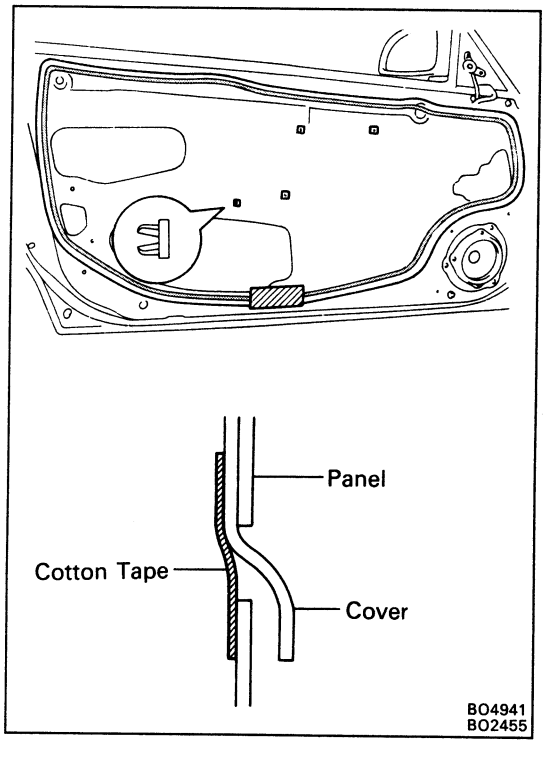
(c) When you raise up the glass, check that the glass and the roof weatherstrip retainer are parallel and the front and rear door window upper stops touch at the same time.

(d) When you raise up the glass to the middle, check that the gap of the glass is not big in the door trim support.

(e) Check that the glass move smoothly.

If the above conditions are not met, readjust the glass.





20. INSTAL SERVICE HOLE COVER

(a) Seal the service hole cover with adhesive.

HINT: Bring out the link through the service hole cover.

(b) Insert the lower edge of the cover into the panel slit.

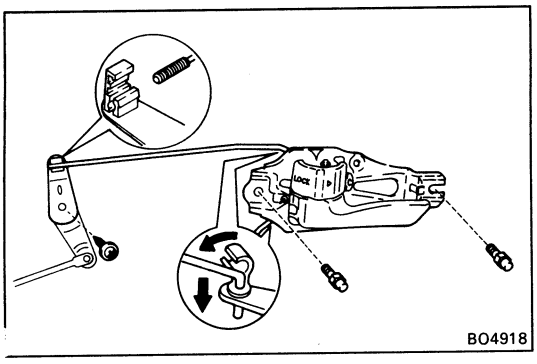
(c) Seal the panel slit with cotton tape.

NOTICE: Do not block the trim clip sealing with the tape.

(d) Install four screw grommets.

21. INSTALL DOOR TRIM BRACKET

Install the bracket with two bolts.



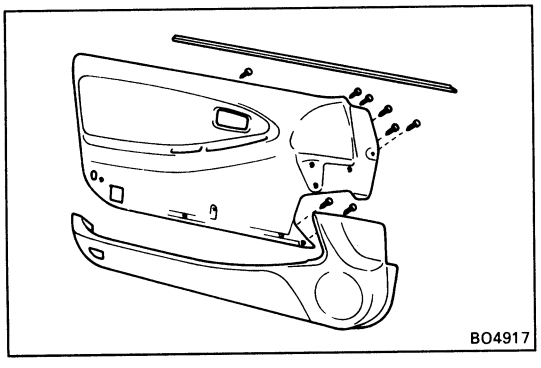
22. INSTALL LOCKING LINK

Install the locking link with the screw.

23. INSTALL DOOR INSIDE HANDLE

(a) Connect two links to the inside handle.

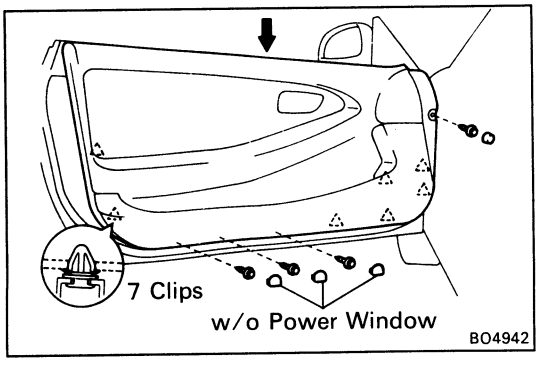
(b) Install the inside handle with two bolts.



24. INSTALL DOOR TRIM

(a) Install the inner weatherstrip to the door trim.

(b) Install the door trim pocket with eight screws to the door trim.



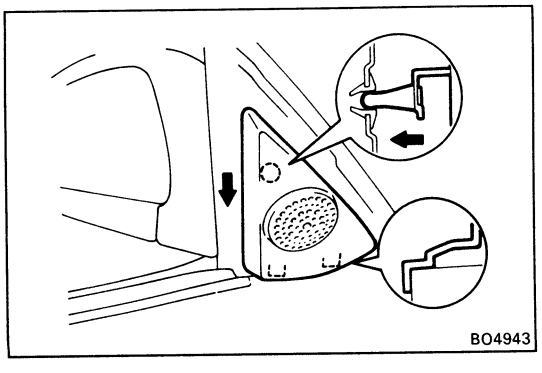
(c) (w/Door Courtesy Light)
Connect the connector.

(d) Insert the upper edge of the trim from above, tap the trim by hand and fix it in place with the clips.

(e) Install four bolts.

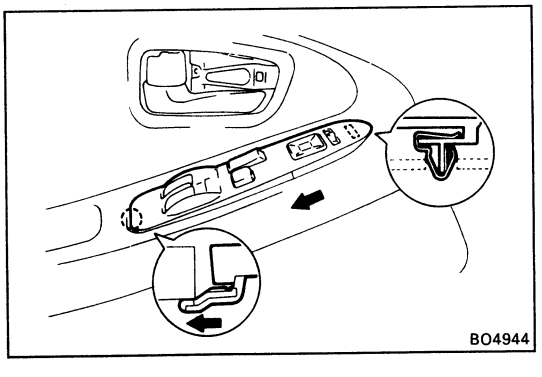
(f) (w/o Power Window)
Install three covers.

(g) Install the screw cap.



25. INSTALL MIRROR COVER

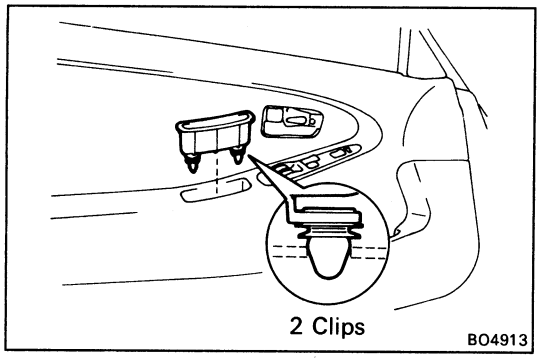
Insert the lower edge of the cover from above, tap the cover to install it.



26. (w/Power Window)
INSTALL ARMREST PANEL

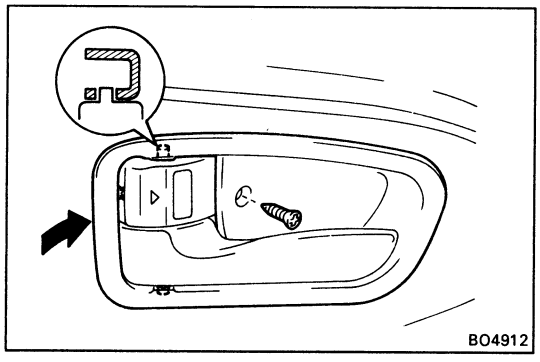
(a) Connect the connectors.

(b) Slide the panel rearward and tap the panel to install it.



27. INSTALL DOOR PULL HANDLE

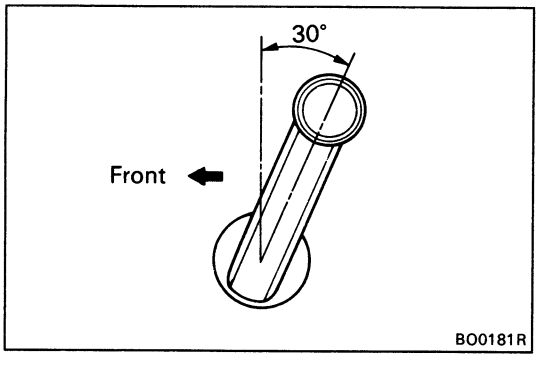
Push the pull handle to install it.



28. INSTALL DOOR INSIDE HANDLE BEZEL

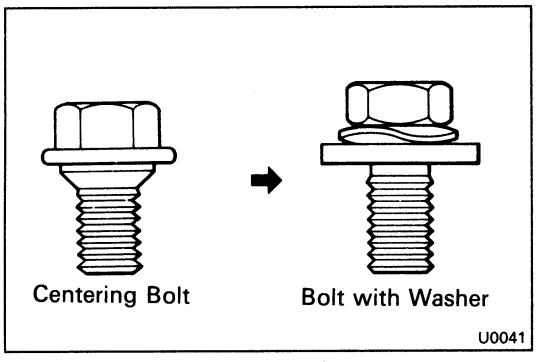
(a) Push in the bezel to install it.

(b) Install the screw.



29. (w/o Power Window)
INSTALL REGULATOR HANDLE

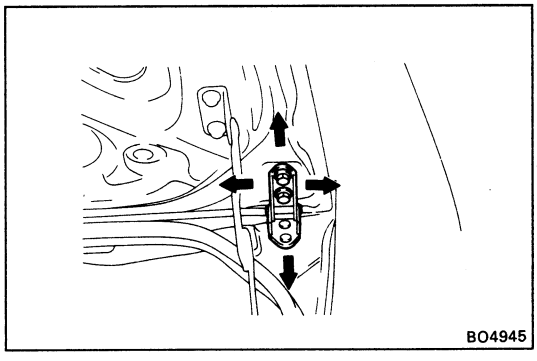
With door window fully closed, install the plate and the regulator handle with the snap ring as shown.



LUGGAGE COMPARTMENT DOOR

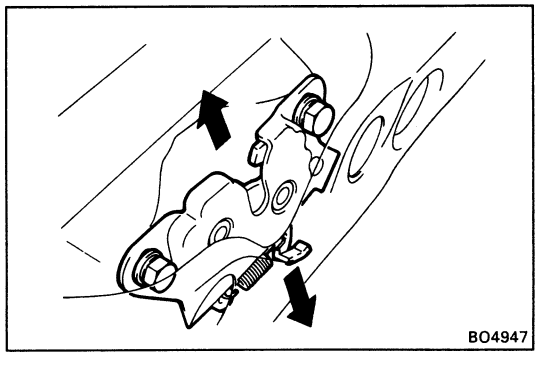
ADJUSTMENT OF LUGGAGE COMPARTMENT DOOR

HINT: Since the centering bolt is used as the door hings set bolt, the door cannot be adjusted with it on. Substitute the bolt with the washer for the centering bolt.



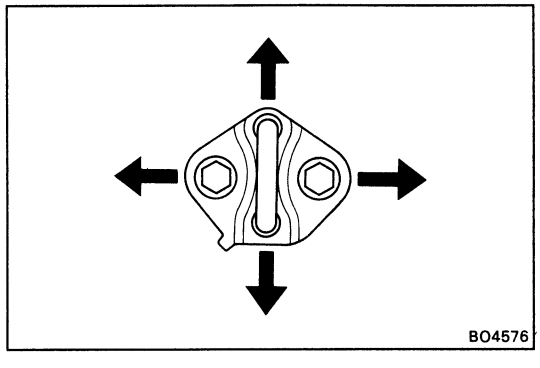
1. ADJUST DOOR IN FORWARD/REARWARD AND LEFT/RIGHT DIRECTIONS

Adjust the door by loosening the door side hinge bolts.



2. ADJUST LUGGAGE COMPARTMENT DOOR LOCK

Adjust the lock by loosening the bolts.

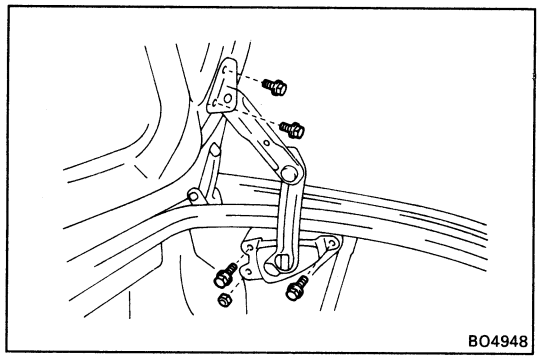


3. ADJUST DOOR LOCK STRIKER

(a) Check that the door fit and door lock are adjusted correctly.

(b) Loosen the striker mounting screws to adjust.

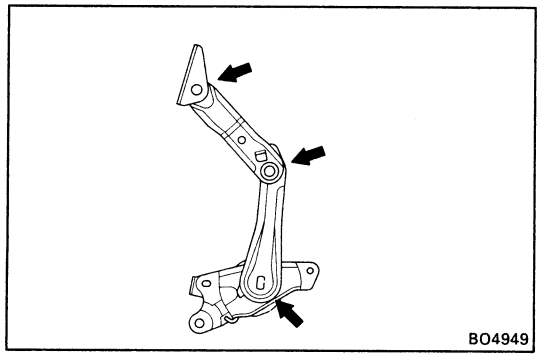
(c) Using a plastic hammer, tap the striker to adjust it.



REMOVAL OF LUGGAGE COMPARTMENT DOOR BALANCER

REMOVE LUGGAGE COMPARTMENT DOOR BALANCER

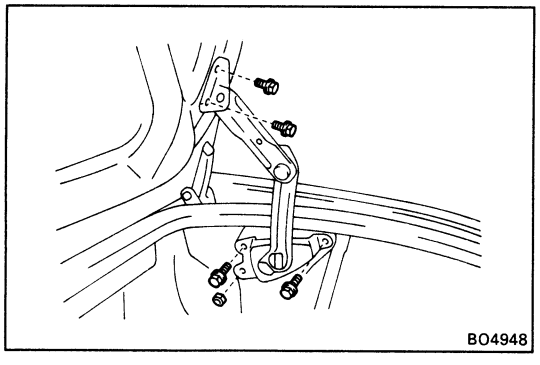
Remove four bolts, the nut and the balancer.



INSTALLATION OF LUGGAGE COMPARTMENT DOOR BALANCER

1. **BEFORE INSTALLING PARTS, COAT THEM WITH MP GREASE**

   (a) Apply MP grease to the sliding surface of the balancer.



2. **INSTALL LUGGAGE COMPARTMENT DOOR BALANCER**

   Install the balancer with four bolts and the nut.

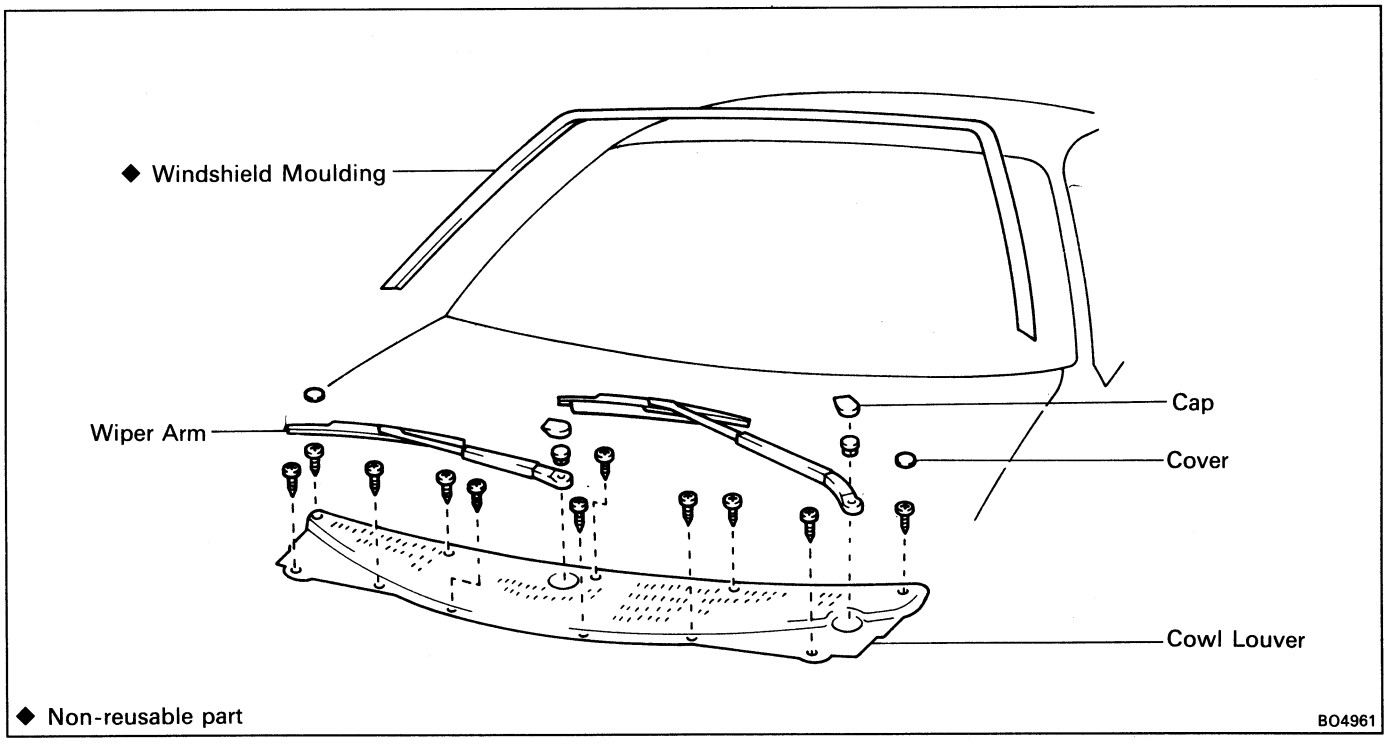
MOULDING

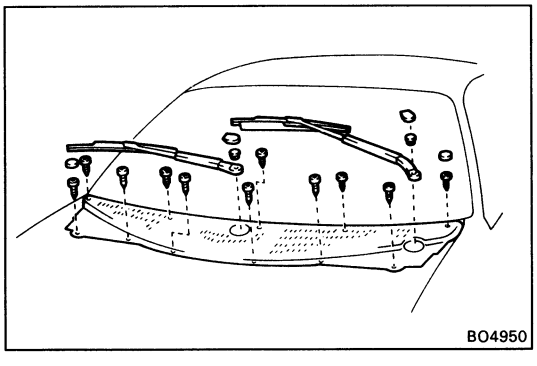
Windshield Moulding

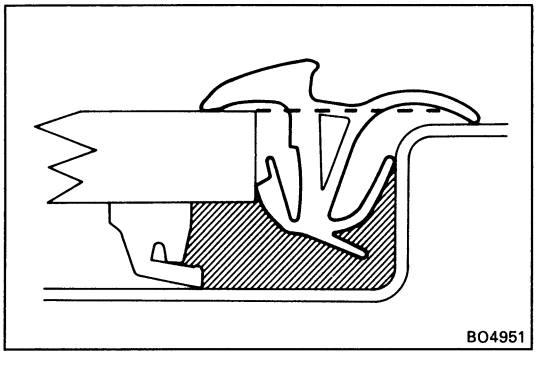
PREPARE ITEMS LISTED

Part Name	Part No.
Auto glass sealer (Three cement black)	08833-00030

COMPONENTS





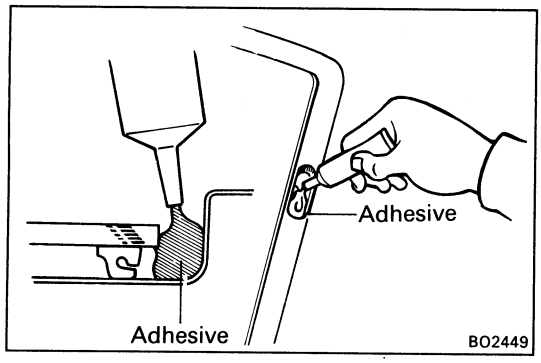


REMOVAL OF WINDSHIELD MOULDING

1. **REMOVE WIPER ARMS**
   (a) Remove two caps.
   (b) Remove two nuts and two wiper arms.

2. **REMOVE COWL LOUVER**
   (a) Remove two covers.
   (b) Remove eleven screws and the cowl louver.

3. **REMOVE WINDSHIELD MOULDING**
   Using a knife, cut off the moulding as shown.
   NOTICE: Do not damage the body with the knife.



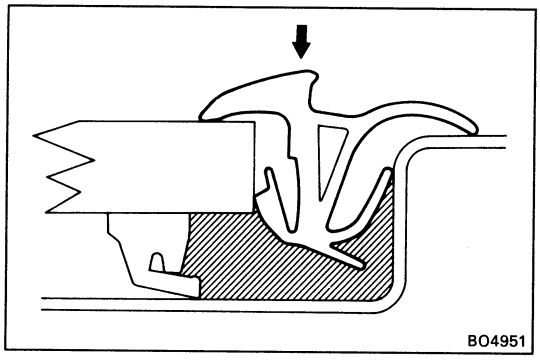
INSTALLATION OF WINDSHIELD MOULDING

(See page BO-24)

1. **CUT ADHESIVE AT MOULDING INSTALLATION AREA**

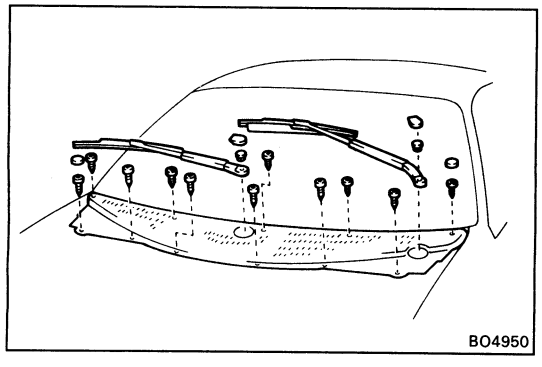
   Using the knife, cut off the adhesive around the moulding installation area.

2. **APPLY ADHESIVE AT MOULDING INSTALLATION AREA**



3. **INSTALL WINDSHIELD MOULDING**

   Place the moulding onto the body and tap it by hand.



4. **INSTALL COWL LOUVER**
   (a) Install the cowl louver with eleven screws.
   (b) Install two covers.

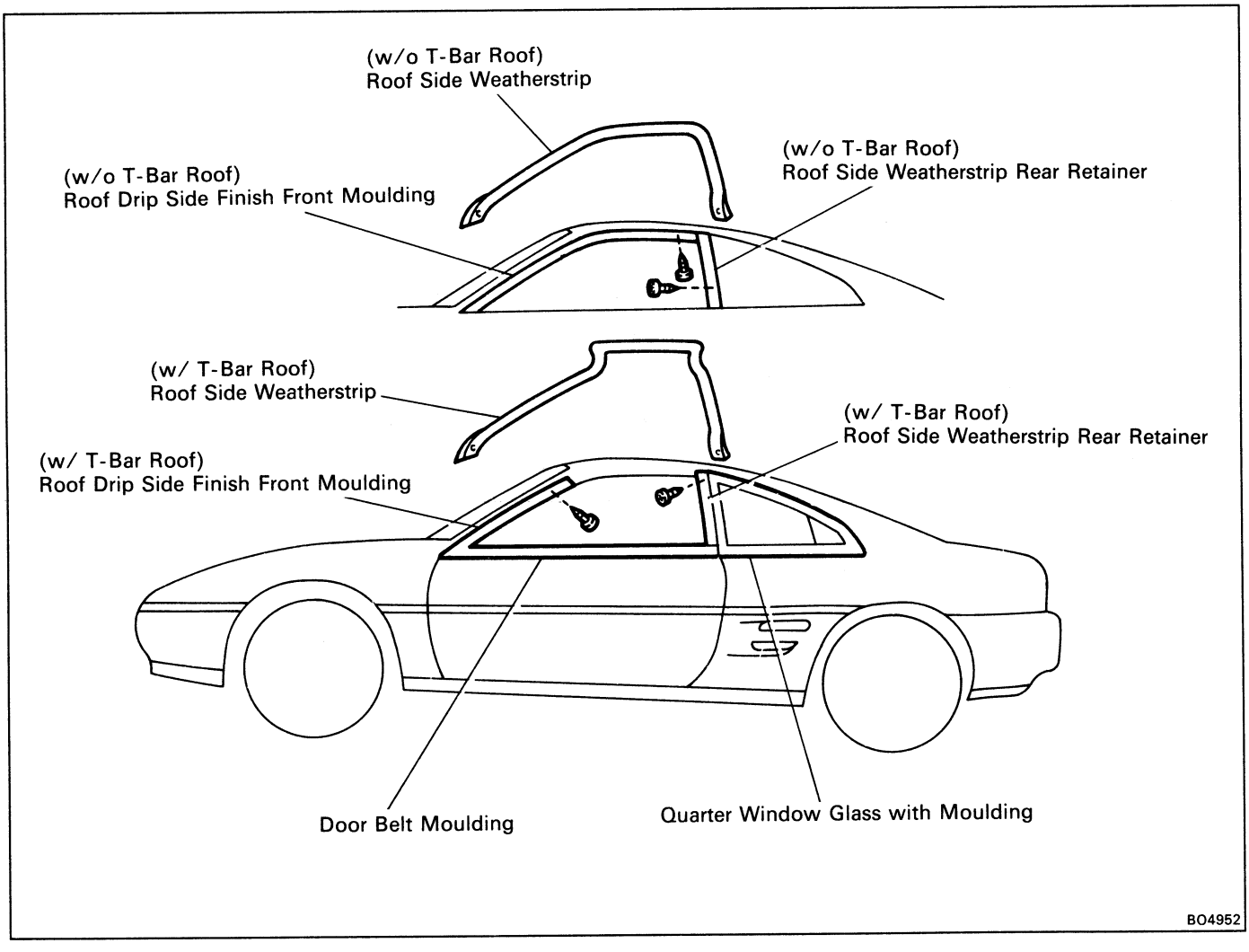
5. **INSTALL WIPER ARMS**
   (a) Install two wiper arms with two nuts.
   (b) install two caps.

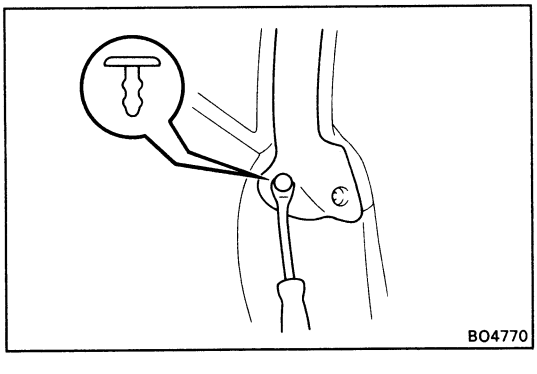
Body Outside Moulding

PREPARE ITEMS LISTED

Part Name and No.	Contents of Set
Butyl tape set (08850-00065)	Butyl tape 9 mm dia. x 2,500 mm (0.35 x 98.43 in.) Primer 5 cc (0.17 fl.oz.) Sponge (for applying primer) Piano wire 1 mm dia. x 600 mm (0.04 x 23.62 in.) (for slicing off glass)
Materials required	Cleaner (for cleaning adhering surfaces)

COMPONENTS

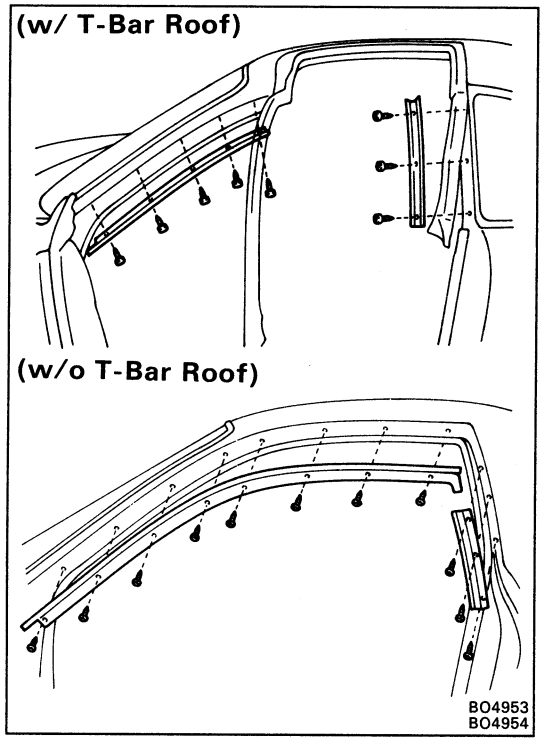




Roof Drip Moulding

REMOVAL

1. **REMOVE ROOF SIDE WEATHERSTRIP**
   (a) Using the clip remover, remove four clips from the weatherstrip.
   (b) Remove the weatherstrip from the moulding and the retainer.



2. **REMOVE ROOF DRIP SIDE FINISH FRONT MOULDING**

(w/ T-Bar Roof)
Remove four screws and the moulding.

(w/o T-Bar Roof)
Remove eight screws and the moulding.

3. **REMOVE ROOF SIDE WEATHERSTRIP REAR RETAINER**

Remove three screws and the retainer

INSTALLATION

1. **INSTALL ROOF SIDE WEATHERSTRIP REAR RETAINER**

Install the retainer with three screws.

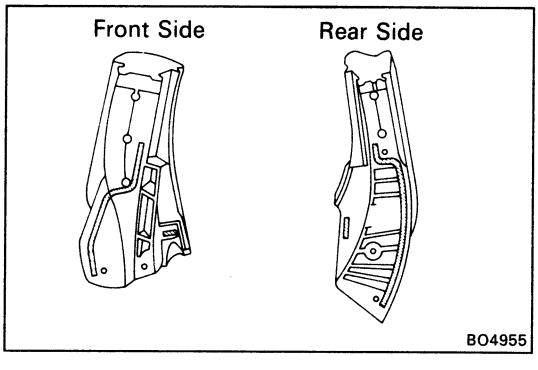
2. **INSTALL ROOF DRIP SIDE FINISH FRONT MOULDING**

(w/ T-Bar Roof)
Install the moulding with four screws.

(w/o T-Bar Roof)
Install the moulding with eight screws.

3. **CLEAN BODY**

Wipe off any adhesive left on the body with cleaner.

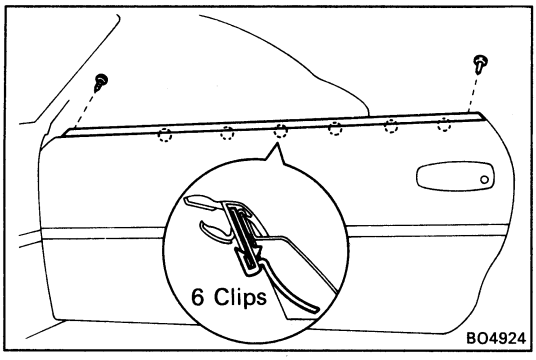


4. **INSTALL ROOF SIDE WEATHERSTRIP**

(a) Install the seal to the weatherstrip as shown.

(b) Install the weatherstrip to the moulding and the retainer.

(c) Install four clips.



Door Belt Moulding

REMOVAL

1. **REMOVE FRONT DOOR COMPONENT PARTS:**
   (See steps 1, 2, 3, 4, 5, 6, 11, 12 and 14 on pages BO-10 to 13)
2. **REMOVE DOOR BELT MOULDING**
   (See step 15 on page BO-13)

INSTALLATION

1. **INSTALL DOOR BELT MOULDING**
   (See step 12 on page BO-17)
2. **INSTALL FRONT DOOR COMPONENT PARTS:**
   (See steps 13, 15, 16, 24, 25, 26, 27, 28 and 29 on pages BO-17 to 21)

Quarter Window Glass with Moulding

REMOVAL

(See steps 1 to 10 on pages BO-42 to 43)

INSTALLATION

(See steps 1 to 12 on pages BO-43 to 44)

Side Protection Moulding

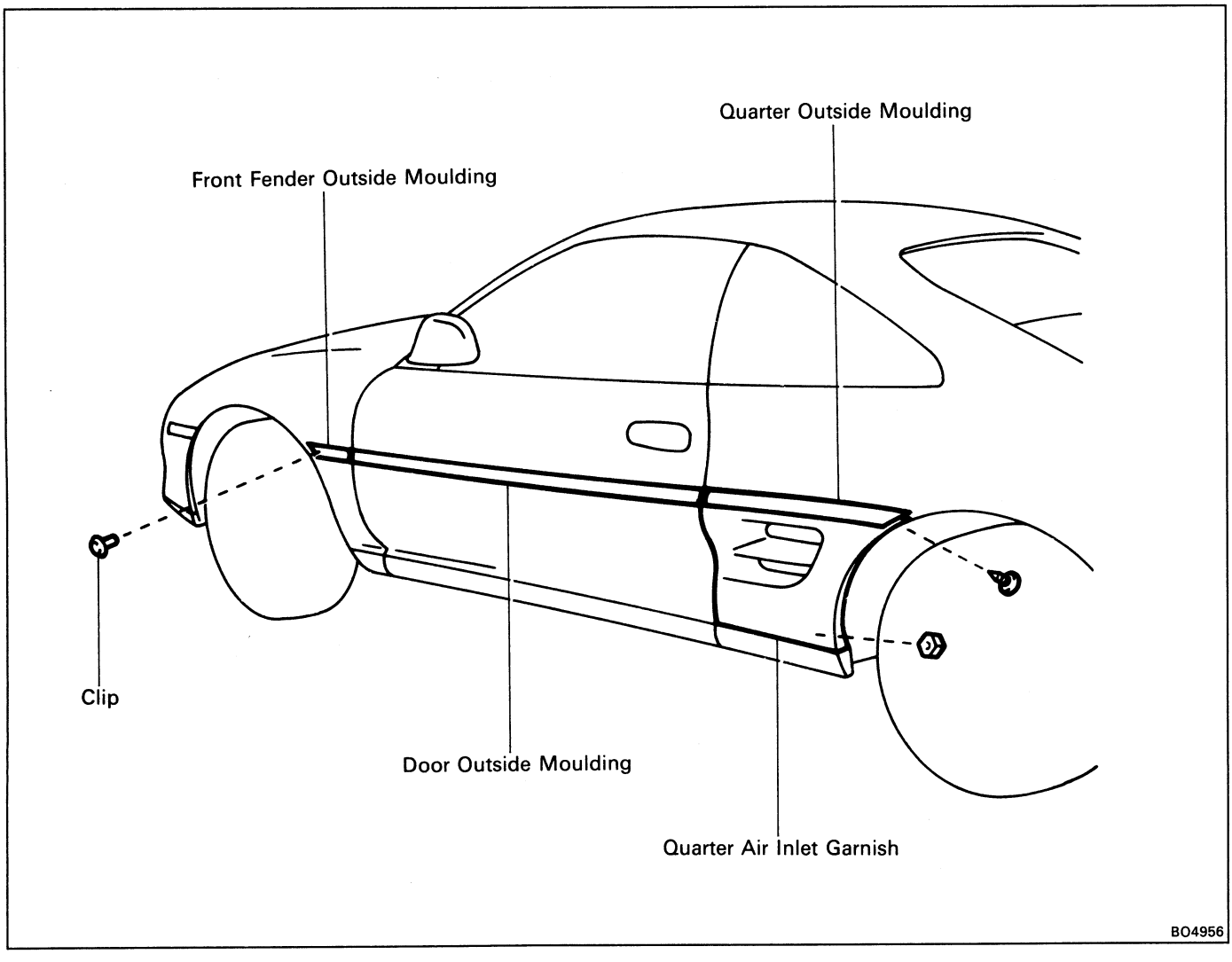
PREPARE ITEMS LISTED

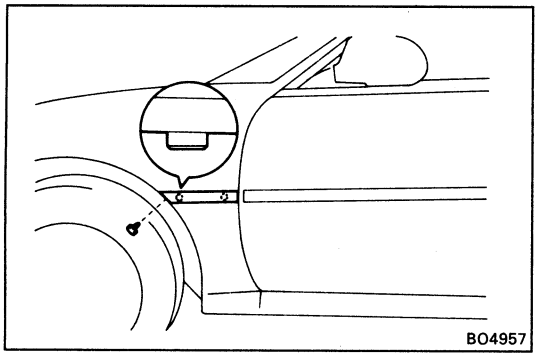
Part No.	Part name	Quantity
08850-00051	Adhesive (Super special) 20g (0.71 oz.)	1
	Cleaner (for cleaning body and removing body oil stains) Heat light	

Precautions for storing moulding material:

- Store in cool place, avoiding 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 and adhesive are limited to about 9 months.

COMPONENTS





REMOVAL OF SIDE PROTECTION MOULDING

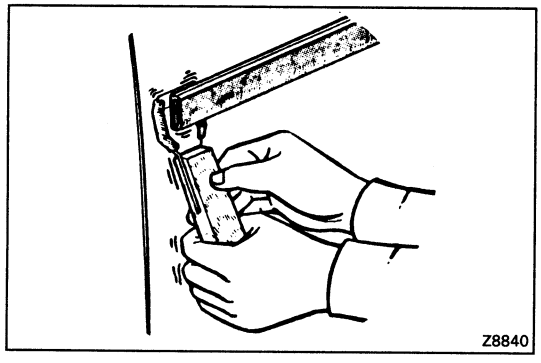
(See page BO-29)

1. REMOVE FRONT FENDER OUTSIDE MOULDING

(a) Using the clip remover, remove the clip from the moulding.

(b) Pull off the moulding by cutting the adhesive with a knife.

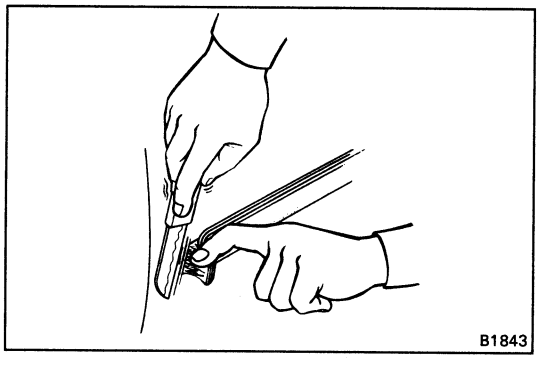
(See step 3 on page BO-30)



2. REMOVE ENDS OF MOULDING

Using a scraper, pry the moulding loose about 30 mm (1.18 in.) from the ends.

HINT: Tape the scraper tip before use.



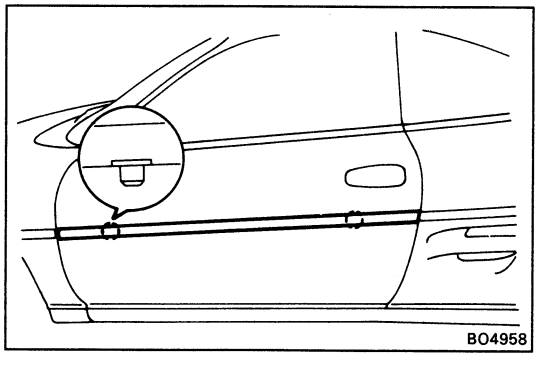
3. REMOVE MOULDING AND ADHESIVE

(a) Pull off the moulding by cutting the adhesive with a knife.

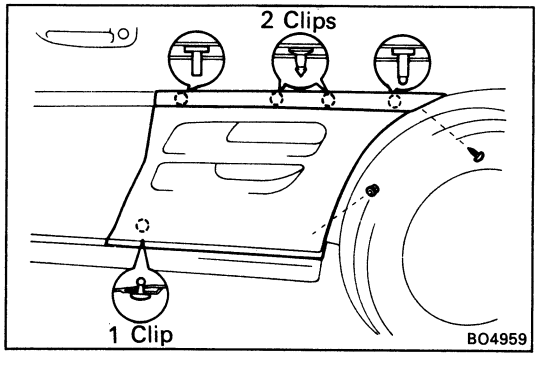
(b) Scrape off adhesive from the body with a cutter of sandpaper.

NOTICE:

- **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 moulding.**



4. REMOVE DOOR OUTSIDE MOULDING



5. REMOVE QUARTER OUTSIDE MOULDING

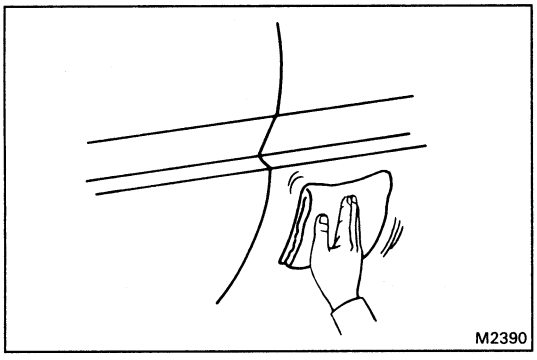
Remove the screw and the moulding.

6. REMOVE QUARTER AIR INLET GARNISH

(a) Remove the nut.

(b) Insert the screwdriver between the garnish and the panel to pry out, and remove it.

HINT: Tape the screwdriver tip before use.

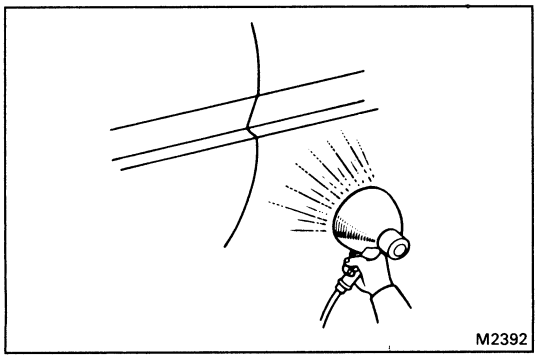

M2390

INSTALLATION OF SIDE PROTECTION MOULDING

(See page BO-29)

1. CLEAN MOULDING MOUNTING SURFACE

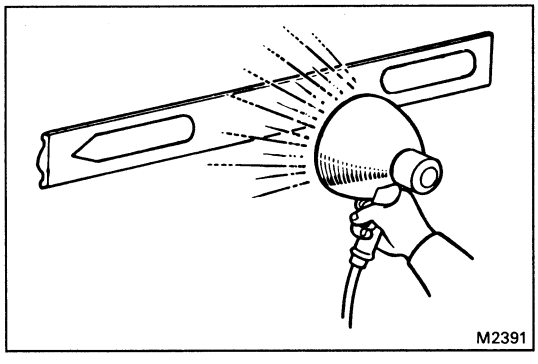
Wipe off stains with cleaner.


M2392

2. HEAT BODY MOUNTING SURFACE

Using a heat light, heat the body mounting surface to 30 – 50°C (86 – 122°F).

NOTICE: When the moulding is installed, the temperature of the mounting surface should be 20°C (68°F) or higher.

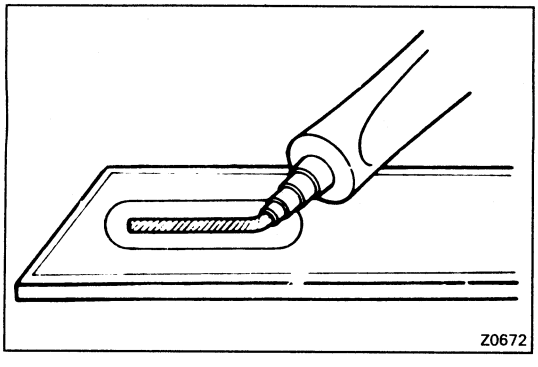

M2391

3. HEAT MOULDING

Using a heat light, heat the moulding to 30 – 60°C (86 – 140°F).

NOTICE: Do not heat moulding excessively.

The temperature should not be higher than 80°C (176°F).


Z0672

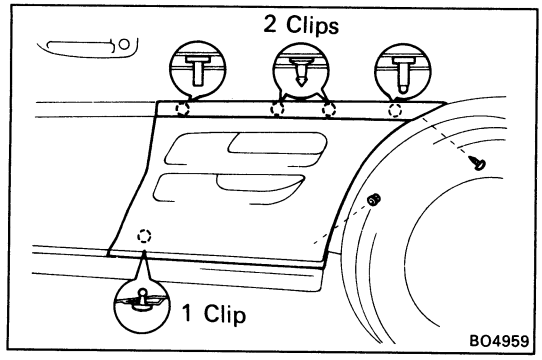
4. APPLY ADHESIVE TO DOOR OUTSIDE MOULDING

Apply adhesive to both punched out ends of the moulding.

NOTICE: Install the moulding within 7 minutes after applying the adhesive.

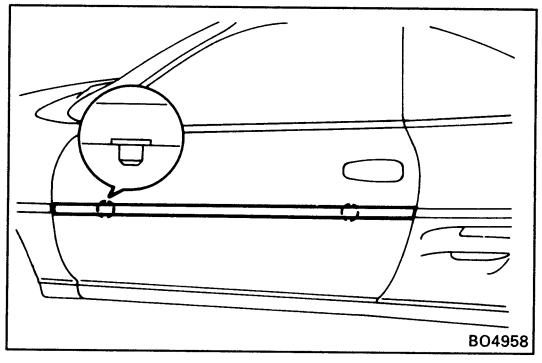
5. LIFT MOULDING RELEASE SHEET FROM FACE OF MOULDING

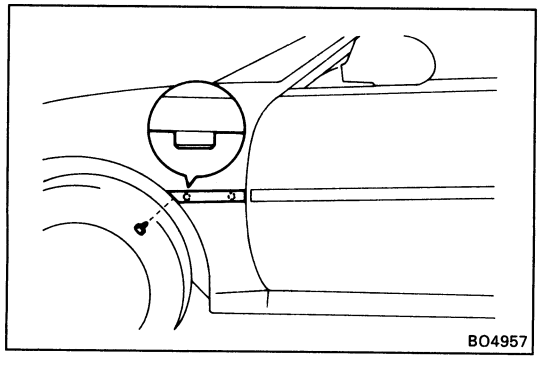
NOTICE: When the moulding release sheet is removed, be sure that no dirt or dust can get onto the uncoated area.



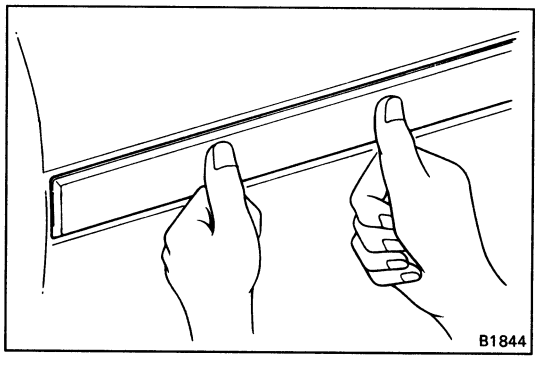
6. **INSTALL QUARTER AIR INLET GARNISH**
   (a) Tap the garnish and fix it in place with the clip.
   (b) Install the nut.

7. **INSTALL MOULDING ALONG BODY PRESS LINE**
   (a) Align the bosses on the moulding with the body holes, and push the moulding to the body.
   (b) Install the screw to the quarter outside moulding.





(c) Install the clip to the front fender outside moulding.

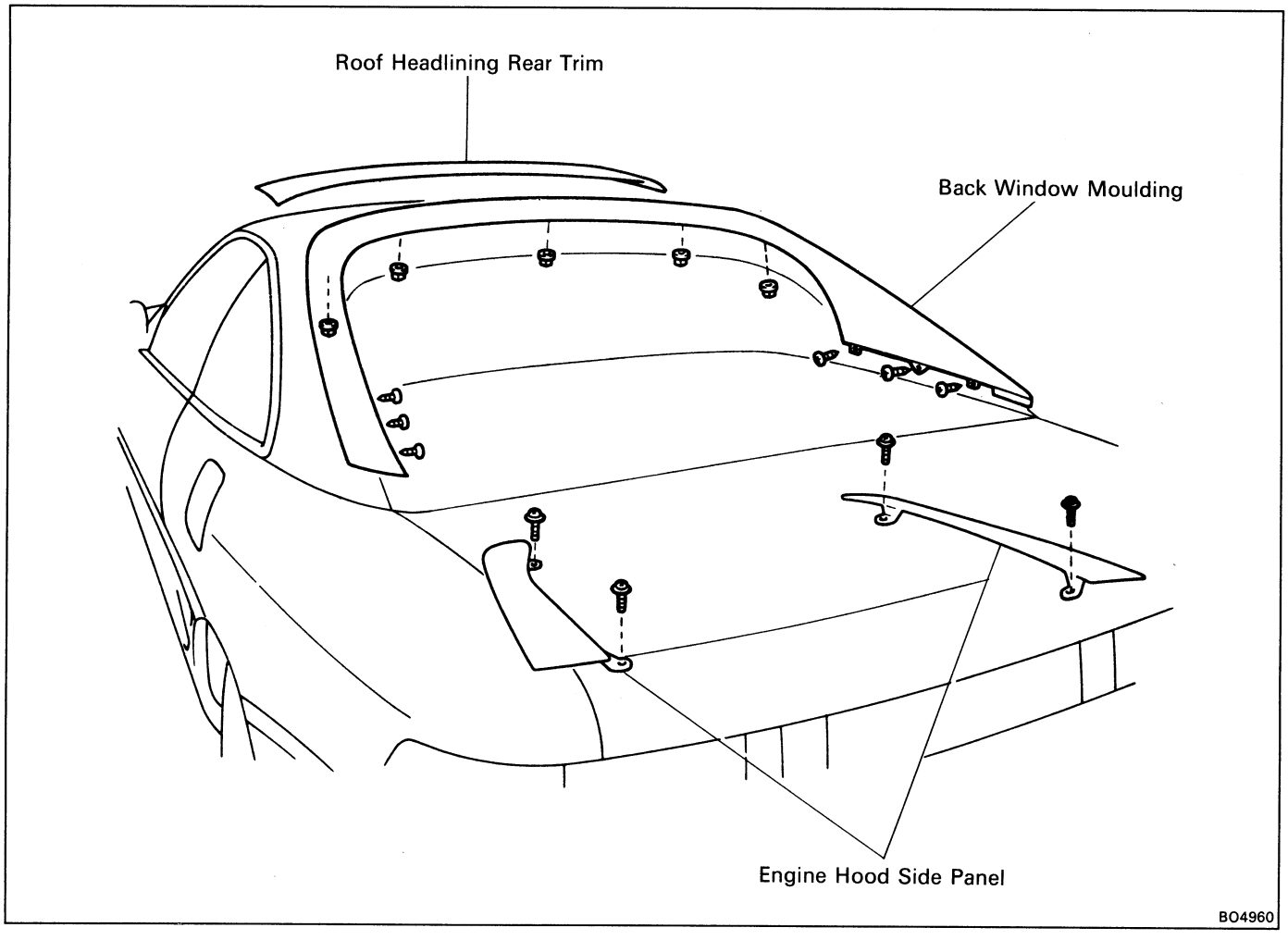


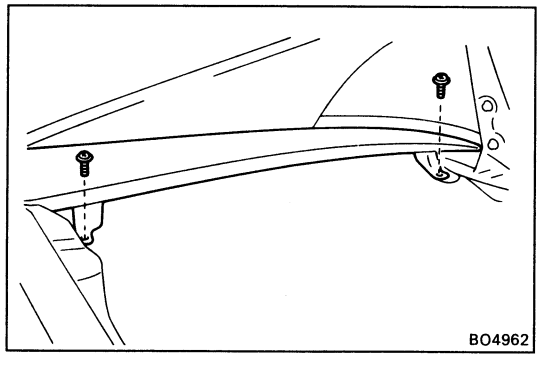
NOTICE:

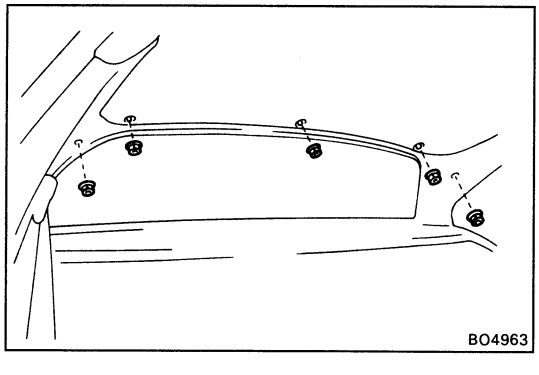
- **Be sure that the body and moulding are heated to the proper temperature.**
- **Do not depress the adhesive-coated parts excessively just hold them down with your thumb.**
- **Scrape off any overflowing adhesive with a plastic spatula and clean the surface with a dry rang.**
- **After installation, do not wash the vehicle for 24 hours.**

Back Window Moulding

COMPONENTS





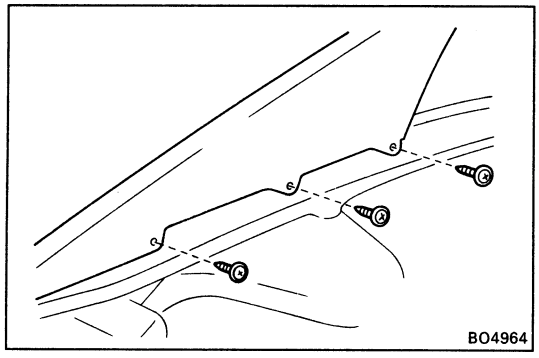


REMOVAL OF BACK WINDOW MOULDING

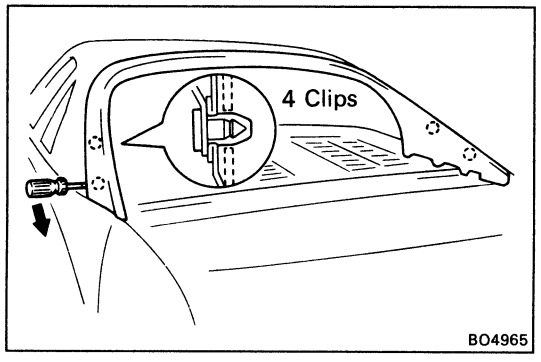
1. **REMOVE ENGINE HOOD SIDE PANELS**
   Remove four screws and two panels.

2. **REMOVE FOLLOWING PARTS**
   (See steps 1 to 6 on page BO-42)
   (a) Door scuff plate
   (b) Roof headlining rear trim
   (c) Room partition trim moulding
   (d) Quarter trim panel
   (e) Seat belt shoulder anchor
   (f) Roof side inner garnish

3. **REMOVE BACK WINDOW MOULDING**
   (a) Remove five nuts.



(b) Remove six screws.



(c) Insert the screwdriver between the moulding and the panel to pry out.

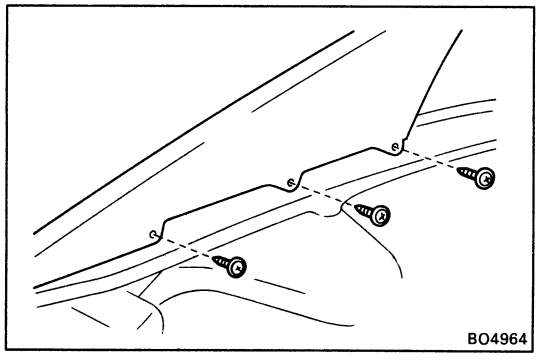
HINT: Tape the screwdriver tip before use.

(d) Pull the moulding upward to remove it.

NOTICE: Do not damage the body.

INSTALLATION OF BACK WINDOW MOULDING

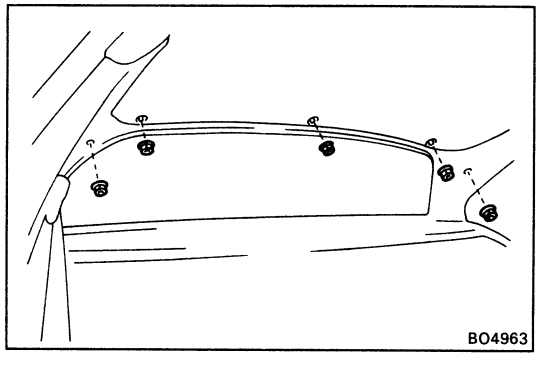
(See page BO-33)



1. INSTALL BACK WINDOW MOULDING

(a) Tap the moulding and, fix it in place with the clips.

(b) Install six screws.



(c) Install five nuts.

2. INSTALL FOLLOWING PARTS:

(a) Roof side inner garnish

(b) Seat belt shoulder anchor

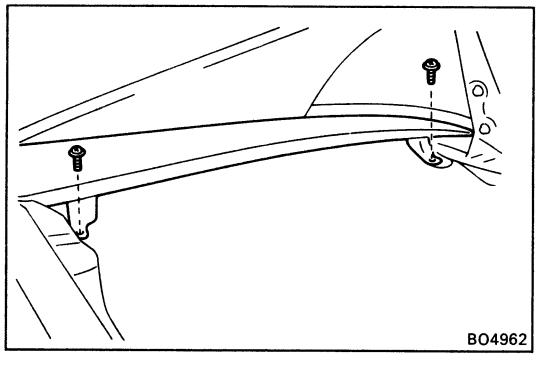
Torque: 440 kg/cm (32 ft-lb, 43N·m)

(c) Quarter trim panel

(d) Room partition trim moulding

(e) Roof headlining rear trim

(f) Door scuff plate



3. INSTALL ENGINE HOOD SIDE PANELS

Install two panels with four screws.

WINDSHIELD

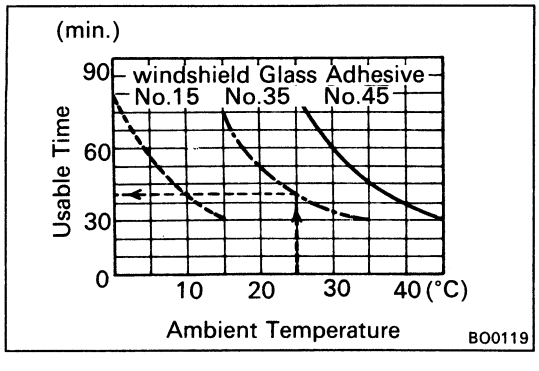
PREPARE ITEMS LISTED

Part name and No.	Contents of set	Quantity
Adhesive set 08850-00070 (0-15°C or 32-59°F) 08850-00080 (15-35°C or 59-95°F) 08850-00090 (35-45°C or 95-113°F)	Main agent 550g (17.64 oz.) Hardening agent 75g (2.65 oz.) Primer G (for glass) 20g (0.71 oz.) Primer M (for body) 20g (0.71 oz.) Sponge (for applying primer) Piano wire 0.6 mm dia. x 1 m (0.024 x 39.37 in.) Cartridge	1 ea. 1 ea. 1 ea. 1 ea. 2 ea. 1 ea. 1 set.
Dam kit 04562-12010	Dam Double stick tape (for sticking on dam)	
	Sealant gun (for applying adhesive) Glass or steel sheet (for mixing adhesive) Putty spatula (for mixing adhesive and correcting adhered parts) Cleaner (for cleaning adhering surface)	

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

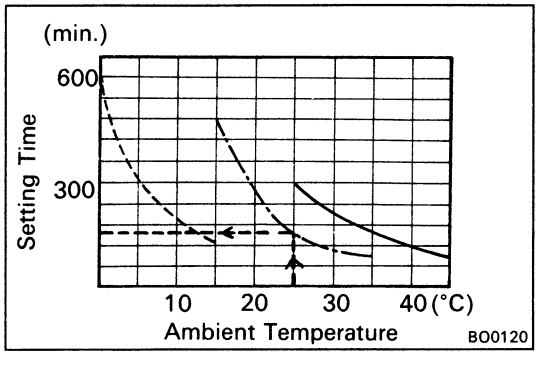
Using an adhesive set suitable for the ambient temperature.



2. CHECK ADHESIVE USABLE TIME

After the mixing main and hardening agents, finish glass installation within the specified time as shown.

Example: For glass installation in an ambient temperature of 25°C (77°F), apply adhesive set No. 35 within 45 minutes.



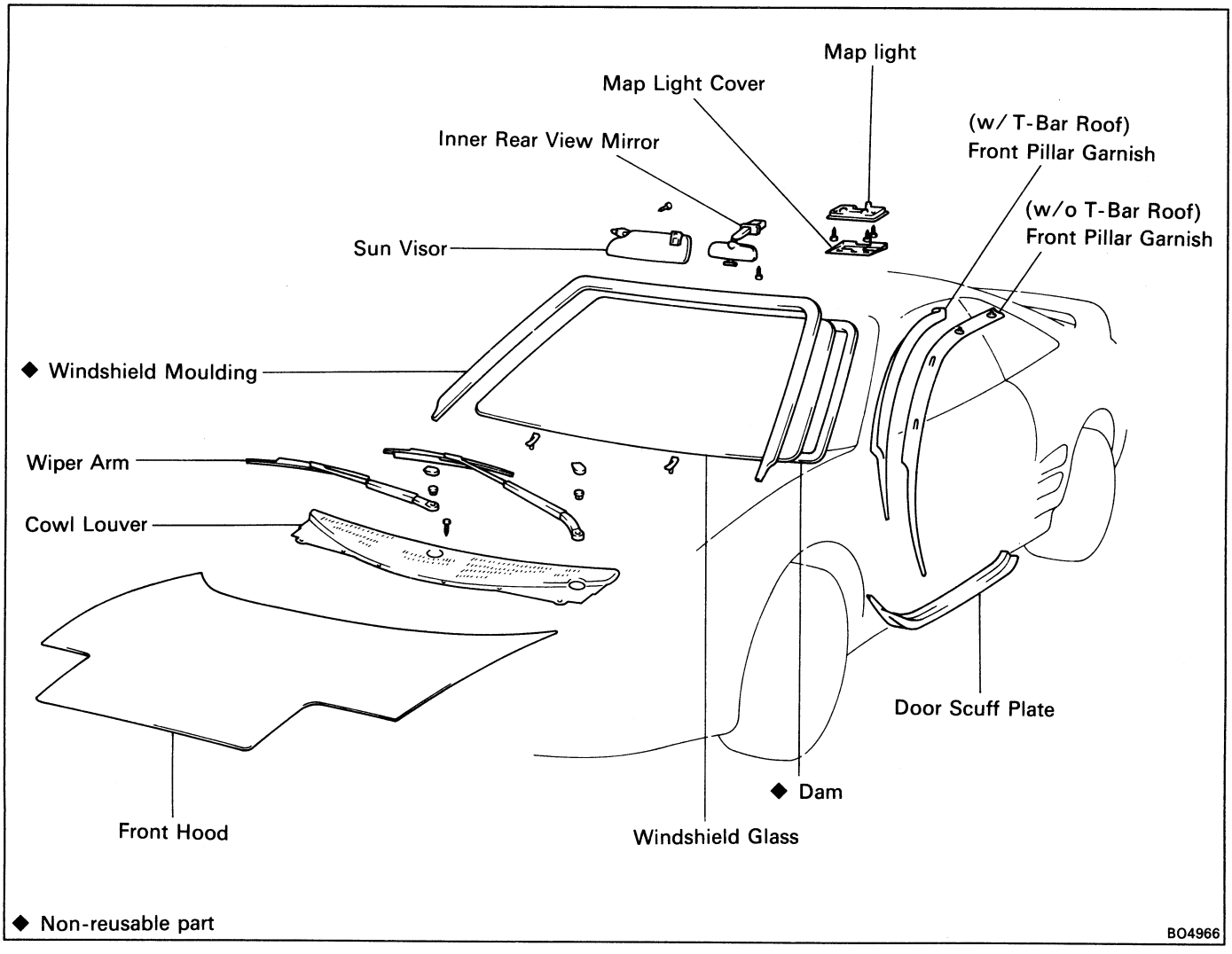
3. CHECK ADHESIVE HARDENING TIME

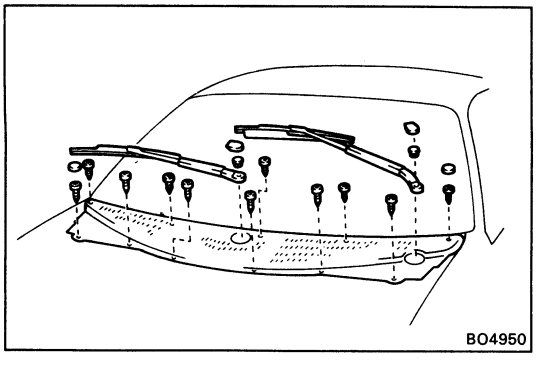
After main and hardening agents are mixed, leak tests should be made only after the hardening time has elapsed.

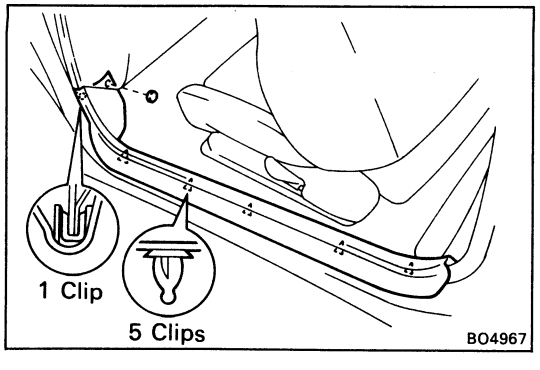
Example: The hardening time for adhesive set No. 35 with an ambient temperature of 25°C (77°F) is 2.5 hours.

NOTICE: Do not drive the vehicle until at least double the hardening time has elapsed.

COMPONENTS

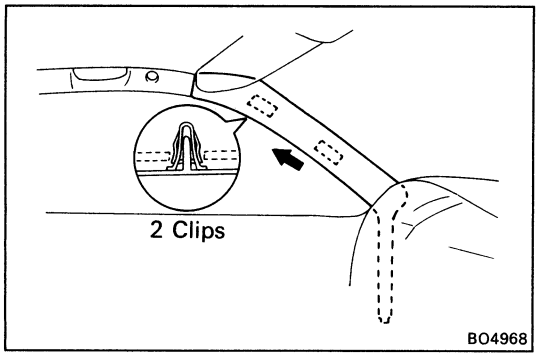




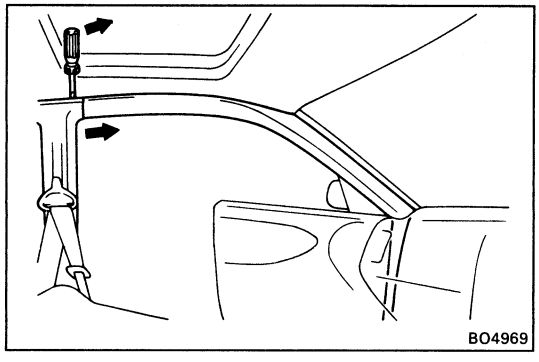


REMOVAL OF WINDSHIELD

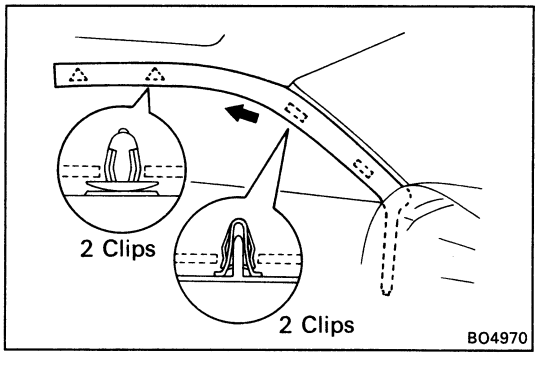
1. **REMOVE FRONT HOOD**
2. **REMOVE WIPER ARMS**
   (a) Remove two caps.
   (b) Remove two nuts and two wiper arms.
3. **REMOVE COWL LOUVER**
   (a) Remove two covers.
   (b) Remove eleven screws and the cowl louver.
4. **REMOVE DOOR SCUFF PLATE**
   (a) Remove the cap.
   (b) Remove the scuff plate by pulling.



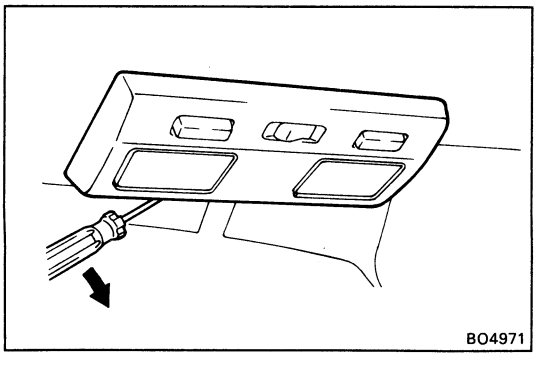
5. **REMOVE FRONT PILLAR GARNISH**
(w/ T-Bar Roof)
(a) Remove the removable roof.
(b) Remove the clips by your hand.
(c) Pull the garnish rearwards to remove it.



(w/o T-Bar Roof)
(a) Pull out the garnish from the roof side inner garnish.



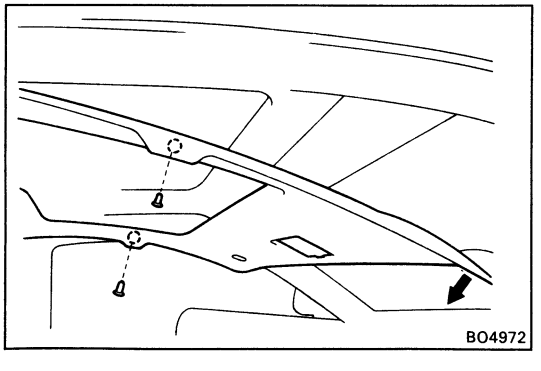
(b) Remove the clips by your hand.
(c) Pull the garnish rearwards to remove it.



6. **REMOVE MAP LIGHT COVER**
Using the screwdriver, remove the cover.
HINT: Tape the screwdriver tip before use.

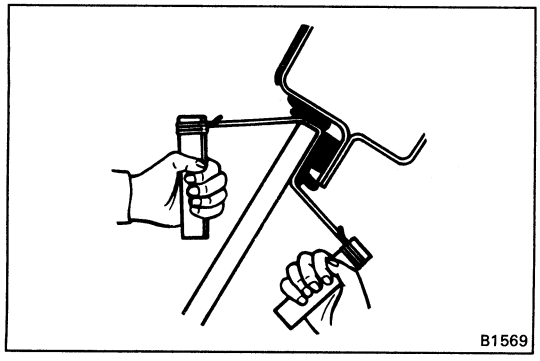
7. **REMOVE MAP LIGHT**
Remove three screws and the light.

8. **REMOVE FOLLOWING PARTS:**
- Inner rear view mirror
- Sun visors and holders



9. **PULL DOWN FRONT SIDE OF ROOF HEADLINING**
(a) Remove two clips.
(b) Pull down the headlining by hand.
NOTICE: Do not damage the roof headlining.

10. **REMOVE WINDSHIELD MOULDING**
(See step 3 on page BO-24)

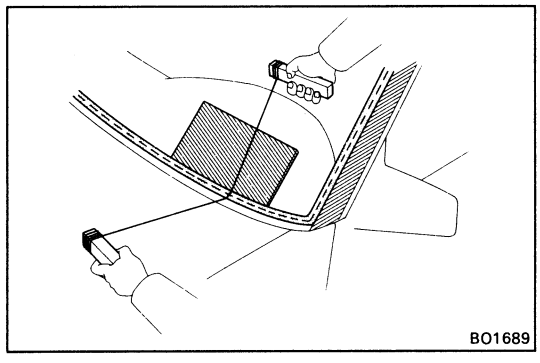


11. REMOVE WINDSHIELD GLASS

(a) Push piano wire through from the interior.

(b) Tie both wire ends to a wooden block or like object.

HINT: Apply adhesive tape to the outer surface to keep the surface from being scratched.



NOTICE: When separating, take care not to damage the paint and interior and exterior ornaments.

To prevent scratching the safety pad when removing the windshield, place a plastic sheet between the piano wire and safety pad.

(c) Cut the adhesive by pulling the piano wire around it.

(d) Remove the glass.

NOTICE: Leave as much of the urethane layer on the body as possible when cutting off the glass.

INSTALLATION OF WINDSHIELD

1. CLEAN AND SHAPE CONTACT SURFACE OF BODY

(a) Remove the retainers.

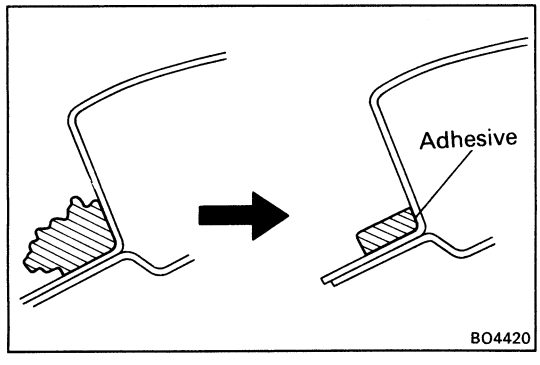
(b) Remove any dam remaining on the body.

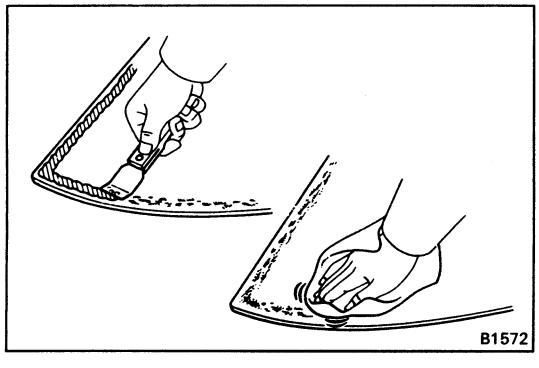
(c) Cut away any rough areas with a knife.

HINT: Leave as much of the urethane layer on the body as possible.

(d) Clean the cutting surface of the urethane gum with a piece of shop rag saturated in cleaner.

HINT: Even if all the urethane has been removed, clean the body.



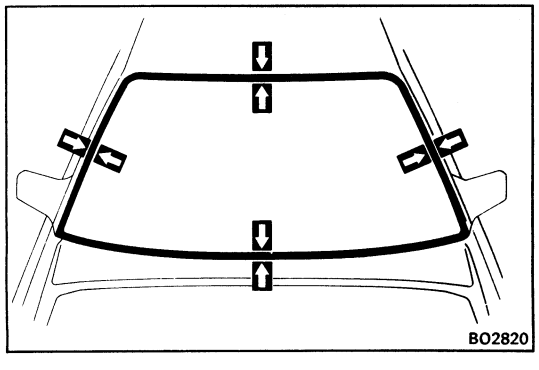


2. CLEAN REMOVED GLASS BEFORE INSTALLATION

(a) Using a scraper, remove the urethane gum sticking to the glass.

(b) Clean the glass with cleaner.

NOTICE: Do not touch the glass after cleaning it.



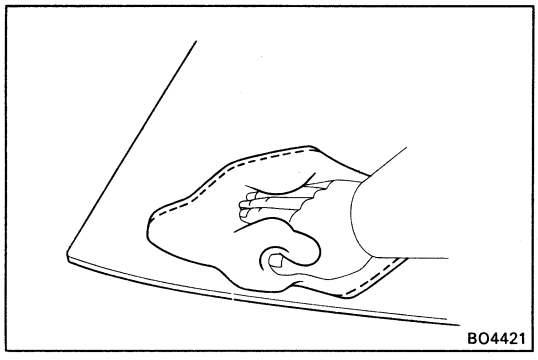
3. POSITION GLASS

(a) Place glass in correct position.

(b) Check that all contacting parts of the glass rim are perfectly even and do not make contact with the fasteners.

(c) Place reference marks between the glass and body.

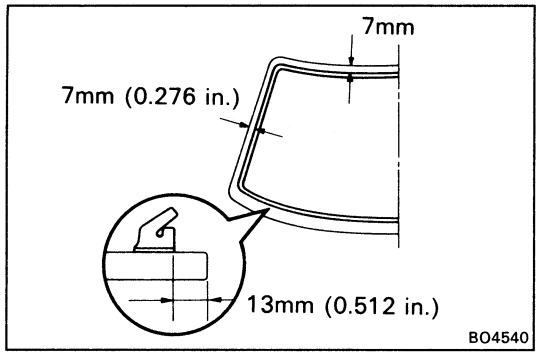
(d) Remove the glass.



4. CLEAN CONTACT SURFACE GLASS

Using cleaner, clean the contact surface black-colored area around the entire glass rim.

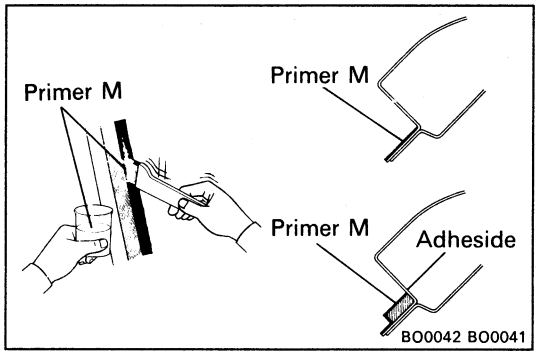
NOTICE: Do not touch the glass face after cleaning it.



5. INSTALL DAM

Install the dam with double-stick tape as shown in the drawing.

NOTICE: Do not touch the glass face after cleaning it.

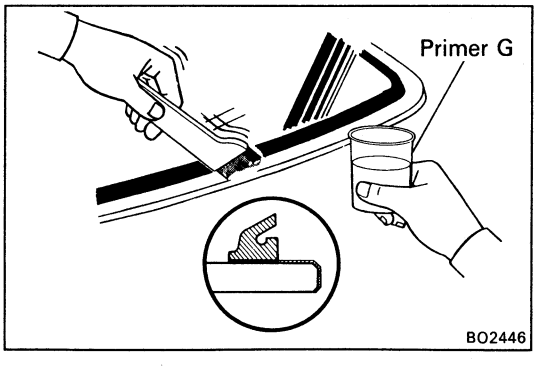


6. COAT CONTACT SURFACE OF BODY WITH PRIMER "M"

Using a brush, coat the contact surface on the body with Primer M.

NOTICE:

- **Let 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 the urethane to the glass or body.**
- **Do not keep any of the opened Primer M and G for later use.**

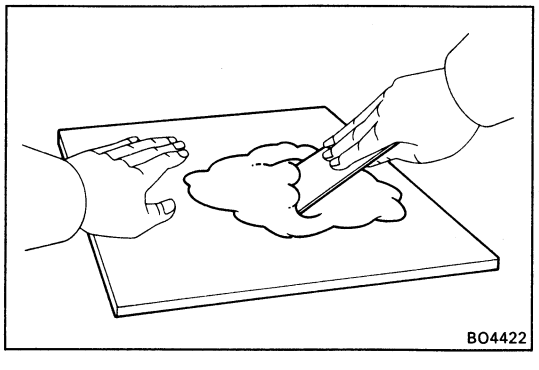


7. COAT CONTACT SURFACE OF GLASS WITH PRIMER "G"

(a) Using a brush or sponge, coat the edge of the glass and the contact surface with Primer G.

(b) Before the Primer dries, wipe it off with a clean cloth.

NOTICE: Be sure that installation of the glass is finished within 70 minutes.



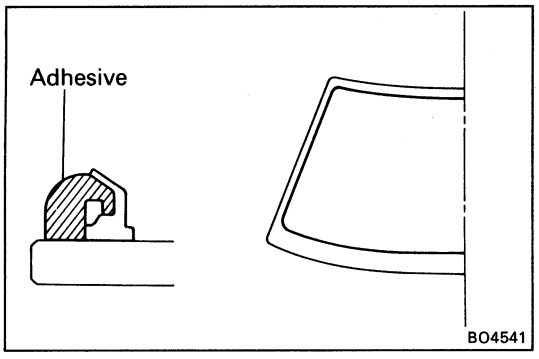
8. MIX ADHESIVE COATING

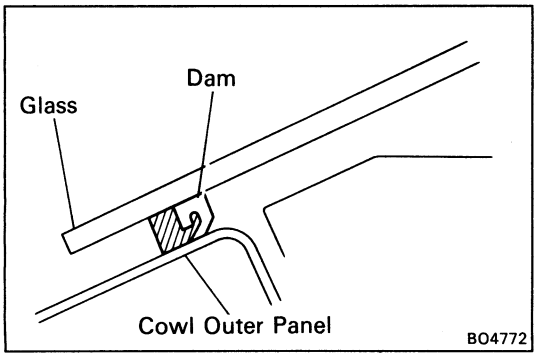
NOTICE:

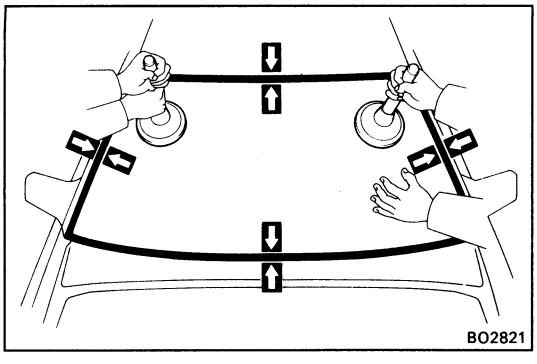
- **Be sure that installation of the glass is finished within usable time. (See step 2 on page BO-35)**
- **The mixture should be made in 5 minutes or less.**

(a) Thoroughly clean the glass plate and putty spatula with solvent.

(b) Thoroughly mix 500g (17.64 oz.) of the main agent and 75g (2.65 oz.) of the hardening agent on a glass plate or like object with a putty spatula.







9. 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 remains on body
3.5 – 5.0 mm (0.138 – 0.197 in.)

If no adhesive remains on body
8 – 10 mm (0.31 – 0.39 in.)

10. INSTALL GLASS

HINT: Confirm that the dam is attached the body panel as shown in the drawing.

(a) Position the glass so that the reference marks are lined up, 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.

11. INSPECT FOR LEAKS AND REPAIR

(a) Perform a leak test after the hardening time has elapsed.

(b) Seal any leaks with auto glass sealer.

Part No. 08833-00030 or equivalent

12. INSTALL FOLLOWING PARTS:

- Windshield moulding (See page BO-25)
- Front side of roof headlining
- Inner rear view mirror, sun visors and holders
- Map light and map light cover
- Front pillar garnish and door scuff plate
- Cowl louver and wiper arms

13. INSTALL AND ADJUST FRONT HOOD (See page BO-6)

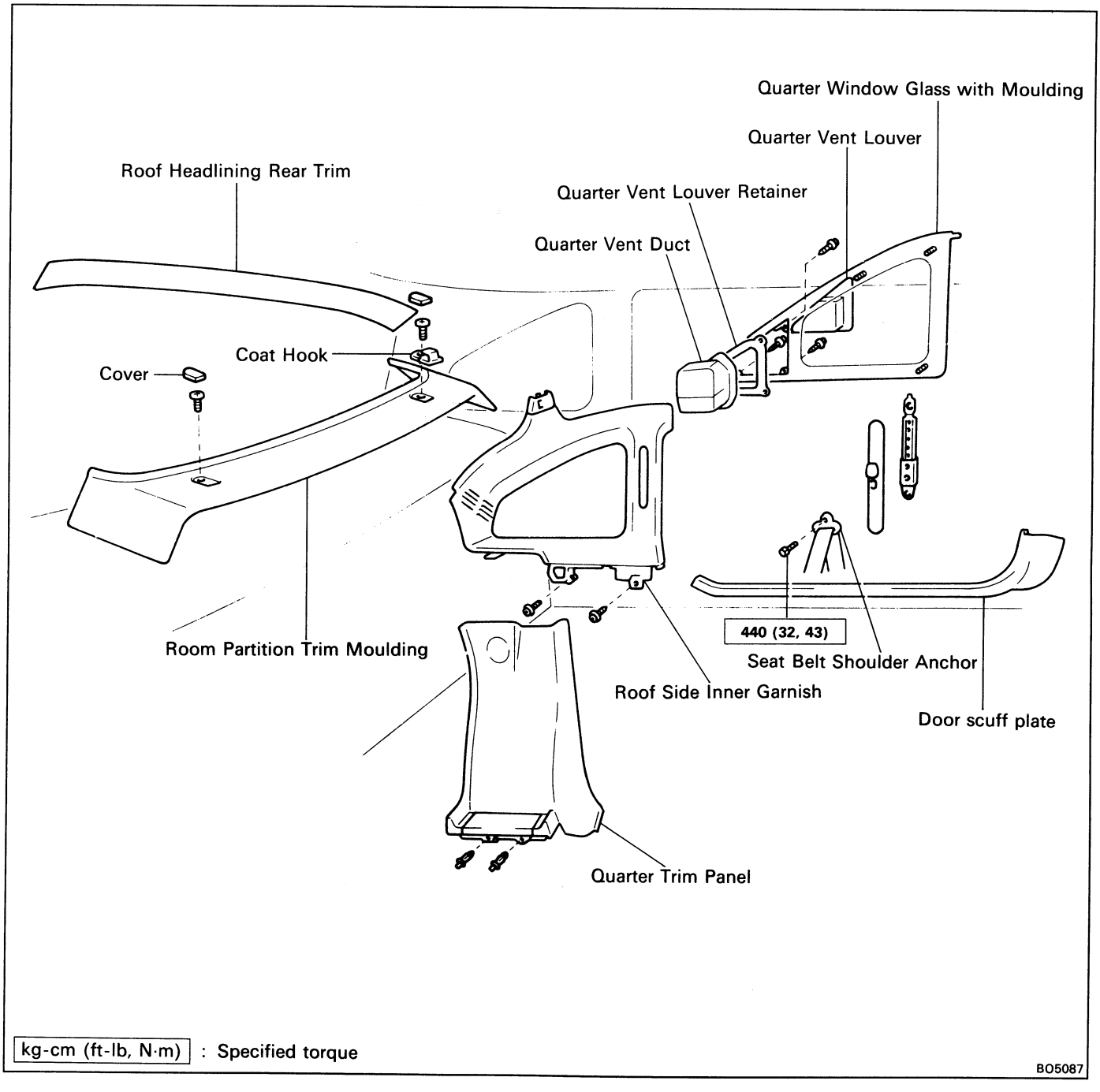
NOTICE: Wait at least twice the setting time before driving the car.

QUARTER WINDOW GLASS

PREPARE ITEMS LISTED

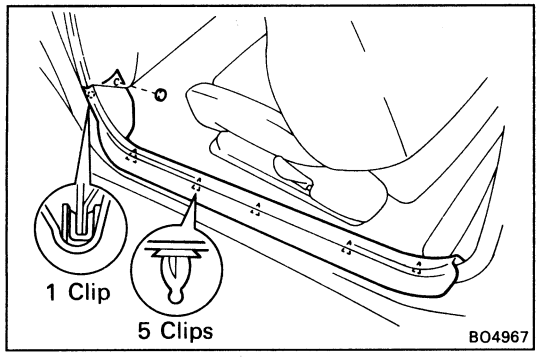
Part Name and No.	Contents of Set
Butyl tape set (08850-00065)	Butyl tape 9 mm dia. x 2,500 mm (0.35 x 98.43 in.) Primer 5 cc (0.17 fl.oz.) Sponge (for applying primer) Piano wire 1 mm dia. x 600 mm (0.04 x 23.62 in.) (for slicing off glass)
Materials required	Cleaner (for cleaning adhering surfaces)

COMPONENTS



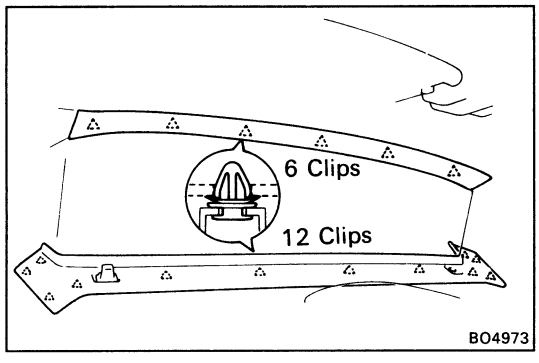
kg-cm (ft-lb, N·m) : Specified torque

BO5087



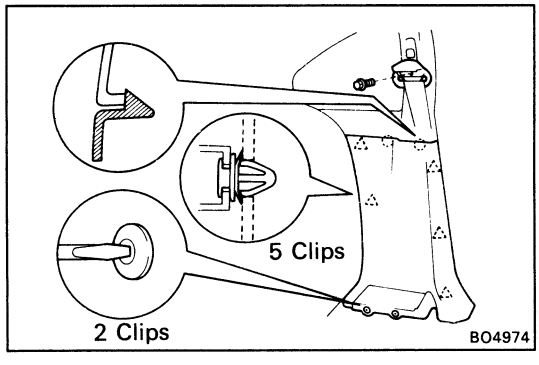
REMOVAL OF QUARTER WINDOW GLASS

1. **REMOVE DOOR SCUFF PLATE**
   (a) Remove the cap.
   (b) Remove the scuff plate by pulling.



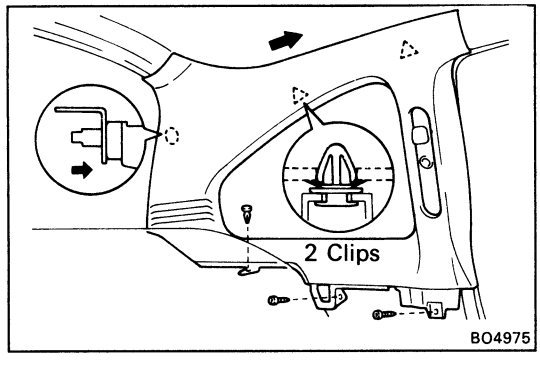
2. **REMOVE ROOF HEADLINING REAR TRIM**
   Remove the trim by pulling.

3. **REMOVE ROOM PARTITION TRIM MOULDING**
   (a) Remove two covers.
   (b) Remove two screws and the hook.
   (c) Remove the moulding by pulling.

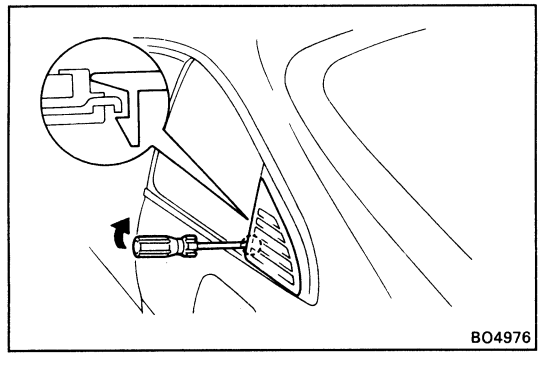


4. **REMOVE QUARTER TRIM PANEL**
   (a) Remove two clips.
   (b) Using the screwdriver, pry loose the clips.
   HINT: Tape the screwdriver tip before use.
   (c) Remove the quarter trim panel by pulling.

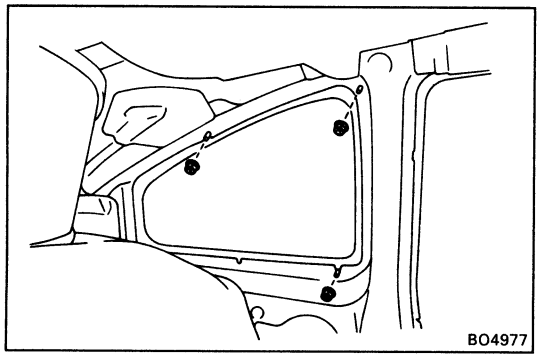
5. **REMOVE SEAT BELT SHOULDER ANCHOR**
   Remove the bolt and the shoulder anchor.



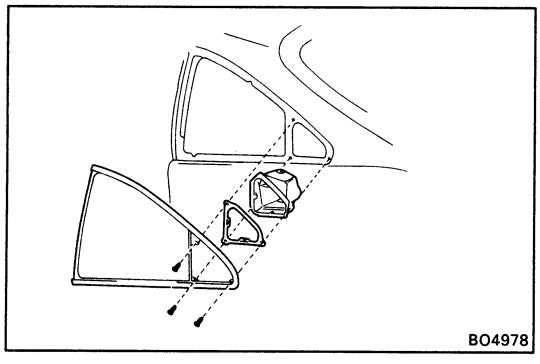
6. **REMOVE ROOF SIDE INNER GRANISH**
   (a) Remove the clip and two screws.
   (b) Using the screwdriver, pry loose the clips.
   HINT: Tape the screwdriver tip before use.
   (c) Pull the garnish forward to remove it.



7. **REMOVE QUARTER VENT LOUVER**
   Using the screwdriver, remove the louver.
   HINT: Tape the screwdriver tip before use.



8. **REMOVE QUARTER WINDOW GLASS WITH MOULDING**
   (a) Remove three nuts.



   (b) Remove three screws.
   (c) Using a knife, cut loose the adhesive.
   (d) Remove the glass with moulding.

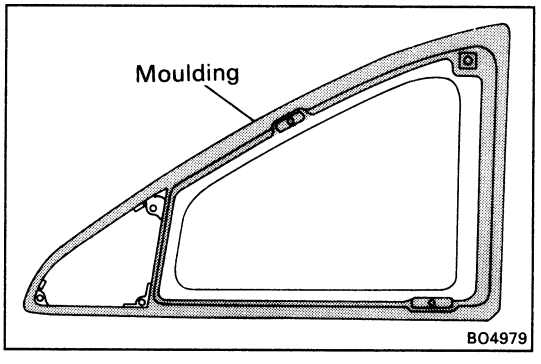
   NOTICE: Do not damage the body.

9. **REMOVE QUARTER VENT LOUVER RETAINER**

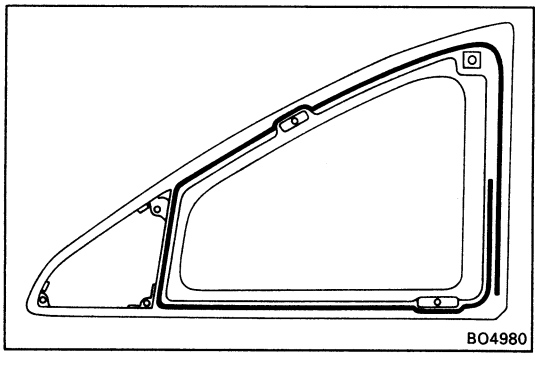
10. **REMOVE QUARTER VENT DUCT**

INSTALLATION OF QUARTER WINDOW GLASS

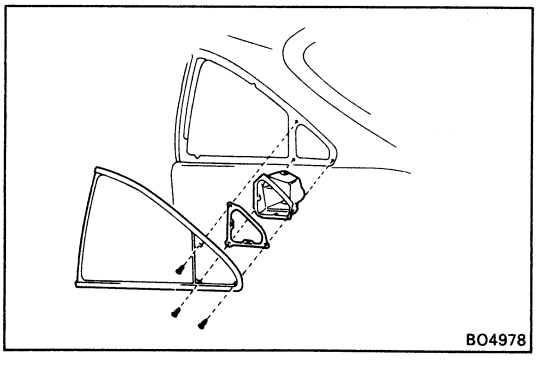
(See page BO-41)



1. **CLEAN BODY OR GLASS**
   Wipe off any adhesive left on the body or moulding with cleaner.



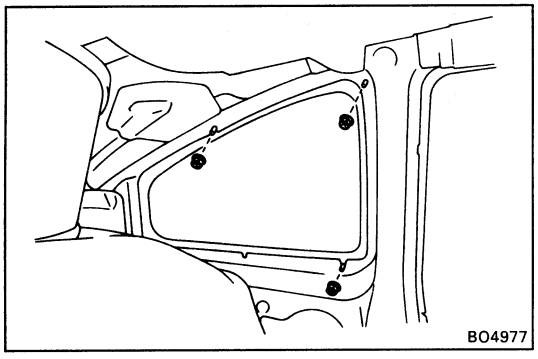
2. **APPLY ADHESIVE AT MOULDING INSTALLATION AREA**



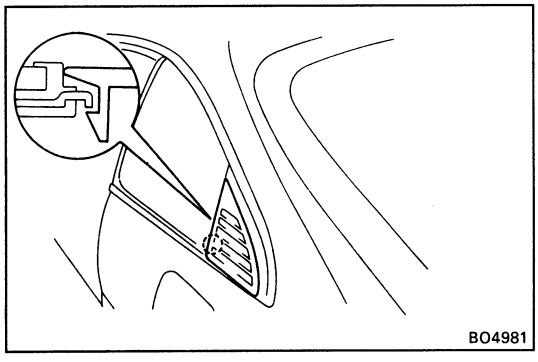
3. **INSTALL QUARTER VENT DUCT**

4. **INSTALL QUARTER VENT LOUVER RETAINER**

5. **INSTALL QUARTER WINDOW GLASS WITH MOULDING**
   (a) Install the glass with moulding to the body.
   (b) Install three screws.

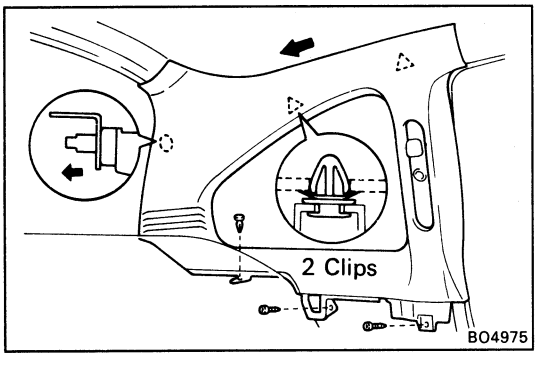


(c) Install three nuts.



6. INSTALL QUARTER VENT LOUVER

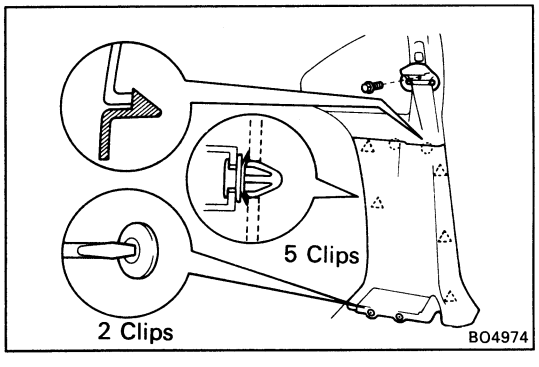
Push in the louver to install it.



7. INSTALL ROOF SIDE INNER GARNISH

(a) Slide the garnish rearward and tap the granish to install it.

(b) Install two screws and the clip.



8. INSTALL SEAT BELT SHOULDER ANCHOR

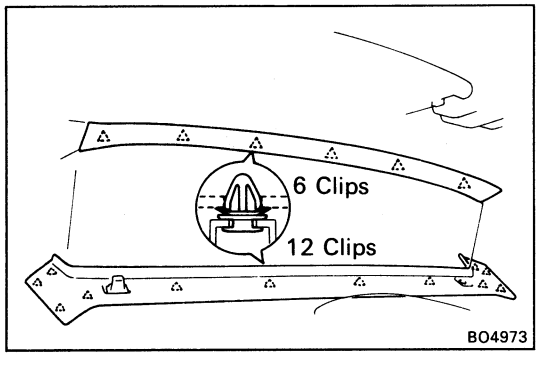
Install the shoulder anchor with the bolt.

Torque: 440 kg-cm (32 fl-lb, 43 N·m)

9. INSTALL QUARTER TRIM PANEL

(a) Tap the panel to install it.

(b) Install two clips.



10. INSTALL ROOM PARTITION TRIM MOULDING

11. INSTALL ROOF HEADLINING REAR TRIM

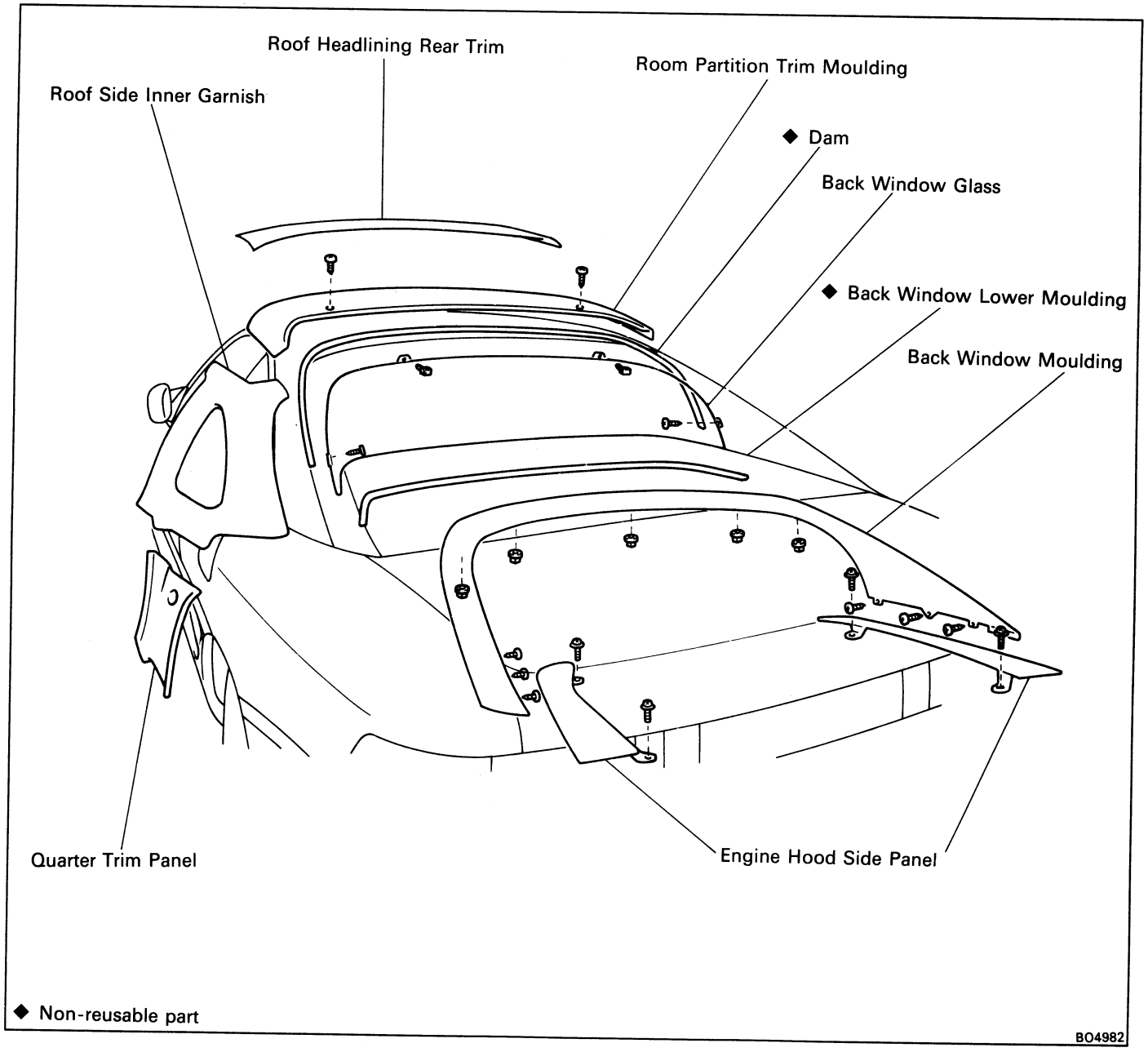
12. INSTALL DOOR SCUFF PLATE

BACK WINDOW GLASS

PREPARE ITEMS LISTED

(See page BO-35)

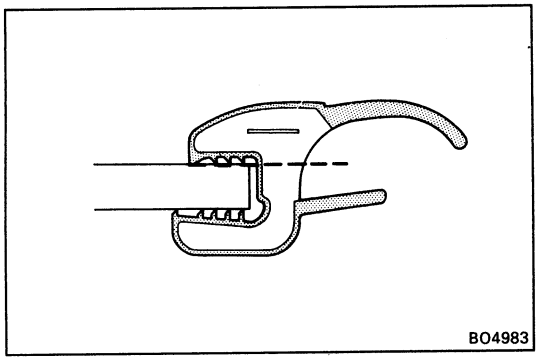
COMPONENTS



REMOVAL OF BACK WINDOW GLASS

1. REMOVE BACK WINDOW MOULDINGS
   (See step 1 to 3 on pages BO-33 to 34)

2. DISCONNECT DEFOGGER WIRE CONNECTORS



3. **REMOVE BACK WINDOW LOWER MOULDING**

Using the knife, cut off the moulding as shown.

NOTICE: Do not damage the body with the knife.

4. **REMOVE BACK WINDOW GLASS**

(a) Remove two screws.

(b) Remove the glass in the same manner as windshield.
(See step 11 on page BO-38)

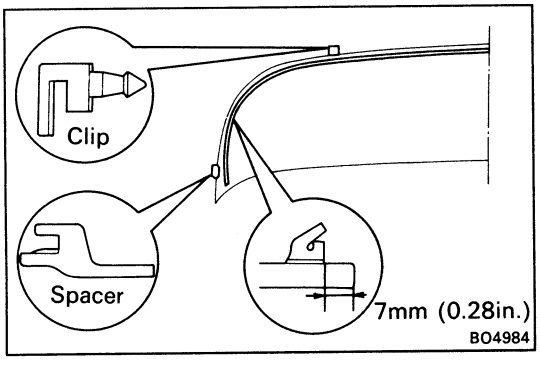
INSTALLATION OF BACK WINDOW GLASS

(See page BO-45)

1. **CLEAN AND SHAPE CONTACT SURFACE OF BODY**
(See step 1 on page BO-38)

2. **CLEAN REMOVED GLASS BEFORE INSTALLATION**
(See step 2 on page BO-39)

3. **CLEAN CONTACT SURFACE OF GLASS**
(See step 4 on page BO-39)



4. **INSTALL SPACER AND CLIP**

Using adhesive, install two spacers and two clips to the glass.

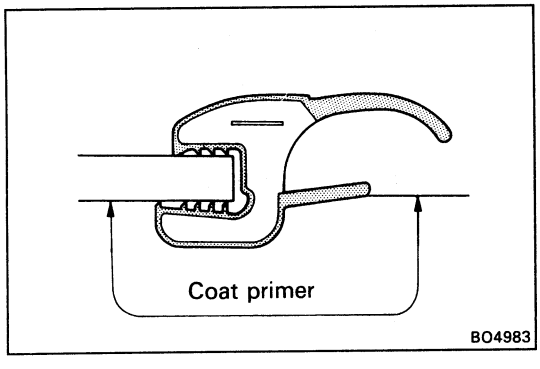
HINT: Fit the spacers and the clips into the cut-out portion in the ceramic.

5. **INSTALL DAM**

Install the dam with double-stick tape as shown in the drawing.

NOTICE: Do not touch the glass face after cleaning it.

6. **COAT CONTACT SURFACE OF BODY WITH PRIMER "M"**
(See step 6 on page BO-39)



7. **INSTALL BACK WINDOW LOWER MOULDING**

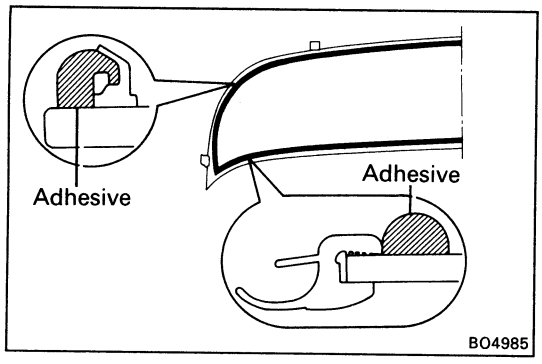
Install the moulding to the glass.

8. **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) Before the Primer dries, wipe it off with a clean cloth.

NOTICE: Be sure that installation of the glass is finished within 70 minutes.



9. MIX ADHESIVE COATING
(See page 8 on page BO-39)

10. 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 remains on body
3.5 – 5.0 mm (0.138 – 0.197 in.)
If no adhesive remains on body
8 – 10 mm (0.31 – 0.39 in.)

11. INSTALL GLASS WITH LOWER MOULDING
(See step 10 on page BO-40)

HINT: Align the clips with the body holes, then install two screws.

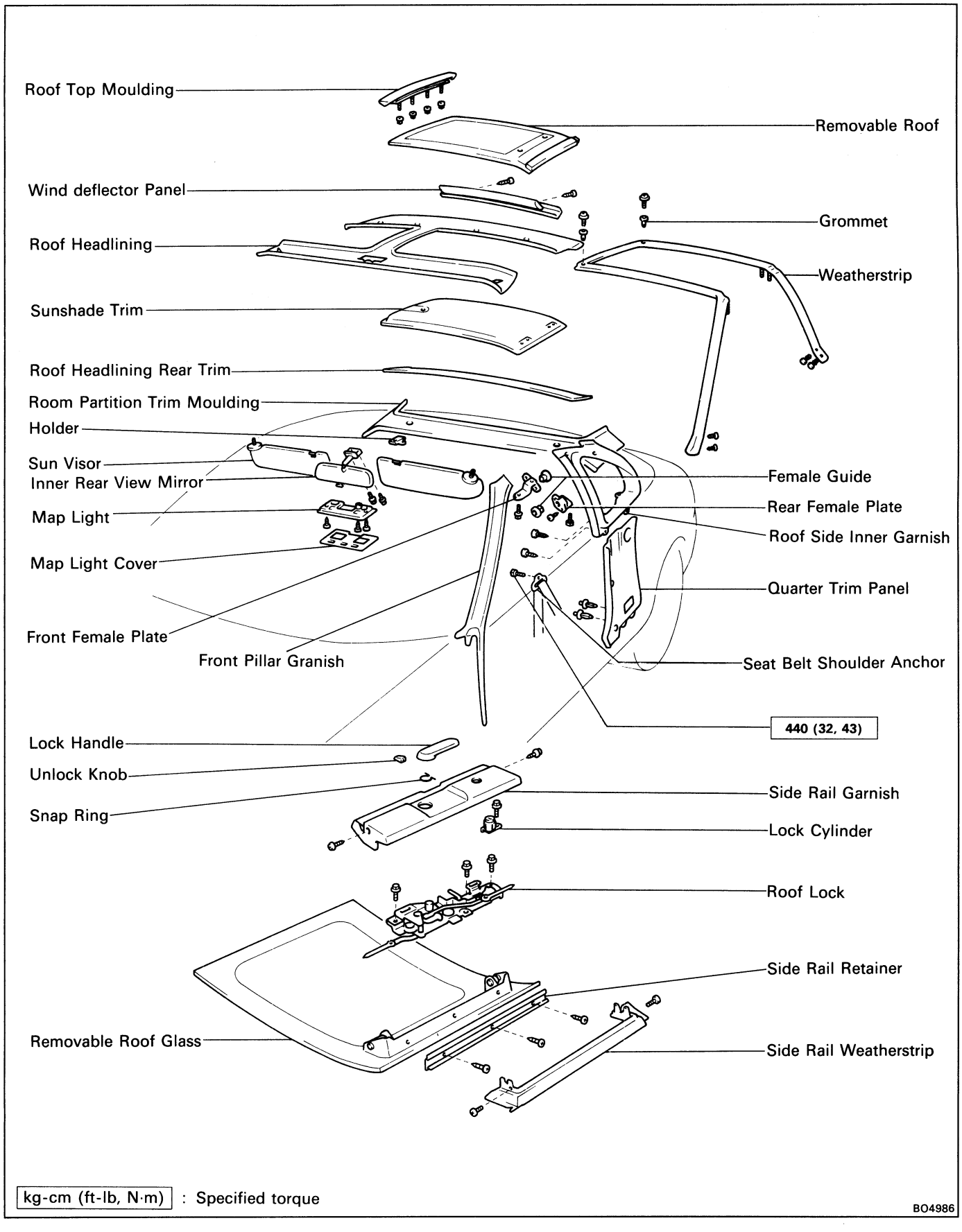
12. INSPECT FOR LEAKS AND REPAIR
(See step 11 on page BO-40)

13. INSTALL BACK WINDOW MOULDINGS
(See step 1 to 3 on page BO-34)

14. CONNECT DEFOGGER WIRE CONNECTORS

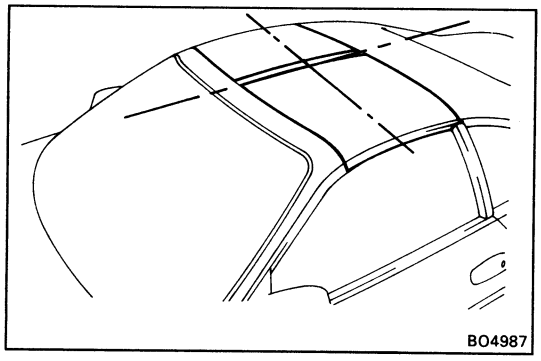
T-BAR ROOF

COMPONENTS



kg-cm (ft-lb, N·m) : Specified torque

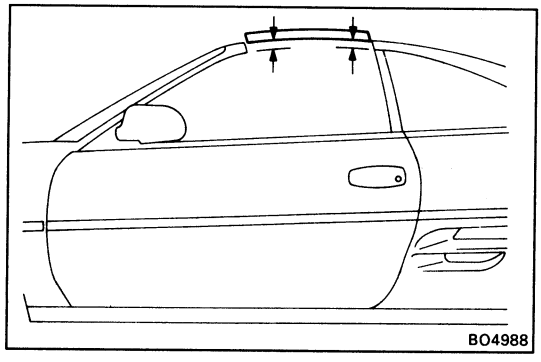
BO4986



ON VEHICLE INSPECTION

INSPECT REMOVABLE ROOF ALIGNMENT

(a) With the removable roof installed, installed, check for water leakage.

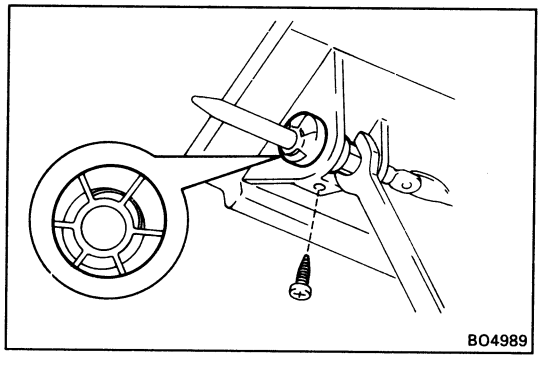


(b) Check for a difference in level between the removable roof glass and the roof panel.

Level: 0 ± 1.4 mm (0 ± 0.055 in.)

ADJUSTMENT OF REMOVABLE ROOF

1. **REMOVE FOLLOWING PARTS:**
   (See step 1, 2 and 5 on page BO-52)
   (a) Lock handle and unlock knob
   (b) Side rail garnish
   (c) Lock guide

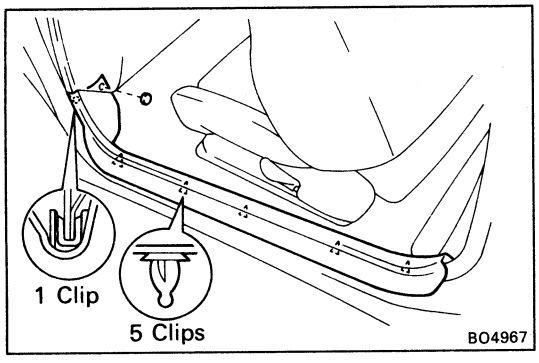


2. **ADJUST REMOVABLE ROOF**

   HINT: There are two types of lock guides, one with the hole centered, and the other with its hole 1.5 mm (0.059 in.) off center. Depending on the installation position in whitch the lock guide with the off center hole is installed, the removable roof can be adjusted in four direction.

   (a) With the removable roof installed, turn the lock guide with the spanner in order to adjust the lock guide.
   (b) Install the screw.

3. **INSTALL FOLLOWING PARTS:**
   (See steps 6 and 7 on page BO-54)
   (a) Side rail granish
   (b) Lock handle and unlock knob



REMOVAL OF T-BAR ROOF

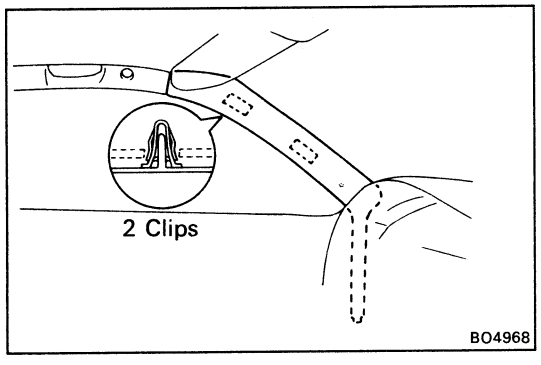
(See page BO-48)

1. REMOVE REMOVABLE ROOF AND SUNSHADE TRIM

2. REMOVE DOOR SCUFF PLATE

(a) Remove the cap.

(b) Remove the scuff plate by pulling.



3. REMOVE FRONT PILLAR GARNISH

(a) Remove the clips by your hand.

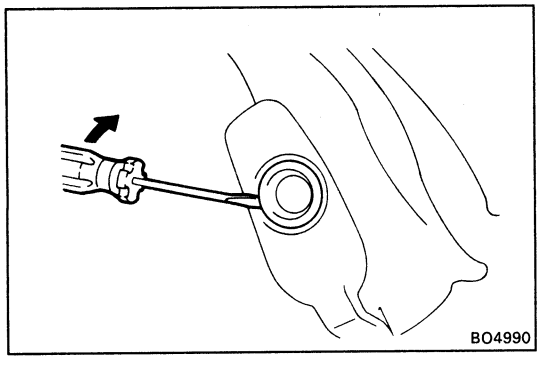
(b) Pull the garnish rearward to remove it.

4. REMOVE FOLLOWING PARTS:
(See steps 6 to 8 on page BO-37)

(a) Map light cover and map light

(b) Inner rear view mirror

(c) Sun visors and holders



5. REMOVE FEMALE GUIDE

Using the screwdriver, remove the female guide from the rear female plate.

HINT: Tape the screwdriver tip before use.

6. REMOVE FOLLOWING PARTS:
(See steps 2 to 6 on page BO-42)

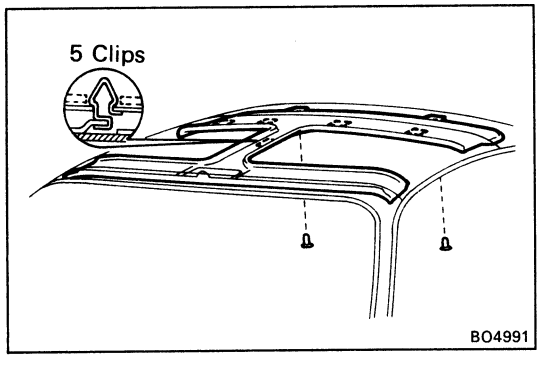
(a) Roof headlining rear trim

(b) Room partition trim moulding

(c) Quarter trim panel

(d) Seat belt shoulder anchor

(e) Roof side inner garnish



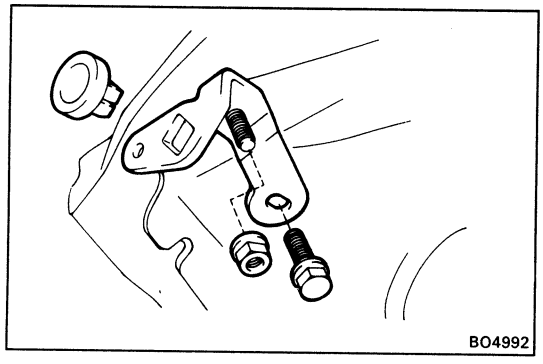
7. REMOVE ROOF HEADLINING

(a) Remove two clips.

(b) Using the screwdriver, pry loose the clips.

HINT: Tape the screwdriver tip before use.

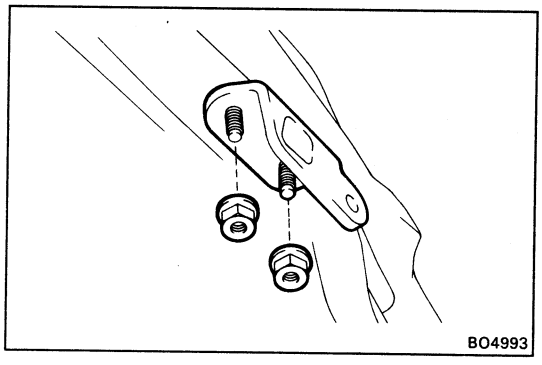
(c) Remove the roof headlining.



8. REMOVE FRONT FEMALE PLATE

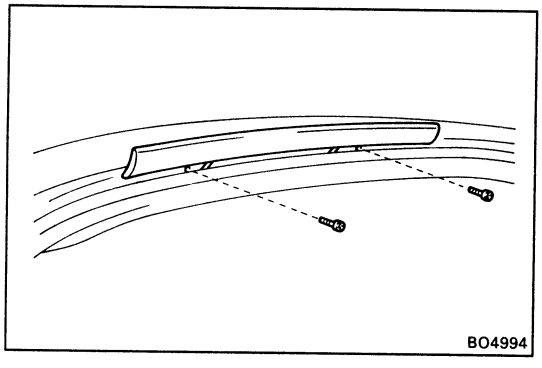
(a) Remove the bolt, the nut and the plate.

(b) Remove the female guide from the plate.



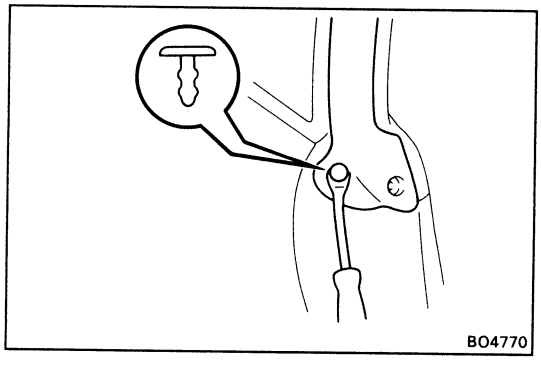
9. REMOVE REAR FEMALE PLATE

Remove two nuts and the plate.



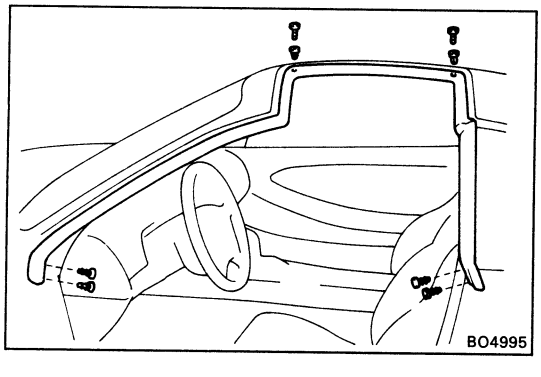
10. REMOVE WIND DEFLECTOR PANEL

Remove two screws and the panel.



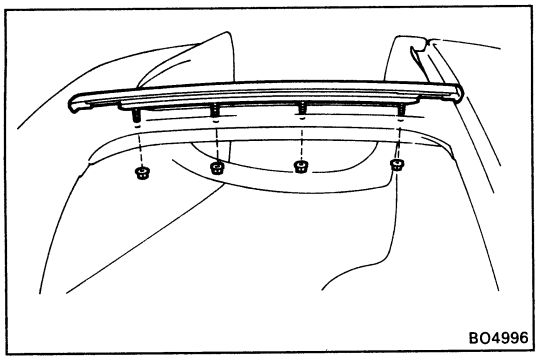
11. REMOVE WEATHERSTRIP

(a) Using the clip remover, remove four clips from the weatherstrip.



(b) Remove two screws and two grommets from the weatherstrip.

(c) Remove the weatherstrip from the moulding and the retainer.

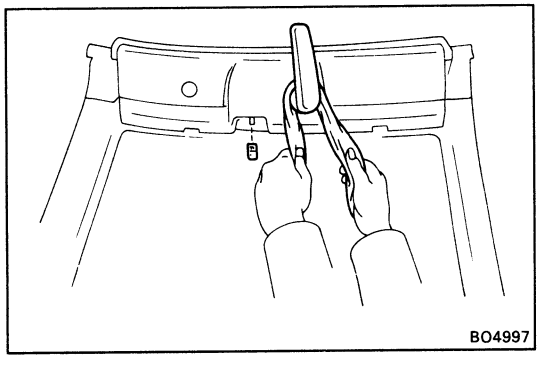


12. REMOVE ROOF TOP MOULDING

Remove four nuts and the top moulding.

DISASSEMBLY OF REMOVABLE ROOF

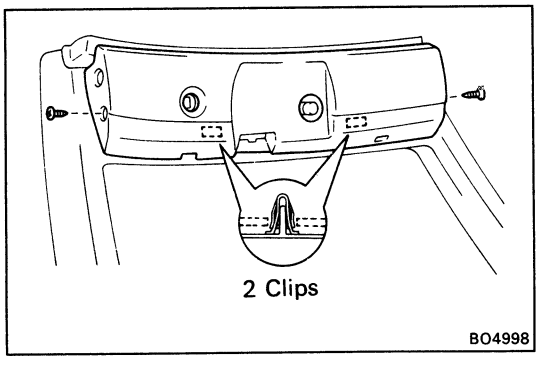
(See page BO-48)



1. REMOVE LOCK HANDLE AND UNLOCK KNOB

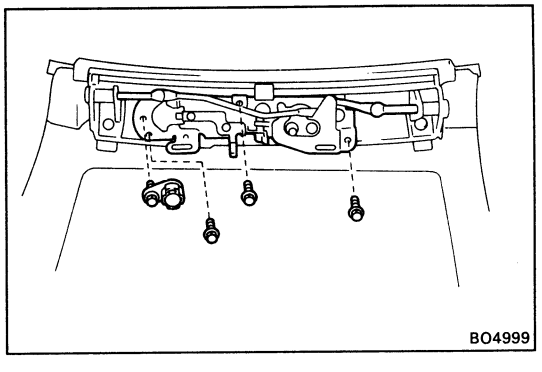
(a) Pull off the snap ring with a shop rag and remove the handle.

(b) Remove the knob.



2. REMOVE SIDE RAIL GARNISH

Remove two screws and the garnish.

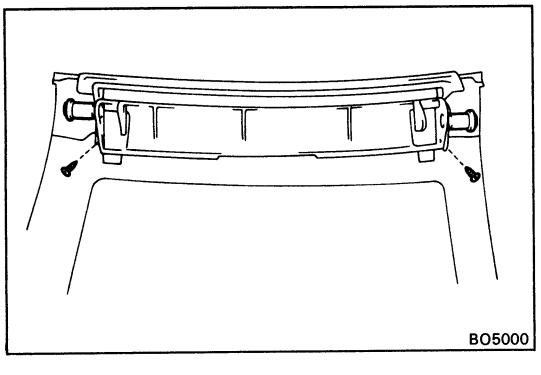


3. REMOVE LOCK CYLINDER

Remove the bolt and the lock cylinder.

4. REMOVE ROOF LOCK

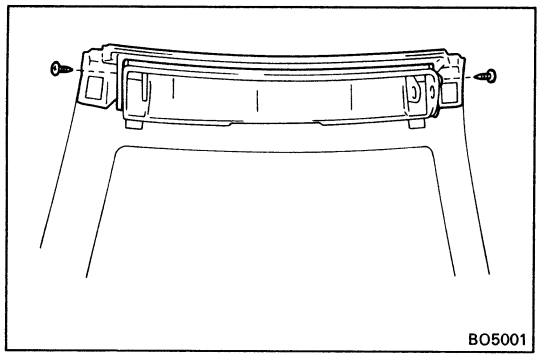
Remove three bolts and the roof lock.



5. REMOVE LOCK GUIDE

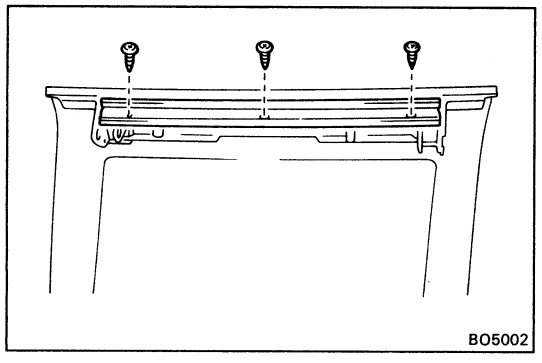
(a) Remove the screw.

(b) Pull out the lock guide.



6. REMOVE SIDE RAIL WEATHERSTRIP

Remove two screws and the weatherstrip.



7. REMOVE SIDE RAIL RETAINER

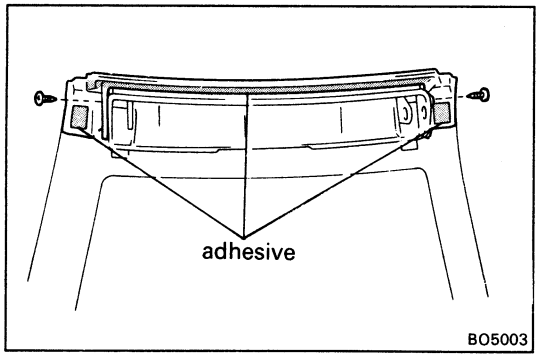
Remove three screws and the retainer.

ASSEMBLY OF REMOVABLE ROOF

(See page BO-48)

1. INSTALL SIDE RAIL RETAINER

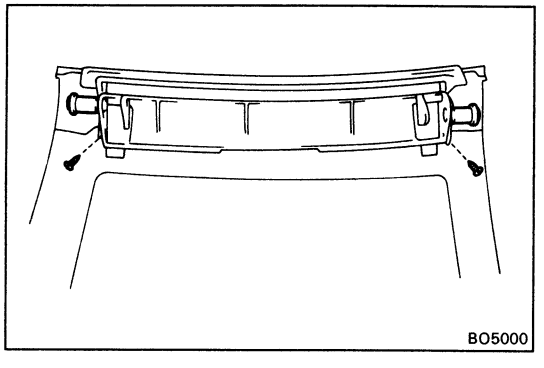
Install the retainer with three screws.



2. INSTALL SIDE RAIL WEATHERSTRIP

(a) Apply adhesive to the glass side as shown.

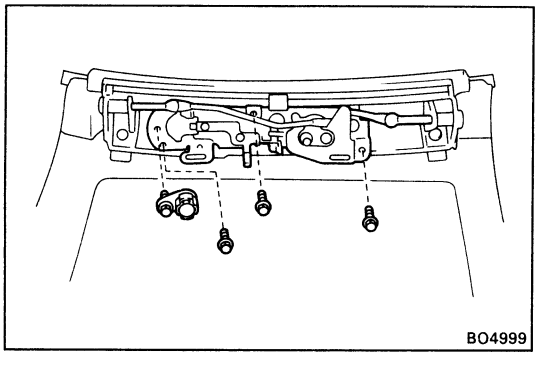
(b) Install the weatherstrip with two screws.



3. INSTALL LOCK GUIDE

(a) Insert the lock guide.

(b) Install the screw.

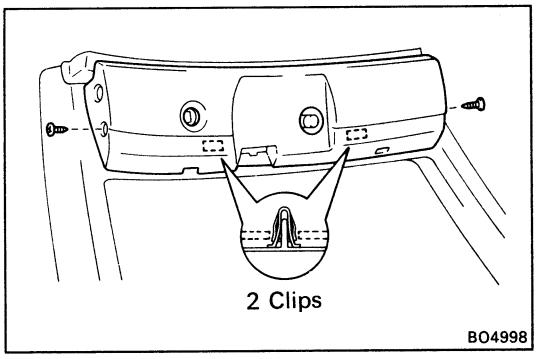


4. INSTALL ROOF LOCK

Install the roof lock with three bolts.

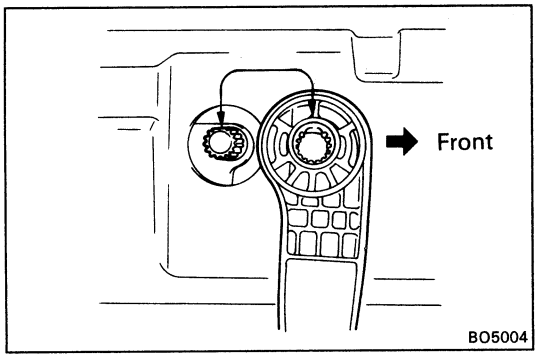
5. INSTALL LOCK CYLINDER

Install the lock cylinder with the bolt.



6. **INSTALL SIDE RAIL GARNISH**

Install the garnish with two screws.

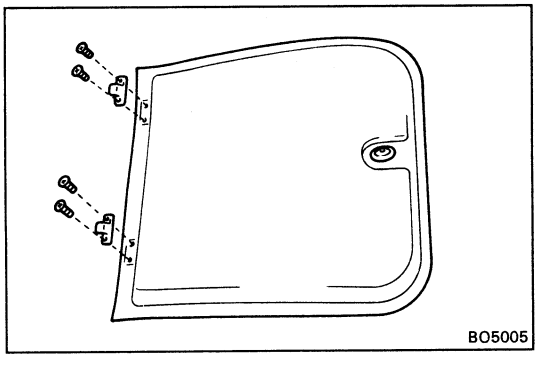


7. **INSTALL LOCK HANDLE AND UNLOCK KNOB**

(a) Install the snap ring to the lever.

(b) Install the handle to the shaft as shown.

(c) Install the knob.



DISASSEMBLY OF SUNSHADE TRIM

(See page BO-48)

REMOVE SUNSHADE TRIM HOLDER

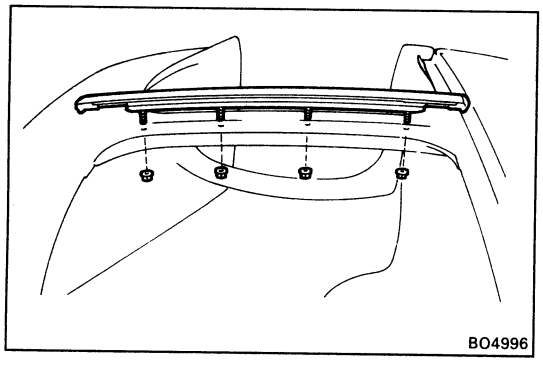
Remove two screws and the holder.

ASSEMBLY OF SUNSHADE TRIM

(See page BO-48)

INSTALL SUNSHADE TRIM HOLDER

Install the holder with two screws.

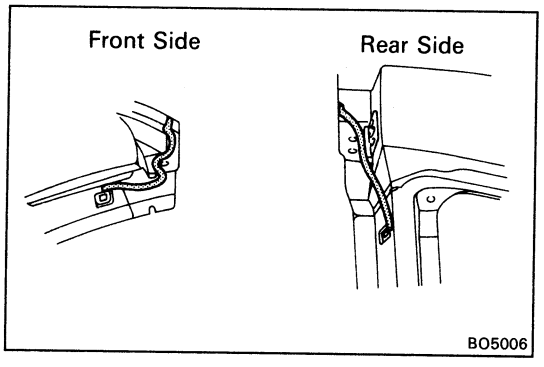


INSTALLATION OF T-BAR ROOF

(See page BO-48)

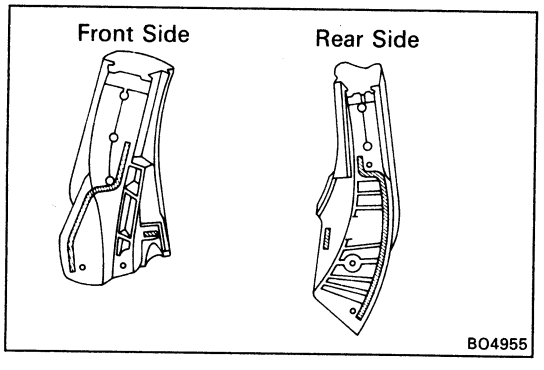
1. INSTALL ROOF TOP MOULDING

Install the top moulding with four nuts.

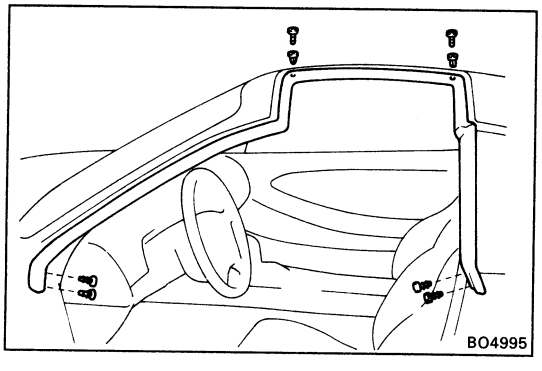


2. INSTALL WEATHERSTRIP

(a) Install the seal to the body



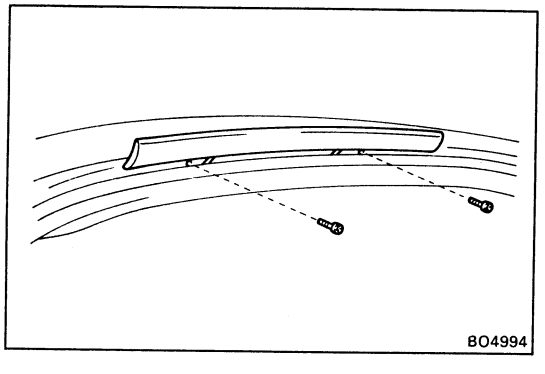
(b) Install the seal to the weatherstrip.



(c) Install the weatherstrip to the moulding and the retainer.

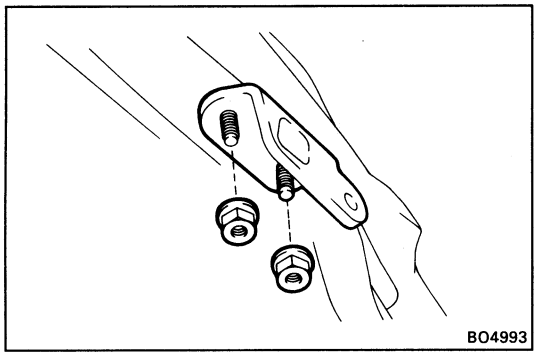
(d) Install two screws and two grommets to the weatherstrip.

(e) Install four clips.



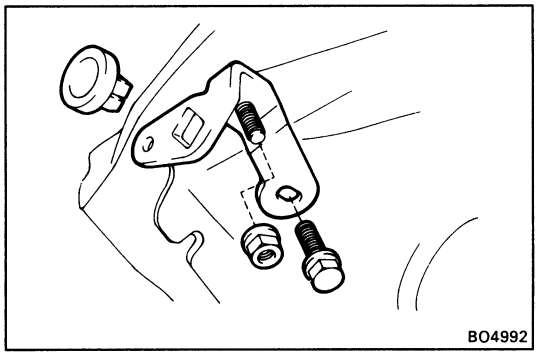
3. INSTALL WIND DEFLECTOR PANEL

Install the panel with two screws.


BO4993

4. INSTALL REAR FEMALE PLATE

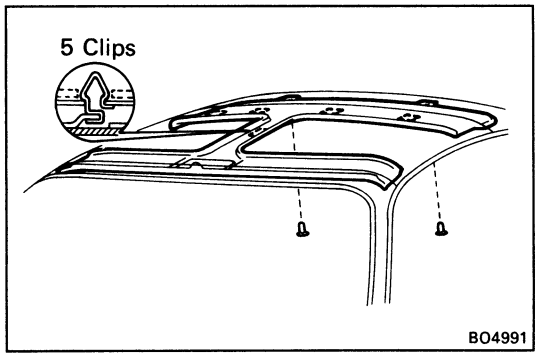
Install the plate with two nuts.


BO4992

5. INSTALL FRONT FEMALE PLATE

(a) Install the female guide to the plate.

(b) Install the plate with the bolt and the nut.



BO4991

6. INSTALL ROOF HEADLINING

(a) Tap the headlining and fix it in place with the clips.

(b) Install two clips.

7. INSTALL FOLLOWING PARTS:

(a) Roof side inner garnish

(b) Seat belt shoulder anchor

Torque: 440 kg-cm (32 ft-lb, 43 N·m)

(c) Quarter trim panel

(d) Room partition trim moulding

(e) Roof headlining rear trim

(f) Sun visors and holders

(g) Inner rear view mirror

(h) Map light and map light cover

(i) Front pillar garnish

(j) Door scuff plate

8. INSTALL FEMALE GUIDE

(a) Install the guide to the rear female plate.

(b) Install the screw.

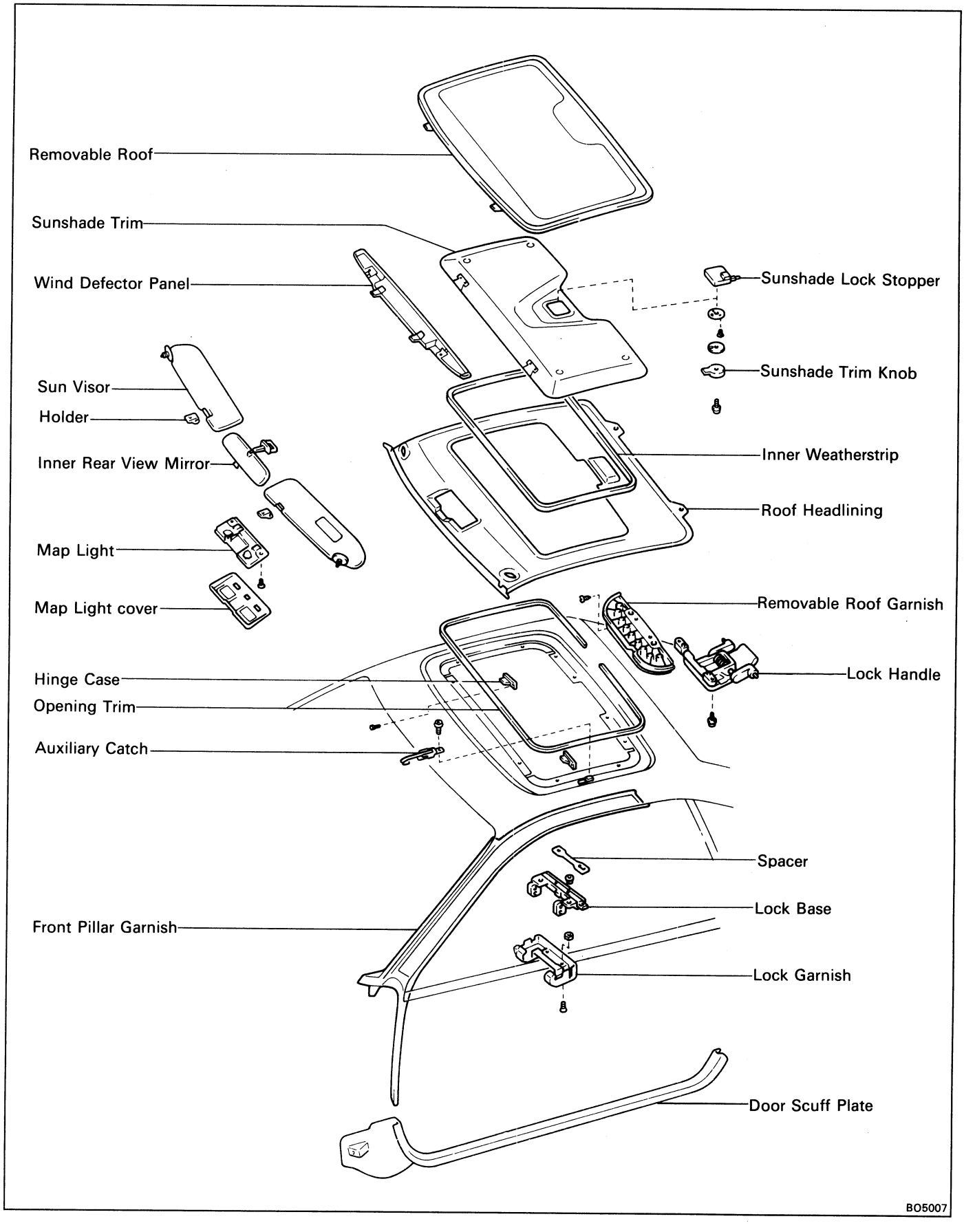
9. ADJUST REMOVABLE ROOF

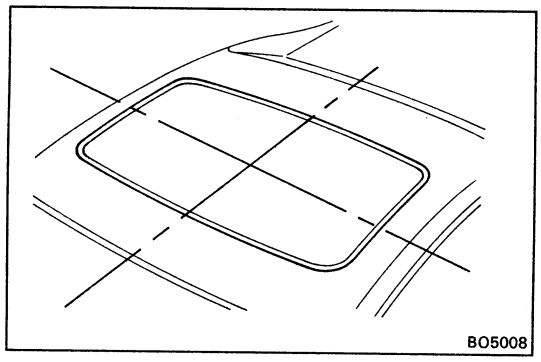
(See page BO-49)

10. INSTALL REMOVABLE ROOF AND SUNSHADE TRIM

MOON ROOF

COMPONENTS

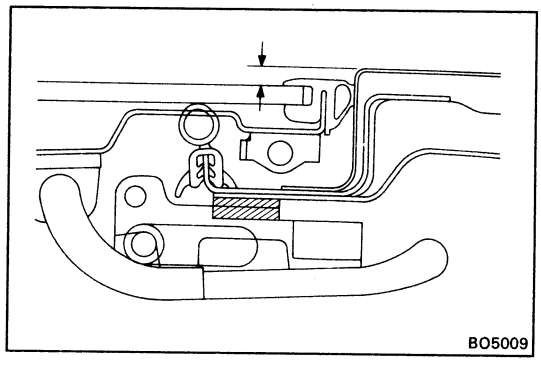




ON-VEHICLE INSPECTION

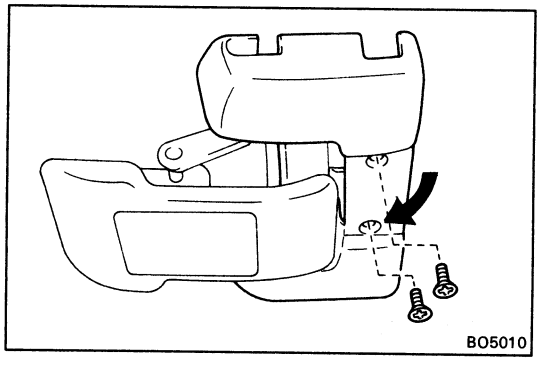
INSPECT REMOVABLE ROOF ALIGNMENT

(a) With the removable roof installed, check for water leakage.



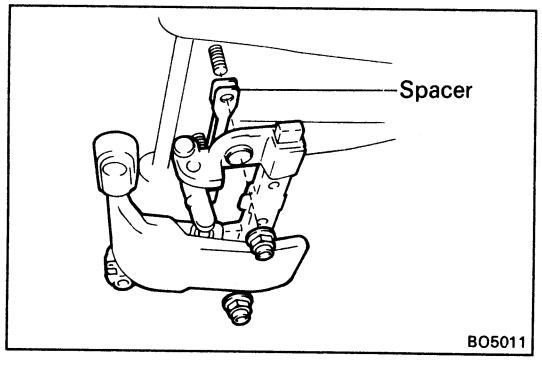
(b) Check for a difference in level between the removal roof and the roof panel.

Rear side: $1.7\ ^{+0}_{-2.5}$ mm ($0.067\ ^{+0}_{-0.098}$ in.)



ADJUSTMENT OF REMOVABLE ROOF

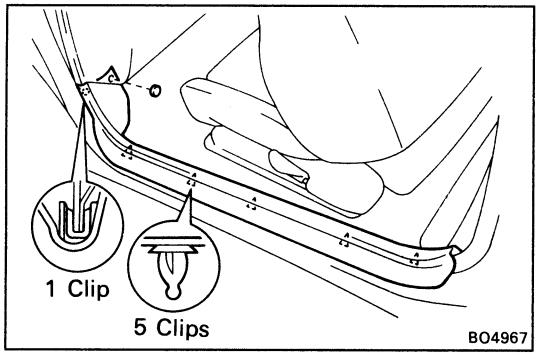
1. **REMOVE FOLLOWING PARTS:**
   (See steps 8 to 9 on page BO-60)
   (a) Lock garnish



   (b) Lock base

2. **ADJUST REMOVABLE ROOF**
   Adjust by increasing or decreasing the number of spacers.

3. **INSTALL FOLLOWING PARTS:**
   (See steps 4 to 5 on page BO-62)
   (a) Lock base
   (b) Lock garnish

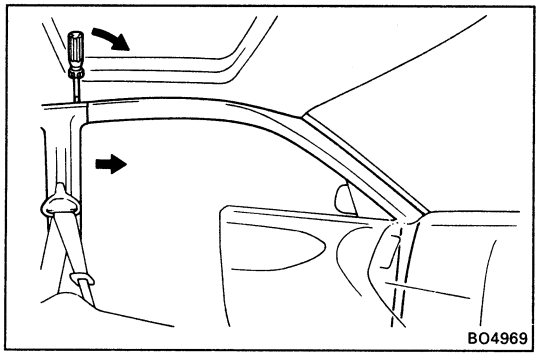


REMOVAL OF MOON ROOF

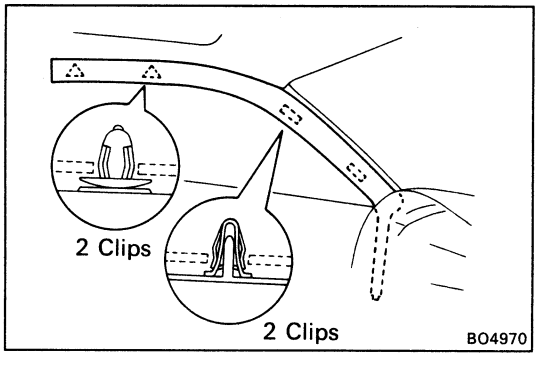
(See page BO-57)

1. **REMOVE SUNSHADE TRIM**

2. **REMOVE DOOR SCUFF PLATE**
   (a) Remove the cap.
   (b) Remove the scuff plate by pulling.

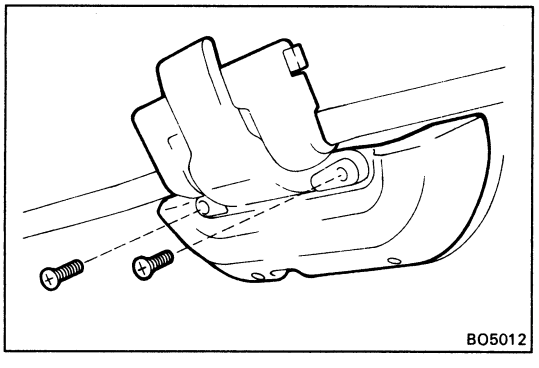


3. **REMOVE FRONT PILLAR GARNISH**
   (a) Pull out the garnish from the roof side inner garnish.

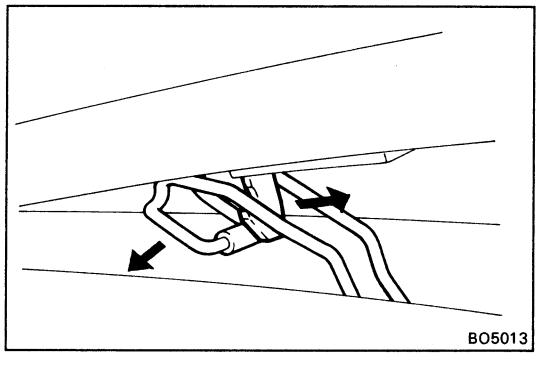


   (b) Remove the clips by your hand.
   (c) Pull the garnish rearward to remove it.

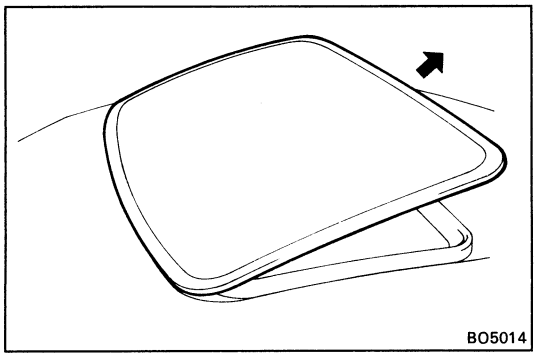
4. **REMOVE FOLLOWING PARTS:**
   (See steps 6 to 8 on page BO-37)
   (a) Map light cover and map light
   (b) Inner rear view mirror
   (c) Sun visors and holders



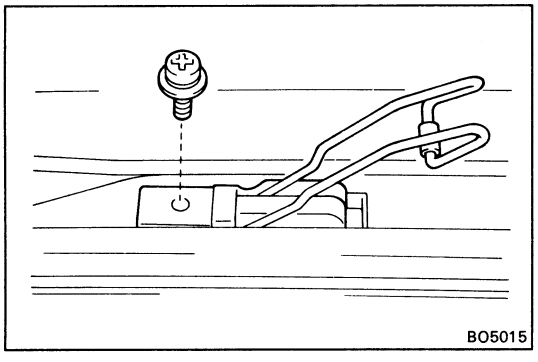
5. **REMOVE REMOVABLE ROOF**
   (a) Remove two screws from the lock handle.



   (b) Disconnect the auxiliary catch from the removable roof.

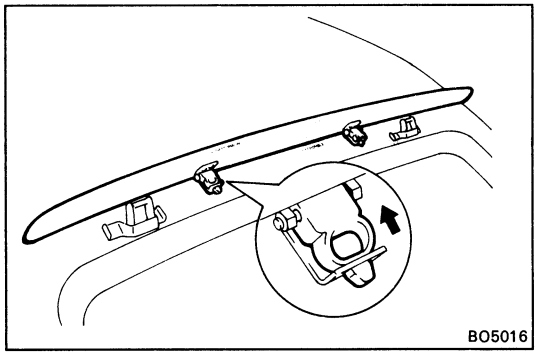


(c) Pull the removable roof rearward to remove it.



6. REMOVE AUXILIARY CATCH

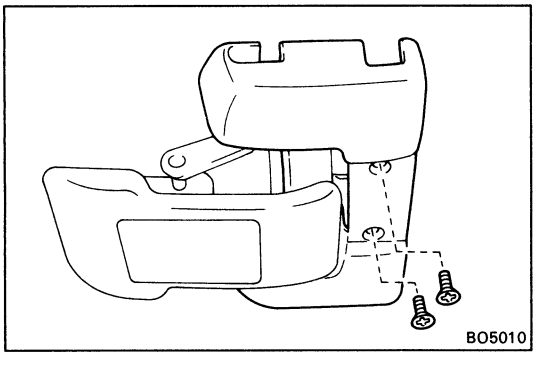
Remove the screw and the catch.



7. REMOVE WIND DEFLECTOR PANEL

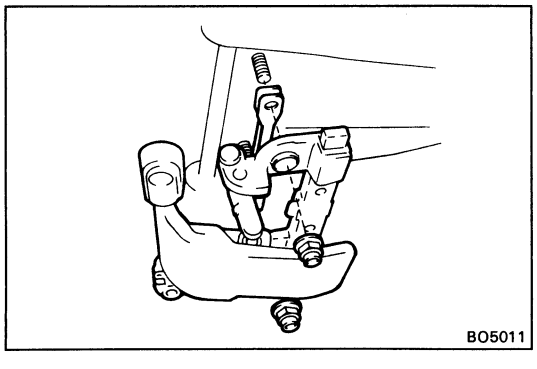
Remove two deflector clips, while prying them with the screwdriver.

HINT: Tape the screwdriver tip before use.



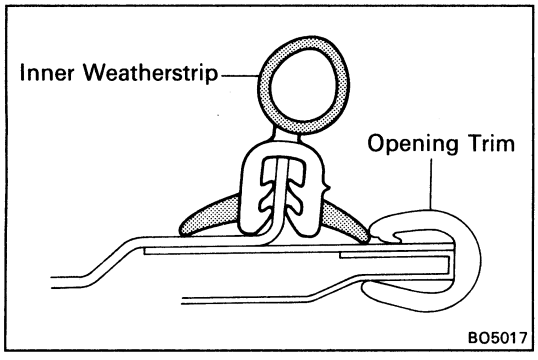
8. REMOVE LOCK GARNISH

Remove two screws and the lock garnish.



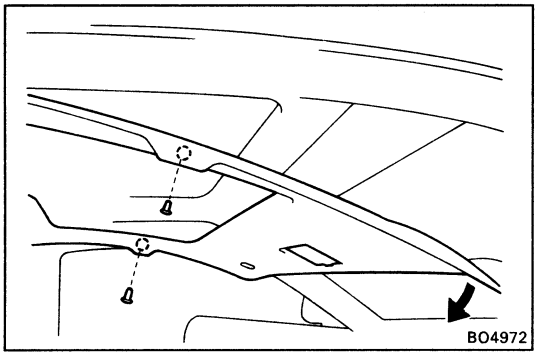
9. REMOVE LOCK BASE

Remove two nuts, the lock base and the spacers.



10. REMOVE OPENING TRIM

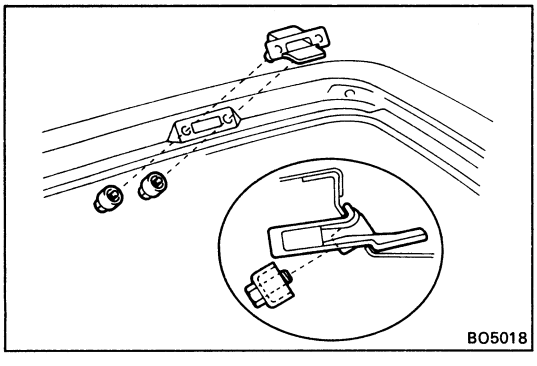
11. REMOVE INNER WEATHERSTRIP



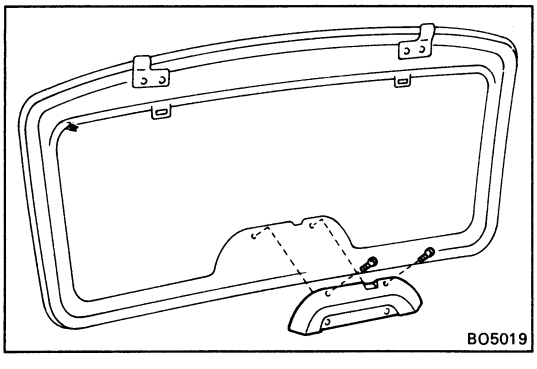
12. REMOVE HINGE CASE

(a) Remove two clips.

(b) Pull down the roof headlining by hand.



(b) Remove two bolts and the hinge case.



DISASSEMBLY OF REMOVABLE ROOF AND SUNSHADE TRIM

(See page BO-57)

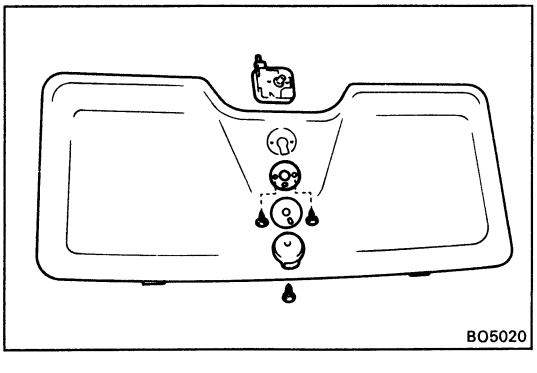
1. REMOVE REMOVABLE ROOF GARNISH

Remove two screws and the garnish.

2. REMOVE SUNSHADE LOCK STOPPER

(a) Remove the screw and the sunshade trim knob.

(b) Remove two screws and the stopper.



ASSEMBLY OF REMOVABLE ROOF AND SUNSHADE TRIM

(See page BO-57)

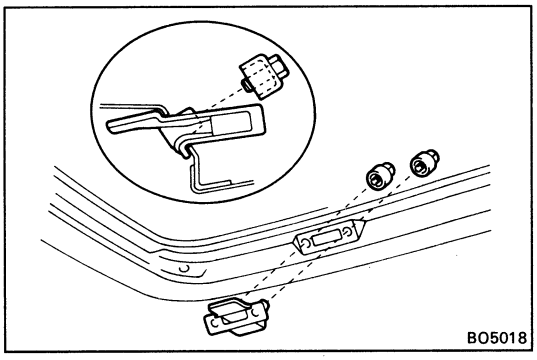
1. INSTALL REMOVABLE ROOF GARNISH

Install the garnish with two screws.

2. INSTALL SUNSHADE LOCK STOPPER

(a) Install the lock stopper with two screws.

(b) Install the sunshade trim knob with the screw.

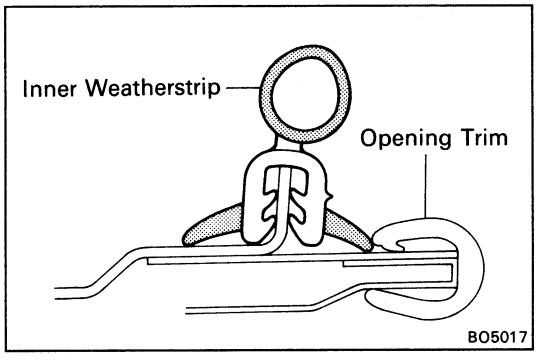


INSTALLATION OF MOON ROOF

(See page BO-57)

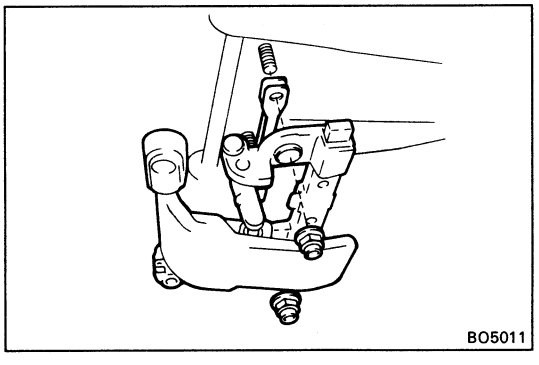
1. INSTALL HINGE CASE

Install the hinge case with two bolts.



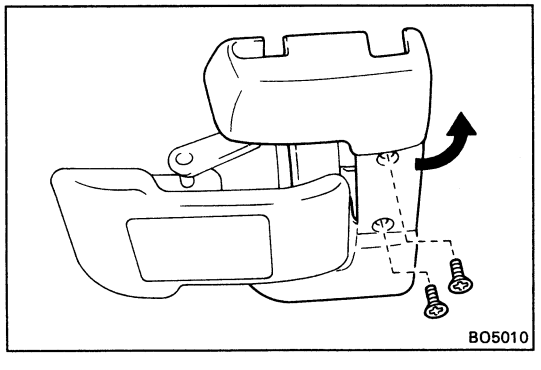
2. INSTALL INNER WEATHERSTRIP

3. INSTALL OPENING TRIM



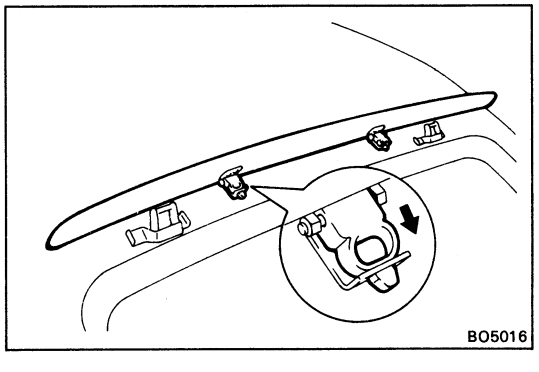
4. INSTALL LOCK BASE

Install the spacers and the lock base with two nuts.



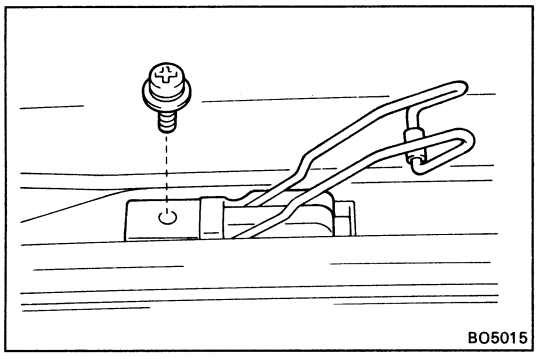
5. INSTALL LOCK GARNISH

Install the garnish with two screws.



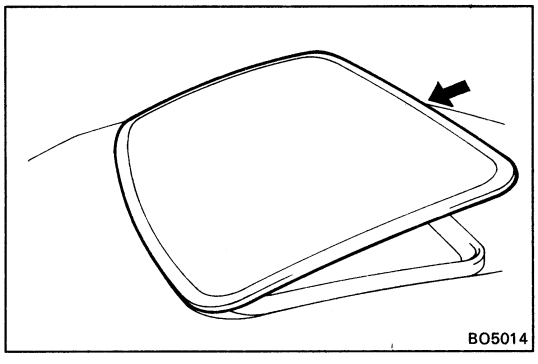
6. INSTALL WIND DEFLECTOR PANEL

Slide the deflector clip rearward and tap the clip to install it.



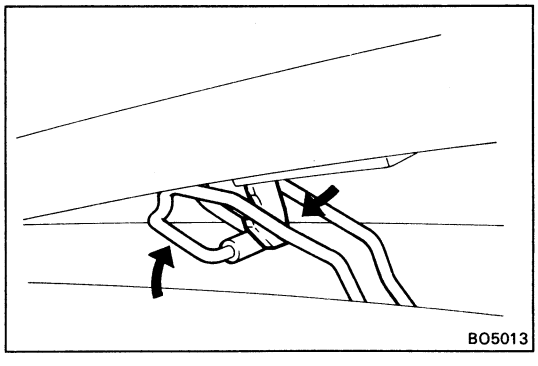
7. INSTALL AUXILIARY CATCH

Install the catch with the screw.

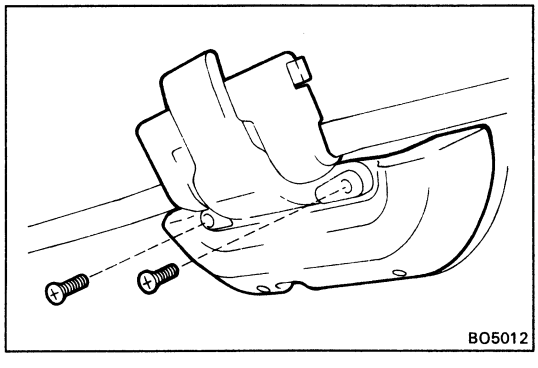


8. INSTALL REMOVABLE ROOF

(a) Place the removable roof onto the roof.



(b) Connect the auxiliary catch to the removable roof.



(c) Install two screws to the lock handle.

9. INSTALL FOLLOWING PARTS:

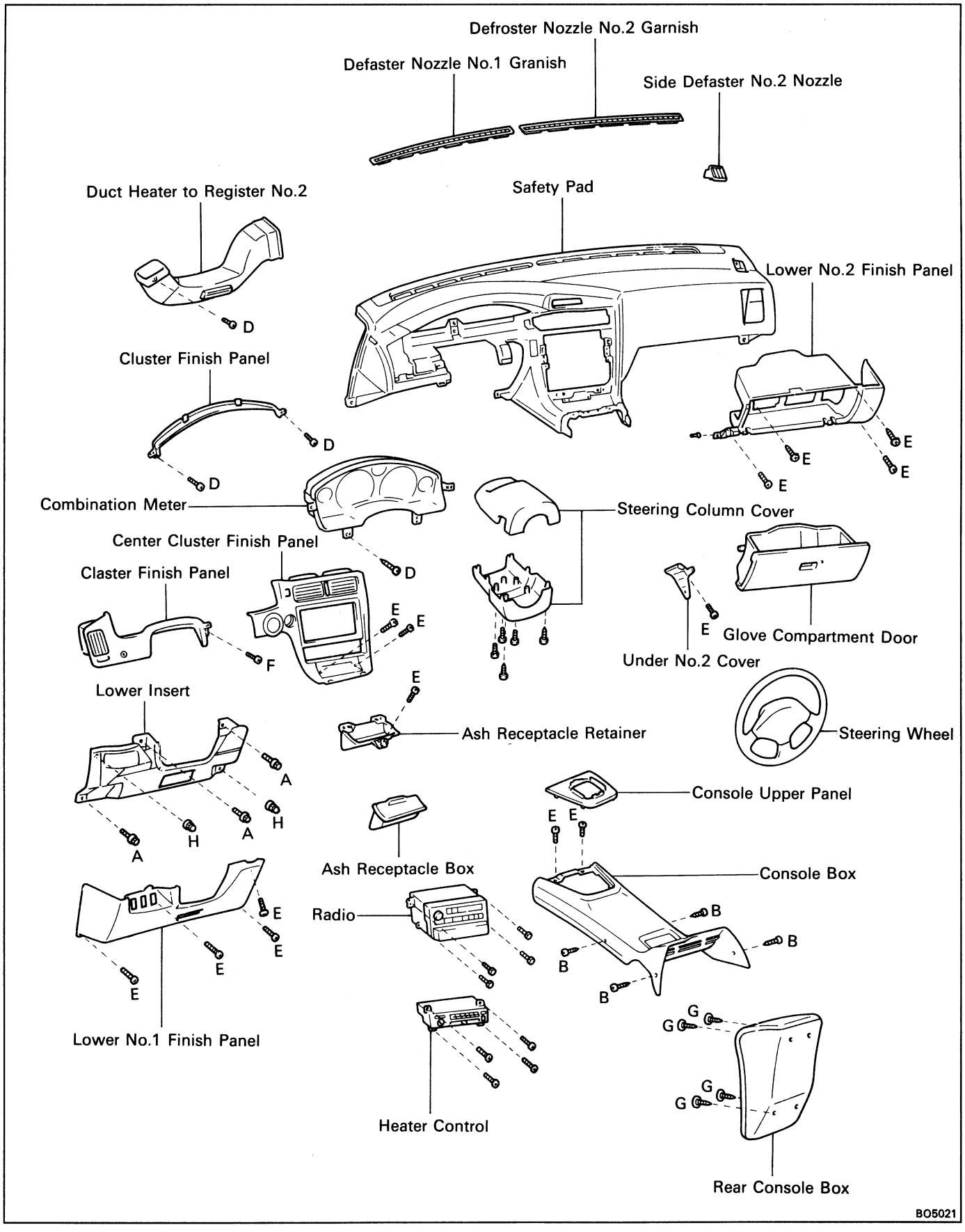
(a) Sun visors and holders
(b) Inner rear view mirror
(c) Map light and map light cover
(d) Front pillar garnish
(e) Door scuff plate

10. ADJUST REMOVABLE ROOF
(See page BO-58)

11. INSTALL SUNSHADE TRIM

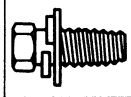
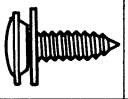
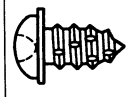
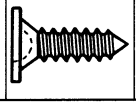
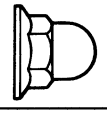
INSTRUMENT PANEL

COMPONENTS



HINT: Screw sizes in the illustration on the previous page are indicated using the code below for removal and installation of instrument panel.

mm (in.)

Code	Shape	Size	Code	Shape	Size	Code	Shape	Size	Code	Shape	Size
A		ϕ=6 (0.24) L=20 (0.99)	B		ϕ=5 (0.20) L=18 (0.71)	C		ϕ=5.22 (0.2055) L=14 (0.55)	D		ϕ=5.22 (0.2055) L=16 (0.63)
E		ϕ=5.22 (0.2055) L=16 (0.63)	F		ϕ=5.22 (0.2055) L=20 (0.79)	G		ϕ=5 (0.20) L=18 (0.71)	H		–

BO5088

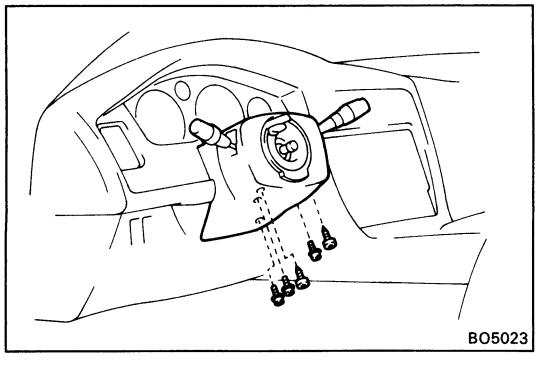
REMOVAL OF INSTRUMENT PANEL

(See page BO-64)

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

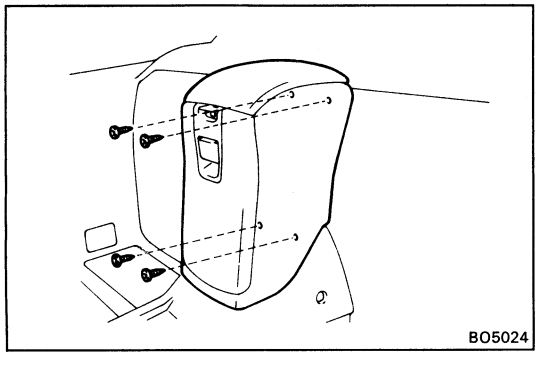
2. **REMOVE FOLLOWING PARTS:**
   (See steps 4 to 5 on page BO-37 to 38)
   (a) Door scuff plate
   (b) Front pillar garnish

3. **REMOVE STEERING WHEEL**
   (See page SR-3)



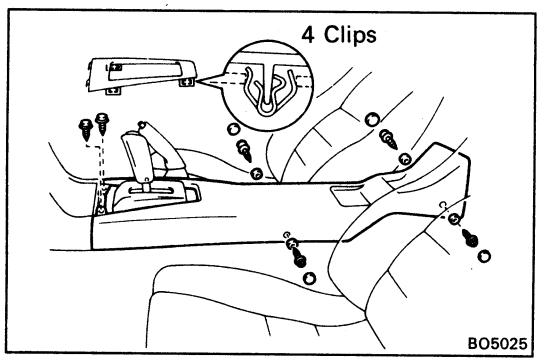
BO5023

4. **REMOVE STEERING COLUMN COVER**
   Remove five screws and the column covers.



BO5024

5. **REMOVE REAR CONSOLE BOX**
   (a) Open the console box doors.
   (b) Remove four screws and the console box.



6. REMOVE CONSOLE UPPER PANEL

(a) Using the screwdriver, remove the clip.

HINT: Tape the screwdriver tip before use.

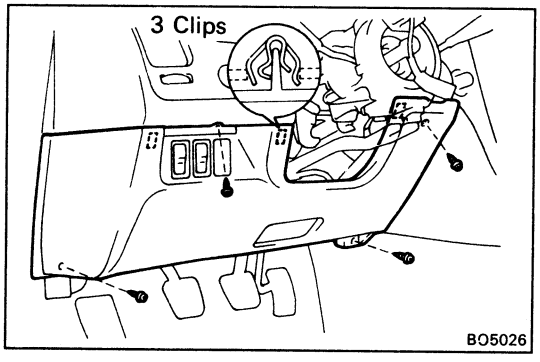
(b) Pull the panel rearward and remove it.

7. REMOVE CONSOLE BOX

(a) Using the screwdriver, remove four screw caps.

HINT: Tape the screwdriver tip before use.

(b) Remove six screws, four bushes and the console box.

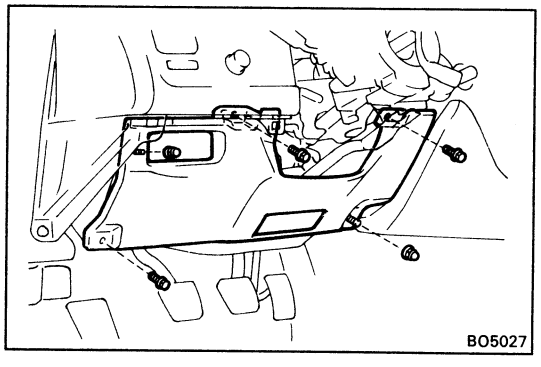


8. REMOVE LOWER NO. 1 FINISH PANEL

(a) Remove four screws.

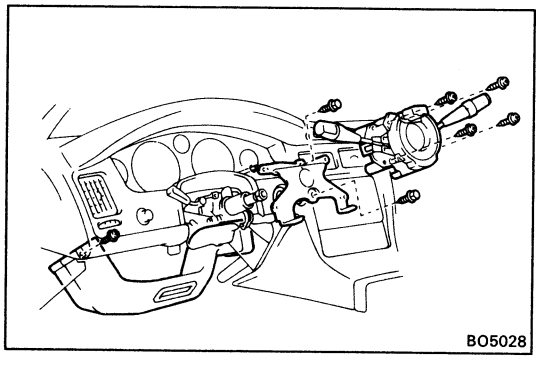
(b) Remove the panel by pulling then disconncet the connectors.

(c) Remove the lower No. 1 register from the panel.



9. REMOVE LOWER INSERT

Remove three bolts, two nuts and the lower insert.



10. REMOVE DUCT HEATER TO REGISTER NO. 2

Remove the screw and the duct.

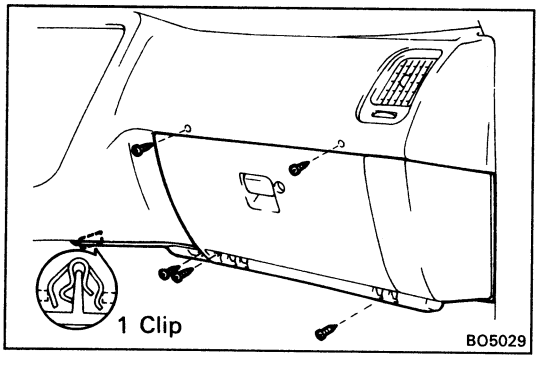
11. REMOVE COMBINATION SWITCH

(a) Disconnect the connectors.

(b) Remove four screws and the combination switch.

12. REMOVE TURN SIGNAL BRACKET

Remove two bolts and the bracket.



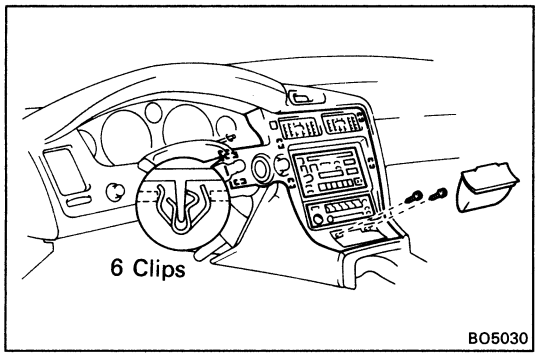
13. REMOVE UNDER NO. 2 COVER

(a) Remove the screw.

(b) Remove the cover by pulling.

14. REMOVE LOWER NO. 2 FINISH PANEL

Remove four screws and the panel.



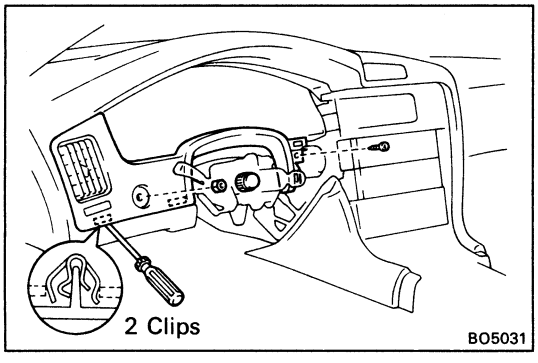
15. REMOVE CENTER CLUSTER FINISH PANEL

(a) Remove the ash receplacle box by pulling.

(b) Remove two screws.

(c) Using the screwdriver, remove the panel and disconnect the connector.

HINT: Tape the screwdriver tip before use.



16. REMOVE CLUSTER FINISH PANEL

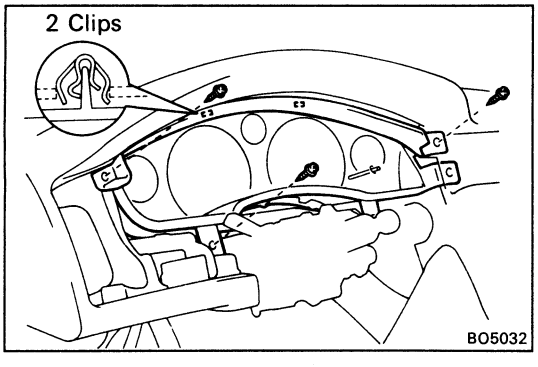
(a) Remove the rheostat knob by pulling.

(b) Remove the nut from the rheostat.

(c) Remove the screw.

(d) Using the screwdriver, remove the panel and disconnect the connector.

HINT: Tape the screwdriver tip before use.



17. REMOVE CLUSTER FINISH PANEL

(a) Remove two screws.

(b) Using the screwdriver, remove the panel.

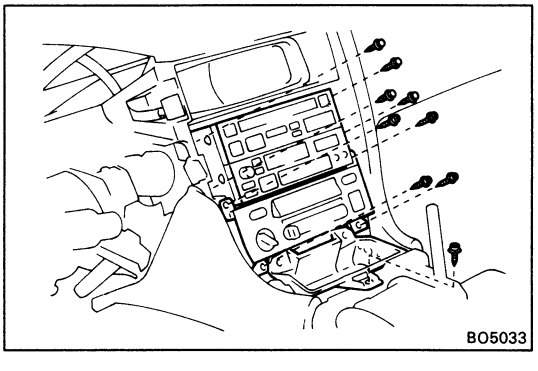
HINT: Tape the screwdriver tip before use.

18. REMOVE COMBINATION METER

(a) Remove the screw.

(b) Disconnect the connectors and the meter bracket.

(c) Remove the meter.



19. REMOVE RADIO

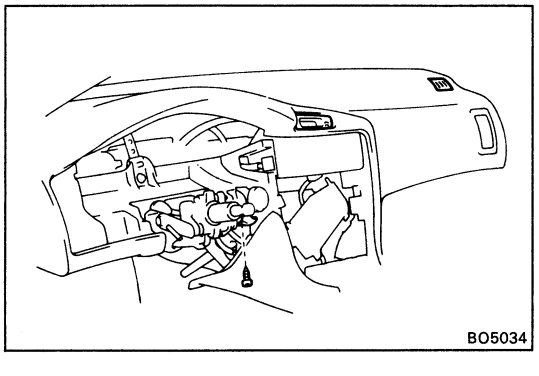
Remove four bolts and the radio.

20. REMOVE HEATER CONTROL

Remove four screws and hang the heater control.

21. REMOVE ASH RECEPTACLE RETAINER

Remove the screw and the retainer.



22. REMOVE CLOCK

(a) Using the screwdriver, remove the clock ornament.

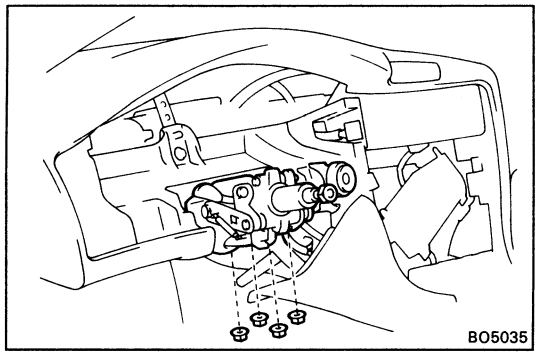
HINT: Tape the screwdriver tip before use.

(b) Disconnect the connector and remove the clock.

23. REMOVE SIDE DEFROSTER NO. 2 NOZZLE

24. REMOVE BRACKET

Remove the screw and the bracket from the safety pad.



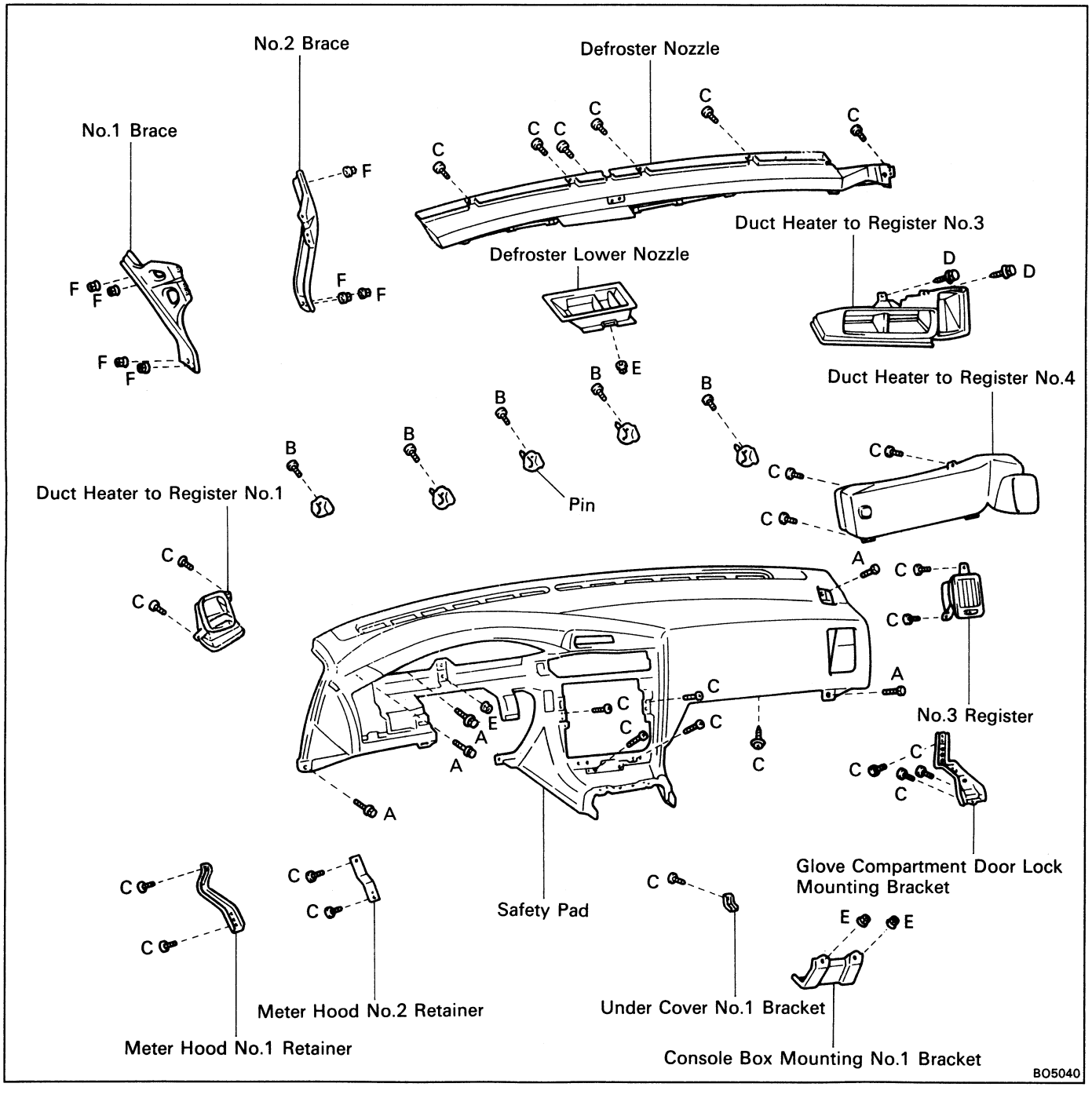
25. DISCONNECT STEERING COLUMN

(a) Remove four nuts.

(b) Disconnect the steering column from the reinforcement.

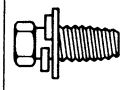
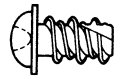
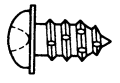
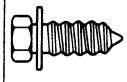
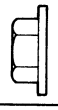
26. REMOVE SAFETY PAD

Remove five bolts, five screws, the nut and the safety pad.



HINT: Screw sizes in the illustration on the previous page are indicated using the code below for removal and installation of instrument panel.

mm (in.)

Code	Shape	Size	Code	Shape	Size	Code	Shape	Size
A		ϕ=6 (0.24) L=20 (0.79)	B		ϕ=4.5 (0.177) L=12 (0.47)	C		ϕ=5.22 (0.2055) L=16 (0.63)
D		ϕ=6 (0.24) L=14 (0.55)	E		–			–

BO5036

27. REMOVE FOLLOWING PARTS FROM SAFETY PAD

- Defroster nozzle
- Defroster nozzle No. 1 garnish
- Defroster nozzle No. 2 garnish
- Meter hood No. 1 retainer
- Meter hood No. 2 retainer
- Glove compartment door lock mounting bracket
- Duct heater to register No. 1
- Duct heater to register No. 4
- No.3 register
- Under cover No. 1 bracket
- Pin

28. REMOVE FOLLOWING PARTS:

- Defroster lower nozzle
- Duct heater to register No. 3
- No. 1 brace
- No. 2 brace
- Console box mounting No. 1 bracket

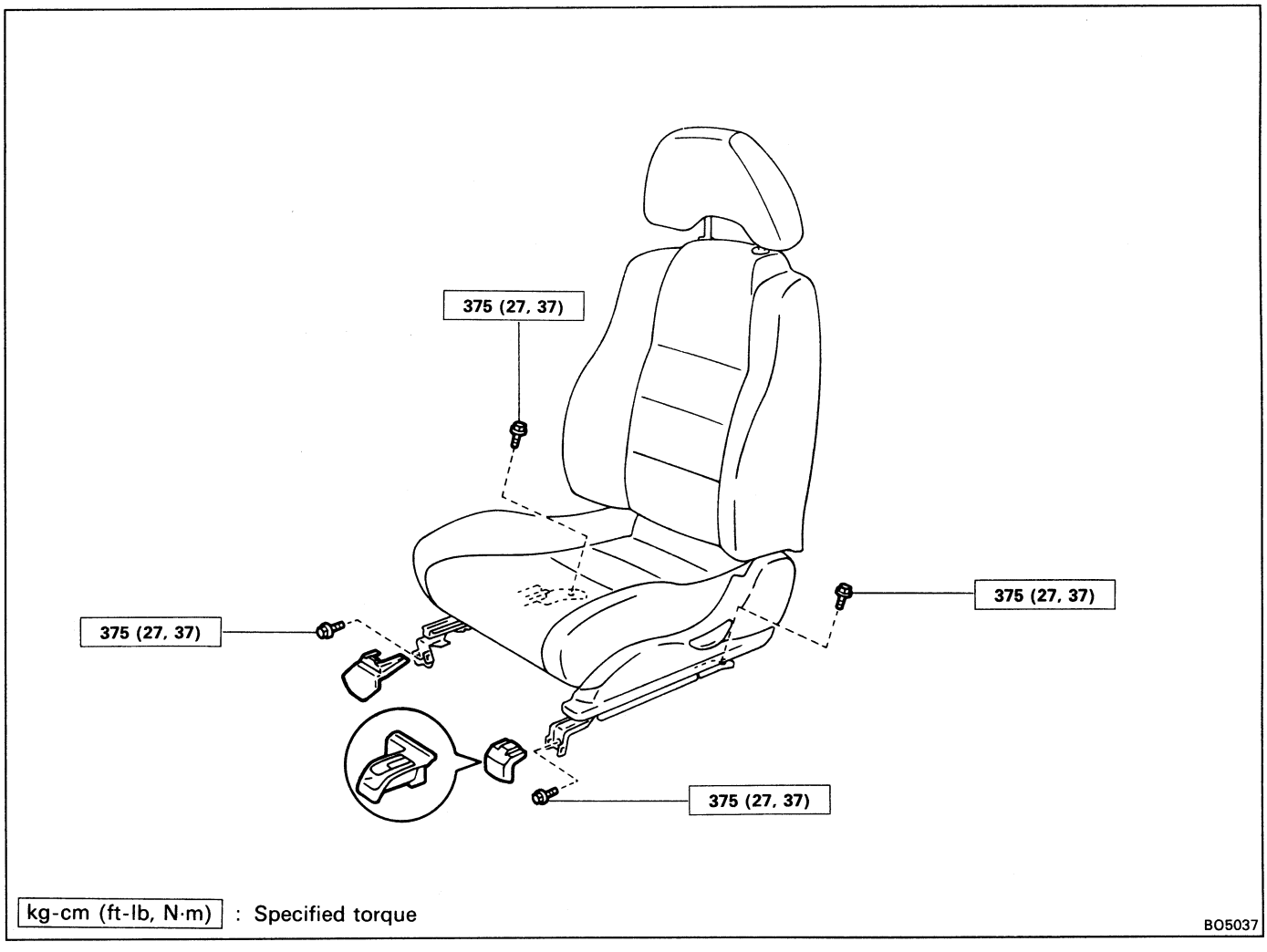
INSTALLATION OF INSTRUMENT PANEL

(See page BO-68 and 64)

INSTALL INSTRUMENT PANEL PARTS BY FOLLOWING REMOVAL SEQUENCE IN REVERSE

SEAT

COMPONENTS

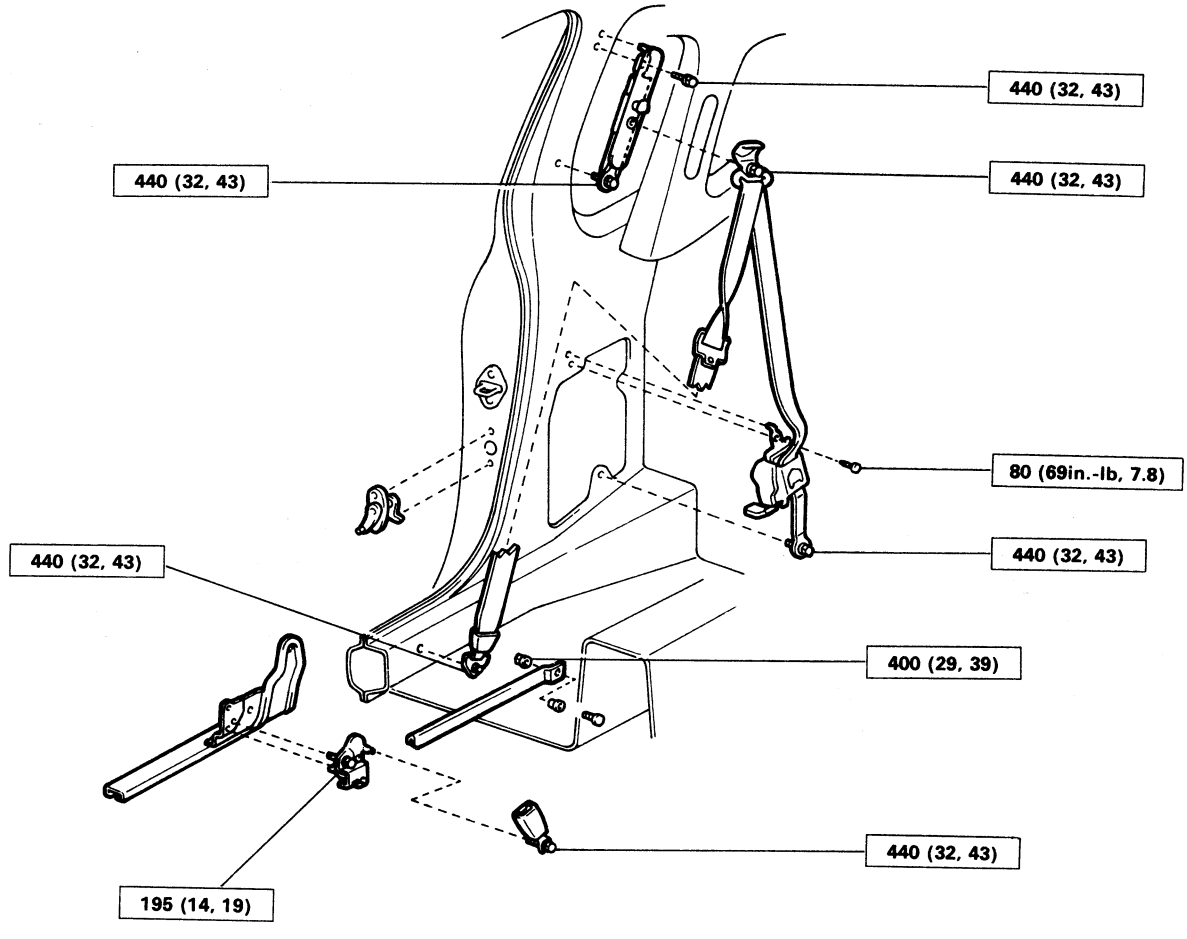


kg-cm (ft-lb, N·m) : Specified torque

BO5037

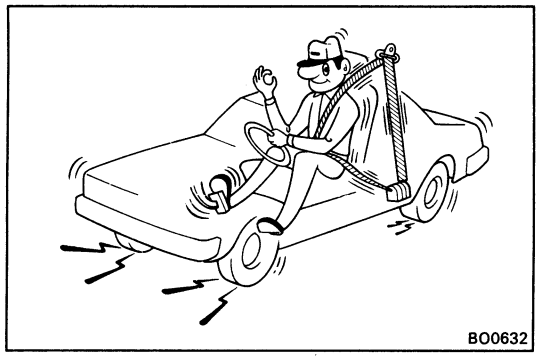
SEAT BELTS

COMPONENTS



kg-cm (ft-lb, N·m) : Specified torque

BO5089



SEAT BELTS

[Emergency Locking Retractor (ELR) Type]

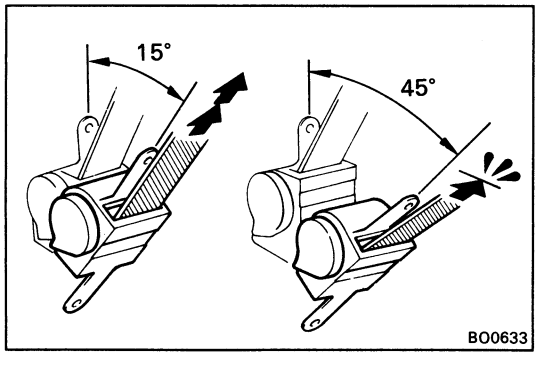
1. RUNNING TEST (IN SAFE AREA)

(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.

HINT: 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.



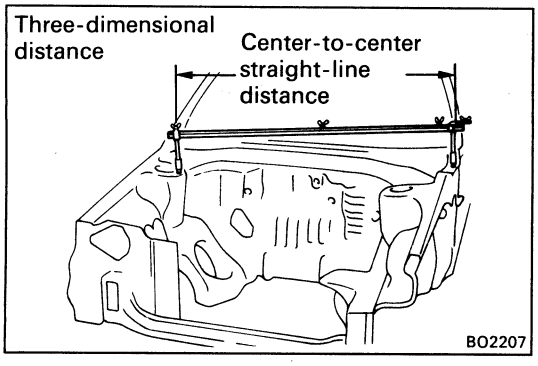
2. STATIC TEST

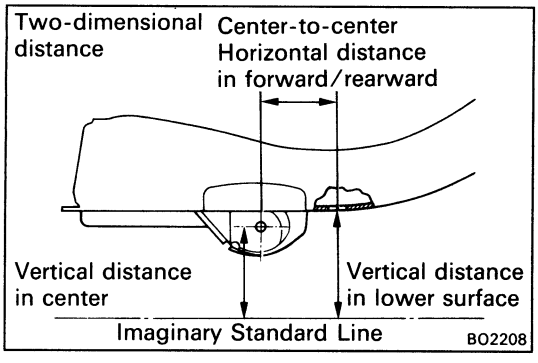
(a) Remove the locking retractor assembly.

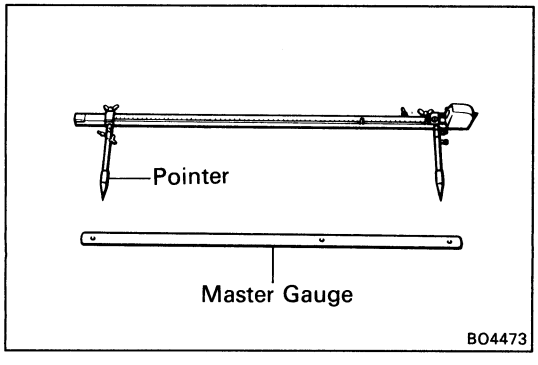
(b) Tilt the retractor slowly.

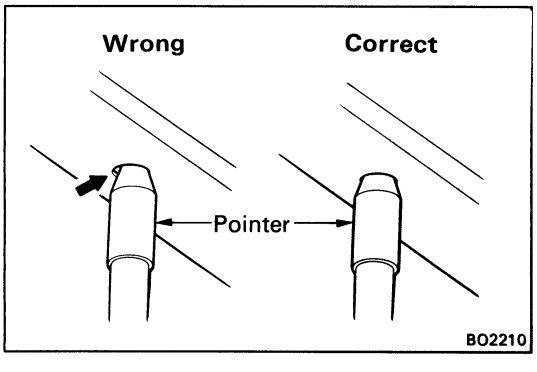
(c) Verify that the belt can be pulled out at a tilt of 15 degrees or less, and cannot be pulled out at over 45 degrees of tilt.

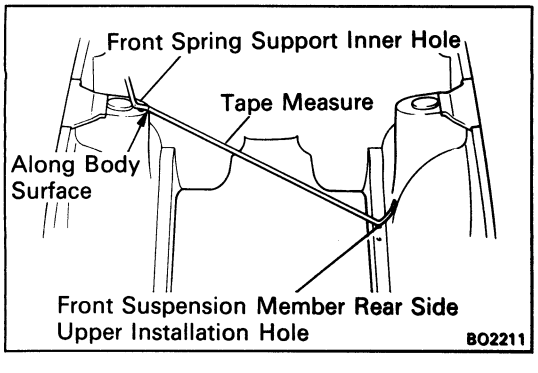
If a problem is found, replace the assembly.











BODY DIMENSIONS

General Information

1. BASIC DIMENSIONS

(a) There are two types of dimensions in the diagram.

(Three-dimensional distance)

- Straight-line distance between the centers of two measuring points.

(Two-dimensional distance)

- Horizontal distance in forward/rearward between the centers of two measuring points.
- The height from an imaginary standard line.

(b) In cases in which only one dimension is given, left and right are symmetrical.

(c) The dimensions in the following drawing indicate actual distance. Therefore, please use the dimensions as a reference.

2. MEASURING

(a) Basically, all measurements are to be done with a tracking gauge. For portions where it is not possible to use a tracking gauge, a tape measure should be used.

(b) Use only a tracking gauge that has no looseness in the body, measuring plate, or pointers.

HINT:

1. The height of the left and right pointers must be equal.
2. Always calibrate the tracking gauge before measuring or after adjusting the pointer height.
3. Take care not to drop the tracking gauge or otherwise shock it.
4. Confirm that the pointers are securely in the holes.

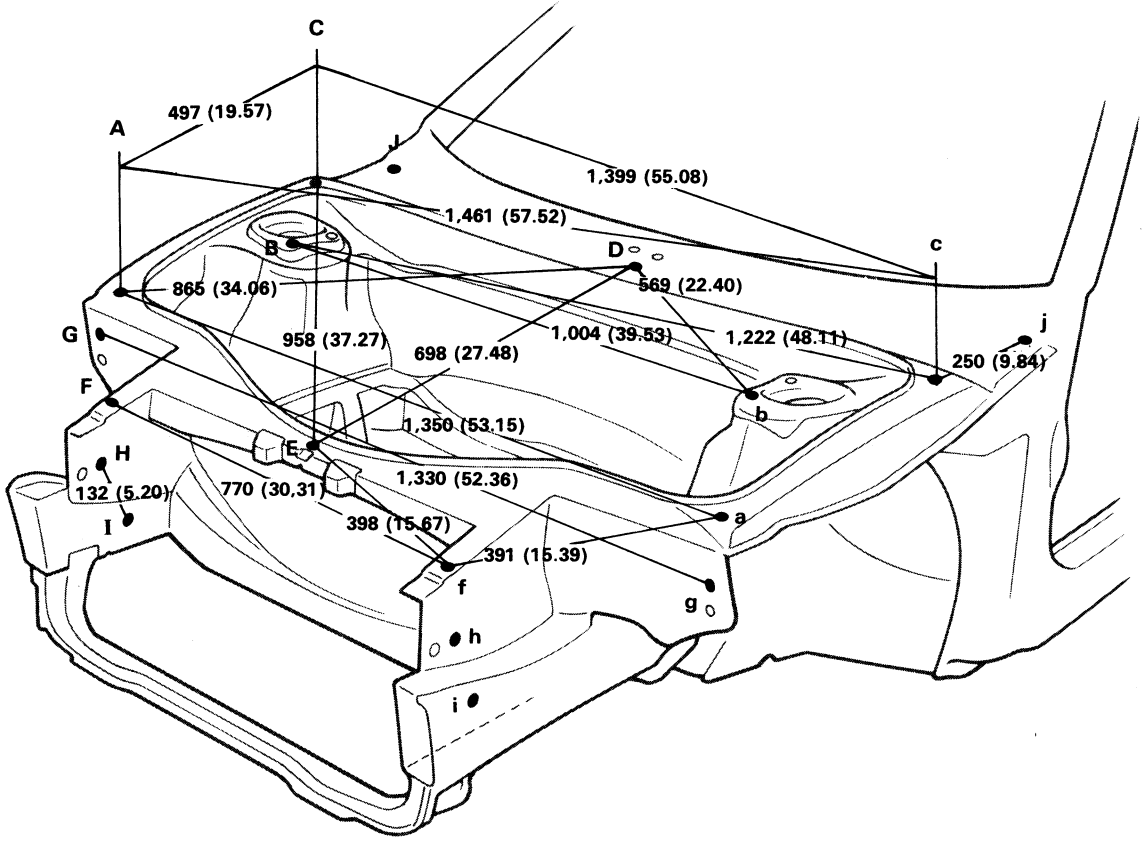
(c) When using a tape measure, avoid twists and bends in the tape.

(d) When tracking a diagonal measurement from the front spring support inner hole to the suspension member upper rear installation hole, measure along the front spring support panel surface.

Body Dimensions

FRONT LUGGAGE COMPARTMENT

(Three-Dimensional Distance)



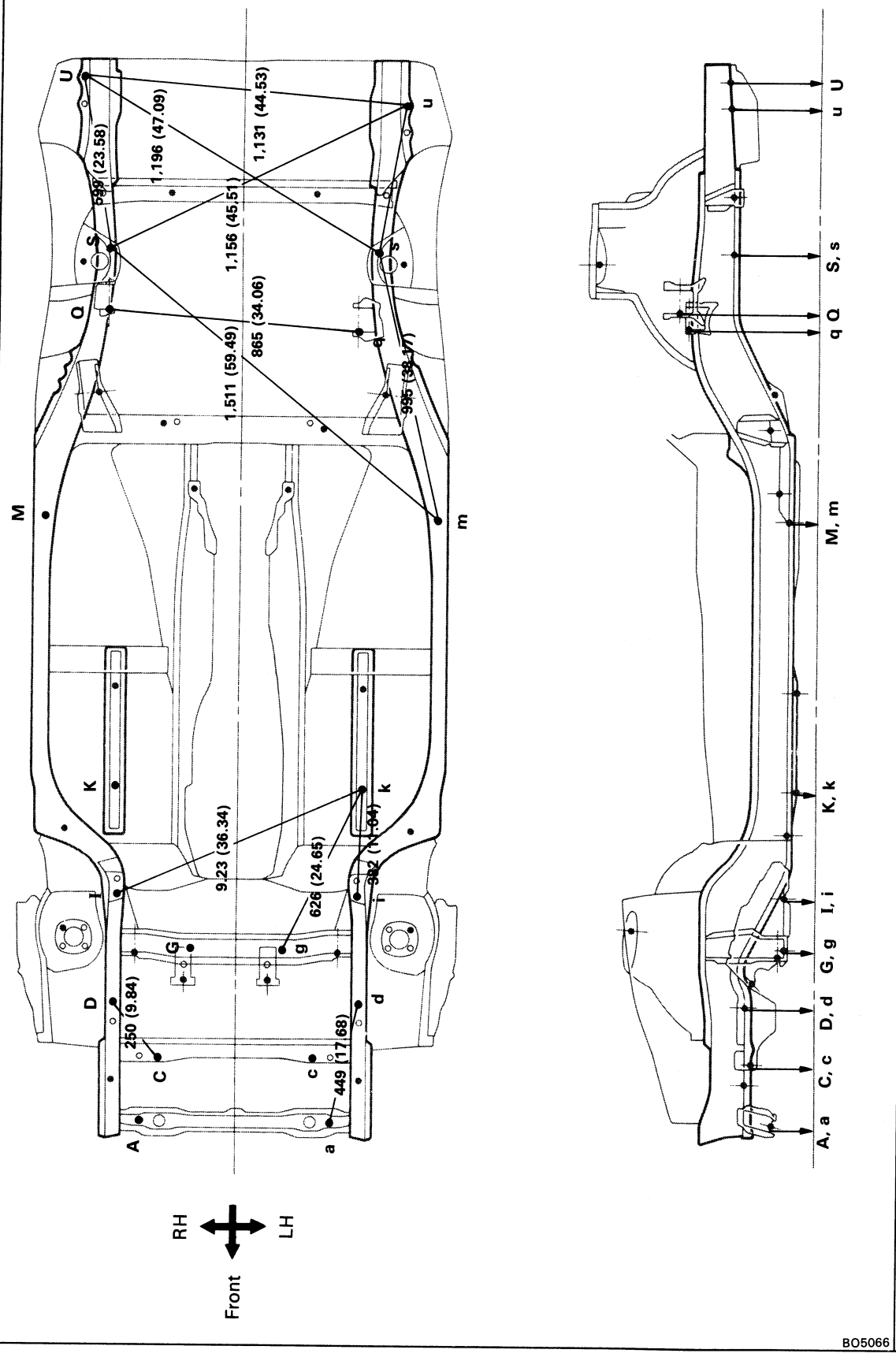
mm(in.)

Symbol	Name	Hole dia.
A, a	Front fender installation nut – front	6 (0.24) nut
B, b	Front suspension brace installation nut	10 (0.39) nut
C, c	Front fender installation nut – rear	6 (0.24) nut
D	Wiper pivot installation hole (center)	7 (0.28)
E	Radiator upper seal installation hole (center)	7 (0.28)
F, f	Radiator upper seal installation hole	7 (0.28)
G, g	Front luggage end panel standard hole	10 (0.39)
H, h	Radiator support standard hole	10 (0.39)
I, i	Front side member standard hole	15 (0.59)
J, j	Hood hinge installation nut – rear	8 (0.31) nut

BO5065

UNDER BODY

(Three-Dimensional Distance)



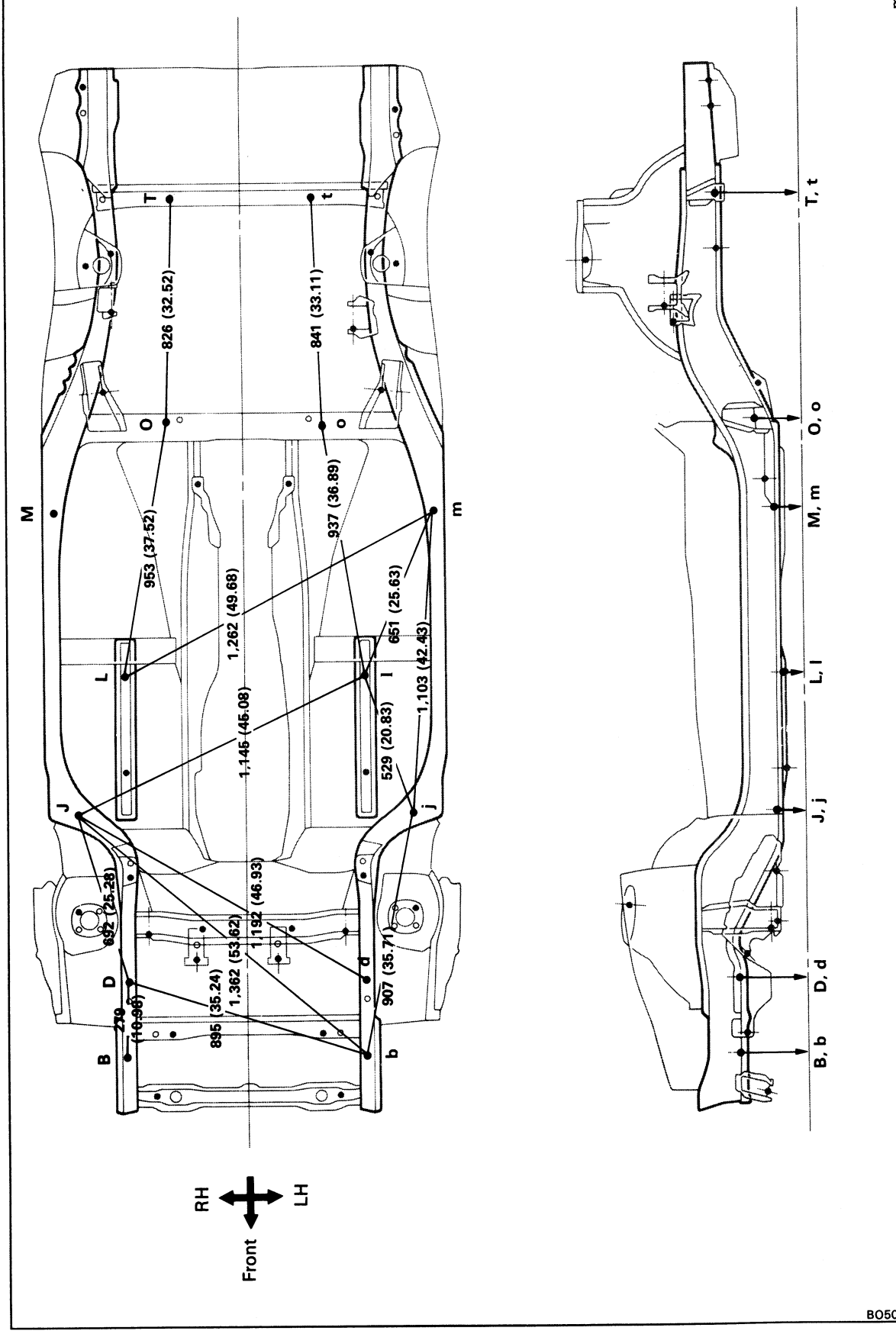
mm (in.)

Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Front cross member standard hole	10 (0.39)	K, k	Front floor under reinforcement standard hole	15 (0.59)
C, c	Strut bar bracket installation nut-front = inner	10 (0.39)	M, m	Rear floor side member standard hole	15 (0.59)
D, d	Strut bar bracket installation nut-rear = rear	10 (0.39)	Q, q	Engine mounting bracket hole-front	13 (0.51)
G, g	Steering gear box support member standard hole	15 (0.59)	S, s	Rear suspension cross member installation nut-front	14 (0.55) nut
I, i	Stabilizer bar installation nut-front	8 (0.31) nut	U, u	Tail pipe bracket installation nut	8 (0.31) nut

UNDER BODY (Con'd)

(Three-Dimensional Distance)

mm (in.)



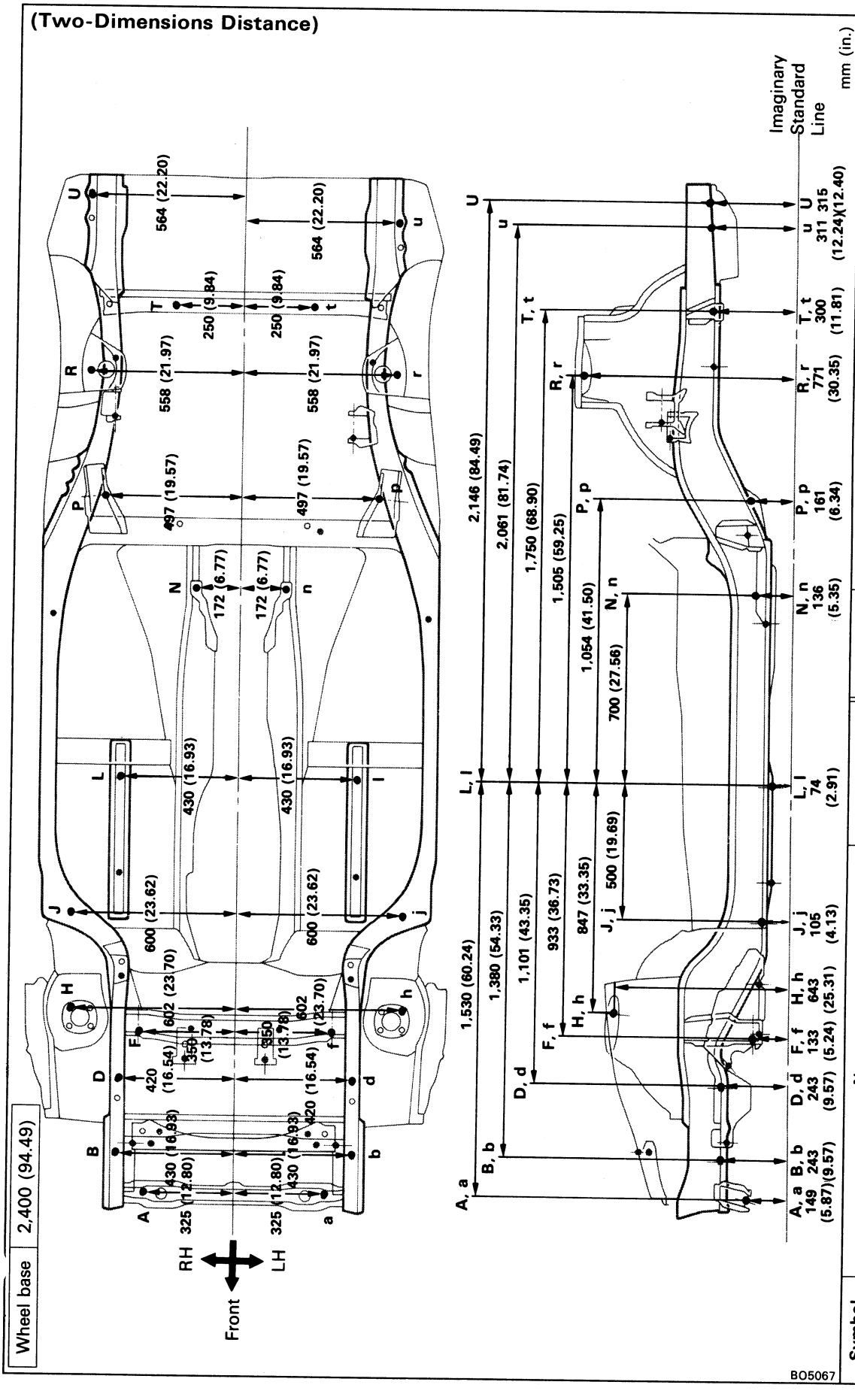
BO5066

Symbol	Name	Hole dia.
B, b	Front side member standard hole	15 (0.59)
D, d	Strut bar bracket installation nut-rear = rear	10 (0.39) nut
J, j	Front side member standard hole	15 (0.59)
L, l	Front floor under reinforcement standard hole	15 (0.59)

Symbol	Name	Hole dia.
M, m	Rear floor side member standard hole	15 (0.59)
O, o	Room partition cross member standard hole	15 (0.59)
T, t	Rear floor cross member standard hole	15 (0.59)
–	–	–

UNDER BODY (Con'd)

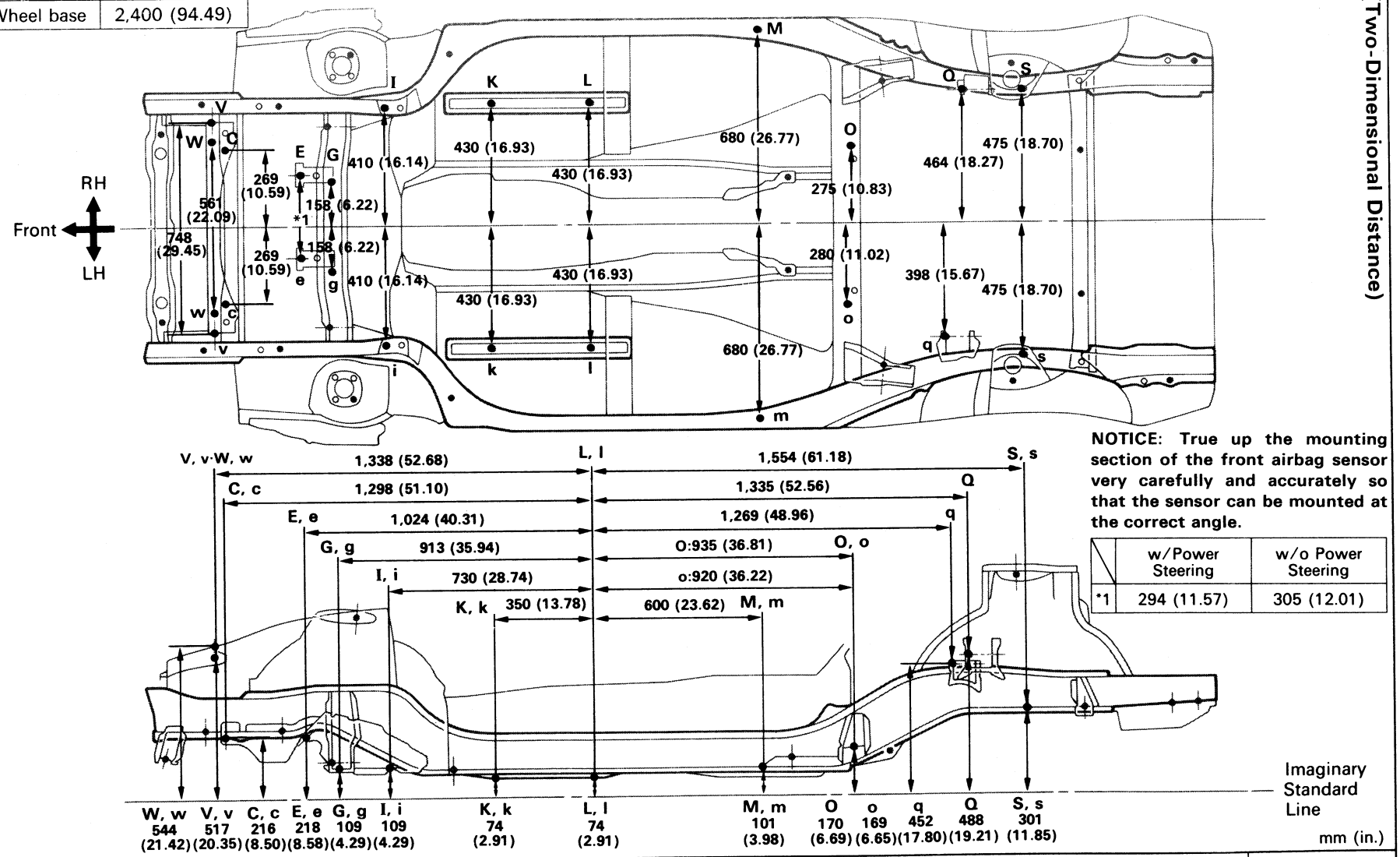
(Two-Dimensions Distance)



Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Front cross member standard hole	10 (0.39)	L, l	Front floor under reinforcement standard hole	15 (0.59)
B, b	Front side member standard hole	15 (0.59)	N, n	Center floor cross member No. 2 installation nut	8 (0.31) nut
D, d	Strut bar bracket installation nut-rear=rear	10 (0.39) nut	P, p	Strut bar installation hole	12 (0.47)
F, f	Lower arm installation hole	13 (0.51)	R, r	Rear spring support hole-outer	11 (0.43)
H, h	Front spring support hole-rear=outer	9 (0.35)	T, t	Rear floor cross member standard hole	15 (0.59)
J, j	Front side member standard hole	15 (0.59)	U, u	Tail pipe bracket installation nut	8 (0.31) nut

(Two-Dimensional Distance)

Wheel base	2,400 (94.49)



NOTICE: True up the mounting section of the front airbag sensor very carefully and accurately so that the sensor can be mounted at the correct angle.

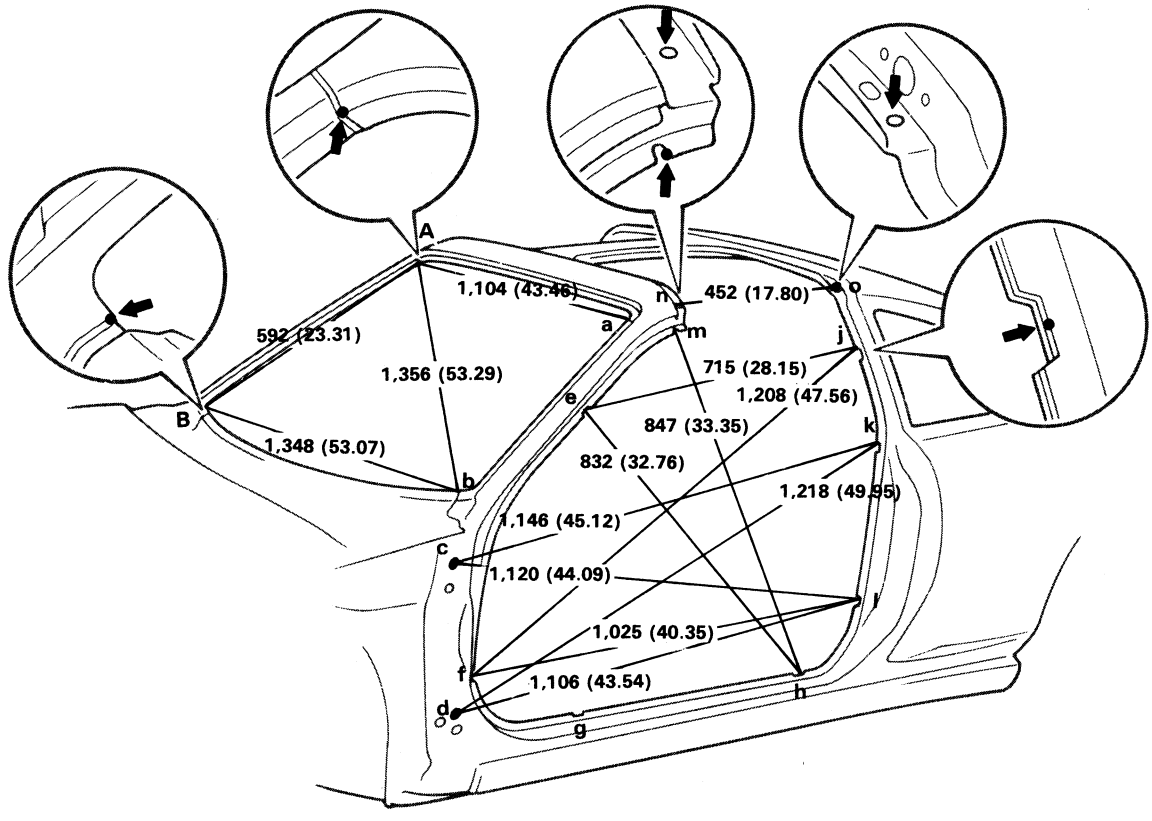
	w/Power Steering	w/o Power Steering
*1	294 (11.57)	305 (12.01)

BO5067

Symbol	Name	Hole dia.	Sumbol	Name	Hole dia.
C, c	Strut bar bracket installation nut-front=inner	10 (0.39) nut	M, m	Rear floor side member standard hole	15 (0.59)
E, e	Steering gear box installation nut	10 (0.39) nut	O, o	Room partition cross member standard hole	15 (0.59)
G, g	Steering gear box support member standard hole	15 (0.59)	Q, q	Engine mounting bracket hole-front	13 (0.51)
I, i	Stabilizer bar installation nut-front	8 (0.31) nut	S, s	Rear suspension cross member installation nut-front	14 (0.55) nut
K, k	Front floor under reinforcement standard hole	15 (0.59)	V, v	Airbag front sensor installation hole-outer	10 (0.39)
L, l	Front floor under reinforcement standard hole	15 (0.59)	W, w	Airbag front sensor installation hole-inner	11x9 (0.43x0.35)

BODY OPENING AREAS (Side View: w/T-Bar Roof)

(Three-Dimensional Distance)



Vehicle Dimensions Left ↔ Right

E-e	F-f	G-g	H-h	J-j	K-k	L-l	M-m	N-n	O-o
1,253 (49.33)	1,402 (55.02)	1,444 (56.85)	1,444 (56.85)	1,233 (48.54)	1,378 (54.25)	1,412 (55.59)	1,101 (43.35)	1,039 (40.91)	1,065 (41.93)

HINT: For symbols, capital letters indicate right side of vehicle, small letters indicate left side of vehicle (Seen for rear).

E-g or e-G	E-h or e-H	E-j or e-J	F-g or f-G	F-l or f-L	G-h or g-H	G-j or g-J	H-j or h-J	H-k or h-K	H-m or h-M	J-l or j-L	J-m	J-M	N-o or n-O
1,510 (59.45)	1,581 (62.24)	1,434 (56.46)	1,455 (57.28)	1,741 (68.54)	1,545 (60.83)	1,713 (67.44)	1,540 (60.63)	1,515 (59.65)	1.519 (59.80)	1,433 (56.42)	1,258 (49.53)	1,257 (49.49)	1,145 (45.08)

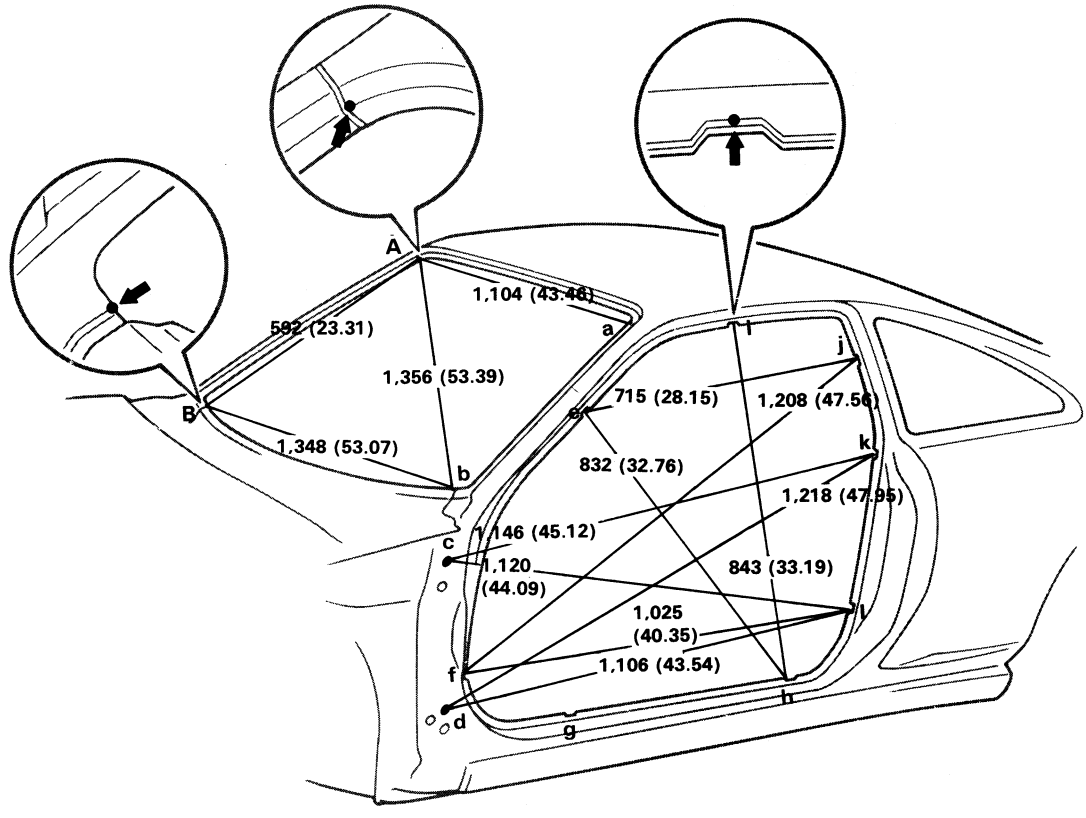
mm (in.)

Symbol	Name	Hole dia.
A, a	Roof panel/Front body pillar adjoining portion	–
B, b	Front body pillar/Cowl panel adjoining portion	–
C, c	Front door hinge installation nut	8 (0.31) nut
D, d	Front door hinge installation nut	8 (0.31) nut
E, e	Front body pillar assembly mark	–
F, f	Front body pillar assembly mark	–
G, g	Rocker panel assembly mark	–
H, h	Rocker panel assembly mark	–
J, j	Quarter panel assembly mark	–
K, k	Quarter panel assembly mark	–
L, l	Quarter panel assembly mark	–
M, m	Front body pillar cut-out portion	–
N, n	Removable roof weatherstrip installation hole	7 (0.28)
O, o	Removable roof weatherstrip installation hole	7 (0.28)

BO5068

BODY OPENING AREAS (Side View: w/o T-Bar Roof)

(Three-Dimensional Distance)



Vehicle Dimensions Left ↔ Right

E-e	F-f	G-g	H-h	I-i	J-j	K-k	L-l
1,253 (49.33)	1,402 (55.20)	1,444 (56.85)	1,444 (56.85)	1,078 (42.44)	1,233 (48.54)	1,378 (54.25)	1,412 (55.59)

HINT: For symbols, capital letters indicate right side of vehicle, small letters indicate left side of vehicle (See for rear).

E-g or e-G	E-h or e-H	E-j or e-J	E-l or e-L	F-g or f-G	F-l or f-L	G-h or g-H	G-j or g-J	H-i or h-I	H-j or h-J	H-k or h-K	J-l or j-L
1,510 (59.45)	1,581 (62.24)	1,434 (56.46)	1,579 (62.17)	1,455 (57.28)	1,741 (68.54)	1,545 (60.83)	1,713 (67.44)	1,506 (59.29)	1,540 (60.23)	1,515 (59.65)	1,433 (56.42)

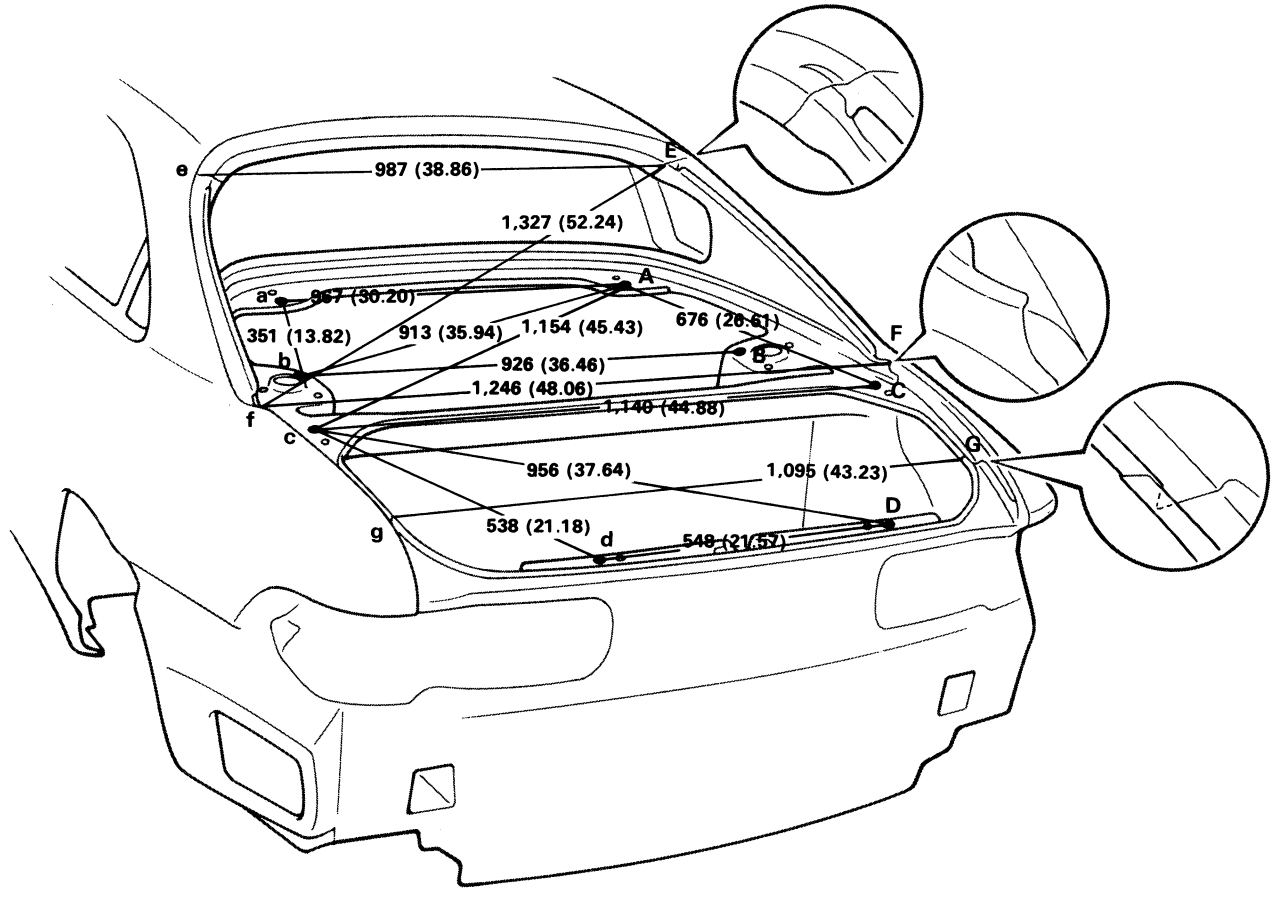
mm (in.)

Symbol	Name	Hole dia.
A, a	Roof panel/Front body pillar adjoining portion	–
B, b	Front body pillar/Cowl panel adjoining portion	–
C, c	Front door hinge installation nut	8 (0.31) nut
D, d	Front door hinge installation nut	8 (0.31) nut
E, e	Front body pillar assembly mark	–
F, f	Front body pillar assembly mark	–
G, g	Rocker panel assembly mark	–
H, h	Rocker panel assembly mark	–
I, i	Roof side rail assembly mark	–
J, j	Quarter panel assembly mark	–
K, k	Quarter panel assembly mark	–
L, l	Quarter panel assembly mark	–

BO5069

BODY OPENING AREAS (Rear View)

(Three-Dimensional Distance)



mm (in.)

Symbol	Name	Hole dia.
A, a	Engine hood hinge installation hole-rear	12 (0.47)
B, b	Rear sping support hole-inner = front	11 (0.43)
C, c	Luggage door hinge installation hole-front	9 (0.35)
D, d	Luggage finish plate installation hole	8.5 (0.335)
E, e	Roof panel/Roof side panel adjoining portion	–
F, f	Roof side panel/Quarter panel adjoining portion	–
G, g	Luggage opening trough/Quarter panel adjoining portion	–

BO5070

AIR CONDITIONING SYSTEM

	Page
GENERAL INFORMATION	AC-2
DESCRIPTION	AC-4
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REFRIGERATION LINES	AC-15
COMPRESSOR	AC-16
RECEIVER	AC-29
CONDENSER	AC-30
COOLING UNIT	AC-32
EVAPORATOR	AC-36
EXPANSION VALVE	AC-36
THERMISTOR	AC-37
A/C CONTROL ASSEMBLY	AC-38
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WATER TEMPERATURE SENSOR	AC-42
SERVOMOTORS	AC-43
BLOWER MOTOR	AC-43
CONDENSER FAN MOTOR	AC-44
BLOWER RESISTOR	AC-44
HEATER MAIN RELAY	AC-44
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FAN MAIN RELAY	AC-45
FAN RELAY NO. 1	AC-45
FAN RELAY NO. 2	AC-45
FAN RELAY NO. 3	AC-45
VACUUM HOSE CIRCUIT	AC-45
VACUUM SWITCHING VALVE (VSV)	AC-46
A/C AMPLIFIER	AC-47

GENERAL INFORMATION

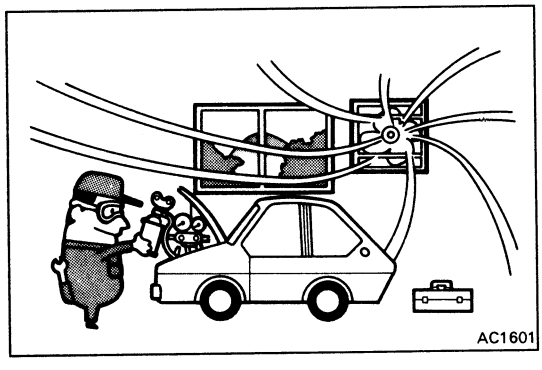
ELECTRICAL PARTS

Before removing and inspecting the electrical parts, set the ignition switch to the LOCK position and disconnect the negative (–) terminal cable from the battery.

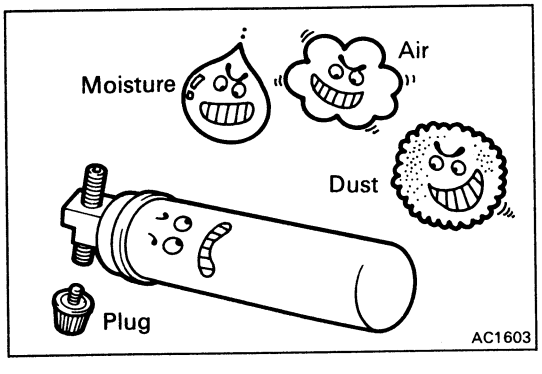
CAUTION: Work must not be started until sfter at least 20 seconds or longer from the time the negative (–) terminal cable is disconnected.

SRS AIRBAG SYSTEM

Failure to carry out service operation in the correct sequence could cause the airbag system to deploy, possibly leading to a serious accident.
When removal or installtion of the parts and the yellow wire harness and connector for the airbag is necessary, refer to the precautionary notices in the AB section before performing the operation.


AC1601


AC1602



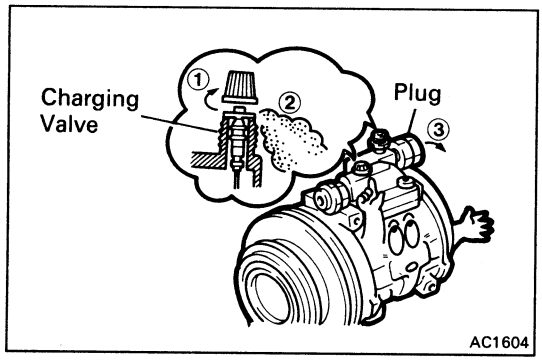
AC1603

REFRIGERATION SYSTEM

1. **WHEN HANDLING REFRIGERANT (R-12), FOLLOWING PRECAUTIONS MUST BE OBSERVED;**
   (a) Do not handle refrigerant in an enclosed area or near an open flame.
   (b) Always wear eye protection.
   (c) Be careful that liquid refrigerant does not get in your eyes or on your skin.

   If liquid refrigerant gets in your eyes or on your skin;
   - Do not rub.
   - Wash the area with lots of cool water.
   - Apply clean petroleum jelly to the skin.
   - Go immediately to a physician or hospital for professional treatment.
   - Do not attempt to treat yourself.

2. **WHEN REPLACING PARTS IN REFRIGERANT LINE;**
   (a) Discharge the refrigerant in the line slowly before replacement.
   (b) Insert a plug immediately in disconnected parts to prevent the entry of moisture and dust.
   (c) Do not leave a new condenser or receiver, etc., lying around with the plug removed.

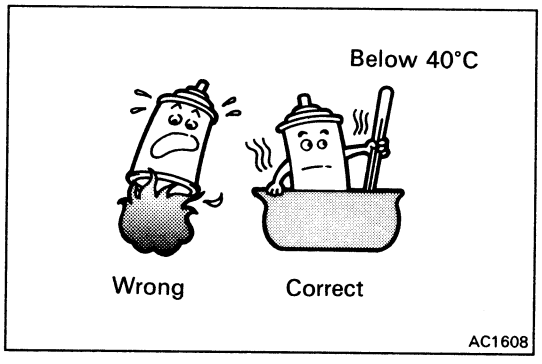


(d) Discharge the refrigerant from the charging valve before installing a new compressor.

If the refrigerant is not discharged first, compressor oil will spray out with the refrigerant gas when the plug is removed.

(e) Do not use a torch for tube bending or lengthening operations.

If tubes are heated with a torch, a layer of oxidation forms inside the tube, causing the same king of trouble as an accumulation of dust.



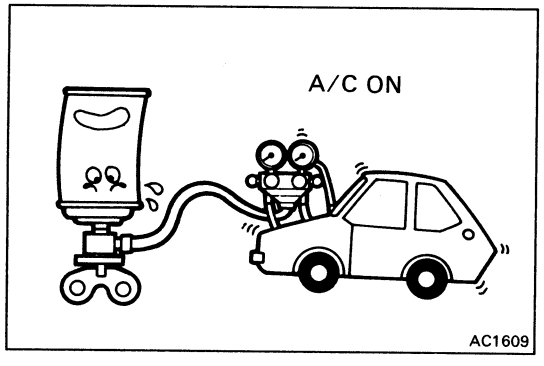
3. WHEN HANDLING REFRIGERANT CONTAINER (SERVICE CAN);

(a) The container must never be heated.

(b) Containers must be kept below 40°C (104°F)

(c) If warming a service can with hot water, be careful that the valve on top of the service can is never immersed in the water, as the water may permeate the refrigerant cycle.

(d) Empty service cans must never be re-used.



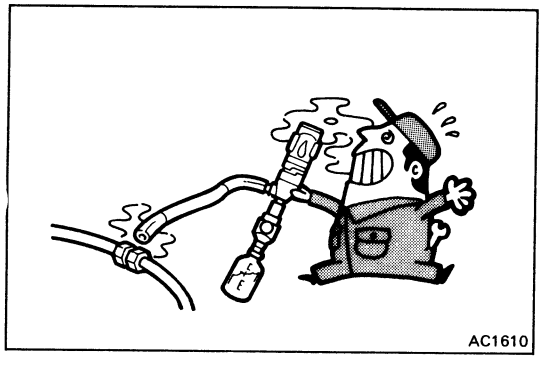
4. WHEN A/C IS ON AND REFRIGERANT GAS IS BEING REPLENISHED;

(a) If there is not enough refrigerant gas in the refrigerant cycle, oil lubrication will be insufficient and compressor burnout may occur, so take care to avoid this.

(b) If the valve on the high pressure side is opened, refrigerant flows in the reverse direction and could cause the service can to rupture, so open and close the valve on the low pressure side only.

(c) If the service can is inverted and refrigerant is loaded in a liquid state, the liquid is compressed and causes the compressor to break down, so the refrigerant must be in a gaseous state.

(d) Be careful not to load too much refrigerant gas, as this cause trouble such as inadequate cooling, poor fuel economy, engine overheating, etc.



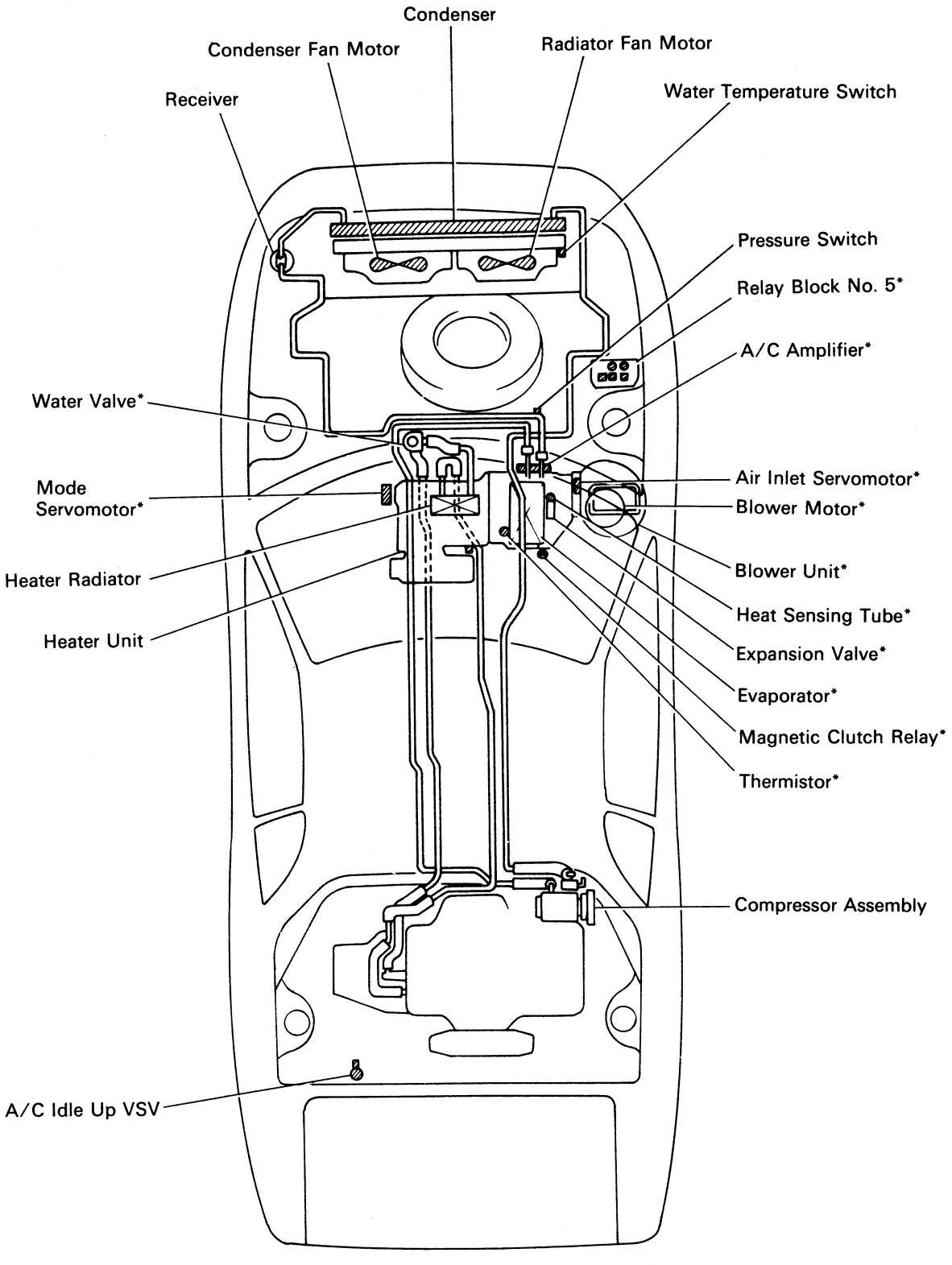
5. WHEN USING GAS-CYLINDER TYPE GAS LEAK TESTER;

(a) As a naked flame is used, first make sure that there are no flammable substances nearby before using it.

(b) Be careful, as a poisonous gas is produced when refrigerant gas comes in contact with heated parts.

DESCRIPTION

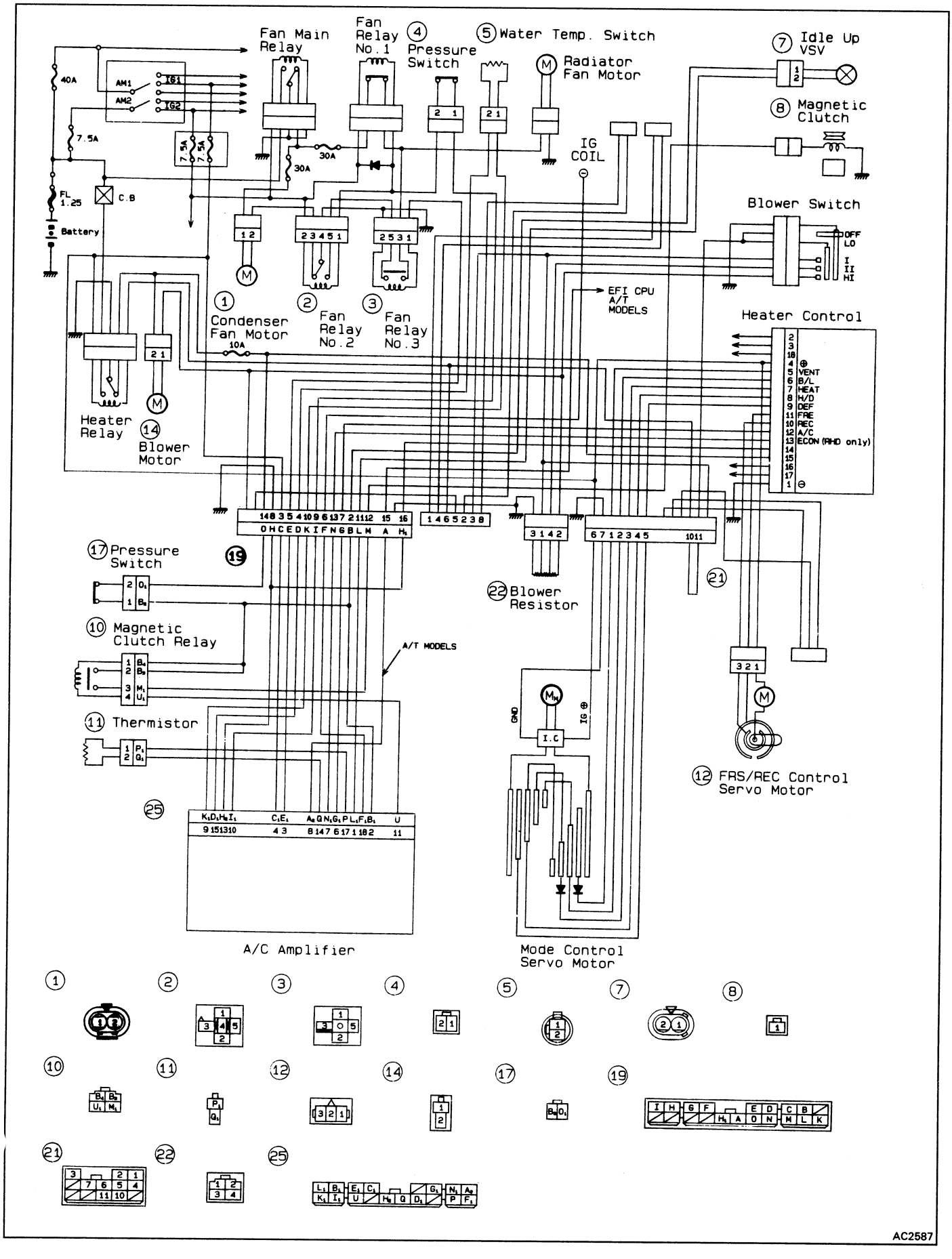
LOCATIONS OF A/C SYSTEM



RHD vehicles, for parts marked (*), are in always symmetrically opposite to LHD vehicles.

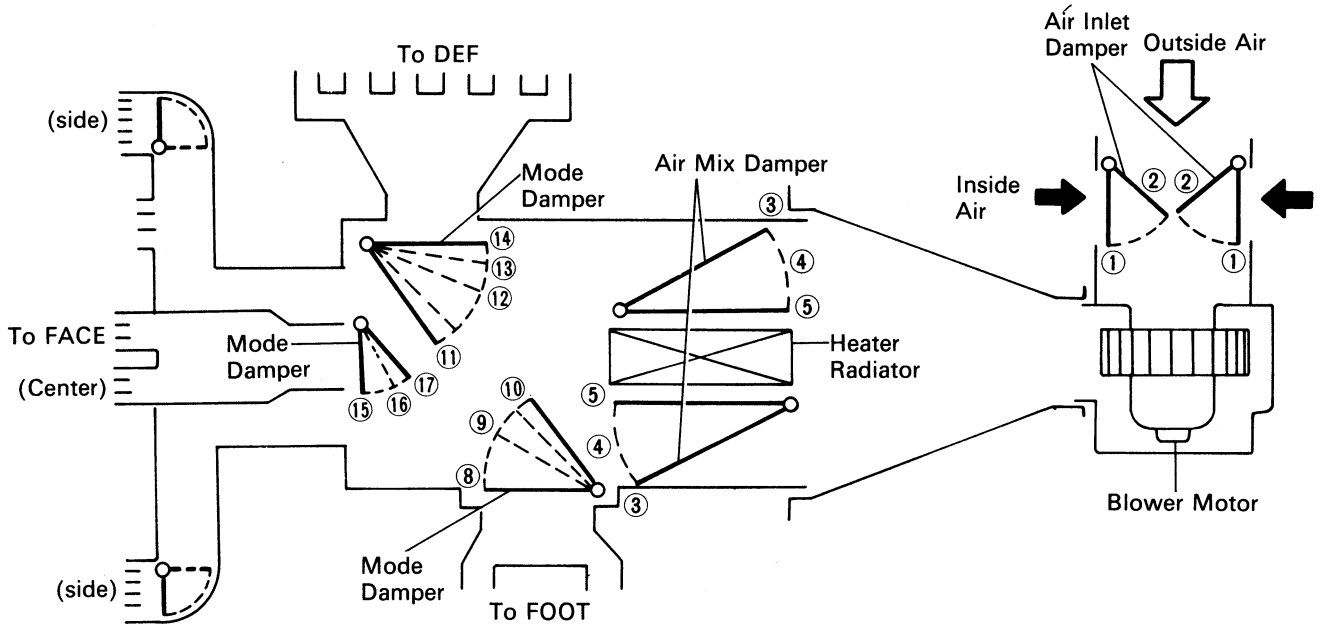
AC2586

ELECTRICAL WIRING DIAGRAMS



AC2587

DAMPARS POSITION



A/C control switch	A/C control lever position	Dampers position	Air flow vents			
			FACE		FOOT	DEF
			Center	Side		
Air Inlet Control Lever	Fresh	①				
	Recirc	②				
Temperature Control Lever	Warm ⇕ Cool	③ ⇕ ④ ⇕ ⑤				
Mode Control Lever	Def.	⑧ ⑪ ⑮		○		◯
	Foot/Def.	⑨ ⑫ ⑮		○	○	○
	Foot	⑩ ⑬ ⑮		○	◯	○
	Bi-Level	⑨ ⑭ ⑯	○	○	○	
	Face	⑧ ⑭ ⑰	◯	◯		

The size of circle (○) indicates the proportion of the air flow volume.

AC2588
001BE

PREPARATION

SPECIAL TOOLS AND EQUIPMENT

Tool	SST No.	Use
Air conditioner service tool set	07110-58011	To evacuate and charge system
Ohmmeter	–	To perform electrical diagnosis
Voltage meter	–	To perform electrical diagnosis
Ammeter	–	To perform electrical diagnosis
Magnetic clutch tool set	07110-77011	General set for magnetic clutch
Magnetic clutch remover	07112-71010	To remove pressure plate
Snap ring pliers (External type)	07114-84020	To remove and install rotor and stator
Key remover	07112-45021	To remove key
Seal plate remover	07112-15010	To remove seal plate
Seal plate presser	07114-15010	To remove and install shaft seal
Hexagon wrench set	07110-61050	To remove and install service valve and front housing
Shaft seal remover	07112-25010	To install seal plate
Key replacer	07114-45010	To install key

SSM (SPECIAL SERVICE MATERIALS)

Part Name	Part No.	Use etc.
DENSOOIL 6, SUNISO No. 5GS or equivalent	07117-68040 –	Compressor

TROUBLESHOOTING

You will find the cause of trouble more easily by properly using the table shown below. In this table, the numbers indicate the order of priority of the causes of trouble. Check each part in the order shown. If necessary, replace the part.

See page / Parts Name / Trouble	AC-12	AC-10	AC-14	AC-5	AC-5	AC-5	AC-42	AC-37	CO-42	AC-44	AC-44	CO-45	AC-44	AC-43
	Inspect Volume of Refrigerant	Inspect Refrigeration System with Manifold Gauge Set	Inspect Drive Belt Tension	Fusible Link (ALT)	Circuit Breaker (HEATER)	Fuse (A/C)	Pressure Switch	Thermistor	Water Temp. Sensor	Heater Main Relay	Magnetic Clutch Relay	Engine Main Relay and Fan Relay No. 1, 2, 3	Blower Resistor	Air Inlet Servomotor
No blower operation				1	2					3			6	
No blower control														
No air flow mode control														
No air inlet control														2
Insufficient flow of cool air										1			3	
Insufficient flow of warm air										1			3	
No cool air comes out	3	4	5			1	6	12			2			
Cool air comes out intermittently	1	2	3					5						
Cool air comes out only at high engine speed	2	3	1											
Insufficient cooling	1	2	3					13	7			6		
No warm air comes out														
Air temp. control not functioning														
No engine idle up when A/C switch on														

Mode Servomotor	Blower Motor	Condenser Fan Motor	A/C Control Assembly	A/C Amplifier	Compressor	Condenser	Evaporator	Expansion Valve (Replace)	Magnetic Clutch	Receiver	Water Valve	Radiator (in Heater Unit)	A/C Idle Up VSV	Wiring or Wiring Connection
AC-43	AC-43	CO-44	AC-38	AC-47	AC-16	AC-30	AC-36	—	AC-16	AC-29	—	—	AC-46	AC-5
	5		4											7
			1											3
2			1											3
			1											3
	2						4							5
	2											4		5
			10	11	8				7		9			13
				4				6						7
					5	4								
		8		12	11	4	14	15	10	5	9			
			2								1	3		4
			2								1			3
				2									1	3

REFRIGERATION SYSTEM

INSPECTION OF REFRIGERATION SYSTEM WITH MANIFOLD GAUGE SET

This is a method in which the trouble is located by using a manifold gauge set. (See "Installation of Manifold Set" on page AC-13.) Read the manifold gauge pressure when the following conditions are established:

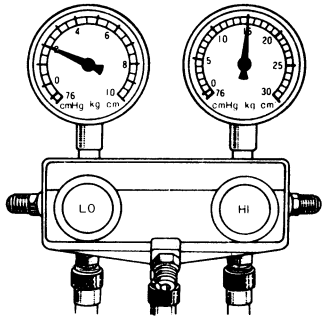
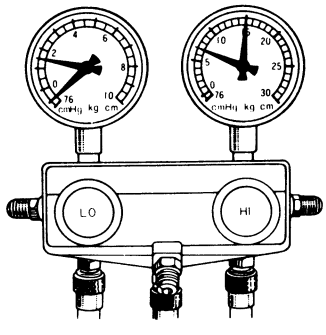
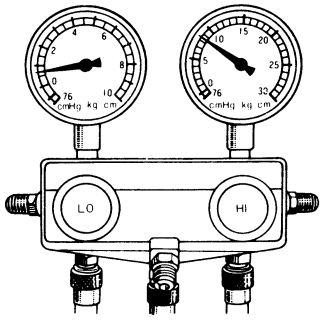
(a) Temperature at the air inlet with the switch set at RECIRC is 30 – 35°C (86 – 95°F)

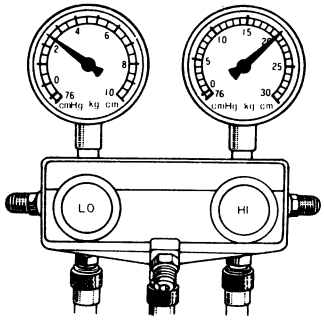
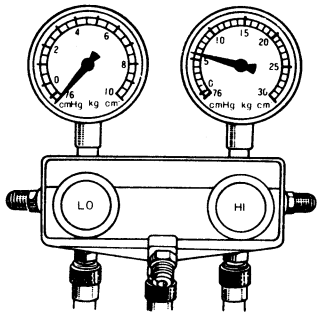
(b) Engine running at 2,000 rpm

(c) Blower fan speed control switch set at high speed

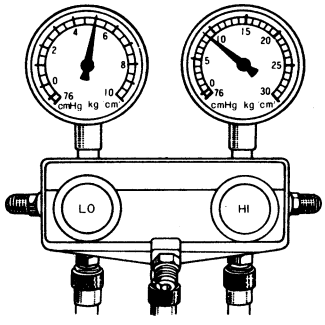
(d) Temperature control switch set at max cool side

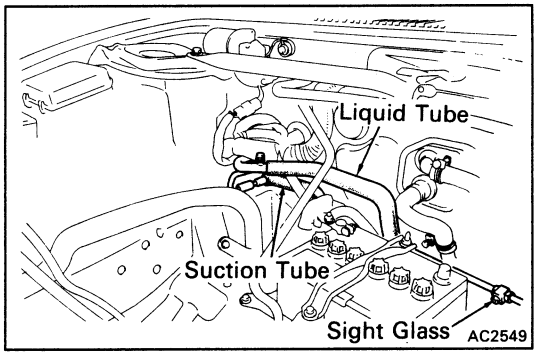
HINT: It should be noted that the gauge indications may vary slightly due to ambient temperature conditions.

No.	Gauge reading kg/cm² (psi, kPa)	Condition	Probable	Remedy
1	LO: 1.5 – 2.0 (21 – 28, 147 – 196) HI: 14.5 – 15.0 (206 – 213, 1,422 – 1,471)  AC0067	Normal cooling	Normally functioning system	
2	During operation, pressure at low pressure side sometimes becomes a vacuum and sometimes normal  AC0068	Periodically cools and then fails to cool	Moisture present in refrigeration system	(1) Replace receiver (2) Remove moisture in system through repeatedly evacuating air (3) Charge with refrigerant to proper amount
3	Pressure low at both low and high pressure sides  AC0069	● Insufficient cooling ● bubbles seen in sight glass	Insufficient refrigerant	(1) Using gas leak tester, check for leakage (2) Charge refrigerant to proper amount
		● Insufficient cooling ● Frost on tubes from receiver to unit	Refrigerant flow obstructed by dirt in receiver	Replace receiver

No.	Gauge reading kg/cm² (psi, kPa)	Condition	Probable cause	Remedy
4	Pressure too high at both low and high pressure side	Insufficient cooling	Insufficient cooling of condenser	(1) Clean condenser (2) Check fan motor operation
5			Refrigerant over charged	Check amount of refrigerant HINT: Vent out refrigerant throuh gauge manifold low pressure side by gradually opening valve
6			Air present in system	(1) Replace receiver (2) Check compressor oil to see if dirty or insufficient (3) Evacuate air and charge with new refrigerant
7	AC0070	● Insufficient cooling ● Frost or large amount of dew on piping at low pressure side	Expansion valve improperly mounted, heat sensing tube defective (Opens too wide)	(1) Check heat sensing tube installation condition (2) If (1) is normal, check expansion valve (3) Replace if defective
8	Vacuum indicated at low pressure side, very low pressure indicated at high pressure  AC0156	● Does not cool (Cools from time to time in some cases) ● Frost or dew seen on piping before and after receiver or expansion valve	Refrigerant does not circulate	Alow to stand for some time and then restart operation to determine if trouble is caused by moisture or dirt If caused by moisture refer to procedures step 2 on page AC-10 If caused by dirt, remove expansion valve and clean off dirt by blowing with air. If not able to remove dirt, replace valve Evacuate air and charge with new refrigerant to proper amount For gas leakage from heat sensing tube, replace expansion valve

HINT at No. 6
These gauge indications are shown when the refrigeration system has been opened and the refrigerant charged without evacuating air.

No.	Gauge reading kg/cm² (psi, kPa)	Condition	Probable cause	Remedy
9	Pressure too high at low pressure side, pressure too low at high pressure side.  AC0157	Does not cool	Insufficient compression	Repair or replace compressor



INSPECTION OF REFRIGERANT VOLUME

1. **RUN ENGINE AT APPROX. 1,500 RPM**
2. **OPERATE A/C AT MAXIMUM COOLING FOR A FEW MINUTES**
3. **INSPECT AMOUNT OF REFRIGERANT**
   Observe the sight glass on the liquid tube.

Item	Symptom	Amount of refrigerant	Remedy
1	Bubbles present in sight glass	Insufficient*	Check for gas leakage 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 out let	Empty or nearly empty	Evacuate and charge system. Then check for gas leakage 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 air conditioner is turned off, refrigerant in sight glass stays clear	Too much	Discharge excess refrigerant to specified amount
6	When air conditioner is turned off, refrigerant foams and then stays clear	Proper	Refer to items 3 and 4

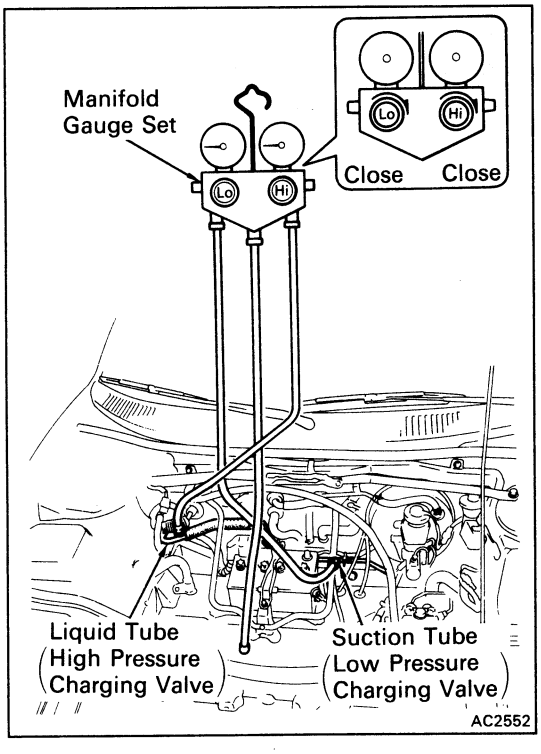
*: Bubbles in the sight glass with ambient temperatures higher can be considered normal if cooling is sufficient.

DISCHARGING OF REFRIGERANT IN REFRIGERATION SYSTEM

(See Air Conditioning Fundamentals and Repairs Pub. No. 36950E)

EVACUATING OF AIR IN REFRIGERATION SYSTEM AND CHARGING WITH REFRIGERANT.

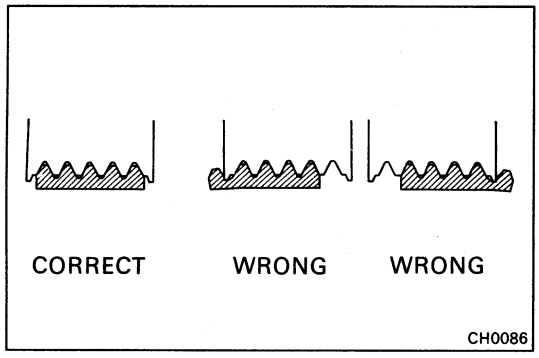
(See Air Conditioning Fundamentals and Repairs Pub. No. 36950E)



INSTALLATION OF MANIFOLD GAUGE SET

1. **CLOSE BOTH HIGH AND LOW HAND VALVES**
2. **CONNECT CHARGING HOSES TO CHARGING VALVES**
   (a) Connect the low pressure hose to the low pressure charging valve and the high pressure hose to the high pressure charging valve.
   (b) Tighten the hose nuts by hand.

NOTICE: Do not apply compressor oil to the seats of the connection.

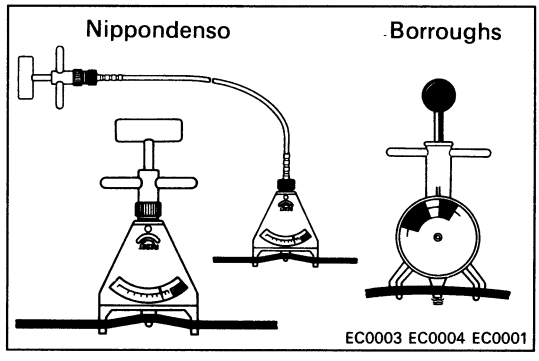


DRIVE BELT

INSPECTION OF DRIVE BELT TENSION

1. **MAKE SURE THAT DRIVE BELT IS INSTALLED CORRECTLY**

   Check that the drive belt fits properly in the ribbed grooves.



2. **INSPECT 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

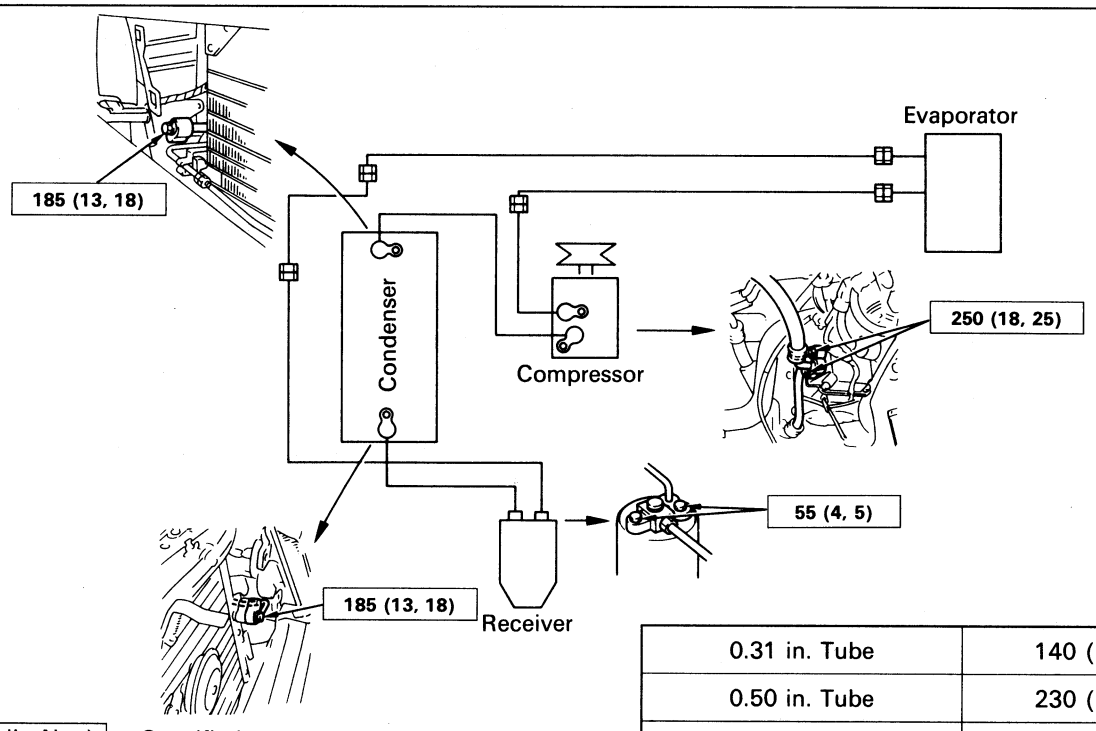
   Drive belt tension:

   New belt 160±25 lb
   Used belt 100±20 lb

   HINT:

   - "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
   - "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.

REFRIGERATION LINES



0.31 in. Tube	140 (10, 14)
0.50 in. Tube	230 (17, 23)
0.62 in. Tube	330 (24, 32)

kg-cm (ft-lb, N.m) : Specified torque

ON-VEHICLE INSPECTION

1. **INSPECT HOSE AND TUBE CONNECTIONS FOR LOOSENESS**

2. **INSPECT HOSES AND TUBES FOR LEAKAGE**

   Using a gas leak tester, check for leakage of refrigerant.

REPLACEMENT OF REFRIGERANT LINES

1. **DISCHARGE REFRIGERANT IN REFRIGERATION SYSTEM**

2. **REPLACE FAULTY TUBE OR HOSE**

   HINT: Cap the open fittings immediately to keep moisture or dirt out of the system.

3. **TORQUE CONNECTIONS TO SPECIFIED TORQUE**

   NOTICE: Connections should not be torqued tighter than the specified torque.

4. **EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT**

   Specified amount: 850 ± 50 g (29.98 ± 1.76 oz)

5. **INSPECT FOR LEAKAGE OF REFRIGERANT**

   Using a gas leak tester, check for leakage of refrigerant.

6. **INSPECT AIR CONDITIONER OPERATION**

COMPRESSOR

ON-VEHICLE INSPECTION (Magnetic Clutch)

INSPECT MAGNETIC CLUTCH FOR FOLLOWING

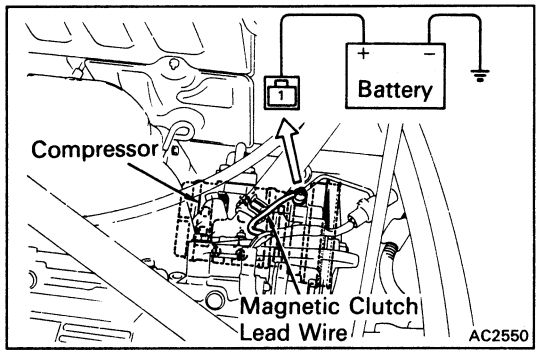
(a) Inspect the pressure plate and the rotor for signs of oil.

(b) Check the clutch bearings for noise and grease leakage.

(c) Connect the positive (+) lead from the battery to the terminal on the magnetic clutch connector and the negative (–) lead to the body ground.

(d) Check that the magnetic clutch is energized.

If the magnetic clutch is not energized, replace the magnetic clutch.



(Compressor)

1. **INSTALL MANIFOLD GAUGE SET**
   See page AC-13

2. **RUN ENGINE AT APPROX. 2,000 RPM**

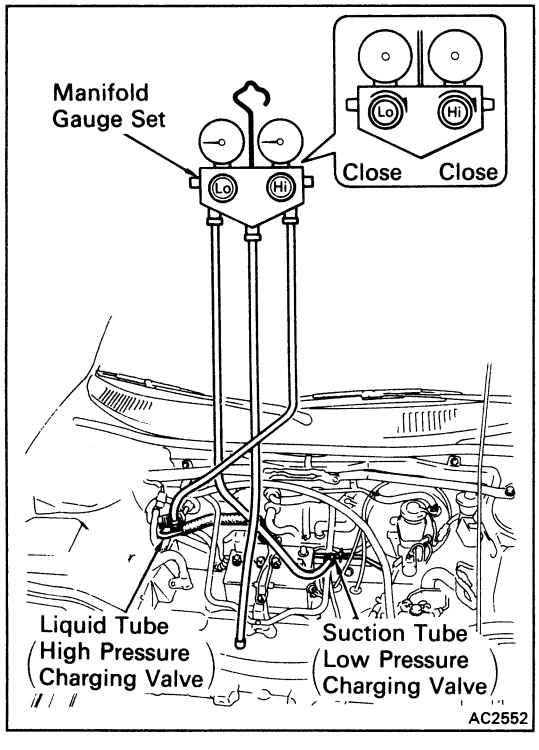
3. **INSPECT COMPRESSOR FOR FOLLOWING**

   (a) High pressure gauge reading is not lower and low pressure gauge reading is not higher than normal.

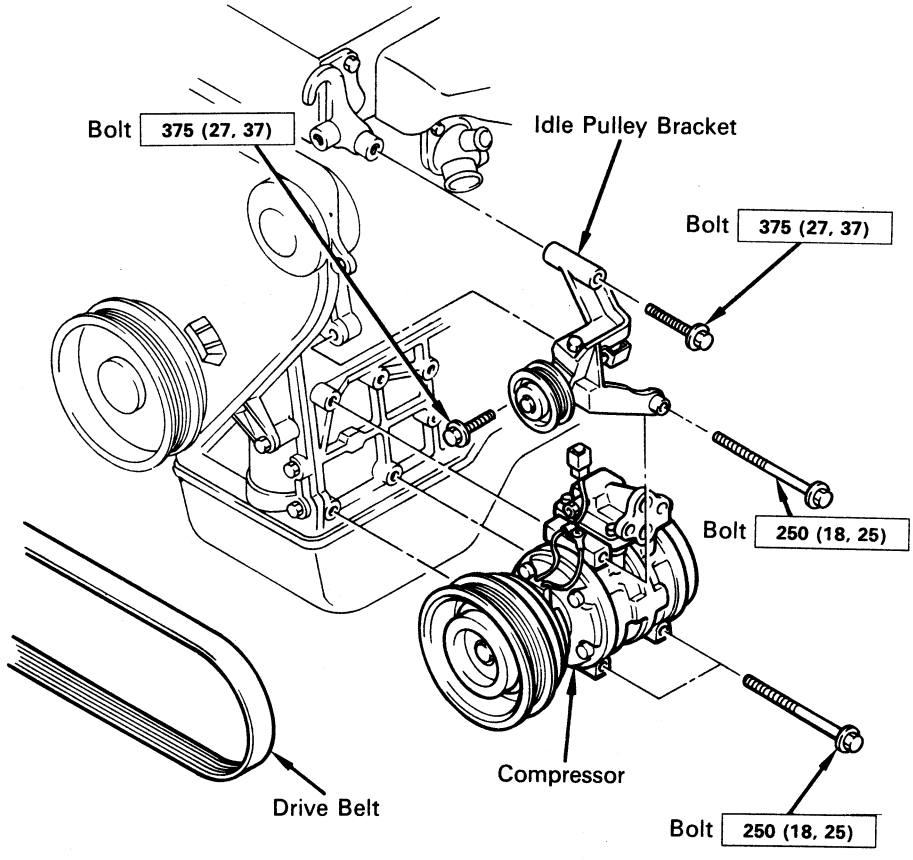
   (b) Check that the metallic sound.

   (c) Check that the leakage from shaft seal.

   If defects are found, replace the compressor.



Removal of Compressor

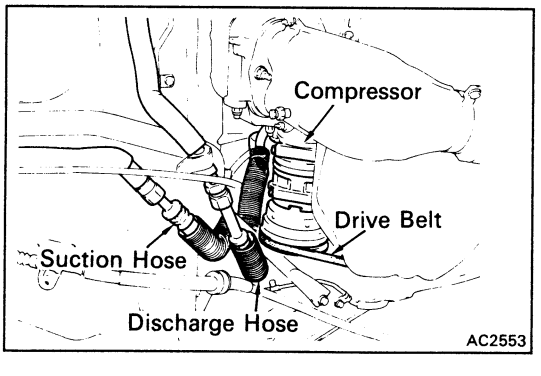


kg-cm (ft-lb, N·m) : Specified torque

AC2565

1. **RUN ENGINE AT IDLE SPEED WITH A/C ON FOR TEN MINUTES**
2. **STOP ENGINE**
3. **DISCONNECT NEGATIVE CABLE TO BATTERY**
4. **REMOVE UNDER COVER.**
5. **DISCONNECT CONNECTOR FROM MAGNETIC CLUTCH**
6. **DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM**
7. **DISCONNECT TWO HOSES FROM COMPRESSOR SERVICE VALVES**

   HINT: Cap the open fitting immediately to keep moisture and dust out of the system.



AC2553

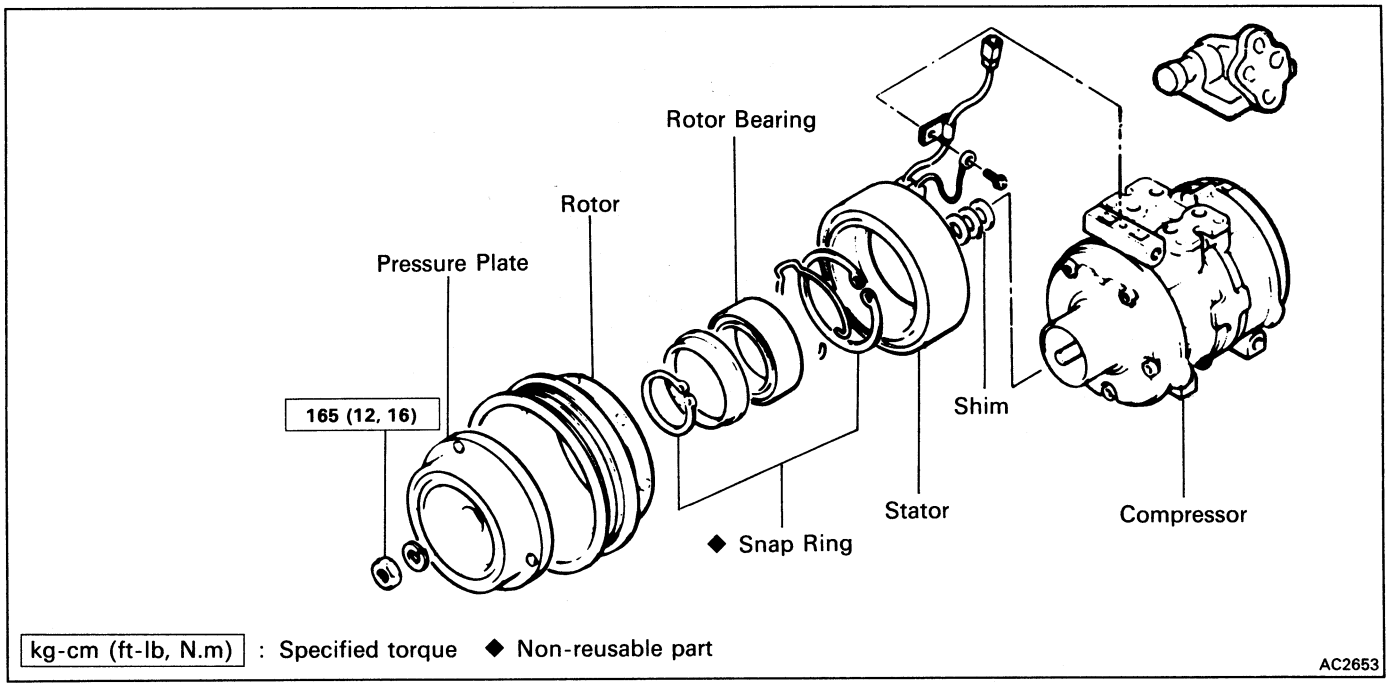
8. **REMOVE COMPRESSOR**

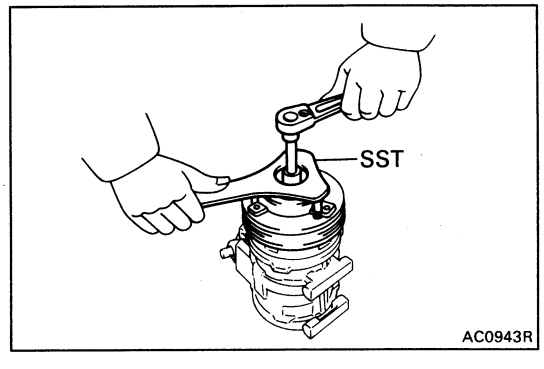
(a) Loosen the drive belt.

(b) Remove the idle pulley bracket.

(c) Remove the compressor.

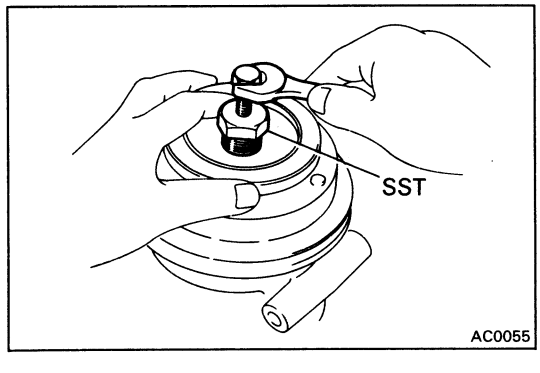
DISASSEMBLY OF MAGNETIC CLUTCH



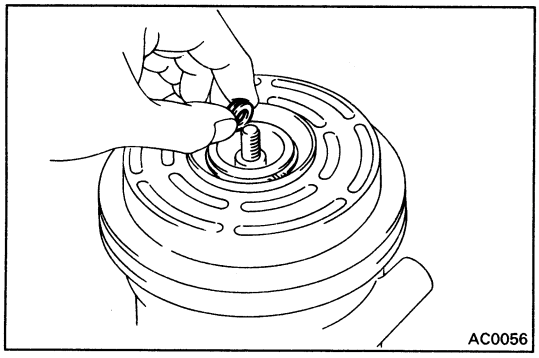


1. **REMOVE PRESSURE PLATE**

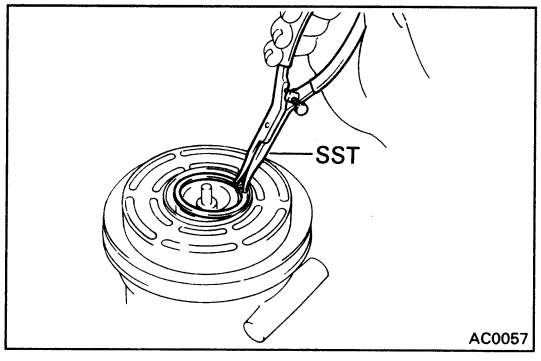
(a) Using SST and a socket, remove the shaft nut.
SST 07112-76040



(b) Using SST and a socket, remove the pressure plate.
SST 07112-71010



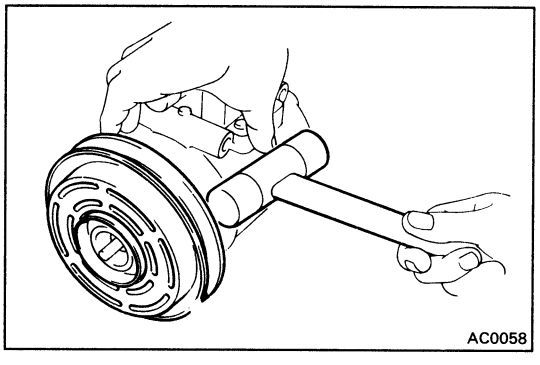
(c) Remove the shims from the shaft.



2. REMOVE ROTOR

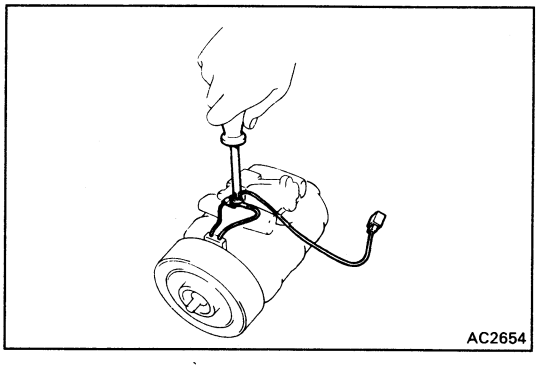
(a) Using SST, remove the snap ring.

SST 07114-84020



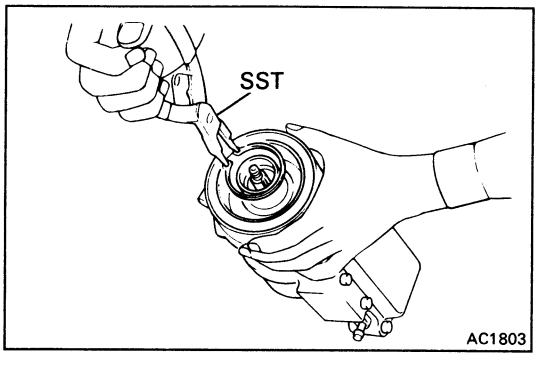
(b) Using a plastic hammer, tap the rotor off the shaft.

NOTICE: Be careful not to damage the pulley when tapping on the rotor.



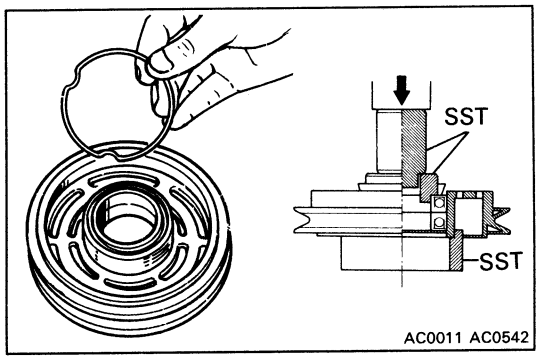
3. REMOVE STATOR

(a) Disconnect the stator lead wires from the compressor housing.



(b) Usint SST, remove the snap ring. Remove the stator.

SST 07114-84020



4. **REMOVE ROTOR BEARINGS**

HINT: Press out the bearings only if they are to be replace.

(a) Remove the bearing snap ring from the rotor.

(b) Using SST, press out the two bearings.

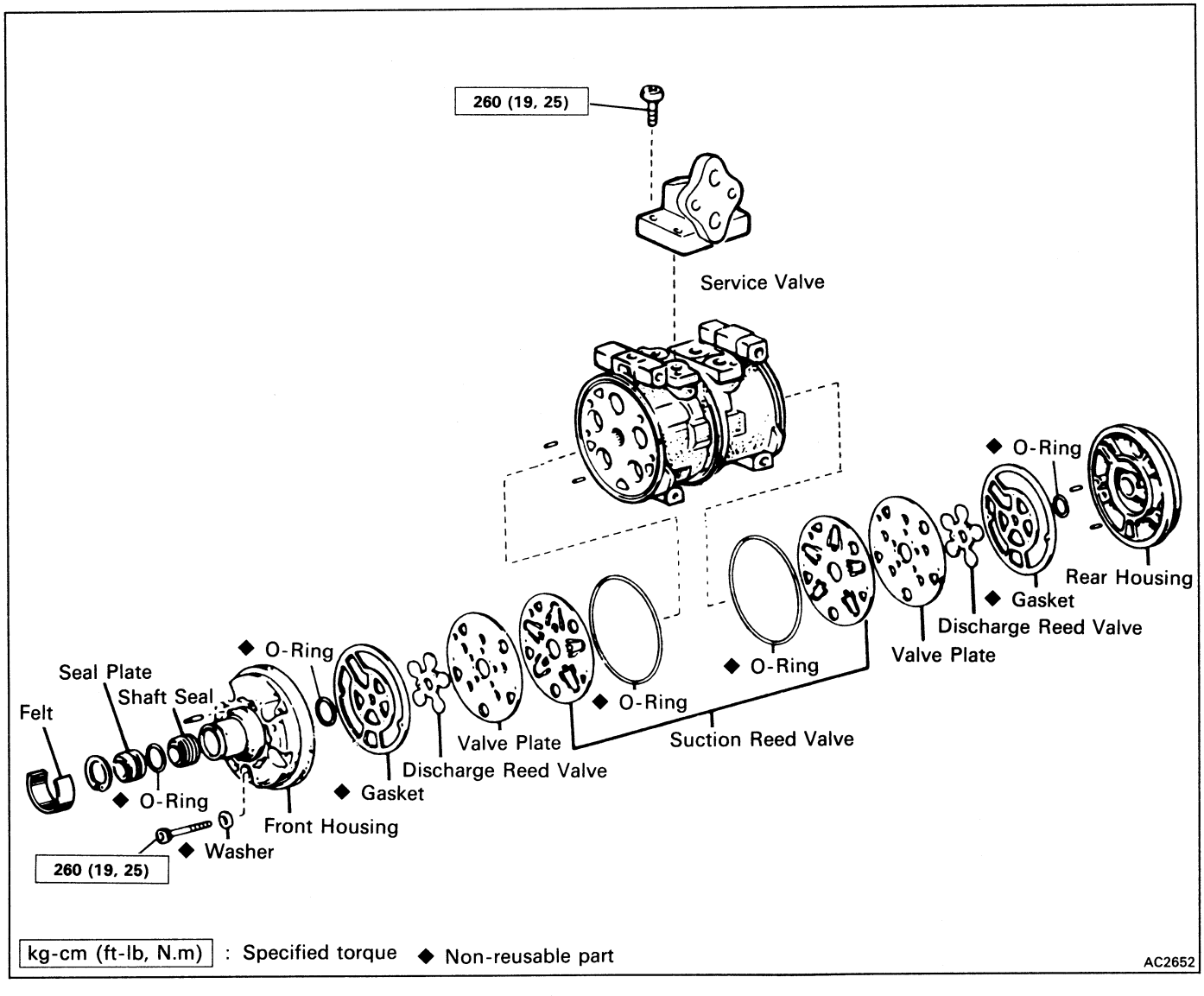
SST 07110-77011

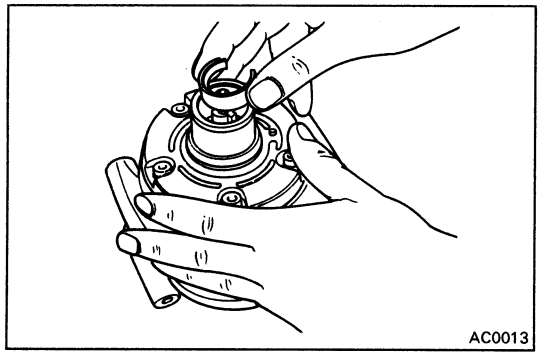
5. **INSPECT PRESSURE PLATE AND ROTOR**

(a) Inspect the pressure plate and rotor surfaces for wear and scoring. Replace if necessary.

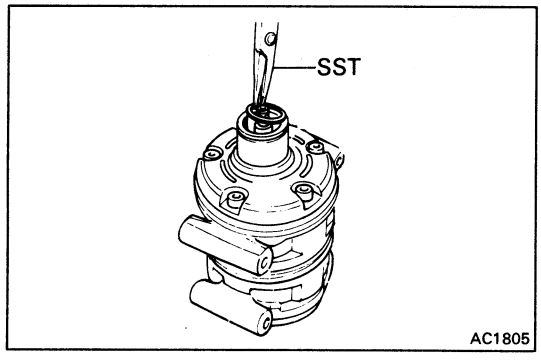
(b) Check the rotor bearings for wear and leakage of grease. Replace if necessary.

DISASSEMBLY OF COMPRESSOR





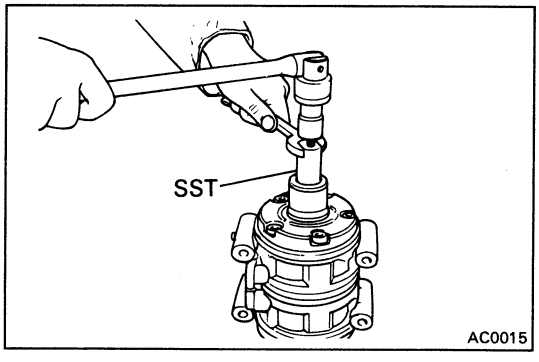
1. REMOVE FELT



2. REMOVE SNAP RING

Using SST, remove the snap ring.

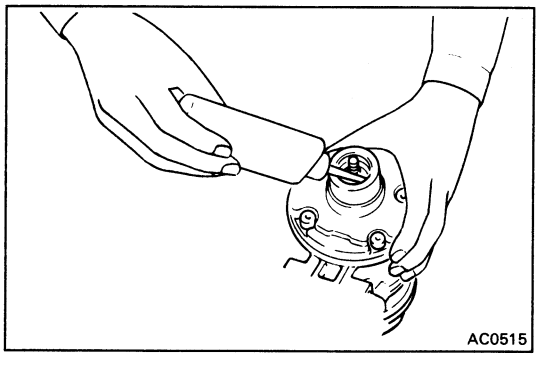
SST 07114-84020



3. REMOVE KEY

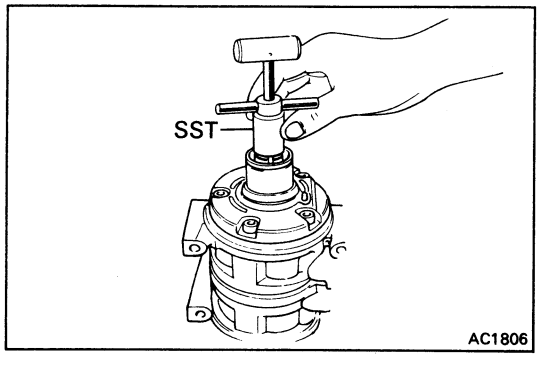
Remove the key from the shaft.

SST 07112-45021



4. APPLY COMPRESSOR OIL TO INNER BORE

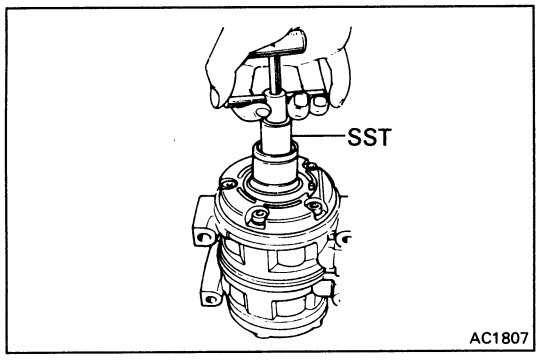
Apply compressor oil to the inner bore of the compressor.



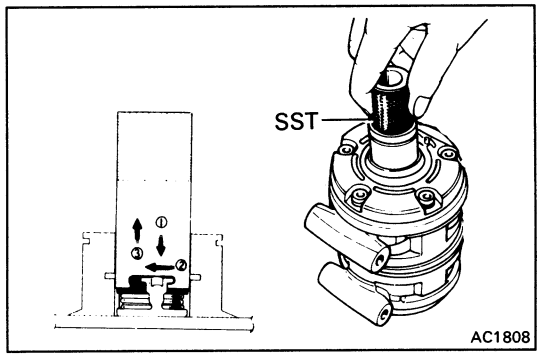
5. REMOVE SEAL PLATE

(a) Insert SST against the shaft. Then push the holder ring downward.

SST 07112-15010



(b) Pull up the remover bar, and remove the seal plate.

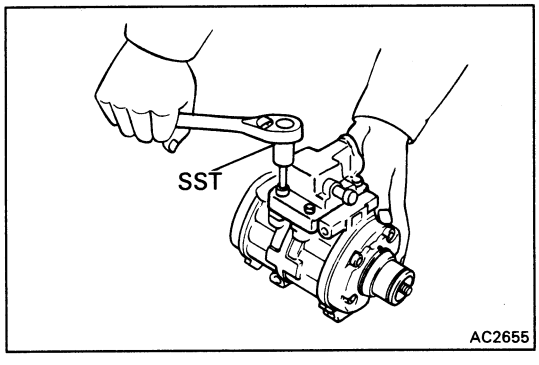


6. REMOVE SHAFT SEAL

Insert SST against the shaft, and turn it to the right while pressing on the remover.

Then remove the shaft seal.

SST 07114-15010

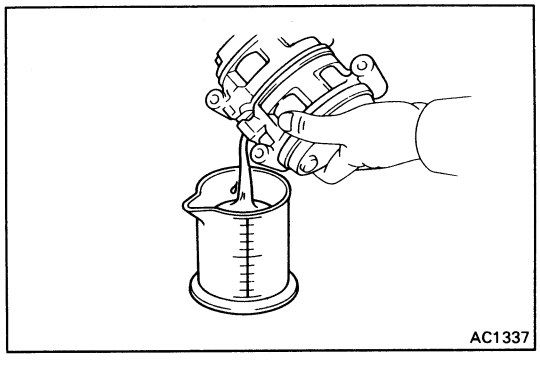


7. REMOVE SERVICE VALVE

(a) Using SST, remove the bolts holding the service valve.

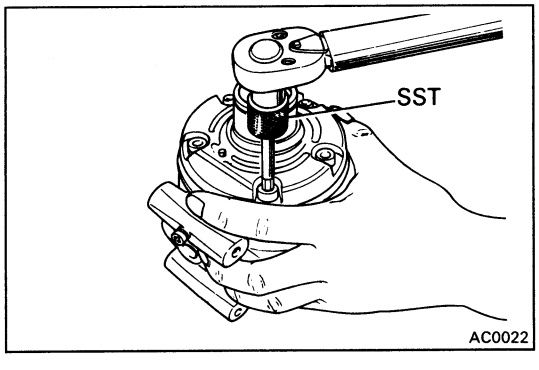
SST 07110-61050

(b) Remove the O-ring from the service valve and discard them.



8. DRAIN COMPRESSOR OIL INTO MEASURING FLASK

Measure the quantity of drained oil because the same amount should be replaced later.

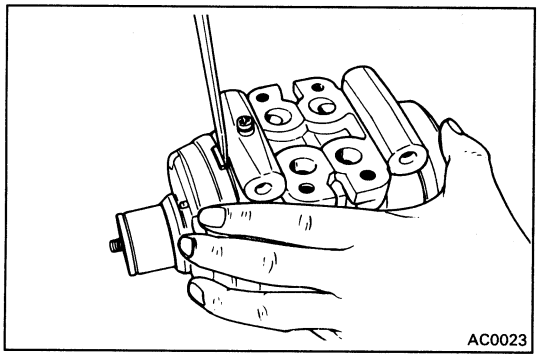


9. REMOVE FRONT HOUSING

(a) Using SST, remove the five through bolts.

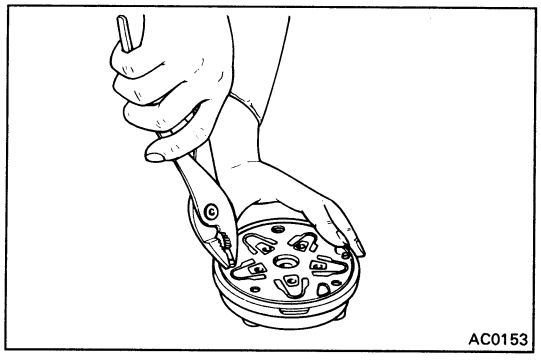
HINT: Do not reuse the five washers.

SST 07110-61050



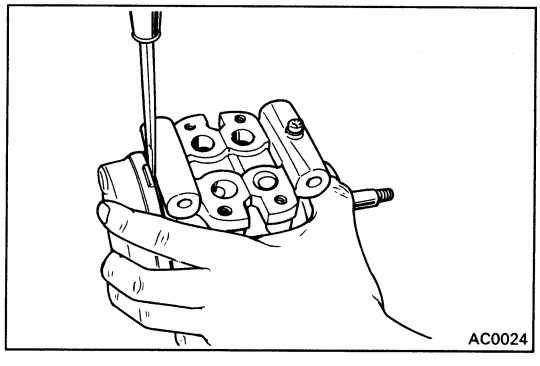
(b) Using a screwdriver, remove the front housing.

NOTICE: Be careful not to scratch the sealing surface of the front housing.



10. REMOVE FRONT VALVE PLATE

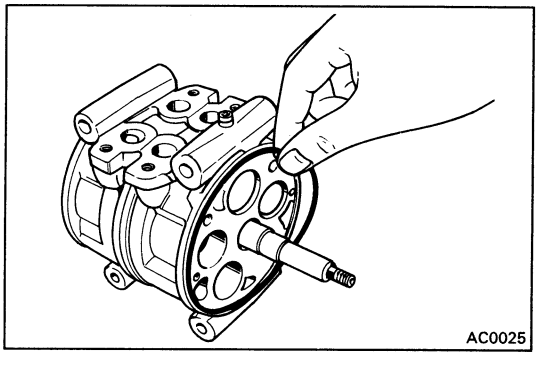
Remove the two pins from the front housing. Discard the pins.



11. REMOVE REAR HOUSING

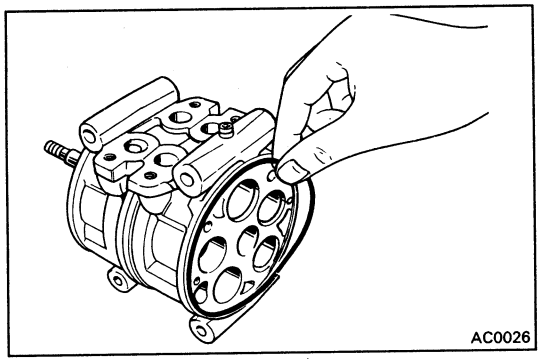
Using a screwdriver, remove the rear housing.

NOTICE: 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.


AC0026

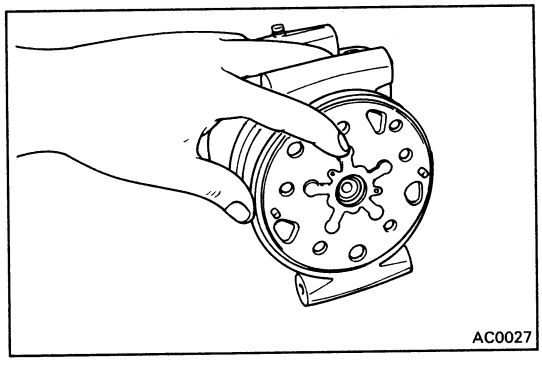
ASSEMBLY OF COMPRESSOR

(See page AC-20)

1. INSTALL REAR VALVE PLATE ON REAR CYLINDER

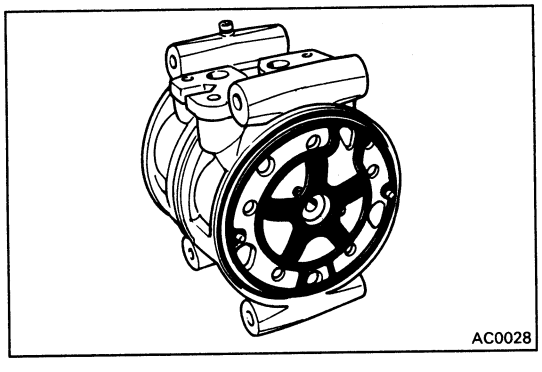
(a) Install two pins in the rear cylinder.

(b) Lubricate a new O-ring with compressor oil. Install the O-ring in the rear cylinder.


AC0027

(c) Install the rear suction valve over the pins on the rear cylinder.

HINT: The front and rear suction valves are identical.

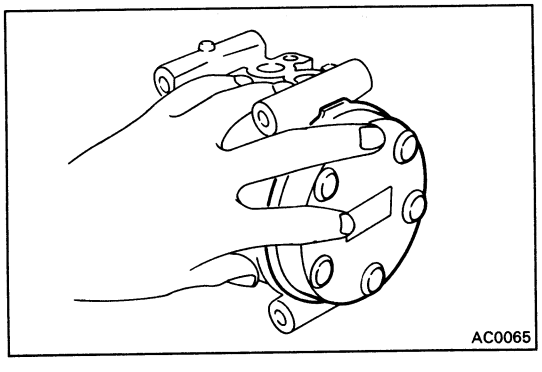

AC0028

(d) Install the rear valve plate together with the discharge valve over the pins on the rear cylinder.

HINT: The rear valve plate is marked with an "R".

(e) Lubricate the new gasket with compressor oil. Install the gasket on the valve plate.

2. INSTALL REAR HOUSING ON REAR CYLINDER


AC0065

3. INSTALL FRONT VALVE PLATE ON FRONT CYLINDER

(a) Install the two pins in the front cylinder.

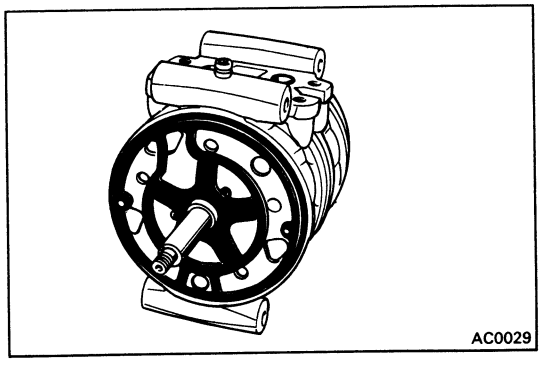
(b) Lubricate a new O-ring with compressor oil. Install the O-ring in the front housing.

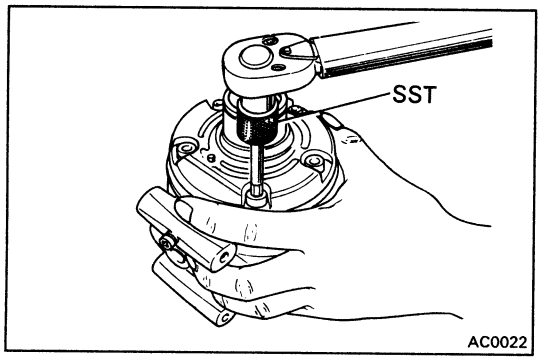
(c) Install the front suction valve over the pins on the front cylinder.

(d) Install the front valve plate together with the discharge valve over the pins on the front cylinder.

HINT: The front valve plate is marked with an "F".

(e) Lubricate the new gasket with compressor oil. Install the gasket on the valve plate.


AC0029

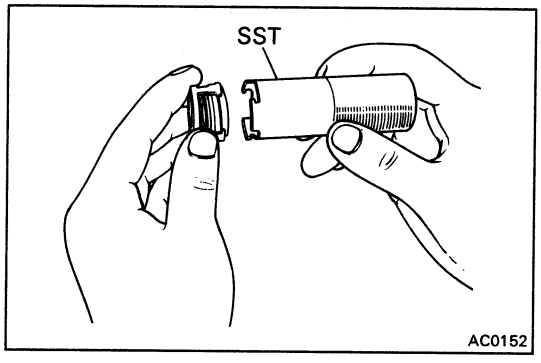


4. INSTALL FRONT HOUSING ON FRONT CYLINDER AND TIGHTEN FIVE THROUGH BOLTS

Using SST and torque wrench, gradually tighten the five through bolts in two or three passes.

SST 07110-61050

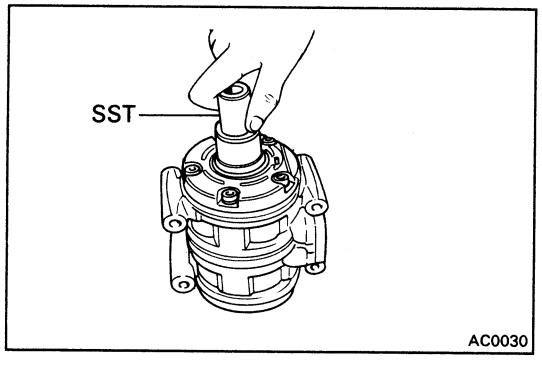
Torque: 260 kg-cm (19 ft-lb, 25 N.m)



5. INSTALL SHAFT SEAL

(a) Fit the shaft seal onto SST.

SST 07114-15010

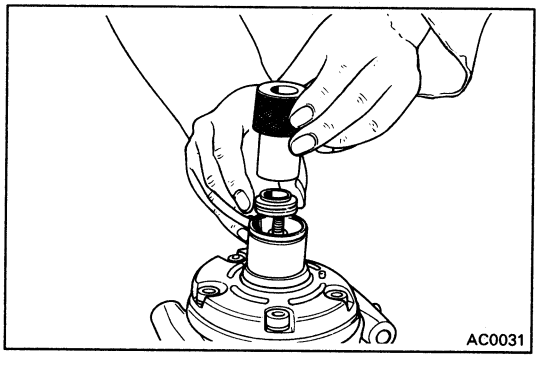


(b) Apply oil to the bore.

(c) Insert SST, and turn it counterclockwise while lightly pressing in.

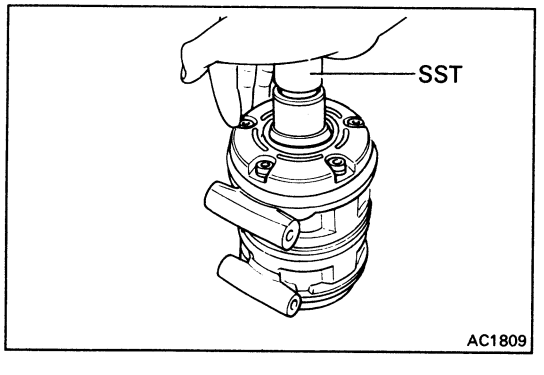
(d) Then pull up the SST.

SST 07114-15010



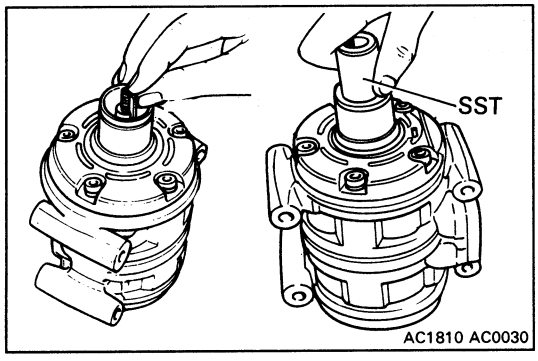
6. INSTALL SEAL PLATE

(a) Put in the seal plate.



(b) Press in SST.

SST 07112-25010

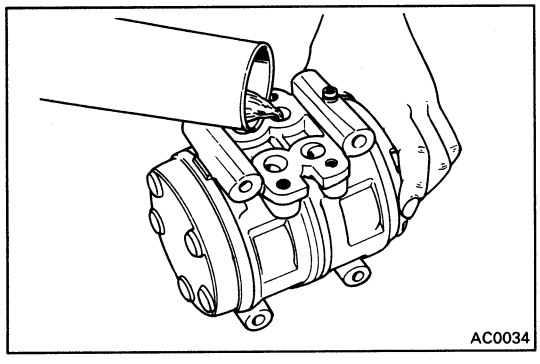


7. INSTALL KEY IN SHAFT GROOVE

Using SST and plastic hammer, tap the key lightly.

SST 07114-45010

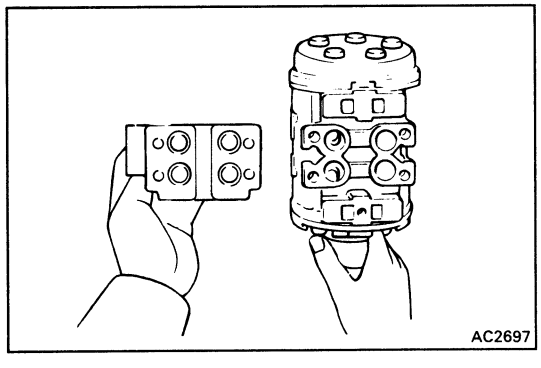
Place the felt inside the bore.
(Refer to page AC-21)



8. POUR COMPRESSOR OIL INTO COMPRESSOR

Add the same quantity of oil as was removed, plus 20 cc, into the compressor.

Compressor oil: DENSOOIL 6, SUNISO No.5GS or equivalent



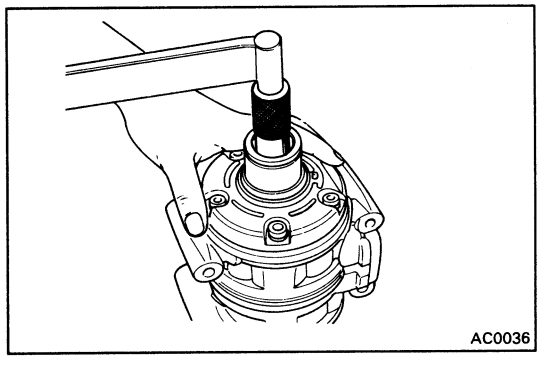
9. INSTALL SERVICE VALVE

(a) Lubricate new O-rings with compressor oil. Install the O-rings in the service valve.

(b) Install the service valve on the compressor. Using SST and torque wrench, tighten the bolts.

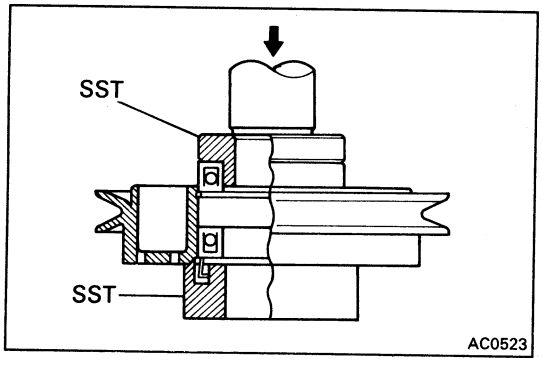
SST 07110-61050

Torque: 260 kg-cm (19 ft-lb, 25 N.m)



10. CHECK SHAFT STARTING TORQUE

Torque: 50 kg-cm (43 in.-lb, 4.9 N.m) or less



ASSEMBLY OF MAGNETIC CLUTCH

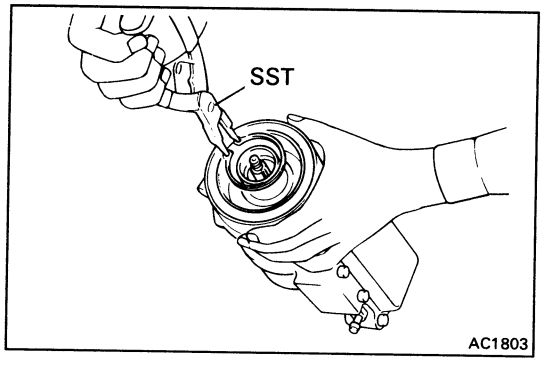
(See page AC-18)

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.



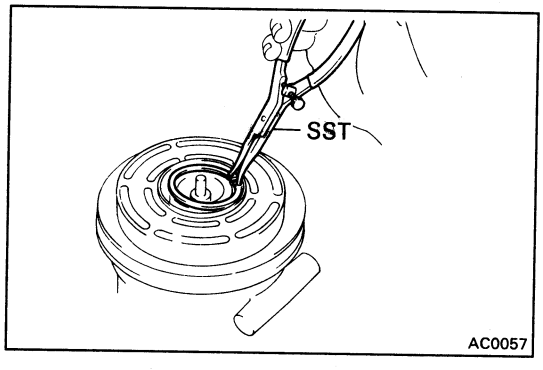
2. INSTALL STATOR

(a) Install the stator on the compressor.

(b) Using SST, install the new snap ring.

SST 07114-84020

(c) Connect the stator lead wires to the compressor housing.

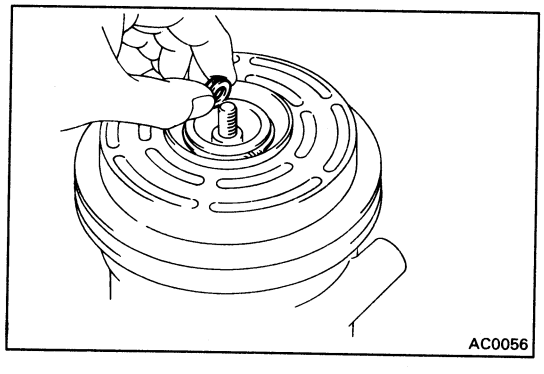


3. INSTALL ROTOR

(a) Install the rotor on the compressor shaft.

(b) Using SST, install the new snap ring.

SST 07114-84020

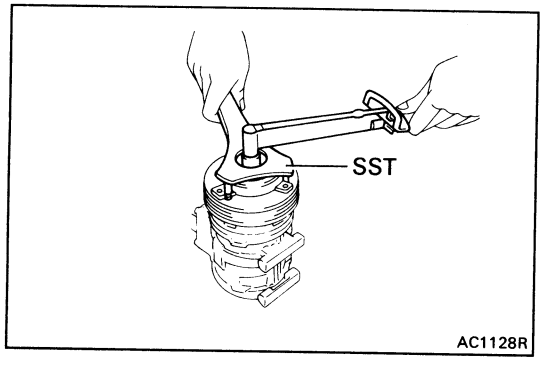


4. INSTALL PRESSURE PLATE

(a) Adjust the clearance between the pressure plate and rotor by installing shims on the compressor shaft.

Standard clearance: 0.8 ± 0.2 mm (0.32 ± 0.08 in.)

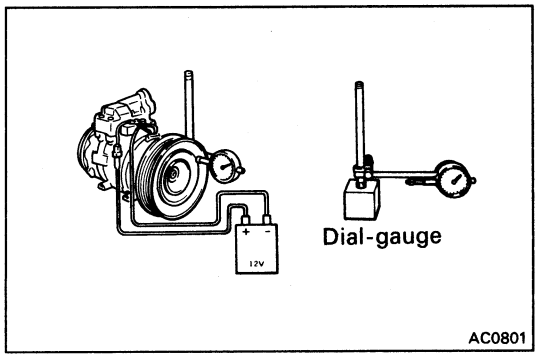
If the clearance is not within tolerance, change the number of shims to obtain the standard clearance.



(b) Using SST and torque wrench, install the shaft nut.

SST 07112-76040

Torque: 200 kg-cm (14 ft-lb, 20 N.m)



5. INSPECT CLEARANCE OF MAGNETIC CLUTCH

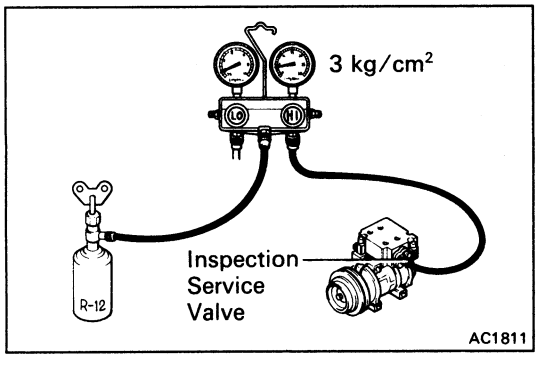
(a) Set the dial-gauge to the pressure plate of the magnetic clutch.

(b) Connect the magnetic clutch lead wire to the positive (+) terminal of the battery.

(c) Check the clearance between the pressure plate and rotor, when connect the negative (–) terminal of the battery.

Standard Clearance: 0.8 ± 0.2 mm (0.32 ± 0.08 in.)

If the clearance is not within standard clearance, adjust the clearance using shims to obtain the standard clearance.



PERFORMANCE TEST OF COMPRESSOR

1. PERFORM GAS LEAKAGE TEST

(a) Install the inspection service valve on the service valve.

HINT: Use only a TOYOTA supplied inspection service valve to perform the gas leakage test.

Part No. Suction side 88376-17020
Discharge side 88376-22020

(b) Charge the compressor with refrigerant through the charge valve until the pressure is 3 kg/cm² (43 psi, 294 kPa).

(c) Using a gas leak detector, check the compressor for leaks.

If leaks are found, check and replace the compressor.

2. EVACUATE COMPRESSOR AND CHARGE WITH REFRIGERANT

Make sure the caps are tight and compressor is free from moisture and contamination.

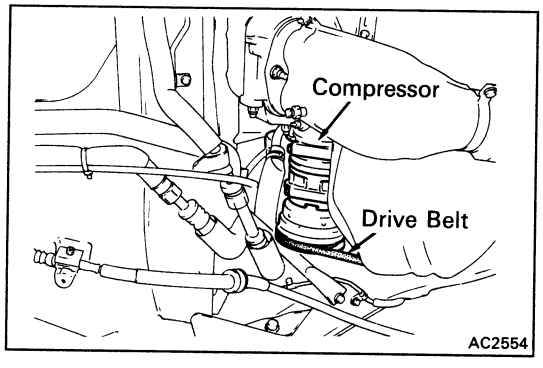
HINT: When storing a compressor for an extended period, charge the compressor with refrigerant or dry nitrogen gas to prevent corrosion.

INSTALLATION OF COMPRESSOR

(See page AC-17)

1. INSTALL COMPRESSOR AND IDLE PULLEY BRACKET WITH FIVE BOLTS

   Torque:



2. INSTALL DRIVE BELT

   See page AC-14

3. CONNECT TWO HOSES TO COMPRESSOR

   Torque:

Discharge line	250 kg-cm (18 ft-lb, 25 N·m)
Suction line	250 kg-cm (18 ft-lb, 25 N·m)

4. CONNECT CLUTCH LEAD WIRE TO WIRING HARNESS

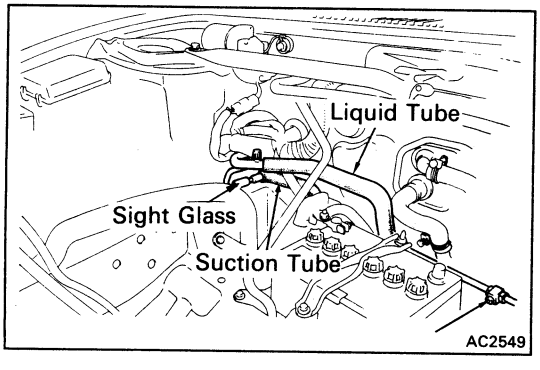
5.

6. CONNECT CABLES TO BATTERY

7. EVACUATE AIR FROM AIR CONDITIONING SYSTEM

8. CHARGE AIR CONDITIONING SYSTEM WITH REFRIGERANT AND CHECK FOR GAS LEAKAGE

   Specified amount: 850 ± 50 g (29.98 ± 1.76 oz)



RECEIVER

ON-VEHICLE INSPECTION

INSPECT SIGHT GLASS, FUSIBLE PLUG AND FITTINGS FOR LEAKAGE

Use a gas leak tester. Repair as necessary.

REMOVAL OF RECEIVER

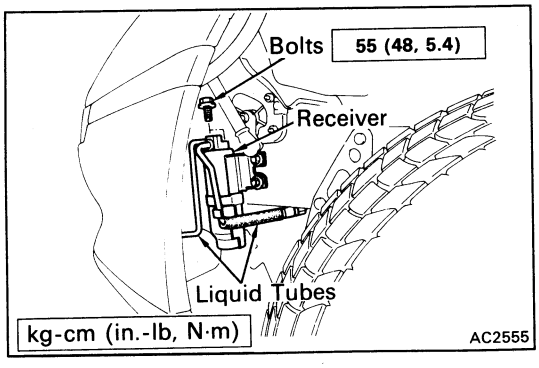
1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

2. REMOVE LEFT SIDE FRONT FENDER LINER AND UNDER COVER

3. DISCONNECT TWO LIQUID TUBES FROM RECEIVER

   HINT: Cap the open fittings immediately to keep moisture out of the system.

4. REMOVE RECEIVER FROM RECEIVER HOLDER



INSTALLATION OF RECEIVER

1. **INSTALL RECEIVER IN RECEIVER HOLDER**

   HINT: Do not remove the blind plugs until ready for connection.

2. **CONNECT TWO LIQUID TUBES TO RECEIVER**

   Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)

3. **REINSTALL FENDER LINER AND UNDER COVER.**

4. **IF RECEIVER WAS REPLACED, ADD COMPRESSOR OIL TO COMPRESSOR**

   Add 20 cc (0.7 fl.oz.)

   Compressor oil: DENSOOIL 6, SUNISO NO.5GS or equivalent

5. **EVACUATE AIR FROM REFRIGERATION SYSTEM**

6. **CHARGE SYSTEM WITH REFRIGERANT AND INSPECT FOR LEAKAGE OF REFRIGERANT**

   Specified amount: 850 ± 50 g (29.98 ± 1.76 oz)

CONDENSER

ON-VEHICLE INSPECTION

1. **INSPECT CONDENSER FINS FOR BLOCKAGE OR DAMAGE**

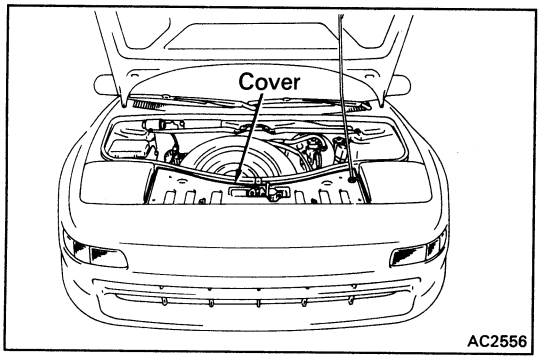
   If the fins are clogged, wash them with water and dry with compressed air.

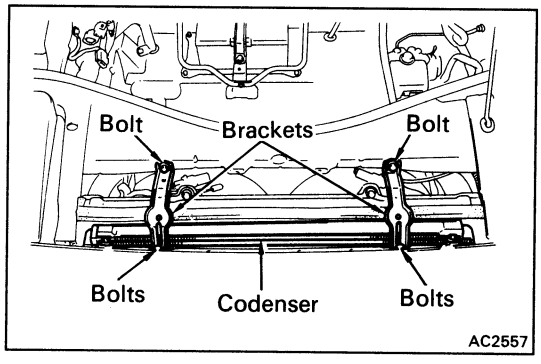
   NOTICE: Be careful not to damage the fins.

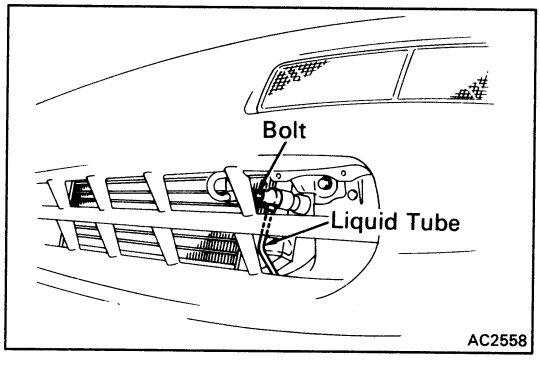
   If the fins are bent, straighten them with a screwdriver or pliers.

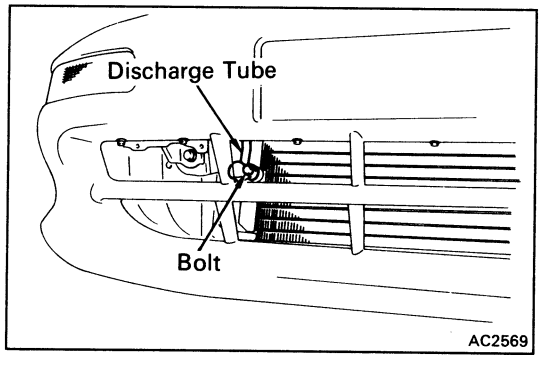
2. **INSPECT CONDENSER FITTINGS FOR LEAKAGE**

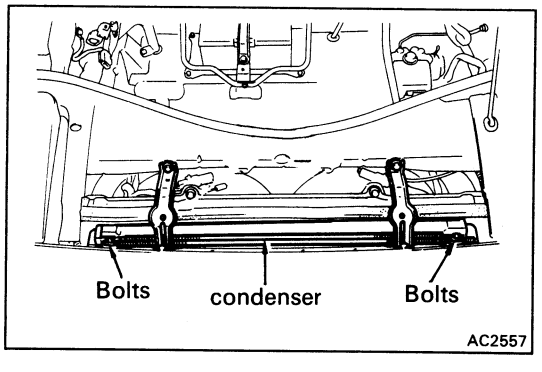
   Repair as necessary.











REMOVAL OF CONDENSOR

1. **DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM**

2. **REMOVE COVER AND TWO BRACKETS WITH FOUR BOLTS**

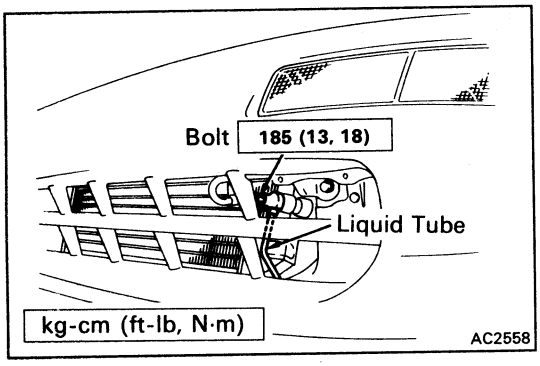
3. **DISCONNECT LIQUID TUBE AND DISCHARGE TUBE FROM CONDENSER FITTINGS**

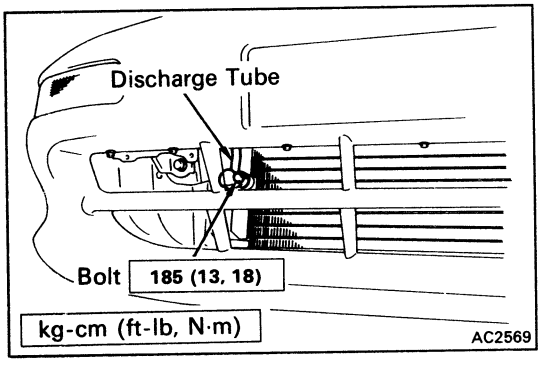
   HINT: Cap the open fittings immediately to keep moisture out of the system.

4. **REMOVE CONDENSER**

   (a) Remove the two bolts.

   (b) Pull out the condenser between the radiator and the body.





INSTALLATION OF CONDENSER

1. **INSTALL CONDENSER**

   Install the brackets and bolts, making sure the rubber cushions fit on the mounting flanges correctly.

2. **CONNECT LIQUID TUBE AND DISCHARGE TUBE TO CONDENSER**

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

3. **REINSTALL TWO BRACKETS WITH FOUR BOLTS AND COVER**

4. **IF CONDENSER WAS REPLACED, ADD COMPRESSOR OIL TO COMPRESSOR**

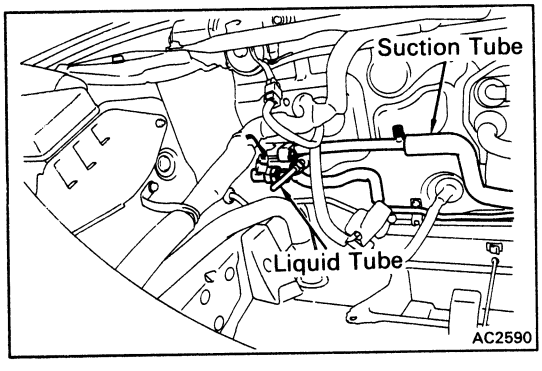
   Add 40 – 50 cc (1.4 – 1.8 fl.oz.)

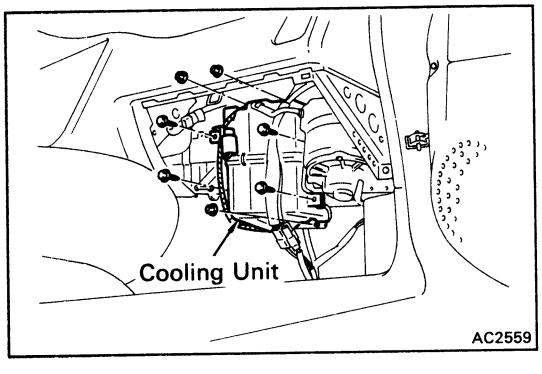
   Compressor oil: DENSOOIL 6, SUNISO NO.5GS or equivalent

5. **EVACUATE AIR FROM AIR CONDITIONING SYSTEM**

6. **CHARGE SYSTEM WITH REFRIGERANT AND INSPECT FOR LEAKAGE OF REFRIGERANT**

   Specified amount: 850 ±50 g (29.98 ± 1.76 oz)





COOLING UNIT

REMOVAL OF COOLING UNIT

1. **DISCONNECT NEGATIVE CABLE FROM BATTERY**

2. **DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM**

3. **DISCONNECT SUCTION TUBE FROM COOLING UNIT OUTLET FITTING**

4. **DISCONNECT LIQUID TUBE FROM COOLING UNIT INLET FITTING**

   HINT: Cap the open fittings immediately to keep moisture out of the system.

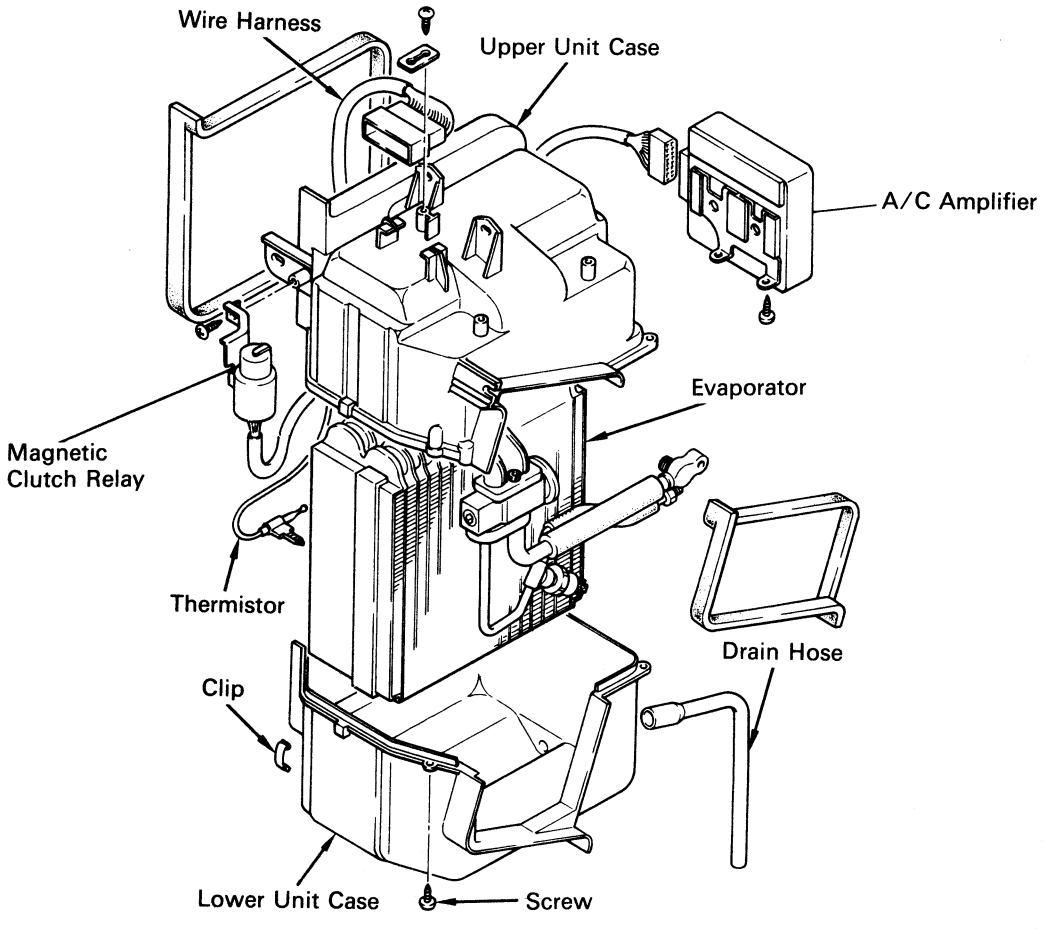
5. **REMOVE GLOVE BOX**

6. **DISCONNECT CONNECTORS**

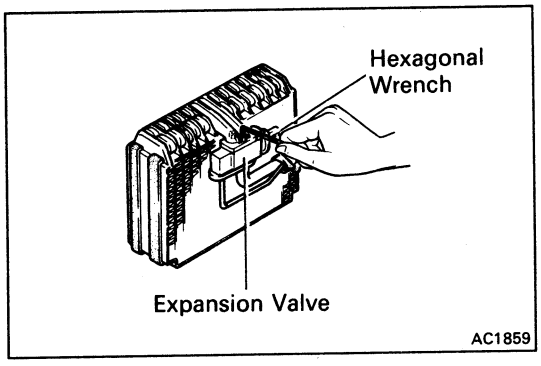
7. **REMOVE COOLING UNIT**

   Remove the three nuts and four bolts and the cooling unit.

DISASSEMBLY OF COOLING UNIT



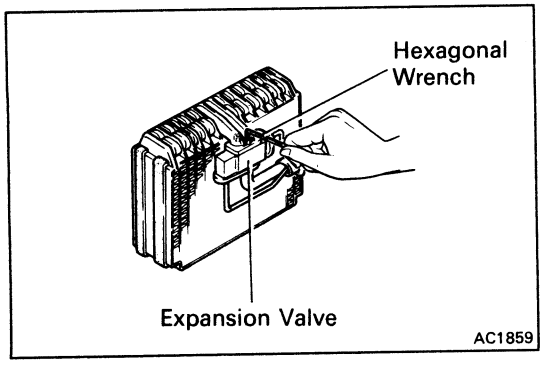
1. **REMOVE MAGNETIC CLUTCH RERAY**
2. **REMOVE A/C AMPLIFIER**
3. **REMOVE UPPER UNIT CASE**
   (a) Disconnect the connectors.
   (b) Remove the wire harness.
   (c) Remove the two clips.
   (d) Remove the four screws.
   (e) Remove the upper unit case.
4. **REMOVE EVAPORATOR FROM LOWER UNIT CASE**
5. **REMOVE THERMISTOR FROM EVAPORATOR**
   Remove the thermistor with the thermistor holder.



6. REMOVE EXPANSION VALVE FROM EVAPORATOR

(a) Remove the packing and heat sensing tube from suction and liquid tubes.

(b) Remove the expansion valve from the evaporator.



ASSEMBLY OF COOLING UNIT

INSTALL COMPONENTS ON EVAPORATOR

(a) Connect the expansion valve, suction and liquid tubes to the evaporator. Torque the bolt.

Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)

HINT: Be sure that the O-rings are positioned on the tube fitting.

(b) Install the holder to the suction and liquid tubes with heat sensing tube.

(c) Install the lower unit case to the evaporator.

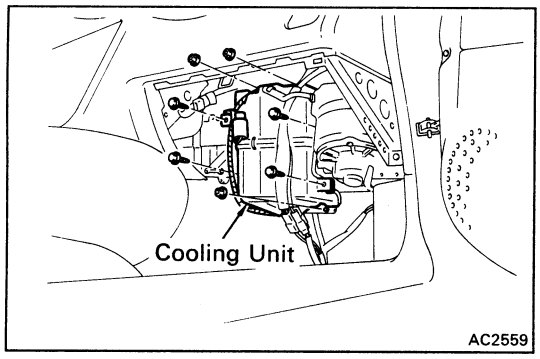
(d) Install the thermistor to the evaporator.

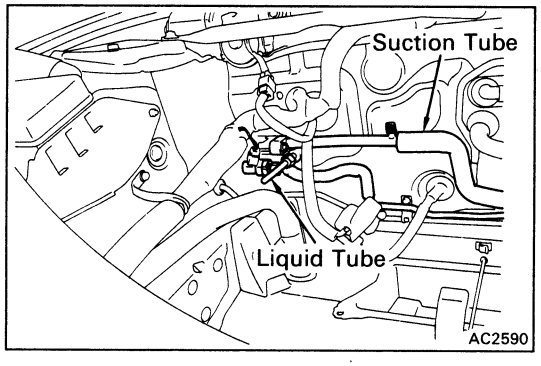
(e) Install the upper unit case.

(f) Install the four screws.

(g) Install three clips.

(h) Install the connector of thermistor.





INSTALLATION OF COOLING UNIT

1. **INSTALL COOLING UNIT**

   Install the cooling unit with the three nuts and four bolts.

2. **CONNECT CONNECTORS**

3. **INSTALL GLOVE BOX REINFORCEMENT**

4. **CONNECT LIQUID TUBE TO COOLING UNIT INLET FITTING**

   Torque the nut.

   Torque: 140 kg-cm (10 ft-lb, 14 N·m)

5. **CONNECT SUCTION TUBE TO COOLING UNIT OUTLET FITTING**

   Torque the nut.

   Torque: 330 kg-cm (24 ft-lb, 32 N·m)

6. **IF EVAPORATOR WAS REPLACED, ADD COMPRESSOR OIL TO COMPRESSOR**

   Add 40 – 50 cc (1.4 – 1.7 fl.oz.)

   Compressor oil: DENSOOIL 6, SUNISO NO.5GS OR equivalent

7. **CONNECT NEGATIVE CABLE TO BATTERY**

8. **EVACUATE AIR FROM REFRIGERATION SYSTEM**

9. **CHARGE SYSTEM WITH REFRIGERANT AND INSPECT FOR LEAKAGE OF REFRIGERANT**

   Specified amount: 850 ± 50 g (29.98 ± 1.76 oz)

EVAPORATOR

REMOVAL OF EVAPORATOR

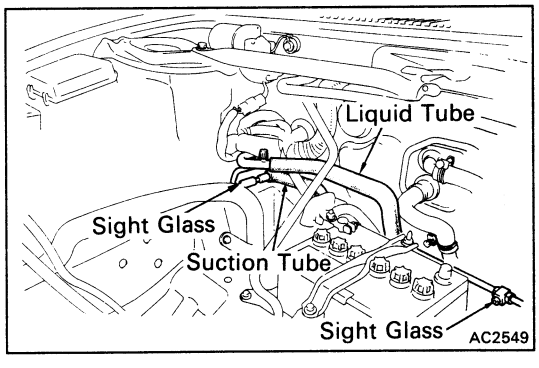
See Disassembly of Cooling Unit on page AC-30.

INSPECTION OF EVAPORATOR

1. **INSPECT EVAPORATOR FINS FOR BLOCKAGE**
   If the fins are clogged, clean them with compressed air.
   NOTICE: Never use water to clean the evaporator.
2. **INSPECT FITTINGS FOR CRACKS OR SCRATCHES**
   Repair as necessary.

INSTALLATION OF EVAPORATOR

See Assembly of Cooling Unit on page AC-32.



EXPANSION VALVE

ON-VEHICLE INSPECTION

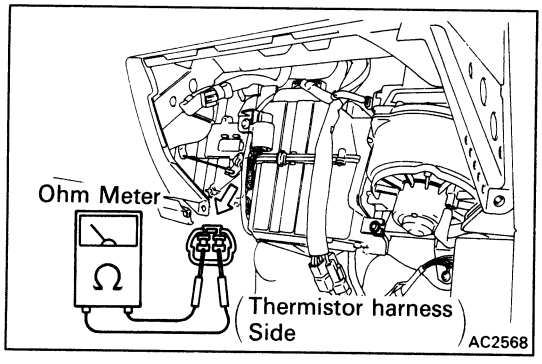
1. **INSPECT REFRIGERANT VOLUME**
   See page AC-12.
2. **INSTALL MANIFOLD GAUGE SET**
   See page AC-13.
3. **A/C SWITCH ON AND BLOWER SWITCH TO HI**
4. **RUN ENGINE AT APPROX, 2,000 RPM**
   Run the engine at 2,000 rpm for at least 5 minutes.
5. **INSPECT EXPANSION VALVE**
   If the expansion valve is clogged, the low pressure reading will drop to 0 kg-cm^2 (0psi, 0kpa), otherwise it is OK.

REMOVAL OF EXPANSION VALVE

See Disassembly of Cooling Unit on page AC-30.

INSTALLATION OF EXPANSION VALVE

See Assembly of Cooling Unit on page AC-32.



THERMISTOR

ON-VEHICLE INSPECTION

1. **DISCONNECT NEGATIVE BATTERY CABLE**
2. **REMOVE GLOVE BOX**
3. **CHECK RESISTANCE OF THERMISTOR**

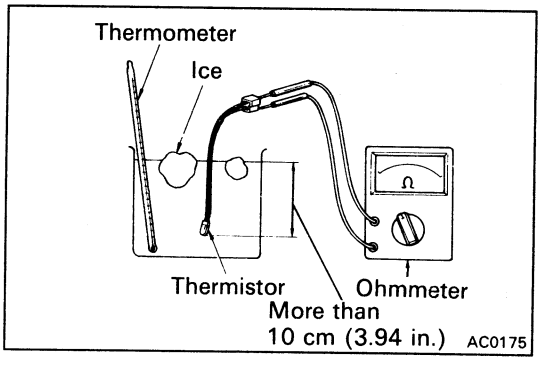
Measure the resistance between terminals.

Standard resistance: 1,500 Ω at 25°C (77°F)

If resistance value is not as specified, replace the thermistor.

REMOVAL OF THERMISTOR

See Disassembly of Cooling Unit on page AC-30.



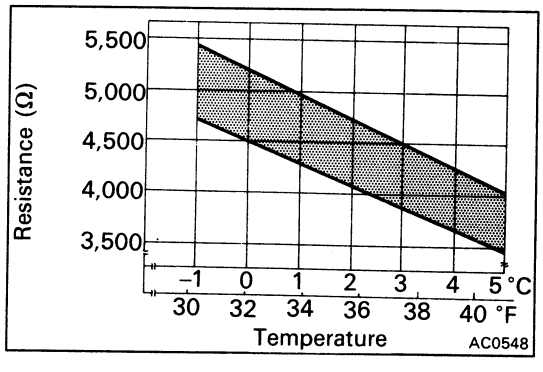
INSPECTION OF THERMISTOR

INSPECT 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.

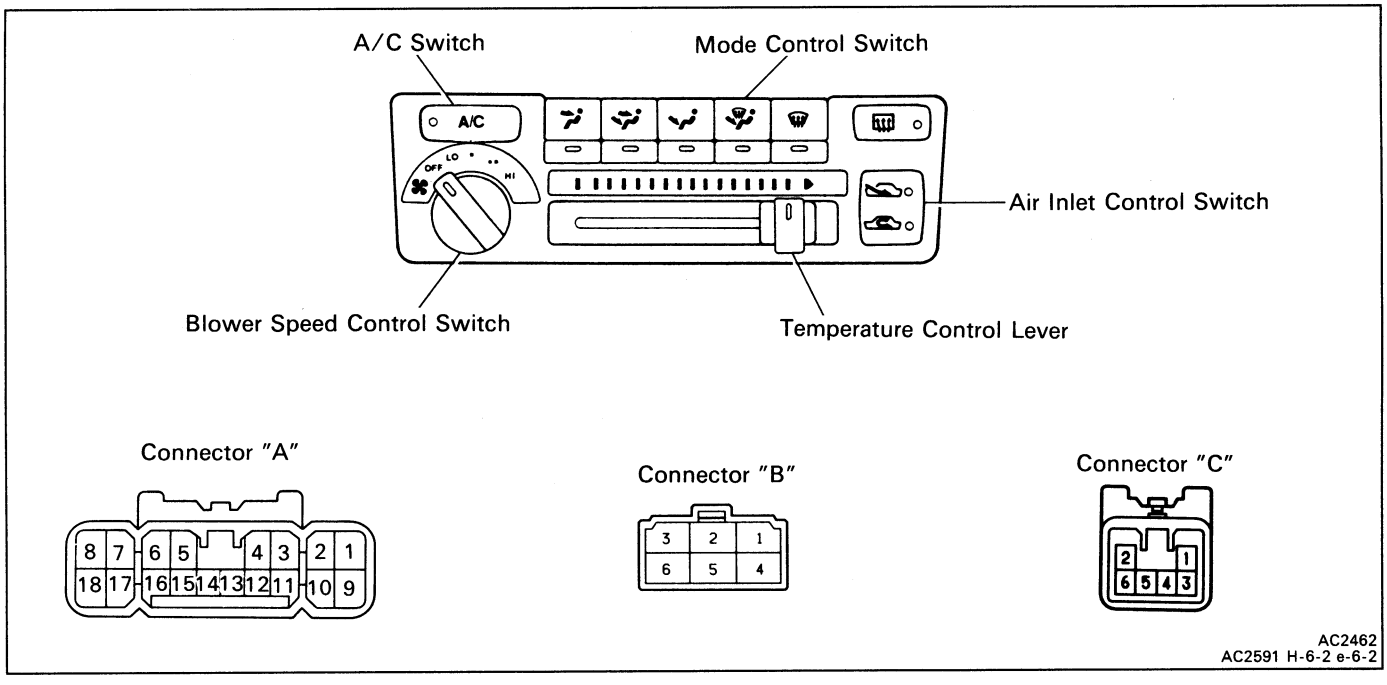
If the intersection is not between the two lines, replace the thermistor.

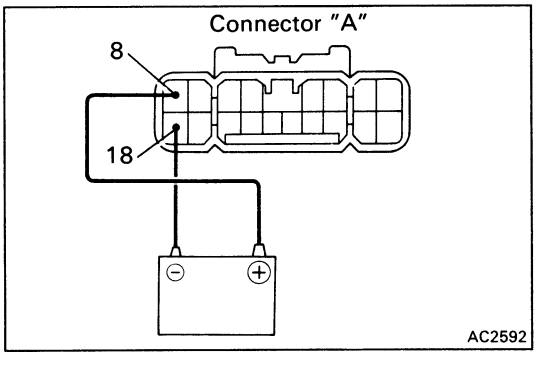


INSTALLATION OF THERMISTOR

See Assembly of Cooling Unit on page AC-32.

A/C CONTROL ASSEMBLY





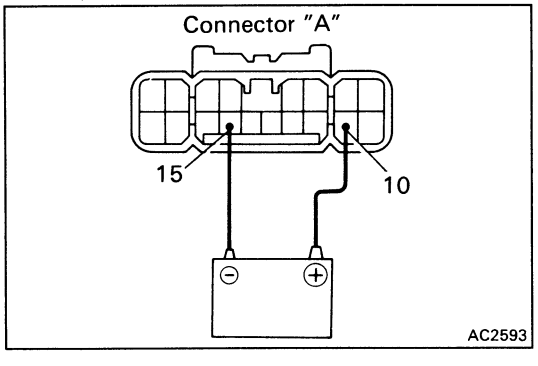
Illuminations (Except A/C Switch)

INSPECTION OF ILLUMINATION

1. **INSPECT ILLUMINATION**

Connect the positive (+) lead from the battery to terminal A-18 and the negative (–) lead to terminal A-8, then check that the illuminations light up.

If illuminations do not light up, test the bulb.



Air Inlet Control Switch

INSPECTION OF AIR INLET CONTROL SWITCH

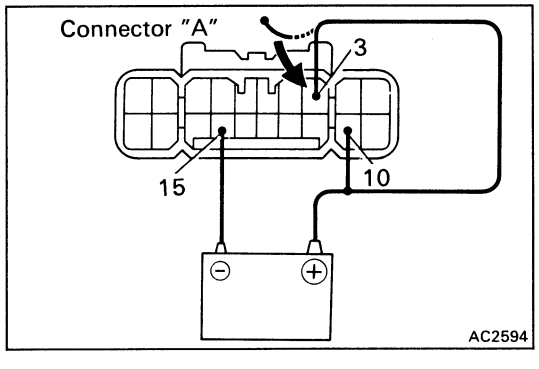
1. **INSPECT INDICATOR**

(a) Connect the positive (+) lead from the battery to terminal A-10 and the negative (–) lead to terminal A-15.

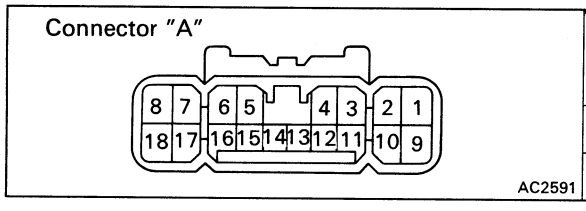
(b) Check that the FRESH and RECIRC indicators light up alternately each time the air inlet control switch button is pressed.

(c) Then, connect the positive (+) lead from the battery to terminal A-3 and check that the indicator dims.

If indicators operation is not as specified, replace the A/C control assembly.

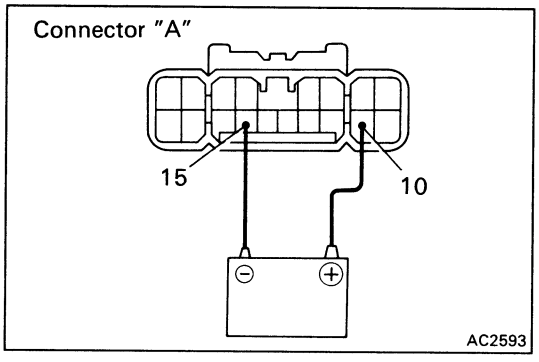


2. INSPECT SWITCH CONTINUITY



Terminal / Switch position	A-1	A-9	A-15
FRESH (Free)	○	▶	○
RECIRC (Pushed in)		○ ▶	○

If continuity is not as specified, replace the A/C control assembly.



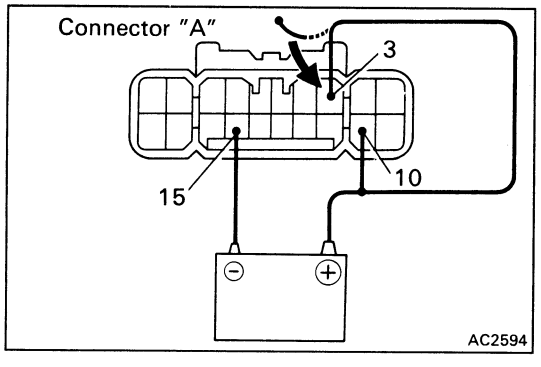
Mode Control Switch

INSPECTION OF MODE CONTROL SWITCH

1. INSPECT INDICATOR

(a) Connect the positive (+) lead from the battery to terminal A-10 and the negative (–) lead to terminal A-15.

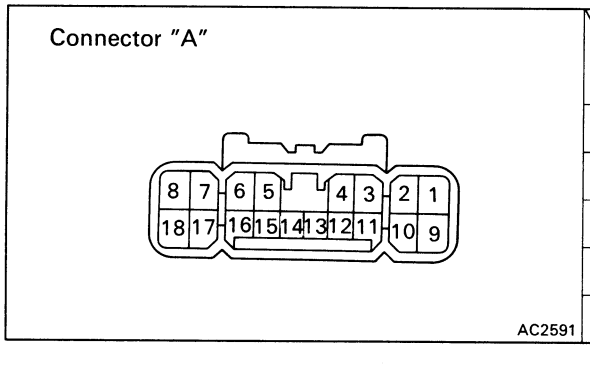
(b) Push each of the mode control switch buttons in and check that their indicators light up.



(c) Then, connect the positive (+) lead from the battery to terminal A-3 and check that the indicator dims.

If indicators operation is not as specified, replace the A/C control assembly.

2. INSPECT SWITCH CONTINUITY



Terminal / Switch position	A-4	A-5	A-12	A-13	A-14	A-15
FACE			○			○
B/L				○		○
FOOT	○					○
FOOT/DEF		○				○
DEF					○	○

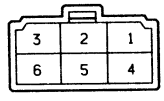
If continuity is not as specified, replace the A/C control assembly.

Blower Speed Control Switch

INSPECTION OF BLOWER SPEED CONTROL SWITCH

INSPECT SWITCH CONTINUITY

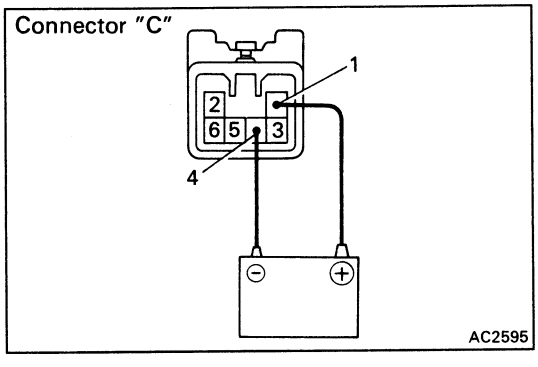
Connector "B"



H-6-2

Terminal / Switch position	B-1	B-2	B-3	B-4	B-6
OFF					
LO				○	○
■	○			○	○
■ ■		○		○	○
HI			○	○	○

If continuity is not as specified, replace the blower speed control switch.



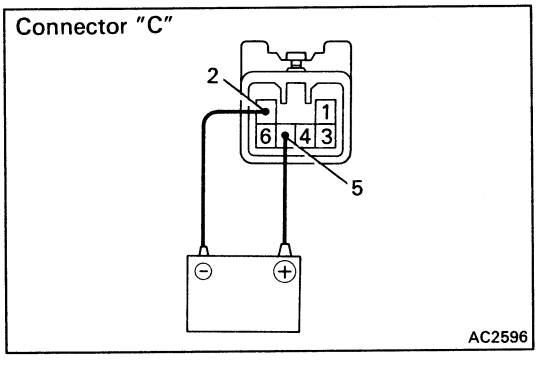
A/C Switch

INSPECTION OF A/C SWITCH

1. INSPECT ILLUMINATION

Connect the positive (+) lead from the battery to terminal C-1 and the negative (–) lead to terminal C-4, then check that the illumination lights up.

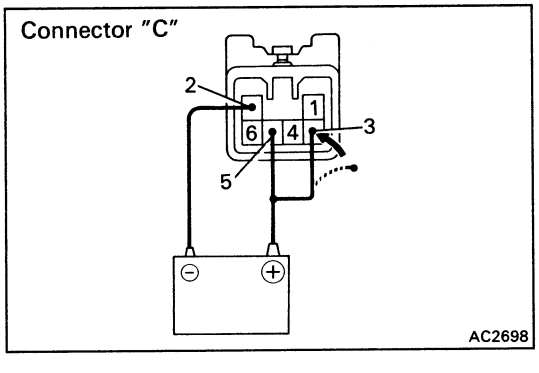
If illumination does not light up, test the bulb.



2. INSPECT INDICATOR

(a) Connect the positive (+) lead from the battery to terminal C-5 and the negative (–) lead to terminal C-2.

(b) Push the A/C switch button in and check that the indicator lights up.



(c) Then, connect the positive (+) lead from the battery to terminal C-3 and check that the indicator dims.

If indicators operation is not as specified, replace the A/C switch.

3. INSPECT SWITCH CONTINUITY

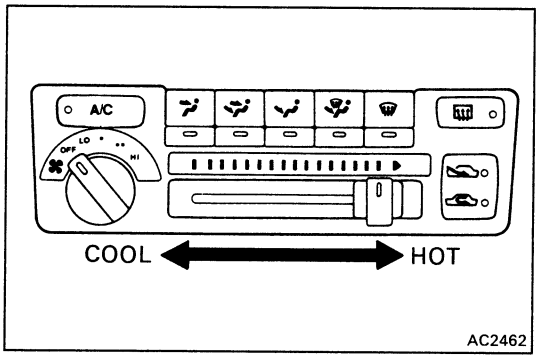
Connector "C"



e-6-2

Terminal / Switch position	C-3	C-5	C-6
OFF			
A/C		○———	———○

If continuity is not as specified, replace the A/C switch.



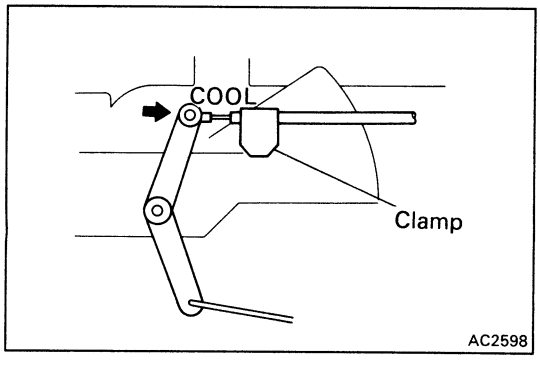
AC2462

Temperature Control Lever

INSPECTION OF TEMPERATURE CONTROL LEVER

INSPECT LEVER OPERATION

Move the control lever left and right, and check for stiffness and bindings through the full range of the levers.

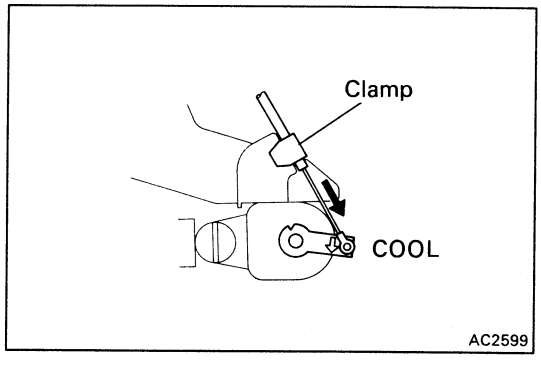


AC2598

ADJUSTMENT OF CONTROL CABLES

1. ADJUST AIR MIX DAMPER CONTROL CABLE

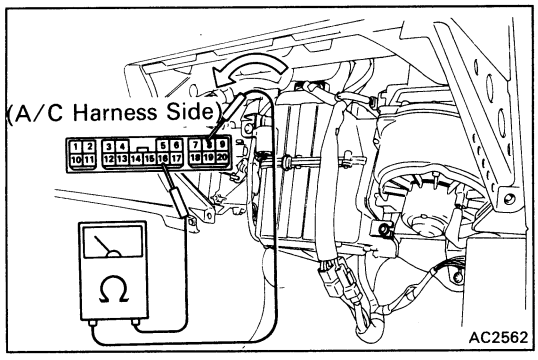
Set the air mix damper and the control lever to "COOL", then install the control cable and lock the clamp.



AC2599

2. ADJUST WATER VALVE CONTROL CABLES

Set the water valve and the control lever to "COOL", then install the control cable and lock the clamp.



PRESSURE SWITCH

(See page AC-4)

ON-VEHICLE INSPECTION

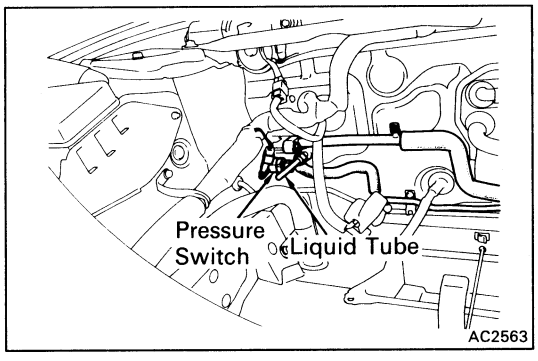
1. DISCONNECT CONNECTOR OF PRESSURE SWITCH

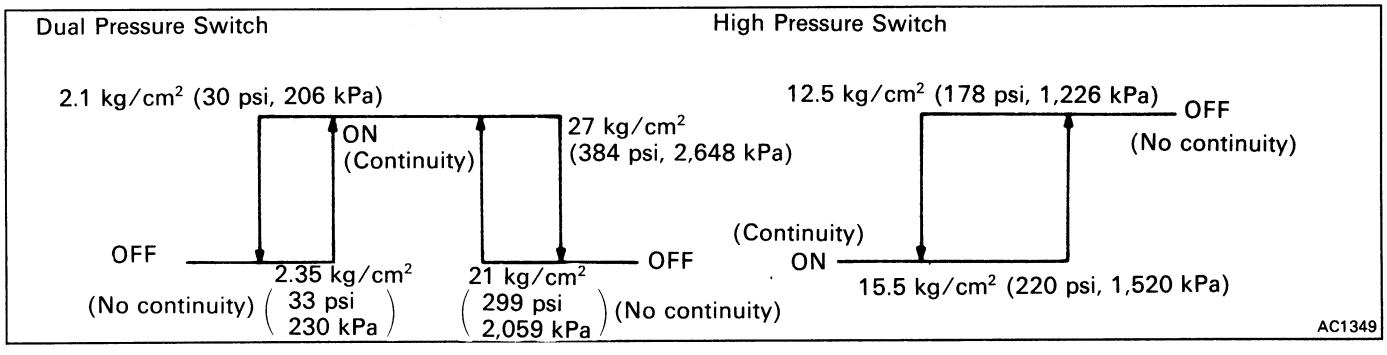
2. INSPECT PRESSURE SWITCH

(a) Install the manifold gauge set.

(b) Observe the gauge reading.

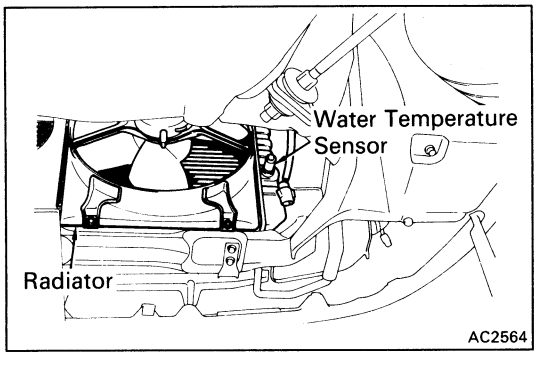
(c) Check the continuity between the two terminals of the pressure switch shown in the below.





If defective, replace the pressure switch.

3. CONNECT CONNECTOR OF PRESSURE SWITCH



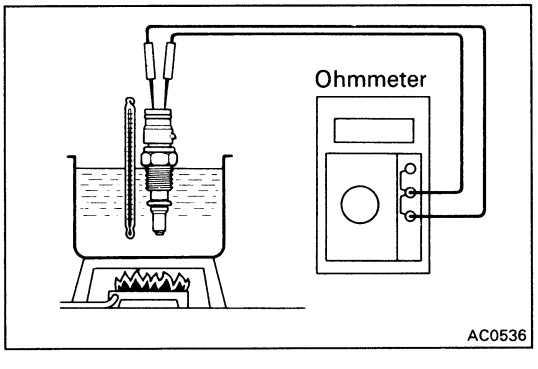
WATER TEMPERATURE SENSOR

(See page AC-4)

INSPECTION OF TEMPERATURE SENSOR

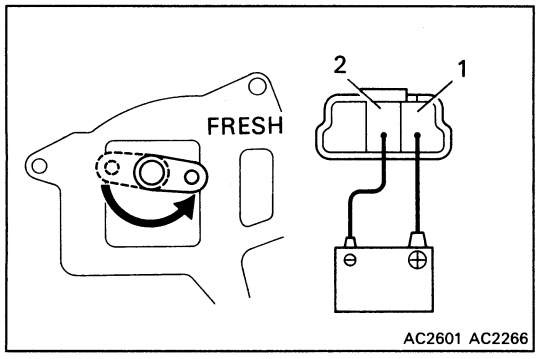
INSPECT WATER TEMPERATURE SENSOR

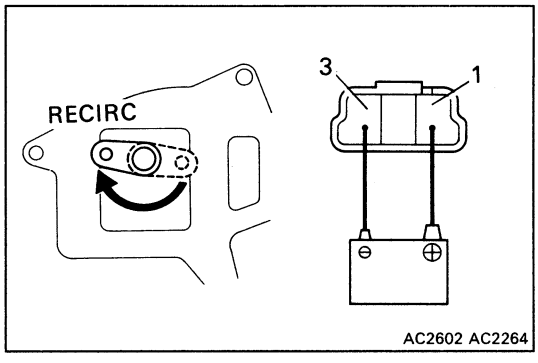
Using an ohmmeter, measure the resistance of the water temperature sensor.



Water temperature	Resistance
85°C (185°F)	approx. 1.35 kΩ
90°C (194°F)	approx. 1.19 kΩ
95°C (203°F)	approx. 1.05 kΩ

If resistance value is not as specified, replace the sensor.





SERVOMOTORS

(See page AC-4)

Air Inlet Servomotor

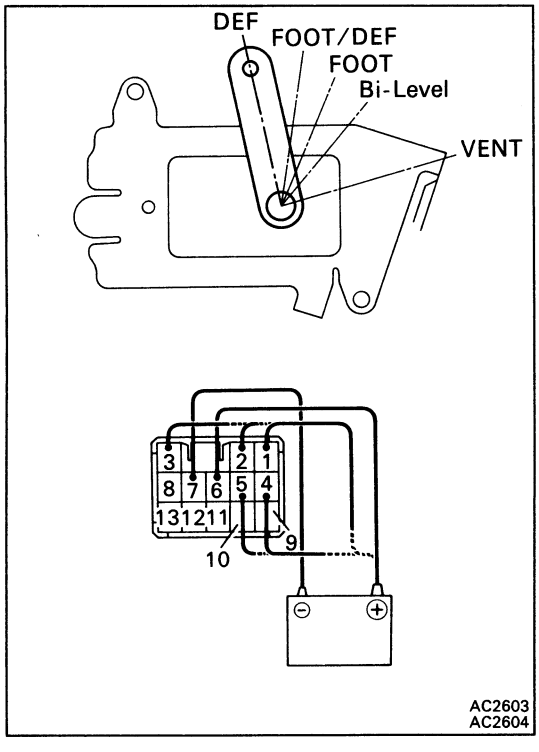
INSPECTION OF AIR INLET SERVOMOTOR

INSPECT SERVOMOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the arm rotates to the "FRESH" side smoothly.

(b) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 3, check that the arm rotates to the "RECIRC" side smoothly.

If operation is not as specified, replace the servo motor.



Mode Servomotor

INSPECTION OF MODE SERVOMOTOR

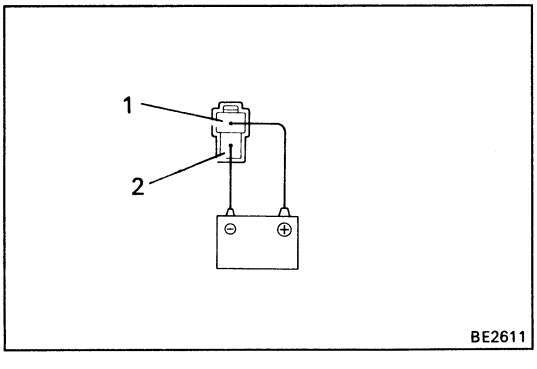
INSPECT SERVOMOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 6 and the negative (–) lead to terminal to 7.

(b) Connect the negative (–) lead from the battery to each terminal and check that the arm rotates to each position as shown.

Connected terminal	Position
1	VENT
2	Bi-Level
3	FOOT
4	FOOT/DEF
5	DEF

If operation is not as specified, replace the servomotor.



BLOWER MOTOR

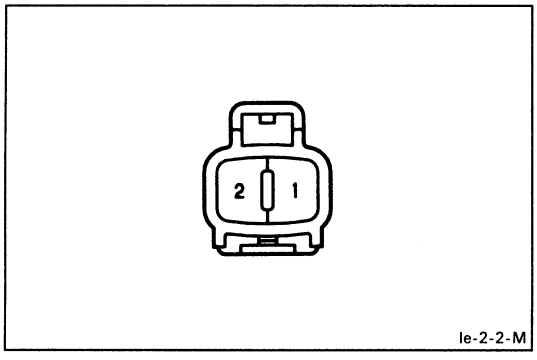
(See page AC-4)

INSPECTION OF BLOWER MOTOR

INSPECT BLOWER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor operation is smooth.

If operation is not as specified, replace the motor.



CONDENSER FAN MOTOR

INSPECTION OF CONDENCER FAN MOTOR

INSPECT FAN MOTOR OPERATION

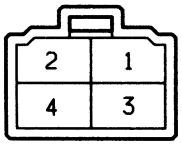
Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor operation is smooth.

If operation is not as specified, replace the motor.

BLOWER RESISTOR

INSPECTION OF BLOWER RESISTOR

INSPECT BLOWER RESISTOR CONTINUITY



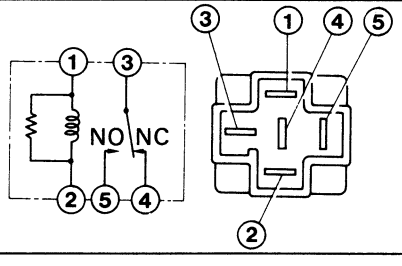
Terminal / Condition	1	3	2	4
Constant	○—WW—○—WW—○—WW—○			

If continuity is not as specified, replace the blower resistor.

HEATER MAIN RELAY

INSPECTION OF HEATER MAIN RELAY

INSPECT RELAY CONTINUITY



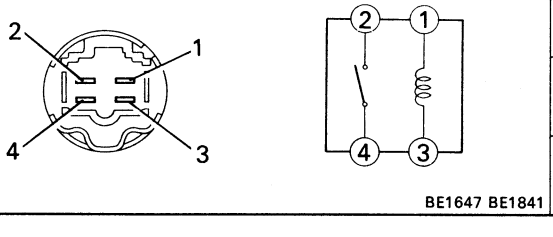
Terminal / Condition	1	2	3	4	5
Constant	○—WW—○		○——○		
Apply battery voltage to terminal 1 and 2			○———		———○

If continuity is not as specified, replace the relay.

MAGNETIC CLUTCH RELAY

INSPECTION OF MAGNETIC CLUTCH RELAY

INSPECT RELAY CONTINUITY



Terminal / Condition	1	2	3	4
Constant	○———	WW	———○	
Apply battery voltage to terminals 1 and 3.		○———		———○

If continuity is not as specified, replace the relay.

FAN MAIN RELAY

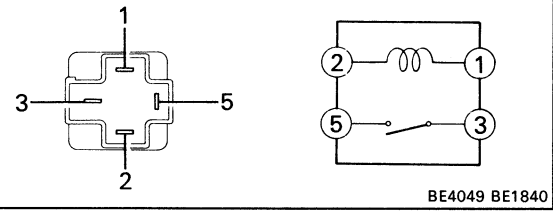
INSPECTION OF RELAY

Check the relay the same way as for the Heater Main Relay.

FAN RELAY NO.1

INSPECTION OF RELAY

INSPECT RELAY CONTINUITY



Terminal / Condition	1	2	3	5
Constant	○—∿∿∿—○			
Apply battery voltage to terminals 1 and 2.			○—○	

If continuity is not as specified, replace the relay.

FAN RELAY NO.2

INSPECTION OF RELAY

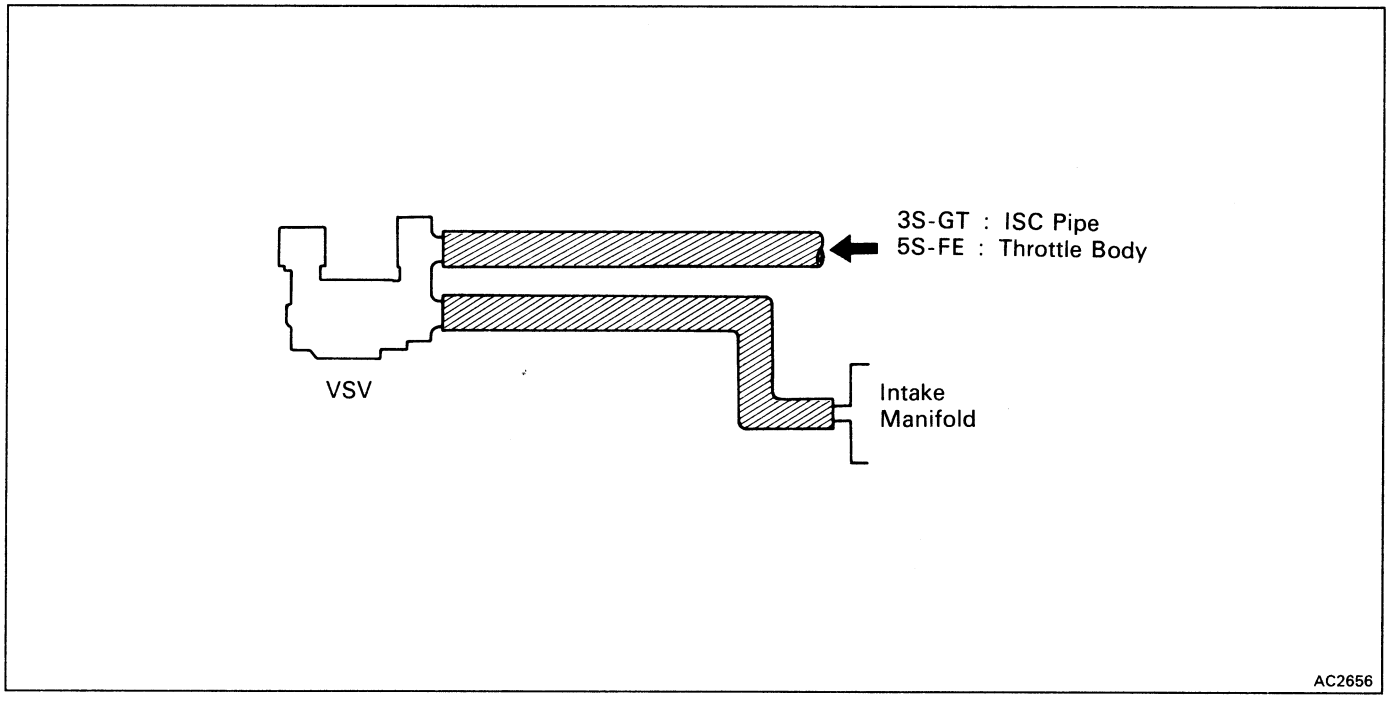
Check the relay the same way as for the Heater Main Relay.

FAN RELAY NO.3

INSPECTION OF RELAY

Check the relay the same way as for the Fan relay No.1 Relay.

VACUUM HOSE CIRCUIT



VACUUM SWITCHING VALVE (VSV)

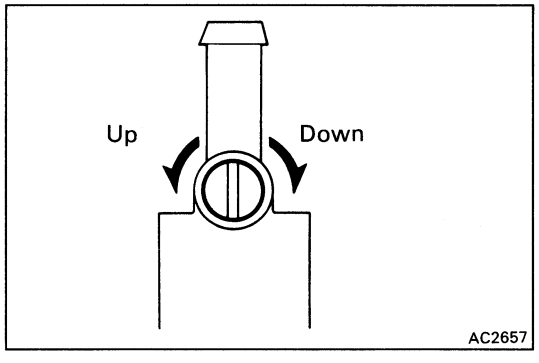
INSPECTION OF IDLE-UP SPEED

1. **WARM UP ENGINE**

2. **SET VEHICLE IN FOLLOWING**
   - Transmission position to Nutral
   - A/C switch ON and Magnetic clutch engaged
   - Blower speed control switch to HI
   - Door window fully opened

3. **INSPECT IDLE-UP SPEED**

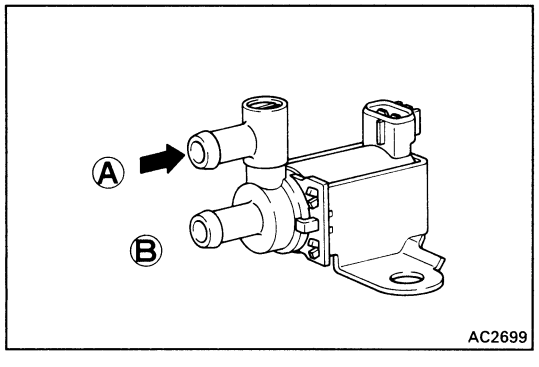
   Standard: 950 ± 50 rpm



ADJUSTMENT OF IDLE-UP SPEED

If idle-up speed is not as specified, adjust the idle-up speed turning the idle speed adjusting screw on the VSV.

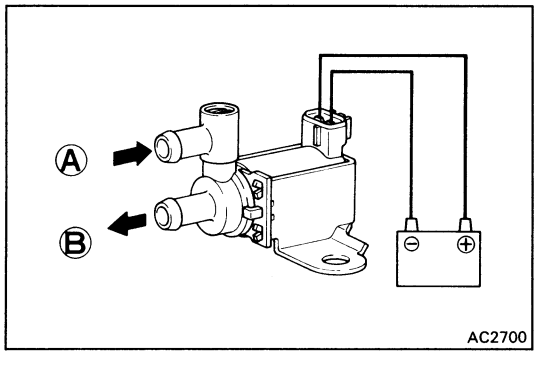
NOTICE: Do not use too much force when tightening the idle adjusting screw.



INSPECTION OF VSV OPERATION

INSPECT VSV OPERATION

(a) Blow into pipe "A" and check that air does not come out of pipe "B".

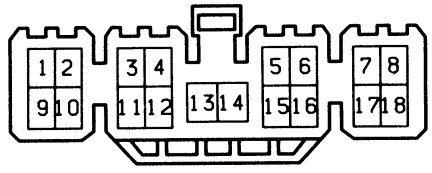


(b) Apply battery voltage (12V) between the terminals 1 and 2.

(c) Blow into pipe "A" and check that air comes out of pipe "B".

If a problem is found, replace the VSV.

Wire Harness Side



S-18-1

A/C AMPLIFIER

INSPECTION OF AMPLIFIER

INSPECT AMPLIFIER CIRCUIT

Disconnect the amplifier and inspect the connector on the wire harness side as shown in the chart.

Test conditions:

- Temperature control lever: MAX COOL
- Blower fan speed control switch: HI

Check for	Tester connection	Condition		Specified value
Continuity	8 – Engine control ECU terminal A/C	Constant		Continuity
	13 – Ground	Constant		Continuity
Resistance	3 – Ground	Constant		Continuity
	9 – 15	Engine coolant condition	85°C (185°F)	Approx. 1.35 kΩ
			90°C (194°F)	Approx. 1.19 kΩ
			95°C (203°F)	Approx. 1.05 kΩ
	14 – 17	Ambient temperature at 25°C (77°F)		Approx. 1.5 kΩ
Voltage	1 – Ground	Ignition switch position switch ON	LOCK or ACC	No voltage
			ON	Battery voltage
	2 – Ground	Ignition switch position switch ON	LOCK or ACC	No voltage
			ON	Battery voltage
	4 – Ground	Ignition switch position switch ON	LOCK or ACC	No voltage
			ON	Battery voltage
	6 – Ground	A/C switch position with ignition switch ON	OFF	No voltage
			ON	Battery voltage
	7 – Ground (RHD models)	ECON switch position with ignition switch ON	OFF	No voltage
			ON	Battery voltage
	10 – Ground	Ignition switch position switch ON	LOCK or ACC	No voltage
			ON	Battery voltage
	11 – Ground	Ignition switch position switch ON	LOCK or ACC	No voltage
			ON	Battery voltage
	18 – Ground	Engine condition	Running	Approx. 10 to 14 v
			Stopped	No voltage

SERVICE SPECIFICATIONS

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BRAKE SYSTEM	A-16
STEERING	A-17
SRS AIRBAG	A-18
BODY	A-18
LUBRICANT	A-19

CLUTCH

Specifications

Pedal height (from asphalt sheet)			184 – 194 mm	7.2 – 7.6 in.
Release point (from pedal stroke end position)		Minimum	25 mm	0.98 in.
Push rod play pedal top			1.0 – 5.0 mm	0.039 – 0.197 in.
Pedal freeplay			5 – 15 mm	0.20 – 0.59 in.
Clutch start switch	ON-OFF stroke		5.0 ± 0.5 mm	0.197 ± 0.020 in.
Reservoir tank slotted spring pin protrusion			1.5 – 3.5 mm	0.059 – 0.138 in.
Disc rivet head depth		Limit	0.3 mm	0.012 in.
Disc runout		Limit	0.8 mm	0.031 in.
Diaphragm spring tip 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	0.1 mm	0.004 in.

Torque Specifications

Part tightened	kg-cm	ft-lb	N·m
Clutch master cylinder x Body	130	9	13
Clutch line union x Clutch master cylinder	155	11	15
Clutch release cylinder x Transaxle case	120	9	12
Flexible hose x Transmission control cable bracket	235	17	23
Clutch line union x Flexible hose	200	14	20
Bleeder plug	110	8	11
Transmission control cable bracket x Clutch release cylinder tube	155	11	15
Clutch release cylinder tube x Release cylinder body	155	11	15
Heat insulator x Release cylinder body	120	9	12
Engine front mounting bracket x Transaxle case	790	57	77
Release fork support x Transaxle case	480	35	47
Clutch cover x Flywheel	195	14	19
Crankshaft x Flywheel	1,000	72	98

MANUAL TRANSAXLE (S54)

Specifications

S54 transaxle	Input shaft				
	Roller bearing journal diameter		Limit	29.970 mm	1.1799 in.
	3rd gear journal diameter		Limit	33.090 mm	1.3028 in.
	4th gear journal diameter		Limit	32.420 mm	1.2764 in.
	5th gear journal diameter		Limit	26.970 mm	1.0618 in.
	Runout		Limit	0.05 mm	0.0020 in.
	Slotted spring pin drive in depth			4.5 – 5.5 mm	0.177 – 0.217 in.
	Output shaft				
	Roller bearing journal diameter		Limit	31.970 mm	1.2587 in.
	1st gear journal diameter		Limit	37.970 mm	1.4949 in.
	2nd gear journal diameter		Limit	31.970 mm	1.2587 in.
	Runout		Limit	0.05 mm	0.0020 in.
	Slotted spring pin drive in depth			4.5 – 5.5 mm	0.177 – 0.217 in.
	Gear thrust clearance	1st	STD	0.10 – 0.29 mm	0.0039 – 0.0114 in.
			Limit	0.35 mm	0.0138 in.
		2nd	STD	0.20 – 0.44 mm	0.0079 – 0.0173 in.
			Limit	0.50 mm	0.0197 in.
		3rd	STD	0.10 – 0.25 mm	0.0039 – 0.0098 in.
			Limit	0.30 mm	0.0118 in.
		4th	STD	0.20 – 0.45 mm	0.0079 – 0.0177 in.
			Limit	0.50 mm	0.0197 in.
		5th	STD	0.20 – 0.40 mm	0.0079 – 0.0157 in.
			Limit	0.45 mm	0.0177 in.
	Gear oil clearance				
	1st, 2nd, 3rd & 4th		STD	0.009 – 0.053 mm	0.0004 – 0.0021 in.
			Limit	0.070 mm	0.0028 in.
	5th		STD	0.009 – 0.050 mm	0.0004 – 0.0020 in.
			Limit	0.070 mm	0.0028 in.
	Shift fork to hub sleeve clearance		Limit	1.0 mm	0.039 in.
	Synchronizer ring to gear clearance		Limit	0.6 mm	0.024 in.
	Reverse shift fork oil clearance		Limit	0.70 mm	0.0276 in.
	Input shaft snap ring thickness				
	No. 2 clutch hub		Mark		
			1	1.95 – 2.00 mm	0.0768 – 0.0787 in.
			2	2.00 – 2.05 mm	0.0787 – 0.0807 in.
			3	2.05 – 2.10 mm	0.0807 – 0.0827 in.
			4	2.10 – 2.15 mm	0.0827 – 0.0846 in.
			5	2.15 – 2.20 mm	0.0846 – 0.0866 in.
			6	2.20 – 2.25 mm	0.0866 – 0.0866 in.
	No. 3 clutch hub		Mark		
			1	1.60 – 1.65 mm	0.0630 – 0.0650 in.
			2	1.65 – 1.70 mm	0.0650 – 0.0669 in.
			3	1.70 – 1.75 mm	0.0669 – 0.0689 in.
			4	1.75 – 1.80 mm	0.0689 – 0.0709 in.
			5	1.80 – 1.85 mm	0.0709 – 0.0728 in.
			6	1.85 – 1.90 mm	0.0728 – 0.0748 in.
			7	1.90 – 1.95 mm	0.0748 – 0.0768 in.
			8	1.95 – 2.00 mm	0.0768 – 0.0787 in.
			9	2.00 – 2.05 mm	0.0787 – 0.0807 in.
			10	2.05 – 2.10 mm	0.0807 – 0.0827 in.
			11	2.10 – 2.15 mm	0.0827 – 0.0846 in.
			12	2.15 – 2.20 mm	0.0846 – 0.0866 in.
			13	2.20 – 2.25 mm	0.0866 – 0.0886 in.
			14	2.25 – 2.30 mm	0.0886 – 0.0906 in.
			15	2.30 – 2.35 mm	0.0906 – 0.0925 in.

Specifications (Cont'd)

S54 transaxle (cont'd)	Input shaft snap ring thickness (cont'd)			
	Rear bearing	Mark		
		A	2.15 – 2.20 mm	0.0846 – 0.0866 in.
		B	2.20 – 2.25 mm	0.0866 – 0.0886 in.
		C	2.25 – 2.30 mm	0.0886 – 0.0906 in.
		D	2.30 – 2.35 mm	0.0906 – 0.0925 in.
		E	2.35 – 2.40 mm	0.0925 – 0.0945 in.
	Output shaft snap ring thickness			
	No. 1 clutch hub	Mark		
		1	2.50 – 2.55 mm	0.0984 – 0.1004 in.
		2	2.55 – 2.60 mm	0.1004 – 0.1024 in.
		3	2.60 – 2.65 mm	0.1024 – 0.1043 in.
		4	2.65 – 2.70 mm	0.1043 – 0.1063 in.
		5	2.70 – 2.75 mm	0.1063 – 0.1083 in.
		6	2.75 – 2.80 mm	0.1083 – 0.1102 in.
	Differential			
	Side gear backlash		0.05 – 0.20 mm	0.0020 – 0.0079 in.
	Side gear thrust washer thickness		0.95 mm	0.0374 in.
			1.00 mm	0.0394 in.
			1.05 mm	0.0413 in.
			1.10 mm	0.0433 in.
			1.15 mm	0.0453 in.
			1.20 mm	0.0472 in.
	Side bearing preload (at staring)		8 – 16 kg-cm	6.9 – 13.9 in.-lb 0.8 – 1.6 N·m
	Side bearing adjusting shim thickness	Mark		
		1	1.90 mm	0.0748 in.
		2	1.95 mm	0.0768 in.
		3	2.00 mm	0.0787 in.
		4	2.05 mm	0.0807 in.
		5	2.10 mm	0.0827 in.
		6	2.15 mm	0.0846 in.
		7	2.20 mm	0.0866 in.
		8	2.25 mm	0.0886 in.
		9	2.30 mm	0.0906 in.
		10	2.35 mm	0.0925 in.
		11	2.40 mm	0.0945 in.
		12	2.45 mm	0.0965 in.
		13	2.50 mm	0.0984 in.
		14	2.55 mm	0.1004 in.
		15	2.60 mm	0.1024 in.
		16	2.65 mm	0.1043 in.
		17	2.70 mm	0.1063 in.
		18	2.75 mm	0.1083 in.
		19	2.80 mm	0.1102 in.
	No. 2 fork shaft slotted spring pin drive in depth		29.5 – 30.5 mm	1.16 – 1.20 in.
	No. 1 shift head slotted spring pin drive in depth		2.0 – 3.0 mm	0.08 – 0.12 in.
	No. 1 fork shaft slotted spring pin drive in depth		3.5 – 4.5 mm	0.14 – 0.18 in.
	Control shaft cover oil seal drive in depth		9.7 – 10.3 mm	0.38 – 0.41 in.

Torque Specifications

S54 transaxle	Part tightened	kg-cm	ft-lb	N·m
	Transaxle x Engine 12 mm bolt	650	47	64
	10 mm bolt	470	34	46
	Transaxle x Starter	400	29	39
	Transaxle x Front engine mounting bracket	790	57	77
	Transaxle x Rear engine mounting bracket	790	57	77
	LH engine mounting bracket x Transaxle	530	38	52
	LH engine mounting stay x Transaxle	380	27	37
	LH engine mounting stay x LH engine mounting	740	54	73
	LH engine mounting x LH engine mounting bracket	650	47	64
	Input shaft front bearing lock plate bolt	185	13	18
	Output shaft front bearing lock plate bolt	185	13	18
	Differential side bearing retainer x Transmission case	185	13	18
	Straight screw plug	130	9	13
	Transaxle case x Transmission case	300	22	29
	Reverse shift arm bracket x Transaxle case	185	13	18
	Reverse idler gear shaft lock bolt	300	22	29
	Rear bearing retainer x Transmission case	210	15	21
	5th driven gear lock nut	1,250	90	123
	Control shaft cover x Transmission case	375	27	37
	Lock ball assembly	230	17	23
	No. 1 lock ball assembly lock nut	375	27	37
	Shift fork x Fork shaft	185	13	18
	No. 1 oil receiver pipe x Transmission case	75	65 in.-lb	7.4
	Transmission case cover x Transmission case	300	22	29
	Release bearing retainer x Transaxle case	75	65 in.-lb	7.4
	Back-up light switch	450	33	44
	Transaxle case oil receiver x Transaxle case	75	65 in.-lb	7.4
	Drain plug	500	36	49
	Filler plug	500	36	49
	Transmission case protector x Transmission case	185	13	18
	Clutch release cylinder x Transaxle	120	9	12
	Stiffener plate	380	27	37
	Selecting bell crank x Transmission case	200	14	20
	Shift lever x Shift and select lever shaft	120	9	12
Shift lever and control cable	Shift lever retainer x Body	120	9	12
	Shift lever plate x Shift lever retainer	195	14	19
	Shift lever x Shift control cable	135	10	13
	Cable bracket x Body	50	43 in.-lb	5
	Grommet retainer set nut	50	43 in.-lb	5

MANUAL TRANSAXLE (E153)

Specifications

E153 transaxle	Input shaft				
	3rd and 4th gear journal diameter		Limit	35.950 mm	1.4154 in.
	5th gear journal diameter		Limit	32.930 mm	1.2965 in.
	Runout		Limit	0.05 mm	0.0020 in.
	Output shaft				
	Roller bearing journal diameter		Limit	32.070 mm	1.2626 in.
	1st and 2nd gear journal diameter		Limit	38.950 mm	1.5335 in.
	Runout		Limit	0.06 mm	0.0024 in.
	Gear thrust clearance	1st	STD	0.10 – 0.35 mm	0.0039 – 0.0138 in.
			Limit	0.40 mm	0.0157 in.
		2nd	STD	0.10 – 0.45 mm	0.0039 – 0.0177 in.
			Limit	0.50 mm	0.0197 in.
		3rd	STD	0.10 – 0.35 mm	0.0039 – 0.0138 in.
			Limit	0.40 mm	0.0157 in.
		4th	STD	0.10 – 0.55 mm	0.0039 – 0.0217 in.
			Limit	0.60 mm	0.0236 in.
		5th	STD	0.10 – 0.57 mm	0.0039 – 0.0224 in.
			Limit	0.65 mm	0.0256 in.
	Gear oil clearance				
	1st & 4th		STD	0.009 – 0.051 mm	0.0004 – 0.0020 in.
			Limit	0.070 mm	0.0028 in.
	2nd & 3rd		STD	0.009 – 0.053 mm	0.0004 – 0.0021 in.
			Limit	0.070 mm	0.0028 in.
	5th		STD	0.009 – 0.050 mm	0.0004 – 0.0020 in.
			Limit	0.070 mm	0.0028 in.
	Reverse idler		STD	0.056 – 0.090 mm	0.0022 – 0.0035 in.
			Limit	0.120 mm	0.0047 in.
	Shift fork to hub sleeve clearance		Limit	1.0 mm	0.039 in.
	Synchronizer ring to gear clearance		Limit	0.6 mm	0.024 in.
	Output shaft bearing preload (at starting)				
		New bearing		8 – 16 kg-cm (6.9 – 13.9 in.-lb, 0.8 – 1.6 N·m)	
		Reused bearing		5 – 10 kg-cm (4.3 – 8.7 in.-lb, 0.5 – 1.0 N·m)	
	Side bearing preload (at starting)				
		New bearing		Output shaft bearing preload 1.9 – 3.7 kg-cm (1.6 – 3.2 in.-lb, 0.2 – 0.4 N·m)	
		Reused bearing		Output shaft bearing preload 1.2 – 2.3 kg-cm (1.0 – 2.0 in.-lb, 0.1 – 0.2 N·m)	
	Speedometer driven gear oil seal drive in depth			33 mm	1.30 in.
	Oil pump				
	Body clearance		STD	0.10 – 0.16 mm	0.004 – 0.006 in.
			Limit	0.30 mm	0.012 in.
	Tip clearance		STD	0.08 – 0.15 mm	0.003 – 0.006 in.
			Limit	0.30 mm	0.012 in.
	Side clearance		STD	0.03 – 0.08 mm	0.001 – 0.003 in.
			Limit	0.15 mm	0.006 in.

Specifications (Cont'd)

E153 transaxle (cont'd)	Input shaft snap ring thickness			
	No. 2 clutch hub	Mark		
		H	2.30 mm	0.0906 in.
		J	2.35 mm	0.0925 in.
		K	2.40 mm	0.0945 in.
		L	2.45 mm	0.0965 in.
		M	2.50 mm	0.0984 in.
		N	2.55 mm	0.1004 in.
		P	2.60 mm	0.1024 in.
	Input rear bearing	Mark		
		1	2.35 mm	0.0925 in.
		2	2.40 mm	0.0945 in.
		3	2.45 mm	0.0965 in.
		4	2.50 mm	0.0984 in.
		5	2.55 mm	0.1004 in.
		6	2.60 mm	0.1024 in.
		7	2.65 mm	0.1043 in.
		8	2.70 mm	0.1063 in.
	Output shaft snap ring thickness			
	No. 1 clutch hub	Mark		
		A	2.80 mm	0.1102 in.
		B	2.85 mm	0.1122 in.
		C	2.90 mm	0.1142 in.
		D	2.95 mm	0.1161 in.
		E	3.00 mm	0.1181 in.
		F	3.05 mm	0.1201 in.
		G	3.10 mm	0.1220 in.
	No. 3 clutch hub	Mark		
		Q	2.25 mm	0.0886 in.
		R	2.30 mm	0.0906 in.
		S	2.35 mm	0.0925 in.
		T	2.40 mm	0.0945 in.
		U	2.45 mm	0.0965 in.
		V	2.50 mm	0.0984 in.
		W	2.55 mm	0.1004 in.
		X	2.60 mm	0.1024 in.
		Y	2.65 mm	0.1043 in.
	Output shaft rear bearing adjusting shim thickness	Mark		
		0	1.30 mm	0.0512 in.
		1	1.35 mm	0.0531 in.
		2	1.40 mm	0.0551 in.
		3	1.45 mm	0.0571 in.
		4	1.50 mm	0.0591 in.
		5	1.55 mm	0.0610 in.
		6	1.60 mm	0.0630 in.
		7	1.65 mm	0.0650 in.
		8	1.70 mm	0.0669 in.
		9	1.75 mm	0.0689 in.

Specifications (Cont'd)

E153 transaxle (cont'd)	Output shaft rear bearing adjusting shim thickness (cont'd)	Mark		
		A	1.80 mm	0.0709 in.
		B	1.85 mm	0.0728 in.
		C	1.90 mm	0.0748 in.
		D	1.95 mm	0.0768 in.
		E	2.00 mm	0.0787 in.
		F	2.05 mm	0.0807 in.
		G	2.10 mm	0.0827 in.
		H	2.15 mm	0.0846 in.
		J	2.20 mm	0.0866 in.
		K	2.25 mm	0.0886 in.
		L	2.30 mm	0.0906 in.
		M	2.35 mm	0.0925 in.
		N	2.40 mm	0.0945 in.
		P	2.45 mm	0.0965 in.
		Q	2.50 mm	0.0984 in.
	Differential pinion to side gear backlash		0.05 – 0.20 mm	0.0020 – 0.0079 in.
	Differential side gear thrust washer thickness		0.80 mm	0.0315 in.
			0.90 mm	0.0354 in.
			1.00 mm	0.0394 in.
			1.10 mm	0.0433 in.
			1.20 mm	0.0472 in.
			1.30 mm	0.0512 in.
			1.40 mm	0.0551 in.
	Differential side bearing adjusting shim thickness	Mark		
		0	2.00 mm	0.0787 in.
		1	2.05 mm	0.0807 in.
		2	2.10 mm	0.0827 in.
		3	2.15 mm	0.0846 in.
		4	2.20 mm	0.0866 in.
		5	2.25 mm	0.0886 in.
		6	2.30 mm	0.0906 in.
		7	2.35 mm	0.0925 in.
		8	2.40 mm	0.0945 in.
		9	2.45 mm	0.0965 in.
		A	2.50 mm	0.0984 in.
		B	2.55 mm	0.1004 in.
		C	2.60 mm	0.1024 in.
		D	2.65 mm	0.1043 in.
		E	2.70 mm	0.1063 in.
		F	2.75 mm	0.1083 in.
		G	2.80 mm	0.1102 in.
		H	2.85 mm	0.1122 in.

Torque Specifications

E153 transaxle	Part tightened	kg-cm	ft-lb	N·m
	Transaxle x Engine	650	47	64
		470	34	46
		380	27	37
	Transaxle x Starter	400	29	39
	Transaxle x Front engine mounting bracket	790	57	77
	Transaxle x Rear engine mounting bracket	790	57	77
	LH engine mounting stay x Transaxle	380	27	37
	LH engine mounting stay x LH engine mounting	740	54	73
	LH engine mounting x LH engine mounting bracket	650	47	64
	Oil pump cover bolt	105	8	10
	Differential right case x Differential left case	640	46	63
	Differential case x Ring gear	1,260	91	124
	Transmission case x Transaxle case	300	22	29
	Transmission case x Case cover	300	22	29
	Rear bearing retainer x Transmission case	430	31	42
	5th driven gear lock nut	1,250	90	123
	Reverse idler shaft lock bolt	300	22	29
	Control shaft cover bolt	200	14	20
	Reverse shift arm bracket x Transaxle case	175	13	17
	Shift fork x Fork shaft	240	17	24
	Filler plug	500	36	49
	Drain plug	500	36	49
	Back-up light switch	410	30	40
	Selecting bellcrank x Transmission case	200	14	20
	Oil pipe clamp	175	13	17
	Shift lever x Shift and select lever shaft	120	9	12
	Lock bolt x Transmission case	500	36	49
	Straight screw plug	250	18	25
	Stiffener plate	380	27	37
	Clutch release cylinder x Transaxle	120	9	12
Shift lever and control cable	Same the S54 manual transaxle (See page A-5)			

AUTOMATIC TRANSAXLE (A241E)

Specifications

Line pressure	Engine idling	D range R range	3.8 – 4.3 kg/cm^2 6.5 – 8.1 kg/cm^2	54 – 61 psi 92 – 115 psi	373 – 422 kPa 637 – 794 kPa
	At stall	D range R range	7.3 – 8.8 kg/cm^2 13.6 – 16.1 kg/cm^2	104 – 125 psi 193 – 229 psi	716 – 863 kPa 1,334 – 1,579 kPa

Engine stall revolution		2,550 ± 150 rpm
Time lag	N range → D range	Less than 1.2 seconds
	N range → R range	Less than 1.5 seconds
Engine idle speed (A/C OFF, N range)		700 ± 50 rpm
Throttle cable adjustment (Throttle valve fully closed)		Between boot end face and inner cable stopper
		0 – 1 mm (0 – 0.04 in.)
Torque converter installation	Correct distance	13.0 mm (0.51 in.)
Torque converter sleeve runout		0.3 mm (0.0118 in.)
Drive plate runout		0.2 mm (0.0079 in.)

Shift schedule — Throttle valve fully open [Fully closed] km/h (mph)

	1 → 2	2 → 3	3 → O/D	[3 → O/D]	[O/D → 3]	O/D → 3	3 → 2	2 → 1
D range	53 – 59 (33 – 37)	102 – 112 (63 – 70)	137 – 149 (85 – 93)	[46 – 52 (29 – 32)]	[19 – 24 (12 – 15)]	131 – 143 (81 – 89)	98 – 108 (61 – 67)	44 – 50 (27 – 31)
2 range	53 – 59 (33 – 37)	—	—	—	—	—	—	44 – 50 (27 – 31)
L range	—	—	—	—	—	—	—	34 – 40 (21 – 25)

Lock-up point — Throttle valve opening 5% km/h (mph)

	Lock-up ON	Lock-up OFF
	O/D	O/D
D range	80 – 87 (50 – 54)	74 – 80 (46 – 50)

Second coast brake	Piston stroke	1.5 – 3.0 mm	0.059 – 0.118 in.
	Piston rod length	72.9 mm	2.870 in.
		71.4 mm	2.811 in.
Oil pump	Body clearance STD	0.07 – 0.15 mm	0.0028 – 0.0059 in.
	Maximum	0.3 mm	0.012 in.
	Tip clearance STD	0.11 – 0.14 mm	0.0043 – 0.0055 in.
	Maximum	0.3 mm	0.012 in.
	Side clearance STD	0.02 – 0.05 mm	0.0008 – 0.0020 in.
	Maximum	0.1 mm	0.004 in.
	Pump body bushing inside diameter Maximum	38.18 mm	1.5031 in.
	Stator shaft bushing inside diameter		
	Front side Maximum	21.57 mm	0.8492 in.
	Rear side Maximum	27.07 mm	1.0657 in.
Direct clutch	Piston stroke	1.11 – 1.47 mm	0.0437 – 0.0579 in.
	Drum bushing inside diameter	47.07 mm	1.8531 in.
	Flange thickness	2.6 mm	0.102 in.
		3.0 mm	0.118 in.
Forward clutch	Piston stroke	1.42 – 1.81 mm	0.0559 – 0.0713 in.
	Flange thickness	3.00 mm	0.1181 in.
		3.37 mm	0.1327 in.

Specifications (Cont'd)

Front planetary gear	Sun gear bushing inside diameter	Standard	22.025 – 22.046 mm	0.8671 – 0.8680 in.
		Maximum	22.096 mm	0.8699 in.
	Ring gear flange bushing inside diameter	Standard	19.025 – 19.050 mm	0.7490 – 0.7500 in.
	Planetary pinion gear thrust clearance	Maximum	0.5 mm	0.020 in.
Rear planetary gear	Planetary pinion gear thrust clearance	Maximum	0.5 mm	0.020 in.
Counter shaft	Starting torque with spring tension gauge		1.2 – 2.0 kg	2.6 – 4.4 lb
	with torque gauge (hexagon nut side)	New bearing	6 – 10 kg-cm	5.2 – 8.7 in.-lb 0.6 – 1.0 N·m
		Reused bearing	3 – 5 kg-cm	2.6 – 4.3 in.-lb 0.3 – 0.5 N·m
	Planetary sun gear bushing inside diameter	Standard	29.800 – 29.825 mm	1.1732 – 1.1742 in.
		Maximum	29.870 mm	1.1760 in.
	Underdrive planetary pinion gear thrust clearance	Maximum	0.5 mm	0.020 in.
	Height (measure the distance between the tip of the counter shaft and bolt seat of the clutch support.)		33.3 – 35.5 mm	1.311 – 1.398 in.
	End play		0.23 – 0.89 mm	0.0091 – 0.0350 in.
Underdrive clutch and one-way clutch No. 3	Clutch drum bushing inside diameter			
		Standard Front side	46.500 – 46.525 mm	1.8307 – 1.8317 in.
		Rear side	55.000 – 55.030 mm	2.1654 – 2.1665 in.
		Maximum Front side	46.570 mm	1.8335 in.
		Rear side	55.080 mm	2.1685 in.
	Underdrive clutch piston stroke		1.22 – 1.54 mm	0.0480 – 0.0606 in.
	Flange thickness		2.30 mm	0.0906 in.
			2.50 mm	0.0984 in.
			2.70 mm	0.1063 in.
Intermediate shaft	Intermediate shaft protrusion length (Reference)		115.8 mm	4.559 in.
Input shaft	Thrust play		0.3 – 0.9 mm	0.012 – 0.035 in.

Specifications (Cont'd)

Valve body spring	Spring	Free length mm (in.)	Coil outer diameter mm (in.)	Total No. of coils	Color
	(Upper valve body)				
	Primary regulator valve	66.7 (2.626)	18.6 (0.732)	12.5	Purple
	Lock-up relay valve	18.8 (0.740)	5.1 (0.201)	14.5	None
	Low coast modulator valve	27.5 (1.083)	8.3 (0.327)	12.5	Yellow
	Down shift plug	30.0 (1.181)	8.7 (0.343)	12.5	Red
	Throttle valve	29.2 (1.150)	9.2 (0.362)	9.5	Light Green
	Throttle modulator valve	29.9 (1.177)	9.0 (0.354)	15.5	Green
	Accumulator control valve	33.2 (1.307)	10.0 (0.394)	11.5	Orange
	(Low valve body)				
	Cooler by-pass valve	18.3 (0.720)	12.0 (0.472)	6.5	Yellow
	Pressure relief valve	11.2 (0.441)	6.4 (0.252)	7.5	None
	2-3 shift valve	30.7 (1.209)	9.7 (0.382)	10.5	Purple
	2nd coast modulator valve	29.6 (1.165)	8.3 (0.327)	12.5	Red
	Lock-up signal valve	30.0 (1.181)	8.2 (0.323)	11.5	Orange
	Secondary regulator valve	27.4 (1.079)	11.0 (0.433)	11.5	Blue
	1-2 shift valve	30.8 (1.213)	9.7 (0.382)	10.5	Purple
	3-4 shift valve	30.8 (1.213)	9.7 (0.382)	10.5	Purple

Valve body retainer	Retainer	Height mm (in.)	Width mm (in.)	Thickness mm (in.)
	(Upper valve body)			
	Accumulator control valve	15.0 (0.591)	5.0 (0.197)	3.2 (0.126)
	Cut-back valve	16.0 (0.630)	5.0 (0.197)	3.2 (0.126)
	Low coast modulator valve	21.2 (0.835)	5.0 (0.197)	3.2 (0.126)
	(Lower valve body)			
	2-3 shift valve	11.5 (0.453)	5.0 (0.197)	3.2 (0.126)
	2nd coast modulator valve	11.5 (0.453)	5.0 (0.197)	3.2 (0.126)
	Lock-up signal valve	11.5 (0.453)	5.0 (0.197)	3.2 (0.126)
	1-2 shift valve	11.5 (0.453)	5.0 (0.197)	3.2 (0.126)
	3-4 shift valve	11.5 (0.453)	5.0 (0.197)	3.2 (0.126)
	Secondary regulator valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)

Accumulator spring	Spring	Free length mm (in.)	Color
	C_1 Outer	74.1 (2.917)	Pink
	C_1 Inner	41.0 (1.614)	Pink
	C_2	62.5 (2.461)	Pink
	C_3 Outer	65.2 (2.570)	Blue
	C_3 Inner	48.0 (1.890)	Orange
	B_2	64.5 (2.539)	Green

Differential	Side bearing preload (at Starting)		
	New bearing	8 – 14 kg-cm	6.9 – 12.2 in.-lb 0.8 – 1.4 N·m
	Reused bearing	4 – 7 kg-cm	3.5 – 6.1 in.-lb 0.4 – 0.7 N·m
	Pinion to side gear backlash	0.05 – 0.20 mm	0.0020 – 0.0079 in.
	Side gear thrust washer thickness	0.95 mm	0.0374 in.
		1.00 mm	0.0394 in.
		1.05 mm	0.0413 in.
		1.10 mm	0.0433 in.
		1.15 mm	0.0453 in.
		1.20 mm	0.0472 in.

Specifications (Cont'd)

Differential (cont'd)	Side bearing adjusting shim thickness	2.00 mm	0.0787 in.
		2.05 mm	0.0807 in.
		2.10 mm	0.0827 in.
		2.15 mm	0.0846 in.
		2.20 mm	0.0866 in.
		2.25 mm	0.0886 in.
		2.30 mm	0.0906 in.
		2.35 mm	0.0925 in.
		2.40 mm	0.0945 in.
		2.45 mm	0.0965 in.
		2.50 mm	0.0984 in.
		2.55 mm	0.1004 in.
		2.60 mm	0.1024 in.
		2.65 mm	0.1043 in.
		2.70 mm	0.1063 in.
		2.75 mm	0.1083 in.
		2.80 mm	0.1102 in.
		2.85 mm	0.1122 in.
		2.90 mm	0.1142 in.

Torque Specifications

Part tightened	kg-cm	ft-lb	N·m
Neutral start switch x Transaxle case	55	48 in.-lb	5.4
Torque converter x Drive plate	280	20	27
Drive plate x Crank shaft	850	61	83
Oil pump body x Stator shaft	100	7	10
Upper valve body x Lower valve body	65	56 in.-lb	6.4
Solenoid x Lower valve body	100	7	10
Ring gear x Differential case	985	71	97
Transaxle housing x Transmission case	300	22	29
Counter shaft x Driven gear	1,600	116	157
Oil pump x Transaxle case	250	18	25
Accumulator cover x Transaxle case	100	7	10
Valve body x Transaxle case	100	7	10
Manual detent spring x Transaxle case	100	7	10
Oil tube bracket	100	7	10
Oil pan	50	43 in.-lb	4.9
Speed sensor x Transaxle case	100	7	10
Sensor adopter	100	7	10
Sensor cover bracket	130	9	13
Neutral start switch x Manual valve shaft	70	61 in.-lb	6.9
Transaxle housing x Engine	650	47	64
Transaxle rear cover x Transaxle case	300	22	29

SUSPENSION AND AXLE

Specifications

Cold tire inflation pressure kg/cm² (psi, kPa)	Tire size		Front	Rear
	5S-FE Engine	195/60R14 85H 205/60R14 87H	2.0 (29, 200) —	— 23 (33, 225)
	3S-GTE Engine	195/60R14 85V 205/60R14 87V	2.0 (29, 200) —	— 23 (33, 225)
Chassis ground clearance mm (in.)	All models		224.0 (8.819)	203.0 (7.992)
Front wheel alignment			Inspection STD	Adjustment STD
	Toe-in Left-right error		1 ± 2 mm (0.04 ± 0.08 in.) 1.0 mm (0.039 in.) or less	1 ± 1 mm (0.04 ± 0.04 in.) 1.0 mm (0.039 in.) or less
	Camber Left-right error		– 0°55′ ± 30′ 30′ or less	— —
	Caster Left-right error		2°45′ ± 45′ 30′ or less	2°45′ ± 30′ 30′ or less
	Steering axis inclination Left-right error		13°35′ ± 30′ 30′ or less	— —
	Wheel angle (Maximum)	Outside wheel	32°	
		Inside wheel	37°30′ ± 1°30′	
	Side slip (Reference only)		3.0 mm/m (0.118 in./3.3 ft) or less	
Rear wheel alignment			Inspection STD	Adjustment STD
	Toe-in Left-right error		5 ± 1 mm (0.20 ± 0.04 in.) 10° or more	1 ± 1 mm (0.04 ± 0.04 in.) 10° or more
	Camber Left-right error		– 1°20′ ± 30′ 30′ or less	— —
Wheel lateral runout	Less than 1.0 mm (0.039 in.)			
Front axle and suspension	Hub bearing axial direction	Limit	0.5 mm	0.0020 in.
	Ball joint rotation condition		8 – 25 kg-cm (7 – 22 in.-lb, 0.8 – 2.5 N·m)	
	Ball joint vertical play		0 mm	0 in.
	Strut bar length		362 mm	14.25 in.
Rear axle and suspension	Hub bearing axial direction	Limit	0.5 mm	0.0020 in.
	Ball joint rotation condition		0.5 – 10 kg-cm (0.43 – 8.68 in.-lb, 0.05 – 0.98 N·m)	
	Ball joint vertical play		0 mm	0 in.
	Drive shaft grease capacity			
	Outboard joint	5S-FE engine	120 – 130 g	0.26 – 0.29 lb
		3S-GTE engine	120 – 130 g	0.26 – 0.29 lb
	Inboard joint	5S-FE engine	232 – 242 g	0.51 – 0.53 lb
		3S-GTE engine	90 – 100 g	0.20 – 0.22 lb
	Side gear shaft	3S-GTE engine	43 – 53 g	0.09 – 0.12 lb
	Drive shaft standard length			
		5S-FE engine LH	540.3 ± 5.0 mm	21.272 ± 0.197 in.
		5S-FE engine RH	831.4 ± 5.0 mm	32.732 ± 0.197 in.
		3S-GTE engine LH	389.7 ± 5.0 mm	15.343 ± 0.197 in.
		3S-GTE engine RH	389.7 ± 5.0 mm	15.343 ± 0.197 in.

Torque Specifications

Part tightened	kg-cm	ft-lb	N·m
FRONT AXLE AND SUSPENSION			
Disc brake dust cover x Steering knuckle	85	74 in.-lb	8.3
Axle hub lock nut	1,250	90	123
Tie rod end x Steering knuckle	500	36	49
Ball joint x Steering knuckle	820	59	80
ABS speed sensor x Steering knuckle (w/ABS)	80	69 in.-lb	7.8
Steering knuckle x Shock absorber	2,600	188	255
Brake caliper x Steering knuckle	600	43	59
Piston rod x Suspension support	500	36	49
Suspension support x Body	400	29	39
Brake hose x Disc brake caliper	310	22	30
Stabilizer link x Shock absorber	650	47	64
Lower arm x Ball joint	800	58	78
Strut Bar x Lower arm	1,150	83	113
Lower arm x Body	1,200	87	118
Stabilizer bar x Body	195	14	19
Stabilizer bar x Stabilizer link	650	47	64
Strut bar x Body	1,150	83	113
Hub nut	1,050	76	103
REAR AXLE AND SUSPENSION			
Axle carrier x Shock absorber	2,600	188	225
Axle carrier x Tie rod end	1,050	76	103
Axle carrier x Lower arm	1,150	83	113
Stabilizer link x Shock absorber	500	36	49
ABS speed sensor x Axle carrier	80	69 in.-lb	7.8
Disc brake caliper x Axle carrier	600	43	59
Hub bearing lock nut (5S-FE engine)	2,100	152	206
(3S-GTE engine)	3,000	217	294
Axle carrier x Ball joint	1,150	83	113
Bearing bracket stay x Engine	770	56	75
Bearing bracket stay x Bearing bracket	770	56	75
Bearing bracket x Drive shaft center bearing	330	24	32
Bearing bracket x Engine	650	47	64
Drive shaft inboard joint holding hexagon bolts	660	48	65
Piston rod x Suspension support	740	54	73
Suspension support x Body	820	59	80
Brake hose x Disc brake caliper	310	22	30
ABS speed sensor wire harnes x Suspension cross member	55	48 in.-lb	5.4
Lower arm x Ball joint	930	67	91
Lower arm holding nut	1,350	98	132
Strut rod nut	910	66	89
Strut rod x Body	1,200	87	118
Suspension arm x Body	1,050	76	103
Stabilizer bar x Body	195	14	19
Suspension cross member x Body	1,150	83	113
Engine mount x Suspension cross member	790	57	77
Exhaust pipe x Suspension cross member	210	15	21
Stabilizer bar x Stabilizer link	500	36	49

BRAKE SYSTEM

Specifications

Brake pedal	Pedal height (from asphalt sheet) Pedal freeplay Pedal reserve distance at 50 kg (110.2 lb, 490 N)		177 – 187 mm 3 – 5 mm More than 117 mm (4.61 in.)	6.968 – 7.362 in. 0.12 – 0.20 in.
Brake booster	Booster push rod to piston clearance	w/ SST	0 mm	0 in.
Front brake	Disc thickness	STD	25.0 mm	0.984 in.
		Limit	24.0 mm	0.945 in.
	Disc runout	Limit	0.07 mm	0.0028 in.
	Pad thickness	STD	10.0 mm	0.394 in.
		Limit	1.0 mm	0.039 in.
Rear brake	Disc thickness	STD	16.0 mm	0.630 in.
		Limit	15.0 mm	0.591 in.
	Disc runout	Limit	0.10 mm	0.039 in.
	Pad thickness	STD	10.0 mm	0.394 in.
		Limit	1.0 mm	0.039 in.
Parking brake	Lever travel	at 20 kg (44.1 lb, 196 N)	5 – 8 clicks	

Torque Specifications

Part tightened	kg-cm	ft-lb	N·m
Master cylinder x Piston stopper bolt	100	7	10
Master cylinder x Reservoir	17.5	15.2 in.-lb	1.7
Master cylinder x Brake booster	130	9	13
Brake tube union nut	155	11	15
Brake booster clevis lock nut	260	19	25
Brake booster x Pedal bracket	130	18	25
Front disc brake cylinder installation bolt (PE36T Disc)	350	25	34
Front disc brake cylinder installation bolt (PD51 Disc)	255	18	25
Front disc brake torque plate x Steering knuckle	900	65	88
Front disc brake cylinder x Flexible hose	310	22	30
Rear disc brake cylinder installation bolt	200	14	20
Rear disc brake torque plate x Rear axle carrier	600	43	59
Rear disc brake cylinder x Flexible hose	310	22	30
ABS actuator x Body	195	14	19
Bleeder plug	85	74 in.-lb	8.3
ABS actuator x Actuator bracket	55	48 in.-lb	5.4
Front speed sensor installation bolt	80	69 in.-lb	7.8
Rear speed sensor installation bolt	80	69 in.-lb	7.8

STEERING

Specifications

Steering column	Steering wheel freeplay	Maximum	30 mm	1.18 in.	
	Pawl stopper	Mark			
		1 or A	12.65 – 12.75 mm	0.4980 – 0.5020 in.	
		2 or B	12.55 – 12.65 mm	0.4941 – 0.4980 in.	
		3 or C	12.45 – 12.55 mm	0.4902 – 0.4941 in.	
		4 or D	12.35 – 12.45 mm	0.4862 – 0.4902 in.	
		5 or E	12.25 – 12.35 mm	0.4823 – 0.4862 in.	
Manual steering gear housing	Steering rack runout	Maximum	0.3 mm	0.012 in.	
	Pinion bearing preload	at Turning	2.3 – 3.3 kg-cm	2.0 – 2.9 in.-lb	0.2 – 0.3 N·m
	Total preload	at Turning	6 – 13 kg-cm	5.2 – 11.3 in.-lb	0.6 – 1.3 N·m
Power steering	Maximum rise of oil level		Below 5 mm (0.20 in.)		
	Oil pressure	at Idle speed	50 – 55 kg/cm^2 (711 – 782 psi, 4,903 – 5,394 kPa)		
	Steering effort		4.5 kg	9.9 lb	44 N
	Steering rack runout	Maximum	0.3 mm	0.012 in.	
	Total preload	at Turning	9 – 13 kg-cm	7.8 – 11.3 in.-lb	0.9 – 1.3 N·m

Torque Specifications

Steering column	Part tightened	kg-cm	ft-lb	N·m
	Main shaft x Steering wheel	360	26	35
	Steering wheel pad (w/ airbag)	75	65 in.-lb	7.4
	Column tube x Body	260	19	25
	Universal joint bolt	360	26	35
	Tilt lever assembly installation bolt	30	26 in.-lb	2.9
	Tilt pawl set nut	60	52 in.-lb	5.9
	Tilt lever retainer set nut	150	11	15
	Compression spring bushing bolt	80	69 in.-lb	7.8
	Main shaft x Intermediate shaft	360	26	35
Manual steering gear housing	Gear housing bracket x Body	440	32	43
	Tie rod end x Steering knuckle	500	36	49
	Universal joint bolt	360	26	35
	Pinion bearing adjusting screw lock nut	930	67	91
	Rack guide spring cap lock nut	570	41	56
	Rack x Rack end	650	47	64
	Tie rod end lock nut	570	41	56
Power steering (Power steering pump)	PS pump x Crossmember	260	19	25
	Rear pump stay x PS pump	185	13	18
	Rear pump stay x Body	185	13	18
	Pressure tube union nut	370	27	36
(Gear housing)	Gear housing bracket x Body	440	32	43
	Tie rod end x Steering knuckle	500	36	49
	Universal joint bolt	360	26	35
	Pressure tube union bolt	500	36	49
	Return tube	250	18	25

Torque Specifications (Cont'd)

	Part tightened	kg-cm	ft-lb	N·m
(Gear housing) (cont'd)	Rack x Rack end	520	38	51
	Tie rod end lock nut	570	41	56
	Control valve housing x Rack housing	185	13	18
	Control valve shaft-seft-locking nut	250	18	25
	Rack housing cap	600	43	59
	Rack guide spring cap lock nut	340	25	33
	Turn pressure tube x Housing	110	8	11

SRS AIRBAG

Specifications

	Terminal	
Front airbag sensor resistance	⊕S – ⊕A	755 – 885 Ω
	⊕S – ⊖S	∞
	⊖S – ⊖A	Less than 1 Ω

Torque Specifications

Part tightened	kg-cm	ft-lb	N·m
Steering wheel	360	26	35
Steering wheel pad	75	65 in.-lb	7.4
Front airbag sensor	260	19	25
Center airbag sensor assembly	130	9	13

BODY

Torque Specifications

Part tightened	kg-cm	ft-lb	N·m
SEAT			
Seat adjuster x Body	375	27	37
SEAT BELTS			
Adjustable anchor x Body	440	32	43
Shoulder anchor x Adjustable anchor	440	32	43
Anchor x Body	440	32	43
Backle x Seat	440	32	43
Anchor plate x Body	400	29	39
ELR x Body	440	32	43
	80	69 in.-lb	9.8
Bracket x Seat	195	14	19

LUBRICANT

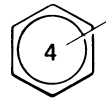
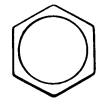
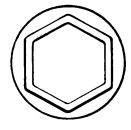
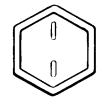
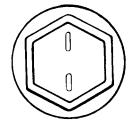
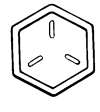
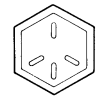
Item		Capacity			Classification
		Liters	US qts	Imp. qts	
Manual transaxle oil (w/ Differential)	S54	2.6	2.7	2.3	ATF DEXRON®II
	E153	4.2	4.4	3.7	Transaxle oil E50 (08885-80206) or equivalent
Automatic transaxle fluid					ATF DEXRON®II
Dry fill		8.0	8.5	7.0	
Drain and refill		3.3	3.5	2.9	
Power steering fluid	Total	0.65	0.69	0.75	TOYOTA POWER STEERING FLUID EH (Part No. 08886-01206) or equivalent
Steering gear housing grease		—			Molybdenum disulphide lithium base, NLGI No. 2
Brake fluid		—			SAE J1703 or FMVSS No. 116 DOT 3

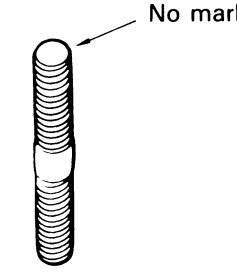
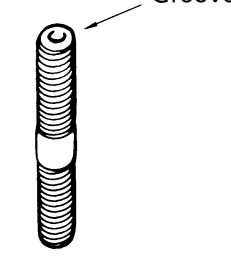
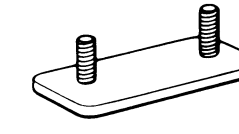
STANDARD BOLT TORQUE SPECIFICATIONS

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STANDARD BOLT TORQUE SPECIFICATIONS

HOW TO DETERMINE BOLT STRENGTH

	Mark	Class
Hexagon head bolt	 Bolt head No. 4— 5— 6— 7— 8— 9— 10— 11—	4T 5T 6T 7T 8T 9T 10T 11T
	 No mark	4T
Hexagon flange bolt w/ washer hexagon bolt	 No mark	4T
Hexagon head bolt	 Two protruding lines	5T
Hexagon flange bolt w/ washer hexagon bolt	 Two protruding lines	6T
Hexagon head bolt	 Three protruding lines	7T
Hexagon head bolt	 Four protruding lines	8T

	Mark	Class
Stud bolt	 No mark	4T
	 Grooved	6T
Welded bolt		4T

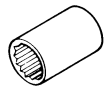
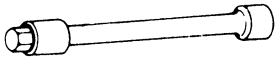
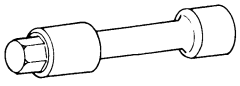
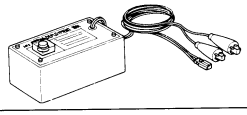
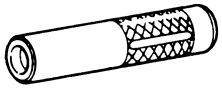
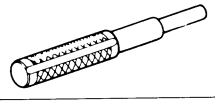
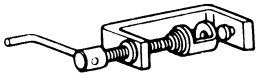
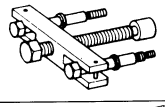
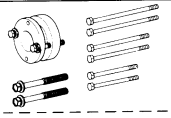
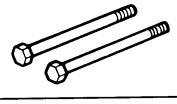
SPECIFIED TORQUE FOR STANDARD BOLTS

Class	Diameter mm	Pitch mm	Specified 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	60	52 in.-lb	6
	8	1.25	130	9	12.5	145	10	14
	10	1.25	260	19	26	290	21	29
	12	1.25	480	35	47	540	39	53
	14	1.5	760	55	74	850	61	84
	16	1.5	1,150	83	115	—	—	—
5T	6	1	65	56 in.-lb	6.5	75	65 in.-lb	7.5
	8	1.25	160	12	15.5	175	13	17.5
	10	1.25	330	24	32	360	26	36
	12	1.25	600	43	59	670	48	65
	14	1.5	930	67	91	1,050	76	100
	16	1.5	1,400	101	140	—	—	—
6T	6	1	80	69 in.-lb	8	90	78 in.-lb	9
	8	1.25	195	14	19	210	15	21
	10	1.25	400	29	39	440	32	44
	12	1.25	730	53	71	810	59	80
	14	1.5	1,100	80	110	1,250	90	125
	16	1.5	1,750	127	170	—	—	—
7T	6	1	110	8	10.5	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	105
	14	1.5	1,500	108	145	1,700	123	165
	16	1.5	2,300	166	230	—	—	—
8T	8	1.25	300	22	29	330	24	33
	10	1.25	620	45	61	690	50	68
	12	1.25	1,100	80	110	1,250	90	120
9T	8	1.25	340	25	34	380	27	37
	10	1.25	710	51	70	790	57	78
	12	1.25	1,300	94	125	1,450	105	140
10T	8	1.25	390	28	38	430	31	42
	10	1.25	800	58	78	890	64	88
	12	1.25	1,450	105	140	1,600	116	155
11T	8	1.25	430	31	42	480	35	47
	10	1.25	890	64	87	990	72	97
	12	1.25	1,600	116	155	1,800	130	175

SST AND SSM

	Page
SST (SPECIAL SERVICE TOOLS)	C-2
SSM (SPECIAL SERVICE MATERIALS)	C-17

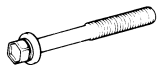
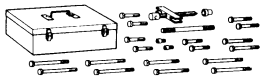
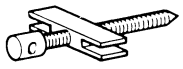
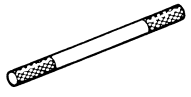
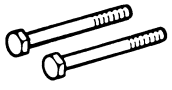
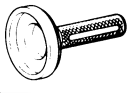
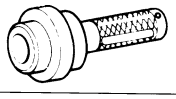
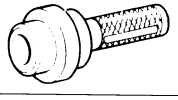
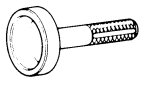
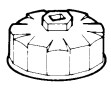
SST (SPECIAL SERVICE TOOLS)

Illustration	Part No.	Part Name	EM	TC	FI	LU	IG	ST	CH	CL	MT E153	MT S54	AT	SA Front	SA Rear	BR	SR	AB	BE	BO
	09011-38121	12 mm Socket Wrench for 12 Pointed Head	*1 ●																	
	09032-00100	Oil Pan Seal Cutter				●														
	09043-38100	Hexagon 10 mm Wrench	*2 ●																	
	09043-88010	Hexagon 8 mm Wrench													*3 ●					
	09082-00700	SRS Airbag Deployment Tool																●		
	09201-41020	Valve Stem Oil Seal Replacer	●					*4 ●												
	09201-60011	Valve Guide Bushing Remover & Replacer									●	●								
	09201-70010	Valve Guide Bushing Remover & Replacer	●																	
	09202-70010	Valve Spring Compressor	●																	
	09213-31021	Crankshaft Pulley Puller	*3 ●														*5 ●	*5 ●		
	09213-54015	Crankshaft Pulley Holding Tool	●																	
	(09214-00030)	(Bolt)	*6 ●																	

Remarks:

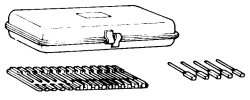
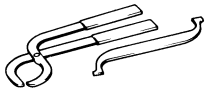
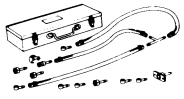
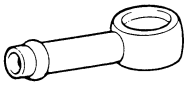
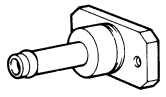
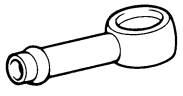
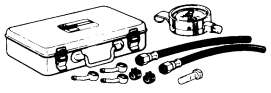
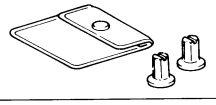
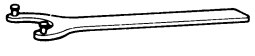
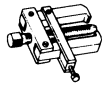
*1 Cylinder head bolt and connecting rod nut (5S-FE only)
*2 Cylinder head bolt (3S-GTE only)
*3 3S-GTE only
*4 Starter bearing for 1.4 kW (conventional) type and 1.6 kW
*5 Steering wheel (USA)
*6 5S-FE only

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Illustration	Part No.	Part Name	EM	TC	FI	LU	IG	ST	CH	CL	MT E153	MT S54	AT	SA Front	SA Rear	BR	SR	AB	BE	BO
	(90119-08216)	(Bolt)	*1 ●																	
	09213-60017	Crankshaft Pulley & Gear Puller Set	●																	
	(09213-00020)	(Body with Bolt)	*2 ●																	
	(09213-00030)	(Handle)	*2 ●																	
	(09213-00050)	(Bolt Set)	*2 ●																	
	09222-30010	Connecting Rod Bushing Remover & Replacer	●																	
	09223-15010	Crankshaft Rear Oil Seal Replacer									●				●					
	09223-46011	Crankshaft Front Oil Seal Replacer	*3 ●																	
	09223-50010	Crankshaft Front Oil Seal Replacer	*4 ●																	
	09223-63010	Crankshaft Rear Oil Seal Replacer	●																	
	09226-10010	Crankshaft Front & Rear Bearing Replacer	●																	
	09228-06500	Oil Filter Wrench				●														

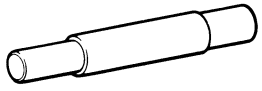
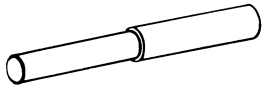
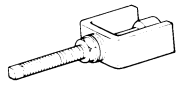
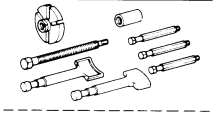
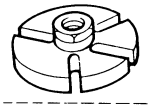
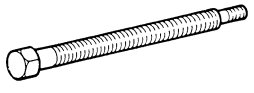
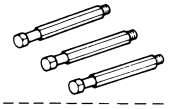
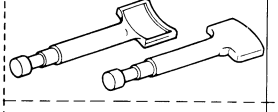
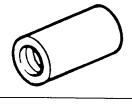
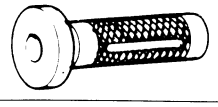
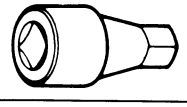
Remarks:
- *1 3S-GTE only
- *2 5S-FE only
- *3 Camshaft oil seal (5S-FE only)
- *4 Camshaft oil seal (3S-GTE only)

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section / Part Name / Part No. / Illustration			EM	TC	FI	LU	IG	ST	CH	CL	MT E153	MT S54	AT	SA Front	SA Rear	BR	SR	AB	BE	BO
	09240-00020	Wire Gauge Set					●						●							
	09248-55010	Valve Clearance Adjust Tool Set	●																	
	09249-63010	Torque Wrench Adaptor	*1 ●																	
	09268-41045	Injection Measuring Tool Set			●															
	(09268-41080)	(No. 6 Union)			●															
	(09268-41090)	(No. 7 Union)			*2 ●															
	(90405-09015)	(No. 1 Union)			●															
	09268-45012	EFI Fuel Pressure Gauge			●															
	09268-74010	Injector Remover			*3 ●															
	09278-54012	Drive Shaft Holding Tool	*4 ●																	
	09285-76010	Injection Pump Camshaft Bearing Cone Replacer						*5 ●	*6 ●											
	09286-46011	Injection Pump Spline Shaft Puller						*7 ●	*8 ●											

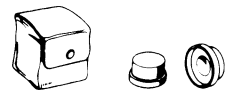
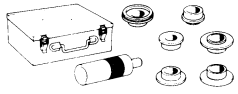
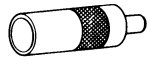
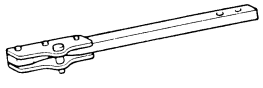
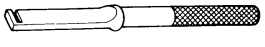
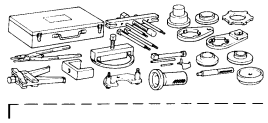
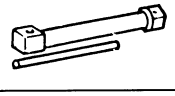
Remarks:
- *1 Camshaft timing pulley
- *2 5S-FE only
- *3 3S-GTE only
- *4 Camshaft timing pulley (5S-FE only)
- *5 Starter bearing for 1.0 kW type
- *6 Alternator rear bearing
- *7 Starter bearing
- *8 Rectifier end frame

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section / Part Name / Part No. / Illustration		EM	TC	FI	LU	IG	ST	CH	CL	MT E153	MT S54	AT	SA Front	SA Rear	BR	SR	AB	BE	BO
	**09301-17010** Clutch Guide Tool								●	●									
	**09301-32010** Clutch Guide Tool								●		●								
	**09308-00010** Oil Seal Puller									●	●	●		*1 ●					
	**09309-32050** 5th Driven Gear Replacer										●								
	**09310-17010** Transaxle Gear Remover & Replacer									●									
	**(09310-07010)** (Plate)									●									
	**(09310-07020)** (Center Bolt)									●									
	**(09310-07030)** (Set Bolt)									●									
	**(09310-07040)** (Claw)									●									
	**(09310-07050)** (Adaptor)									●									
	**09310-35010** Countershaft Bearing Replacer										●			*2 ●					
	**09313-30021** Detent Ball Plug Socket									●	●								

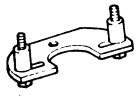
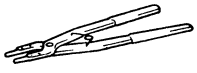
Remarks:
*1 3S-GTE (LH)
*2 Rear axle hub

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section / Part Name / Part No. / Illustration			EM	TC	FI	LU	IG	ST	CH	CL	MT		AT	SA		BR	SR	AB	BE	BO
											E153	S54		Front	Rear					
	09315-00021	Clutch Release Bearing Remover & Replacer													*1 ●					
	09316-60010	Transmission & Transfer Bearing Replacer									●	●			●					
	(09316-00010)	(Replacer Pipe)									●	●			*2 ●					
	(09316-00020)	(Replacer "A")									●									
	(09316-00030)	(Replacer "B")										●								
	(09316-00040)	(Replacer "C")									●				*2 ●					
	(09316-00050)	(Replacer "D")									●									
	(09316-00070)	(Replacer "F")									●	●								
	09330-00021	Companion Flange Holding Tool	*3 ●										●							
	09333-00013	Clutch Diaphragm Spring Aligner								●										
	09350-32014	TOYOTA Automatic Transmission Tool Set										●	●		●					
	(09351-32010)	(One-way Clutch Test Tool)											●							

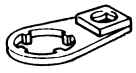
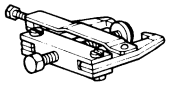
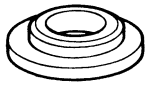
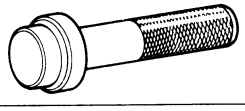
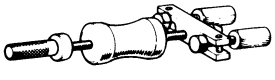
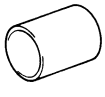
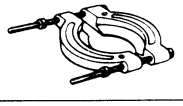
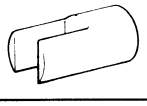
Remarks:
*1 Rear axle hub
*2 5S-FE (M/T) and 3S-GTE (RH)
*3 Crankshaft pulley

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section / Part Name / Part No. / Illustration			EM	TC	FI	LU	IG	ST	CH	CL	MT		AT	SA		BR	SR	AB	BE	BO
											E153	S54		Front	Rear					
	(09351-32020)	(Stator Stopper)											●							
	(09351-32032)	(Counter Driven Gear Holding Tool)											●							
	(09351-32040)	(No. 1 Piston Spring Compressor)											●							
	(09351-32050)	(Snap Ring Expander)											●							
	(09351-32061)	(Oil Pump Puller)											●							
	(09351-32070)	(No. 2 Piston Spring Compressor)											●							
	(09351-32090)	(Oil Seal Remover & Replacer)										●	●							
	(09351-32100)	(Drive Pinion Bearing Replacer)											●							
	(09351-32111)	(Side Bearing Race Replacer)											●		*1 ●					
	(09351-32120)	(Overdrive Bearing Replacer)										●	●							
	(09351-32130)	(Handle)										●	●		*2 ●					
	(09351-32140)	(Oil Seal Replacer)											●							

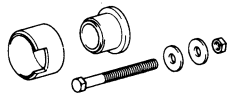
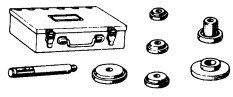
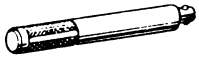
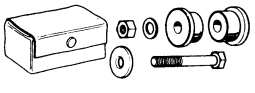
Remarks:
*1 5S-FE (A/T LH)
*2 5S-FE (A/T RH)

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section / Part Name / Part No. / Illustration			EM	TC	FI	LU	IG	ST	CH	CL	MT		AT	SA		BR	SR	AB	BE	BO
											E153	S54		Front	Rear					
	(09351-32150)	(Oil Seal Replacer)										●	●		*1 ●					
	(09351-32170)	(Lock Nut Wrench)											●							
	(09351-32180)	(Bearing Replacer)											●							
	(09351-32190)	(Measure Terminal)											●							
	09502-10012	Differential Side Bearing Puller										●	●							
	09506-30012	Differential Drive Pinion Rear Bearing Cone Replacer									●									
	09515-10010	Rear Axle Bearing Replacer										●								
	09517-36010	Rear Axle Shaft Oil Seal Replacer									●									
	09520-00031	Rear Axle Shaft Puller												●	●					
	09527-17010	Rear Axle Shaft Bearing Remover													●					
	09555-55010	Differential Drive Pinion Bearing Replacer											●							
	09564-32011	Differential Preload Adaptor										●	●							

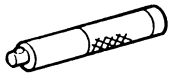
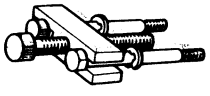
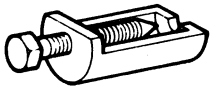
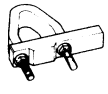
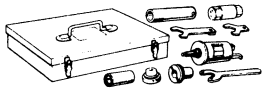
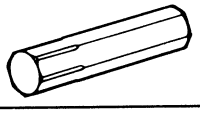
Remark:
*1 5S-FE (A/T)

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section / Part Name / Part No. / Illustration			EM	TC	FI	LU	IG	ST	CH	CL	MT		AT	SA		BR	SR	AB	BE	BO
											E153	S54		Front	Rear					
	09570-22011	Differential Mounting Cushion Remover & Replacer													*1 ●					
	09608-12010	Front Hub & Drive Pinion Bearing Replacer Set									●									
	(09608-00020)	(Remover & Replacer Handle)									●									
	(09608-00060)	(Drive Pinion Front Bearing Cup Replacer)									●									
	(09608-00080)	(Differential Side Bearing Cone Replacer)									●									
	09608-16041	Front Hub Bearing Adjusting Tool													●					
	(09608-02010)	(Cover)													*1 ●					
	(09608-02020)	(Bolt & Nut)													*2 ●					
	(09608-02040)	(Retainer)													*2 ●					
	09608-20012	Front Hub & Drive Pinion Bearing Tool Set							●			●			●					
	(09608-00030)	(Replacer)							*3 ●			●								
	(09608-00040)	(Replacer)													●					

Remarks:
*1 3S-GTE only
*2 5S-FE only
*3 Alternator front bearing

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section / Part Name / Part No. / Illustration			EM	TC	FI	LU	IG	ST	CH	CL	MT		AT	SA		BR	SR	AB	BE	BO
											E153	S54		Front	Rear					
	(09608-00080)	(Replacer)										●								
	(09608-03020)	(Handle)										●			●					
	(09608-03060)	(Replacer)										●								
	09608-30012	Front Hub & Drive Pinion Bearing Tool Set												●						
	(09608-04020)	(Handle)												●						
	09609-20011	Steering Wheel Puller															*1 ●			
	09610-20012	Pitman Arm Puller												●						
	09612-00012	Rack & Pinion Steering Rack Housing Stand															●			
	09612-10093	Steering Gear Housing Overhaul Tool Set															●			
	(09617-10010)	(Steering Pinion Bearing Adjusting Screw Lock Nut Wrench)															*2 ●			
	(09628-10020)	(Ball Joint Lock Nut Wrench)															*2 ●			
	09612-10131	Hexagon Wrench															*3 ●			

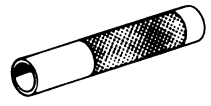
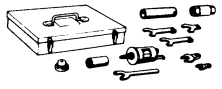
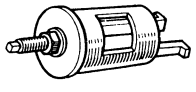
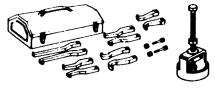
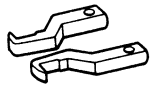
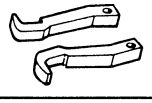
Remarks:

*1 Canada only

*2 Manual steering gear housing

*3 Power steering gear housing

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section / Part Name / Part No. / Illustration			EM	TC	FI	LU	IG	ST	CH	CL	MT		AT	SA		BR	SR	AB	BE	BO
											E153	S54		Front	Rear					
	09612-22011	Tilt Handle Bearing Replacer										●					*1 ●			
	09612-24014	Steering Gear Housing Overhaul Tool Set															●			
	(09612-10022)	(Hexagon Wrench)															*2 ●			
	(09612-10061)	(Steering Pinion Bearing Replacer)															*2 ●			
	(09613-22011)	(Steering Rack Shaft Bushing Puller)															*3 ●			
	(09616-10010)	(Steering Pinion Bearing Adjusting Socket)															*2 ●			
	(09616-10020)	(Steering Pinion Bearing Adjusting Screw Wrench)															*2 ●			
	(09617-22030)	(Steering Rack End Wrench)															*3 ●			
	(09617-24011)	(Steering Rack Wrench)															*2 ●			
	09612-65014	Steering Worm Bearing Puller									●									
	(09612-01020)	(Claw "B")									●									
	(09612-01060)	(Claw "E")									●									

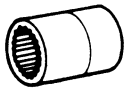
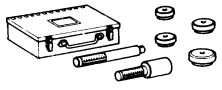
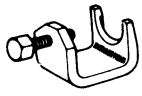
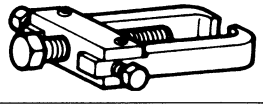
Remarks:

*1 Control valve housing oil seal (PS)

*2 Manual steering gear housing

*3 Power steering gear housing

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section / Part Name / Part No. / Illustration			EM	TC	FI	LU	IG	ST	CH	CL	MT E153	MT S54	AT	SA Front	SA Rear	BR	SR	AB	BE	BO
	09616-00010	Steering Worm Bearing Adjusting Socket															*1 ●			
	09616-30011	Steering Worm Bearing Adjusting Screw Wrench	*2 ●																	
	09617-10020	Steering Rack End Wrench															*1 ●			
	09620-30010	Steering Gear Box Replacer Set				●											●			
	(09627-30010)	(Steering Sector Shaft Bushing Replacer)				*3 ●														
	(09631-00020)	(Handle)				*3 ●											●			
	09628-10011	Ball Joint Puller												●	●					
	09628-62011	Ball Joint Puller													●		●			
	09630-24013	Steering Rack Oil Seal Tool Set															●			
	(09620-24010)	(Valve Cup Oil Seal Remover)															●			
	(09620-24020)	(Valve Cup Oil Seal Replacer)															●			
	(09620-24030)	(Valve Cup Bearing Replacer)															●			

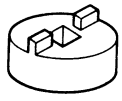
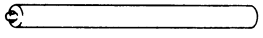
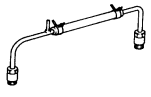
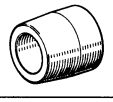
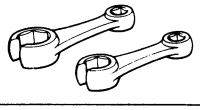
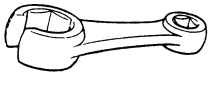
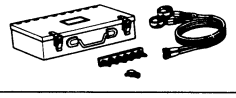
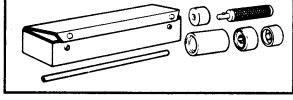
Remarks:

*1 Power steering gear housing

*2 Oil pump pulley

*3 Oil pump oil seal

SST (SPECIAL SERVICE TOOLS) (Cont'd)

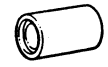
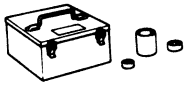
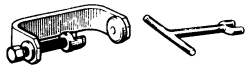
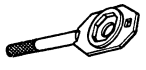
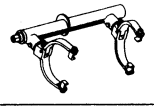
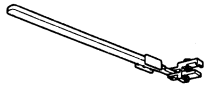
Section / Part Name / Part No. / Illustration			EM	TC	FI	LU	IG	ST	CH	CL	MT		AT	SA		BR	SR	AB	BE	BO
											E153	S54		Front	Rear					
	09631-10021	Rack Stopper Wrench															*1 ●			
	09631-10040	Steering Rack Cover "D"															*1 ●			
	09631-12020	Handle															*1 ●			
	09631-12071	Steering Rack Oil Seal Test Tool															*1 ●			
	09631-20031	Oil Seal "B" Remover															*1 ●			
	09631-20070	Seal Ring Guide															*1 ●			
	09631-20081	Seal Ring Tool															*1 ●			
	09631-22020	Power Steering Hose Nut 14 x 17 mm Wrench Set			*2 ●												●			
	09633-00020	Power Steering Hose Nut Wrench															●			
	09649-17010	Steering Knuckle Tool												●						
	09709-29017	LSPV Gauge Set														●				
	09710-22041	Rear Suspension Bushing Tool Set													●					

Remarks:

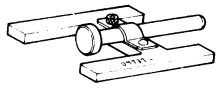
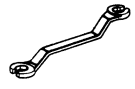
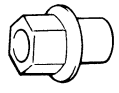
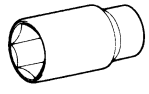
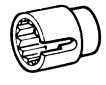
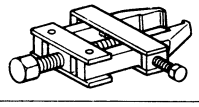
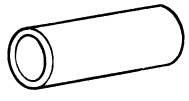
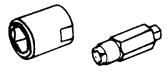
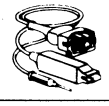
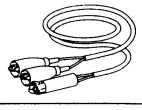
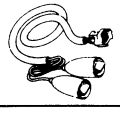
*1 Power steering gear housing

*2 Fuel line flare nut

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section / Part Name / Part No. / Illustration			EM	TC	FI	LU	IG	ST	CH	CL	MT		AT	SA		BR	SR	AB	BE	BO
											E153	S54		Front	Rear					
	(09710-02050)	(Base)													●					
	09710-30030	Rear Suspension Bushing Tool Set											●							
	(09710-03160)	(Remover)											●							
	09719-14020	Rear Disc Brake Tool Set														●				
	(09719-00020)	(Piston Driver)														●				
	09720-00012	Shock Absorber Overhaul Tool Set												●						
	(09721-00071)	(Front Shock Absorber Ring Nut Wrench)												●						
	09726-10010	Lower Suspension Arm Bushing Remover & Replacer													●					
	(09726-00030)	(Spacer)													●					
	09727-00045	Arm Set "B"												●						
	09727-30020	Coil Spring Compressor												●	●					
	09729-22031	Front Spring Upper Seat Holder												●						

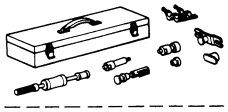
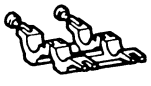
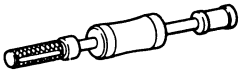
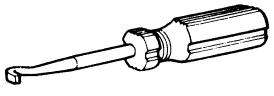
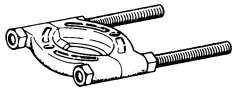
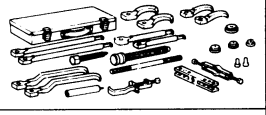
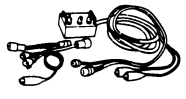
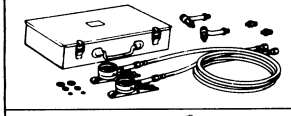
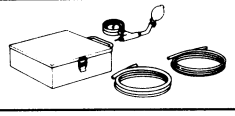
SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section / Part Name / Part No. / Illustration			EM	TC	FI	LU	IG	ST	CH	CL	MT		AT	SA		BR	SR	AB	BE	BO
											E153	S54		Front	Rear					
	09737-00010	Brake Booster Push Rod Gauge														●				
	09751-36011	Brake Tube Union Nut 10 x 12 mm Wrench								●						●				
	09756-00010	Adjusting Bolt Guide Nut														●				
	09812-00010	Door Hinge Set Bolt Wrench																		●
	09816-30010	Oil Pressure Switch Socket	*1 ●																	
	09817-16011	Back-up Light Switch Tool									●									
	09820-00021	Alternator Rear Bearing Puller							*2 ●											
	09820-00030	Alternator Rear Bearing Replacer						*3 ●												
	09820-63010	Alternator Pulley Set Nut Wrench Set							●											
	09842-30050	Wire "A" EFI Inspection			●															
	09842-30060	Wire "E" EFI Inspection			*4 ●															
	09842-30070	Wire "F" EFI Inspection			*5 ●															

Remarks:

- *1 Knock sensor (3S-GTE only)
- *2 Alternator rear bearing
- *3 Starter bearing for 1.4 kW (compact) type
- *4 3S-GTE only
- *5 5S-FE only

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section / Part Name / Part No. / Illustration			EM	TC	EC	FI	LU	IG	ST	CH	CL	MT		AT	SA		BR	AB	BE	BO	EC
												E153	S54		Front	Rear					
	09843-18020	Diagnosis Check Wire	●		●	●		●						●			●	●	●		
	09910-00015	Puller Set																●			
	(09911-00011)	(Puller Clamp)																●			
	(09912-00010)	(Puller Slide Hammer)																●			
	09921-00010	Spring Tension Tool										●	●								
	09950-00020	Bearing Remover										●	●	●		●					
	09950-20017	Universal Puller										●	●		●	●		●			
	09990-00150	ABS (Anti-lock Brake System) Actuator Checker and Sub-harness															●				
	09992-00094	Automatic Transmission Oil Pressure Gauge Set												●							
	09992-00241	Turbocharger Pressure Gauge		*1 ●																●	

Remark:
*1 3S-GTE only

NOTE: For reference to SSTs for the Air Conditioning System see page AC-7.

SSM (SPECIAL SERVICE MATERIALS)

Part Name	Part No.	Sec.	Use etc.
Seal packing or equivalent	08826-00080	EM	Cylinder head semi-circular plug Cylinder head Camshaft bearing cap
		LU	Oil pan
Seal packing 1281, Three bond 1281 or equivalent	08826-00090	MT	(S54) Transmission case Transmission case cover (E153) Transmission case Transaxle case cover
Seal packing 1121, Three bond 1121 or equivalent	08826-00801	SA	Inboard joint cover
Adhesive 1324, Three bond 1324 or equivalent	08833-00070	EM	Flywheel mount bolt for M/T (3S-GTE) Flywheel or drive plate mount bolt (5S-FE)
		EC	EVAP BVSV
		MT	Rear bearing retainer set bolts
		AT	Torque converter set bolts Oil gallery cover set bolts
Adhesive 1344, Three bond 1344, Loctite 242 or equivalent	08833-00080	EM	No.1 idler pulley pivot bolt (3S-GTE)
		LU	Oil pressure switch
		MT	(S54) Plug threads Idler gear shaft lock bolt Side bearing retainer set bolts Transmission case cover set bolts (E153) Plug threads Transaxle case cover set bolts Control shaft cover set bolts
		AT	Transaxle housing set bolts
		SR	(Manual steering gear housing) Pinion bearing adjusting screw Pinion bearing adjusting screw lock nut Rack guide spring cap Rack guide spring cap lock nut (Power steering gear housing) Rack housing cap Rack guide spring cap Rack guide spring cap lock nut
Adhesive 1131, Three bond 1131, Loctite 518 or equivalent	08833-00090	AT	Transaxle rear cover Transaxle housing

SSM (SPECIAL SERVICE MATERIALS) (Cont'd)

Part Name	Part No.	Sec.	Use etc.
Dupont paste No.4817	–	BE	Rear window defogger wire
Windshield glass adhesive set No.15	08850-00070	BO	Windshield (0 – 15°C or 32 – 59°F)
Windshield glass adhesive set No.35	08850-00080	BO	Windshield (15 – 35°C or 59 – 95°F)
Windshield glass adhesive set No.45	08850-00090	BO	Windshield (35 – 45°C or 95 – 113°F)
Dam kit	04562-12010	BO	Windshield
Butyl tape set	08850-00065	BO	Moulding Quarter window glass
Auto glass sealer	08833-00030	BO	Moulding Windshield Back window glass

NOTE: For reference to SSMs for the Air Conditioning System see page AC-7.