

# IMPORTANT

## WARNING/CAUTION/NOTE

Please read this manual and follow its instructions carefully. To emphasize special information, the words **WARNING**, **CAUTION** and **NOTE** have special meanings. Pay special attention to the messages highlighted by these signal words.

### **WARNING:**

Indicates a potential hazard that could result in death or injury.

### **CAUTION:**

Indicates a potential hazard that could result in vehicle damage.

### **NOTE:**

Indicates special information to make maintenance easier or instructions clearer.

### **WARNING:**

This service manual is intended for authorized Suzuki dealers and qualified service mechanics only. Inexperienced mechanics or mechanics without the proper tools and equipment may not be able to properly perform the services described in this manual.

Improper repair may result in injury to the mechanic and may render the vehicle unsafe for the driver and passengers.

### **WARNING:**

For vehicles equipped with a Supplemental Restraint (Air Bag) System:

- Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to “Air Bag System Components and Wiring Location View” under “General Description” in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and “Service Precautions” under “On-Vehicle Service” in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.
- If the air bag system and another vehicle system both need repair, Suzuki recommends that the air bag system be repaired first, to help avoid unintended air bag system activation.
- Do not modify the steering wheel, instrument panel or any other air bag system component (on or around air bag system components or wiring). Modifications can adversely affect air bag system performance and lead to injury.
- If the vehicle will be exposed to temperatures over 93°C (200°F) (for example, during a paint baking process), remove the air bag system components (air bag (inflator) modules, SDM and/or seat belt with pretensioner) beforehand to avoid component damage or unintended activation.

# FOREWORD

This manual contains procedures for diagnosis, maintenance, adjustments, minor service operations, replacement of components (Service) and for disassembly and assembly of major components (Unit Repair-Overhaul).

## **Applicable model: RH413/RH416**

The contents are classified into sections each of which is given a section number as indicated in the Table of Contents on following page. And on the first page of each individual section is an index of that section.

This manual should be kept in a handy place for ready reference of the service work.

Strict observance of the so specified items will enable one to obtain the full performance of the vehicle.

When replacing parts or servicing by disassembling, it is recommended to use SUZUKI genuine parts, tools and service materials (lubricant, sealants, etc.) as specified in each description.

All information, illustrations and specifications contained in this literature are based on the latest product information available at the time of publication approval. And used as the main subject of description is the vehicle of standard specifications among others.

Therefore, note that illustrations may differ from the vehicle being actually serviced.

The right is reserved to make changes at any time without notice.

## **Related Manual**

Manual Name	Manual No.
RH413/RH416 Wiring Diagram Manual	99512-54G00-015

**SUZUKI MOTOR CORPORATION**

*OVERSEAS SERVICE DEPARTMENT*



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## NOTE:

The screen toned Section 8A is in Wiring Diagram Manual mentioned in FOREWORD of this manual.





## SECTION 7A1

## MANUAL TRANSAXLE

7A1

**WARNING:**

For vehicles equipped with Supplemental Restraint (Air Bag) System :

- Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to “Air Bag System Components and Wiring Location View” under “General Description” in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and “Service Precautions” under “On-Vehicle Service” in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.
- Technical service work must be started at least 90 seconds after the ignition switch is turned to the “LOCK” position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).

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## General Description

### Construction and Servicing

The transaxle provides five forward speeds and one reverse speed by means of three synchronizers and three shafts: input shaft, countershaft and reverse gear shaft. All forward gears are in constant mesh, and reverse uses a sliding idler gear arrangement.

The low speed synchronizer is mounted on countershaft and engaged with countershaft first gear or second gear, while the high speed synchronizer is done on input shaft and engaged with input shaft third gear or fourth gear.

The fifth speed synchronizer on input shaft is engaged with input shaft fifth gear mounted on the input shaft.

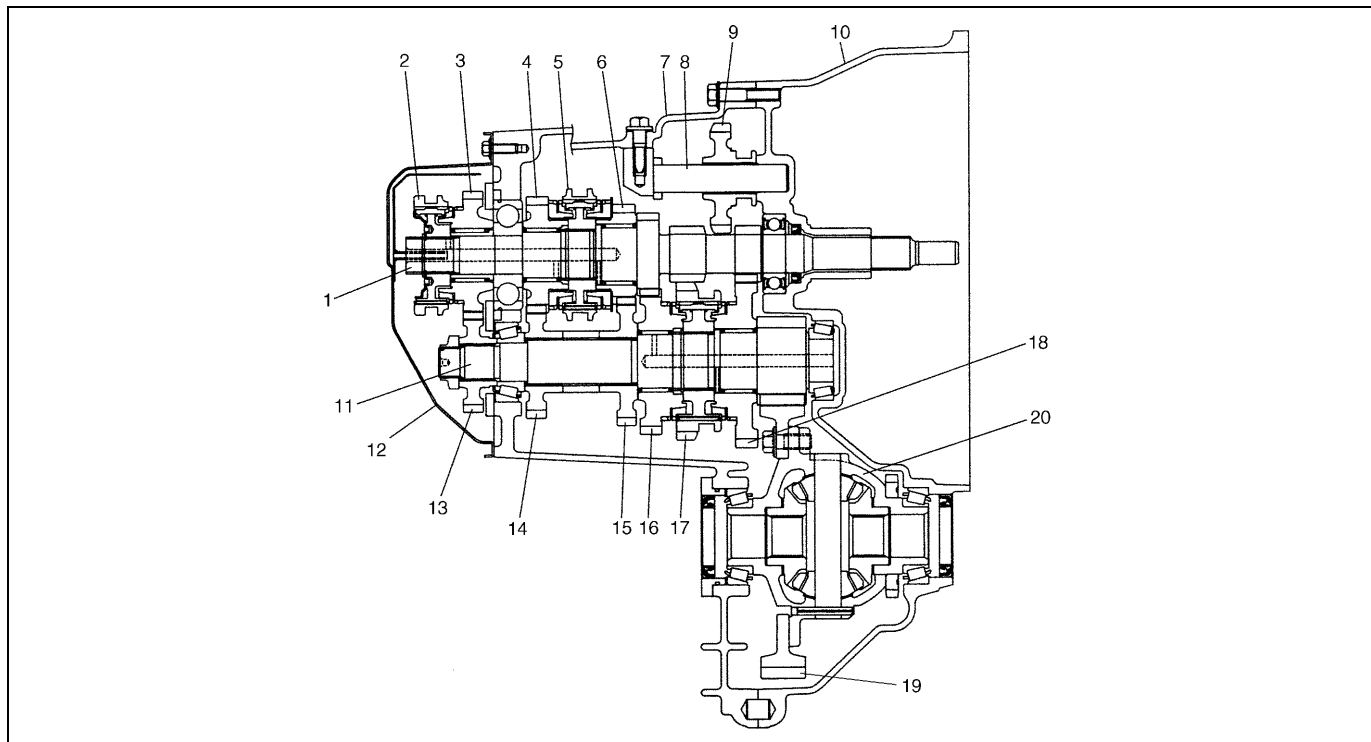
The countershaft turns the final gear and differential assembly, thereby turning the front drive shafts which are attached to the front wheels.

4WD model uses a full-time 4WD system in which a viscous coupling is installed between propeller shaft No.1 and No.2 so that optimum amount of drive force is distributed to the front and rear wheels according to the driving conditions.

For servicing, it is necessary to use genuine sealant or its equivalent on mating surfaces of transaxle case which is made of aluminum. The case fastening bolts must be tightened to specified torque by means of torque wrench. It is also important that all parts are thoroughly cleaned with cleaning fluid and air dried before reassembling.

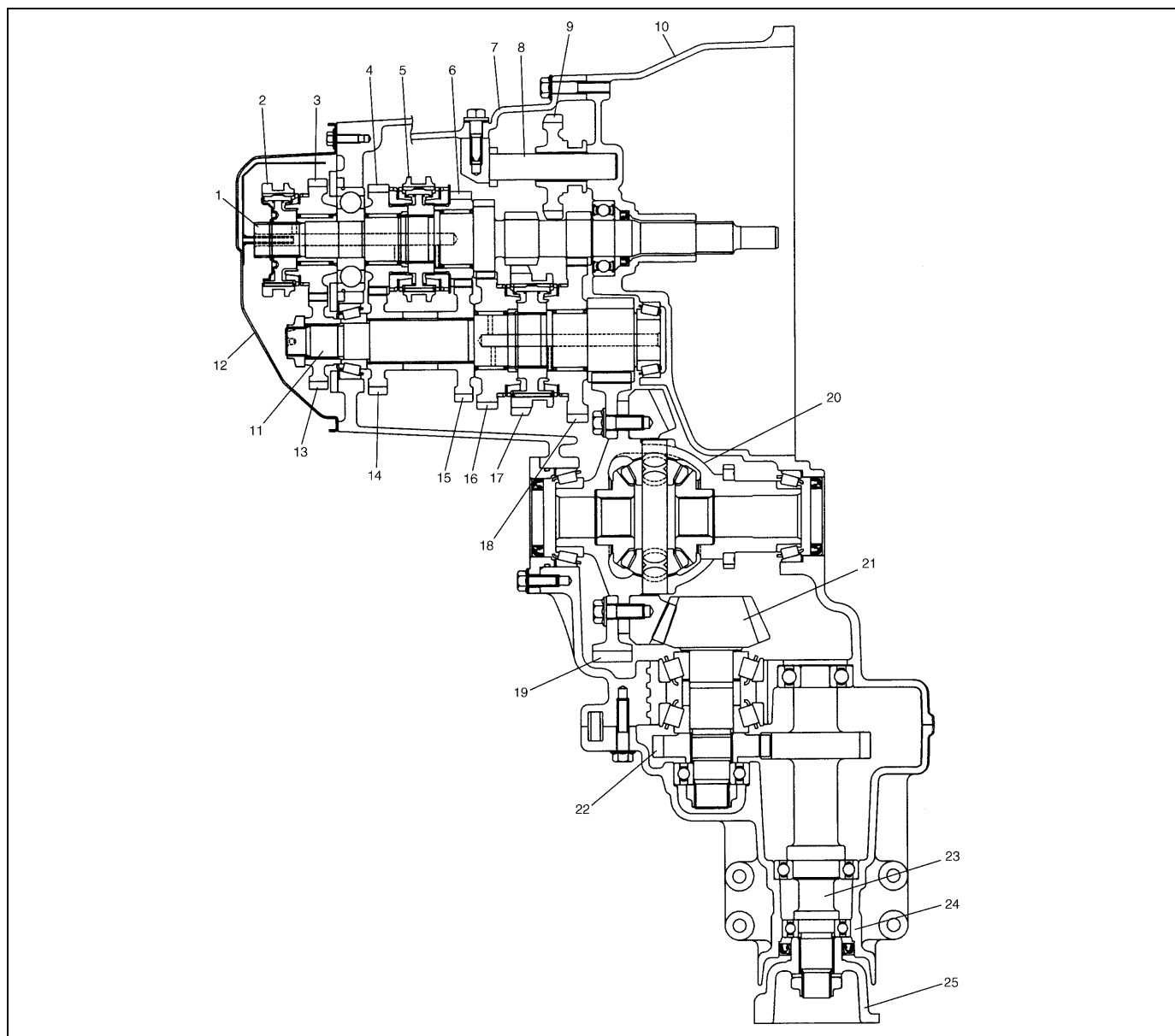
Further, care must be taken to adjust preload of countershaft taper roller bearings. New synchronizer rings are prohibited from being lapped with respective gear cones by using lapping compound before they are assembled.

### Transaxle for 2WD model



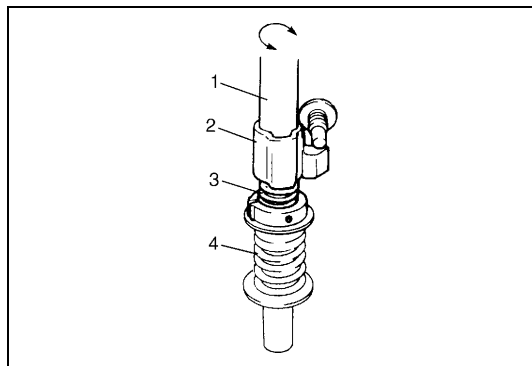
1. Input shaft	6. Input shaft 3rd gear	11. Countershaft	16. Countershaft 2nd gear
2. 5th speed sleeve & hub	7. Left case	12. Side cover	17. Low speed sleeve & hub
3. Input shaft 5th gear	8. Reverse gear shaft	13. Countershaft 5th gear	18. Countershaft 1st gear
4. Input shaft 4th gear	9. Reverse idler gear	14. Countershaft 4th gear	19. Final gear
5. High speed sleeve & hub	10. Right case	15. Countershaft 3rd gear	20. Differential case

## Transaxle for 4WD model



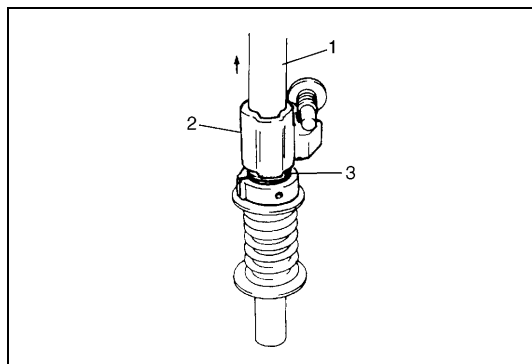
1. Input shaft	8. Reverse gear shaft	15. Countershaft 3rd gear	22. Transfer drive gear
2. 5th speed sleeve & hub	9. Reverse idler gear	16. Countershaft 2nd gear	23. Transfer output shaft
3. Input shaft 5th gear	10. Right case	17. Low speed sleeve & hub	24. Transfer output case
4. Input shaft 4th gear	11. Countershaft	18. Countershaft 1st gear	25. Transfer output flange
5. High speed sleeve & hub	12. Side cover	19. Final gear	
6. Input shaft 3rd gear	13. Countershaft 5th gear	20. Front differential	
7. Left case	14. Countershaft 4th gear	21. Transfer output pinion	

5th & reverse gear shift cam, cam guide return spring and 5th to reverse interlock guide bolt are provided to prevent the gear from being directly shifted from 5th to reverse.



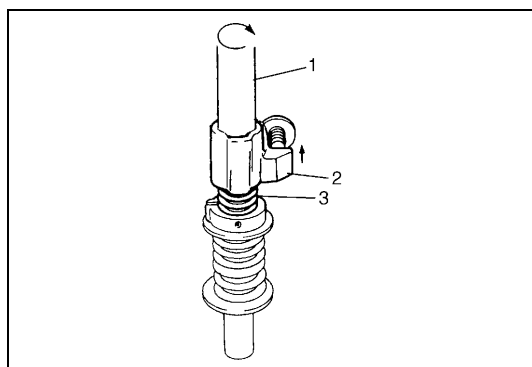
- 1) When shift lever is at neutral position between 3rd and 4th gear, shift cam is under guide bolt and can turn freely clockwise (to 3rd gear) and counterclockwise (to 4th gear).

1. Shift & select shaft
2. Shift cam
3. Return spring (expanded)
4. Reverse select spring (expanded)



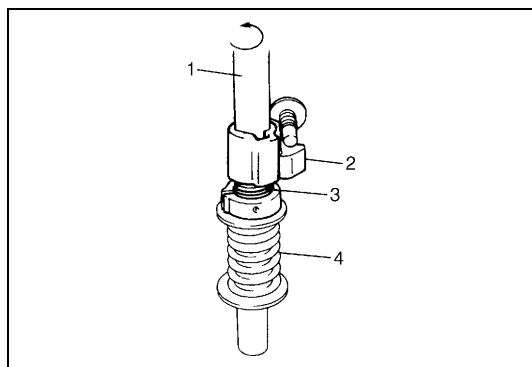
- 2) When shift lever is shifted toward the right from neutral position, shift and select shaft moves up but shift cam is restricted by guide bolt and return spring is contracted.

1. Shift & select shaft
2. Shift cam
3. Reverse select spring (contracted)



- 3) When shift lever is shifted to 5th gear, shift & select shaft turns clockwise letting shift cam off from guide bolt and pushed up by return spring. In this state, movement of shift cam is restricted by guide bolt and therefore, gearshift to reverse is not attainable.

1. Shift & select shaft
2. Shift cam
3. Reverse select spring (expanded)



- 4) When shift lever is shifted from neutral position between 5th gear and reverse gear to reverse gear, shift cam turns counterclockwise to attain reverse gear.

1. Shift & select shaft
2. Shift cam
3. Return spring (contracted)
4. Reverse select spring (contracted)

## Diagnosis

Condition	Possible Cause	Correction
<b>Gears slipping out of mesh</b>	Worn shift fork shaft	Replace
	Worn shift fork or synchronizer sleeve	Replace
	Weak or damaged locating springs	Replace
	Worn bearings on input shaft or counter shaft	Replace
	Worn chamfered tooth on sleeve and gear	Replace sleeve and gear
<b>Hard shifting</b>	Inadequate lubricant	Replenish
	Improper clutch pedal free travel	Replace clutch arm or master cylinder
	Distorted or broken clutch disc	Replace
	Damaged clutch pressure plate	Replace clutch cover
	Worn synchronizer ring	Replace
	Worn chamfered tooth on sleeve or gear	Replace sleeve or gear
	Worn gear shift control shaft joint bush	Replace
	Distorted shift shaft	Replace
<b>Noise</b>	Inadequate or insufficient lubricant	Replenish
	Damaged or worn bearing(s)	Replace
	Damaged or worn gear(s)	Replace
	Damaged or worn synchronizer parts	Replace
	Maladjusted backlash between bevel pinion and gear	Adjust as prescribed
	Improper tooth contact in the mesh between bevel pinion and gear	Adjust or replace

## On-Vehicle Service

### Oil Change

- 1) Before changing or inspecting oil, be sure to stop engine and lift vehicle horizontally.
- 2) With vehicle lifted up, check oil level and leakage.  
If leakage exists, correct it.
- 3) Drain old oil and fill new specified oil by specified amount (up to level hole).
- 4) Torque drain plug (1) and level/filler plug (2) as specified below. Apply sealant to thread of drain plug and level/filler plug before installation.

**“A” : Sealant 99000-31230**

#### Tightening torque

**Transaxle oil level/filler and drain plugs**

**(a) : 21 N·m (2.1 kg-m, 15.5 lb-ft)**

#### NOTE:

- It is recommended to use API GL-4 75W-90 gear oil.
- Whenever vehicle is hoisted for any service work other than oil change, check for oil leakage.

**Transaxle oil :**

**API GL-4**

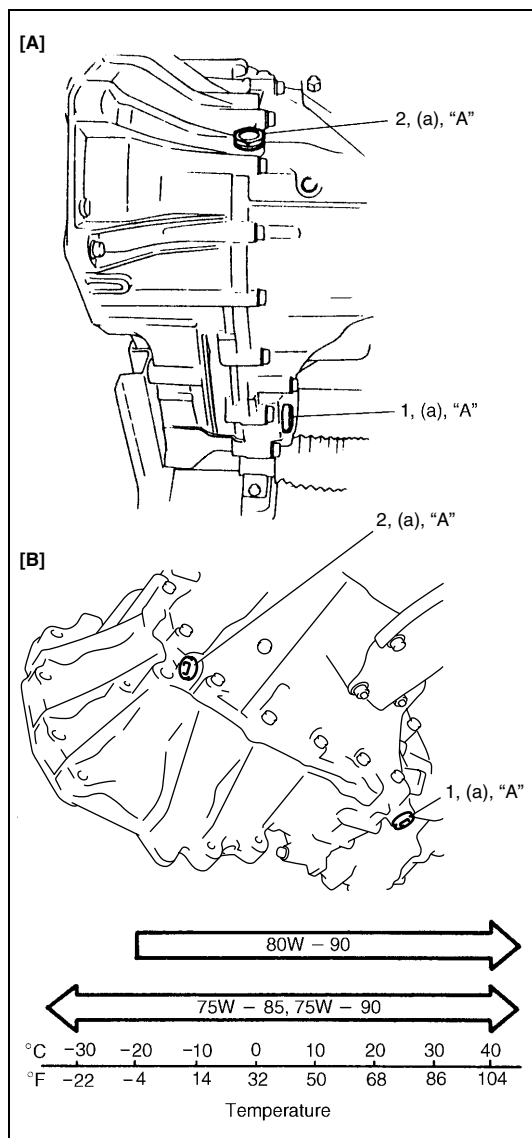
**For SAE classification, refer to viscosity chart in the figure.**

**Transaxle oil capacity for 2WD model :**

**2.0 liters (4.2/3.5 US/Imp. pt)**

**Transaxle oil capacity for 4WD model :**

**4.1 liters (8.7/7.2 US/Imp. pt)**



[A] : 2WD model

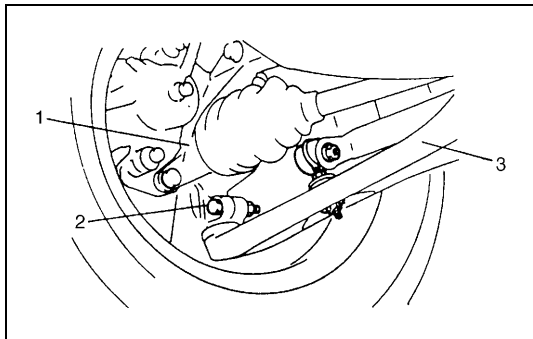
[B] : 4WD model



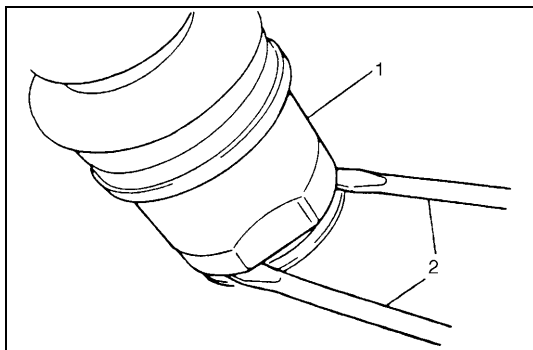
## Differential Side Oil Seal

### REPLACEMENT

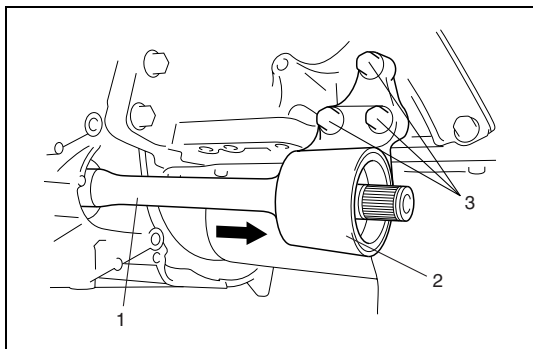
- 1) Lift up vehicle and drain transaxle oil.
- 2) Remove ball stud bolt (2), and then separate suspension arm (3) from knuckle (1).



- 3) Disconnect drive shaft joint.
  - a) In case of left side oil seal:  
By using flat head rod or the like (2), pull out drive shaft joint (1) so as to release snap ring fitting of joint spline at differential side.  
Pushing knuckle portion outward, detach drive shaft at differential side.



- b) In case of right side oil seal:  
Remove exhaust No.1 pipe.  
By using plastic hammer, drive out drive shaft joint so as to release snap ring fitting of joint spline at center shaft.  
After removing center bearing support bolts (3), pull out center drive shaft (1) with center bearing support (2) from differential gear.



- 4) Remove oil seal (1) and install a new one by using special tool and hammer.

#### NOTE:

**When installing oil seal, face its spring side inward.**

#### Special tool

(A) : 09913-75810 (For 4WD model)

(A) : 09913-75520 (For 2WD model)

#### Distance between case and oil seal for 4WD model

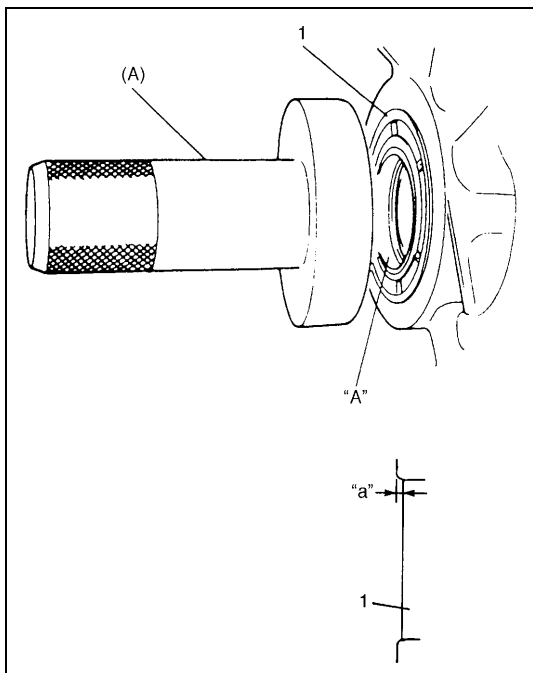
"a" : 1.0 - 1.5 mm (0.04 - 0.06 in.)

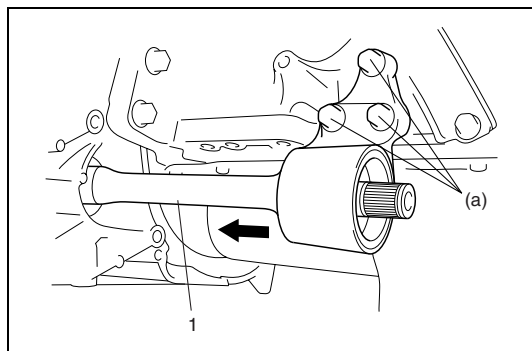
#### Distance between case and oil seal for 2WD model

"a" : 0 - 0.5 mm (0 - 0.02 in.)

- 5) Apply grease to oil seal lip and at the same time check drive shaft where oil seal contacts and make sure of its smoothness.

**"A" : Grease 99000-25010**





- 6) Insert drive shaft joint or center drive shaft (1) to differential gear. With right side drive shaft, install center bearing support.

**CAUTION:**

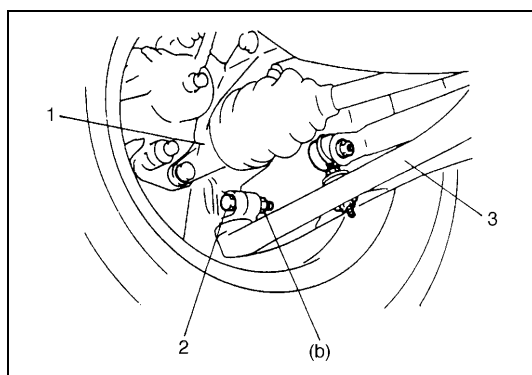
- Be careful not to scratch oil seal lip with drive shaft joint while inserting.
- Make sure to insert drive shaft joint fully and seat its snap ring as it was.
- Do not hit joint boot with hammer or the like. Nothing but hands is allowed to use when inserting joint.

**Tightening torque**

**Center bearing support bolts**

(a) : 55 N·m (5.5 kg-m, 40.0 lb-ft)

- 7) )Install exhaust No.1 pipe.



- 8) Connect ball stud with knuckle (1) and fasten with nut to specification.

**Tightening torque**

**Ball stud nut**

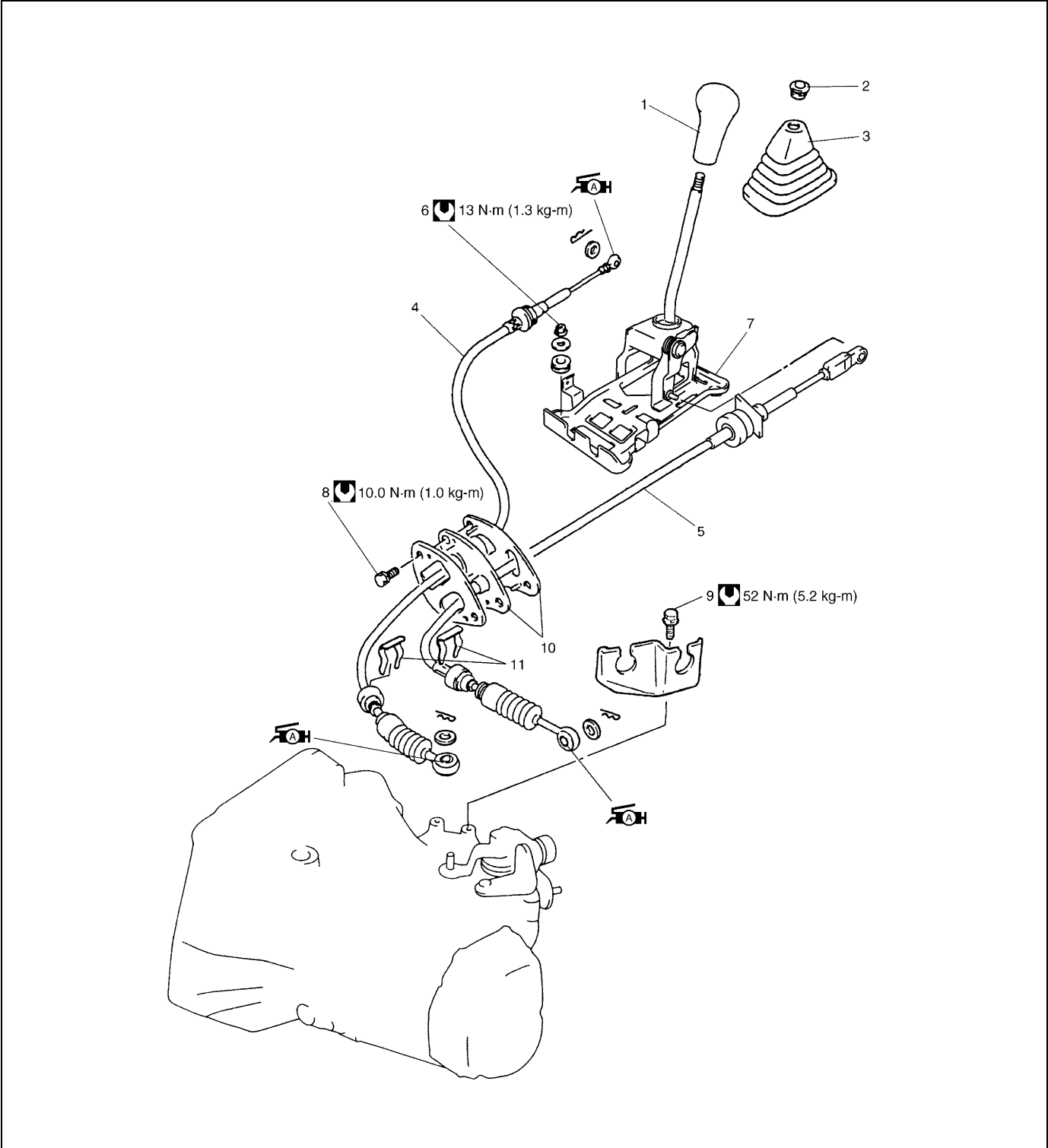
(b) : 60 N·m (6.0 kg-m, 43.5 lb-ft)




2.	Ball stud bolt
3.	Lower arm

- 9) Pour transaxle oil as specified and make sure that oil has been sealed with oil seal.

Gear Shift Control Lever and Cable

COMPONENTS



1. Gear shift control lever knob	 5. Gear select control cable : Apply SUZUKI SUPER GREASE A 99000-25010 to connecting portion of gear shift control cable	9. Cable bracket bolt
2. Lever boot holder	6. Gear shift control cable guide nut	10. Cable grommet
3. Gear shift lever boot	7. Gear shift control lever assembly	11. E-ring
 4. Gear shift control cable : Apply SUZUKI SUPER GREASE A 99000-25010 to connecting portion of gear shift control cable	8. Cable mounting bolt	 Tightening torque

## REMOVAL

- 1) Remove console box.
- 2) Disconnect gear shift and select control cables from gear shift control lever assembly.
- 3) Remove gear shift control cable guide nuts and gear shift lever assembly from body.
- 4) Disconnect shift and select cables from transaxle.
- 5) Remove E-rings, cable grommet and cable clamp, and then remove shift and select cables from body.

## INSTALLATION

Reverse removal procedure for installation and note as follows.

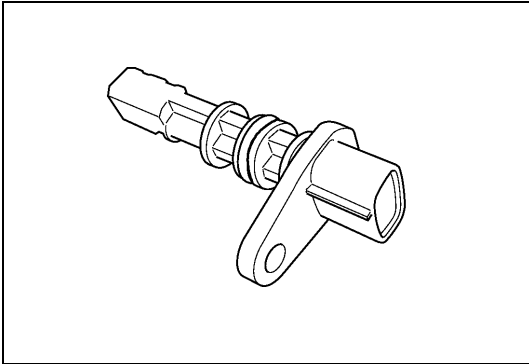
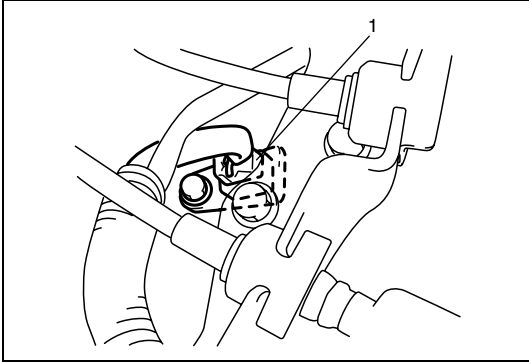
- Tighten each bolts and nuts to specified torque referring to “Gear Shift Control Lever and Cable Components”.
- Apply grease to turning or sliding portions.

**Grease 99000-25010**

## Vehicle Speed Sensor (VSS)

### REMOVAL

- 1) Disconnect negative cable at battery.
- 2) Disconnect VSS coupler (1).

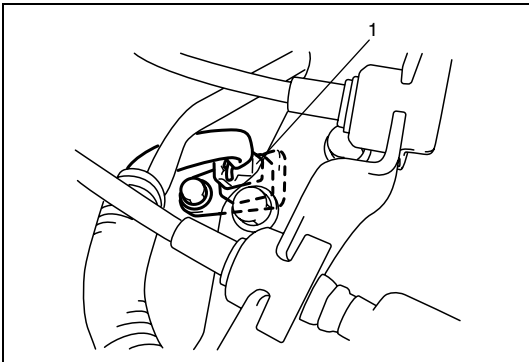
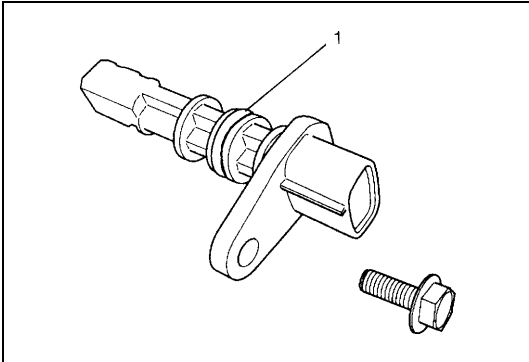


- 3) Remove VSS.

### INSTALLATION

- 1) Check O-ring (1) and VSS surface for their flawlessness, apply grease to O-ring and then install VSS to transaxle.

**Grease 99000-25010**

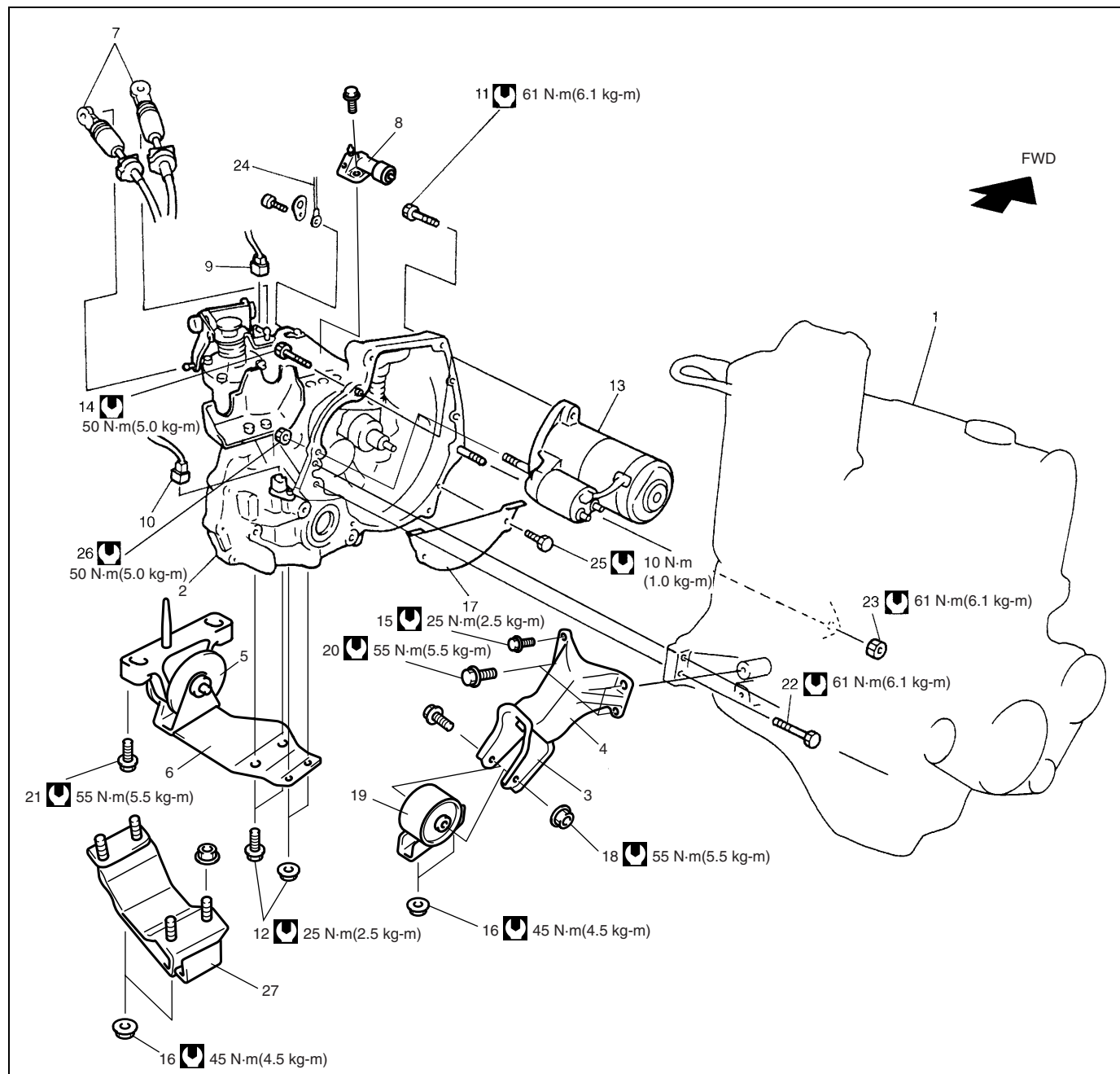


- 2) Connect VSS coupler (1).

- 3) Connect negative cable at battery.

# Unit Repair Overhaul

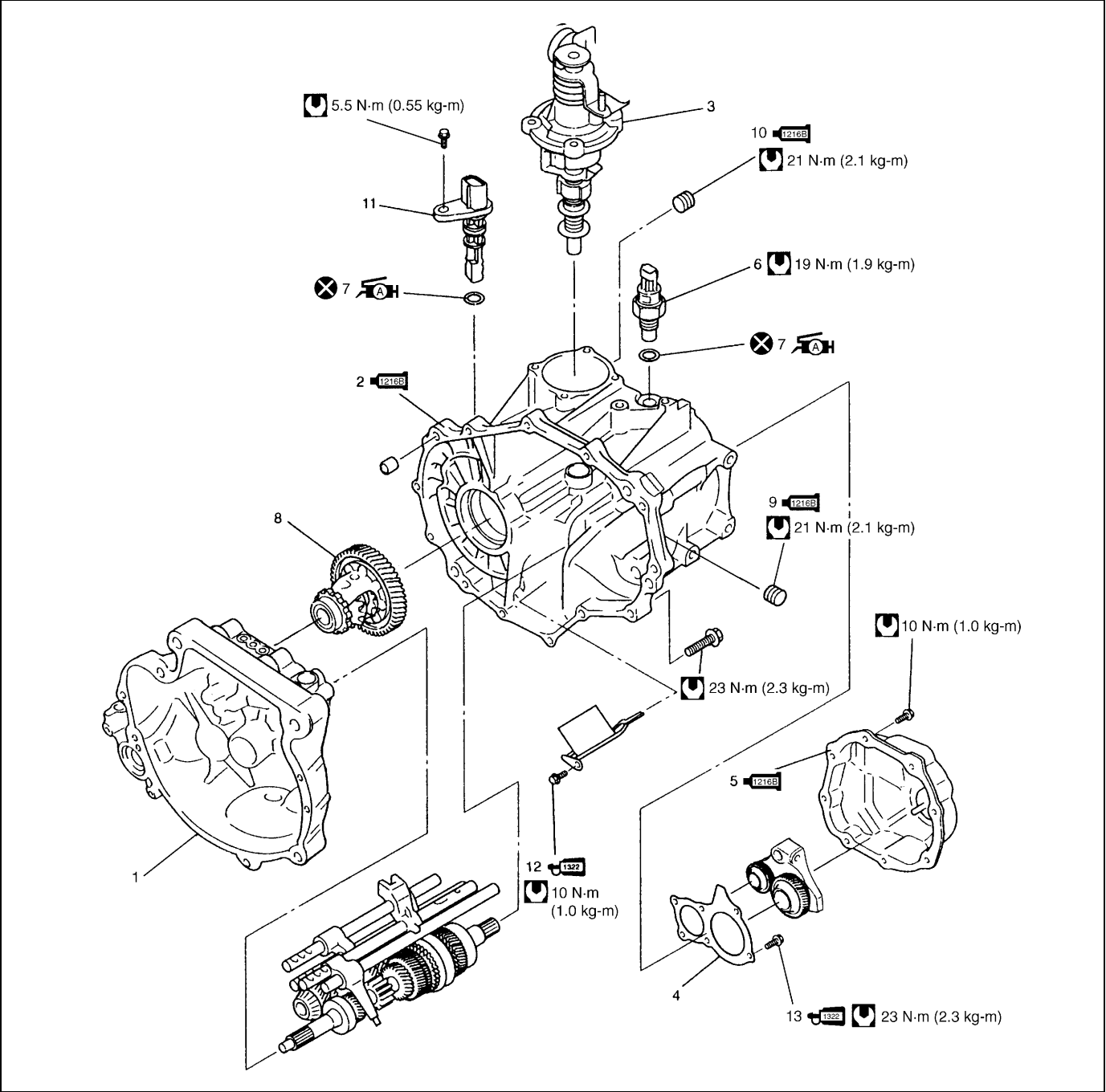
## Transaxle Unit COMPONENTS



1. Engine	11. Transaxle to engine bolts	21. Engine left mounting bolt
2. Transaxle	12. Engine left mounting bracket bolts and nuts	22. Transaxle to engine bolts
3. Engine rear mounting No.1 bracket (for 2WD model)	13. Starting motor	23. Transaxle to engine nut
4. Engine rear mounting No.2 bracket (for 2WD model)	14. Starting motor bolt	24. Ground cable
5. Engine left mounting	15. Engine rear mounting No.2 bracket bolt (M8)	25. Clutch housing lower plate bolts
6. Engine left mounting bracket	16. Engine rear mounting to member nuts	26. Starting motor nut
7. Shift & select control cables	17. Clutch housing lower plate	27. Engine rear mounting (for 4WD model)
8. Clutch operating cylinder	18. Engine rear mounting nut	Tightening torque
9. Backup lamp switch connector	19. Engine rear mounting (for 2WD model)	
10. VSS connector	20. Engine rear mounting No.2 bracket bolts (M10)	

# Transaxle Case

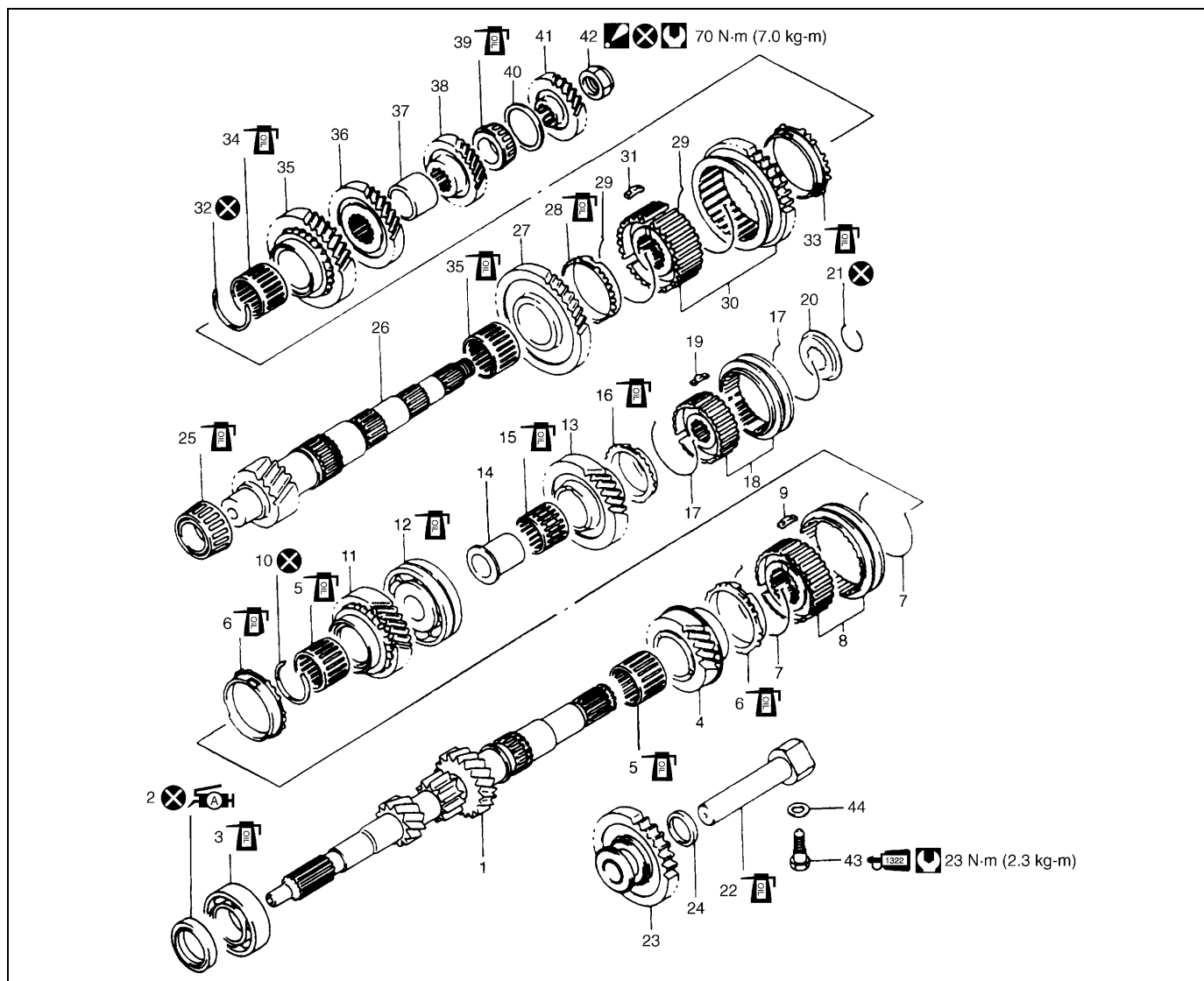
## COMPONENTS



1. Transaxle right case	9. Oil level/filler plug : Apply sealant 99000-31230 to all around thread part of plug.
2. Transaxle left case : Apply sealant 99000-31230 to mating surface of left case and right case.	10. Oil drain plug : Apply sealant 99000-31230 to all around thread part of plug.
3. Gear shifter assembly	11. VSS
4. Transaxle left case plate	12. Oil gutter bolt : Apply thread lock 99000-32110 to all around thread part of bolt.
5. Transaxle side cover : Apply sealant 99000-31230 to mating surface of side cover and left case.	13. Left case plate bolt : Apply thread lock 99000-32110 to all around thread part of bolt.
6. Backup lamp switch	Tightening torque
7. O-ring : Apply SUZUKI SUPER GREASE A 99000-25010 to O-ring.	Do not reuse.
8. Differential assembly	

# Input & Counter Shaft

## COMPONENTS

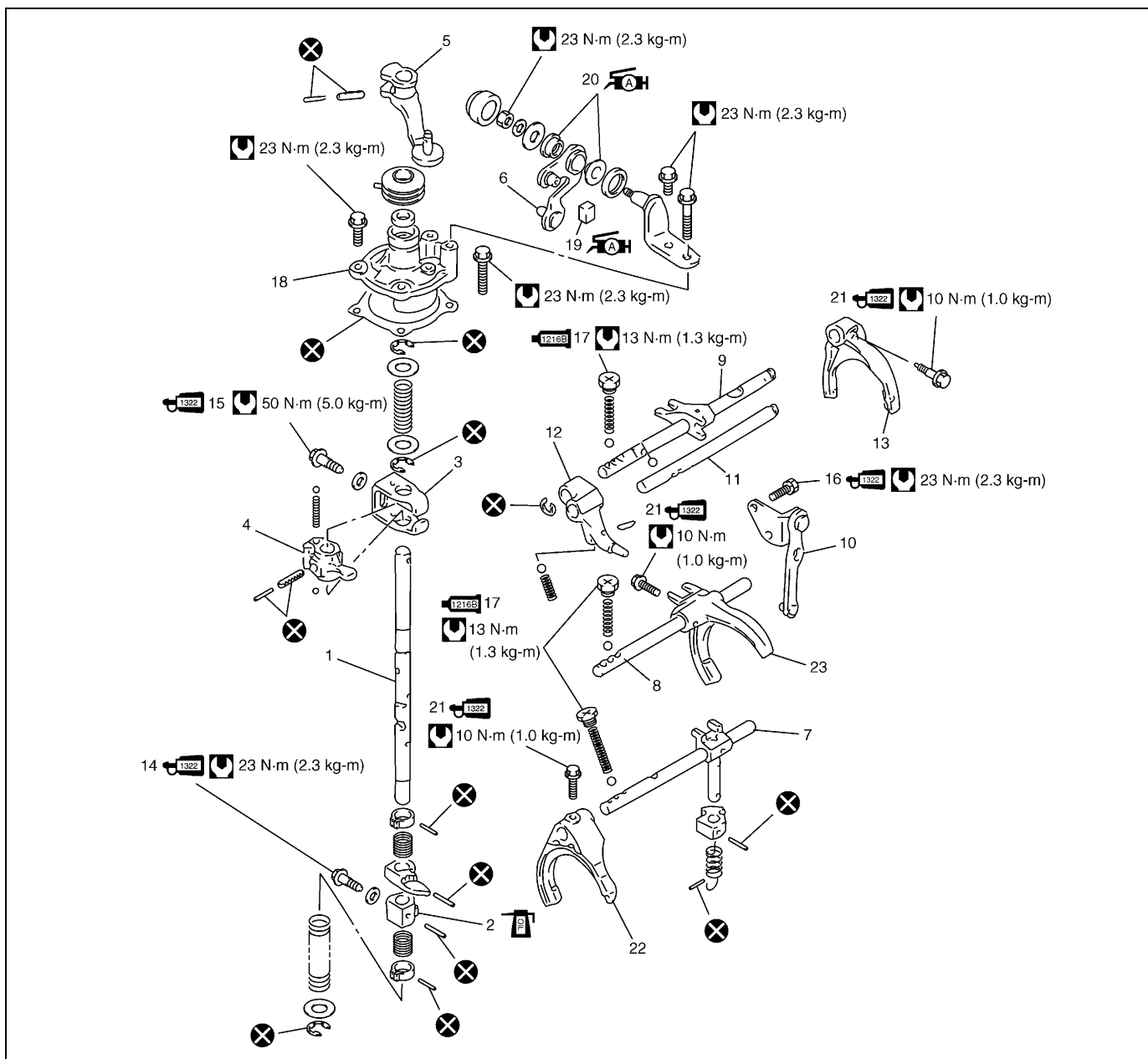


1. Input shaft	17. 5th synchronizer spring	33. 2nd gear synchronizer ring
2. Oil seal : Apply grease 99000-25010 to oil seal lip.	18. 5th speed sleeve & hub	34. Needle bearing
3. Input shaft right bearing	19. 5th synchronizer key	35. Countershaft 2nd gear
4. Input shaft 3rd gear	20. 5th synchronizer hub plate	36. Countershaft 3rd gear
5. Needle bearing	21. Circlip	37. 3rd & 4th gear spacer
6. High speed synchronizer ring	22. Reverse gear shaft	38. Countershaft 4th gear
7. High speed synchronizer spring	23. Reverse idler gear	39. Countershaft left bearing
8. High speed sleeve & hub	24. Reverse shaft washer	40. Bearing set shim
9. High speed synchronizer key	25. Countershaft right bearing	41. Countershaft 5th gear
10. Circlip	26. Countershaft	42. Countershaft nut : After tightening nut to specified torque, caulk nut securely.
11. Input shaft 4th gear	27. Countershaft 1st gear	43. Reverse shaft bolt : Apply thread lock cement 99000-32110 to thread part of bolt.
12. Input shaft left bearing	28. 1st gear synchronizer ring	44. Washer
13. Input shaft 5th gear	29. Low speed synchronizer spring	45. Tightening torque
14. 5th gear spacer	30. Low speed sleeve & hub	Do not reuse.
15. 5th gear needle bearing	31. Low speed synchronizer key	Apply transaxle oil.
16. 5th speed synchronizer ring	32. Circlip	



# Gear Shifter

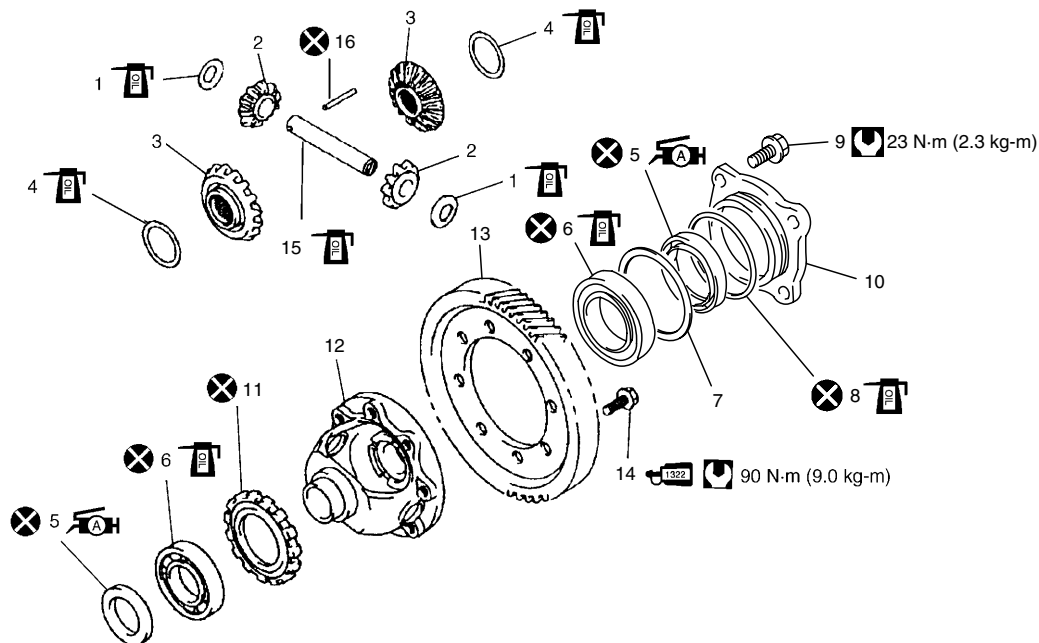
## COMPONENTS



1. Gear shift & select shaft	10. Reverse gear shift lever	19. Select lever shaft bush : Apply grease 99000-25010 to whole area of bush.
2. 5th & reverse gear shift cam	11. 5th & reverse gear shift guide shaft	20. Select lever boss : Apply grease 99000-25010 to internal and external diameter.
3. Gear shift interlock plate	12. Reverse gear shift arm	21. Shift fork bolt : Apply thread lock 99000-32110 to bolt thread.
4. Gear shift & select lever	13. 5th gear shift fork	22. Low speed gear shift fork
5. Shift cable lever	14. 5th to reverse interlock guide bolt : Apply thread lock 99000-32110 to bolt thread.	23. High speed gear shift fork
6. Select cable lever	15. Gear shift interlock bolt : Apply thread lock 99000-32110 to bolt thread.	Tightening torque
7. Low speed gear shift shaft	16. Reverse gear shift lever bolt : Apply thread lock 99000-32110 to all around thread part of bolt.	Do not reuse.
8. High speed gear shift shaft	17. Gear shift locating bolt : Apply sealant 99000-31230 to bolt thread.	
9. 5th & reverse gear shift shaft	18. Guide case	

## Differential

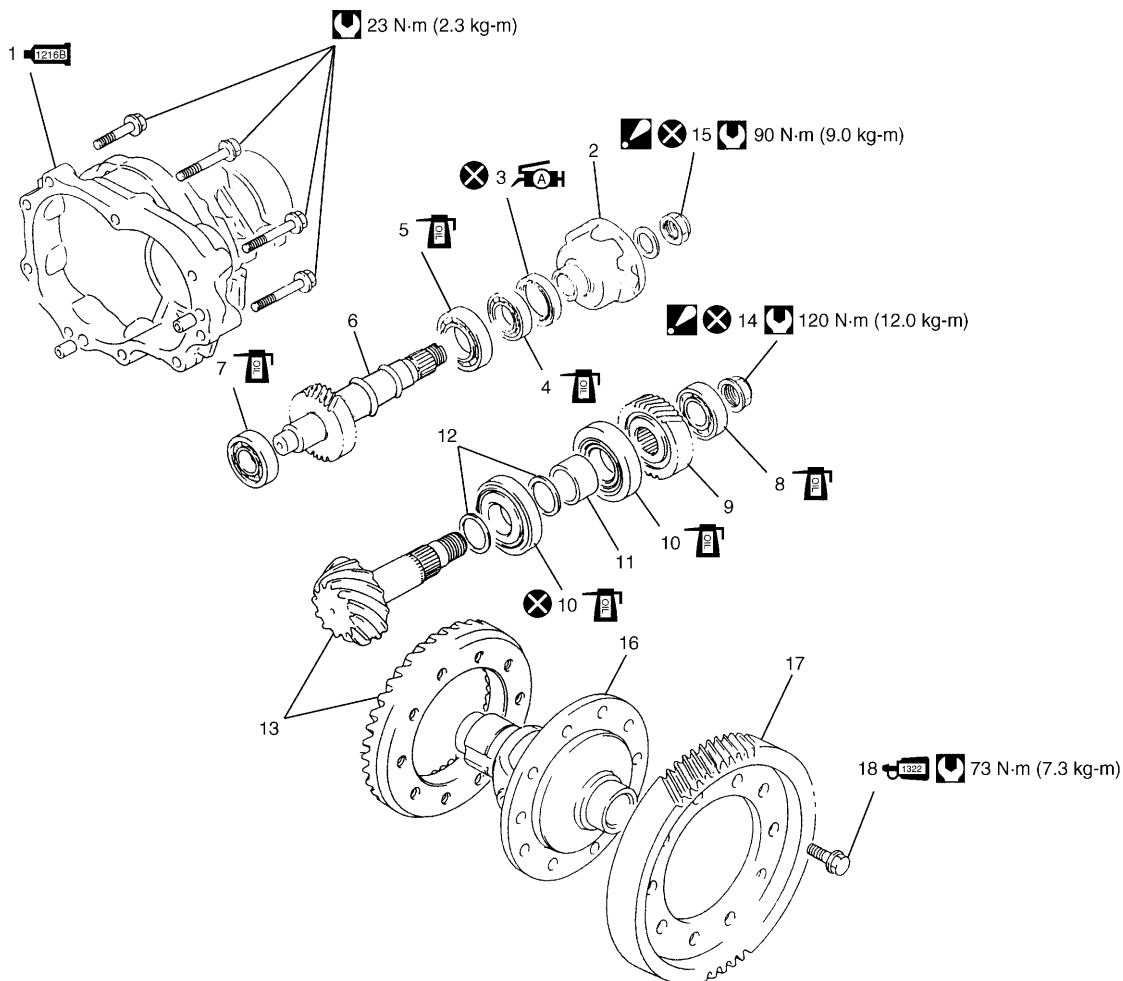
### COMPONENTS



1. Pinion gear washer	8. O-ring	15. Differential pinion shaft
2. Differential side pinion gear	9. Side bearing retainer bolt	16. Differential pinion shaft pin
3. Differential side gear	10. Side bearing retainer	Tightening torque
4. Side gear washer	11. Speed sensor ring	Do not reuse.
5. Differential side oil seal : Apply grease 99000-25010 to oil seal lip.	12. Differential case	Apply transaxle oil.
6. Differential side bearing	13. Final gear	
7. Shim	14. Final gear bolt (For 2WD vehicle) : Apply thread lock 99000-32110 to all around thread part of bolt.	

## Transfer

### COMPONENTS



1. Transfer output case : Apply sealant 99000-31230 to mating surface of output case and rear case.	8. Drive gear bearing	15. Transfer output flange nut : After tightening nut to specified torque, caulk nut securely.
2. Transfer output flange	9. Drive gear	16. Differential case
3. Transfer output flange oil seal : Apply grease 99000-25010 to oil seal lip.	10. Pinion bearing	17. Final gear
4. Output No.2 bearing	11. Pinion spacer	18. Final gear bolt (For 4WD vehicle) : Apply thread lock 99000-32110 to all around thread part of bolt.
5. Output No.1 bearing	12. Pinion bearing shim	Tightening torque
6. Output shaft	13. Bevel gear set	Do not reuse.
7. Output No.3 bearing	14. Transfer bevel pinion nut : After tightening nut to specified torque, caulk nut securely.	Apply transaxle oil.

## Transaxle Unit

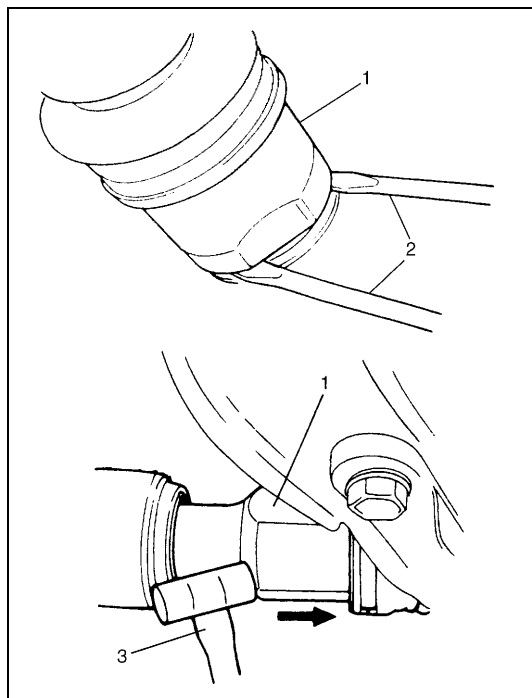
### DISMOUNTING

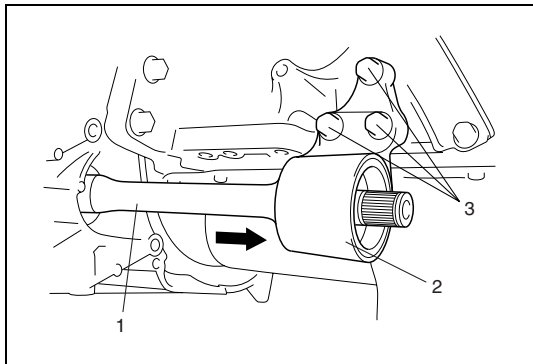
#### UNDER HOOD

- 1) Disconnect battery ground cable.
- 2) Remove clutch operating cylinder from T/M with hose still attached.
- 3) Remove gear control cables.
- 4) Remove water intake pipe bolts.
- 5) Undo wiring harness clamps and connectors.
- 6) Remove ground cable from T/M.
- 7) Remove starting motor taking out its bolt and nut.
- 8) Remove transaxle fastening bolts.
- 9) Support engine by using lifting device.

#### ON LIFT

- 1) Drain transaxle oil.
- 2) Remove engine under covers.
- 3) Remove exhaust No.1 pipe and exhaust No.2 pipe.
- 4) For 4WD model, remove propeller shaft No.1 referring to Section 4B.
- 5) Remove clutch housing lower plate.
- 6) Remove ball stud bolt from right and left knuckles, then disconnect each suspension arm.
- 7) Using flat head rod or the like (2), pull out drive shaft joint (1) at differential side so as to release snap ring fitting of joint (for LH drive shaft).  
Using plastic hammer (3), drive out drive shaft joint so as to release snap ring fitting of joint spline at center shaft (for RH drive shaft).





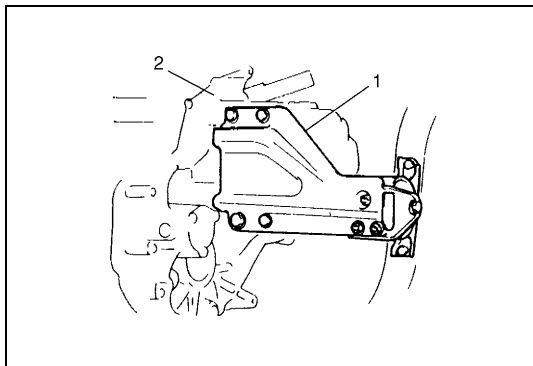
- 8) Remove center bearing support bolts (3) and remove center bearing support (2) with center shaft (1) from differential side gear.

- 9) For 2WD model, remove engine rear mounting No.1 bracket with No.2 bracket.

For 4WD model, remove suspension frame referring to "Front Suspension Frame" in Section 3.

- 10) Remove transaxle to engine bolts and nut.  
 11) Lower vehicle and support transaxle with transmission jack.  
 12) Remove engine LH mounting with bracket (1).

2. Transaxle



- 13) Remove other attached parts from transaxle, if any.  
 14) Pull transaxle out so as to disconnect input shaft from clutch disc and then lower it.

## REMOUNTING

### CAUTION:

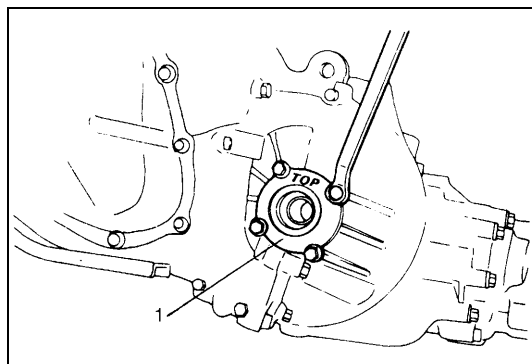
- Care should be taken not to scratch oil seal lip with drive shaft while raising transaxle.
- Do not hit drive shaft joint with hammer when installing it into differential gear.

For remounting, reverse dismounting procedure noting the followings.

- Push in drive shaft joints fully so as to engage snap ring of shaft with differential gear or center shaft.
- Set each clamp for wiring securely.
- Fill transaxle with oil as specified.
- Connect battery and check function of engine, clutch and transaxle.

## Disassembling Unit

### Transfer and differential (for 4WD model)

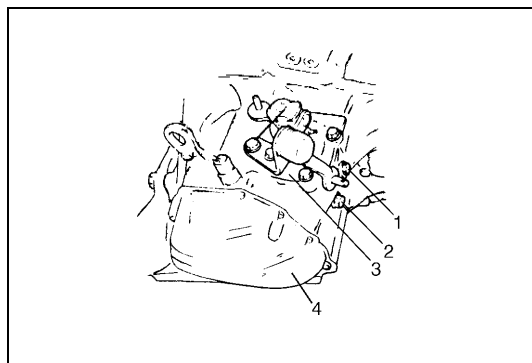


- 1) Remove differential side bearing retainer (1).
- 2) Remove VSS.
- 3) Remove transfer assembly and differential from transaxle.

**CAUTION:**

Be careful not to damage gear teeth surface.

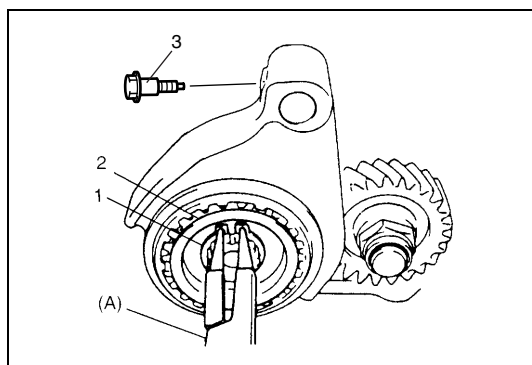
### Gear shift and select shaft assembly and fifth gears



- 1) Remove gear shift interlock bolt (1) and 5th to reverse interlock guide bolt (2) from transaxle case.
- 2) Remove gear shift & select shaft assembly (3).
- 3) Remove 9 bolts and take off transaxle side cover (4).

**CAUTION:**

Care should be taken not to distort side cover when it is removed from left case.

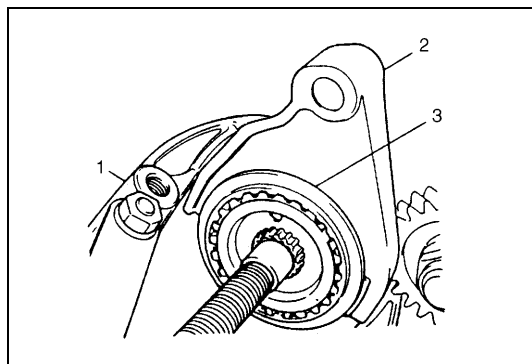


- 4) Using special tool, remove circlip (1) and then hub plate (2).

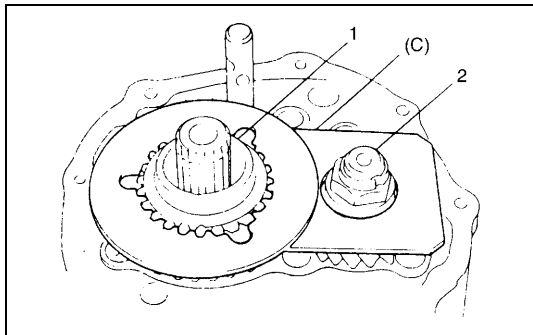
**Special tool**

(A) : 09900-06107

- 5) Remove 5th shift fork shaft bolt (3).



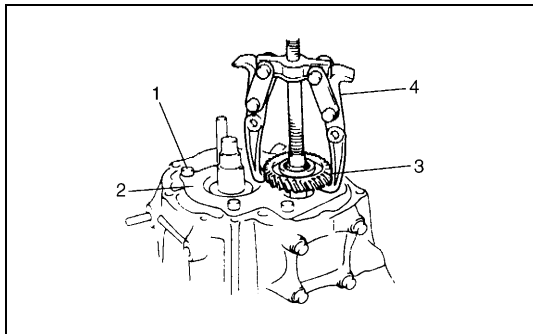
- 6) Remove gear shift fork (2), sleeve & hub assembly (3), synchronizer ring spring, synchronizer ring and 5th gear all together. Use gear puller (1) for removal if spline fitting of hub is tight.



- 7) Unfasten caulking of countershaft nut (2), install input shaft 5th gear (1) and special tool to stop rotation of shafts, and then remove countershaft nut (2).

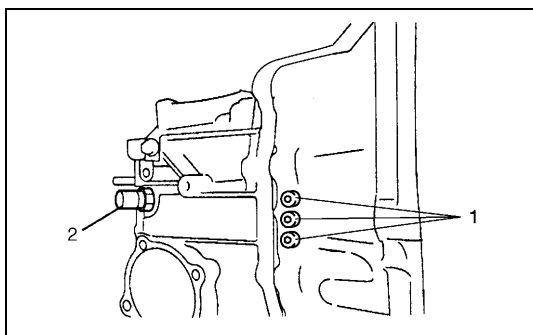
#### Special tool

(C) : 09927-76060

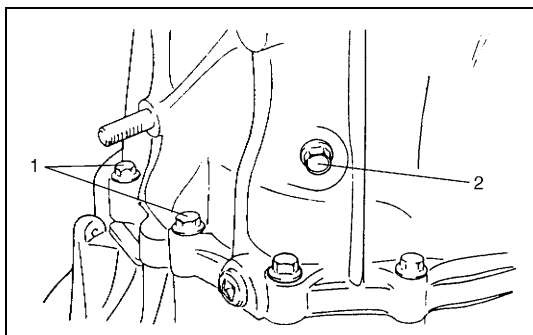


- 8) Remove input shaft 5th gear, needle bearing and then counter shaft 5th gear (3). Gear puller (4) would be necessary if spline fitting of countershaft 5th gear is tight.
- 9) Remove bolts (1) and take off left case plate (2), and then bearing set shim.

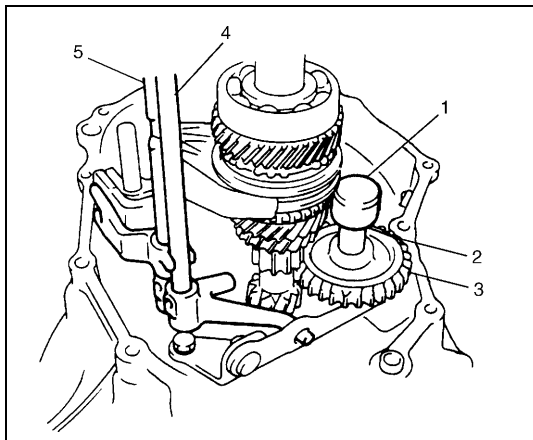
### Main shaft and countershaft



- 1) Remove gear shift locating bolts (1), then take out locating springs and steel balls.
- 2) Remove back up light switch (2).



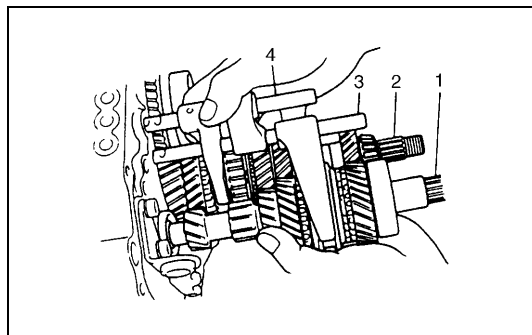
- 3) Remove reverse shaft bolt (2) with washer.
- 4) Remove transaxle case outside bolts (1) and clutch housing bolts.
- 5) Tapping left case flanges with plastic hammer, remove left case.



- 6) Pull out reverse gear shaft (1) with washer (2), then take off reverse idler gear (3).
- 7) Pull out 5th & reverse gear shift guide shaft (4) together with 5th & reverse gear shift shaft (5).

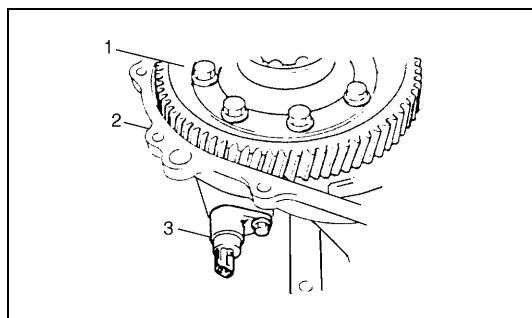
#### NOTE:

- When removing 5th & reverse gear shift shaft and guide shaft, push up high speed gear shift shaft and shift it to 4th to facilitate removal of 5th & reverse shifter.

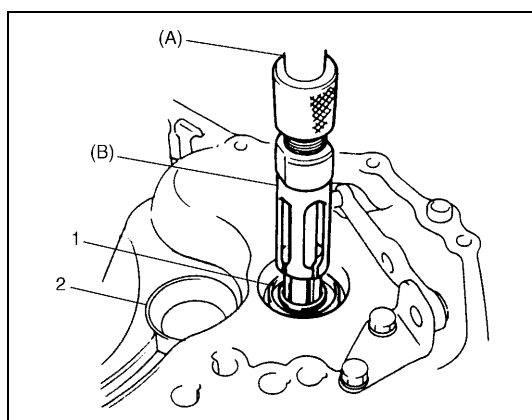


- 8) Tapping input shaft end with plastic hammer, push it out as assembly from case a little, then take out input shaft assembly (1), countershaft assembly (2), high speed gear shift shaft (3) and low speed gear shift shaft (4) all at once.
- 9) Remove countershaft L bearing cup from left case.
- 10) Remove differential side L oil seal also from left case.

### Right case



- 1) Remove differential gear assembly (1) from right case (2).
- 2) Remove bolt and then pull out VSS (3).



- 3) Remove input shaft oil seal (1) by using special tools (combination of bearing remover and sliding shaft).

### Special tool

(A) : 09930-30104

(B) : 09923-74510

- 4) Also pull out countershaft R bearing cup (2) by using special tools.

### Special tool

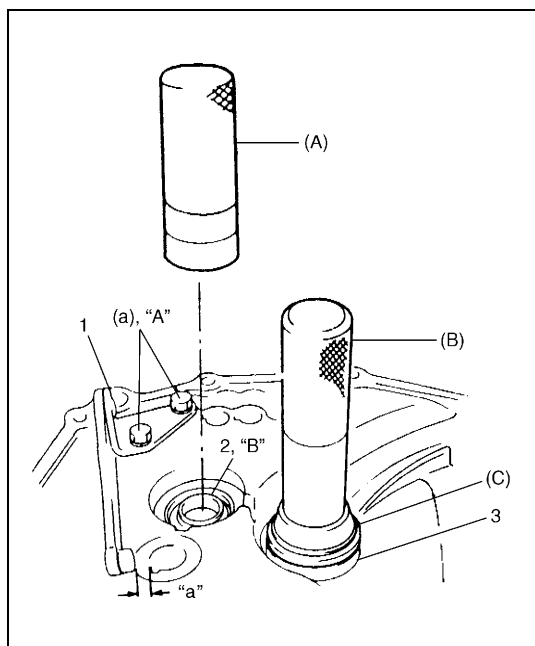
09941-64511

09930-30104



## Sub Assembly Service

### Right case



- 1) If reverse gear shift lever (1) has been removed, fasten it with 2 bolts after applying thread lock cement with distance "a" between lever end and shaft bore set to specified value.

#### Distance between lever end and shaft bore

"a" : 5 mm (0.2 in.)

"A": Cement 99000-32110

#### Tightening torque

##### Reverse gear shift lever bolts

(a) : 23 N·m (2.3 kg·m, 17.0 lb·ft)

#### NOTE:

- Distance "a" can be measured by installing reverse gear shaft provisionally.
- When "a" is 5 mm (0.2 in.), clearance between reverse idler gear groove and shift lever end will be 1 mm (0.04 in.).

- 2) Install input shaft oil seal (2) facing its spring side upward. Use special tool and hammer for installation and apply grease to oil seal lip.

"B" : Grease 99000-25010

#### Special tool

(A) : 09913-84510

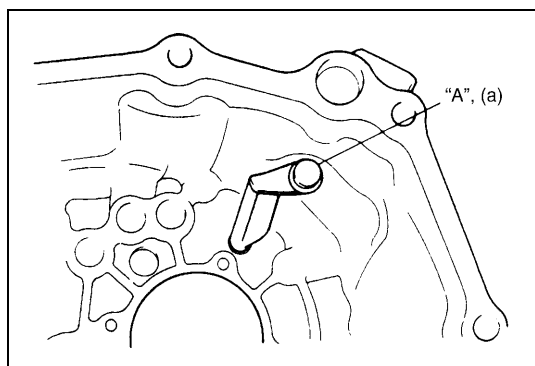
- 3) Install countershaft R bearing cup (3) by using special tools and hammer.

#### Special tool

(B) : 09913-75821

(C) : 09924-84510-004

### Left case



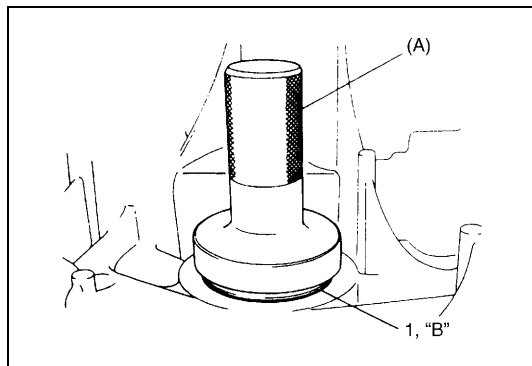
- 1) If input oil gutter has been removed, install it with bolt to which thread lock cement has been applied.

"A" : Cement 99000-32110

#### Tightening torque

##### Input oil gutter bolt

(a) : 10 N·m (1.0 kg·m, 7.5 lb·ft)



- 2) For 2WD model, install differential side L oil seal (1) until it becomes flush with differential side bearing retainer surface by using special tool with hammer, and then apply grease to its lip.

**NOTE:**

**Face oil seal spring side inward.**

**“B” : Grease 99000-25010**

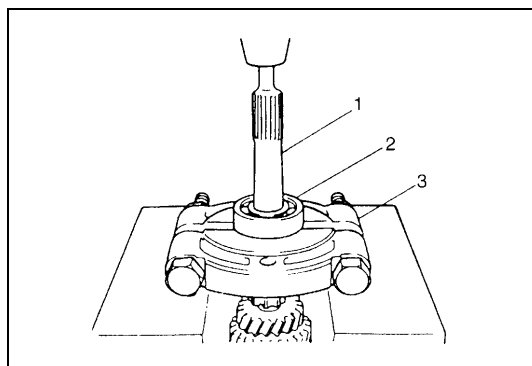
**Special tool**

**(A) : 09913-75520**

- 3) Install counter shaft L bearing cup into case bore by tapping it with plastic hammer lightly.

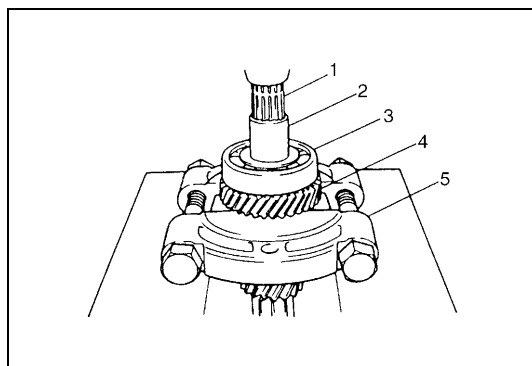
## Input shaft assembly

### DISASSEMBLY



- 1) Remove input shaft R bearing (2) by using bearing puller (3) and hydraulic press.

1. Input shaft

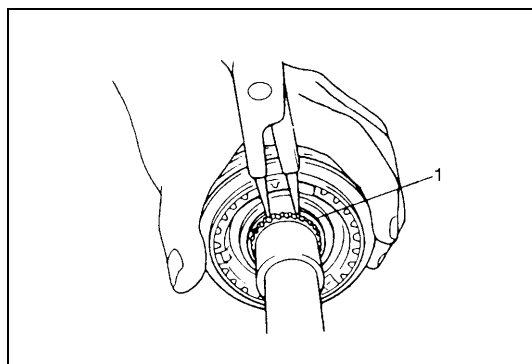


- 2) Drive out 5th gear spacer (2), L bearing (3) and 4th gear (4) all at once by using puller (5) and hydraulic press.

**CAUTION:**

- To avoid gear tooth from being damaged, support it at flat side of bearing puller.
- Stop press work in the middle way and take out 5th gear bush to prevent it from being compressed and then continue to remove bearing with gear.

1. Input shaft



- 3) Take out 4th gear needle bearing and high speed synchronizer ring.

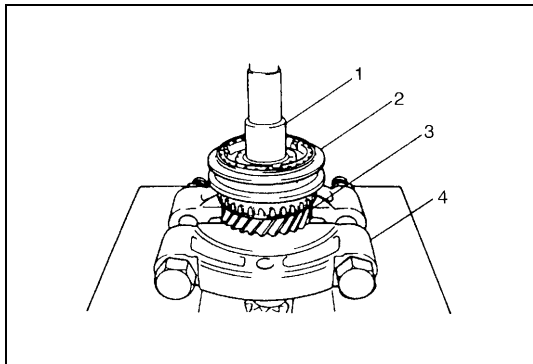
- 4) Using special tool, remove circlip (1).

**NOTE:**

**For smooth removal of circlip, it is recommended to correct tool tips to be flat.**

**Special tool**

**(A) : 09900-06107**



- 5) Drive out high speed synchronizer sleeve & hub assembly (2) together with 3rd gear (3) by using puller (4) and hydraulic press.

**CAUTION:**

**Make sure to use flat side of puller to avoid causing damage to 3rd gear tooth.**

1. Input shaft

- 6) Take out 3rd gear needle bearing from shaft.  
7) Disassemble synchronizer sleeve & hub assembly.

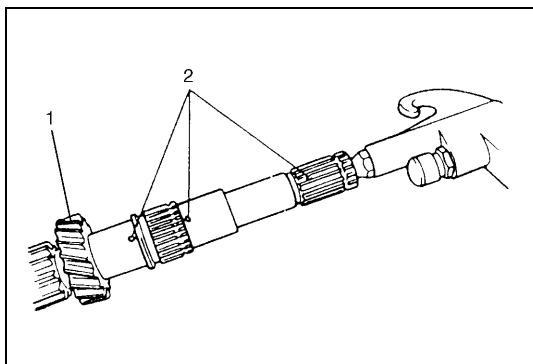
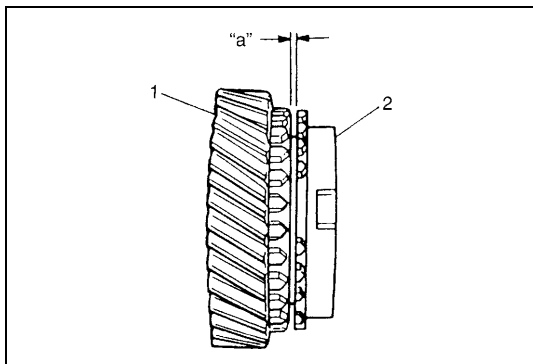
**INSPECTION AND REASSEMBLY**

- 1) Clean all components thoroughly, inspect them for any abnormality and replace with new ones as necessary.  
2) If synchronizer parts need to be repaired, check clearance "a" between ring (2) and gear (1), each chamfered tooth of gear, ring and sleeve, then determine parts replacement.

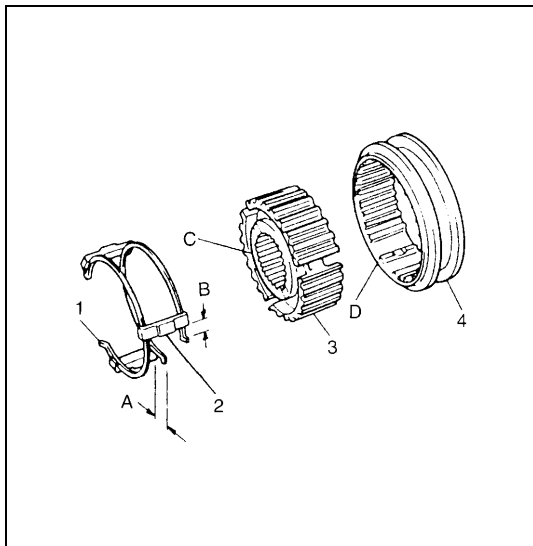
**Clearance "a" between synchronizer ring and gear**

**Standard : 1.0 - 1.4 mm (0.039 - 0.055 in.)**

**Service limit : 0.5 mm (0.019 in.)**



- 3) To ensure lubrication of input shaft (1), air blow oil holes (2) and make sure that they are free from any obstruction.



- 4) Fit high speed synchronizer sleeve (4) to hub (3), insert 3 keys (2) in it and then set springs (1) as shown in figure.

**NOTE:**

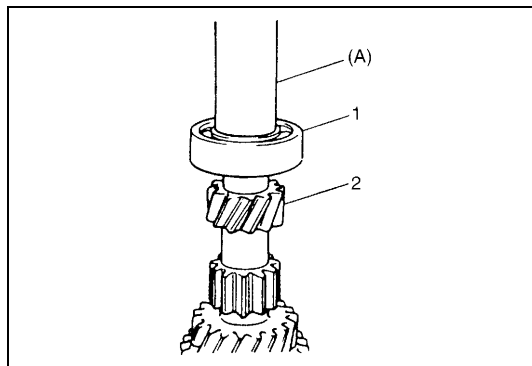
- No specific direction is assigned to high speed synchronizer sleeve or each key but it is assigned as assembly.
- Size of high speed synchronizer sleeve, hub, keys and springs is between those of low speed and 5th speed ones.

**Synchronizer key installation position**

**: A = B**

C : Left side (Short flange)

D : Key way

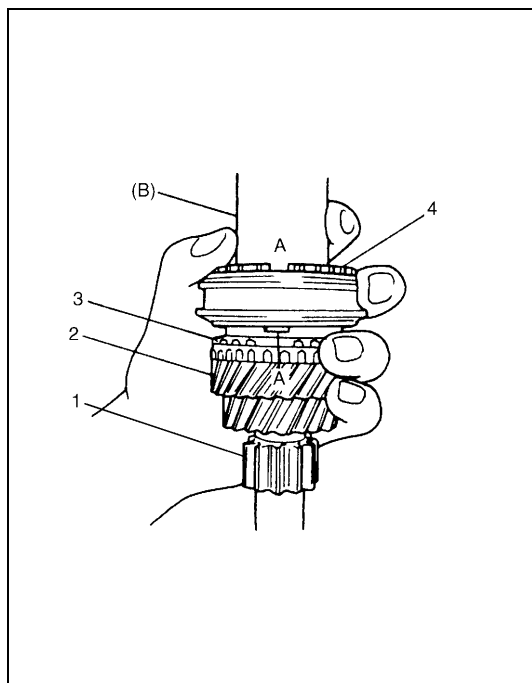


5) Drive in R bearing (1) by using special tool and hammer.

**Special tool**

**(A) : 09913-80112**

2. Input shaft
----------------



6) Install 3rd gear needle bearing, apply oil to it, then install 3rd gear (2) and synchronizer ring (3).

7) Drive in high speed sleeve & hub assembly (4) by using special tool and hammer.

**NOTE:**

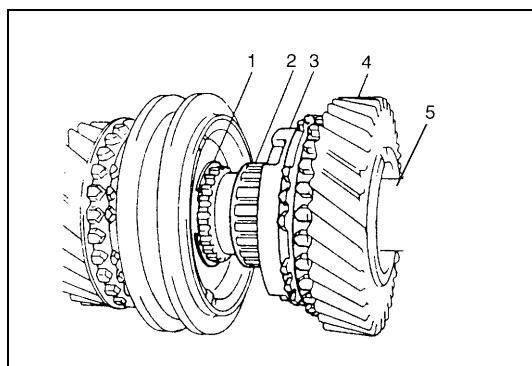
- While press-fitting sleeve & hub, make sure that synchronizer ring key slots are aligned with keys in sleeve & hub assembly.
- Check free rotation of 3rd gear after press-fitting sleeve & hub assembly.
- Needle bearings and synchronizer rings for 3rd and 4th are identical respectively.

**Special tool**

**(B) : 09913-84510**

1 : Input shaft
-----------------

A : Key way
-------------

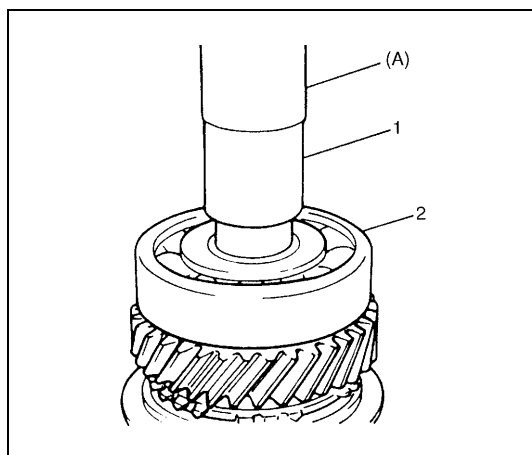


8) Install circlip (1), needle bearing (2), apply oil to bearing, then install synchronizer ring (3) and 4th gear (4).

**CAUTION:**

**Confirm that circlip is installed in groove securely.**

5 : Input shaft
-----------------



9) Press-fit L bearing (2) by using special tool and hammer.

**Special tool**

**(A) : 09913-80112**

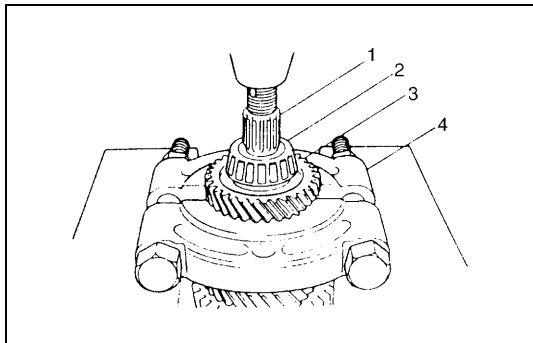
10) Using the same special tool, drive in 5th gear spacer (1).

**CAUTION:**

**To prevent 5th gear spacer from being distorted because of excessive compression, do not press-fit it with L bearing at once.**

## Counter shaft assembly

### DISASSEMBLY

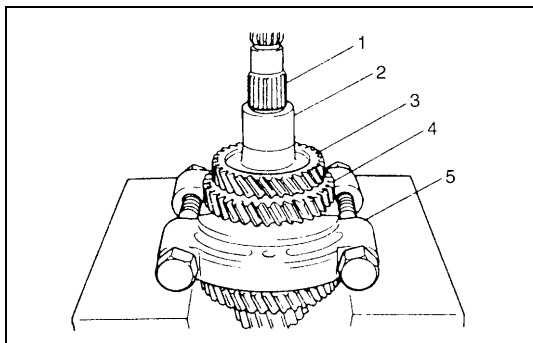


- 1) Drive out L bearing cone (2) with 4th gear (3) by using puller (4) and hydraulic press.

#### CAUTION:

- Use puller and hydraulic press that will bear at least 5 ton (11,000 lb) safely.
- To avoid tooth damage, support 4th gear at flat side of puller.

1 : Countershaft

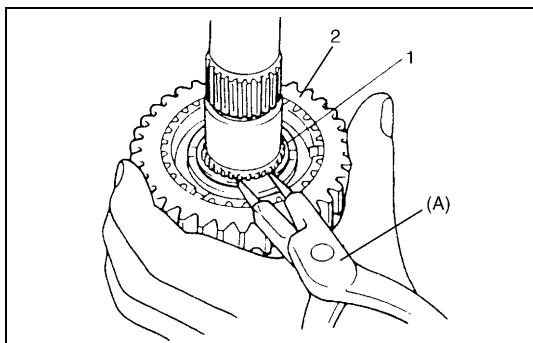


- 2) Apply puller (5) to 2nd gear (4) and drive out 3rd & 4th gear spacer (2) and 3rd gear (3) together with 2nd gear by using hydraulic press. Needle bearing would come out with 2nd gear.

#### CAUTION:

If compression exceeds 5 ton (11,000 lb), release compression once, reset puller support and then continue press work again.

1 : Countershaft



- 3) Take out 2nd synchronizer ring.

- 4) Using special tool, remove circlip (1).

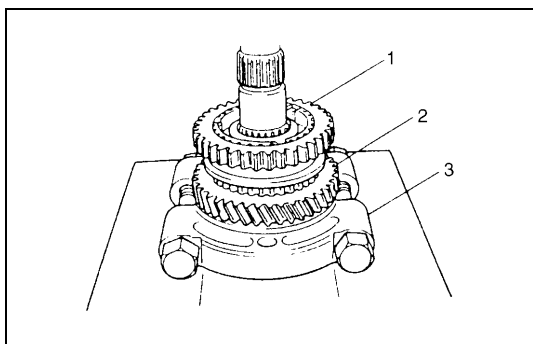
#### NOTE:

Correct tool tips to be flat to facilitate removal of circlip.

#### Special tool

(A) : 09900-06107

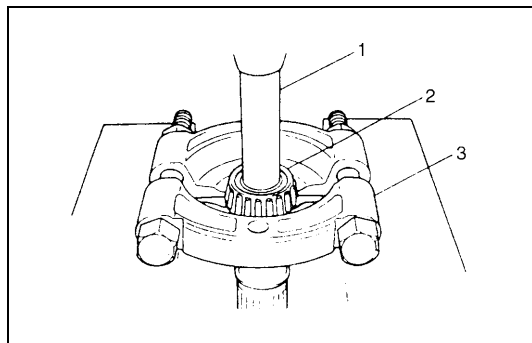
2 : Low speed synchronizer sleeve



- 5) Apply puller (3) to 1st gear (2) and drive out low speed synchronizer sleeve & hub assembly (1) with gear by using hydraulic press.

- 6) Disassemble synchronizer sleeve & hub assembly.

- 7) Take out needle bearing from shaft.



- 8) Remove R bearing cone (2) by using puller (3), metal stick (1) and hydraulic press.

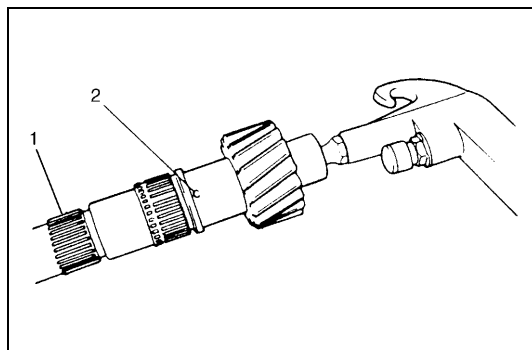
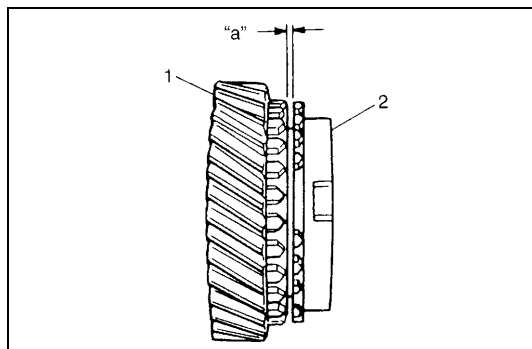
## INSPECTION AND ASSEMBLY

- 1) Clean all components thoroughly, inspect them for any abnormality and replace with new ones as necessary.
- 2) If synchronizer parts need to be repaired, check clearance "a" between ring (2) and gear (1), each chamfered tooth of gear, ring and sleeve, then determine parts replacement.

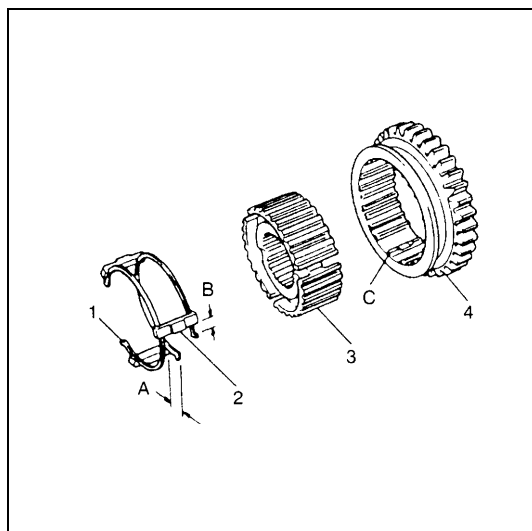
**Clearance "a" between synchronizer ring and gear**

**Standard : 1.0 - 1.4 mm (0.039 - 0.055 in.)**

**Service limit : 0.5 mm (0.019 in.)**



- 3) To ensure lubrication of countershaft (1), air blow oil holes (2) and make sure that they are free from any obstruction.



- 4) Fit low speed synchronizer sleeve (4) to hub (3), insert 3 keys (2) in it and then set springs (1) as shown in figure.

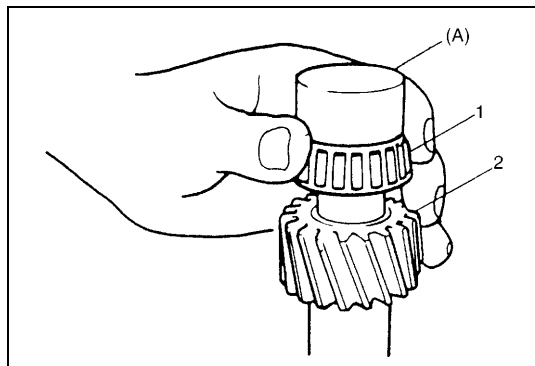
### NOTE:

- No specific direction is assigned to low speed synchronizer hub or each key but it is assigned as assembly.
- Size of low speed synchronizer keys and springs are the largest compared with those of high speed and 5th speed ones.

**Synchronizer key installation position**

**: A = B**

C: Key way

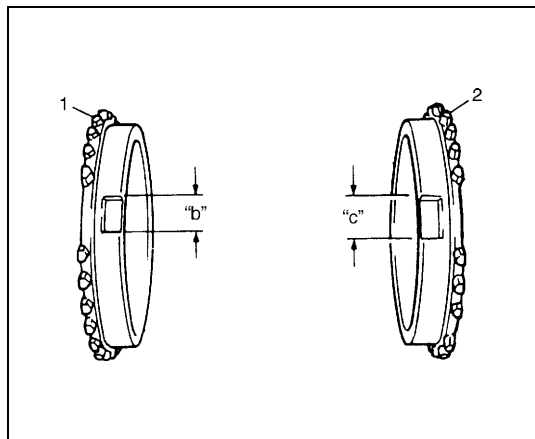


5) Install R bearing cone (1) by using special tool and hammer.

**Special tool**

(A) : 09923-78210

2 : Countershaft



6) Install needle bearing, apply oil to it, then install 1st gear and 1st gear synchronizer ring.

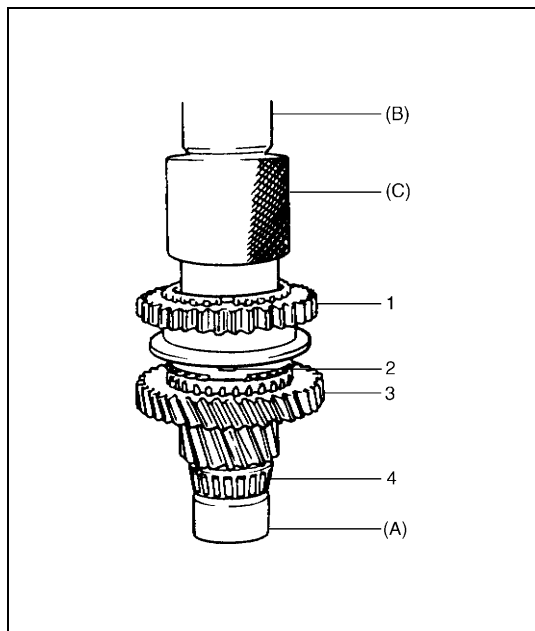
**NOTE:**

- Needle bearings for 1st and 2nd gear are identical.
- Key slot width of 1st synchronizer ring (1) is smaller than that of 2nd synchronizer ring (2). Distinguish the difference properly.

**Key slot width**

“b” : 11.4 mm (0.45 in.)

“c” : 12.8 mm (0.50 in.)



7) Drive in low speed sleeve & hub assembly (1) by using special tools and hammer.

**NOTE:**

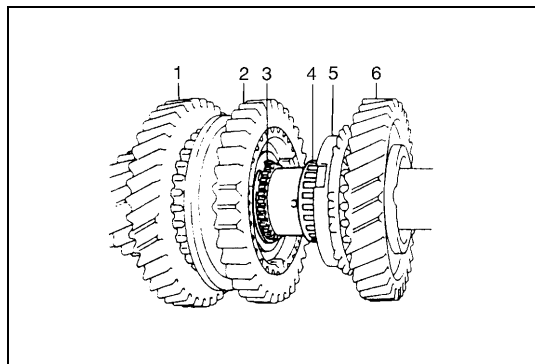
- Support shaft with special tool as shown in figure so that retainer of bearing cone (4) will be free from compression.
- Make sure that synchronizer ring key slots (2) are aligned with keys while press-fitting sleeve & hub assembly.
- Check free rotation of 1st gear (3) after press-fitting sleeve & hub assembly.

**Special tool**

(A) : 09923-78210

(B) : 09913-85210

(C) : 09940-54910



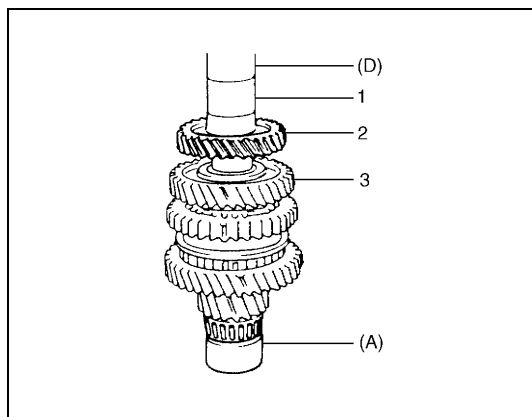
8) Install circlip (3), needle bearing (4), apply oil to bearing, then install 2nd gear synchronizer ring (5) and 2nd gear (6).

**CAUTION:**

Confirm that circlip is installed in groove securely.

1. 1st gear

2. Low speed sleeve & hub assembly



- 9) Press-fit 3rd gear (2) and spacer (1) by using special tool and hydraulic press.

**NOTE:**

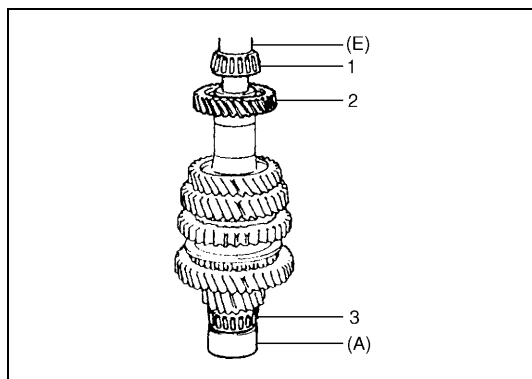
It is recommended to press-fit spacer and 3rd gear first, and then 4th gear later separately so that countershaft will not be compressed excessively.

**Special tool**

(A) : 09923-78210

(D) : 09913-85210

3. 2nd gear



- 10) Press-fit 4th gear (2) by using the same procedure as the above.

- 11) Install L bearing cone (1) by using special tool and hammer.

**NOTE:**

For protection of bearing cone (3), always support shaft with special tool as shown in figure.

**Special tool**

(A) : 09923-78210

(E) : 09913-80112

### Gear shift & select shaft assembly

- 1) To disassemble component parts, use special tools and 2.8-3.0 mm (0.11 in.) pin remover in addition.

**Special tool**

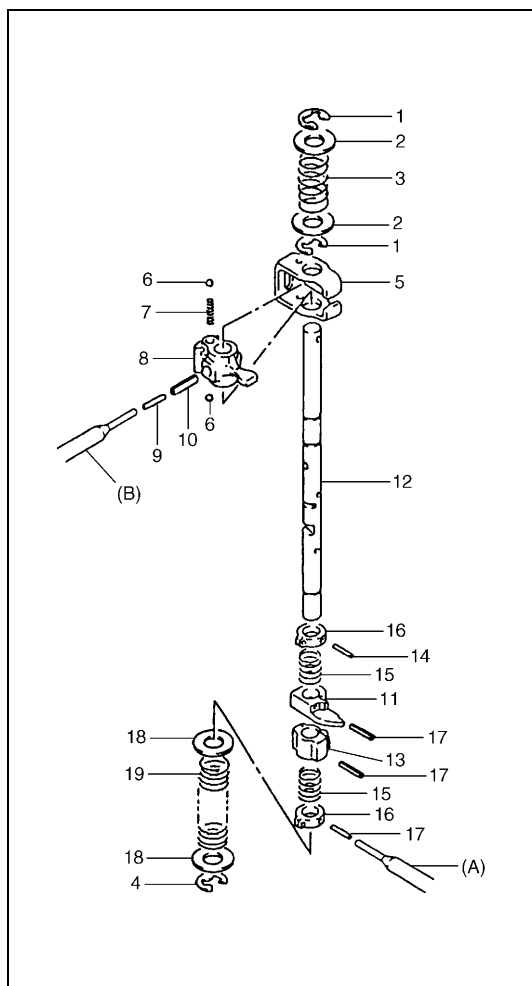
(A) : 09922-85811 (4.5 mm)

(B) : 09925-78210 (6.0 mm)

- 2) Clean all parts thoroughly, inspect them and replace with new ones as required.
- 3) Assemble component parts by reversing removal procedure.

**NOTE:**

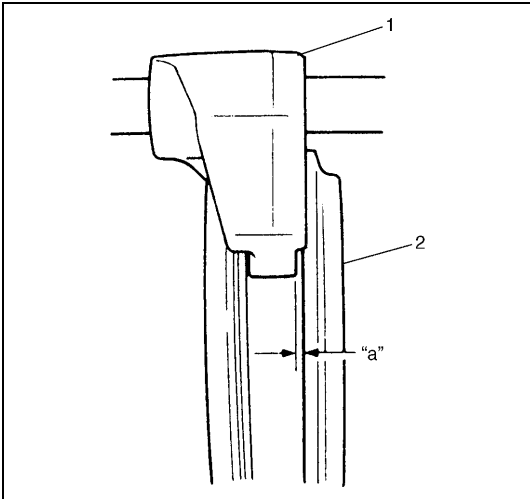
- When driving in spring pins, prevent shaft from being bent by supporting it with wood block.
- Assemble 5th & reverse gear shift cam by winding cam guide return spring, and then drive in spring pin.
- Locate low speed select spring (White-Lower position) and reverse select spring (Pink-Upper position) correctly.



1. E-ring	11. Gear shift No.1 cam
2. Thrust Washer	12. Gear shift select shaft
3. Reverse select spring	13. 5th/reverse gear shift cam
4. E-ring	14. Spring pin
5. Gear shift interlock plate	15. Cam guide return spring
6. Ball	16. 5th/reverse gear shift cam guide
7. Gear shift interlock spring	17. Spring pin
8. Gear shift select lever	18. Thrust washer
9. Spring pin	19. Low select spring
10. Spring pin	



High speed and low speed gear shift shafts



- Using feeler gauge, check clearance between fork (1) and sleeve (2) and replace those parts if it exceeds limit of 1.0 mm (0.039 in.).

NOTE:

For correct judgement of parts replacement, carefully inspect contact portion of fork and sleeve.

Clearance “a” between fork and sleeve  
 Service limit : 1.0 mm (0.039 in.)

- Insert each gear shift shaft into case and check that it moves smoothly. If it doesn’t, correct by using oilstone, reamer or the like.

- Disassemble component parts by using spring pin remover and hammer.

Special tool

(A) : 09922-85811 (4.5 mm)

- Assemble shift shafts as shown while making sure that component parts are in proper order.

NOTE:

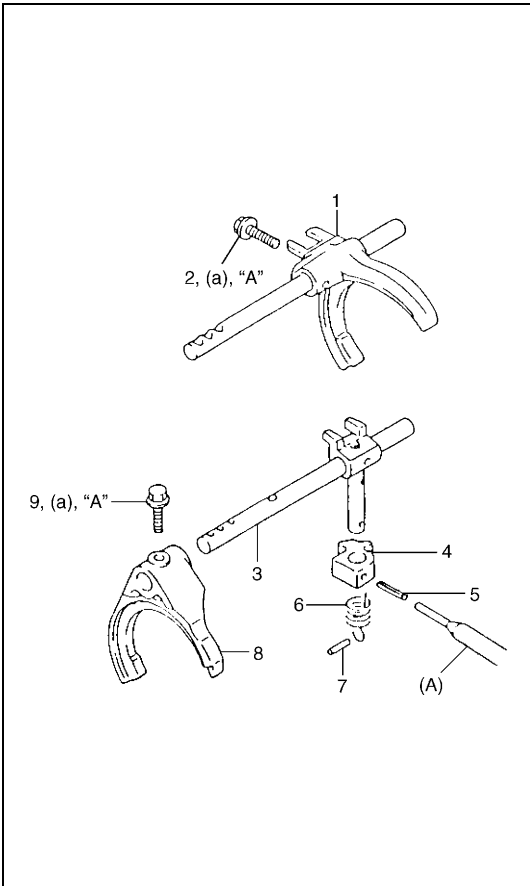
- Correct shaft surface by using oilstone, if any scratch or dent is found.
- Support shaft with wood blocks when driving in spring pins.
- Apply thread lock cement to shift fork bolts.

“A” : Cement 99000-32110

Tightening torque

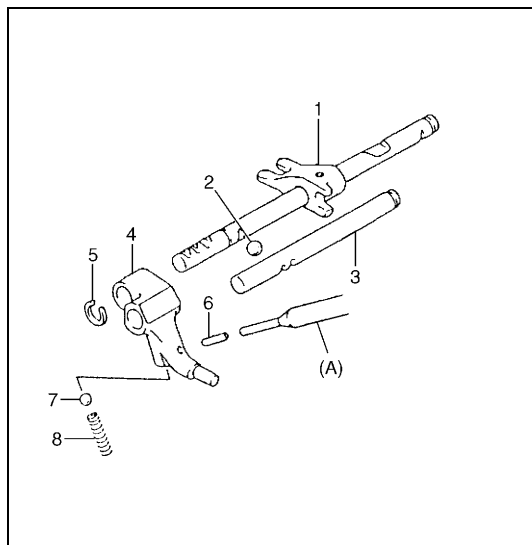
Shift fork bolts

(a) : 10 N·m (1.0 kg-m, 7.5 lb-ft)



1. High speed gear shift yoke assembly	6. No.2 cam return spring
2. Low/high speed fork bolt	7. Pin
3. Low speed gear shift yoke assembly	8. Low speed gear shift fork
4. Gear shift No.2 cam	9. Low/high speed fork bolt
5. Pin	

## 5th & rev gear shift shafts



- 1) Disassemble component parts by using spring pin remover and hammer.

### Special tool

(A) : 09922-85811 (4.5 mm)

- 2) Replace or correct parts as required and assemble shafts making sure that component parts are in proper order as shown.

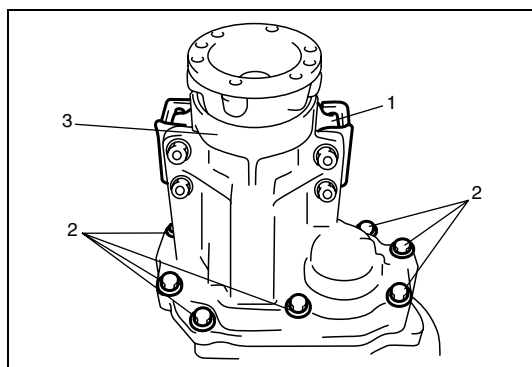
### NOTE:

**Install 2 steel balls in reverse gear shift arm without fail.**

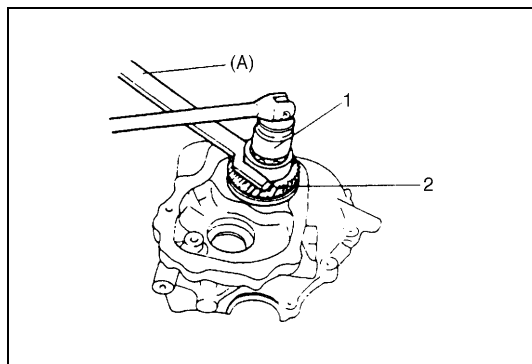
1. 5th & reverse gear shift yoke	5. Snap ring
2. Ball	6. Pin
3. 5th & reverse gear shift guide shaft	7. Ball
4. Reverse gear shift arm	8. Reverse gear shift arm spring

## Transfer assembly

### DISASSEMBLY



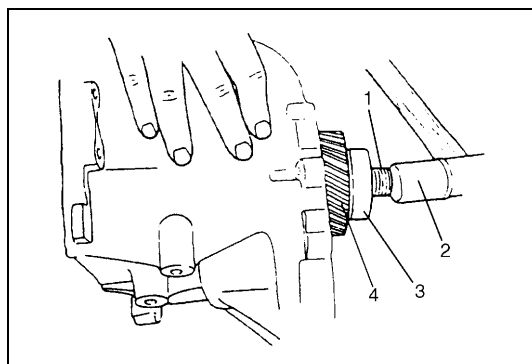
- 1) Remove rear mounting (1).
- 2) Remove output case bolts (2).
- 3) Remove output case (3).



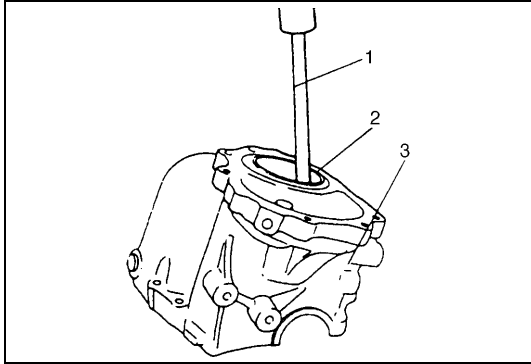
- 4) Using special tool, hold drive gear (2) securely and loosen output pinion nut (1).

### Special tool

(A) : 09927-76030

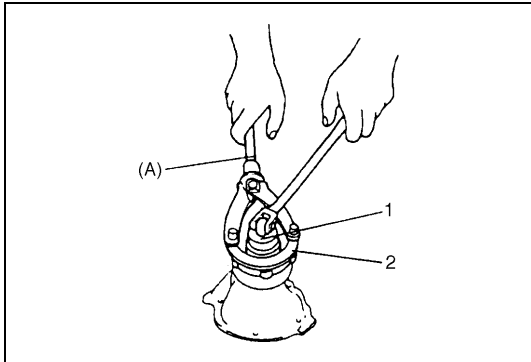


- 5) Drive out output pinion (1) with plastic hammer (2).  
At this time, drive gear bearing (3), drive gear (4) and pinion shaft gear bearing come off at the same time.



6) Drive pinion bearing outer races (2) out of rear case (3).

1. Bar (rod)

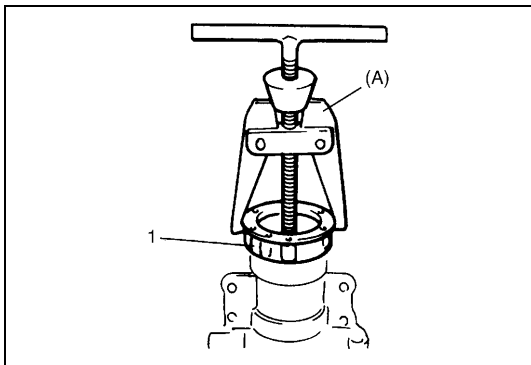


7) Unfasten caulking of output shaft nut and loosen it with flange (2) fixed as shown.

**Special tool**

**(A) : 09930-40113**

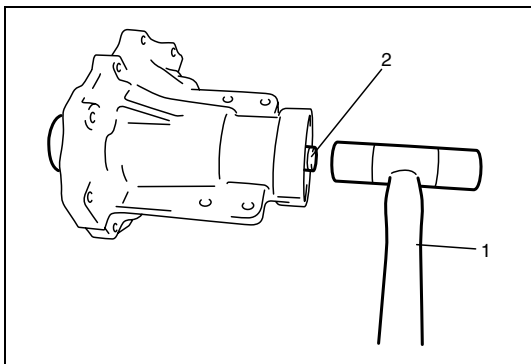
1. Box (30 mm)



8) Using special tool, remove output flange (1).

**Special tool**

**(A) : 09913-60910**



9) Using plastic hammer (1), drive out output shaft (2) with bearings.

### Pinion shaft

1) Remove shim(s) and then drive out bevel pinion front bearing (1) by using special tool.

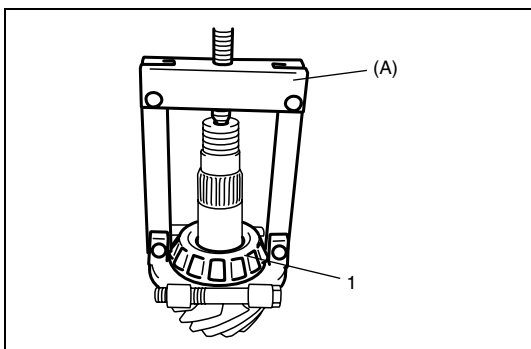
**Special tool**

**(A) : 09913-65810**

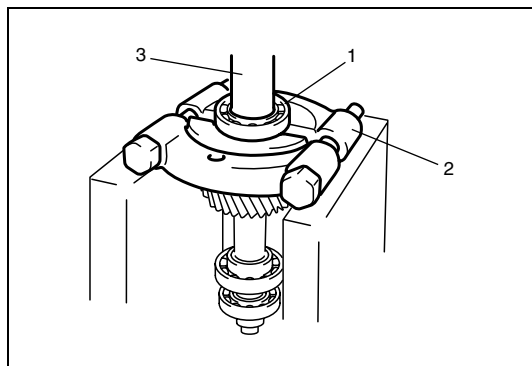
**NOTE:**

**Change removed bearing to new one.**

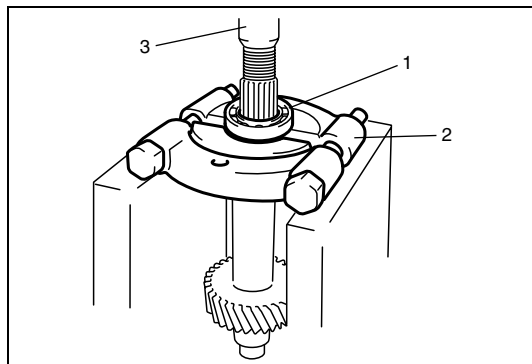
2) Remove shim(s) from pinion shaft.



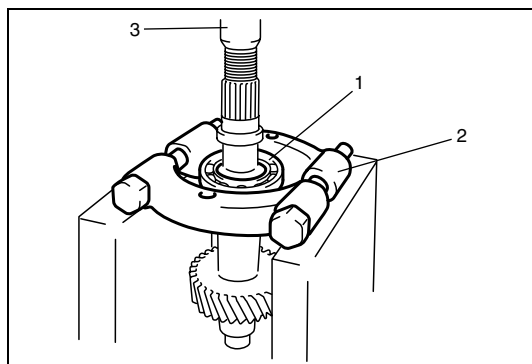
## Output shaft



- 1) Drive out No.3 bearing (1) by using puller (2), metal stick (3) and hydraulic press.

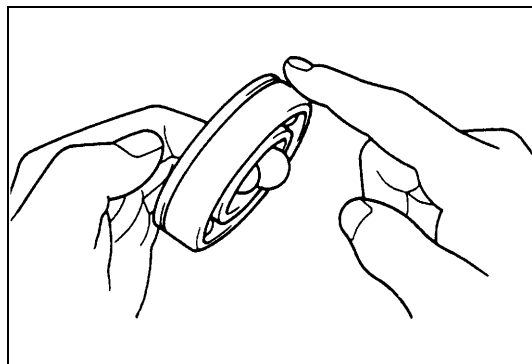


- 2) Drive out No.2 bearing (1) by using puller (2) and hydraulic press (3).



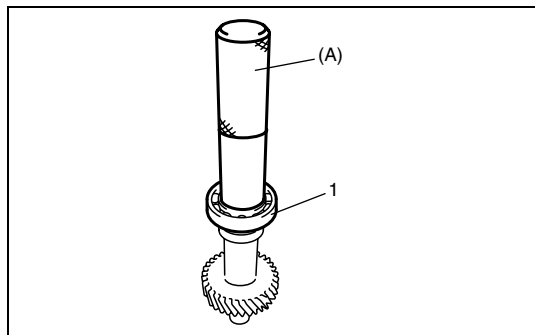
- 3) Drive out No.1 bearing (1) by using puller (2) and hydraulic press (3).

## INSPECTION



Check tooth surface of gear and rotation of bearing and replace with new one if necessary.

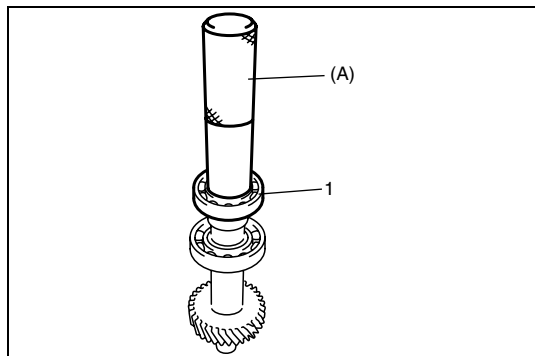
As long as no abnormal condition such as noise exists before removal, replacement is unnecessary.

**ASSEMBLY****Output shaft**

- 1) Drive in No.1 bearing (1) by using special tool and hammer.

**Special tool**

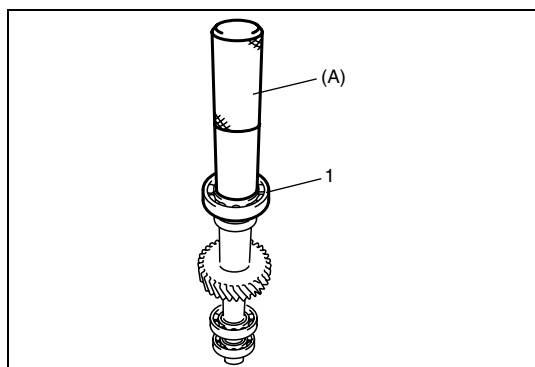
(A) : 09913-84510



- 2) Drive in No.2 bearing (1) by using special tool and hammer.

**Special tool**

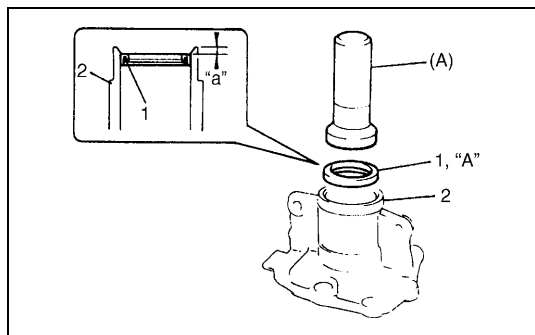
(A) : 09913-80112



- 3) Drive in No.3 bearing (1) by using special tool and hammer.

**Special tool**

(A) : 09913-80112

**Output case**

- 1) If oil seal is removed, install new oil seal (1) with grease applied to oil seal lip by using special tool.

“A” : Grease 99000-25010

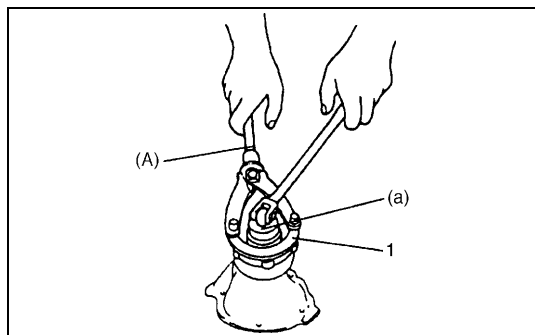
**Special tool**

(A) : 09913-75810

**Clearance**

“a” : 1.0 - 1.5 mm (0.04 - 0.06 in.)

2. Output case
----------------



- 2) Install output flange (1), washer and new nut.  
 3) Tighten nut to specified torque by using special tool and then caulk nut.

**Special tool**

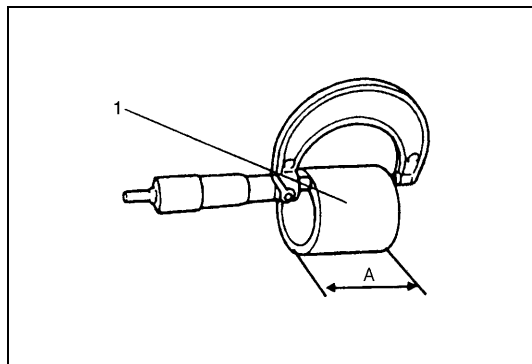
(A) : 09930-40113

**Tightening torque****Output flange nut**

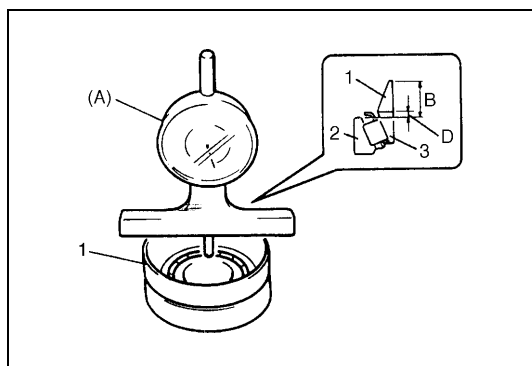
(a) : 90 N·m (9.0 kg-m, 65.0 lb-ft)

## ADJUSTMENT

### Bevel pinion bearing shim adjustment



- 1) Measure length A of drive pinion spacer (1).



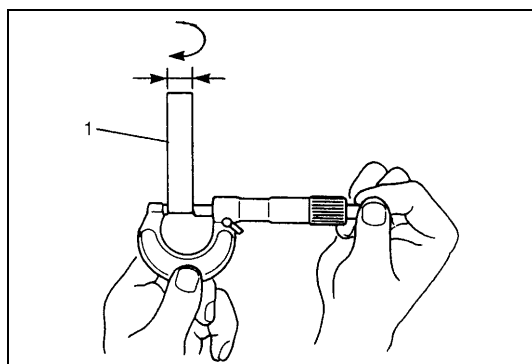
- 2) Measure level difference B between other outer race (1) plus outer race (3) and inner race (2) of bevel pinion bearing (at both front and rear).

Level difference at front bearing plus other outer race : B

Level difference at rear bearing plus other outer race : B'

#### Special tool

(A) : 09922-77241

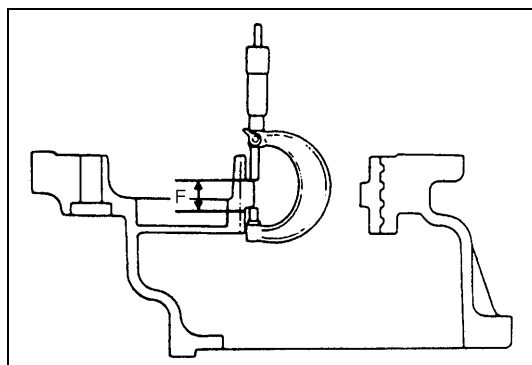


- 3) Measure length C of other outer race (1).

Level difference at front bearing :  $B - C = D$

Level difference at rear bearing :  $B' - C = D'$

$D + D' = E$



- 4) Measure dimension F of differential carrier.

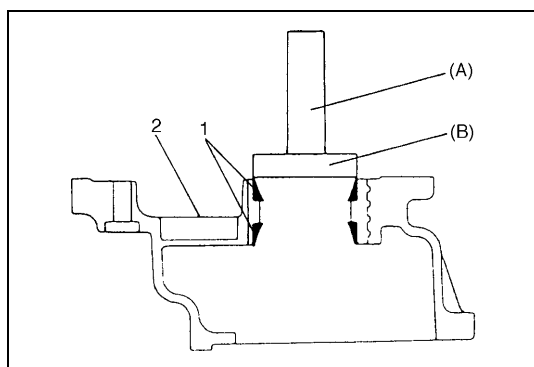
$E + F = G$

Measured level difference =  $G - A$

5) Using following table, select necessary shim(s).

UNIT (mm)

Shim to use Measured level difference	0.60	0.63	0.66	0.69	0.72	0.75	0.78	0.81	0.84	0.87	0.30
0.976 – 1.005	●										●
1.006 – 1.035		●									●
1.036 – 1.065			●								●
1.066 – 1.095				●							●
1.096 – 1.125					●						●
1.126 – 1.155						●					●
1.156 – 1.185							●				●
1.186 – 1.215								●			●
1.216 – 1.245									●		●
1.246 – 1.275										●	●
1.276 – 1.305	● ●										
1.306 – 1.335	●	●									
1.336 – 1.365	●		●								
1.366 – 1.395	●			●							
1.396 – 1.425	●				●						
1.426 – 1.455	●					●					
1.456 – 1.485	●						●				
1.486 – 1.515	●							●			
1.516 – 1.545	●								●		
1.546 – 1.575	●									●	
1.576 – 1.605		●								●	
1.606 – 1.635			●							●	
1.636 – 1.665				●						●	

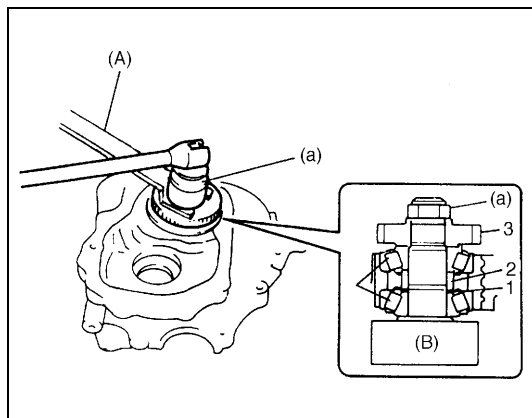


6) Press-fit bevel pinion bearing outer races (1) into rear case (2).

**Special tool**

**(A) : 09924-74510**

**(B) : 09951-16090**

**Bevel pinion shim (mounting distance)**

- 1) Place bearings, spacer (2), shim(s) (1) and drive gear (3) on bevel pinion dummy of special tool (Bevel pinion dummy set) and tighten bevel pinion nut to specified torque.  
Use new nut.

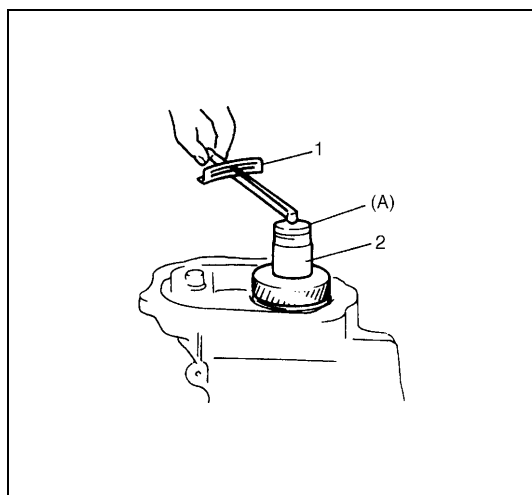
**Tightening torque****Bevel pinion nut**

(a) : 120 N·m (12.0 kg-m, 87.0 lb-ft)

**Special tool**

(A) : 09927-76030

(B) : 09922-77270



- 2) Using torque wrench (1), measure preload.

**Bevel pinion bearing preload**

Standard : 0.5 - 1.3 N·m (5 -13 kg-cm, 0.37 - 0.94 lb-ft)

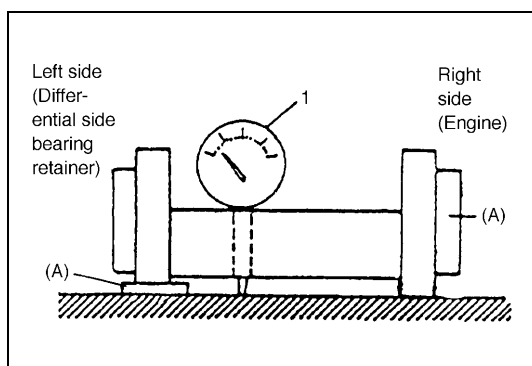
**Special tool**

(A) : 09915-24550

**NOTE:**

- Apply thin coat of gear oil to bearing before measurement.
- Also before measuring preload, turn taper bearing a few times to ensure its good fitting.

2. Box (30 mm)
----------------



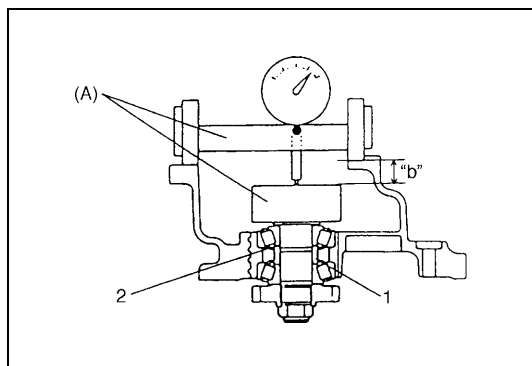
- 3) Place bevel pinion adjuster on surface plate as shown and set dial gauge (1) to "0".

**Special tool**

(A) : 09922-77270

**NOTE:**

As bearing size is different between right and left, use shim supplied in bevel pinion dummy set under smaller size bearing as shown.



- 4) Measure dimension "b" in figure by reading dial gauge.

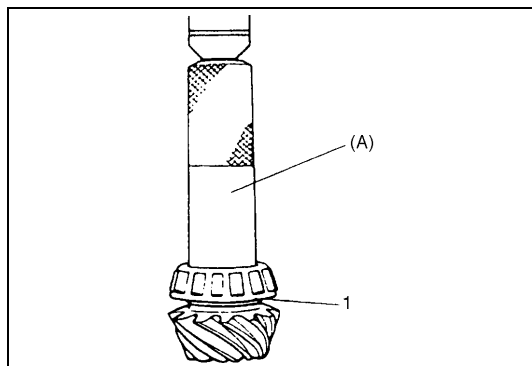
**Special tool**

(A) : 09922-77270

1. Drive pinion spacer
2. Bevel pinion bearing shim



[illegible]



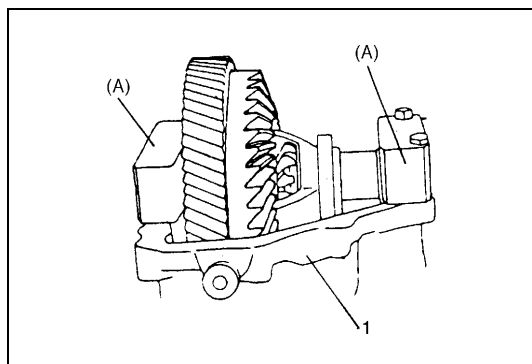
- 6) Place shim(s) on bevel pinion shaft and press-fit bevel pinion front bearing by using special tool.

**Special tool**

**(A) : 09913-84510**

1. Mounting distance adjusting shim

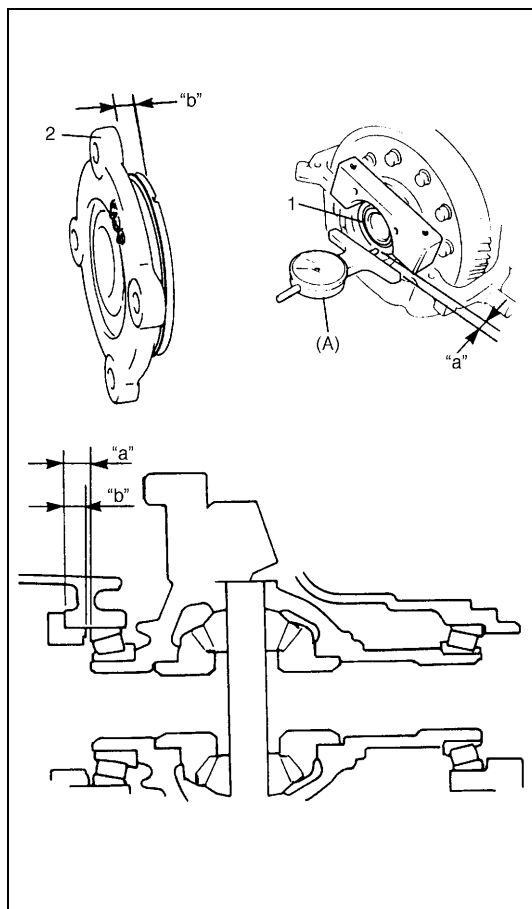
**Drive bevel gear backlash and side bearing preload**



- 1) Using special tool, install differential assembly into rear case (1).

**Special tool**

**(A) : 09927-56030**



- 2) Using depth gauge, measure depth "a" down to bearing outer race (1) and obtain difference with dimension "b" of bearing retainer (2) ; "a" – "b" = "c".

**Special tool**

**(A) : 09922-77241**

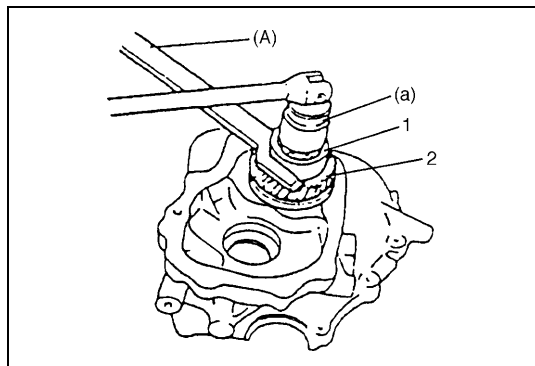
- 3) Calculate shim thickness to be inserted into differential side bearing.

$$\text{Shim thickness} = "c" + (0.085 \text{ to } 0.114 \text{ mm}) \\ (0.0033 \text{ to } 0.0045 \text{ in.})$$

- 4) Select shim(s) to fit within calculated value.

**Available differential side bearing shim thickness**

0.30 mm (0.012 in.)
0.87 mm (0.034 in.)
0.84 mm (0.033 in.)
0.81 mm (0.032 in.)
0.78 mm (0.031 in.)
0.75 mm (0.029 in.)
0.72 mm (0.028 in.)
0.69 mm (0.027 in.)
0.66 mm (0.026 in.)
0.63 mm (0.025 in.)
0.60 mm (0.024 in.)



- 5) Place bearings (1), spacer, shim(s) and drive gear (2) to rear case and tighten bevel pinion nut to specified torque.

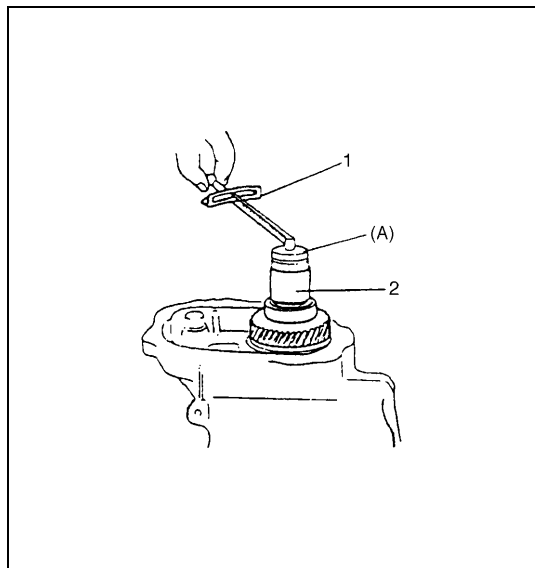
#### **Tightening torque**

##### **Bevel pinion nut**

(a) : 120 N·m (12.0 kg·m, 87.0 lb·ft)

##### **Special tool**

(A) : 09927-76030



- 6) Using torque wrench (1), measure bearing preload.

##### **Bevel pinion bearing preload**

Standard : 0.5 - 1.3 N·m (5 - 13 kg·cm, 0.37 - 0.94 lb·ft)

##### **Special tool**

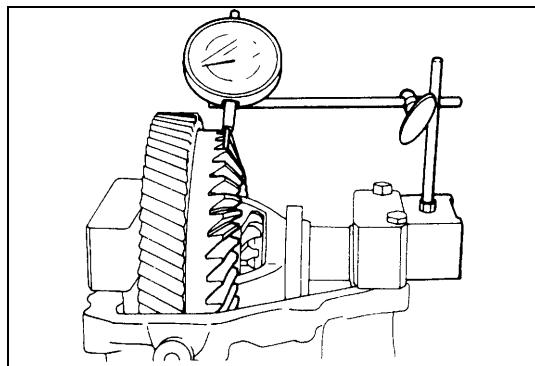
(A) : 09915-24550

#### **NOTE:**

- Apply thin coat of gear oil to bearing before measurement.
- Also before measuring preload, turn taper bearing a few times to ensure its good fitting.

2. Box (30 mm)

- 7) Caulk bevel pinion nut.



- 8) Adjust the driving bevel gear backlash by adding or taking off shims in bearing gap of the left and right cases (stopper) so as to obtain the specified value for the backlash.

- 9) To measure drive bevel gear backlash, set dial gauge at right angle to bevel gear tooth, fix drive bevel pinion and rear dial gauge while moving bevel gear.

##### **Drive bevel gear backlash**

0.10 - 0.18 mm (0.004 - 0.007 in.)

- 10) With bevel gear installed, measure starting torque by using differential preload adjusting tool. If bevel pinion starting torque and side bearing starting torque with bevel gear installed (bevel pinion bearing + side bearing preload) is within standard value, side bearing preload is satisfactory.

##### **Side bearing preload**

Standard : (Measured bevel pinion preload) + (0.3 - 0.5 N·m (3 - 5 kg·cm, 0.217 - 0.361 lb·ft))

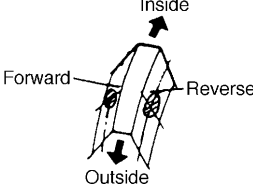
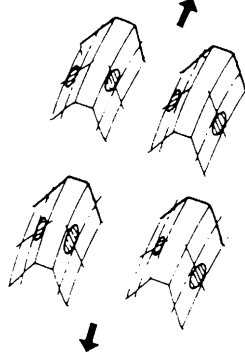
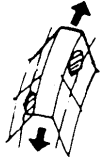
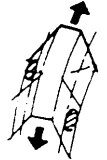
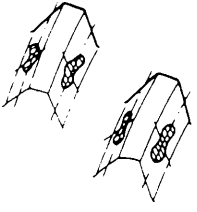
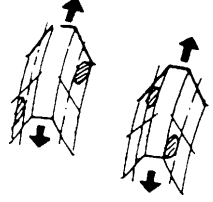
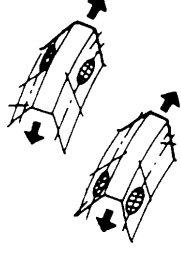
## INSPECTION

### Gear tooth surface contact

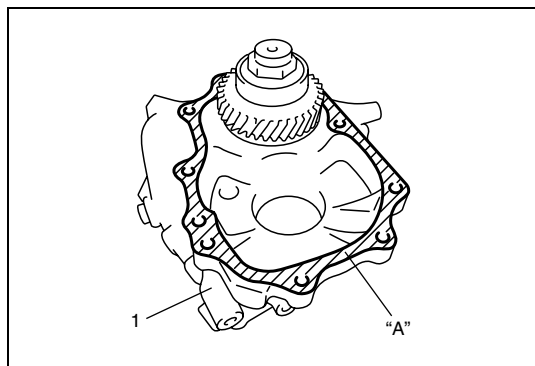
Upon completion of assembly, apply red lead paste to tooth surface of drive bevel gear and turn it by hand to check its contact with drive bevel pinion. Adjust if check result is not satisfactory.

#### NOTE:

Apply red lead paste all around bevel gear but not so much as to become sticky.

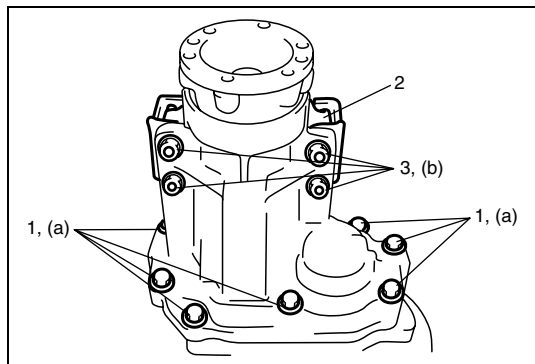
	Tooth surface contact	Possible cause and correction		Tooth surface contact	Possible cause and correction
Correct		Both forward and reverse contacts should occur a little toward inside from the center.	Defect in parts (s)		When tooth contacts occur as shown at the left, gear itself is defective. Correction : Replace drive bevel gear and drive bevel pinion as a set.
		Forward contact occurs toward outside and reverse contact toward inside from the center and both at higher position. In such case, bevel pinion shim is too thin. Correction : Adjust shim thickness by increasing it.			
		Forward contact occurs toward inside and reverse contact toward outside from the center and both at lower position. In such case, bevel pinion shim is too thick. Correction : Adjust shim thickness by reducing it.			When contact is not oval in shape, gear itself is defective. Abnormal contact is also caused by nick in tooth surface or faulty condition of differential case at its drive bevel gear mounting part. Correction : Replace drive bevel gear and drive bevel pinion as a set and differential gear case as well, if found defective.
Defect in parts (s)		When tooth contacts occur as shown at the left, proper rear case offset (18 mm) is not obtained. Correction : Replace rear case (rear case, right case and left case assembly).			
		When tooth contacts are deviated toward inside or outside of gear, possible causes are as follows. <ul style="list-style-type: none"> <li>• Drive bevel gear or drive bevel pinion defective.</li> <li>• Poor squareness of rear case.</li> <li>• Rear case surface where gear is installed is defective.</li> </ul> Correction : Replace defective part as an assembly.			

## Transfer



- 1) Clean mating surface to both rear case (1) and output case, coat mating surface of rear case with sealant evenly then mate it with output case.

**“A” : Sealant 99000-31230**



- 2) Tighten output case bolts (1) to specified torque.

### Tightening torque

#### Output case bolts

**(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)**

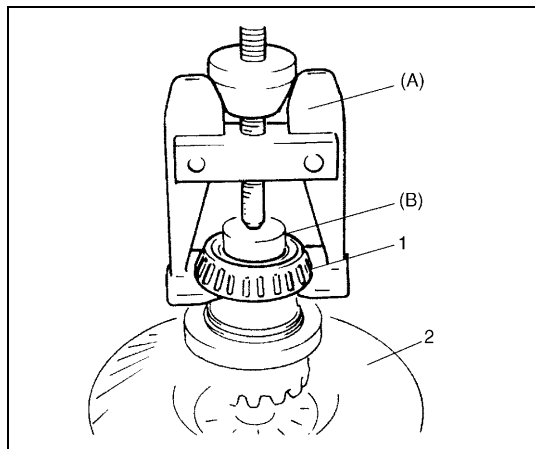
- 3) Install rear mounting (2) and tighten nuts (3) to specified torque.

#### Rear mounting nuts

**(b) : 25 N·m (2.5 kg-m, 18.0 lb-ft)**

## Differential assembly

### DISASSEMBLY



- 1) Using special tool, remove R bearing (1).

#### Special tool

**(A) : 09913-61510**

**(B) : 09925-88210**

#### NOTE:

**Change removed bearing to new one.**

2. Differential case

- 2) Remove L bearing by using puller while supporting its center shaft as described above.

- 3) Support differential case with soft jawed vise and remove final gear bolts then take out final gear (and bevel gear for 4WD model).

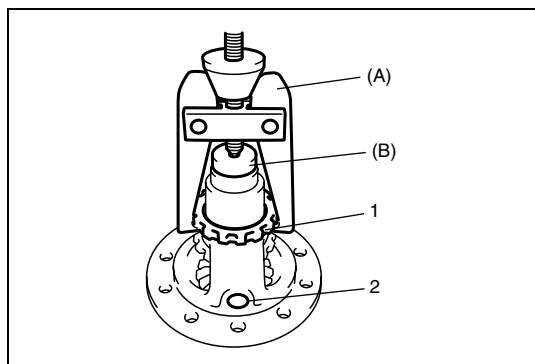
- 4) Using special tools, remove sensor rotor (1).

#### Special tool

**(A) : 09913-60910**

**(B) : 09925-88210**

- 5) Drive out differential side pinion shaft (2) and then disassemble components parts.



## ADJUSTMENT AND REASSEMBLY

Judging from abnormality noted before disassembly and what is found through visual check of component parts after disassembly, prepare replacing parts and proceed to reassembly. Make sure that all parts are clean.

- 1) Assemble differential gear and measure thrust play of differential gear as follows.

### Special tool

(A) : 09900-20606

(B) : 09900-20701

### Differential gear thrust play

0.05 - 0.33 mm (0.002 - 0.013 in.)

### Left side

- Hold differential assembly with soft jawed vise and apply measuring tip of dial gauge to top surface of gear (2).
- Using 2 screwdrivers, (1), move gear up and down and read movement of dial gauge pointer.

### Right side

- Using similar procedure to the above, set dial gauge tip to gear (2) shoulder.
- Move gear up and down by hand and read dial gauge.

- 2) If thrust play is out of specification, select suitable thrust washer from among following available size, install it and check again that specified gear play is obtained.

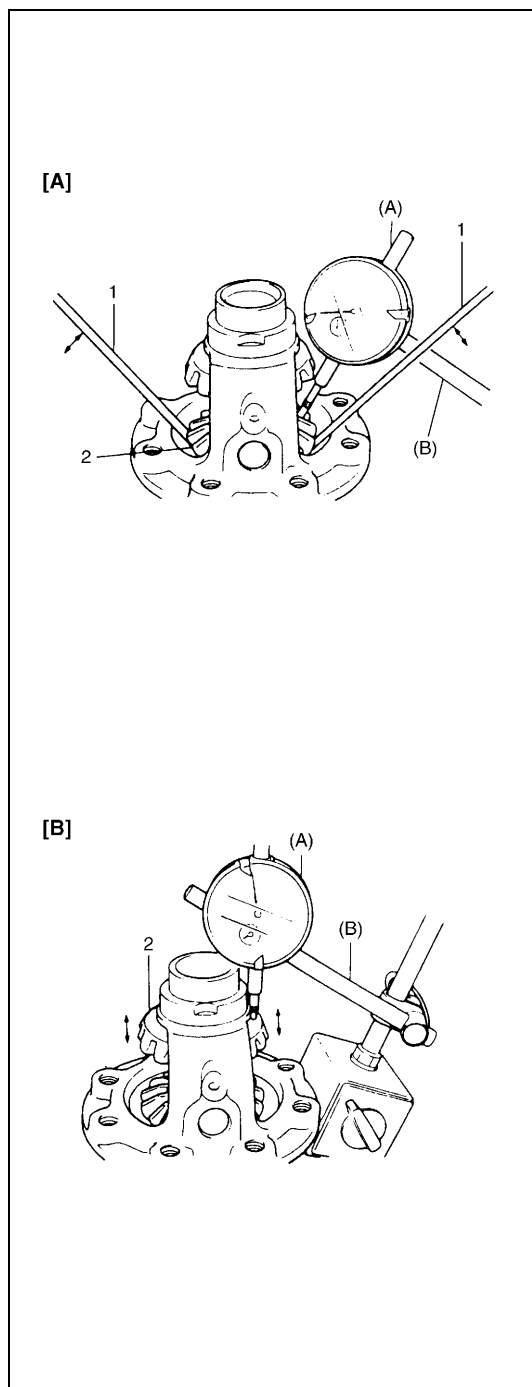
### Available differential gear thrust washer thickness

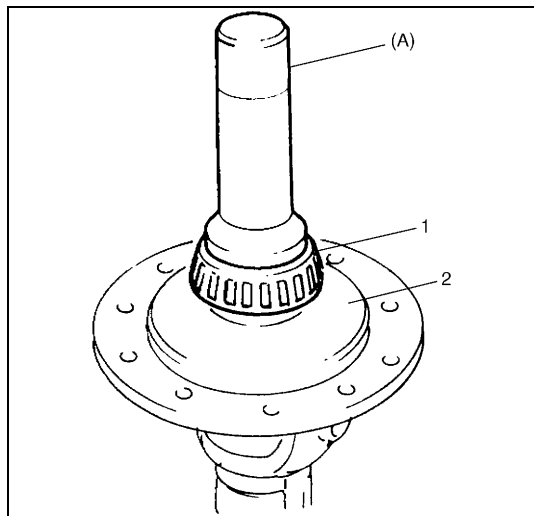
0.85 mm (0.033 in.)
0.9 mm (0.035 in.)
0.95 mm (0.037 in.)
1.0 mm (0.039 in.)
1.05 mm (0.041 in.)
1.1 mm (0.043 in.)
1.15 mm (0.045 in.)

- 3) Drive in spring pin from right side till it is flush with differential case surface (for 2WD model).

[A] : Left side

[B] : Right side



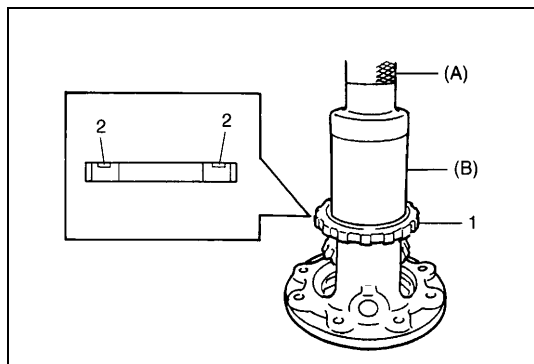


- 4) Press-fit L bearing (1) by using special tool and copper hammer.

**Special tool**

(A) : 09951-76010

2. Differential case
----------------------

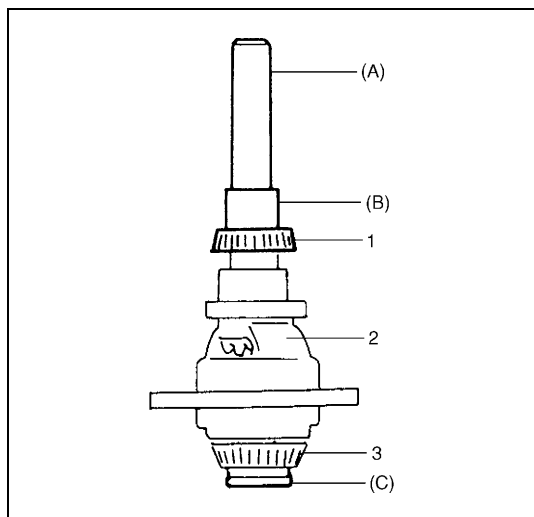


- 5) Press-fit new sensor rotor (1) with groove (2) side upward as shown by using special tools and copper hammer.

**Special tool**

(A) : 09913-75510

(B) : 09944-78210



- 6) Press-fit R bearing (1) by using special tools and copper hammer.

**Special tool**

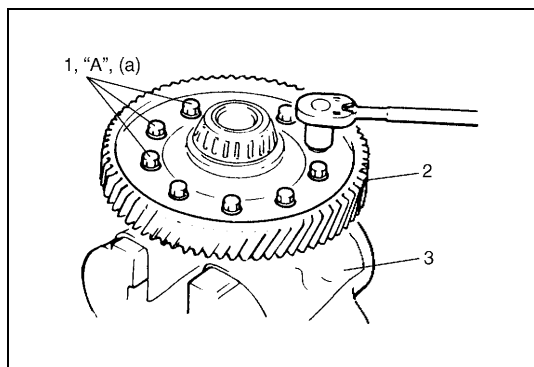
(A) : 09924-74510

(B) : 09951-16060

(C) : 09913-85230

2. Differential case
----------------------

3. Differential side L bearing
--------------------------------



- 7) Hold differential assembly with soft jawed vise (3), install final gear (2) and bevel gear (for 4WD model) and then tighten 10 bolts (1) to specified torque.

**CAUTION:**

Use of any other bolts than specified ones is prohibited.

“A” : Cement 99000-32110

**Tightening torque**

Final gear bolts (for 2WD model)

(a) : 90 N·m (9.0 kg·m, 65.0 lb·ft)

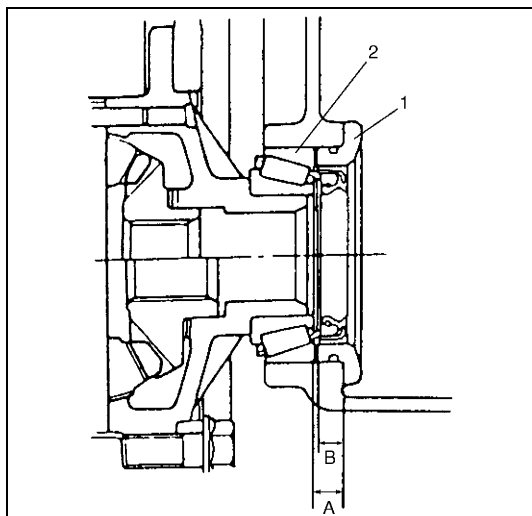
Final gear bolts (for 4WD model)

(a) : 73 N·m (7.3 kg·m, 53.0 lb·ft)

## Assembling Unit

### Differential to left case (for 2WD model)

- 1) Install differential assembly into right case.
- 2) Measure clearance "A" (between differential side face and side bearing outer race (2)) and "B" (bearing retainer (1)).
- 3) Select the shim referring to the following table.

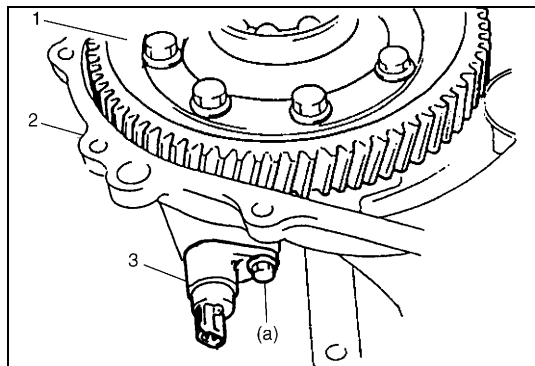


Clearance A – B (mm)	Thickness of bearing shim to be installed (mm)
0.636 – 0.665	0.75
0.666 – 0.695	0.78
0.696 – 0.725	0.81
0.726 – 0.755	0.84
0.756 – 0.785	0.87
0.786 – 0.815	0.90
0.816 – 0.845	0.93
0.846 – 0.875	0.96
0.876 – 0.905	0.99
0.906 – 0.935	1.02
0.936 – 0.965	1.05
0.966 – 0.995	1.08
0.996 – 1.025	1.11
1.026 – 1.055	1.14
1.056 – 1.085	1.17
1.086 – 1.115	1.20
1.116 – 1.145	1.23
1.146 – 1.175	1.26
1.176 – 1.205	1.29
1.206 – 1.235	1.32
1.236 – 1.265	1.35
1.266 – 1.295	1.38
1.296 – 1.325	1.41

### Available differential bearing shim thickness

0.3 mm (0.011 in.)
0.6 mm (0.023 in.)
0.63 mm (0.024 in.)
0.66 mm (0.025 in.)
0.69 mm (0.027 in.)
0.72 mm (0.028 in.)
0.75 mm (0.029 in.)
0.78 mm (0.030 in.)
0.81 mm (0.031 in.)
0.84 mm (0.033 in.)
0.87 mm (0.034 in.)





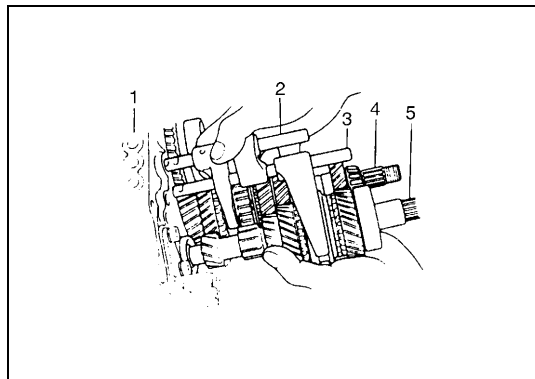
- 4) Apply oil to O-ring and insert VSS (3), then tighten bolt.

#### Tightening torque

VSS bolt (a) : 5.5 N·m (0.55 kg-m, 4.0 lb-ft)

1. Differential assembly
2. Transaxle right case

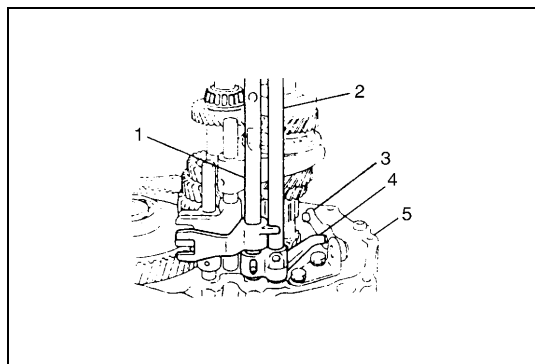
#### Left case



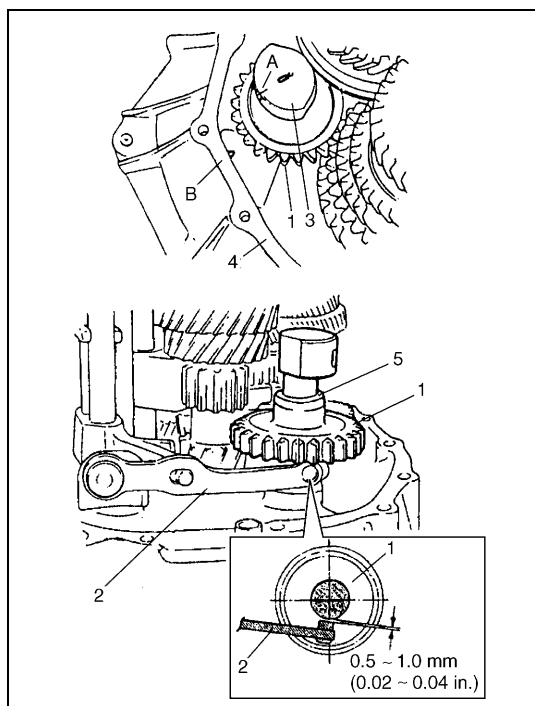
- 1) Join input shaft (5), countershaft (4), low speed gear shift shaft (2) and high speed gear shift shaft (3) assemblies all together, then install them into right case (1) so as not to damage oil seal by input shaft spline.

#### NOTE:

- Input shaft R bearing on shaft can be installed into right case by tapping shaft with plastic hammer.
- Make sure that counter shaft is engaged with final gear while installing.



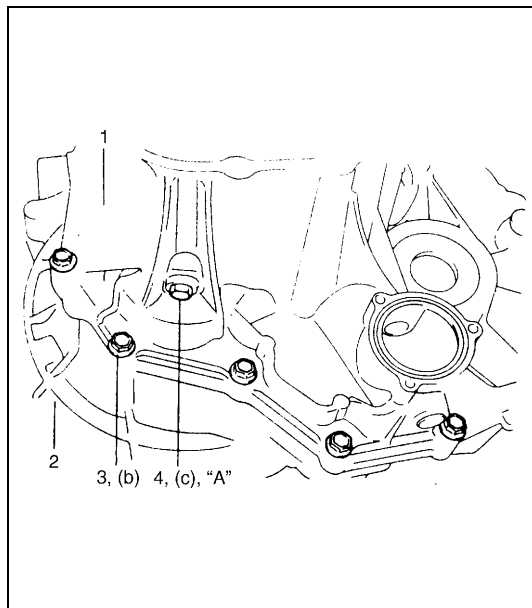
- 2) Install 5th & reverse gear shift shaft (1) with 5th & reverse gear shift guide shaft (2) into right case (5). Reverse gear shift arm (4) has to be joined with reverse gear shift lever (3) at the same time.



- 3) Make reverse idler gear (1) with reverse gear shift lever (2), insert reverse gear shaft (3) into case (4) through idler gear and then align A in shaft with B in case.

#### NOTE:

- Make sure that washer (5) has been installed in shaft at above the gear.
- Confirm that reverse gear shift lever end has clearance 1 mm (0.04 in.) to idler gear groove.



- 4) Clean mating surfaces of both right and left cases, coat mating surface of left case (1) with sealant evenly then mate it with right case (2).

**Sealant 99000-31230**

- 5) Tighten case bolts (3) from outside to specified torque.

**Tightening torque**

**Transaxle case bolts**

**(b) : 23 N·m (2.3 kg-m, 17.0 lb-ft)**

- 6) Install reverse shaft bolt (4), to which thread lock cement has been applied, with aluminum washer and tighten it.

**"A" : Cement 99000-32110**

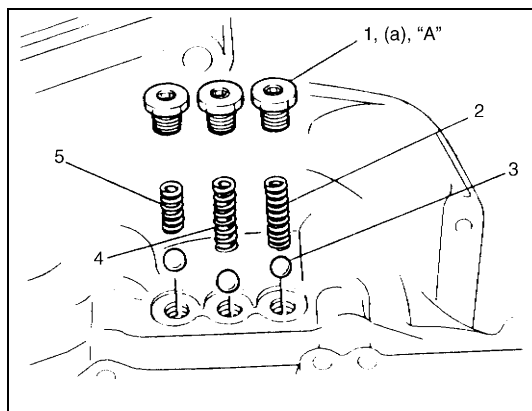
**Tightening torque**

**Reverse shaft bolt**

**(c) : 23 N·m (2.3 kg-m, 17.0 lb-ft)**

- 7) Install another case bolts from clutch housing side and tighten them to specification.

- 8) Check locating springs for deterioration and replace with new ones as necessary.



Locating spring free length	Standard	Service limit
Low speed (2)	53.1 mm (2.091 in.)	50.5 mm (1.988 in.)
High speed (4)	45.9 mm (1.807 in.)	44.0 mm (1.732 in.)
5th & reverse (5)	29.9 mm (1.777 in.)	28.5 mm (1.122 in.)

- 9) Install steel ball (3) and locating spring for respective gear shift shaft and tighten with bolt (1) to which sealant has been applied.

**"A" : Sealant 99000-31230**

**Tightening torque**

**Gear shift locating bolts**

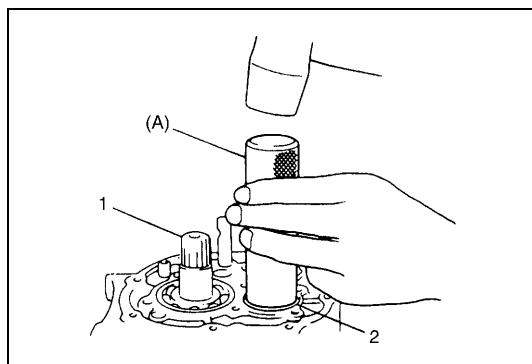
**(a) : 13 N·m (1.3 kg-m, 9.5 lb-ft)**

## Fifth gears

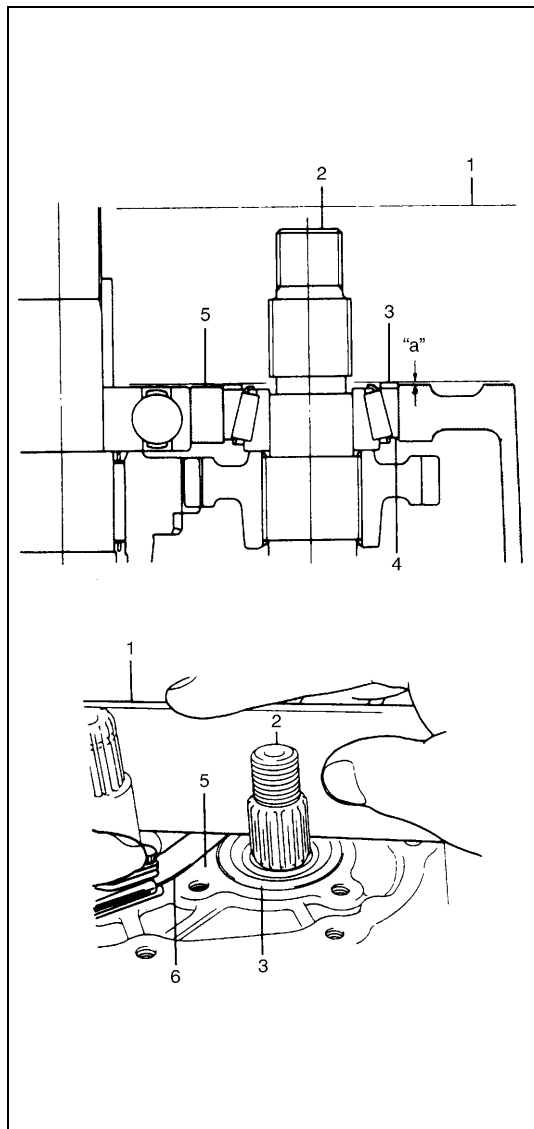
- 1) To seat countershaft L bearing cup (2) to bearing cone, tap cup by using special tool and plastic hammer.

**Special tool**

**(A) : 09913-84510**



1. Input shaft



- 2) Put a shim (3) on bearing cup (4) provisionally, place straight edge (1) over it and compress it by hand through straight edge, and then measure "a" (Clearance between case surface (5) and straight edge) by using feeler gauge (6).

#### Clearance between case surface and straight edge

"a" : 0.08 – 0.12 mm (0.0032 – 0.0047 in.)

- 3) By repeating above step, select a suitable shim which adjusts clearance "a" to specification and put it on bearing cup.

#### NOTE:

Insert 0.1 mm (0.004 in.) feeler to know whether or not a shim fulfills specification quickly.

#### Available countershaft 5th gear shim thickness

0.55 mm (0.021 in.)
0.6 mm (0.023 in.)
0.65 mm (0.025 in.)
0.7 mm (0.027 in.)
0.75 mm (0.029 in.)
0.8 mm (0.031 in.)
0.85 mm (0.033 in.)
0.9 mm (0.035 in.)
0.95 mm (0.037 in.)
1.0 mm (0.039 in.)
1.05 mm (0.041 in.)
1.1 mm (0.043 in.)

2. Counter shaft

- 4) Place left case plate (2) inserting its end in groove of shift guide shaft (4) and then tighten bolts (1) to which thread lock cement has been applied.

#### NOTE:

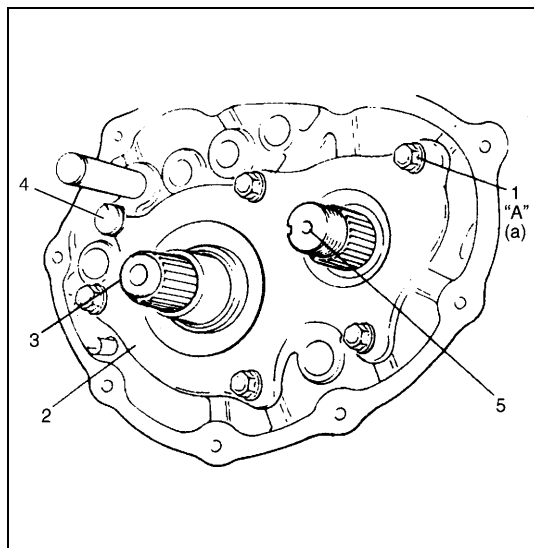
After tightening bolts, make sure that countershaft can be rotated by hand feeling certain load.

"A" : Cement 99000-32110

#### Tightening torque

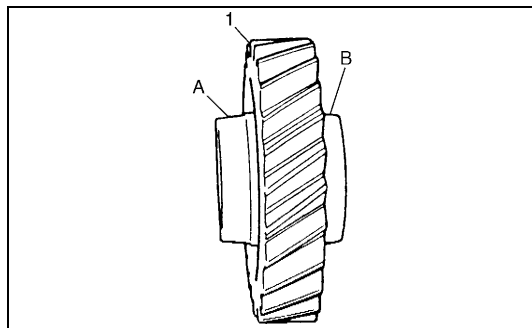
##### Left case plate bolts

(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)



3. Input shaft

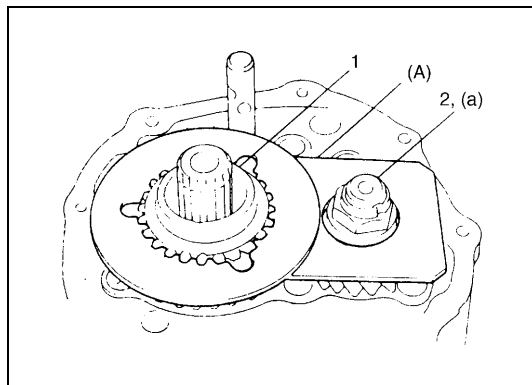
5. Counter shaft



- 5) Install countershaft 5th gear (1) to countershaft facing machined boss A inward.

A. Machined boss (Inside)
---------------------------

B. No machining (Outside)
---------------------------



- 6) Install needle bearing to input shaft, apply oil then install input shaft 5th gear (1) and special tool to stop shaft rotation.

### Special tool

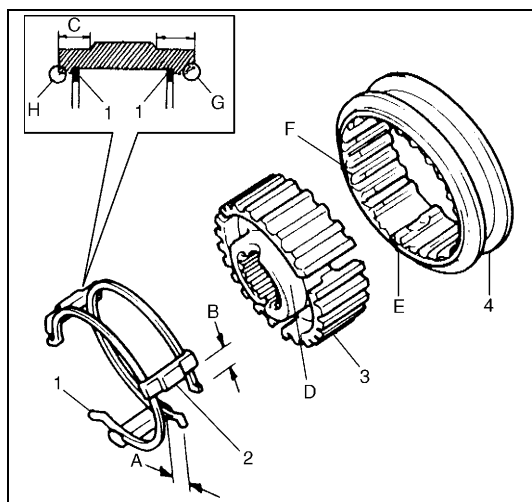
(A) : 09927-76060

- 7) Tighten new countershaft nut (2) to specified torque and caulk countershaft nut (2) securely.

### Tightening torque

#### Countershaft nut

(a) : 70 N·m (7.0 kg-m, 51.0 lb-ft)



- 8) Assemble 5th speed synchronizer sleeve (4) and hub (3) with keys (2) and springs (1).

### NOTE:

Short side C in keys, long boss D in hub and chamfered spline F in sleeve should face inward (5th gear side).

### Synchronizer key installation position

: A = B

C : Short side (Inward)
-------------------------

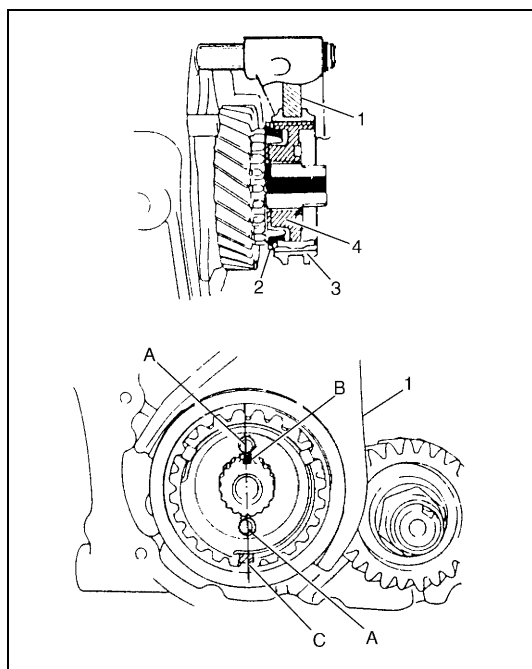
D : Long boss (Inward)
------------------------

E : Key way
-------------

F : Chamfered spline (Inward)
-------------------------------

G : Cut
---------

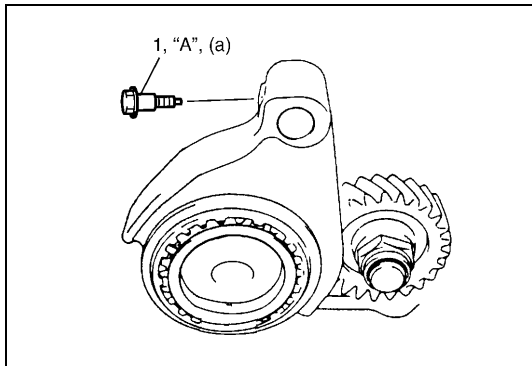
H : Non cut side (Inward)
---------------------------



- 9) Install synchronizer ring (2) to input shaft 5th gear.  
 10) Fit 5th gear shift fork (1) to sleeve (3) & hub (4) assembly and install them into input shaft, gear shift shaft at once aligning hub depression A, shaft mark B and synchronizer key C.

### NOTE:

Long boss of hub faces inward (gear side).



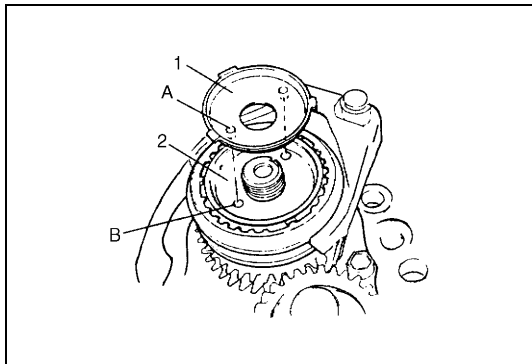
- 11) Tighten shift fork shaft bolt (1) to which thread lock cement has been applied.

**“A” : Cement 99000-32110**

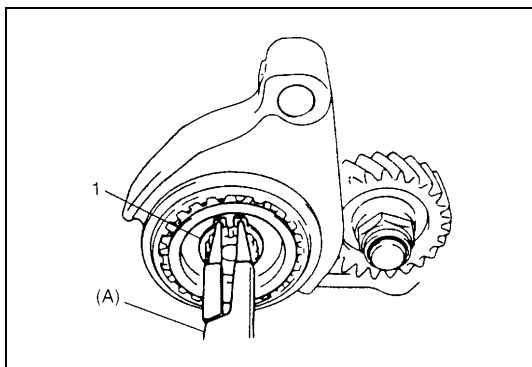
**Tightening torque**

**Shift fork bolt**

**(a) : 10 N·m (1.0 kg-m, 7.5 lb-ft)**



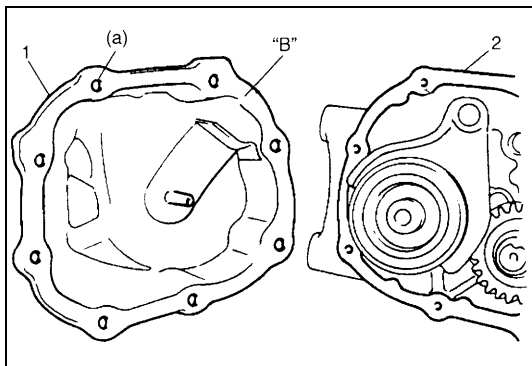
- 12) Install 5th synchronizer hub plate (1) to synchronizer hub (2) by positioning it so that its lugs A fit into their depression B in synchronizer hub.



- 13) Using special tool, install circlip (1).

**Special tool**

**(A) : 09900-06107**

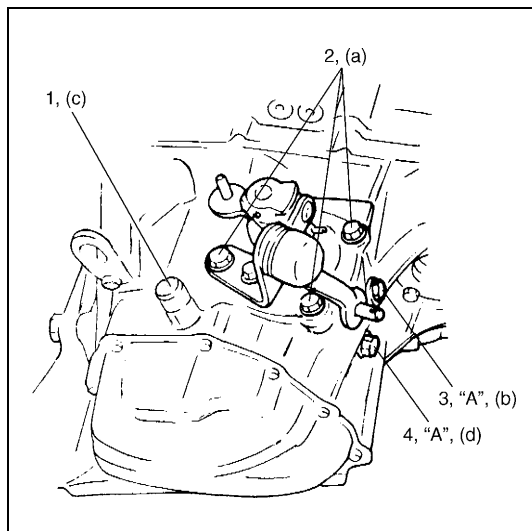


- 14) Clean mating surface of both left case (2) and side cover (1), coat mating surface with sealant evenly, mate it with left case and then tighten with bolts.

**“B” : Sealant 99000-31230**

**Tightening torque**

**Side cover bolts (a) : 10 N·m (1.0 kg-m, 7.5 lb-ft)**



## Gear shift and select shaft assembly

- 1) Clean mating surface of guide case.
- 2) Install gear shift and select shaft assembly with new gasket into transaxle.
- 3) Place breather hose bracket and tighten it together with gear shift guide case bolts (2) to specified torque.

### Tightening torque

#### Gear shift guide case bolts

(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

- 4) Install washer and gear shift interlock bolt (3) to which thread lock cement has been applied and then tighten it to specified torque.

**“A” : Cement 99000-32110**

### Tightening torque

#### Gear shift interlock bolt

(b) : 50 N·m (5.0 kg-m, 36.5 lb-ft)

- 5) Install washer and 5th to reverse interlock guide bolt (4) to which thread lock cement has been applied and then tighten it to specified torque.

**“A” : Cement 99000-32110**

### Tightening torque

#### 5th to reverse interlock guide bolt

(d) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

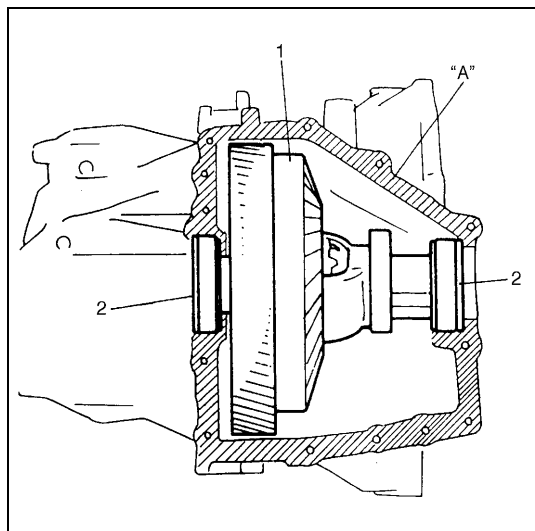
- 6) Tighten backup lamp switch (1) to specified torque.

### Tightening torque

#### Backup lamp switch

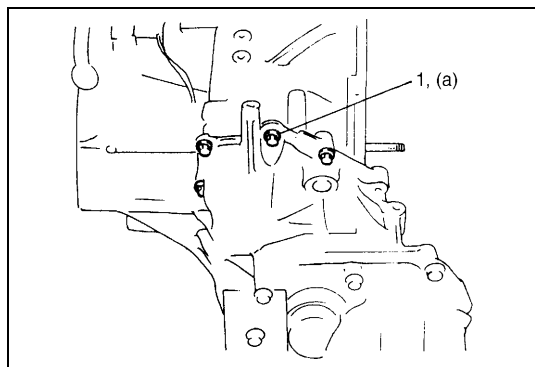
(c) : 20 N·m (2.0 kg-m, 14.5 lb-ft)

- 7) Check input shaft for rotation in each gear position.
- 8) Also confirm function of backup lamp switch in reverse position by using ohmmeter.

**Installation of transfer & differential (for 4WD model)**

- 1) Install differential assembly (1) and shim(s) (2) into transaxle case.
- 2) Clean mating surfaces of both transaxle case and rear case, coat mating surface of transaxle case with sealant evenly then mate it with rear case.

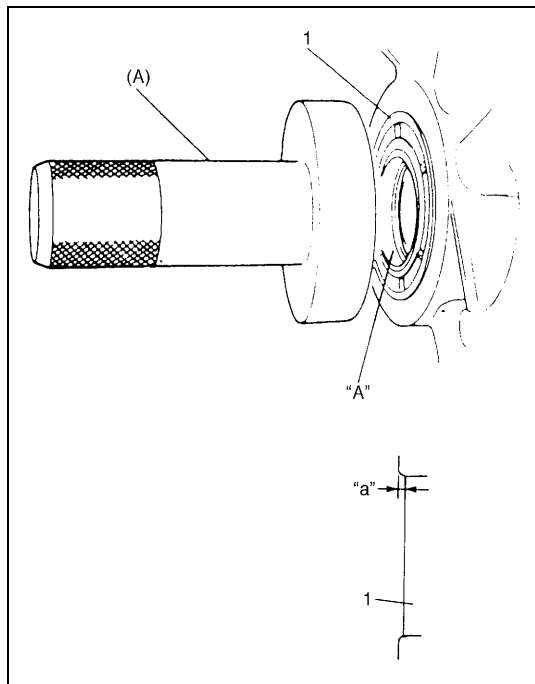
**"A" : Sealant 99000-31230**



- 3) Tighten rear case bolts (1) to specified torque.

**Tightening torque****Rear case bolts**

**(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)**



- 4) Install differential side oil seals (1) by using special tool and hammer, and then apply grease to its lip.

**NOTE:**

**Face oil seal spring side inward.**

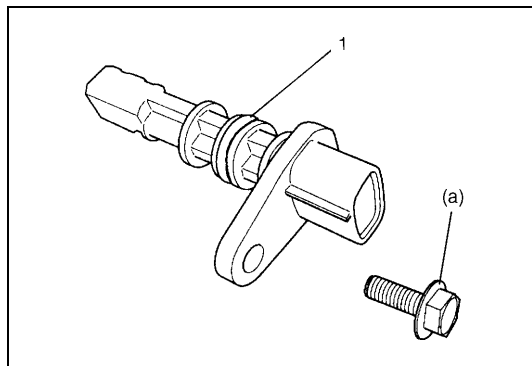
**Level difference between oil seal and case**

**"a" : 1.0 – 1.5 mm (0.04 - 0.06 in.)**

**Special tool**

**(A) : 09913-75810**

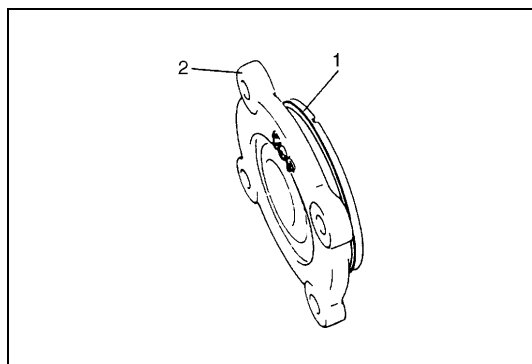
**"A" : Grease 99000-25010**



- 5) Check O-ring (1) and VSS surface for their flawlessness, apply oil to O-ring and then install VSS to transaxle.

**Tightening torque**

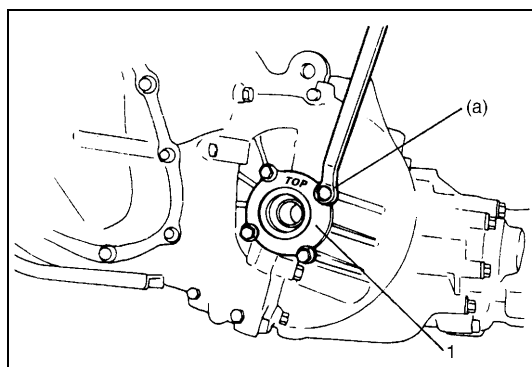
**VSS bolt (a) : 5.5 N·m (0.55 kg-m, 4.0 lb-ft)**



- 6) Check side bearing retainer O-ring (1) for flawlessness, apply oil to O-ring and then install to transaxle.

**NOTE:**

**Install side bearing retainer (2) with its “TOP” mark facing upward.**



- 7) Tighten side bearing retainer bolts to specified torque.

**Tightening torque**

**Side bearing retainer bolts (a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)**

1. Side bearing retainer



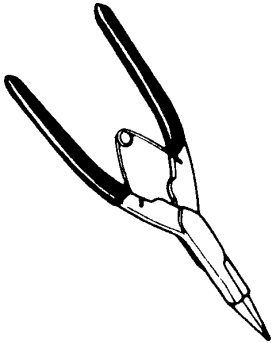
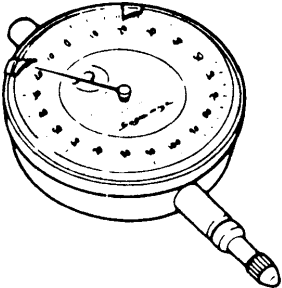
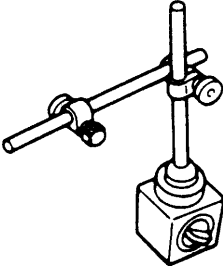
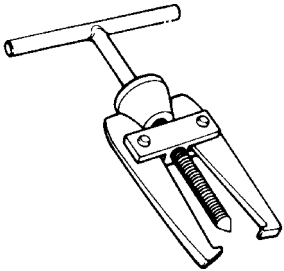
## Tightening Torque Specification

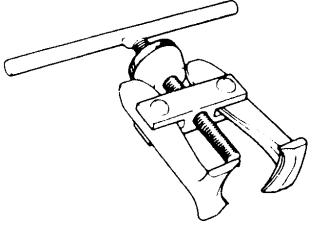
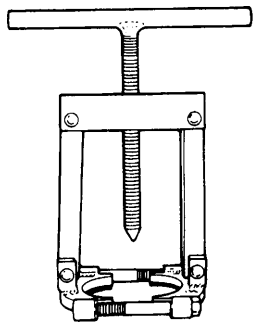
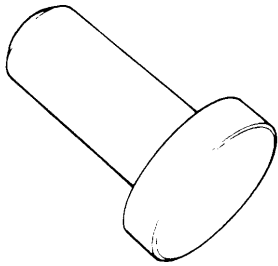
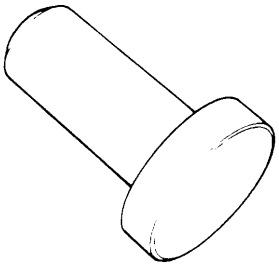
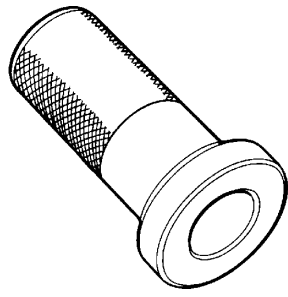
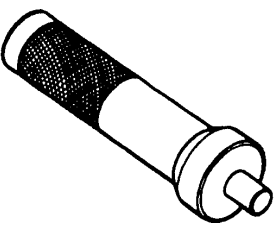
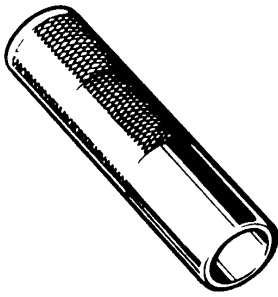
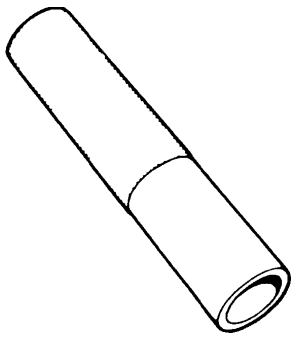
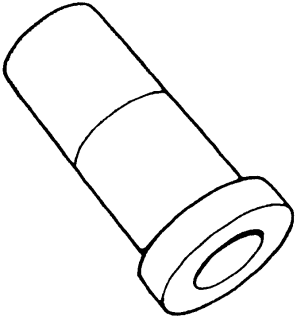
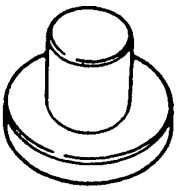
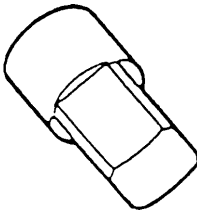
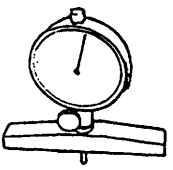
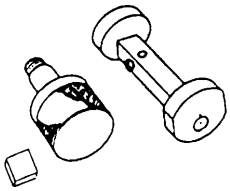
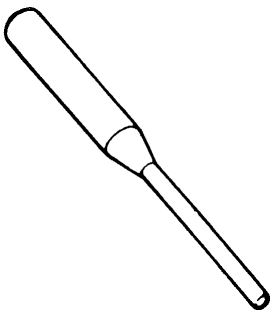
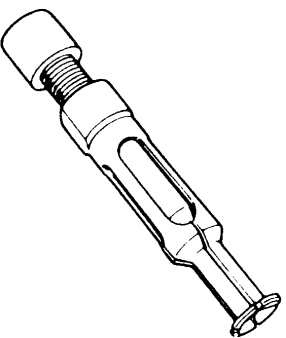
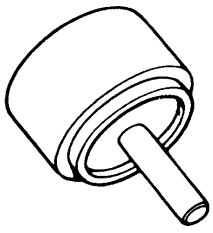
Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Oil filler/level plug	21	2.1	15.5
Oil drain plug	21	2.1	15.5
VSS bolt	5.5	0.55	4.0
Center bearing support bolts	55	5.5	40.0
Ball stud bolt and nut	60	6.0	43.5
Output flange nut	90	9.0	65.0
Bevel pinion nut	120	12.0	87.0
Transaxle case bolts	23	2.3	17.0
Shift fork bolts	10	1.0	7.5
Input oil gutter bolt	10	1.0	7.5
Side bearing retainer bolts	23	2.3	17.0
Final gear bolts (for 2WD model)	90	9.0	65.0
Final gear bolts (for 4WD model)	73	7.3	53.0
Gear shift locating bolts	13	1.3	9.5
Left case plate bolts	23	2.3	17.0
Countershaft nut	70	7.0	51.0
Side cover bolts	10	1.0	7.5
Gear shift guide case bolts	23	2.3	17.0
Gear shift interlock bolt	50	5.0	36.5
5th to reverse interlock guide bolt	23	2.3	17.0
Backup lamp switch	20	2.0	14.5
Reverse gear shift lever bolts	23	2.3	17.0
Reverse shaft bolt	23	2.3	17.0
Exhaust No.2 pipe to No.1 pipe bolts	43	4.3	31.5
Exhaust No.1 pipe to manifold bolts	50	5.0	36.5
Exhaust No.2 pipe to muffler bolts	43	4.3	31.5
Output case bolts	23	2.3	17.0
Rear case bolts	23	2.3	17.0
Rear mounting nuts	25	2.5	18.0

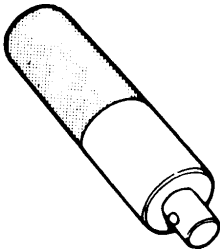
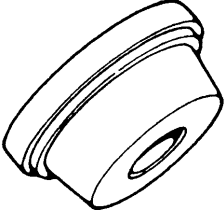
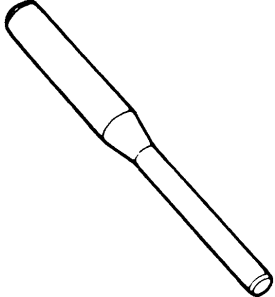
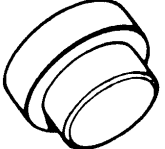
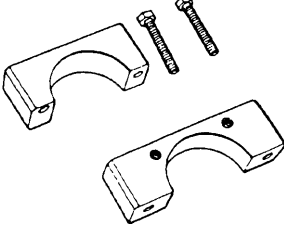
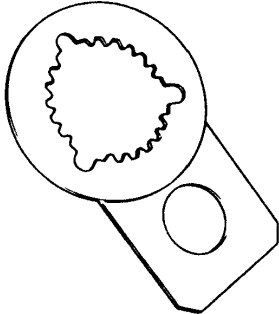
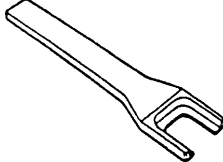
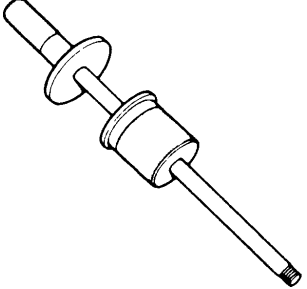
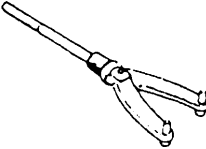
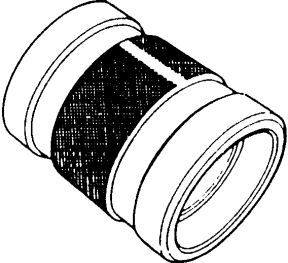
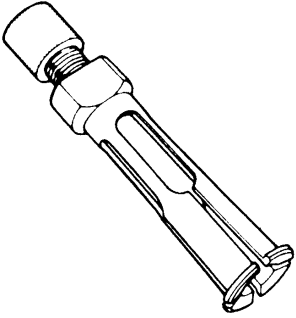
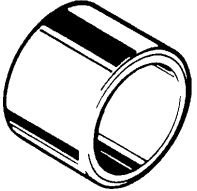
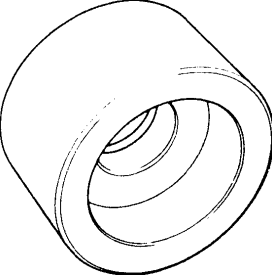
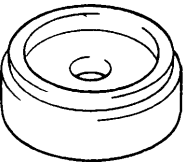
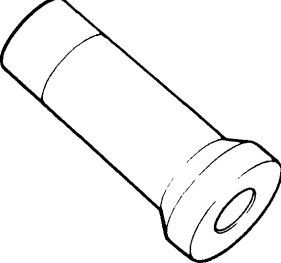
## Required Service Material

Material	Recommended SUZUKI product (Part Number)	Use
Lithium grease	SUZUKI SUPER GREASE A (99000-25010)	<ul style="list-style-type: none"> <li>• Select lever shaft bush</li> <li>• Select lever boss</li> <li>• Oil seal lips</li> <li>• Shift &amp; select control cable end</li> <li>• O-rings</li> </ul>
Sealant	SUZUKI BOND NO.1216 B (99000-31230)	<ul style="list-style-type: none"> <li>• Drain and lever/filler plugs</li> <li>• Mating surface of transaxle case</li> <li>• Mating surface of transfer output case</li> <li>• Mating surface of side cover</li> <li>• Gear shift locating bolts</li> </ul>
Thread lock cement	THREAD LOCK CEMENT 1322 (99000-32110)	<ul style="list-style-type: none"> <li>• Left case plate bolts</li> <li>• Shift fork bolts</li> <li>• Gear shift interlock bolt</li> <li>• 5th to reverse interlock guide bolt</li> <li>• Reverse gear shift lever bolts</li> <li>• Oil gutter bolt</li> <li>• Final gear bolts</li> <li>• Reverse shaft bolt</li> </ul>

## Special Tool

 <p>09900-06107 Snap ring pliers (Opening type)</p>	 <p>09900-20606 Dial gauge</p>	 <p>09900-20701 Magnetic stand</p>	 <p>09913-60910 Bearing/Gear puller</p>
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 <p>09913-61510 Bearing puller</p>	 <p>09913-65810 Bearing puller</p>	 <p>09913-75510 (O.D. 70.5 mm) Bearing installer</p>	 <p>09913-75520 (O.D. 60.5 mm) Bearing installer</p>
 <p>09913-75810 Bearing installer</p>	 <p>09913-75821 Installer attachment</p>	 <p>09913-80112 Bearing installer</p>	 <p>09913-84510 Bearing installer</p>
 <p>09913-85210 Bearing installer</p>	 <p>09913-85230 Bearing removing jig</p>	 <p>09915-24550 Adapter socket</p>	 <p>09922-77241 Dial depth gauge</p>
 <p>09922-77270 Bevel pinion dummy set</p>	 <p>09922-85811 Spring pin remover 4.5 mm</p>	 <p>09923-74510 Bearing remover</p>	 <p>09923-78210 Bearing installer</p>

 <p>09924-74510 Bearing &amp; oil seal installer handle</p>	 <p>09924-84510-004 Bearing installer attachment</p>	 <p>09925-78210 Spring pin remover 6 mm</p>	 <p>09925-88210 Bearing puller attachment</p>
 <p>09927-56030 Gear holder tool</p>	 <p>09927-76060 Gear holder</p>	 <p>09927-76030 Bevel pinion holder</p>	 <p>09930-30104 Sliding shaft</p>
 <p>09930-40113 Rotor holder</p>	 <p>09940-54910 Bearing installer</p>	 <p>09941-64511 Bearing remover</p>	 <p>09944-78210 Bearing installer support</p>
 <p>09951-16060 Bush remover</p>	 <p>09951-16090 Oil seal installer</p>	 <p>09951-76010 Bearing installer</p>	



## SECTION 7B1

## AUTOMATIC TRANSAXLE (4 A/T)

7B1

**WARNING:**

For vehicles equipped with Supplemental Restraint (Air Bag) System :

- Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to “Air Bag System Components and Wiring Location View” under “General Description” in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and “Service Precautions” under “On-Vehicle Service” in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.
- Technical service work must be started at least 90 seconds after the ignition switch is turned to the “LOCK” position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).

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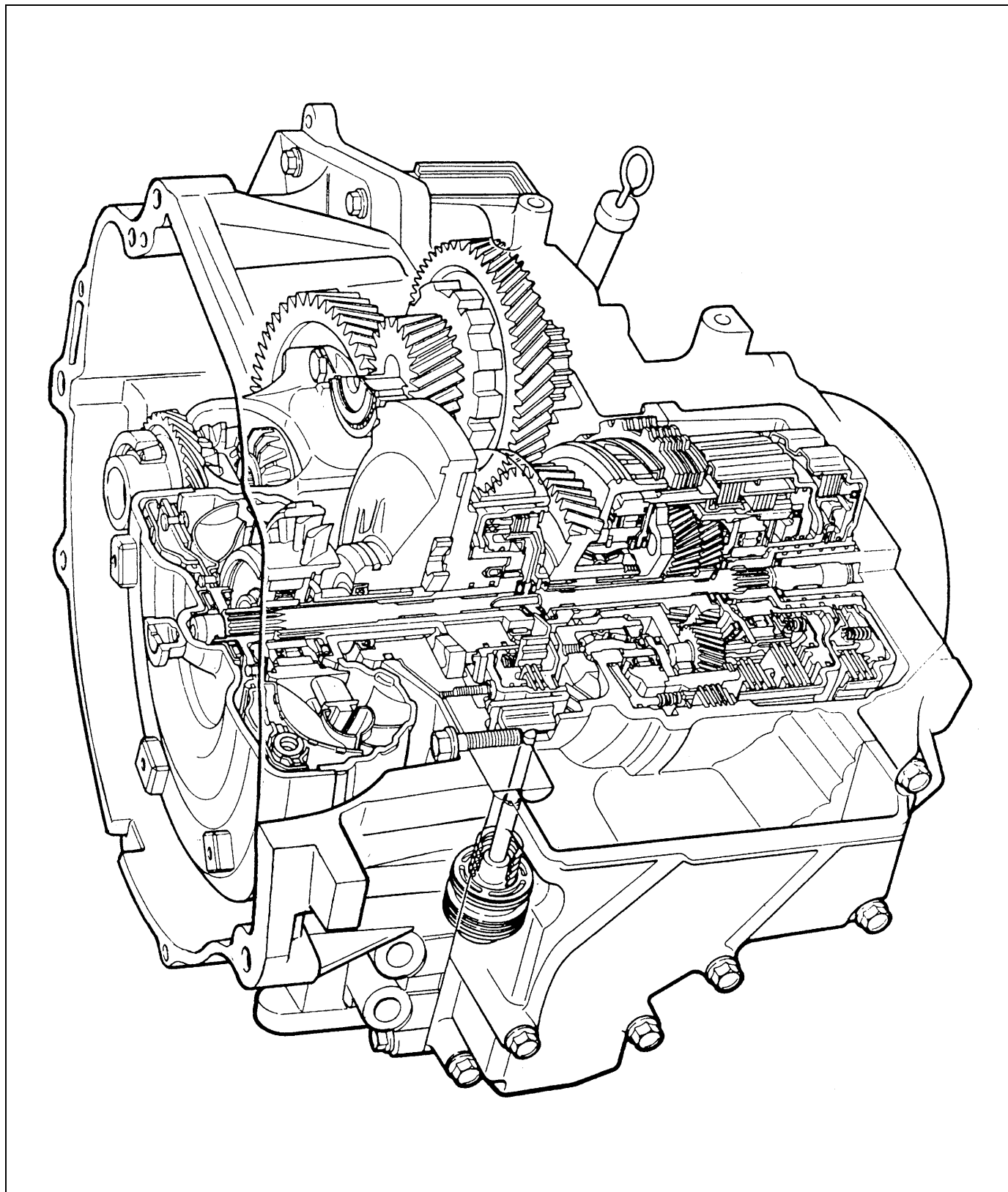
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## General Description

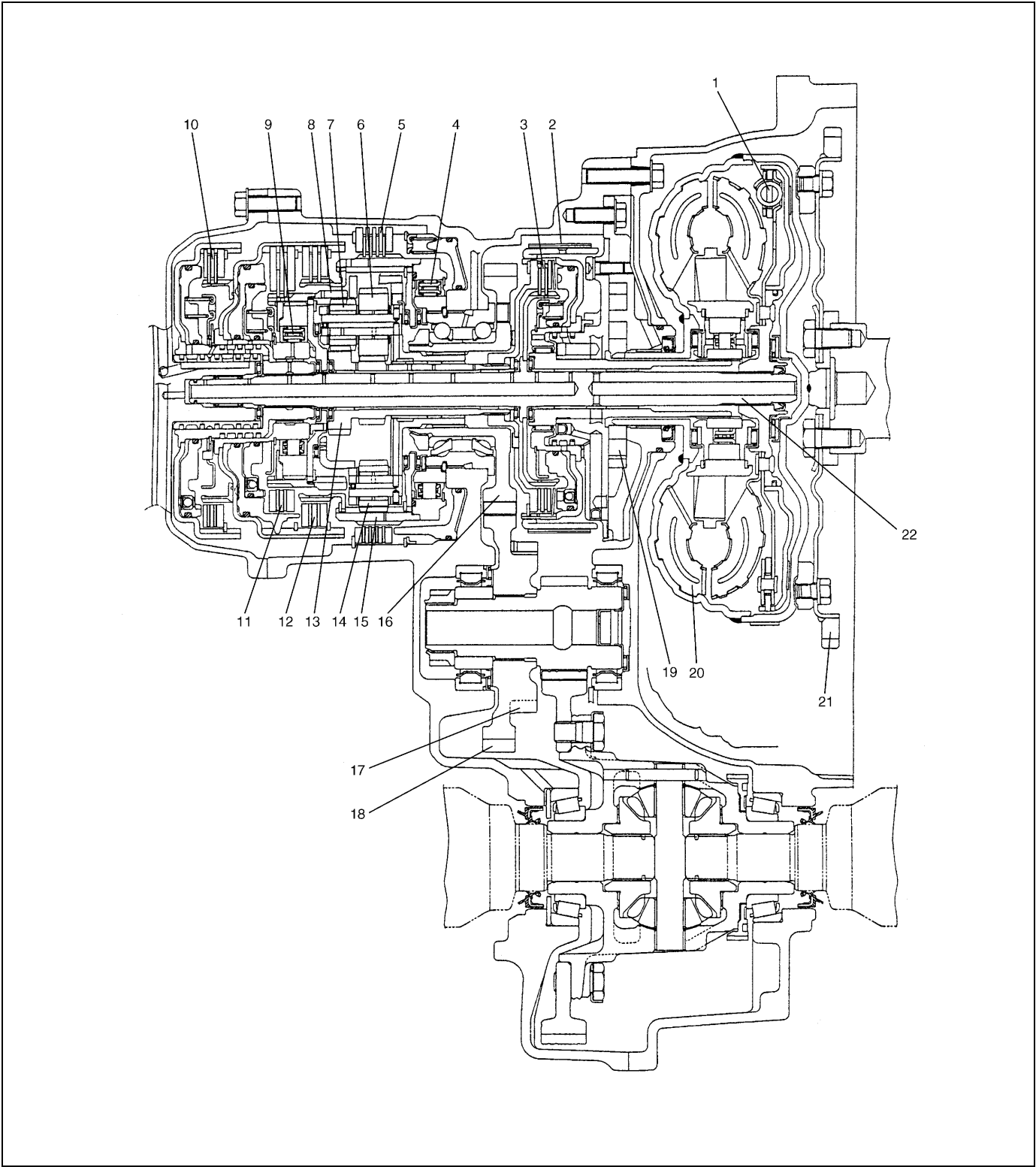
This automatic transaxle is a full automatic type with 3-speed plus overdrive (O/D).

The torque converter is a 3-element, 1-step and 2-phase type and is equipped with an electronically controlled lock-up mechanism. The gear shift device consists of 2 sets of planetary gear units, 4 disc type clutches, a disc type brake, a band type brake and 2 one-way clutches. The gear shift is done by selecting one of 6 positions ("P", "R", "N", "D", "2" and "L") by means of the select lever installed on the floor. On the shift knob, there is an overdrive (O/D) off switch which prevents shift-up to the overdrive mode.



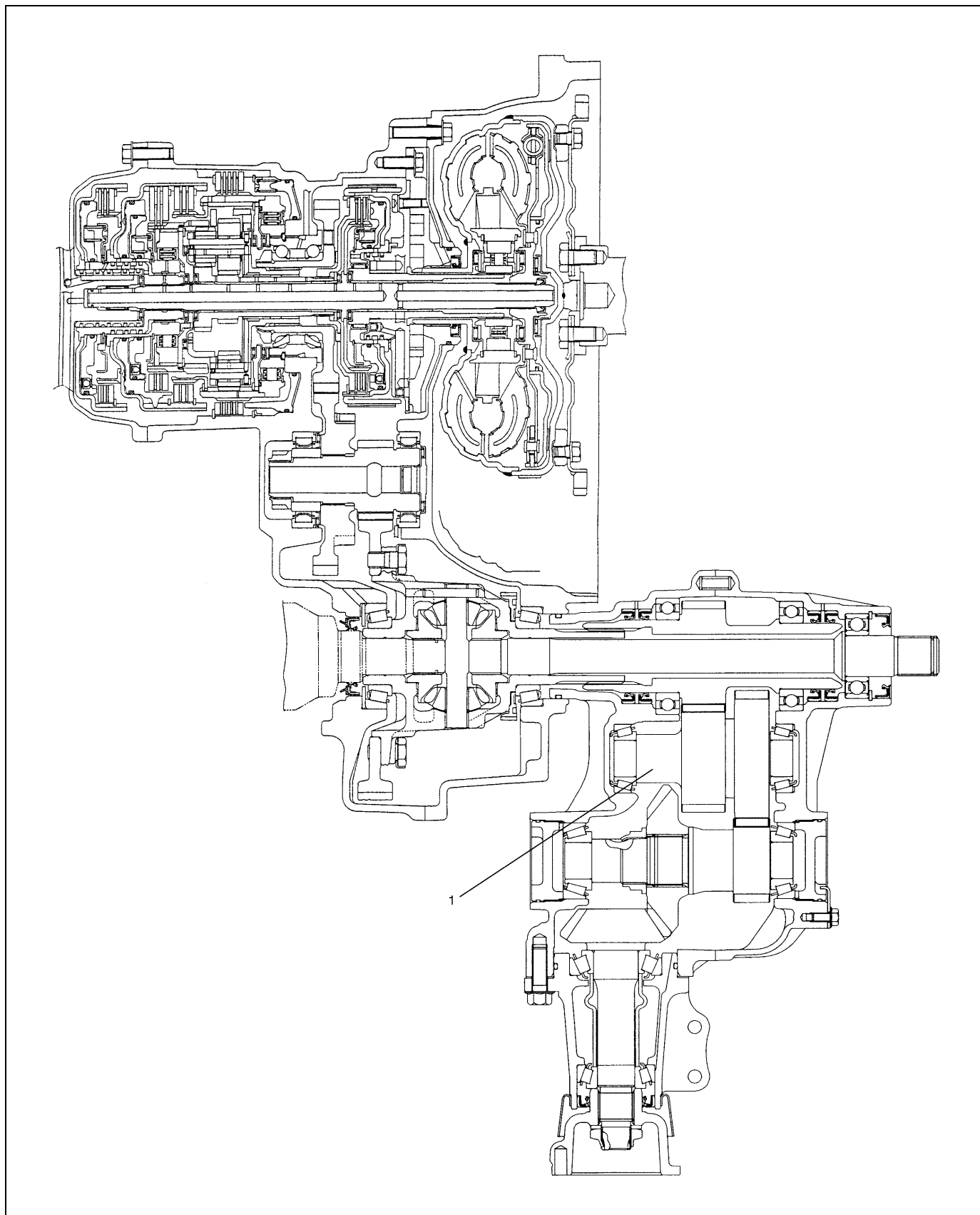


2WD



1. Torque converter clutch (TCC)	9. One-way clutch No.0	17. Parking lock gear
2. 2nd and 4th brake band	10. Forward clutch	18. Counter driven gear (Reduction gear)
3. Reverse clutch	11. Coast clutch	19. Oil pump
4. One-way clutch No.1	12. Overdrive clutch	20. Torque converter
5. 1st and reverse brake	13. Planetary sun gear	21. Drive plate
6. Front large planetary pinion	14. Front small planetary pinion	22. Input shaft
7. Rear planetary pinion	15. Front planetary ring gear	
8. Rear planetary ring gear	16. Counter drive gear (Reduction gear)	

4WD

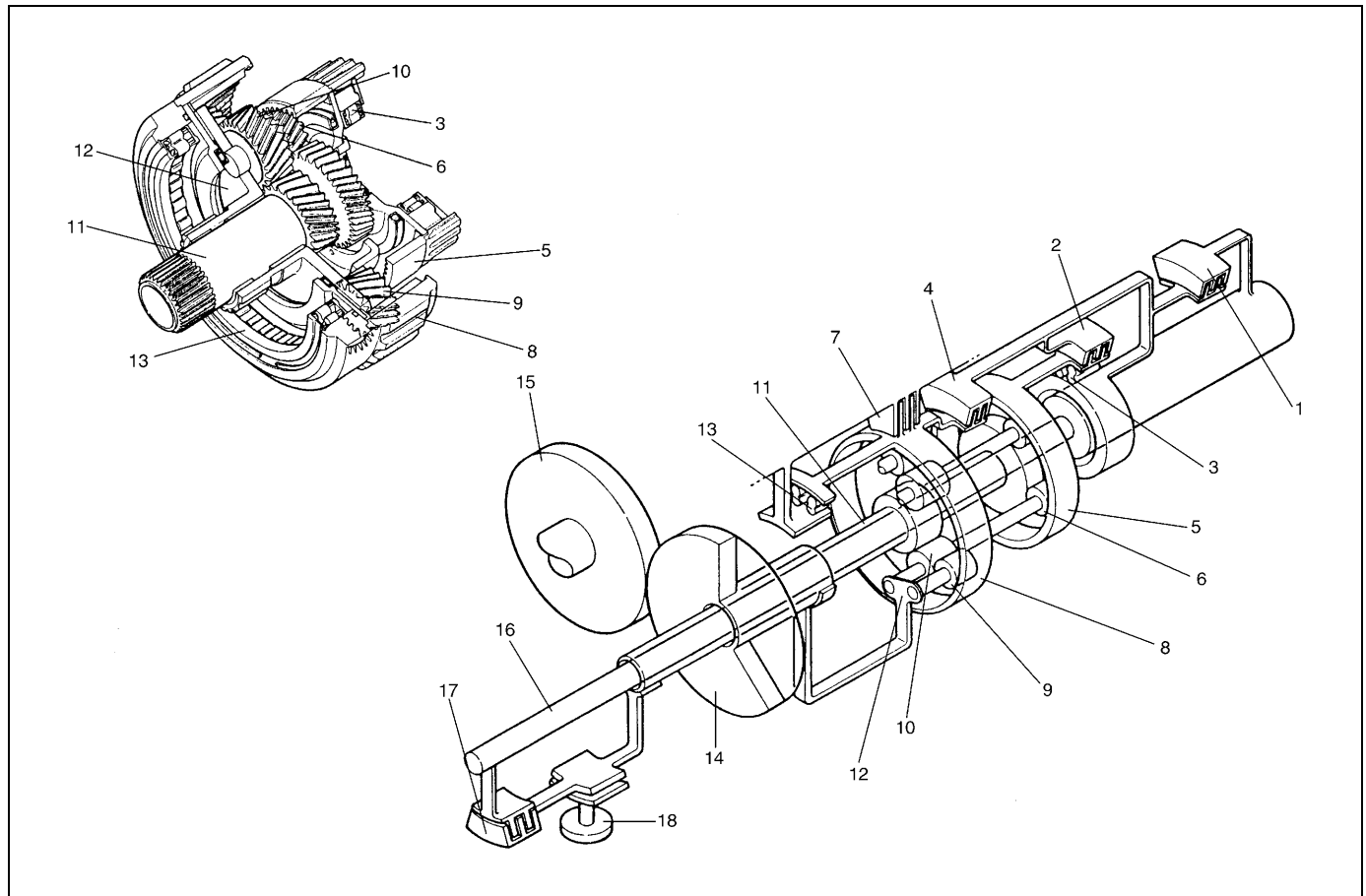


1. Transfer assembly

## Specifications

Item			Specifications			
Torque converter	Type Stall torque ratio		3-element, 1-step, 2-phase type (with TCC (lock-up) mechanism) 2.15			
Oil pump	Type Drive system		Internal gear type oil pump Engine driven			
Gear change device	Type		Forward 4-step, reverse 1-step planetary gear type			
	Shift position		"P" range	Gear in neutral, output shaft fixed, engine start		
			"R" range	Reverse		
			"N" range	Gear in neutral, engine start		
			"D" range (O/D ON)	Forward 1st ↔ 2nd ↔ 3rd ↔ 4th (O/D) automatic gear change		
			"D" range (O/D OFF)	Forward 1st ↔ 2nd ↔ 3rd ← 4th automatic gear change		
			"2" range	Forward 1st ↔ 2nd ← 3rd ← 4th automatic gear change		
			"L" range	Forward 1st ← 2nd reduction, and fixed at 1st gear		
	Gear ratio	1st	2.807	Number of teeth	Front sun gear : 26	
		2nd	1.479		Rear sun gear : 35	
		3rd	1.000		Front large pinion gear : 28	
		4th (overdrive gear)	0.734		Front small pinion gear : 19	
		Reverse (reverse gear	2.769		Rear pinion gear : 19 Front internal gear : 98 Rear internal gear : 73	
	Control elements		Wet type multi-disc clutch ... 4 sets Band type brake ... 1 set Wet type multi-disc brake ... 1 sets One-way clutch ... 2 sets			
Reduction gear ratio		1.018				
Final gear reduction ratio		4.047				
Lubrication	Lubrication system		Force feed system by oil pump			
Cooling	Cooling system		Radiator assisted cooling (water-cooled)			
Fluid used			DEXRON®-III or DEXRON®-IIE			

## Clutch/Brake/Planetary Gear



1. Forward clutch	7. 1st and reverse brake	13. One-way clutch No.1
2. Coast clutch	8. Front planetary ring gear	14. Counter drive gear
3. One-way clutch No.0	9. Front small planetary pinion gear	15. Counter driven gear
4. Overdrive clutch	10. Front large planetary pinion gear	16. Input shaft
5. Rear planetary ring gear	11. Planetary sun gear	17. Reverse clutch
6. Rear planetary pinion gear	12. Planetary carrier	18. 2nd and 4th brake

## Functions

PART NAME	FUNCTION
2nd and 4th brake	Fixes planetary sun gear
Reverse clutch	Meshes input shaft and sun gear
One-way clutch No.1	Prevents front planetary ring gear from turning counterclockwise (reverse direction of engine input rotation direction)
1st and reverse brake	Fixes front planetary ring gear
Overdrive clutch	Meshes front planetary ring gear and input shaft only when forward clutch is at work
One-way clutch No.0	Prevents rear planetary ring gear from turning counterclockwise (reverse direction of engine input rotation direction) only when forward clutch is at work.
Coast clutch	Meshes rear planetary ring gear and input shaft only when forward clutch is at work.
Forward clutch	Meshes rear planetary and front planetary ring gear only when over-drive clutch is at work, and meshes input shaft and rear planetary ring gear only when coast clutch is at work.

## Table of Component Operation

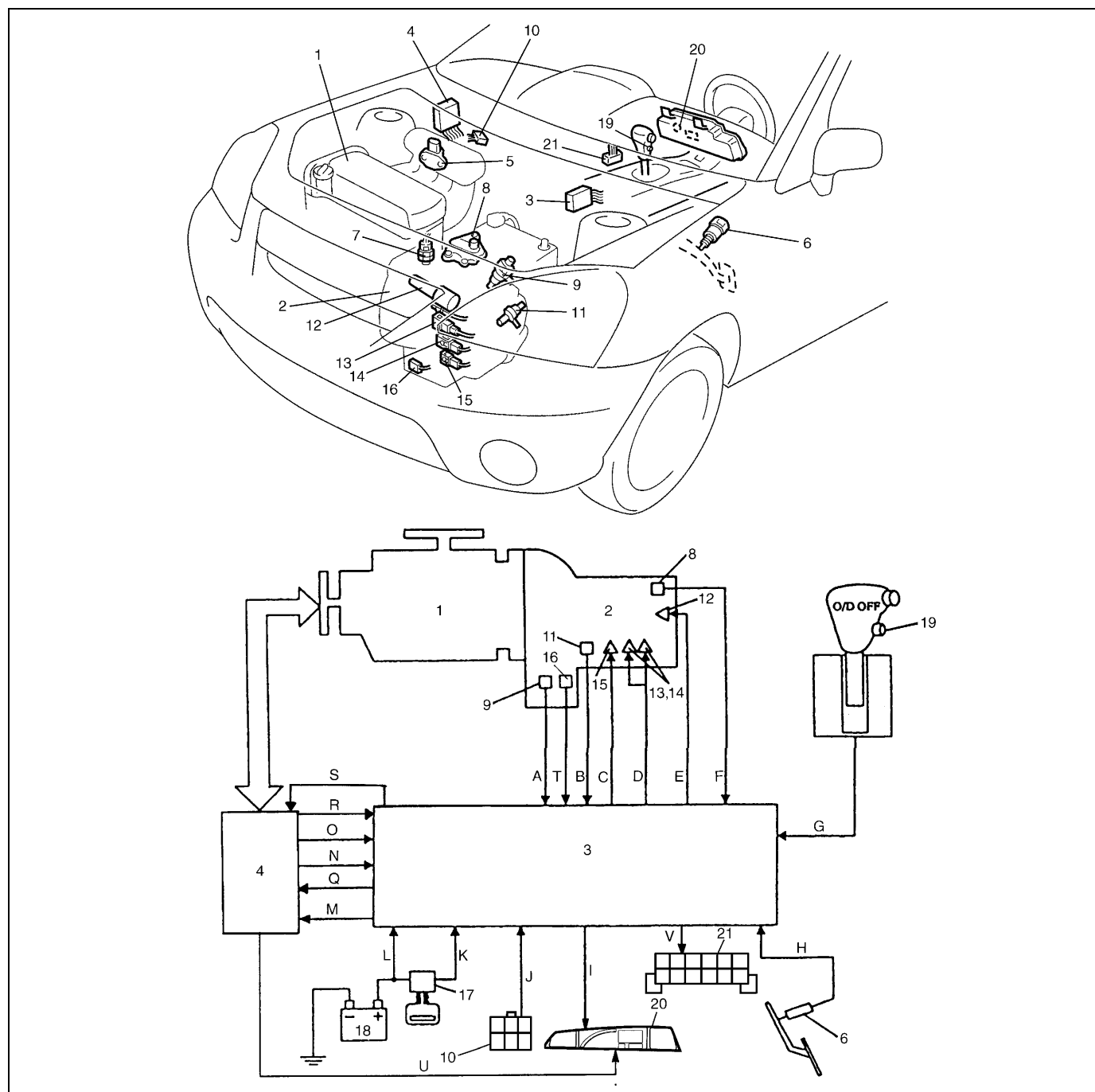
Selector position	Gear position	Part										
		Solenoid valve-A No.1	Solenoid valve-B No.2	TCC solenoid valve	Forward clutch	Reverse clutch	Coast clutch	Over-drive clutch	2nd/4th brake	1st/reverse brake	One-way clutch No.1	One-way clutch No.0
	P	○	×	×	×	×	○	×	×	×	×	×
	R	○	×	×	×	○	○	×	×	○	×	×
	N	○	×	×	×	×	○	×	×	×	×	×
D	1st	○	×	×	○	×	○	×	×	×	○	○
	2nd	○	○	×	○	×	○	×	○	×	×	○
	3rd	×	○	△	○	×	○	○	×	×	×	○
	4th(O/D)	×	×	△	○	×	×	○	○	×	×	×
2	1st	○	×	×	○	×	○	×	×	×	○	○
	2nd	○	○	×	○	×	○	×	○	×	×	○
L	1st	○	×	×	○	×	○	×	×	○	○	○

○ :ON

× :OFF

△ :ON only when TCC is operating

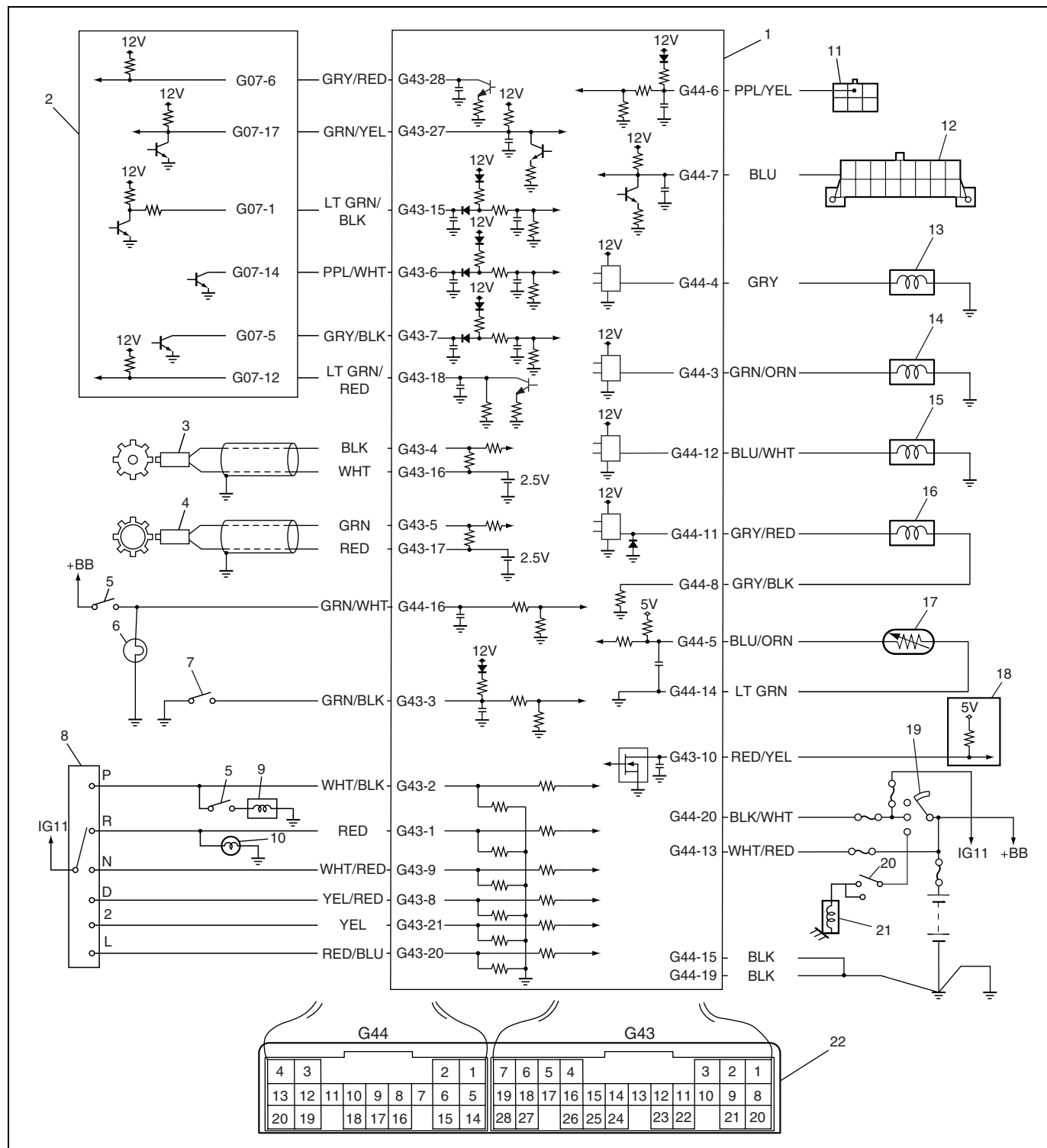
## Electronic Shift Control System



1. Engine	15. TCC solenoid valve	H. Brake signal
2. Transaxle	16. Transmission fluid temperature sensor (A/T fluid temp. sensor)	I. Shift indicator, "O/D OFF" lamp and DTC signal
3. Transmission control module (TCM)	17. Ignition switch	J. Diagnosis switch signal
4. Engine control module (ECM)	18. Battery	K. Power supply
5. Throttle position sensor	19. O/D off switch	L. Power supply for back-up
6. Brake light (stop lamp) switch	20. Odometer, "O/D OFF" lamp, shift indicator and malfunction indicator lamp (in combination meter)	M. "D" range signal (Transmission range sensor signal except "P" and "N" range)
7. Engine coolant temperature sensor	21. Data link connector	N. Engine coolant temperature signal
8. Transmission range sensor (shift switch)	A. Output shaft speed	O. Throttle opening signal
9. Output shaft speed sensor	B. Input shaft speed	Q. A/T failure signal
10. Monitor connector	C. TCC control	R. Engine speed signal
11. Input shaft speed sensor	D. Automatic shift control	S. Torque reduction signal
12. Pressure control solenoid valve	E. Line pressure control	T. A/T fluid temperature signal
13. Shift solenoid valve-A (No.1)	F. Transmission range signal	U. MIL signal
14. Shift solenoid valve-B (No.2)	G. "O/D" off signal	V. Serial data signal

## Transmission Control Module (TCM)

The TCM is an electronic circuit component that controls gear shift and idle-up according to the signal from each sensor. It is a microcomputer of an IC, transistor, diode, etc. It is installed at the right side of the steering column.



1. TCM	9. Shift lock solenoid (if equipped)	17. Transmission temperature sensor (A/T fluid temp. sensor)
2. ECM	10. Backup lamp	18. Combination meter
3. Output shaft speed sensor	11. Monitor connector (color in Blue)	19. Ignition switch
4. Input shaft speed sensor	12. Data link connector (DLC)	20. Inhibitor switch
5. Brake light switch	13. Shift solenoid valve-A (No. 1)	21. Starter relay
6. Brake light	14. Shift solenoid valve-B (No. 2)	22. Terminal arrangement of TCM coupler (viewed from harness side)
7. O/D off switch	15. TCC (Lock-up) solenoid valve	
8. Transmission range sensor (Shift switch)	16. Pressure control solenoid	

## Operation of shift solenoid valves and TCC solenoid valve

RANGE		D				2		L	N	R		P
GEAR		1st	2nd	3rd	4th (O/D)	1st	2nd	1st	Neu- tral	Rev (>7km/h)	Rev (≤7km/h)	-
SOLENOIDS	Shift solenoid valve-A (NO.1)	○	○	×	×	○	○	○	(—)	×	△	△
	Shift solenoid valve-B (NO.2)	×	○	○	×	×	○	×	(—)	○	×	×
	TCC solenoid valve	×	×	(○)	(○)	×	×	×	×	×	×	×

○ :ON (Turn power on)

×

△ :Power is turned off after passing 3 seconds from shifting with vehicle stopped

(○) :ON only when lock-up function operates

(—) :Gear is neutral position regardless of solenoid status

	Valve status	
	Turn power ON	Turn power OFF
Shift solenoid valve-A (No.1)	Close	Open
Shift solenoid valve-B (No.2)	Close	Open
TCC solenoid valve	Open	Close



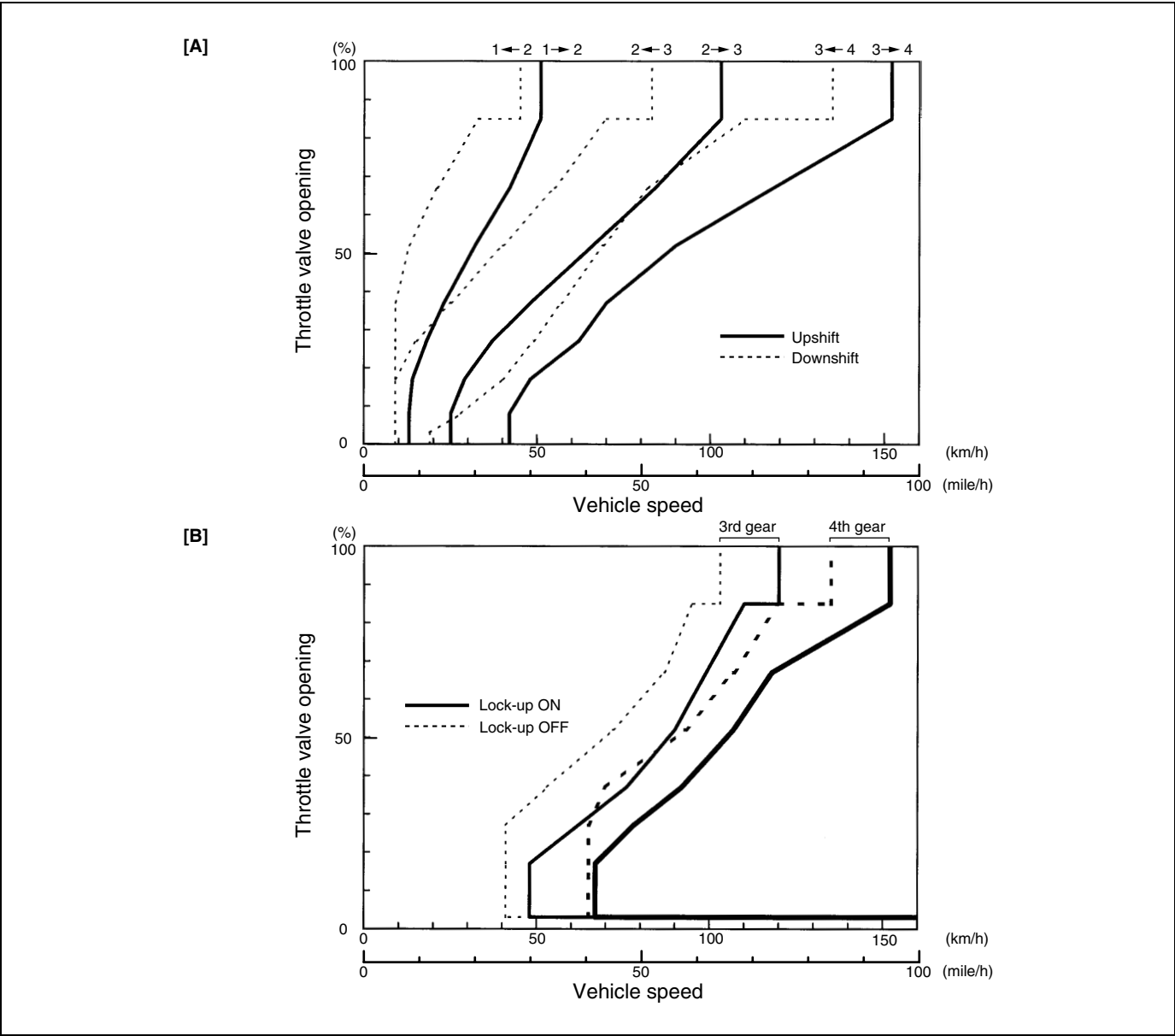
**Automatic gear shift diagram**

Automatic shift schedule as a result of shift control is shown below. In case that selector lever is shifted to L at a higher than 51 km/h (32 mile/h) speed, 2nd gear is operated and then down shifts to 1st at a speed lower than that. No up shift is available in L.

The same as, the select lever is shifted to 2 at a higher than 103 km/h (64.5 mile/h) speed, 3rd gear is operated and then down shifts to 2nd at a speed lower than that. No up shift is available in 2.

	Shift					
Throttle opening	1→2	2→3	3→4	4→3	3→2	2→1
Full throttle km/h (mile/h)	51 (32)	103 (64)	152 (54)	135 (54)	83 (52)	45 (28)
Closed throttle km/h (mile/h)	13 (8)	25 (16)	42 (26)	19 (12)	9 (6)	9 (6)

**GEAR SHIFT DIAGRAM [A] AND TCC LOCK-UP DIAGRAM [B]**



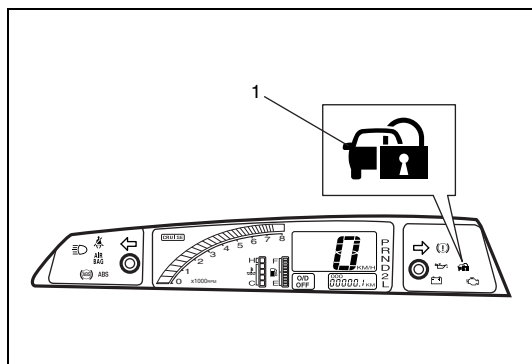
## Diagnosis

### General Description

This vehicle is equipped with an electronic transaxle control system, which controls the automatic shift up and shift down timing, TCC operation, etc. suitably to vehicle driving conditions.

TCM has an On-Board Diagnostic System which detects a malfunction in this system and abnormality of those parts that influence the engine exhaust emission.

When diagnosing a trouble in transaxle including this system, be sure to have full understanding of the outline of “On-Board Diagnostic System” and each item in “Precaution in Diagnosing Trouble” and execute diagnosis according to “Automatic Transaxle Diagnostic Flow Table” given below to obtain correct result smoothly.



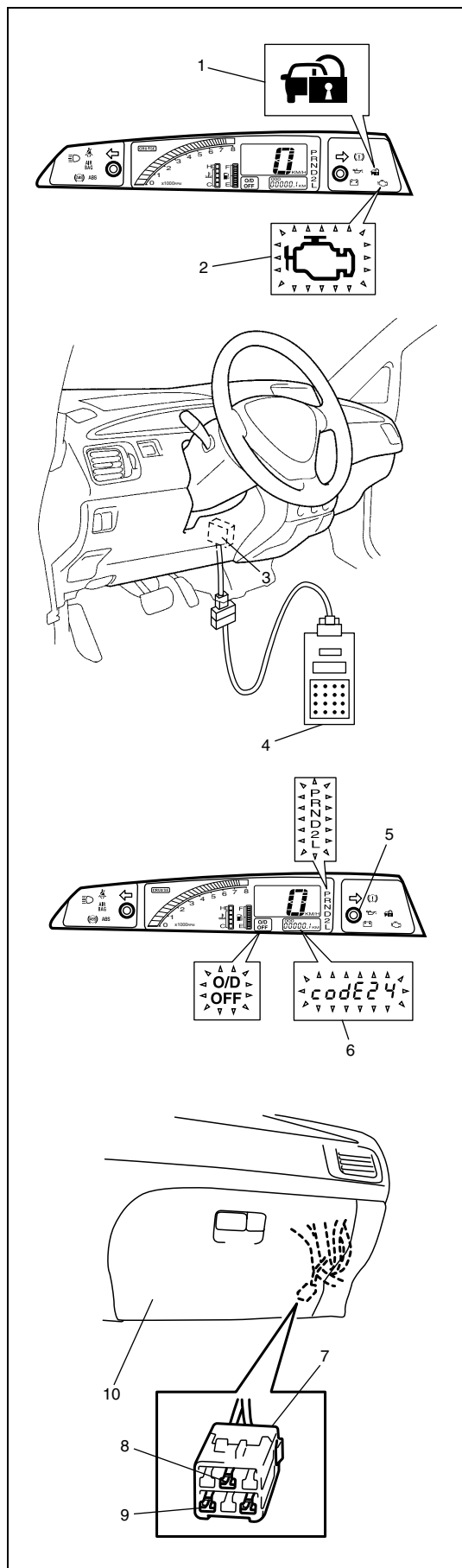
#### NOTE:

There are two types of On-Board Diagnostic System depending on vehicle specifications. The type of system for vehicle being serviced can be identified by whether equipped with immobilizer lamp (1) as indicator in combination meter or not. Identify the type of system by confirming whether equipped with immobilizer lamp (1) in combination meter turning ignition switch ON with leaving engine OFF.

### On-board Diagnostic System

#### [For vehicle with immobilizer lamp]

For automatic transaxle control system, TCM has following functions.



- When TCM detects a malfunction in A/T control system, it stores malfunction DTC and at the same time transmits DTC of that malfunction to ECM. (Based on this signal, ECM turns ON malfunction indicator lamp (MIL) (2) and stores DTC/freeze frame data in its memory.)
- If no malfunction is detected after detecting above malfunction, TCM immediately halts to transmit DTC of that malfunction to ECM, however, DTC stored in TCM memory will remain. If ECM receives no DTC of malfunction for 3 driving cycles continuously, it turns MIL off although DTC stored in ECM memory will also remain.
- It is possible to communicate with ECM and/or TCM through data link connector (DLC) (3) by using SUZUKI scan tool (4). (Diagnostic information can be checked and erased by using scan tool.)
- It is also possible to check DTC stored in TCM memory by displaying DTC on digital display odometer (6). DTC is displayed on odometer by connecting diagnosis switch terminal (8) with ground terminal (9) of monitor connector (color in Blue) (7), with reset button (5) pressed. If no malfunction DTC is stored in TCM memory, DTC No.12 is displayed. If one or more DTCs are stored in TCM memory, they are displayed 3 seconds each sequentially. After all DTCs are displayed, they are displayed in the same manner as above again.

1. Immobilizer lamp
---------------------

10. Glove box
---------------

## 2 driving cycle detection logic

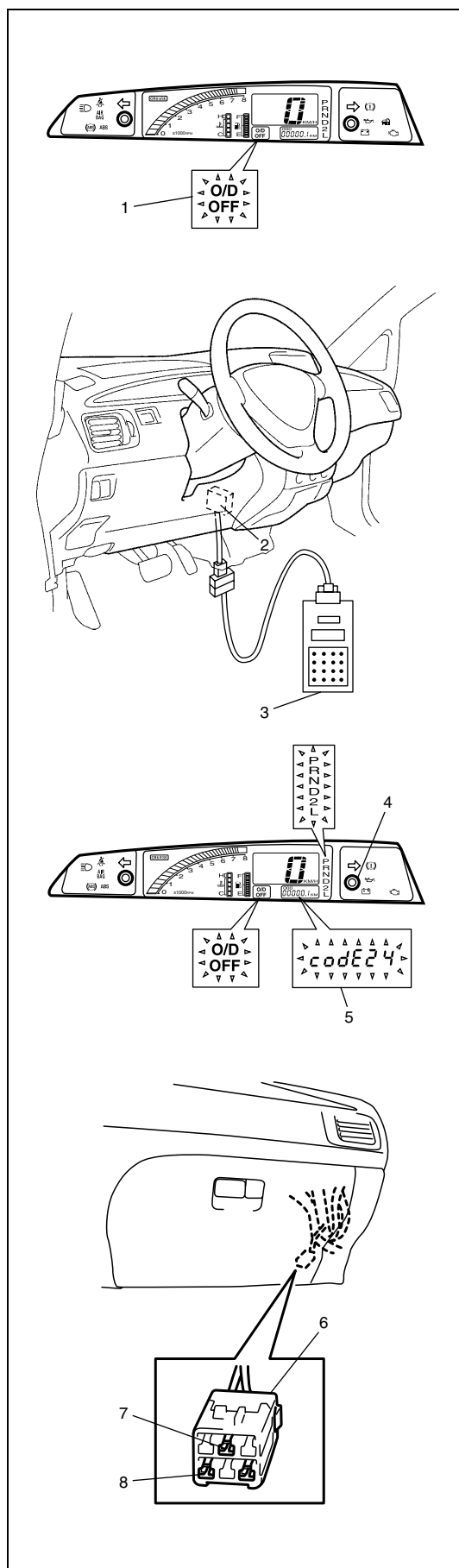
When a malfunction is detected during initial driving cycle, TCM transmits a data to inform ECM of malfunction occurrence. At this time, ECM stores a corresponding pending DTC in its memory. (but MIL does not light). If the same malfunction is also detected in next driving cycle, ECM lights MIL when it receives a data informing occurrence of a malfunction from TCM.

## Freeze frame data

Refer to Section 6 for details.

**[For vehicle without immobilizer lamp]**

For automatic transaxle control system, TCM has following functions.



- When ignition switch is turned ON with O/D off switch turned OFF and no malfunction in A/T control system is detected, "O/D OFF" lamp (1) lights for about 2 seconds after ignition switch is turned ON and then goes OFF for bulb check. If O/D off switch is ON at this time, however, "O/D OFF" lamp remains ON to let driver known that gear is not shifted to overdrive gear (4th gear).
- When TCM detects a malfunction in A/T control system, it flashes "O/D OFF" lamp (1) and stores malfunction DTC in its memory.
- It is possible to communicate with TCM through data link connector (DLC) (2) by using SUZUKI scan tool (3). (Diagnostic information can be checked and erased by using scan tool.)
- It is also possible to check DTC stored in TCM memory by displaying DTC on digital display odometer (5). DTC is displayed on odometer by connecting diagnosis switch terminal (7) with ground terminal (8) of monitor connector (color in Blue) (6) while reset button (4) is pressed. If no malfunction DTC is stored in TCM memory, DTC No.12 is displayed. If one or more DTCs are stored in TCM memory, they are displayed 3 seconds each sequentially. After all DTCs are displayed, they are displayed in the same manner as above repeatedly.

## Precaution in Diagnosing Trouble

- Don't disconnect couplers from TCM and/or ECM, battery cable from battery, TCM and/or ECM ground wire harness from engine or main fuse before checking the diagnosis information (DTC, freeze frame data, etc.) stored in TCM and/or ECM memory.

Such disconnection will clear memorized information in TCM and/or ECM memory.

- Using SUZUKI scan tool the diagnostic information stored in ECM memory can be checked and cleared as well. Before its use, be sure to read Operator's (instruction) Manual supplied with it carefully to have good understanding of its functions and usage.
- DTC stored in TCM can not be cleared by using ECM application of SUZUKI scan tool in mass storage cartridge. Be sure to follow "Diagnostic Trouble Code Clearance" in this section when cleaning it.
- Priorities for diagnosing troubles

If two or more diagnostic trouble codes (DTCs) are stored, proceed to flow table (chart) of DTC which was detected earliest in order and follow instruction in that table (chart). If no instructions are given, troubleshoot diagnostic trouble codes according to the following priorities.

- 1) Diagnostic trouble codes (DTCs) other than DTC P0171/P0172 (Fuel system too lean/too rich), DTC P0300/P0301/P0302/P0303/P0304 (Misfire detected) and DTC P0400 (EGR flow malfunction)
- 2) DTC P0171/P0172 (Fuel system too lean/too rich) and DTC P0400 (EGR flow malfunction)
- 3) DTC P0300/P0301/P0302/P0303/P0304 (Misfire detected)

- Be sure to read "Precaution for Electrical Circuit Service" in Section 0A before inspection and observe what is written there.
- TCM and/or ECM replacement

When substituting a known-good TCM and/or ECM, check for following conditions.

Neglecting this check may result in damage to good TCM and/or ECM.

- All relays and actuators have resistance of specified value.
- MAP sensor and TP sensor are in good condition. Also, the power circuit of these sensors is not shorted to the ground.

## Automatic Transaxle Diagnostic Flow Table

Refer to the following pages for the details of each step.

Step	Action	Yes	No
1	Customer Complaint Analysis 1) Perform customer complaint analysis referring to the next page. Was customer complaint analysis performed according to instruction on the next page?	Go to Step 2.	Perform customer complaint analysis.
2	Diagnostic Trouble Code (DTC) and Freeze Frame Data Check, Record and Clearance 1) Check for DTC (including pending DTC) referring to the next page. Is there any DTC(s)?	1) Print DTC and freeze frame data or write them down and clear them by referring to "DTC Clearance" in this section. 2) Go to Step 3.	Go to Step 4.
3	Visual Inspection 1) Perform visual inspection referring to the next page. Is there any faulty condition?	1) Repair or replace malfunction part. 2) Go to Step 11.	Go to Step 5.
4	Visual Inspection 1) Perform visual inspection referring to the next page. Is there any faulty condition?	1) Repair or replace malfunction part. 2) Go to Step 11.	Go to Step 8.
5	Trouble Symptom Confirmation 1) Confirm trouble symptom referring to the next page. Is trouble symptom identified?	Go to Step 6.	Go to Step 7.
6	Rechecking and Record of DTC/Freeze Frame Data 1) Recheck for DTC and freeze frame data referring to "DTC Check" in this section. Is there any DTC(s)?	Go to Step 9.	Go to Step 8.
7	Rechecking and Record of DTC/Freeze Frame Data 1) Recheck for DTC and freeze frame data referring to "DTC Check" in this section. Is there any DTC(s)?	Go to Step 9.	Go to Step 10.
8	Automatic Transaxle Basic Inspection and Trouble Diagnosis Table 1) Check and repair according to "A/T Basic Check" and "Trouble Diagnosis Table" in this section. Are check and repair complete?	Go to Step 11.	1) Check and repair malfunction part(s). 2) Go to Step 11.
9	Troubleshooting for DTC 1) Check and repair according to applicable DTC Flow Table. Are check and repair complete?	Go to Step 11.	1) Check and repair malfunction part(s). 2) Go to Step 11.

Step	Action	Yes	No
10	Check for Intermittent Problems 1) Check for intermittent problems referring to the next page. Is there any faulty condition?	1) Repair or replace malfunction part(s). 2) Go to Step 11.	Go to Step 11.
11	Final Confirmation Test 1) Clear DTC if any. 2) Perform final confirmation test referring to the next page. Is there any problem symptom, DTC or abnormal condition?	Go to Step 6.	End.

### 1. Customer Complaint Analysis (See Customer Problem Inspection Form)

Record details of the problem (failure, complaint) and how it occurred as described by the customer.

For this purpose, use of such an inspection form will facilitate collecting information to the point required for proper analysis and diagnosis.

### 2. Diagnostic Trouble Code (DTC)/Freeze Frame Data Check, Record and Clearance

First, referring to “DTC Check” in this section, check DTC (including pending DTC). If DTC exists, print or write down DTC and freeze frame data and then clear malfunction DTC(s) by referring to “DTC Clearance” in this section. Malfunction DTC indicates malfunction in the system but it is not possible to know from it whether the malfunction is occurring now or it occurred in the past and normal condition has been restored. In order to know that, check symptom in question according to Step 5 and then recheck DTC according to Step 6.

Diagnosing a trouble based on the DTC in this step only or failure to clear the DTC in this step may result in a faulty diagnosis, trouble diagnosis of a normal circuit or difficulty in troubleshooting which is otherwise unnecessary.

### 3 and 4. Visual Inspection

As a preliminary step, be sure to perform visual check of the items that support proper function of the engine and automatic transaxle referring to “Visual Inspection” in this section.

### 5. Trouble Symptom Confirmation

Check trouble symptoms based on information obtained in Step 1 Customer Complaint Analysis and Step 2 DTC / Freeze Frame Data Check.

Also, reconfirm DTC according to “DTC Confirmation Procedure” described in each DTC Flow Table.

### 6 and 7. Rechecking and Record of DTC/Freeze Frame Data

Refer to “DTC Check” in this section for checking procedure.

### 8. Automatic Transmission Basic Check and Trouble Diagnosis Table

Perform basic check of A/T according to flow table of “Automatic Transaxle Basic Check” first. When the end of the flow table has been reached, check the parts of the system suspected as a possible cause referring to “Trouble Diagnosis Table” and based on symptoms appearing on the vehicle (symptoms obtained through steps of customer complaint analysis, trouble symptom confirmation and/or A/T basic check) and repair or replace faulty parts, if any.

### 9. Diagnostic Trouble Code Flow Table (See each DTC Flow Table)

Based on the DTC indicated in Step 6/7 and referring to Diagnostic Trouble Code Flow Table in this section, locate the cause of the trouble, namely in a sensor, switch, wire harness, connector, actuator, TCM or other part and repair or replace faulty parts.

**10. Check for Intermittent Problem**

Check parts where an intermittent trouble is easy to occur (e.g. wire harness, connector, etc.), referring to “Intermittent and Poor Connection” in Section 0A and related circuit of DTC recorded in Step 2.

**11. Final Confirmation Test**

Confirm that the problem symptom has gone and the vehicle is free from any abnormal conditions. If what has been repaired is related to the malfunction DTC, clear the DTC once and check to ensure that no malfunction DTC is indicated.



**Customer Problem Inspection Form (Example)**

User name:	Model:	VIN:	
Date of issue:	Date of Reg.:	Date of problem:	Mileage:

PROBLEM SYMPTOMS	
<input type="checkbox"/>	Vehicle does not move (R, D, 2, L or any range)
<input type="checkbox"/>	No upshift automatically ( <input type="checkbox"/> 1st to 2nd <input type="checkbox"/> 2nd to 3rd <input type="checkbox"/> 3rd to 4th (O/D) <input type="checkbox"/> 2 range <input type="checkbox"/> D range)
<input type="checkbox"/>	No downshift automatically ( <input type="checkbox"/> 3rd to 2nd <input type="checkbox"/> 2nd to 1st <input type="checkbox"/> 4th (O/D) to 3rd <input type="checkbox"/> 2 range <input type="checkbox"/> D range)
<input type="checkbox"/>	No gear change manually ( <input type="checkbox"/> 1st ↔ 3rd <input type="checkbox"/> 3rd ↔ 4th)
<input type="checkbox"/>	TCC no lock-up <input type="checkbox"/> TCC no lock-up off
<input type="checkbox"/>	Automatic shift point too high or too low
<input type="checkbox"/>	Excessive gear change shock (1st/2nd/3rd/4th (O/D)/Reverse)
<input type="checkbox"/>	No kickdown
<input type="checkbox"/>	Transmission slipping in (1st/2nd/3rd/4th (O/D)/Reverse)
<input type="checkbox"/>	Others _____

VEHICLE/ENVIRONMENTAL CONDITION WHEN PROBLEM OCCURS	
<b>Environmental Condition</b>	
Weather	<input type="checkbox"/> Fair <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain <input type="checkbox"/> Always <input type="checkbox"/> Other _____
Temperature	(   °F/   °C) <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold <input type="checkbox"/> always
Frequency	<input type="checkbox"/> Always <input type="checkbox"/> Sometimes (   times/   day, month) <input type="checkbox"/> Only once <input type="checkbox"/> Under certain condition
Read	<input type="checkbox"/> Urban <input type="checkbox"/> Suburb <input type="checkbox"/> Highway <input type="checkbox"/> Mountainous <input type="checkbox"/> Uphill <input type="checkbox"/> Downhill <input type="checkbox"/> Tarmacadam
	<input type="checkbox"/> Gravel <input type="checkbox"/> Other _____
<b>Vehicle Condition</b>	
Engine & transmission condition	<input type="checkbox"/> Cold/ <input type="checkbox"/> Warming up phase/ <input type="checkbox"/> Warmed up Engine speed (   r/min.) Throttle opening ( <input type="checkbox"/> Idle/ <input type="checkbox"/> About   % <input type="checkbox"/> full) O/D cut switch ( <input type="checkbox"/> ON/ <input type="checkbox"/> OFF)
Vehicle condition	<input type="checkbox"/> At stop/ <input type="checkbox"/> During driving ( <input type="checkbox"/> Constant speed <input type="checkbox"/> Accelerating <input type="checkbox"/> Decelerating <input type="checkbox"/> Braking) <input type="checkbox"/> Right hand corner <input type="checkbox"/> Left hand corner <input type="checkbox"/> Vehicle speed (   km/h   mile/h) <input type="checkbox"/> Other _____

"O/D OFF" lamp	<input type="checkbox"/> Blink <input type="checkbox"/> Always ON <input type="checkbox"/> Sometimes ON <input type="checkbox"/> Always OFF <input type="checkbox"/> Good condition
Malfunction indicator lamp	<input type="checkbox"/> Blink <input type="checkbox"/> Always ON <input type="checkbox"/> Sometimes ON <input type="checkbox"/> Always OFF <input type="checkbox"/> Good condition
Diagnostic trouble code	First check: <input type="checkbox"/> No code <input type="checkbox"/> Malfunction code (   ) Second check: <input type="checkbox"/> No code <input type="checkbox"/> Malfunction code (   )

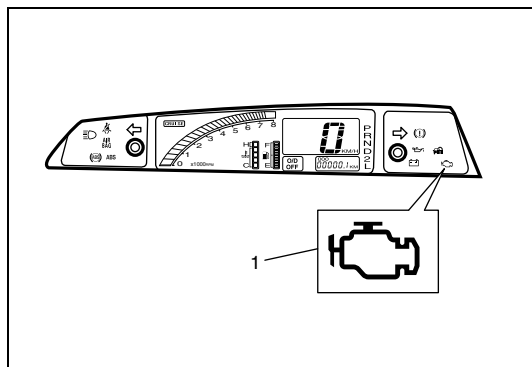
**NOTE:**

The above form is a standard sample. It should be modified according to conditions characteristic of each market.

## Malfunction Indicator Lamp (MIL) Check

Refer to the same item in Section 6 for checking procedure.

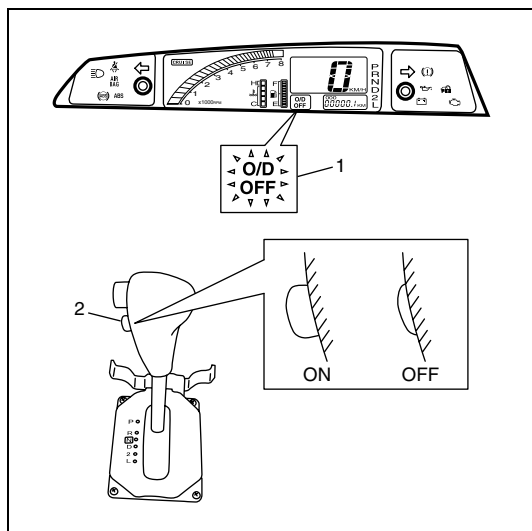
1. MIL



## “O/D OFF” Lamp Check

- 1) Check that O/D off switch button (2) is at OFF position (pushed).
- 2) Turn ignition switch ON.
- 3) Check that “O/D OFF” lamp (1) lights for about 2 sec. and then goes OFF.

If anything faulty is found, advance to “Diagnostic Flow Table A-3”.



## Diagnostic Trouble Code (DTC) Check

Automatic transaxle DTC can be checked using any one of the following 3 methods.

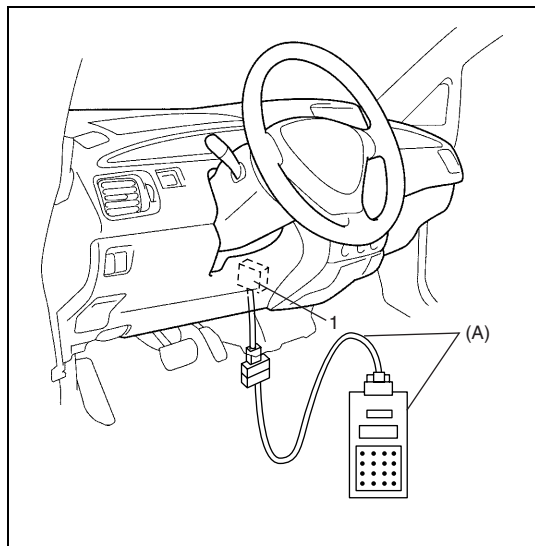
### Reading DTC from ECM using SUZUKI scan tool – method-1

Refer to the same item in Section 6 for reading procedure.

#### NOTE:

The method is available only for the vehicle with immobilizer lamp.

## Reading DTC from TCM using SUZUKI scan tool – method-2



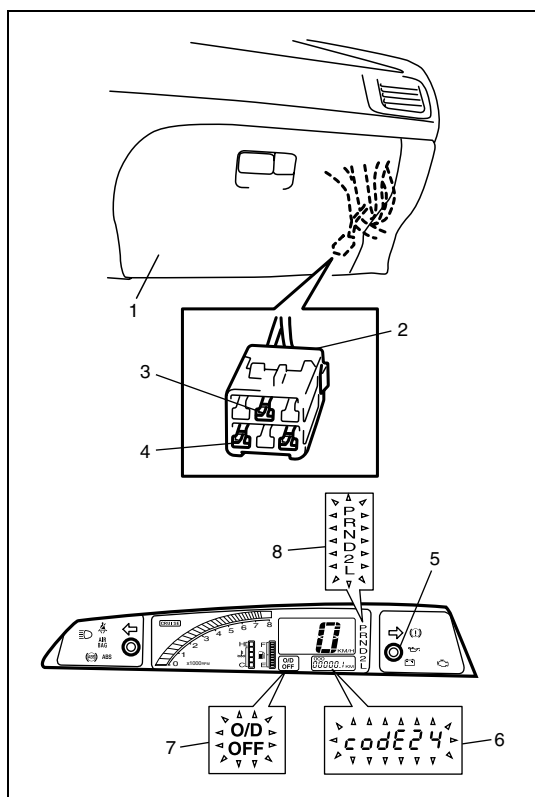
- 1) Turn ignition switch OFF.
- 2) After setting cartridge, connect SUZUKI scan tool to data link connector (DLC) (1) located in underside of instrument panel at driver's seat side.

### Special tool

**(A) : SUZUKI scan tool**

- 3) Turn ignition switch ON.
- 4) Read DTC according to instructions displayed on SUZUKI scan tool and print it down. Refer to SUZUKI scan tool operator's manual for further details.
- 5) After completing the check, turn ignition switch OFF and disconnect SUZUKI scan tool from data link connector (DLC) (1).

## Displaying DTC on odometer – method-3



- 1) Turn ignition switch OFF.
- 2) Remove glove box (1) from instrument panel.
- 3) Using service wire, connect diagnosis switch terminal (3) with ground terminal (4) of monitor connector (color in Blue) (2).
- 4) Turn ignition switch ON.
- 5) Press reset button (5) and hold on pressing it.
- 6) Read DTC displayed on odometer (6). (For example, DTC No. 24 is displayed on odometer in the figure.)
- 7) After completing the check, release reset switch, turn ignition switch OFF and disconnect service wire from monitor connector (2).

### NOTE:

**While DTC is displayed on odometer, "O/D OFF" lamp (7) and shift indicator (8) light together.**

## Diagnostic Trouble Code (DTC) Clearance

As automatic transaxle DTC is stored in memory of ECM and TCM respectively, be sure to clear it from both ECM and TCM by using either method-1 and method-2 or method-1 and method-3 of the following 3 methods.

### NOTE:

**For vehicle without immobilizer lamp, method-1 is not necessary to be performed, because automatic transmission DTC is not stored in memory of ECM.**

### To clear DTC stored in ECM with scan tool – method-1

Refer to the same item in Section 6 for reading procedure.

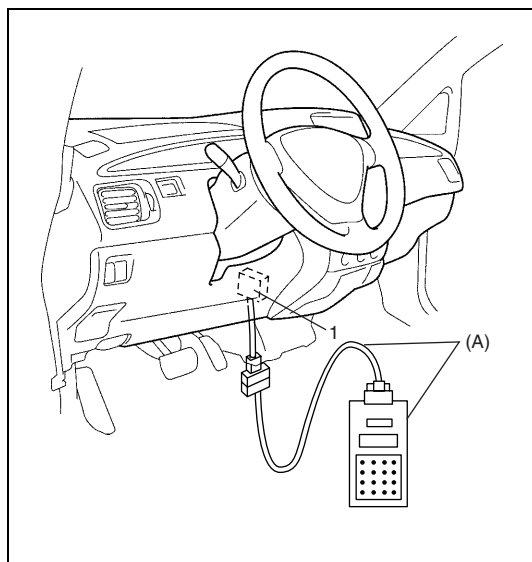
### To clear DTC stored in TCM with scan tool – method-2

- 1) Turn ignition switch OFF.
- 2) After setting cartridge, connect SUZUKI scan tool to data link connector (DLC) (1) located in underside of instrument panel at driver's seat side.

### Special tool

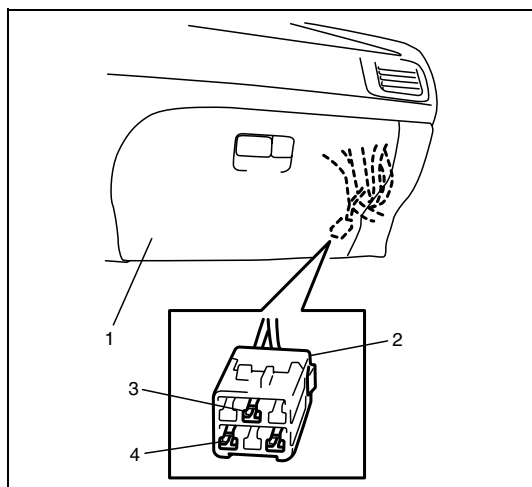
**(A) : SUZUKI scan tool**

- 3) Turn ignition switch ON.
- 4) Clear DTC according to instructions displayed on SUZUKI scan tool. Refer to SUZUKI scan tool operator's manual for further details.
- 5) After completing the clearance, turn ignition switch OFF and disconnect SUZUKI scan tool from data link connector (DLC) (1).



### To clear DTC stored in TCM without scan tool – method-3

- 1) Remove glove box (1) from instrument panel.
- 2) Turn ignition switch ON.
- 3) After 6 seconds or more, repeat connecting and disconnecting diagnosis switch terminal (3) and ground terminal (4) of monitor connector (color in Blue) (2) 5 times at about 1 second interval within 10 seconds, using service wire.
- 4) Check TCM that no malfunction DTC remains in memory of it.



## Diagnostic Trouble Code (DTC) Table

### NOTE:

- Confirmation available table of automatic transaxle related DTC is shown below.

	Vehicle with immobilizer Lamp				Vehicle without immobilizer Lamp			
	DTC in ECM		DTC in TCM		DTC in ECM		DTC in TCM	
	Code type I	Code type II	Code type I	Code type II	Code type I	Code type II	Code type I	Code type II
SUZUKI scan tool	○	×	○	○	×	×	○	○
Generic scan tool	○	×	×	×	×	×	×	×
Not using scan tool (Displaying on odometer)	×	×	×	○	×	×	×	○

○ :Available (DTC can be confirmed)

× :Not available (DTC can not be confirmed)

- A:** Driving cycles when MIL lightening and storing DTC in ECM and TCM memory for vehicle with immobilizer lamp
- B:** Driving cycles when “O/D OFF” light flashing and storing DTC in TCM memory for vehicle without immobilizer lamp
- \*1:** Trouble (and DTC) is not detected for vehicle without immobilizer lamp.
- \*2:** MIL does not light although DTC is detected and stored for vehicle with immobilizer lamp.
- \*3:** “O/D OFF” lamp does not flash although DTC is detected and stored for vehicle without immobilizer lamp.

DTC NO.		DETECTING ITEM	DETECTING CONDITION (DTC will set when detecting:)	A	B
Type I	Type II				
P0705	34	Transmission range sensor circuit malfunction	<ul style="list-style-type: none"> <li>No sensor signal is inputted.</li> <li>or</li> <li>“D” range signal and other one or more signals are inputted simultaneously.</li> </ul>	1 driving cycle	*3 1 driving cycle
P0710	36	Transmission fluid temperature sensor circuit malfunction	Sensor output voltage is too high (Circuit open or shorted power circuit)	Not applicable	*3 2 driving cycles
	38		Sensor output voltage is too low (Circuit shorted to ground)		
P0715	37	Input/Turbine speed sensor circuit malfunction	No sensor signal is inputted although output shaft speed sensor signal is inputted.	1 driving cycle	1 driving cycle
P0720	31	Output speed sensor circuit malfunction	No sensor signal is inputted although input shaft speed sensor signal is inputted.	1 driving cycle	1 driving cycle
*1 P0725	*1 35	Engine speed input circuit malfunction	No engine speed signal is inputted although engine is running and engine coolant temperature sensor signal is in normal condition.	2 driving cycles	Not applicable

DTC NO.		DETECTING ITEM	DETECTING CONDITION (DTC will set when detecting:)	A	B
Type I	Type II				
*1 P0741	*1 29	Torque converter clutch system performance or stuck off	<ul style="list-style-type: none"> <li>Difference in revolution between engine and A/T input is larger than specification although TCM commanded solenoid to turn ON.</li> </ul> or <ul style="list-style-type: none"> <li>Difference in revolution between engine and A/T input is smaller than specification although TCM commanded solenoid to turn OFF.</li> </ul>	2 driving cycles	Not applicable
P0743	25	Torque converter clutch system electrical	Voltage of TCC solenoid terminal is too high although TCM is commanding TCC solenoid to turn OFF.	1 driving cycle	*3 1 driving cycle
	26		Voltage of TCC solenoid terminal is too low although TCM is commanding TCC solenoid to turn ON.		
P0748	41	Pressure control solenoid electrical	No electric flow is detected on solenoid circuit.	1 driving cycle	1 driving cycle
	42		Too much electric flow is detected on pressure control solenoid circuit.		
*1 P0751	*1 17	Shift solenoid-A (No.1) performance or stuck off	Actual gear position (ratio) does not agree with gear position (ratio) commanded by TCM to A/T.	2 driving cycles	Not applicable
P0753	21	Shift solenoid-A (No.1) electrical	Voltage of shift solenoid terminal is too high although TCM is commanding shift solenoid to turn OFF.	1 driving cycle	1 driving cycle
	22		Voltage of shift solenoid terminal is too low although TCM is commanding shift solenoid to turn ON.		
*1 P0756	*1 28	Shift solenoid-B (No.2) performance or stuck off	Actual gear position (ratio) does not agree with gear position (ratio) commanded by TCM to A/T.	2 driving cycles	Not applicable
P0758	23	Shift solenoid-B (No.2) electrical	Voltage of shift solenoid terminal is too high although TCM is commanding shift solenoid to turn OFF.	1 driving cycle	1 driving cycle
	24		Voltage of shift solenoid terminal is too low although TCM is commanding shift solenoid to turn ON.		

DTC NO.		DETECTING ITEM	DETECTING CONDITION (DTC will set when detecting:)	A	B
Type I	Type II				
P1700	32	Throttle position signal circuit malfunction	Too short low signal of pulse signal from ECM to TCM continues out of specification.	1 driving cycle	1 driving cycle
	33		Too long low signal of pulse signal from ECM to TCM continues out of specification.		
P1702	52	Internal malfunction of TCM	Calculation of current data stored in TCM is not correct comparing with pre-stored checking data in TCM.	1 driving cycle	1 driving cycle
P1705	51	Engine coolant temperature signal circuit malfunction	Voltage at signal circuit TCM terminal is low or high while engine is running.	1 driving cycle	1 driving cycle
P1895	27	Torque reduction signal circuit malfunction	Voltage of torque reduction signal circuit terminal is low although TCM does not require ECM to reduce engine torque.	Not applicable	*3 1 driving cycle

## Fail Safe Table

This function is provided by the safe mechanism that assures safe driveability even when the solenoid valve, sensor or its circuit fails.

The table below shows the fail safe function for each fail condition of solenoid, solenoid or its circuit.

DTC NO.		TROUBLE AREA	FAIL SAFE OPERATION
P0753	21 22	Shift solenoid valve-A or its circuit	<ul style="list-style-type: none"> <li>Power supply to shift solenoid valve, TCC solenoid valve and pressure control solenoid valve is cut.</li> <li>Gear position is fixed as shown below.               <ul style="list-style-type: none"> <li>When select lever position is R: Reverse</li> <li>D: 4th (O/D)</li> <li>2: 3rd</li> <li>L: 1st</li> </ul> </li> <li>Lock-up function is inhibited to operate. (Except P1702)</li> </ul>
P0758	23 24	Shift solenoid valve-B or its circuit	
P0748	41 42	Pressure control solenoid valve or its circuit	
P1702	52	TCM	
P0743	25 26	TCC solenoid valve or its circuit	<ul style="list-style-type: none"> <li>Lock-up function is inhibited to operate.</li> <li>Up-shift to 4th gear is inhibited when A/T fluid temperature is 150°C (302°F) or higher.</li> <li>When TCC solenoid valve circuit is shorted to power circuit and vehicle speed is less than 10 km/h (6 mile/h), gear position is fixed in 1st gear for prevention of engine stall.</li> </ul>
P0705	34	Transmission range sensor or its circuit	<ul style="list-style-type: none"> <li>In case of circuit open, selected range is set as "D" range and lock-up function is inhibited to operate.</li> <li>In case of circuit short (In case that 2 or more sensor signals are inputted), selected range is set in priority order shown below. N &gt; R &gt; L &gt; 2 &gt; D &gt; P</li> </ul>
P0710	36 38	Transmission fluid temperature sensor or its circuit	Line pressure raising control at low fluid temperature is inhibited.

DTC NO.		TROUBLE AREA	FAIL SAFE OPERATION
P0715	37	Input shaft speed sensor or its circuit	<ul style="list-style-type: none"> <li>Power supply to shift solenoid valve and TCC solenoid valve is cut.</li> <li>Gear position is fixed as shown below. <ul style="list-style-type: none"> <li>When select lever position is R: Reverse <ul style="list-style-type: none"> <li>D: 4th (O/D)</li> <li>2: 3rd</li> <li>L: 1st</li> </ul> </li> </ul> </li> <li>Lock-up function is inhibited to operate.</li> <li>Reverse control operation, which inhibit reverse driving at "R" range while vehicle runs forward more than 7 km/h (4 mile/h), is inhibited.</li> </ul>
P0720	31	Output shaft speed sensor or its circuit	
P1700	32 33	Throttle position signal circuit	<ul style="list-style-type: none"> <li>Power supply to shift solenoid valve and TCC solenoid valve is cut.</li> <li>Gear position is fixed as shown below. <ul style="list-style-type: none"> <li>When select lever position is R: Reverse <ul style="list-style-type: none"> <li>D: 4th (O/D)</li> <li>2: 3rd</li> <li>L: 1st</li> </ul> </li> </ul> </li> <li>Lock-up function is inhibited to operate.</li> <li>Torque reducing requirement to ECM (torque reduction control) is inhibited.</li> </ul>
P1705	51	Engine coolant temperature signal circuit	Engine coolant temperature is assumed as normal operating temperature, and controls of overdrive and lock-up is released from inhibition.
P1895	27	Torque reduction signal circuit	Torque reducing requirement to ECM (torque reduction control) is inhibited.



## Visual Inspection

Visually check the following parts and systems.

INSPECTION ITEM	REFERRING SECTION
<ul style="list-style-type: none"> <li>• A/T fluid ----- level, leakage, color</li> <li>• A/T fluid hoses ----- disconnection, looseness, deterioration</li> <li>• Throttle cable ----- play (under warm engine), installation</li> <li>• A/T select cable ----- installation</li> <li>• Engine oil ----- level, leakage</li> <li>• Engine coolant ----- level, leakage</li> <li>• Engine mountings ----- play, looseness, damage</li> <li>• Suspension ----- play, looseness</li> <li>• Drive shafts ----- damage</li> <li>• Battery ----- indicator condition, corrosion of terminal</li> <li>• Connectors of electric wire harness ----- disconnection, friction</li> <li>• Fuses ----- burning</li> <li>• Parts ----- installation, damage</li> <li>• Bolts ----- looseness</li> <li>• Other parts that can be checked visually</li> </ul> <p>Also check the following items at engine start, if possible.</p> <ul style="list-style-type: none"> <li>• "O/D OFF" lamp ----- Operation</li> <li>• Malfunction indicator lamp ----- Operation</li> <li>• Charge warning lamp ----- Operation</li> <li>• Engine oil pressure warning lamp ----- Operation</li> </ul> <ul style="list-style-type: none"> <li>• Engine coolant temp. meter ----- Operation</li> <li>• Other parts that can be checked visually</li> </ul>	<p>Section 0B</p> <p>Section 7B1</p> <p>Section 6E1</p> <p>Section 7B1</p> <p>Section 0B</p> <p>Section 0B</p> <p>Section 6A1</p> <p>Section 3</p> <p>Section 4A and Section 4C</p> <p>Section 6E1</p> <p>Section 8</p> <p>Section 6E1</p> <p>Section 6H</p> <p>Section 8 (Section 6A1 for pressure check)</p>

## Automatic Transaxle Basic Check

This check is important for troubleshooting when TCM has detected no DTC and no abnormality has been noted in visual inspection. Follow the flow table carefully.

Step	Action	Yes	No
1	Was "Automatic Transaxle Diagnostic Flow Table" preformed?	Go to Step 2.	Go to "Automatic Transaxle Diagnostic Flow Table".
2	Perform "Road Test" in this section. Is it OK?	Go to Step 3.	Proceed to "Troubleshooting" in "Road Test".
3	Perform "Manual Road Test" in this section. Is it OK?	Go to Step 4.	Proceed to "Troubleshooting" in "Manual Road Test".
4	Perform "Engine Brake Test" in this section. Is it OK?	Go to Step 5.	Proceed to "Troubleshooting" in "Engine Brake Test".
5	Perform "Stall Test" in this section. Is it OK?	Go to Step 6.	Proceed to "Troubleshooting" in "Stall Test".
6	Perform "Time Lag Test" in this section. Is it OK?	Go to Step 7.	Proceed to "Troubleshooting" in "Time Lag Test".
7	Perform "Line Pressure Test" in this section. Is it OK?	Go to Step 8.	Proceed to "Troubleshooting" in "Line Pressure Test".
8	Proceed to "Trouble Diagnosis Table-1" in this section. Is trouble identified?	Repair or replace faulty parts.	Go to Step 9.
9	Proceed to "Trouble Diagnosis Table-2" in this section. Is trouble identified?	Repair or replace faulty parts.	Proceed to "Trouble Diagnosis Table-3" in this section.

## Trouble Diagnosis Table

### Trouble diagnosis table-1

#### Electrical Repair

Condition	Possible Cause	Correction
<b>Poor 1 → 2 shift</b>	Shift solenoid valve-B circuit faulty	Inspect circuit for open, short and intermittent. If NG, repair.
	Output shaft speed sensor circuit faulty	
	Transmission range sensor circuit faulty	
	Throttle position sensor signal circuit faulty	
	Throttle position sensor circuit faulty	Inspect circuit for open, short and intermittent referring to Section 6. If NG, repair.
	TCM	Inspect referring to DTC Flow Table of P0705, P0720, P0758 and P1700 in this section. If NG, replace.
	ECM	Inspect referring to DTC Flow Table of P0120 in Section 6. If NG, replace.
<b>Poor 2 → 3 shift</b>	Shift solenoid valve-A circuit faulty	Inspect circuit for open, short and intermittent. If NG, repair.
	Output shaft speed sensor circuit faulty	
	Transmission range sensor circuit faulty	
	Throttle position sensor signal circuit faulty	
	Throttle position sensor circuit faulty	Inspect circuit for open, short and intermittent referring to Section 6. If NG, repair.
	TCM	Inspect referring to DTC Flow Table of P0705, P0720, P0753 and P1700 in this section. If NG, replace.
	ECM	Inspect referring to DTC Flow Table of P0120 in Section 6. If NG, replace.

Condition	Possible Cause	Correction
<b>Poor 3 → O/D shift</b>	Shift solenoid valve-B circuit faulty	Inspect circuit for open, short and intermittent. If NG, repair.
	Output shaft speed sensor circuit faulty	
	Transmission range sensor circuit faulty	
	Transmission fluid temperature sensor circuit faulty	
	Throttle position sensor signal circuit faulty	
	Engine coolant temperature sensor signal circuit faulty	
	Throttle position sensor circuit faulty	Inspect circuit for open, short and intermittent referring to Section 6. If NG, repair.
	Engine coolant temperature sensor circuit faulty	Refer to "Diagnostic Flow Table A-1" in this section.
	O/D off switch circuit faulty	Inspect referring to DTC Flow Table of P0705, P0710, P0720, P0758, P1700 and P1705 in this section. If NG, replace.
<b>Incorrect gear shift point</b>	TCM	Inspect referring to DTC Flow Table of P0115 and P0120 in Section 6. If NG, replace.
	ECM	Inspect referring to DTC Flow Table of P0115 and P0120 in Section 6. If NG, replace.
	Output shaft speed sensor circuit faulty	Inspect circuit for open, short and intermittent. If NG, repair.
	Throttle position sensor signal circuit faulty	
	Throttle position sensor circuit faulty	Inspect circuit for open, short and intermittent referring to Section 6. If NG, repair.
	TCM	Inspect referring to DTC Flow Table of P0720 and P1700 in this section. If NG, replace.
	ECM	Inspect referring to DTC Flow Table of P0120 in Section 6. If NG, replace.

Condition	Possible Cause	Correction
<b>Non operate TCC (lock-up) system</b>	TCC solenoid valve circuit faulty	Inspect circuit for open, short and intermittent. If NG, repair.
	Output shaft speed sensor circuit faulty	
	Transmission range sensor circuit faulty	
	Transmission fluid temperature sensor circuit faulty	
	Throttle position sensor signal circuit faulty	
	Engine coolant temperature sensor signal circuit faulty	Inspect circuit for open, short and intermittent referring to Section 6. If NG, repair.
	Throttle position sensor circuit faulty	
	Engine coolant temperature sensor circuit faulty	Refer to "Diagnostic Flow Table A-2" in this section.
<b>Higher or lower stall speed</b>	Brake light switch circuit faulty	Inspect referring to DTC Flow Table of P0705, P0710, P0720, P0743, P1700 and P1705 in this section. If NG, replace.
	TCM	Inspect referring to DTC Flow Table of P0115 and P0120 in Section 6. If NG, replace.
<b>Excessive "N" → "D" or "N" → "R" time lag</b>	ECM	Inspect circuit for open, short and intermittent. If NG, repair.
	Pressure control solenoid valve circuit faulty	Inspect referring to DTC Flow Table of P0748 in this section. If NG, replace.
<b>Higher or lower line pressure</b>	TCM	Inspect circuit for open, short and intermittent. If NG, repair.
	Pressure control solenoid valve circuit faulty	Inspect referring to DTC Flow Table of P0748 in this section. If NG, replace.

**Trouble diagnosis table-2****On-Vehicle Repair**

<b>Condition</b>	<b>Possible Cause</b>	<b>Correction</b>
<b>Unable to run in all range</b>	Faulty valve body component	Replace valve body assembly.
<b>Poor 1 → 2 shift, excessive shock or slippage</b>	Engine abnormal condition	Inspect and repair engine.
	Malfunction of shift solenoid valve-B	Inspect. If NG, replace.
	Malfunction of input shaft speed sensor	
	Malfunction of output shaft speed sensor	
	Malfunction of transmission range sensor	
	Malfunction of transmission fluid temperature sensor	
	Malfunction of throttle position sensor	Inspect referring to Section 6E1. If NG, replace.
	Malfunction of brake light switch	Inspect referring to Section 5. If NG, replace.
	Malfunction of pressure control solenoid valve	Inspect. If NG, replace valve body assembly.
	Faulty valve body component	Replace valve body assembly.
<b>Poor 2 → 3 shift, excessive shock or slippage</b>	Engine abnormal condition	Inspect and repair engine.
	Malfunction of shift solenoid valve-A	Inspect. If NG, replace.
	Malfunction of input shaft speed sensor	
	Malfunction of output shaft speed sensor	
	Malfunction of transmission range sensor	
	Malfunction of transmission fluid temperature sensor	
	Malfunction of throttle position sensor	Inspect referring to Section 6E1. If NG, replace.
	Malfunction of brake light switch	Inspect referring to Section 5. If NG, replace.
	Malfunction of pressure control solenoid valve	Inspect. If NG, replace valve body assembly.
	Faulty valve body component	Replace valve body assembly.
<b>Poor 3 → O/D shift, excessive shock or slippage</b>	Engine abnormal condition	Inspect and repair engine.
	Malfunction of TCC solenoid valve	Inspect. If NG, replace.
	Malfunction of input shaft speed sensor	
	Malfunction of output shaft speed sensor	
	Malfunction of transmission range sensor	
	Malfunction of transmission fluid temperature sensor	
	Malfunction of O/D switch	
	Malfunction of engine coolant temperature sensor	Inspect referring to Section 6E1. If NG, replace.
	Malfunction of throttle position sensor	Inspect referring to Section 5. If NG, replace.
	Malfunction of brake light switch	
	Malfunction of pressure control solenoid valve	Inspect. If NG, replace valve body assembly.
	Faulty valve body component	Replace valve body assembly.

Condition	Possible Cause	Correction
<b>Incorrect shift point</b>	Engine abnormal condition	Inspect and repair engine.
	Malfunction of output shaft speed sensor	Inspect. If NG, replace.
	Malfunction of throttle position sensor	
<b>Non operate TCC (lock-up) system</b>	Malfunction of TCC solenoid valve	Inspect. If NG, replace.
	Malfunction of output shaft speed sensor	
	Malfunction of transmission range sensor	
	Malfunction of transmission fluid temperature sensor	
	Malfunction of throttle position sensor	Inspect referring to Section 6E1. If NG, replace.
	Malfunction of engine coolant temperature sensor	
	Malfunction of brake light switch	Inspect referring to Section 5. If NG, replace.
<b>Excessive “N” → “D” or “N” → “R” time lag</b>	Faulty valve body component	Replace valve body assembly.
	Pressure control solenoid valve circuit faulty	Inspect. If NG, replace valve body assembly.
	Primary regulator valve faulty	Replace valve body assembly.

### Trouble diagnosis table-3

#### Off-Vehicle Repair

Condition	Possible Cause	Correction
<b>Unable to run in all range</b>	Faulty oil pump	Inspection. If NG, replace.
	Seized or broken planetary gear	
	Faulty one-way clutch No.2	
	Damaged drive plate	
	Faulty torque converter	Replace.
<b>Poor 1 → 2 shift, excessive shock or slippage</b>	Faulty 2nd/4th brake	Inspection. If NG, replace.
	Faulty one-way clutch No.1	
<b>Poor 2 → 3 shift, excessive shock or slippage</b>	Faulty O/D clutch	Inspection. If NG, replace.
	Faulty 2nd/4th brake	
<b>Poor 3 → O/D shift, excessive shock or slippage</b>	Faulty coast clutch	Inspection. If NG, replace.
	Faulty 2nd/4th brake	
	Faulty one-way clutch No.0	
<b>Non operate TCC (lock-up) system</b>	Faulty valve body component	Replace valve body assembly.
<b>Excessive “N” → “D” time lag</b>	Clogged oil strainer	Replace.
	Faulty oil pump	Inspection. If NG, replace.
	Faulty forward clutch	
	Faulty one-way clutch No.0 and/or No.1	
	Leakage from “D” range fluid pressure circuit	Overhaul or replace valve body assembly.

Condition	Possible Cause	Correction
<b>Excessive “N” → “R” time lag</b>	Clogged oil strainer	Replace.
	Faulty oil pump	Inspection. If NG, replace.
	Faulty reverse clutch	
	Faulty 1st/reverse brake	
	Leakage from “D” range fluid pressure circuit	Overhaul or replace valve body assembly.
<b>Poor engine brake in downshift to “2” range</b>	Faulty 3rd/4th brake	Inspection. If NG, replace.
<b>Poor engine brake in downshift to “L” range</b>	Faulty 1st/reverse brake	Inspection. If NG, replace.

## Road Test

This test is to check if upshift, downshift and lock-up take place at specified speeds while actually driving vehicle on a level road.

### WARNING:

- Carry out test in very little traffic area to prevent an accident.
- Test requires 2 persons, a driver and a tester.

- 1) Warm up engine.
- 2) With engine running at idle, shift select “D”.
- 3) Accelerate vehicle speed by depressing accelerator pedal gradually.
- 4) While driving in “D” range, check if gear shift and lock-up occur properly as shown in “Gear Shift Diagram and Lock-Up Diagram”. (Refer to “Automatic Gear Shift Diagram” in this section.)

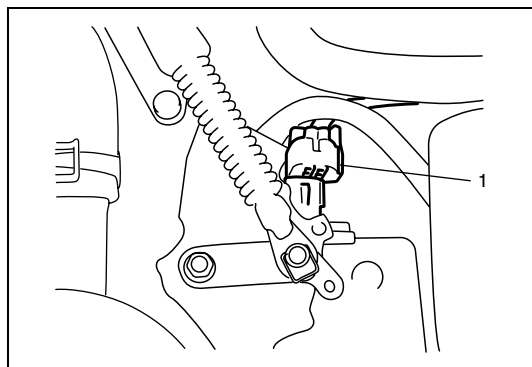
## Troubleshooting

Condition	Possible Cause	Correction
<b>Unable to run in all range</b>	Faulty valve body component	Replace valve body assembly
	Faulty oil pump	Inspect. If NG, replace.
	Seized or broken planetary gear	
	Faulty one-way clutch No.2	
	Damaged drive plate	
	Faulty torque converter	Replace.
<b>1 → 2 upshift fails to occur</b>	Malfunction of shift solenoid valve-B	Inspect. If NG, replace.
	Malfunction of throttle position sensor	
	Malfunction of output shaft speed sensor	
	Malfunction of transmission range sensor	
	Faulty valve body component	Replace valve body assembly.
	Faulty 2nd/4th brake	Inspect. If NG, replace.
	Faulty one-way clutch No.1	



Condition	Possible Cause	Correction
<b>2 → 3 upshift fails to occur</b>	Malfunction of shift solenoid valve-A	Inspect. If NG, replace.
	Malfunction of throttle position sensor	
	Malfunction of output shaft speed sensor	
	Malfunction of transmission range sensor	
	Faulty valve body component	Replace valve body assembly.
	Faulty O/D clutch	Inspect. If NG, replace.
	Faulty 2nd/4th brake	
<b>3 → O/D upshift fails to occur</b>	Malfunction of shift solenoid valve-B	Inspect. If NG, replace.
	Malfunction of O/D off switch	
	Malfunction of engine coolant temperature sensor	
	Malfunction of throttle position sensor	
	Malfunction of transmission range sensor	
	Malfunction of output shaft speed sensor	
	Malfunction of transmission fluid temperature sensor	
	Faulty valve body component	Replace valve body assembly.
	Faulty coast clutch	Inspect. If NG, replace.
	Faulty 2nd/4th brake	
	Faulty one-way clutch No.0	
<b>Gear shift point is incorrect</b>	Abnormal engine condition	Inspect and repair engine.
	Malfunction of output shaft speed sensor	Inspect. If NG, replace.
	Malfunction of throttle position sensor	
<b>TCC (lock-up) function does not operate</b>	Malfunction of TCC solenoid valve	Inspect. If NG, replace.
	Malfunction of brake light switch	
	Malfunction of engine coolant temperature sensor	
	Malfunction of throttle position sensor	
	Malfunction of transmission range sensor	
	Malfunction of output shaft speed sensor	
	Malfunction of transmission fluid temperature sensor	
	Faulty valve body component	Replace valve body assembly.
	Faulty torque converter	Replace.

## Manual Road Test



This test checks the gears being used in “L”, “2” or “D” range when driven with unoperated gear shift control system. Test drive vehicle on a level road.

### NOTE:

**Before this test, check diagnostic trouble code (DTC).**

- 1) With select lever in “P”, start engine and warm it up.
- 2) After warming up engine, turn ignition switch OFF and disconnect valve body connector (1).
- 3) With select lever in “L” range, start vehicle and accelerate to 20 km/h (12.5 mile/h). Check in this state that 1st gear is being used.
- 4) At 20 km/h (12.5 mile/h), shift select lever to “2” range and accelerate to 40 km/h (25 mile/h). Check in this state that 3rd gear is being used.
- 5) At 40 km/h (25 mile/h), shift select lever to “D” range and check that O/D gear is used when speed is higher than 40 km/h (25 mile/h).
- 6) After above checks, stop vehicle then turn ignition switch OFF, and connect valve body connector (1).
- 7) Clear DTC.

### Troubleshooting

Condition	Possible Cause	Correction
Selected gear is not correct	Faulty valve body component	Replace valve body assembly.
	Faulty clutch or brake	Inspect clutch and brake. If any parts are faulty, replace them.

## Engine Brake Test

### WARNING:

**Before test, make sure that there is no vehicle behind so as to prevent rear-end collision.**

- 1) While driving vehicle in 3rd gear of “D” range, shift select lever down to “2” range and check if engine brake operates.
- 2) In the same way as in Step 1), check engine brake for operation when select lever is shifted down to “L” range.
- 3) Engine brake should operate in above test.

### Troubleshooting

Condition	Possible Cause	Correction
Failure to operate when shifted down to “2” range	Faulty 2nd/4th brake	Inspect. If NG, replace.
Failure to operate when shifted down to “L” range	Faulty 1st/reverse brake	

## Stall Test

This test is to check overall performance of automatic transaxle and engine by measuring stall speed at “D” and “R” ranges. Be sure to perform this test only when transaxle fluid is at normal operating temperature and its level is between FULL and LOW marks.

### CAUTION:

- **Do not run engine at stall more than 5 seconds continuously, for fluid temperature may rise excessively high.**
- **After performing stall test, be sure to leave engine running at idle for longer than 1 minute before another stall test.**

- 1) Apply parking brake and block wheels.
- 2) Install tachometer.
- 3) Start engine with select lever shifted to “P”.
- 4) Depress brake pedal fully.
- 5) Shift select lever to “D” and depress accelerator pedal fully while watching tachometer. Read engine rpm quickly when it has become constant (stall speed).
- 6) Release accelerator pedal immediately after stall speed is checked.
- 7) In the same way, check stall speed in “R” range.
- 8) Stall speed should be within following specification.

### Engine stall speed

**Standard : 2,180 – 2,480 rpm**

## Troubleshooting

Condition	Possible Cause	Correction
<b>Lower than standard level in both “D” and “R” range</b>	Engine output torque failure	Inspect and repair engine.
	Faulty one-way clutch of torque converter	Replace torque converter.
<b>Higher than standard level in “D” range</b>	Malfunction of pressure control solenoid valve (Low line pressure)	Inspect. If NG, replace valve body assembly.
	Malfunction of primary regulator valve (Low line pressure)	Replace valve body assembly.
	Slippery forward clutch	Inspect. If NG, replace.
	Faulty one-way clutch No.0 and/or No.1	
	Leakage from “D” range fluid pressure circuit	Overhaul or replace valve body assembly.
<b>Higher than standard level in “R” range</b>	Malfunction of pressure control solenoid valve (Low line pressure)	Inspect. If NG, replace valve body assembly.
	Malfunction of primary regulator valve (Low line pressure)	Replace valve body assembly.
	Slippery reverse clutch	Inspect. If NG, replace.
	Slippery 1st/reverse brake	
	Leakage from “R” range fluid pressure circuit	Overhaul or replace valve body assembly.

Condition	Possible Cause	Correction
<b>Higher than standard level in both “D” and “R” range</b>	Malfunction of pressure control solenoid valve (Low line pressure)	Inspect. If NG, replace valve body assembly.
	Malfunction of primary regulator valve (Low line pressure)	Replace valve body assembly.
	Clogged oil strainer	Replace.
	Faulty oil pump	Inspect. If NG, replace.
	Faulty coast clutch	
	Leakage from both “D” and “R” range fluid pressure circuit	Overhaul or replace valve body assembly.

## Time Lag Test

This test is to check conditions of clutch, reverse brake and fluid pressure. “Time lag” means time elapsed since select lever is shifted with engine idling till shock is felt.

- 1) With chocks placed before and behind front and rear wheels respectively, depress brake pedal.
- 2) Start engine.
- 3) With stop watch ready, shift select lever from “N” to “D” range and measure time from that moment till shock is felt.
- 4) Similarly measure time lag by shifting select lever from “N” to “R” range.

### Gear shifting time lag

“N” → “D” : Less than 0.7 sec.

“N” → “R” : Less than 1.2 sec.

### NOTE:

- When repeating this test, be sure to wait at least one minute after select lever is shifted back to “N” range.
- Engine should be warmed up fully for this test.
- Repeat test 3 times and take average of those data for final time lag data.

## Troubleshooting

Condition	Possible Cause	Correction
<b>“N” → “D” time lag exceeds specification</b>	Malfunction of pressure control solenoid valve (Low line pressure)	Inspect. If NG, replace valve body assembly.
	Malfunction of primary regulator valve (Low line pressure)	Replace valve body assembly.
	Clogged oil strainer	Replace.
	Faulty oil pump	Inspect. If NG, replace.
	Faulty forward clutch	
	Faulty one-way clutch No.0 and/or No.1	
	Leakage from “D” range fluid pressure circuit	Overhaul or replace valve body assembly.

Condition	Possible Cause	Correction
<b>“N” → “R” time lag exceeds specification</b>	Malfunction of pressure control solenoid valve (Low line pressure)	Inspect. If NG, replace valve body assembly.
	Malfunction of primary regulator valve (Low line pressure)	Replace valve body assembly.
	Clogged oil strainer	Replace.
	Faulty oil pump	Inspect. If NG, replace.
	Faulty reverse clutch	
	Faulty 1st/reverse brake	
	Leakage from “R” range fluid pressure circuit	Overhaul or replace valve body assembly.

## Line Pressure Test

Purpose of this test is to check operating conditions of each part by measuring fluid pressure in fluid pressure line.

Line pressure test requires following conditions.

- Automatic fluid is at normal operating temperature (70 – 80°C / 158 – 176°F).
- Fluid is filled to proper level (between FULL and LOW on dipstick).
- Air conditioner switch is turned OFF.

1) Apply parking brake securely and place chocks against wheels.

2) Remove fluid pressure check hole plug bolt (1).

3) Attach oil pressure gauge to fluid pressure check hole in transaxle case.

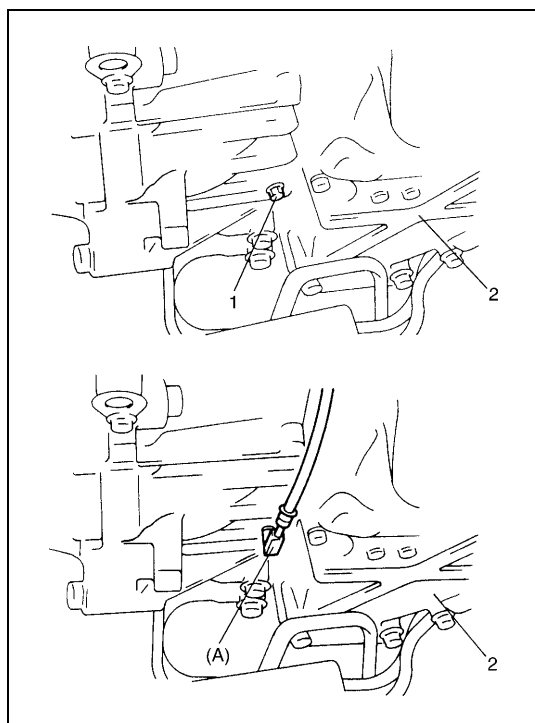
### Special tool

(A) : 09925-37811-001

### CAUTION:

After attaching oil pressure gauge, check that no fluid leakage exists.

2. Transaxle side cover



4) Depress foot brake fully, run engine at idle and stall then check fluid pressure in “D” or “R” range.

### CAUTION:

- Do not continue running engine at stall speed longer than 5 seconds.
- After performing line pressure test, be sure to leave engine running at idle for longer than one minute before performing another line pressure test.

**Automatic transmission line pressure**

	<b>“D” range</b>	<b>“R” range</b>
<b>At idle speed</b>	<b>3.7 – 4.3 kg/cm<sup>2</sup> 53 – 61 psi</b>	<b>5.2 – 6.2 kg/cm<sup>2</sup> 74 – 88 psi</b>
<b>At stall speed</b>	<b>11.2 – 13.1 kg/cm<sup>2</sup> 159 – 186 psi</b>	<b>15.0 – 17.2 kg/cm<sup>2</sup> 213 – 245 psi</b>

**Troubleshooting**

<b>Condition</b>	<b>Possible Cause</b>	<b>Correction</b>
<b>Higher than standard level in each range</b>	Malfunction of pressure control solenoid valve (Low line pressure)	Inspect. If NG, replace valve body assembly.
	Malfunction of primary regulator valve (Low line pressure)	Replace valve body assembly.
<b>Lower than standard level in each range</b>	Malfunction of pressure control solenoid valve (Low line pressure)	Inspect. If NG, replace valve body assembly.
	Malfunction of primary regulator valve (Low line pressure)	Replace valve body assembly.
	Clogged oil strainer	Replace.
	Faulty oil pump	Inspect. If NG, replace.
	Leakage from both “D” and “R” range fluid pressure circuit	Overhaul or replace valve body assembly.
<b>Lower than standard level only in “D” range</b>	Leakage from “D” range fluid pressure circuit	Overhaul or replace valve body assembly.
<b>Lower than standard level only in “R” range</b>	Leakage from “R” range fluid pressure circuit	Overhaul or replace valve body assembly.

**“P” Range Test**

- 1) Stop vehicle on a slope of 5 degrees or more, shift select lever to “P” range and at the same time apply parking brake.
- 2) After stopping engine, depress brake pedal and release parking brake.
- 3) Then, release brake pedal gradually and check that vehicle remains stationary.
- 4) Depress brake pedal and shift select lever to “N” range.
- 5) Then, release brake pedal gradually and check that vehicle moves.

**WARNING:**

**Before test, make sure no one is around vehicle or down on a slope and keep watchful for safety during test.**

**Troubleshooting**

<b>Condition</b>	<b>Possible Cause</b>	<b>Correction</b>
<b>Vehicle moves at “P” range or remains stationary at “N” range</b>	Defective parking lock pawl or spring	Inspect. If NG, repair.

## Diagnostic Flow Table A-1: No Gear Shift to O/D

### System Description

TCM does not shift to O/D gear under any of the following condition.

- O/D off switch is ON. ("O/D OFF" lamp OFF)

### Troubleshooting

#### WARNING:

- When performing a road test, select a place where there is no traffic or possibility of a traffic accident and be very careful during testing to avoid occurrence of an accident.
- Road test should be carried out with 2 persons, a driver and tester, on a level road.

Step	Action	Yes	No
1	Was "Automatic Transaxle Diagnostic Flow Table" in this section performed?	Go to Step 2.	Go to "Automatic Transaxle Diagnostic Flow Table" in this section.
2	Perform running test under the following conditions and check voltage between terminal G44-4 of TCM connector and ground, terminal G44-3 of TCM connector and ground. <ul style="list-style-type: none"> <li>• O/D off switch is OFF.</li> <li>• Selector lever is in "D" range.</li> <li>• Drive vehicle with 4th gear condition referring to "Automatic Gear Shift Diagram" in this section.</li> </ul> Is each terminal voltage 0 – 2 V?	Faulty shift solenoid valve, circuit or transaxle.	"GRY" or "GRN/ORN" circuit shorted to power circuit. If wire is OK, go to Step3.
3	"O/D" off switch signal inspection. With ignition switch ON, check voltage between terminal G43-3 of TCM connector and ground. O/D off switch OFF: 10 – 14 V O/D off switch ON: 0 – 2 V Is result as specified?	Substitute a Known-good TCM and recheck.	Faulty O/D off switch or its circuit. If OK, substitute a know-good TCM and recheck.

## Diagnostic Flow Table A-2: No Lock-Up Occurs

### System Description

TCM turns TCC solenoid OFF under any of the following conditions.

- Brake light switch is ON.
- Transmission range sensor circuit is in faulty condition. (P0705)
- Input shaft speed sensor circuit is in faulty condition. (P0715)
- Output shaft speed sensor circuit is in faulty condition. (P0720)
- TCC (lock-up) system circuit is in faulty condition. (P0743)
- Pressure control solenoid circuit is in faulty condition. (P0748)
- Shift solenoid circuit is in faulty condition. (P0753/P0758)
- Throttle position signal circuit is in faulty condition. (P1700)

### Troubleshooting

#### WARNING:

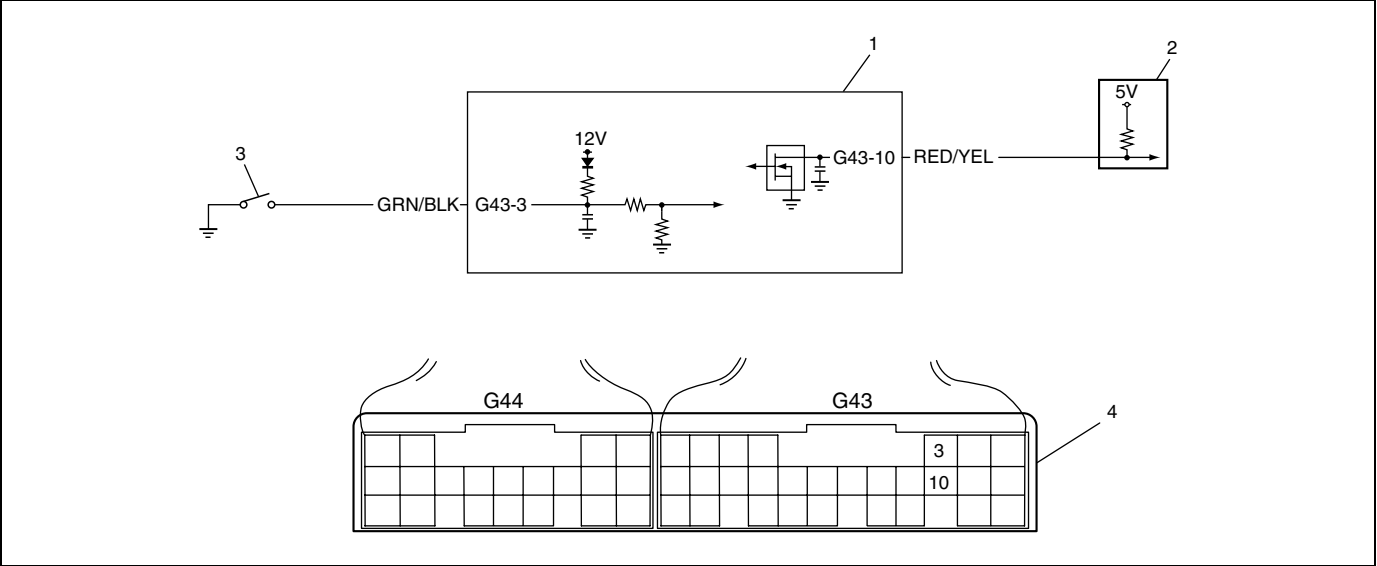
- When performing a road test, select a place where there is no traffic or possibility of a traffic accident and be very careful during testing to avoid occurrence of an accident.
- Road test should be carried out with 2 persons, a driver and tester, on a level road.

Step	Action	Yes	No
1	Was "Automatic Transaxle Diagnostic Flow Table" in this section performed?	Go to Step 2.	Go to "Automatic Transaxle Diagnostic Flow Table" in this section.
2	Check DTC. Is DTC P0705, P0715, P0720, P0743, P0748, P0753, P0758 or P1700 detected?	Perform DTC Flow Table to repair and retry.	Go to Step 3.
3	Perform running test under the following conditions and check voltage between terminal G44-12 of TCM connector and ground. <ul style="list-style-type: none"> <li>• Selector lever is in "D" range.</li> <li>• Brake pedal is released.</li> <li>• Drive vehicle with TCC ON condition referring to "Automatic Gear Shift Diagram" in this section.</li> </ul> Is terminal voltage about 10 – 14 V?	Faulty TCC solenoid valve, circuit or transaxle.	Go to Step 4.
4	Brake light switch signal inspection With ignition switch ON, check voltage between terminal G44-16 of TCM connector and ground. Brake pedal is released: 0 – 2 V Brake pedal is depressed: 10 – 14 V Is result as specified?	Substitute a known-good TCM and recheck.	Mis-adjusted brake light switch, faulty brake light switch or its circuit. If OK, substitute a known-good TCM and recheck.



Diagnostic Flow Table A-3: “O/D OFF” Lamp Circuit Check

Wiring Diagram



1. TCM	3. O/D off switch
2. Combination meter	4. Terminal arrangement of TCM connector (viewed from harness side)

Circuit Description

Operation (ON/OFF) of the “O/D OFF” lamp is controlled by transmission control module (TCM) and combination meter.

When ignition switch is turned ON with O/D off switch OFF (switch button is pushed) and malfunction is not detected, TCM turn “O/D OFF” lamp ON only for 2 seconds to check bulb and terns it OFF.

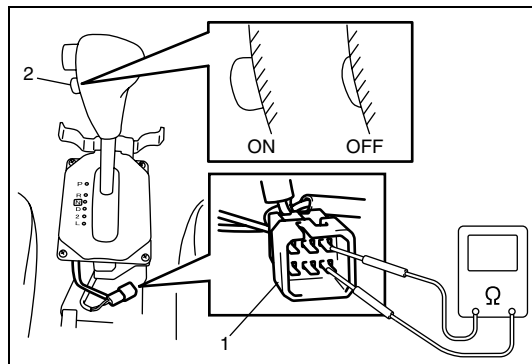
When ignition switch is turned ON regardless of engine running or not and malfunction is detected, “O/D OFF” lamp is blinked by TCM and combination meter while malfunction is detected to warn driver of such occurrence of trouble. (This function is available only for vehicle without immobilizer lamp.) “O/D OFF” lamp also blinks only for 10 seconds when communication circuit between TCM and combination meter break down (open or shot).

Troubleshooting

Step	Action	Yes	No
1	Does “O/D OFF” lamp light steady?	Go to Step 2.	Go to Step 5.
2	Check O/D off switch position. Is O/D off switch turned OFF (Is switch button at OFF position)?	Go to Step 3.	Turn O/D off switch OFF.
3	Check O/D off switch circuit. 1) Turn ignition switch OFF and disconnect TCM connectors. 2) Check resistance between terminal G43-3 of disconnected harness side connector and ground with O/D off switch OFF. Is continuity indicated?	Go to Step 4.	Faulty combination meter or TCM. Inspect combination meter referring to Section 8. If OK, substitute a know-good TCM and recheck.

Step	Action	Yes	No
4	Check O/D off switch for operation. 1) Disconnect O/D off switch coupler. 2) Check continuity between switch terminals under each condition below. See figure. O/D off switch OFF: No continuity O/D off switch ON: Continuity Is check result satisfactory?	"GRN/BLK" circuit shorted to ground.	Replace O/D off switch.
5	Does not "O/D OFF" lamp light or blink even passing 60 seconds after turning ignition switch ON?	Faulty combination meter or TCM. Inspect combination meter referring to Section 8. If OK, substitute a know-good TCM and recheck.	Go to Step 6.
6	Does "O/D OFF" lamp blink for 10 seconds and then go out?	"RED/YEL" circuit open or shorted to ground. If circuit is OK, faulty combination meter or TCM. Inspect combination meter referring to Section 8. If OK, substitute a know-good TCM and recheck.	Go to Step 7.
7	Is "O/D OFF" lamp blinking steady for over 10 seconds?	Go to Step 8.	System is OK.
8	Check DTC. Check DTC referring to "DTC Check" in this section. Are there any DTC(s)?	Proceed to "Automatic Transaxle Diagnostic Flow Table".	Faulty combination meter or TCM. Inspect combination meter referring to Section 8. If OK, substitute a know-good TCM and recheck.

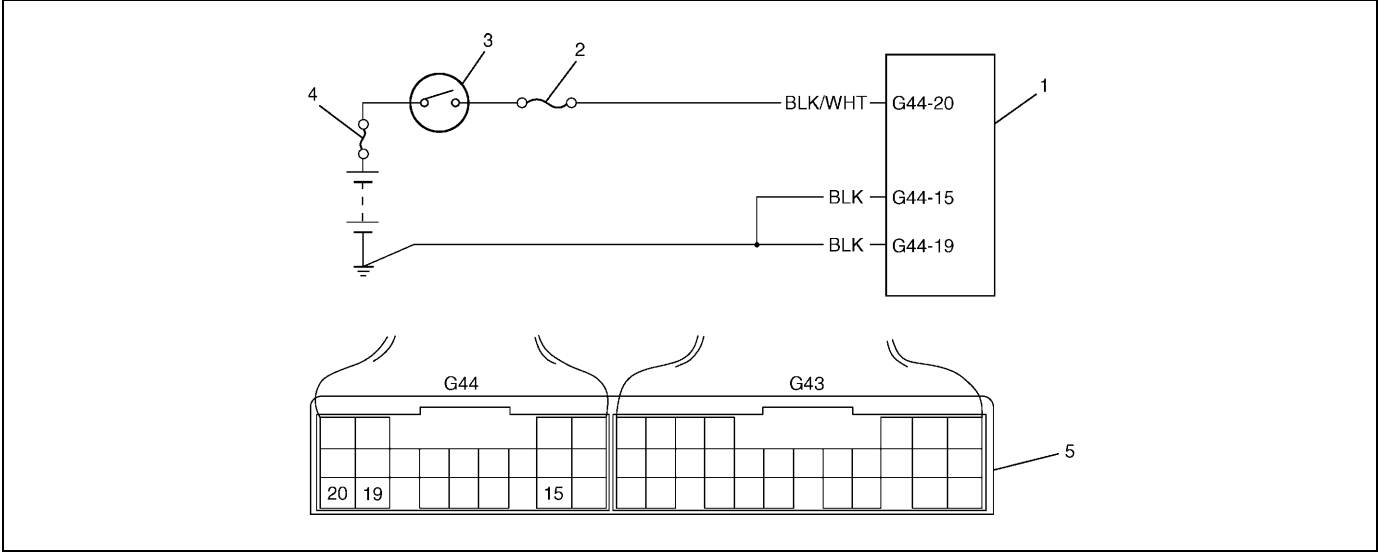
Fig. for Step 2 and Step 4



- |                           |
|---------------------------|
| 1. O/D off switch coupler |
| 2. O/D off switch button  |

Diagnostic Flow Table A-4: TCM Power and Ground Circuit Check

Wiring Diagram



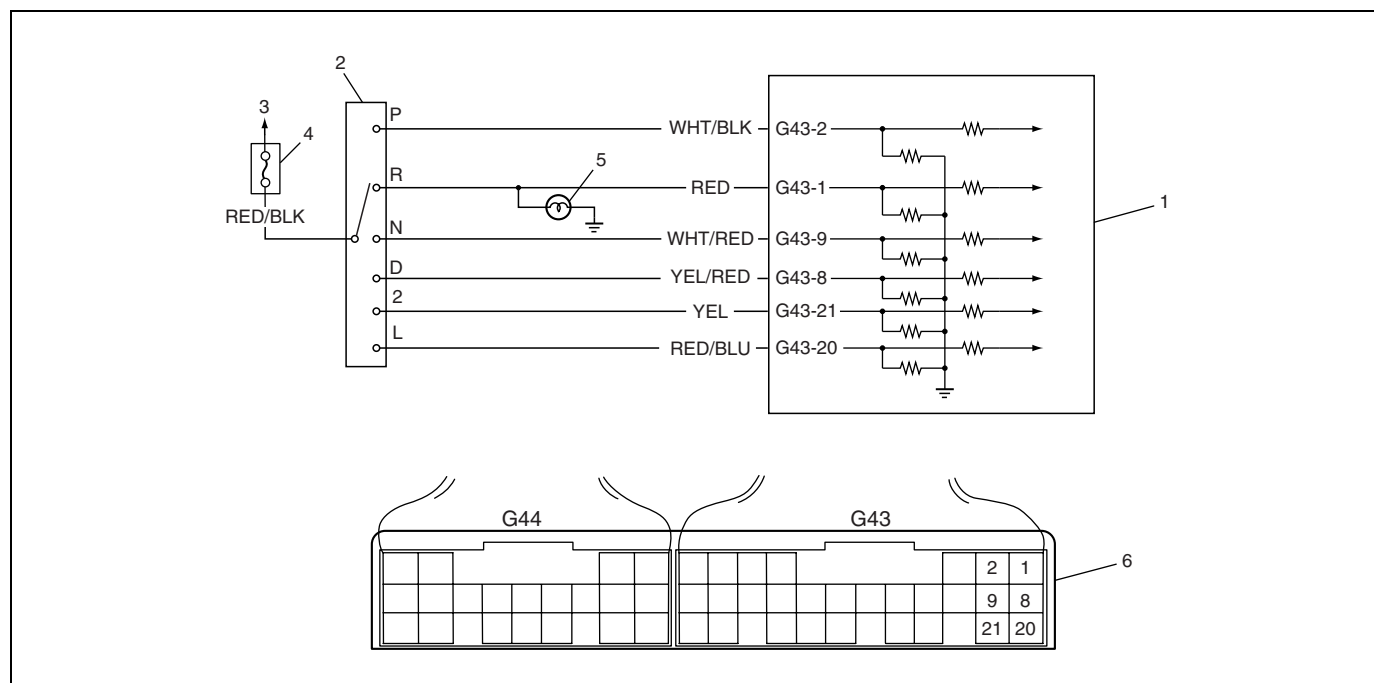
1. TCM	3. Ignition switch	5. Terminal arrangement of TCM connector (viewed from harness side)
2. IG fuse	4. Main fuse	

Troubleshooting

Step	Action	Yes	No
1	Check TCM Power Circuit. 1) Disconnect TCM connector with ignition switch OFF. 2) Check for proper connection to TCM at G44-20 terminal. 3) If OK, turn ignition switch ON and check voltage at terminal G44-20 of disconnected TCM connector. Is it 10 – 14 V?	Go to Step 2.	“BLK/WHT” circuit open.
2	Check TCM Ground Circuit. 1) Turn ignition switch OFF. 2) With TCM connectors disconnected, check for proper connection to TCM at G44-15 terminal. 3) If OK, check resistance between G44-15/ G44-19 terminal of disconnected TCM connector and body ground. Is continuity indicated?	TCM power and ground circuits are in good condition.	“BLK” circuit open.

# DTC P0705/DTC No.34 Transmission Range Sensor Circuit Malfunction

## Wiring Diagram



1. TCM	3. From ignition switch	5. Backup lamp
2. Transmission range sensor	4. Fuse box	6. Terminal arrangement of TCM connector (viewed from harness side)

## DTC Detecting Condition and Trouble Area

DTC DETECTING CONDITION	TROUBLE AREA
<ul style="list-style-type: none"> <li>Transmission range switch signal (P, R, N, D, 2, or L) is not inputted for more than 25 seconds at more than 60km/h (35 mile/h) vehicle speed.</li> </ul> or <ul style="list-style-type: none"> <li>“D” range signal and other one or more signals are inputted simultaneously for 10 seconds.</li> </ul>	<ul style="list-style-type: none"> <li>Transmission range sensor (switch) maladjusted.</li> <li>Transmission range sensor (switch) or its circuit malfunction.</li> <li>TCM</li> </ul>

## DTC Confirmation Procedure

### WARNING:

- When performing a road test, select a place where there is no traffic or possibility of a traffic accident and be very careful during testing to avoid occurrence of an accident.
- Road test should be carried out with 2 persons, a driver and tester, on a level road.

- 1) Connect scan tool to DLC with ignition switch OFF.
- 2) Clear DTCs in TCM and ECM memories by using scan tool and start engine.
- 3) Shift selector lever to each of “L”, “2”, “D”, “N”, “R” and “P” ranges for 20 seconds each.
- 4) Increase vehicle speed to about 70 km/h (44 mile/h) in D range.
- 5) Keep driving above vehicle speed for 35 seconds.
- 6) Release accelerator pedal, decrease vehicle speed and stop vehicle.
- 7) Check DTC and pending DTC (If available).

## Troubleshooting

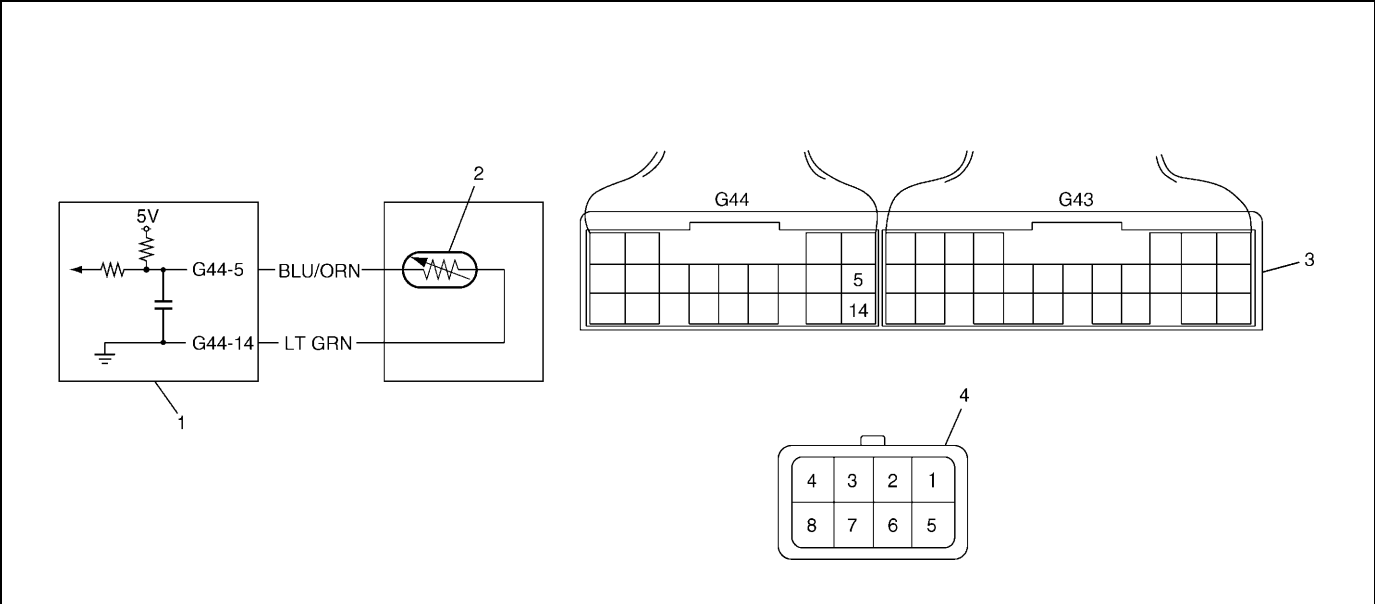
Step	Action	Yes	No
1	Was "Automatic Transaxle Diagnostic Flow Table" performed?	Go to Step 2.	Go to "Automatic Transaxle Diagnostic Flow Table" in this section.
2	Do you have SUZUKI scan tool?	Go to Step 3.	Go to Step 4.
3	Check Transmission range sensor(switch) circuit for operation. Check by using SUZUKI scan tool: 1) Connect SUZUKI scan tool to DLC with ignition switch OFF. 2) Turn ignition switch ON and check transmission range signal (P, R, N, D, 2 or L) on display when shifting select lever to each range. Is applicable range indicated? Are check results satisfactory?	Intermittent trouble. Check for intermittent referring to "Intermittent and Poor Connection" in Section 0A.	Go to Step 5.
4	Check Transmission range sensor(switch) circuit for operation. Check by using SUZUKI scan tool: 1) Turn ignition switch ON. 2) Check voltage at terminals G43-1, G43-2, G43-8, G43-9, G43-20 and G43-21 respectively with select lever shifted to each range. Taking terminal G43-21 as an example, is battery voltage indicated only when select lever is shifted to "2" range and 0 V for other ranges as shown in table below? Check voltage at other terminals likewise, referring to figure. Are check results satisfactory?	Intermittent trouble. Check for intermittent referring to "Intermittent and Poor Connection" in Section 0A.	Go to Step 5.
5	Check select cable for adjustment referring to "Select Cable Adjustment" in section. Is it adjusted correctly?	Go to Step 6.	Adjust.
6	Check transmission range sensor for installation position. 1) Shift select lever to "N" range. 2) Check that "N" reference line on switch and center line on shaft are aligned. Are they aligned?	Go to Step 7.	Adjust.
7	Check Transmission range sensor(switch) referring to "Transmission Range Sensor" in this section. Are check results satisfactory?	"RED/BLK", "WHT/BLK", "RED", "WHT/RED", "YEL/RED", "YEL" or "RED/BLU" circuit open or short. If wires and connections are OK, substitute a know-good TCM and recheck.	Replace Transmission range sensor.

Table for Step 4

		Terminal					
		G43-2	G43-1	G43-9	G43-8	G43-21	G43-20
Select lever position	P	B + V	0 V	0 V	0 V	0 V	0 V
	R	0 V	B + V	0 V	0 V	0 V	0 V
	N	0 V	0 V	B + V	0 V	0 V	0 V
	D	0 V	0 V	0 V	B + V	0 V	0 V
	2	0 V	0 V	0 V	0 V	B + V	0 V
	L	0 V	0 V	0 V	0 V	0 V	B + V

DTC P0710/DTC No.36 or 38 Transmission Fluid Temperature Sensor Circuit Malfunction

Wiring Diagram



1. TCM	3. Terminal arrangement of TCM connector (viewed from harness side)
2. Transmission fluid temperature sensor	4. Valve body connector

DTC Detecting Condition and Trouble Area

DTC DETECTING CONDITION	TROUBLE AREA
<ul style="list-style-type: none"> <li>Transmission temperature sensor terminal voltage is less than 0.05 V for 5 minutes or more after turning ignition switch ON.</li> </ul> or <ul style="list-style-type: none"> <li>Transmission temperature sensor terminal voltage is more than 4.6 V and shift range is in “R”, “D”, “2” or “L” for 15 minutes after starting engine.</li> </ul>	<ul style="list-style-type: none"> <li>Transmission fluid temperature sensor or its circuit malfunction.</li> <li>TCM</li> </ul>

DTC Confirmation Procedure

**WARNING:**

- When performing a road test, select a place where there is no traffic or possibility of a traffic accident and be very careful during testing to avoid occurrence of an accident.
- Road test should be carried out with 2 persons, a driver and tester, on a level road.

- 1) Connect scan tool to DLC with ignition switch OFF.
- 2) Clear DTCs in TCM and ECM memories by using scan tool and start engine.
- 3) Shift selector lever to “D” range and drive vehicle for 20 minutes or more.
- 4) Stop vehicle and turn ignition switch OFF.
- 5) Repeat step 3) one time.
- 6) Check DTC and pending DTC (If available).

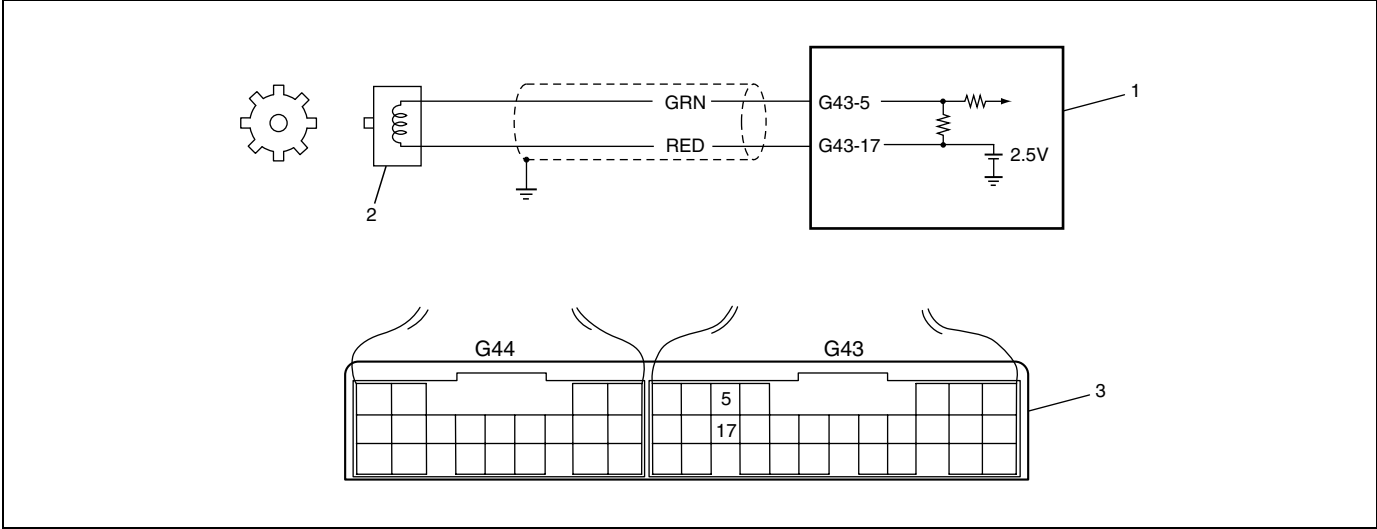
## Troubleshooting

Step	Action	Yes	No
1	Was "Automatic Transaxle Diagnostic Flow Table" performed?	Go to Step 2.	Go to "Automatic Transaxle Diagnostic Flow Table" in this section.
2	Check Transmission Fluid Temperature Sensor Circuit for Open. 1) Turn ignition switch OFF. 2) Disconnect TCM connectors from TCM. 3) Check for proper connection to transmission fluid temperature sensor at terminals G44-5 and G44-14. 4) If OK, check continuity between terminals G44-5 and G44-14 of disconnected harness side TCM connector. Is continuity indicated?	Go to Step 3.	"BLU/ORN" or "LT GRN" circuit open.
3	Check Transmission Fluid Temperature Sensor Circuit for Ground Short. Check continuity between terminal G44-5 of disconnected harness side TCM connector and ground. Is continuity indicated?	"BLU/ORN" circuit shorted to ground.	Go to Step 4.
4	Check Transmission Fluid Temperature Sensor Circuit for IG Short. 1) Cool down A/T fluid temperature under ambient temperature. 2) Connect TCM couplers to TCM with ignition switch OFF. 3) Turn ignition switch ON. 4) Measure voltage between terminal G44-5 of TCM connector and ground. Is it 4.6 V or more?	"BLU/ORN" circuit shorted to power circuit. If circuit is OK, go to Step 5.	Intermittent trouble or faulty TCM. Check for intermittent referring to "Intermittent and Poor Connection" in Section 0A. If OK, substitute a known-good TCM and recheck.
5	Inspect Transmission Fluid Temperature Sensor. Inspect transmission temperature sensor referring to "Transmission Fluid Temperature Sensor Inspection" in this section. Is result satisfactory?	Intermittent trouble or faulty TCM. Check for intermittent referring to "Intermittent and Poor Connection" in Section 0A. If OK, substitute a known-good TCM and recheck.	Replace transmission fluid temperature sensor.



DTC P0715/DTC No.37 Input/Turbine Speed Sensor Circuit Malfunction

Wiring Diagram



1. TCM	2. Input shaft speed sensor	3. Terminal arrangement of TCM connector (viewed from harness side)
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DTC Detecting Condition and Trouble Area

DTC DETECTING CONDITION	TROUBLE AREA
<p>No input shaft speed sensor signal is detected although output shaft speed sensor signals are detected under vehicle condition shown below.</p> <ul style="list-style-type: none"> <li>1st gear and 7 km/h (5 mile/h) or more vehicle speed</li> <li>or</li> <li>2nd gear and 13 km/h (8 mile/h) or more vehicle speed</li> <li>or</li> <li>3rd gear and 18 km/h (11 mile/h) or more vehicle speed</li> <li>or</li> <li>4th gear and 26 km/h (16 mile/h) or more vehicle speed</li> </ul>	<ul style="list-style-type: none"> <li>Input shaft speed sensor or its circuit malfunction.</li> <li>Improper input shaft speed sensor installation.</li> <li>Damaged forward clutch drum.</li> <li>Foreign material attachment to sensor or drum.</li> <li>TCM</li> </ul>

DTC Confirmation Procedure

**WARNING:**

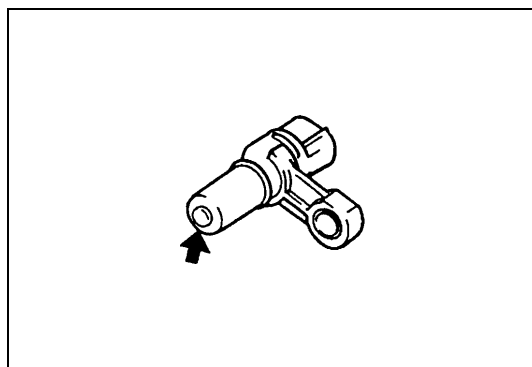
- When performing a road test, select a place where there is no traffic or possibility of a traffic accident and be very careful during testing to avoid occurrence of an accident.
- Road test should be carried out with 2 persons, a driver and tester, on a level road.

- 1) Connect scan tool to DLC with ignition switch OFF.
- 2) Clear DTCs in TCM and ECM memories by using scan tool and start engine.
- 3) Shift selector lever to “D” range and drive vehicle at 30 km/h (19 mile/h) or more vehicle at least for 60 seconds.
- 4) Stop vehicle.
- 5) Check DTC and pending DTC (If available).

## Troubleshooting

Step	Action	Yes	No
1	Was "Automatic Transaxle Diagnostic Flow Table" performed?	Go to Step 2.	Go to "Automatic Transaxle Diagnostic Flow Table" in this section.
2	Check Input Shaft Speed Sensor Circuit. 1) Disconnect TCM connectors with ignition switch OFF. 2) Check for proper connection to input shaft speed sensor at G43-5 and G43-17 terminals. 3) If OK, check resistance of sensor circuit. Resistance between terminals G43-5 and G43-17 of disconnected harness side TCM connector: 387 – 475 $\Omega$ at 20°C (68°F) Resistance between terminal G43-5/G43-17 of disconnected harness side TCM connector and ground: No continuity Are check result satisfactory?	Go to Step 4.	Go to Step 3.
3	Inspect input shaft speed sensor. Inspect input shaft speed sensor referring to "Input Shaft Speed Sensor Inspection" in this section. Is result satisfactory?	"RED" or "GRN" circuit open or short.	Replace input shaft speed sensor.
4	Check Visually Input Shaft Speed Sensor and Forward Clutch Drum Using Mirror for the Followings. See Fig. . <ul style="list-style-type: none"> <li>• No damage</li> <li>• No foreign material attached</li> <li>• Correct installation</li> </ul> Are they in good condition?	Intermittent trouble or faulty TCM. Check for intermittent referring to "Intermittent and Poor Connection" in Section 0A. If OK, substitute a known-good TCM and recheck.	Clean, repair or replace.

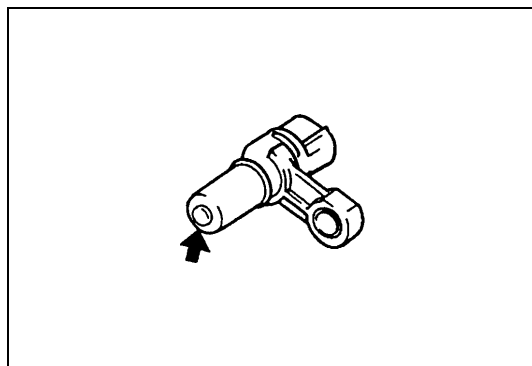
Fig. for Step 4



**WARNING:**

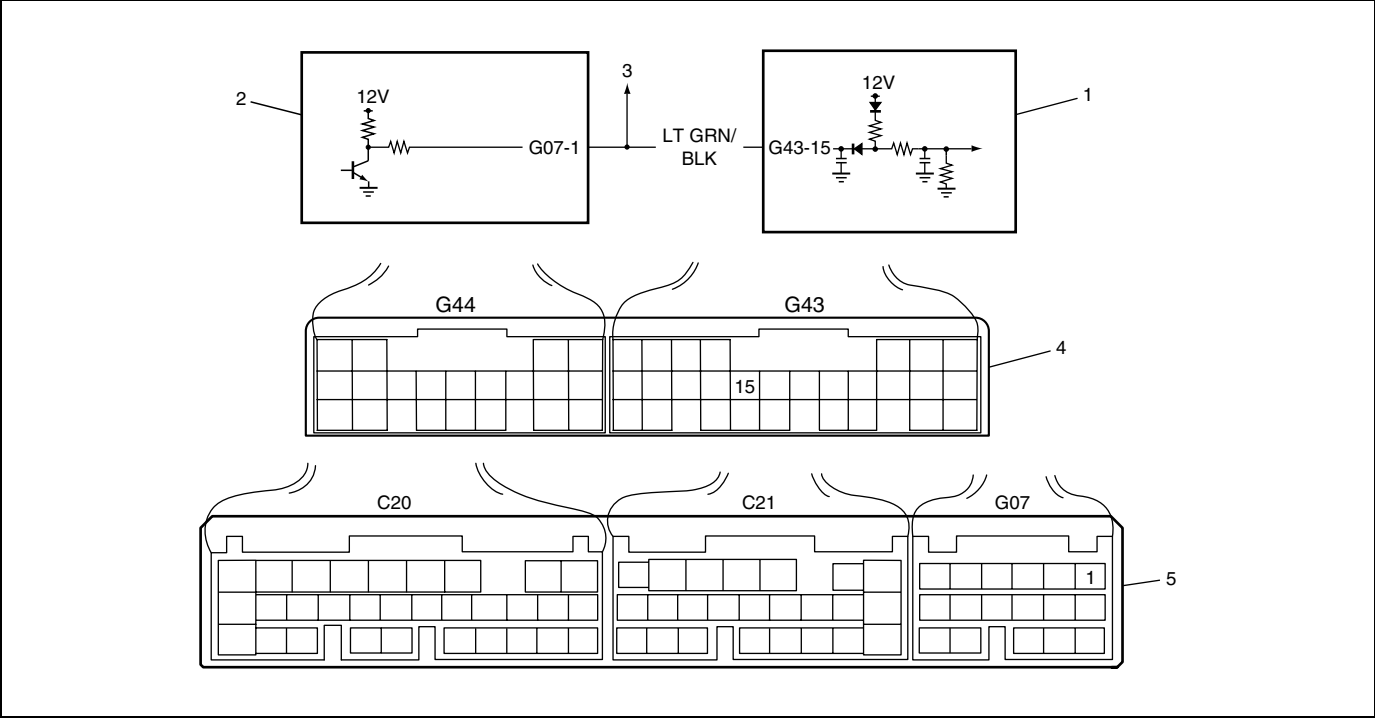
Step	Action	Yes	No
2	<p>Check Output Shaft Speed Sensor Circuit.</p> <ol style="list-style-type: none"> <li>1) Disconnect TCM connectors with ignition switch OFF.</li> <li>2) Check for proper connection to output shaft speed sensor at G43-4 and G43-16 terminals.</li> <li>3) If OK, check resistance of sensor circuit. Resistance between terminals G43-4 and G43-16 of disconnected harness side TCM connector: 648 – 792 <math>\Omega</math> at 20°C (68°F) Resistance between terminal G43-4/G43-16 of disconnected harness side TCM connector and ground: No continuity</li> </ol> <p>Are check results satisfactory?</p>	Go to Step 4.	Go to Step 3.
3	<p>Inspect Output Shaft Speed Sensor.</p> <p>Inspect output shaft speed sensor referring to “Output Shaft Speed Sensor Inspection” in this section.</p> <p>Is result satisfactory?</p>	“BLK” or “WHT” wire open or short.	Replace output shaft speed sensor.
4	<p>Check Visually Output Shaft Speed Sensor and Sensor Rotor Using Mirror for the Followings. See Fig.</p> <ul style="list-style-type: none"> <li>• No damage</li> <li>• No foreign material attached</li> <li>• Correct installation</li> </ul> <p>Are they in good condition?</p>	<p>Intermittent trouble or faulty TCM.</p> <p>Check for intermittent referring to “Intermittent and Poor Connection” in Section 0A.</p> <p>If OK, substitute a known-good TCM and recheck.</p>	Clean, repair or replace.

Fig. for Step 4



DTC P0725/DTC No.35 Engine Speed Input Circuit Malfunction

Wiring Diagram



1. TCM	3. To tachometer	5. Terminal arrangement of ECM connector (viewed from harness side)
2. ECM	4. Terminal arrangement of TCM connector (viewed from harness side)	

DTC Detecting Condition and Trouble Area

DTC DETECTING CONDITION	TROUBLE AREA
No engine speed signal is inputted although engine is running and engine temperature sensor signal is in normal condition.	<ul style="list-style-type: none"> <li>Engine speed input signal circuit malfunction.</li> <li>TCM</li> <li>ECM</li> </ul>

DTC Confirmation Procedure

**WARNING:**

- When performing a road test, select a place where there is no traffic or possibility of a traffic accident and be very careful during testing to avoid occurrence of an accident.
- Road test should be carried out with 2 persons, a driver and tester, on a level road.

- 1) Connect scan tool to DLC with ignition switch OFF.
- 2) Clear DTCs in TCM and ECM memories by using scan tool.
- 3) Start engine and keep engine running for 30 seconds.
- 4) Turn ignition switch OFF.
- 5) Repeat step 3) one time.
- 6) Check DTC and pending DTC (If available).

## Troubleshooting

Step	Action	Yes	No
1	Was "Automatic Transaxle Diagnostic Flow Table" performed?	Go to Step 2.	Go to "Automatic Transaxle Diagnostic Flow Table" in this section.
2	Check Engine Speed Input Signal Circuit for Open. 1) Turn ignition switch OFF. 2) Disconnect TCM and ECM connectors from TCM and ECM. 3) Check for proper connection to TCM at terminal G43-15 and to ECM at terminal G07-1. 4) If OK, check continuity between terminals G43-15 and G07-1 of disconnected harness side TCM and ECM connectors. Is continuity indicated?	Go to Step 3.	"LT GRN/BLK" circuit open.
3	Check Engine Speed Input Signal Circuit for Short. 1) Check continuity between terminal G43-15 of disconnected harness side TCM connector and ground. Is continuity indicated?	"LT GRN/BLK" circuit shorted to ground.	Go to Step 4.
4	Check TCM Terminal Voltage. 1) Connect TCM connectors to TCM with ignition switch OFF. 2) Turn ignition switch ON. 3) Measure voltage between terminal G43-15 of connected harness side ECM connector and ground. Is it 10 – 14 V?	Go to Step 5.	Substitute a known-good TCM and recheck.
5	Check ECM Terminal Voltage. 1) Turn ignition switch OFF. 2) Connect ECM connectors to ECM. 3) Turn ignition switch ON. 4) Measure voltage between terminal G07-1 of connected harness side ECM connector and ground. Is it 10 – 14 V?	Intermittent trouble or faulty TCM or ECM. Check for intermittent referring to "Intermittent and Poor Connection" in Section 0A. If OK, substitute a known-good TCM and/or ECM recheck.	Substitute a known-good ECM and recheck.

## DTC P0741/DTC No.29 TCC System Performance or Stuck Off

### DTC Detecting Condition and Trouble Area

DTC DETECTING CONDITION	TROUBLE AREA
<ul style="list-style-type: none"> <li>When driving vehicle with 4th gear in "D" range, difference in revolution between engine and A/T input (input shaft speed sensor speed) is larger than specification although TCM commanded TCC solenoid to turn ON.</li> <li>When driving vehicle with 3th gear in "D" range, difference in revolution between engine and A/T input (input shaft speed sensor speed) is smaller than specification although TCM commanded TCC solenoid to turn OFF.</li> </ul>	<ul style="list-style-type: none"> <li>Mechanical malfunction of TCC solenoid valve.</li> <li>Malfunction of valve body assembly.</li> <li>Fluid passage clogged or leaking.</li> <li>Torque converter clutch malfunction.</li> </ul>

### DTC Confirmation Procedure

#### WARNING:

- When performing a road test, select a place where there is no traffic or possibility of a traffic accident and be very careful during testing to avoid occurrence of an accident.
- Road test should be carried out with 2 persons, a driver and tester, on a level road.

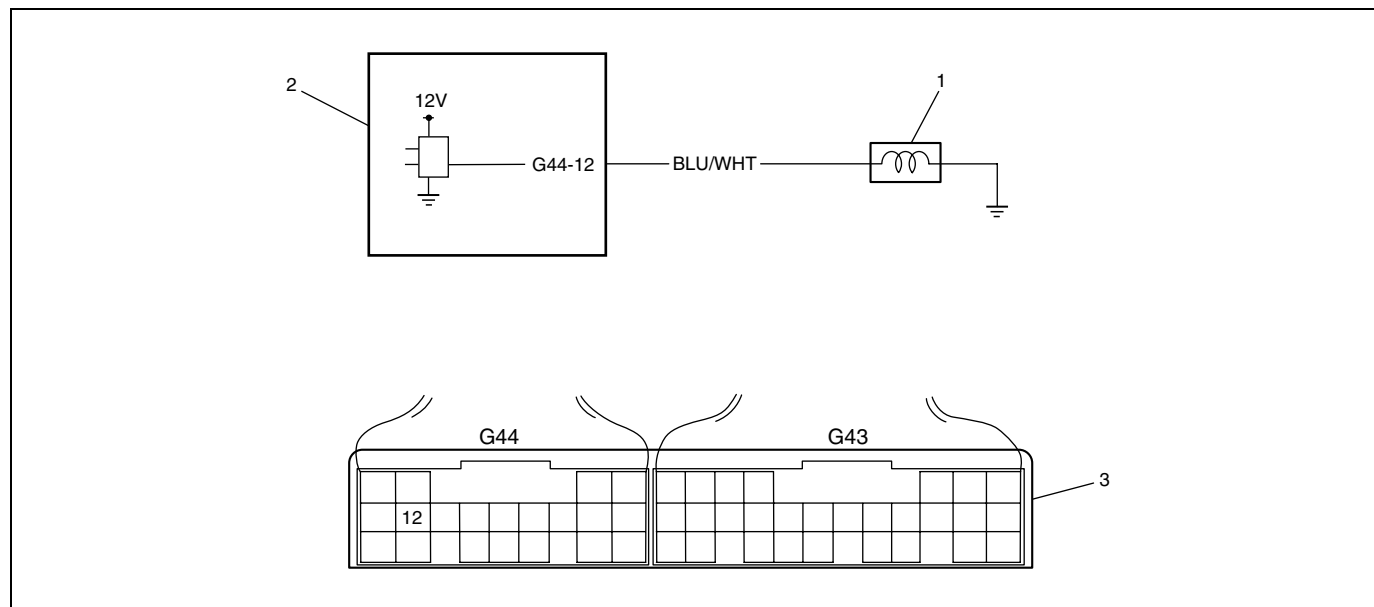
- Connect scan tool to DLC with ignition switch OFF.
- Clear DTCs in TCM and ECM memories by using scan tool.
- Start engine and warm it up to normal operating temperature.
- Turn O/D off switch OFF. (Confirm "O/D OFF" lamp does not light.)
- Shift selector lever to "D" range and keep it for 20 seconds or longer.
- Drive vehicle with 4th gear in "D" range and lock-up ON for 10 seconds or longer referring to "Automatic Gear Shift Diagram" in this section. (Reference: less than 20% throttle opening and at vehicle speed of 80 km/h (50 mile/h) or more)
- Turn O/D off switch ON keeping on driving in "D" range. (Confirm "OD OFF" lamp lights.)
- Drive vehicle with 3th gear in "D" range, more than 10% throttle opening and at vehicle speed of 25 – 45 km/h (16 – 28 mile/h) for 10 seconds or longer.
- Stop vehicle and turn ignition switch OFF.
- Repeat step 3) to 8).
- Stop vehicle.
- Check DTC and pending DTC (If available).

### Troubleshooting

Step	Action	Yes	No
1	Was "Automatic Transaxle Diagnostic Flow Table" performed?	Go to Step 2.	Go to "Automatic Transaxle Diagnostic Flow Table" in this section.
2	Check TCC Solenoid Valve for Operation referring to "Solenoid Valves Inspection" in this section. Is it in good condition?	Clean fluid passage or replace torque converter or valve body assembly.	Replace TCC solenoid valve.

## DTC P0743/DTC No.25 or No.26 TCC System Electrical

### Wiring Diagram



1. TCC solenoid valve

2. TCM

3. Terminal arrangement of TCM connector (viewed from harness side)

### DTC Detecting Condition and Trouble Area

DTC DETECTING CONDITION	TROUBLE AREA
<ul style="list-style-type: none"> <li>Voltage of TCC solenoid valve TCM terminal is low although TCM is commanding TCC solenoid to turn ON.</li> <li>Voltage of TCC solenoid valve TCM terminal is high although TCM is commanding TCC solenoid to turn OFF.</li> </ul>	<ul style="list-style-type: none"> <li>TCC solenoid valve circuit shorted to ground.</li> <li>TCC solenoid valve circuit open or shorted to power circuit.</li> <li>TCM</li> </ul>

### DTC Confirmation Procedure

#### WARNING:

- When performing a road test, select a place where there is no traffic or possibility of a traffic accident and be very careful during testing to avoid occurrence of an accident.
- Road test should be carried out with 2 persons, a driver and a tester, on a level road.

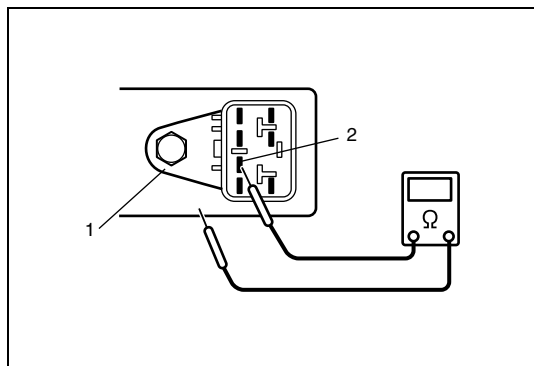
- Connect scan tool to DLC with ignition switch OFF.
- Clear DTCs in TCM and ECM memories by using scan tool.
- Start engine and warm it up to normal operating temperature.
- Turn O/D off switch OFF. (Confirm "O/D OFF" lamp does not light.)
- Drive vehicle with 4th gear in "D" range and lock-up ON for 10 seconds or longer referring to "Automatic Gear Shift Diagram" in this section. (Reference: less than 20% throttle opening and at vehicle speed of 80 km/h (50 mile/h) or more)
- Decrease vehicle speed gradually and stop vehicle.
- Check DTC and pending DTC (If available).



## Troubleshooting

Step	Action	Yes	No
1	Was "Automatic Transaxle Diagnostic Flow Table" performed?	Go to Step 2.	Go to "Automatic Transaxle Diagnostic Flow Table" in this section.
2	Check TCC Solenoid Valve Circuit for IG Short. 1) Turn ignition switch ON and measure voltage between terminal G44-12 of harness side TCM connector and ground. Is it 0 – 2 V?	Go to Step 3.	"BLU/WHT" circuit shorted to power circuit or open.
3	Check TCC Solenoid Valve Resistance. 1) Turn ignition switch OFF. 2) Disconnect valve body connector on transaxle. 3) Check for proper connection to solenoid at "BLU/WHT" circuit. 4) Check resistance of solenoid. See Fig. Resistance between terminal of transaxle side valve body connector and transaxle : 11 – 15 $\Omega$ (at 20°C (68°F)) Is check result satisfactory?	Go to Step 4.	Replace shift solenoid valve or lead wire.
4	Check TCC Solenoid Circuit for Ground Short. 1) Connect valve body connector. 2) Measure resistance between terminal G44-12 of disconnected harness side TCM connector and ground. Is it 11 – 15 $\Omega$ (at 20° (68°F))?	Intermittent trouble or faulty TCM. Check for intermittent referring to "Intermittent and Poor Connection" in Section 0A. If OK, substitute a known-good TCM and recheck.	"BLU/WHT" circuit shorted to ground.

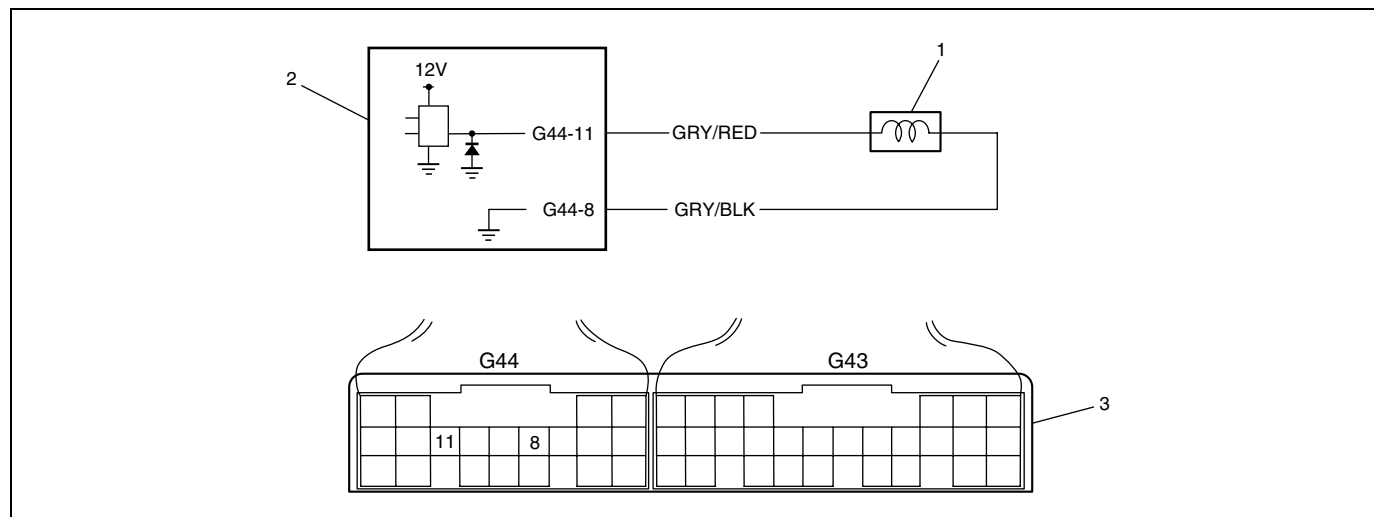
Fig. for Step 3



- |                                      |
|--------------------------------------|
| 1. Valve body connector on transaxle |
| 2. TCC solenoid valve terminal       |

# DTC P0748/DTC No.41 or No.42 Pressure Control Solenoid Electrical

## Wiring Diagram



1. Pressure control solenoid valve

2. TCM

3. Terminal arrangement of TCM connector (viewed from harness side)

## DTC Detecting Condition and Trouble Area

DTC DETECTING CONDITION	TROUBLE AREA
<ul style="list-style-type: none"> <li>Too much electric flow is detected on pressure control solenoid circuit.</li> <li>No electric flow is detected on pressure control solenoid circuit.</li> </ul>	<ul style="list-style-type: none"> <li>Pressure control solenoid circuit shorted to power circuit.</li> <li>Pressure control solenoid circuit open or shorted to ground.</li> <li>Pressure control solenoid malfunction.</li> <li>TCM</li> </ul>

## DTC Confirmation Procedure

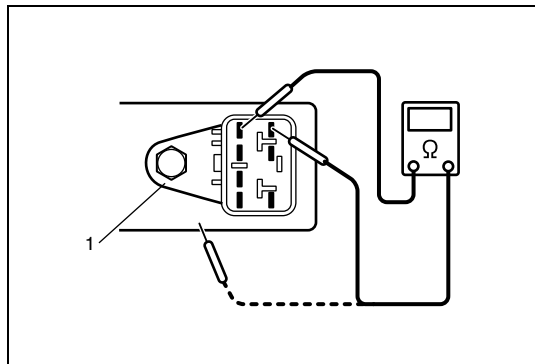
- 1) Connect scan tool to DLC with ignition switch OFF.
- 2) Clear DTCs in TCM and ECM memories by using scan tool.
- 3) Start engine and run if for 1 minute.
- 4) Check DTC and pending DTC (If available).

## Troubleshooting

Step	Action	Yes	No
1	Was "Automatic Transaxle Diagnostic Flow Table" performed?	Go to Step 2.	Go to "Automatic Transaxle Diagnostic Flow Table" in this section.
2	Check Pressure Control Solenoid Valve Circuit for IG Short. <ol style="list-style-type: none"> <li>1) Turn ignition switch OFF and disconnect TCM connectors.</li> <li>2) Check for proper connection to TCM at terminals G44-11 and G44-8.</li> <li>3) If OK, turn ignition switch ON and measure voltage between terminal G44-11 of disconnected harness side TCM connector and ground.</li> </ol> Is it 0 V?	Go to Step 3.	"GRY/RED" or "GRY/BLK" circuit shorted to power circuit.

Step	Action	Yes	No
3	<p>Check Pressure Control Solenoid Valve Resistance.</p> <ol style="list-style-type: none"> <li>1) Turn ignition switch OFF.</li> <li>2) Disconnect valve body connector on transaxle.</li> <li>3) Check for proper connection to solenoid at "GRY/RED" and "GRY/BLK" circuits.</li> <li>4) Check resistance of solenoid. See Fig.</li> </ol> <p>Resistance between terminals of transaxle side valve body connector: 3.3 – 3.7 <math>\Omega</math> (at 20°C (68°F))</p> <p>Resistance between terminal of transaxle side valve body connector and transaxle: Infinity</p> <p>Is check results satisfactory?</p>	Go to Step 4.	Replace pressure control solenoid valve or lead wire.
4	<p>Check Pressure Control Solenoid Valve Circuit for Ground Short.</p> <ol style="list-style-type: none"> <li>1) Connect valve body connector.</li> <li>2) Check continuity between terminal G44-11 of disconnected harness side TCM connector and ground.</li> </ol> <p>Is continuity indicated?</p>	"GRY/RED" or "GRY/BLK" circuit shorted to ground.	Go to Step 5.
5	<p>Check Pressure Control Solenoid Valve Circuit for Open.</p> <p>Check resistance between terminals G44-11 and G44-8 of disconnected harness side TCM connector.</p> <p>Is it infinity?</p>	"GRY/RED" or "GRY/BLK" circuit open.	<p>Intermittent trouble or faulty TCM.</p> <p>Check for intermittent referring to "Intermittent and Poor Connection" in Section 0A.</p> <p>If OK, substitute a known-good TCM and recheck.</p>

Fig. for Step 3



1. Valve body connector

**DTC P0751/DTC No.17 Shift Solenoid-A (No.1) Performance or Stuck Off****DTC P0756/DTC No.28 Shift Solenoid-B (No.2) Performance or Stuck Off****DTC Detecting Condition and Trouble Area****[DTC P0751/DTC NO.17]**

DTC DETECTING CONDITION	TROUBLE AREA
When one of the following condition is detected while driving at 15km/h (10 mile/h) or more in "D" range after engine being warmed up. <ul style="list-style-type: none"> <li>Transaxle gear ratio is detected as same as that of 2nd gear although TCM command is for 3rd gear.</li> <li>Transaxle gear ratio is detected as same as that of 3rd gear although TCM command is for 2nd gear.</li> </ul>	<ul style="list-style-type: none"> <li>Mechanical malfunction of shift solenoid valve-A (No.1).</li> <li>Malfunction of valve body assembly.</li> <li>Fluid passage clogged or leaking.</li> <li>Mechanical malfunction of transaxle.</li> </ul>

**[DTC P0756/DTC NO.28]**

DTC DETECTING CONDITION	TROUBLE AREA
When one of the following condition is detected while driving at 15km/h (10 mile/h) or more in "D" range after engine being warmed up. <ul style="list-style-type: none"> <li>Transaxle gear ratio is detected as same as that of 3rd gear although TCM command is for 4th gear.</li> <li>Transaxle gear ratio is detected as same as that of 4th gear although TCM command is for 3rd gear.</li> </ul>	<ul style="list-style-type: none"> <li>Mechanical malfunction of shift solenoid valve-B (No.2).</li> <li>Malfunction of valve body assembly.</li> <li>Fluid passage clogged or leaking.</li> <li>Mechanical malfunction of transaxle.</li> </ul>

**DTC Confirmation Procedure****WARNING:**

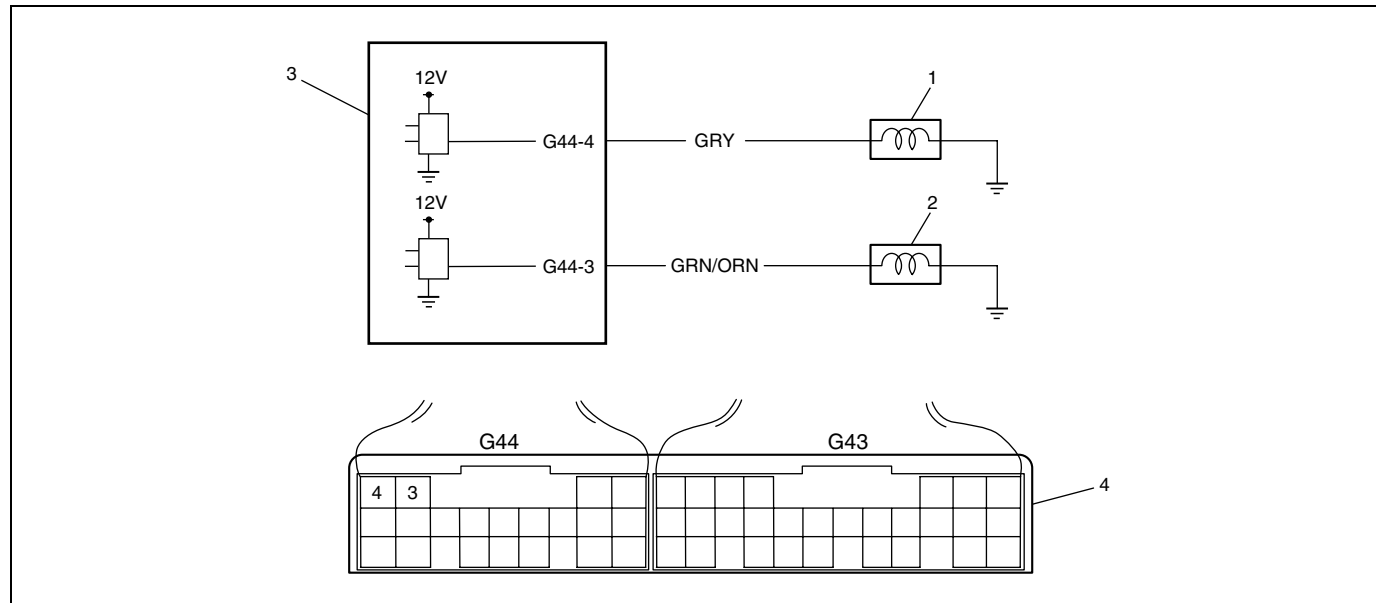
- When performing a road test, select a place where there is no traffic or possibility of a traffic accident and be very careful during testing to avoid occurrence of an accident.
- Road test should be carried out with 2 persons, a driver and tester, on a level road.

- 1) Connect scan tool to DLC with ignition switch OFF.
- 2) Clear DTCs in TCM and ECM memories by using scan tool.
- 3) Start engine and warm it up to normal operating temperature.
- 4) Turn O/D off switch OFF. (Confirm "O/D OFF" lamp does not light.)
- 5) Shift selector lever to "D" range and hold it for 20 seconds or longer.
- 6) Drive vehicle with 2nd, 3rd and 4th gear in "D" range in that order for 20 seconds or longer each referring to "Automatic Gear Shift Diagram" in this section.
- 7) Stop vehicle and turn ignition switch OFF.
- 8) Report Step 3) to 6) one time.
- 9) Stop vehicle.
- 10) Check DTC and pending DTC (If available).

**Troubleshooting**

Step	Action	Yes	No
1	Was "Automatic Transaxle Diagnostic Flow Table" performed?	Go to Step 2.	Go to "Automatic Transaxle Diagnostic Flow Table" in this section.
2	Perform Manual Shift Road Test referring to "Manual Road Test" in this section. Is test result satisfactory?	Go to Step 3.	Go to "Automatic Transaxle Basic Check".

Step	Action	Yes	No
3	Check Shift Solenoid valve-A or -B for Operation referring to “Solenoid Valve Inspection” in this section. Are they in good condition?	Clean fluid passage or replace valve body assembly.	Replace shift solenoid valve-A or -B.

**DTC P0753/DTC No.21 or No.22 Shift Solenoid-A (No.1) Electrical****DTC P0758/DTC No.23 or No.24 Shift Solenoid-B (No.2) Electrical****Wiring Diagram**

1. Shift solenoid valve-A (No.1)	3. TCM
2. Shift solenoid valve-B (No.2)	4. Terminal arrangement of TCM connector (viewed from harness side)

**DTC Detecting Condition and Trouble Area**

DTC DETECTING CONDITION	TROUBLE AREA
<ul style="list-style-type: none"> <li>• Voltage of shift solenoid valve TCM terminal is low although TCM is commanding shift solenoid to turn ON.</li> <li>• Voltage of shift solenoid valve TCM terminal is high although TCM is commanding shift solenoid to turn OFF.</li> </ul>	<ul style="list-style-type: none"> <li>• Shift solenoid valve circuit shorted to ground.</li> <li>• Shift solenoid valve circuit open or shorted to power circuit.</li> <li>• TCM</li> </ul>

**DTC Confirmation Procedure****WARNING:**

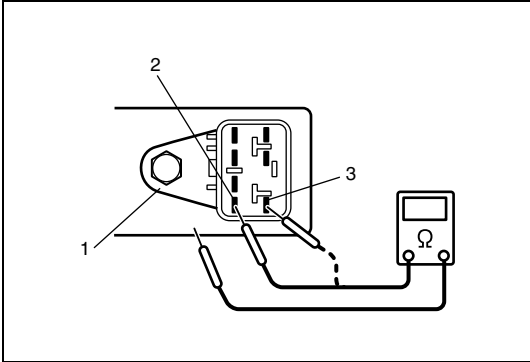
- When performing a road test, select a place where there is no traffic or possibility of a traffic accident and be very careful during testing to avoid occurrence of an accident.
- Road test should be carried out with 2 persons, a driver and tester, on a level road.

- 1) Connect scan tool to DLC with ignition switch OFF.
- 2) Clear DTCs in TCM and ECM memories by using scan tool.
- 3) Start engine and shift selector lever to "D" range.
- 4) Start vehicle and increase vehicle speed to 80 km/h (50 mile/h) in "D" range.
- 5) Keep on driving in above speed for 10 seconds and decrease vehicle speed gradually.
- 6) Stop vehicle.
- 7) Check DTC and pending DTC (If available).

Troubleshooting

Step	Action	Yes	No
1	Was “Automatic Transaxle Diagnostic Flow Table” performed?	Go to Step 2.	Go to “Automatic Transaxle Diagnostic Flow Table” in this section.
2	Check Shift Solenoid Valve Circuit for IG Short. 1) Turn ignition switch OFF and disconnect TCM connectors. 2) Check for proper connection to TCM at terminal G44-4 or G44-3 of TCM connector. 3) If OK, turn ignition switch ON and measure voltage between terminal G44-4 or G44-3 of disconnected harness side TCM connector and ground. Is it 0 – 2 V?	Go to Step 3.	“GRY” or “GRN/ORN” circuit shorted to power circuit.
3	Check Shift solenoid Valve Resistance. 1) Turn ignition switch OFF. 2) Disconnect valve body connector on transaxle. 3) Check for proper connection to solenoid at “GRY” or “GRN/ORN” circuit. 4) Check resistance of solenoid. See Fig. Resistance between terminal of transaxle side solenoid connector and transaxle: 11 – 15 Ω (at 20°C (68°F)) Is check result satisfactory?	Go to Step 4.	Replace shift solenoid valve lead wire.
4	Check Shift Solenoid Circuit for Ground Short or Open. 1) Connect valve body connector. 2) Measure resistance between terminal G44-4 or G44-3 of disconnected harness side TCM connector and ground. Is it 11 – 15 Ω (at 20°C (68°F))?	Intermittent trouble or faulty TCM. Check for intermittent referring to “Intermittent and Poor Connection” in Section 0A. If OK, substitute a known-good TCM and recheck.	“GRY” or “GRN/ORN” circuit shorted to ground or open.

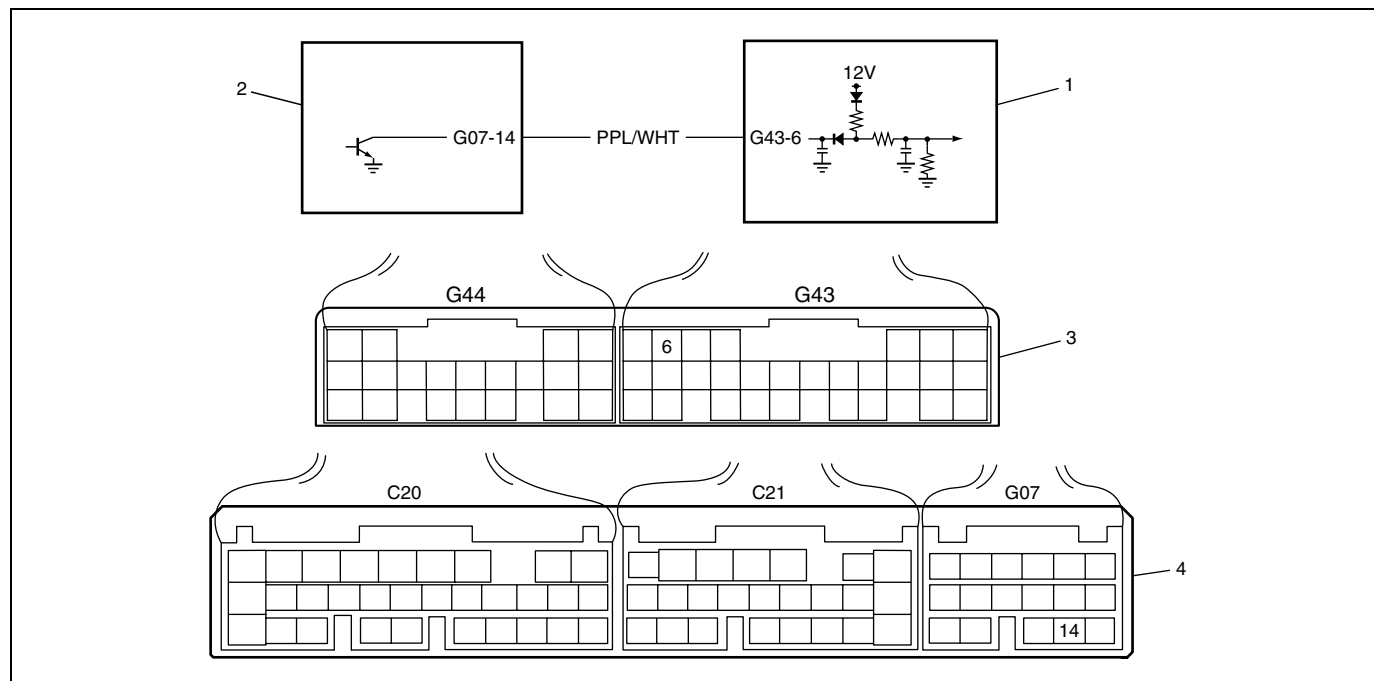
Fig. for Step 3



1. Valve body connector on transaxle
2. Shift solenoid valve-A (No.1) terminal
3. Shift solenoid valve-B (No.2) terminal

# DTC P1700/DTC No.32 or No.33 Throttle Position Signal Circuit

## Wiring Diagram



1. TCM	3. Terminal arrangement of TCM connector (viewed from harness side)
2. ECM	4. Terminal arrangement of ECM connector (viewed from harness side)

## DTC Detecting Condition and Trouble Area

DTC DETECTING CONDITION	TROUBLE AREA
<ul style="list-style-type: none"> <li>Too short low signal of pulse signal from ECM to TCM continues out of specification.</li> <li>Too long low signal of pulse signal from ECM to TCM continues out of specification.</li> </ul>	<ul style="list-style-type: none"> <li>Throttle position sensor or its circuit malfunction.</li> <li>Throttle position signal circuit from ECM to TCM open or short.</li> <li>TCM</li> <li>ECM</li> </ul>

## DTC Confirmation Procedure

- 1) Connect scan tool to DLC with ignition switch OFF.
- 2) Clear DTCs in TCM and ECM memories by using scan tool.
- 3) Turn ignition switch ON.
- 4) Depress accelerator pedal fully and keep it for 10 seconds.
- 5) Release accelerator pedal and start engine.
- 6) Run engine at idle for 20 seconds.
- 7) Check DTC and pending DTC (If available).

## Troubleshooting

Step	Action	Yes	No
1	Was "Automatic Transaxle Diagnostic Flow Table" performed?	Go to Step 2.	Go to "Automatic Transaxle Diagnostic Flow Table" in this section.
2	Is there DTC related to throttle position sensor (P0120/P0121)?	Go to corresponding DTC Flow Table in Section 6.	Go to Step 3.



Step	Action	Yes	No
3	<p>Check Throttle Position Signal Circuit for IG Short.</p> <ol style="list-style-type: none"> <li>1) Turn ignition switch OFF.</li> <li>2) Disconnect TCM and ECM connectors from TCM and ECM.</li> <li>3) Check proper connection to TCM at terminal G43-6 and to ECM at terminal G07-14.</li> <li>4) If OK, turn ignition switch ON and measure voltage between terminal G43-6 of disconnected harness side TCM connector and ground.</li> </ol> <p>Is it 10 – 14 V?</p>	“PPL/WHT” circuit shorted to power circuit.	Go to Step 4.
4	<p>Check Throttle Position Signal Circuit for Open.</p> <ol style="list-style-type: none"> <li>1) Turn ignition switch OFF.</li> <li>2) Check continuity between terminal G43-6 of disconnected harness side TCM connector and terminal G07-14 of disconnected harness side ECM connector.</li> </ol> <p>Is continuity indicated?</p>	Go to Step 5.	“PPL/WHT” circuit open.
5	<p>Check Throttle Position Signal Circuit for Ground Short.</p> <p>Check continuity between terminal G43-6 of disconnected harness side TCM connector and ground.</p> <p>Is continuity indicated?</p>	“PPL/WHT” circuit shorted to ground.	<p>Intermittent trouble or faulty TCM or ECM.</p> <p>Check for intermittent referring to “Intermittent and Poor Connection” in Section 0A.</p> <p>If OK, substitute a known-good TCM or ECM and recheck.</p>

## DTC P1702/DTC No.52 Internal Malfunction of TCM

### DTC Detecting Condition and Trouble Area

DTC DETECTING CONDITION	TROUBLE AREA
Calculation of current data stored in TCM is not correct comparing with pre-stored checking data in TCM.	TCM

### DTC Confirmation Procedure

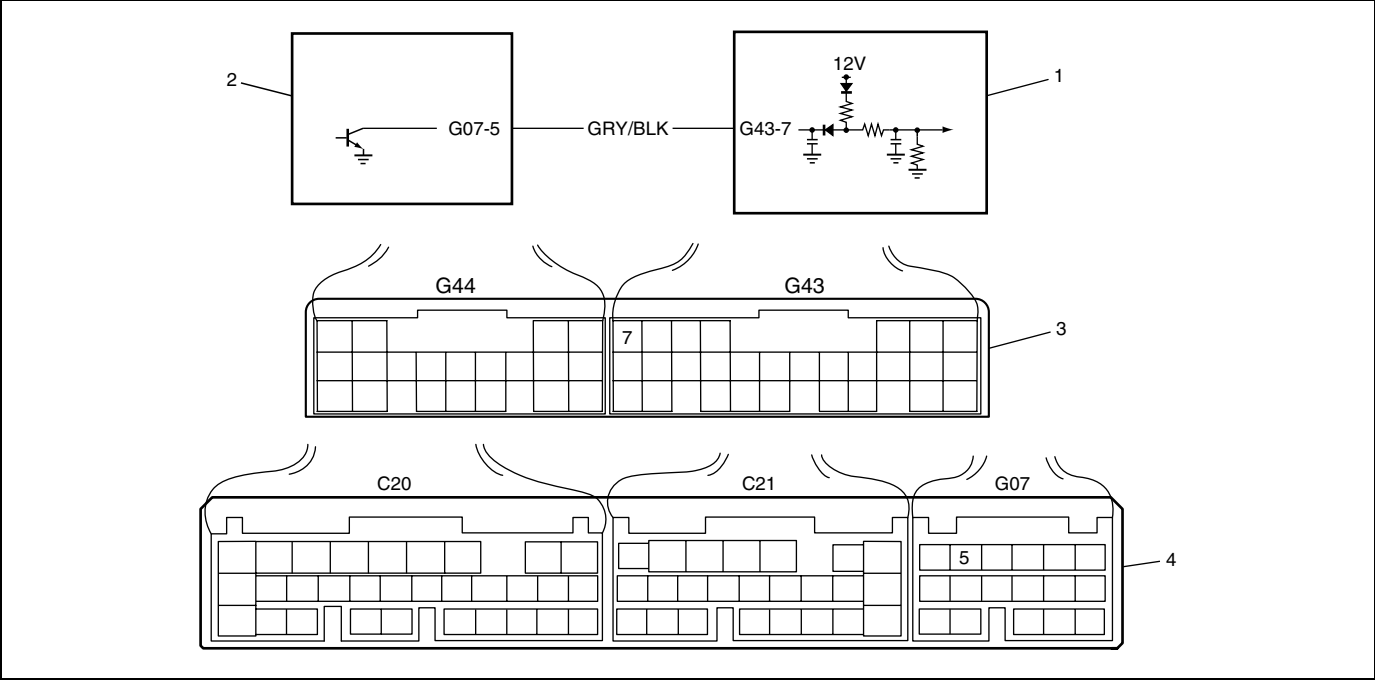
- 1) Connect scan tool to DLC with ignition switch OFF.
- 2) Clear DTCs in TCM and ECM memories by using scan tool.
- 3) After passing 10 seconds from turning ignition switch ON, check DTC and pending DTC (if available).

### Troubleshooting

Step	Action	Yes	No
1	Is there DTC P1702/DTC No.52 after performing "DTC Confirmation Procedure"?	Faulty TCM. Replace TCM.	Could be a temporary malfunction of TCM.

DTC P1705/DTC No.51 Engine Coolant Temperature Signal Circuit Malfunction

Wiring Diagram



1. TCM	3. Terminal arrangement of TCM connector (viewed from harness side)
2. ECM	4. Terminal arrangement of ECM connector (viewed from harness side)

DTC Detecting Condition and Trouble Area

DTC DETECTING CONDITION	TROUBLE AREA
<ul style="list-style-type: none"> <li>After passing 15 minute or more from starting to run engine in 600 rpm or more, 0 V of engine coolant temperature TCM terminal voltage continues out of specification.</li> <li>While engine is running in 600 rpm or more, 12 V of engine coolant temperature TCM terminal voltage continues out of specification.</li> </ul>	<ul style="list-style-type: none"> <li>Engine coolant temperature sensor or its circuit malfunction.</li> <li>Engine coolant temperature signal circuit from ECM to TCM open or short.</li> <li>TCM</li> <li>ECM</li> </ul>

DTC Confirmation Procedure

- 1) Connect scan tool to DLC with ignition switch OFF.
- 2) Clear DTCs in TCM and ECM memories by using scan tool.
- 3) Start engine and run it for 20 minutes or more.
- 4) Check DTC and pending DTC (If available).

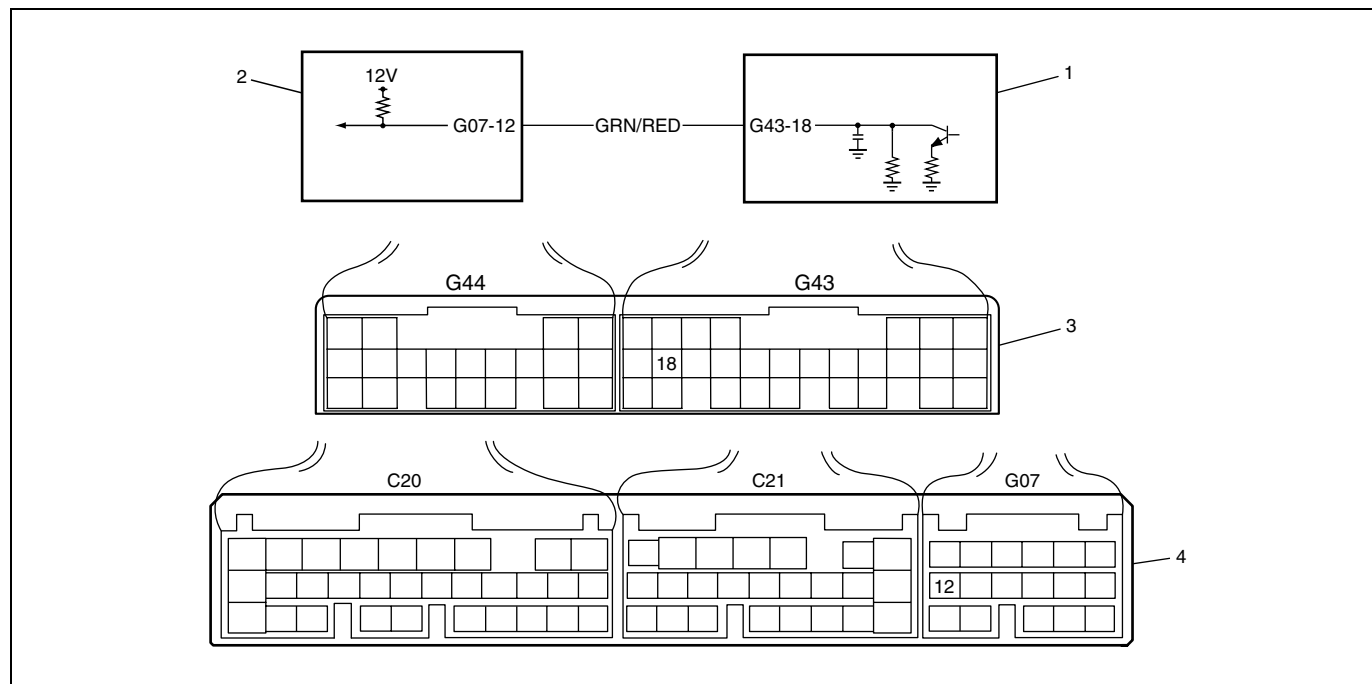
Troubleshooting

Step	Action	Yes	No
1	Was “Automatic Transaxle Diagnostic Flow Table” performed?	Go to Step 2.	Go to “Automatic Transaxle Diagnostic Flow Table” in this section.
2	Is there DTC related to throttle position sensor (P0115)?	Go to corresponding DTC Flow Table in Section 6.	Go to Step 3.

Step	Action	Yes	No
3	Check Engine Coolant Temperature Signal Circuit for IG Short. 1) Turn ignition switch OFF. 2) Disconnect TCM and ECM connectors from TCM and ECM. 3) Check proper connection to TCM at terminal G43-7 and to ECM at terminal G07-5. 4) If OK, turn ignition switch ON and measure voltage between terminal G43-7 of disconnected harness side TCM connector and ground. Is it 10 – 14 V?	“GRY/BLK” circuit shorted to power circuit.	Go to Step 4.
4	Check Engine Coolant Temperature Signal Circuit for Open. 1) Turn ignition switch OFF. 2) Check continuity between terminal G43-7 of disconnected harness side TCM connector and terminal G07-5 of disconnected harness side ECM connector. Is continuity indicated?	Go to Step 5.	“GRY/BLK” circuit open.
5	Check Engine Coolant Temperature Signal Circuit for Ground Short. Check continuity between terminal G43-7 of disconnected harness side TCM connector and ground. Is continuity indicated?	“GRY/BLK” circuit shorted to ground.	Intermittent trouble or faulty TCM or ECM. Check for intermittent referring to “Intermittent and Poor Connection” in Section 0A. If OK, substitute a known-good TCM or ECM and recheck.

# DTC P1895/DTC No.27 Torque Reduction Signal Circuit Malfunction

## Wiring Diagram



1. TCM	3. Terminal arrangement of TCM connector (viewed from harness side)
2. ECM	4. Terminal arrangement of ECM connector (viewed from harness side)

## DTC Detecting Condition and Trouble Area

DTC DETECTING CONDITION	TROUBLE AREA
Voltage of torque reduction signal circuit TCM terminal is low although TCM does not require ECM to reduce engine torque.	<ul style="list-style-type: none"> <li>• Torque reduction signal circuit from TCM to ECM open.</li> <li>• TCM</li> <li>• ECM</li> </ul>

## DTC Confirmation Procedure

- 1) Connect scan tool to DLC with ignition switch OFF.
- 2) Clear DTCs in TCM and ECM memories by using scan tool.
- 3) Start engine and run it for 1 minute.
- 4) Check DTC and pending DTC (If available).

## Troubleshooting

Step	Action	Yes	No
1	Was "Automatic Transaxle Diagnostic Flow Table" performed?	Go to Step 2.	Go to "Automatic Transaxle Diagnostic Flow Table" in this section.
2	Check Torque Reduction Signal Circuit for Open. <ol style="list-style-type: none"> <li>1) Turn ignition switch OFF.</li> <li>2) Disconnect TCM and ECM connectors from TCM and ECM.</li> <li>3) Check continuity between terminal G43-18 of disconnected harness side TCM connector and terminal G07-12 of disconnected harness side ECM connector.</li> </ol> Is continuity indicated?	Go to Step 3.	"GRN/RED" circuit open.

Step	Action	Yes	No
3	Check Torque Reduction Signal Circuit for Ground Short. Check continuity between terminal G43-18 of disconnected harness side TCM connector and ground. Is continuity indicated?	“GRN/RED” circuit shorted ground.	Go to Step 4.
4	Check Power Supply from ECM. 1) Connect ECM connectors to ECM. 2) Turn ignition switch ON. 3) Measure voltage between terminal G07-12 of connected harness side ECM connector and ground. Is it 10 – 14 V?	Intermittent trouble or faulty TCM or ECM. Check for intermittent referring to “Intermittent and Poor Connection” in Section 0A. If OK, substitute a known-good TCM or ECM and recheck.	Faulty ECM.

## Scan Tool Data

As the data values given below are standard values estimated on the basis of values obtained from the normally operating vehicles by using a scan tool, use them as reference values. Even when the vehicle is in good condition, there may be cases where the checked value does not fall within each specified data range. Therefore, judgment as abnormal should not be made by checking with these data alone.

Also, condition in the below table that can be checked by the scan tool are those detected by TCM and output from TCM as commands and there may be cases where the automatic transaxle or actuator is not operating (in the condition) as indicated by the scan tool.

### NOTE:

The following scan tool data related to automatic transaxle can be checked only by communicating with TCM.

SCAN TOOL DATA	VEHICLE CONDITIOIN		NORMAL CONDITION/REFERENCE VALUES
GEAR POSITION	Ignition switch ON	Selector lever is in "P" position	P or N
		Selector lever is in "R" position	R
		Selector lever is in "N" position	P or N
		Selector lever is in "D" position	1
		Selector lever is in "2" position	1
		Selector lever is in "L" position	1
ENGINE SPEED	At engine idle speed		Engine idle speed is displayed
INPUT SHAFT REV	At engine idle speed and selector lever is in "P" position		(Engine idle speed is displayed in increments of 50 rpm)
	At 60 km/h (37.5 mile/h) constant speed, O/D off switch ON, 20% or less throttle opening and 3rd gear ("D" range)		2250 RPM (displayed in increments of 50 rpm)
OUTPUT SHAFT REV	At vehicle stop		0 RPM
	At 60 km/h (37.5 mile/h) constant speed, O/D off switch ON, 20% or less throttle opening and 3rd gear		2250 RPM (displayed in increments of 50 rpm)
BATTERY VOLT.	Ignition switch ON and engine stop		9 – 16 V
ATF TEMP.	After driving at 60 km/h (37.5 mile/h) for 15 minutes or more, and A/T fluid temperature reaches 70 – 80°C (158 – 176°F)		70 – 80°C (158 – 176°F)
SHIFT SOL #1 COM: *** MON:***	Within 3 seconds after shifting "D" to "P"		ON
	At 40 km/h (25 mile/h) constant speed, O/D off switch ON, 20% or less throttle opening and 3rd gear		OFF
SHIFT SOL #2 COM: *** MON:***	Within 3 seconds after shifting "D" to "P"		OFF
	At 40 km/h (25 mile/h) constant speed, O/D off switch ON, 20% or less throttle opening and 3rd gear		ON
TCC SOL COM: *** MON:***	At 5 km/h (3 mile/h) constant speed, O/D off switch OFF, closed throttle and 1st gear		OFF
	At 80 km/h (50 mile/h) constant speed, O/D off switch OFF, 20% or less throttle opening and 4th gear		ON
PRESS CONT SOL	At vehicle stop, closed throttle and 1st gear		9.5 %
VEHICLE SPEED	At vehicle stop		0 KPH, 0 MPH

SCAN TOOL DATA	VEHICLE CONDITIOIN		NORMAL CONDITION/REFERENCE VALUES
O/D OFF SWITCH	Ignition switch ON	O/D off switch OFF	OFF
		O/D off switch ON	ON
TRANS. RANGE ***** D: ***	Ignition switch ON	Selector lever is in "P" position	P, OFF
		Selector lever is in "R" position	R, ON
		Selector lever is in "N" position	N, OFF
		Selector lever is in "D" position	D, ON
		Selector lever is in "2" position	2, ON
		Selector lever is in "L" position	L, ON
THROTTLE POS.	Ignition switch ON	Accelerator pedal is depressed	0 – 100% (Varies depending on depressed value)
		Accelerator pedal is released	0 %
BRAKE SWITCH	Ignition switch ON	Brake pedal is depressed	ON
		Brake pedal is released	OFF
TORQ REDUC-TION SIG	At shifting gear (Not always but the time when attaining scheduled relation between shifting and throttle opening)		ON
	Under condition of not shifting gear		OFF
COOLANT TEMP.	Just after turning ignition switch ON		VERY LOW
	Coolant temperature is 50°C or more		LOW
	Coolant temperature sensor is in faulty condition		HIGH

**SCAN TOOL DATA DEFINITIONS:****GEAR POSITION (R/P or N/1/2/3/4)**

Current gear position computed by throttle position coming from ECM and vehicle speed.

**ENGINE SPEED (RPM)**

Engine speed computed by reference pulses from crankshaft position sensor.

**INPUT SHAFT REV (INPUT SHAFT REVOLUTION, RPM)**

Input shaft revolution computed by reference pulses coming from input shaft speed sensor on transaxle case.

**OUTPUT SHAFT REV (OUTPUT SHAFT REVOLUTION, RPM)**

Output shaft revolution computed by reference pulses coming from output shaft speed sensor on transaxle case.

**BATTERY VOLT. (BATTERY VOLTAGE, V)**

Battery voltage read by TCM as analog input signal by TCM.

**ATF TEMP. (ATF TEMPERATURE, °C, °F)**

ATF temperature decided by signal from transmission fluid temperature sensor installed in valve body.

**SHIFT SOL #1 COM/MON (SHIFT SOLENOID-A (NO.1) COMMAND/MONITOR, ON/OFF)**

COM-ON : ON command being outputted to shift solenoid-A (No.1)

COM-OFF : ON command not being outputted to shift solenoid-A (No.1)

MON-ON : Electricity being passed to shift solenoid-A (No.1)

MON-OFF : Electricity not being passed to shift solenoid-A (No.1)

**SHIFT SOL #2 COM/MON (SHIFT SOLENOID-B (NO.2) COMMAND/MONITOR, ON/OFF)**

COM-ON : ON command being outputted to shift solenoid-B (No.2)

COM-OFF : ON command not being outputted to shift solenoid-B (No.2)

MON-ON : Electricity being passed to shift solenoid-B (No.2)

MON-OFF : Electricity not being passed to shift solenoid-B (No.2)



**TCC SOL COM/MON (TCC SOLENOID COMMAND/MONITOR, ON/OFF)**

COM-ON : ON command being outputted to shift solenoid-B (No.2)

COM-OFF : ON command not being outputted to shift solenoid-B (No.2)

MON-ON : Electricity being passed to shift solenoid-B (No.2)

MON-OFF : Electricity not being passed to shift solenoid-B (No.2)

**PRESS CONT SOL (PRESSURE CONTROL SOLENOID, %)**

Electric current value ratio between electric current value being outputted from TCM to solenoid and maximum value can be outputted by TCM.

**VEHICLE SPEED (KPH/MPH)**

Vehicle speed computed by reference pulses coming from vehicle speed sensor on transaxle case.

**O/D OFF SWITCH (ON/OFF)**

Inputted signal from O/D off switch on selector knob.

ON : O/D off switch ON

OFF : O/D off switch OFF

**TRANS. RANGE (P/R/N/D/2/L, ON/OFF)**

Transaxle range detected by signal fed from transmission range sensor.

**THROTTLE POS. (THROTTLE POSITION, %)**

Throttle opening ratio computed by duty signal from ECM.

**BRAKE SWITCH (ON/OFF)**

Inputted signal from brake light switch on pedal bracket.

ON : Brake pedal depressed

OFF : Brake pedal released

**TORQ REDUCTION SIG (TORQUE REDUCTION SIGNAL, ON/OFF)**

ON : Signal which TCM require ECM to reduce output torque at shifting gear

OFF : Signal which TCM does not require ECM to reduce output torque

**COOLANT TEMP. (ENGINE COOLANT TEMPERATURE, °C, °F)**

Engine coolant temperature computed by duty signal from ECM.

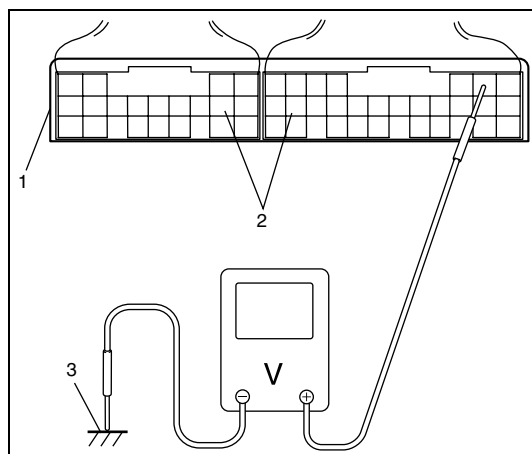
## Inspection of TCM and Its Circuits

TCM and its circuits can be checked at TCM wiring connectors by measuring voltage and resistance.

### CAUTION:

**TCM cannot be checked by itself, it is strictly prohibited to connect voltmeter or ohmmeter to TCM with connector disconnected from it.**

### INSPECTION



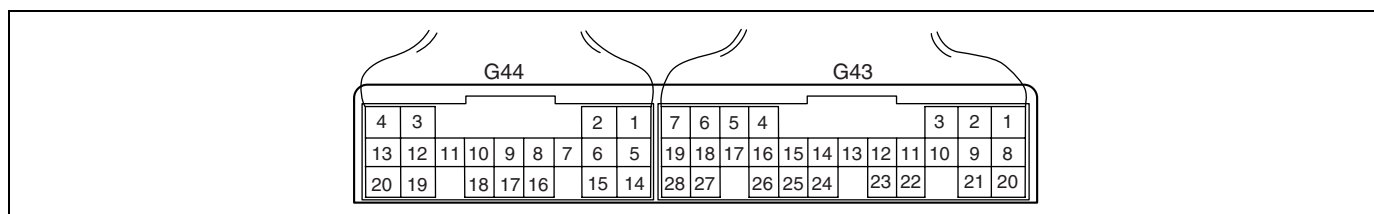
- 1) Remove TCM (1) from vehicle referring to “Transmission Control Module” in this section.
- 2) Connect TCM connectors (2) to TCM.
- 3) Check voltage at each terminal of connectors connected.

### NOTE:

**As each terminal voltage is affected by battery voltage, confirm that it is 11 V or more when ignition switch is ON.**

3. Body ground

### TERMINAL ARRANGEMENT OF TCM COUPLER (VIEWED FROM HARNESS SIDE)



TERMINAL	CIRCUIT	STAN- DARD VOLTAGE	CONDITION
G43	1 Transmission range sensor (“R” range)	10 – 14	Ignition switch ON, selector lever at “R” range
		0 – 2	Ignition switch ON, selector lever at other than “R” range
	2 Transmission range sensor (“P” range)	10 – 14	Ignition switch ON, selector lever at “P” range
		0 – 2	Ignition switch ON, selector lever at other than “P” range
	3 O/D off switch	0 – 2	O/D off switch ON
		10 – 14	O/D off switch OFF
	4 Output shaft speed sensor (+)	2 – 3	Ignition switch ON
	5 Input shaft speed sensor (+)	2 – 3	Ignition switch ON
	6 Throttle opening signal (from ECM)	Voltage varies while throttle valve is opened gradually. (Signal from ECM is duty pulse.)	
	7 Engine coolant temperature signal (from ECM)	Voltage varies depending on engine coolant temperature. (Signal from ECM is duty pulse.)	
	8 Transmission range sensor (“D” range)	10 – 14	Ignition switch ON, selector lever at “D” range
		0 – 2	Ignition switch ON, selector lever at other than “D” range

TERMINAL		CIRCUIT	STAN- DARD VOLTAGE	CONDITION
<b>G43</b>	9	Transmission range sensor ("D" range)	10 – 14	Ignition switch ON, selector lever at "N" range
			0 – 2	Ignition switch ON, selector lever at other than "N" range
	10	Serial data line to Speedometer	0 – 2 ⇕ 10 – 14	Ignition switch ON
	11	Blank	—	—
	12	Blank	—	—
	13	Blank	—	—
	14	Blank	—	—
	15	Engine speed signal	0 – 2	Ignition switch ON
	16	Output shaft speed sensor (—)	2 – 3	Ignition switch ON
	17	Input shaft speed sensor (—)	2 – 3	Ignition switch ON
	18	Torque reduction signal	10 – 14	Ignition switch ON
	19	Blank	—	—
	20	Transmission range sensor ("L" range)	10 – 14	Ignition switch ON, selector lever at "L" range
			0 – 2	Ignition switch ON, selector lever at other than "L" range
	21	Transmission range sensor ("2" range)	10 – 14	Ignition switch ON, selector lever at "2" range
			0 – 2	Ignition switch ON, selector lever at other than "2" range
	22	Blank	—	—
	23	Blank	—	—
	24	Blank	—	—
	25	Blank	—	—
	26	Blank	—	—
	27	Serial data line to ECM	0 – 2 ⇕ 10 – 14	Ignition switch ON
	28	D range signal	10 – 14	Ignition switch ON, selector lever at "P" or "N" range
			0 – 2	Ignition switch ON, selector lever at "R", "D", "2" or "L" range

TERMINAL		CIRCUIT	STAN- DARD VOLTAGE	CONDITION
<b>G44</b>	1	Blank	—	—
	2	Blank	—	—
	3	Shift solenoid valve-B (No.2)	0 – 2	Ignition switch ON, selector lever at “P” range
	4	Shift solenoid valve-A (No.1)	10 – 14	Ignition switch ON, selector lever at “P” range
	5	Transmission fluid temperature sensor (+)	3.3 – 3.7	Ignition switch ON, fluid temperature is 10°C (50°F)
			0.1 – 0.3	Ignition switch ON, fluid temperature is 145°C (293°F)
	6	Diagnosis switch	10 – 14	Ignition switch ON
	7	Data link connector	10 – 14	Ignition switch ON
	8	Pressure control solenoid valve (ground)	0.6 – 1.0	Ignition switch ON
	9	Blank	—	—
	10	Blank	—	—
	11	Pressure control solenoid valve (+)	Voltage varies depending on throttle opening. (Output signal is duty pulse.)	
	12	TCC solenoid valve	0 – 2	Ignition switch ON
	13	Power source for back-up	10 – 14	Constantly
	14	Transmission fluid temperature sensor (ground)	0 – 2	Ignition switch ON
	15	Ground	0 – 2	Ignition switch ON
	16	Brake light switch	10 – 14	Ignition switch ON, brake pedal depressed
			0 – 2	Ignition switch ON, brake pedal released
	17	Blank	—	—
	18	Blank	—	—
	19	Ground	0 – 2	Ignition switch ON
	20	Power source	10 – 14	Ignition switch ON

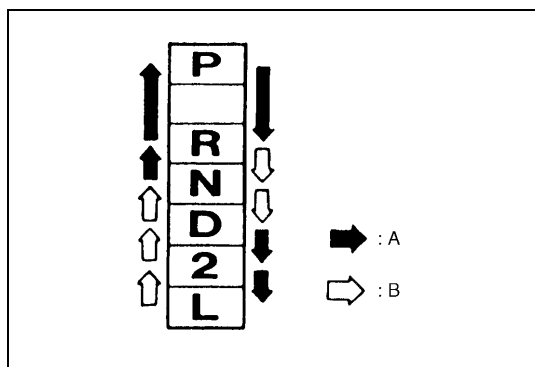
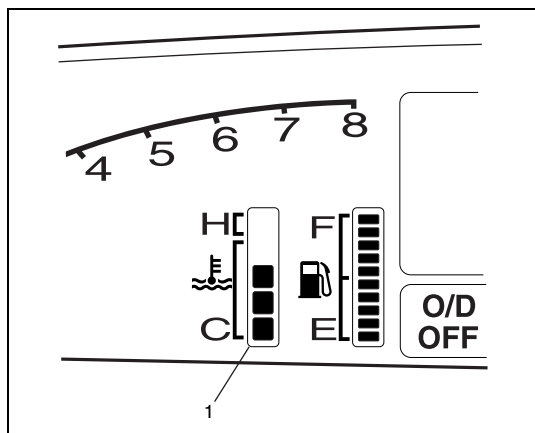
## On-Vehicle Service

### Maintenance Service

#### Fluid level check

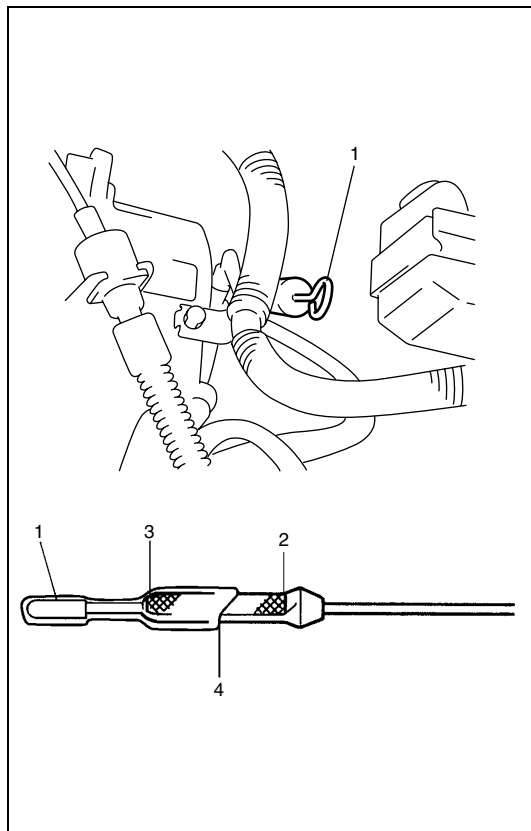
##### LEVEL CHECK AT NORMAL OPERATION TEMPERATURE

- 1) Stop vehicle and place it level.
- 2) Apply parking brake and place chocks against wheels.
- 3) With selector at P position, start engine.
- 4) Warm up engine till fluid temperature reaches normal operating temperature (70 – 80°C/158 – 176°F). As a guide to check fluid temperature, warm up engine till engine coolant temperature meter (1) indicates up to 2nd or 3rd segment from lowest segment as shown in figure.



- 5) Keep engine idling and shift selector slowly to L and back to P position.
- 6) With engine idling, pull out fluid level gauge, wipe it off with a clean cloth and put it back into place.

- |    |  |
|----|--|
| A. | Shift the select lever with its button pushed in.  |
| B. | Shift the select lever without pushing its button. |



- 7) Pull out fluid level gauge (1) again and check fluid level indicated on it. The lowest fluid level should be between FULL HOT and LOW HOT. If it is below LOW HOT, add an equivalent of DEXRON®-III or DEXRON®-IIE up to FULL HOT.

#### Automatic transaxle fluid

: An equivalent of DEXRON®-III or DEXRON®-IIE

#### NOTE:

- Do not race engine while checking fluid level, even after the engine start.
- Do not overfill. Overfilling can cause foaming and loss of fluid through breather. Then slippage and transaxle failure can result.
- Bringing the level from LOW HOT to FULL HOT requires 0.4 liters (0.85/0.70 US/Imp. pt).
- If vehicle was driven under high load such as pulling a trailer, fluid level should be checked about half an hour after it is stopped.

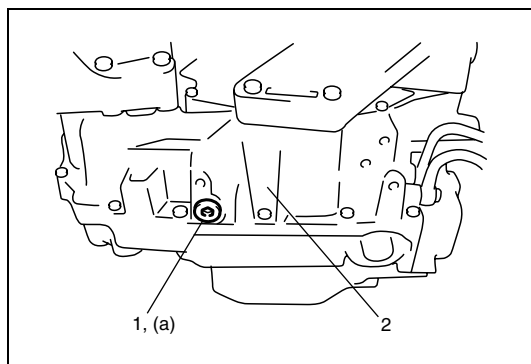
2. "FULL HOT" mark
3. "LOW HOT" mark
4. Fluid level

#### Fluid change

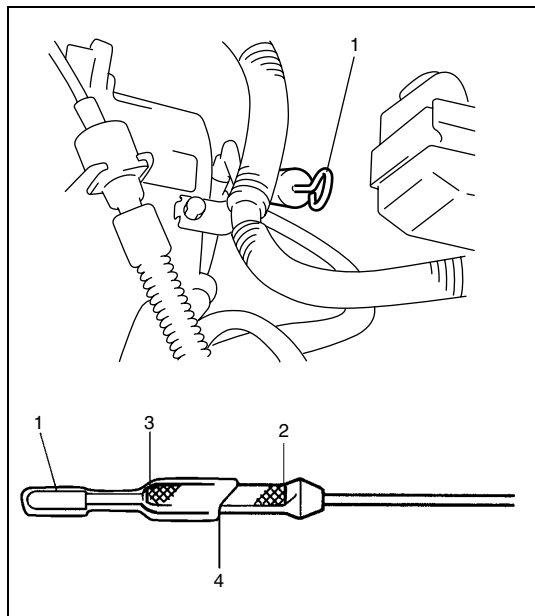
- 1) Lift up vehicle.
- 2) When engine is cool, remove drain plug (1) from transaxle housing (2) and drain A/T fluid.
- 3) Install drain plug (1).

#### Tightening torque

A/T fluid drain plug (a) : 40 N·m (4.0 kg-m, 29.0 lb-ft)



- 4) Lower vehicle and fill proper amount of an equivalent of DEXRON®-III or DEXRON®-IIE



- 5) Check fluid level referring to “Fluid level check” in this section.

#### Automatic transaxle fluid

: An equivalent of DEXRON®-III or DEXRON®-IIE

#### Automatic transaxle fluid capacity

When draining from drain plug hole :

2.7 liters (5.71/4.75 US/Imp. pt.)

When overhauling :

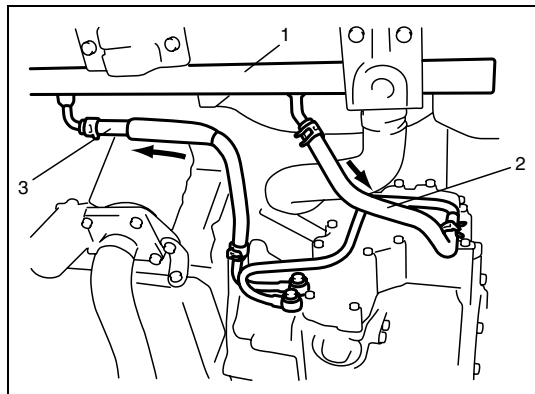
6.0 liters (12.68/10.56 US/Imp. pt.)

1. Fluid level gauge
2. “FULL HOT” mark
3. “LOW HOT” mark
4. Fluid level

#### A/T fluid cooler hoses

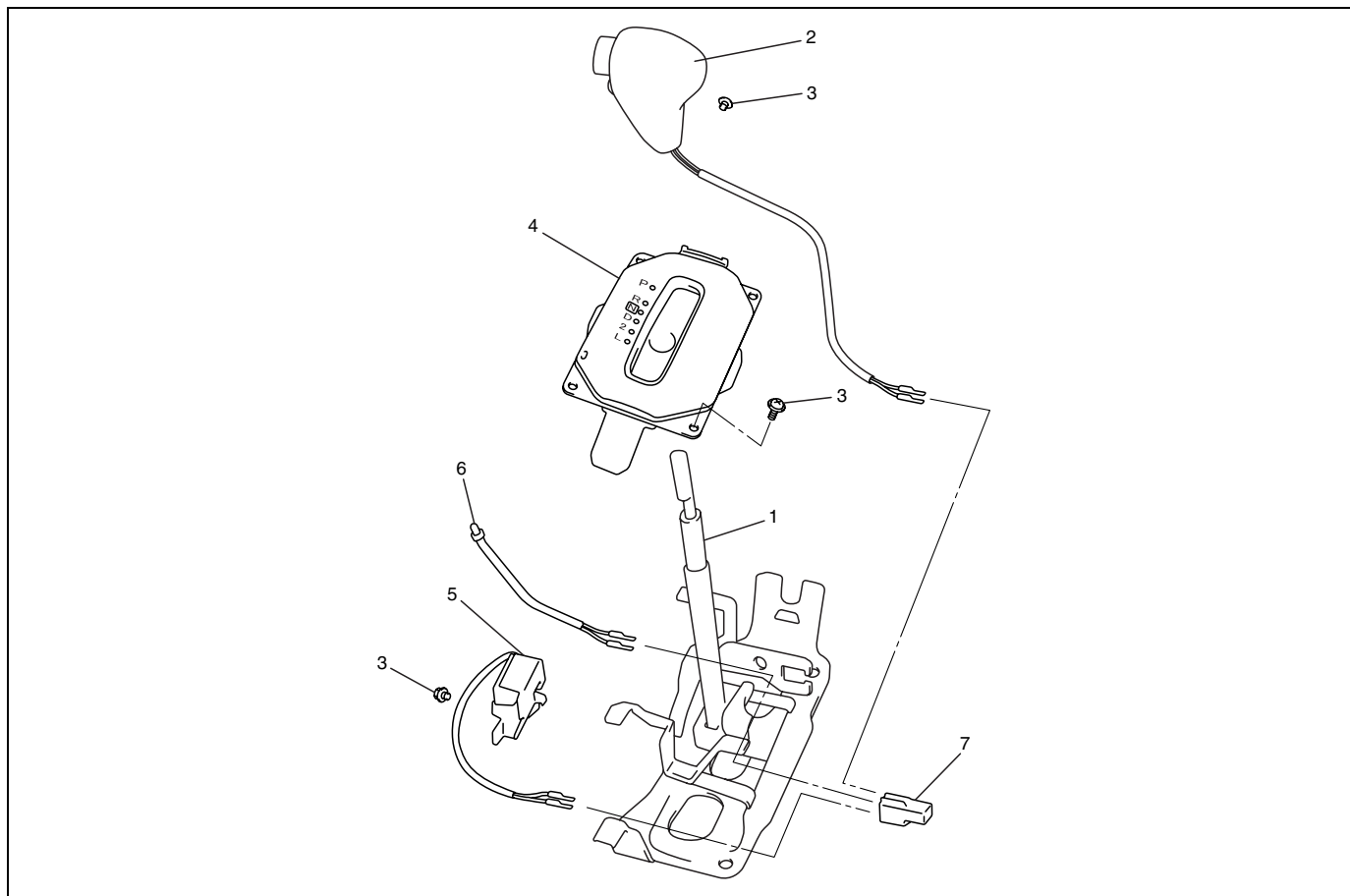
The rubber hoses for the A/T fluid cooler should be replaced at specified interval. When replacing them, be sure to note the following.

- to replace clamps at the same time
- to insert hose as far as its limit mark
- to clamp clamps securely



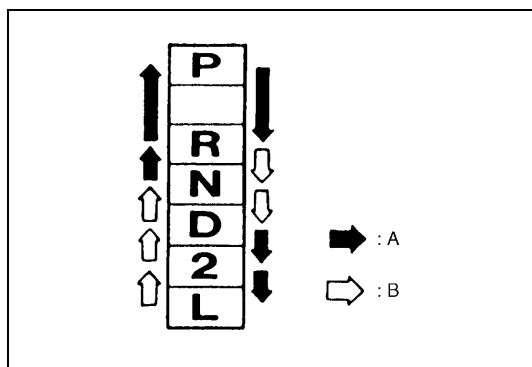
1. Radiator
2. Inlet hose (Outlet from A/T fluid cooler)
3. Outlet hose (Inlet to A/T fluid cooler)

## Selector Lever



1. Selector lever assembly	4. Indicator assembly	7. Connector
2. Knob assembly	5. Shift lock solenoid (if equipped)	
3. Screw	6. Illumination lamp assembly	

### INSPECTION



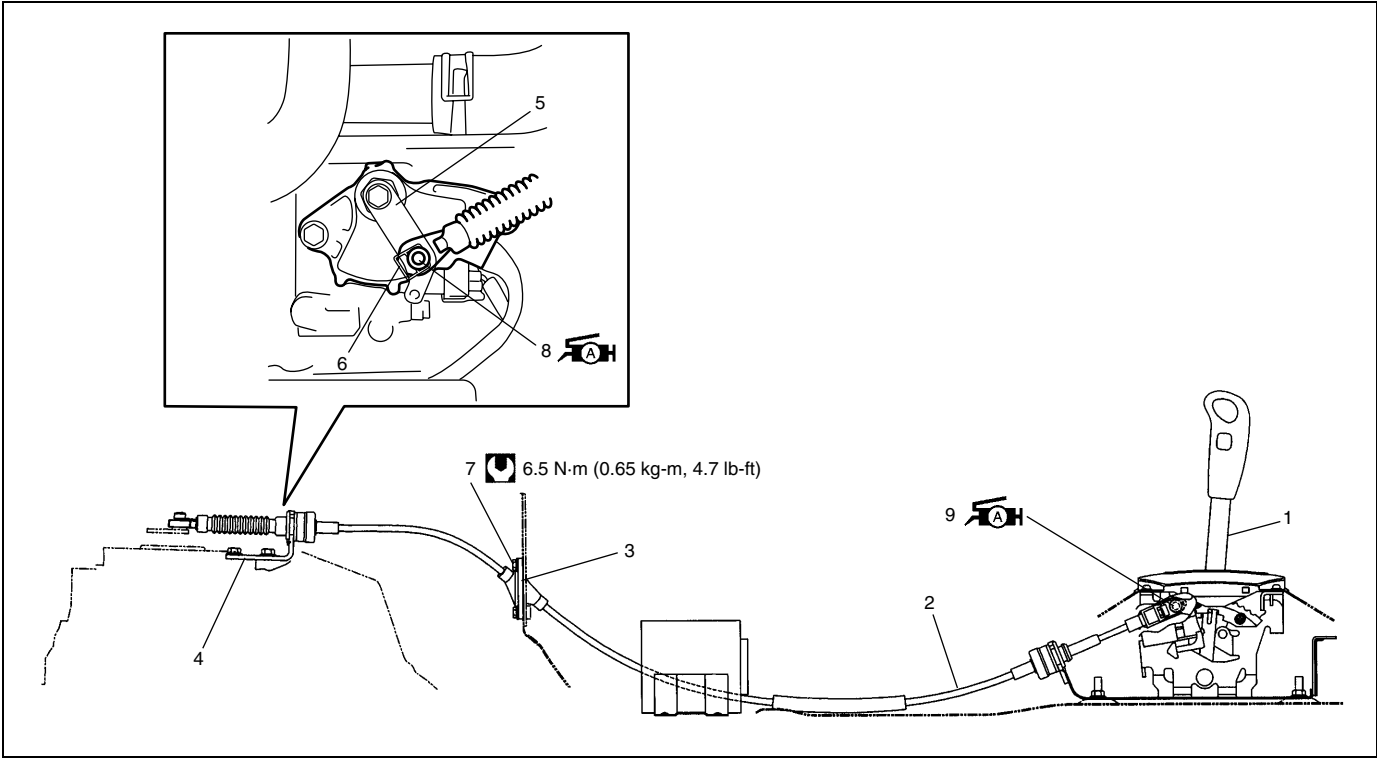
Check select lever for smooth and clear-cut movement and position indicator for correct indication.

For operation of select lever, refer to the figure.

A. Shift the select lever with its button pushed in.
B. Shift the select lever without pushing its button.



Select Cable



1. Selector lever assembly	6. Clip
2. Select cable	7. Select cable retainer bolt
3. Select cable retainer	8. Manual shift lever pin : Apply lithium grease 99000-25010 to all around pin (0.15 g)
4. Cable bracket	9. Selector lever pin : Apply lithium grease 99000-25010 to all around pin (0.15 g)
5. Manual shift lever	Tightening torque

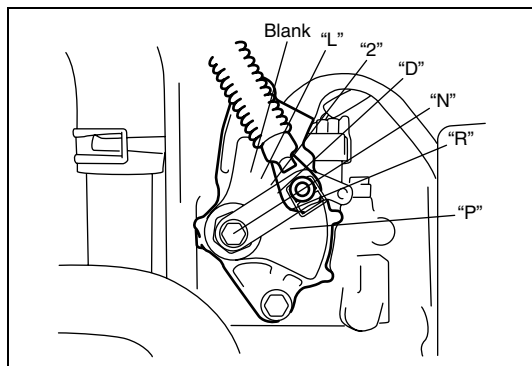
REMOVAL

- 1) Remove parking brake lever cover.
- 2) Remove console box.
- 3) Disconnect select cable from selector lever and then detach from bracket.
- 4) Remove clip and disconnect select cable from manual shift.
- 5) Remove select cable retainer from dash panel.

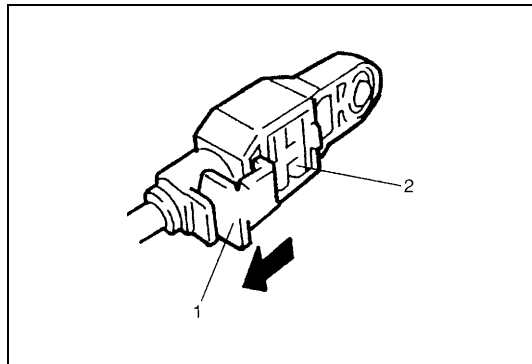
INSTALLATION

Install select cable by reversing removal procedure.  
 The important steps in installation are as follows.

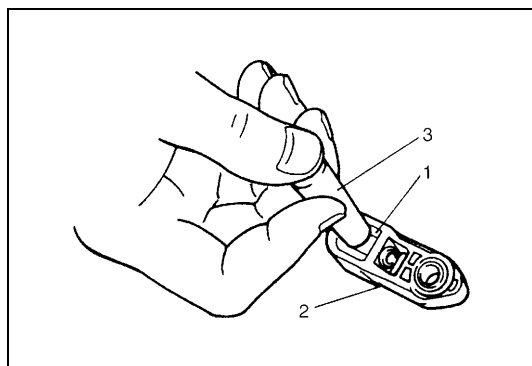
- Apply grease to pin and cable joint.
- Tighten bolts in upper figure to specified torque.
- Adjusting procedure is as follows.

**ADJUSTMENT**

- 1) Shift manual shift lever to "N" range (transmission range sensor "N" range).
- 2) Remove adjuster (cable end) from selector lever pin of selector lever assembly.

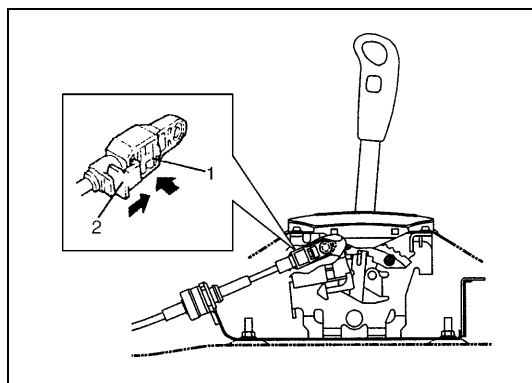


- 3) Release lock plate (1) which restrict moving of cable end holder (2).



- 4) Push cable end holder (1) out from eye-end (2) using an appropriate tool (3) to disengage cable.

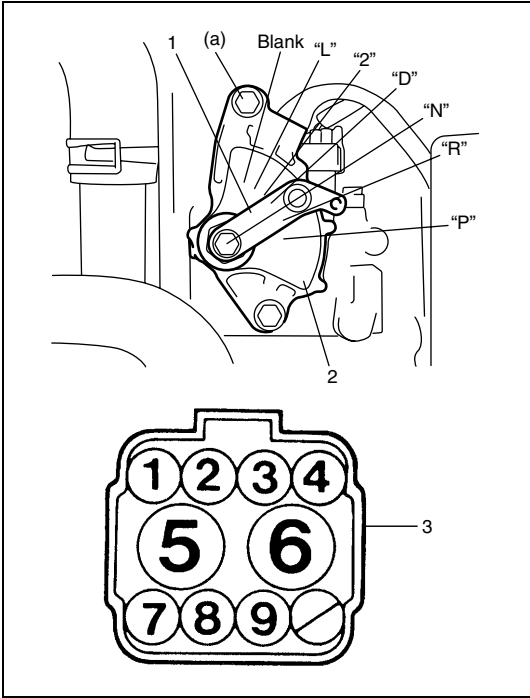
- 5) Shift selector lever to "N" position.
- 6) Apply grease to selector lever pin and install adjuster (cable end) to it.

**Grease 99000-25010**

- 7) With both selector lever and transmission range sensor kept each "N" position, drive cable end holder (1) in until it locks cable.
- 8) Slide lock plate (2) to secure cable end holder in position.
- 9) After select cable was installed, check for the following.
  - Push vehicle with selector lever shifted to "P" range. Vehicle should not move.
  - Vehicle can not be driven in "N" range.
  - Vehicle can be driven in "D", "2" and "L" ranges.
  - Vehicle can be backed in "R" range.

Transmission Range Sensor (Shift Switch)

ADJUSTMENT



- 1) Shift manual shift lever (1) to "N" range.
- 2) Connect ohmmeter between 7 and 9 terminals of disconnected transmission range sensor connector (3).
- 3) Turn transmission range sensor (2) gradually to find position where ohmmeter reading indicates continuity.  
Then fix transmission range sensor (2) at that position by tightening bolts to specified torque.

Tightening torque

**Transmission range sensor bolts (a) : 25 N·m (2.5 kg·m, 18.0 lb·ft)**

- 4) Connect transmission range sensor connector (3).
- 5) Check that engine starts in "N" and "P" ranges but it doesn't start in "D", "2", "L" or "R" range. Also, check that back-up lamp turn ON in "R" range.

INSPECTION

- 1) Disconnect transmission range sensor connector.
- 2) Check that continuity exists at terminals shown below by moving selector lever.

		Terminal No.								
		1	2	3	4	5	6	7	8	9
Sensor Position	P					○	○		○	○
	R				○					○
	N					○	○	○		○
	D			○						○
	2		○							○
	L	○								○

## Output Shaft Speed Sensor

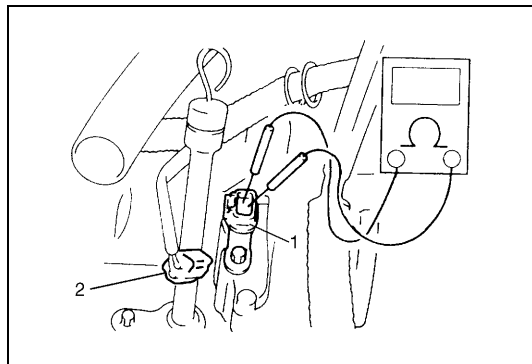
### INSPECTION

- 1) Disconnect negative cable at battery.
- 2) Disconnect output shaft speed sensor connector (2).
- 3) Check resistance between output shaft speed sensor terminals.

#### Output shaft speed sensor resistance

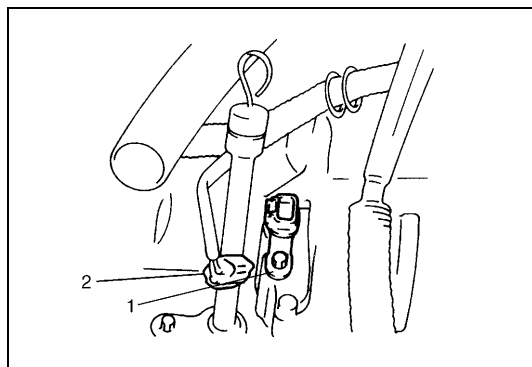
**Standard : 648 – 792  $\Omega$  at 20°C (68°F)**

1. Output shaft speed sensor



### REMOVAL

- 1) Disconnect negative cable at battery.
- 2) Disconnect output shaft speed sensor connector (2).
- 3) Remove output shaft speed sensor (1) by removing its bolt.



### INSTALLATION

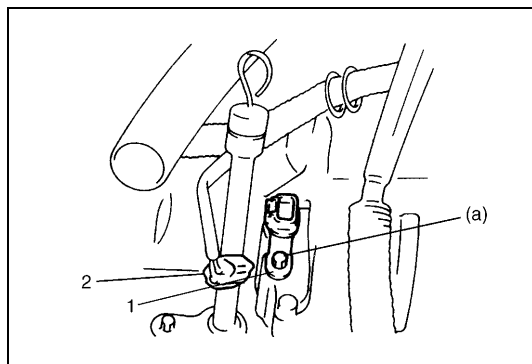
- 1) Apply A/T fluid to output shaft speed sensor O-ring.
- 2) Install output shaft speed sensor (1) to A/T case and tighten bolt to specified torque.

#### Tightening torque

#### Output shaft speed sensor bolt

**(a) : 5.5 N·m (0.55 kg-m, 4.0 lb-ft)**

- 3) Connect output shaft speed sensor connector (2) to output shaft speed sensor (1).



- 4) Connect negative cable to battery.

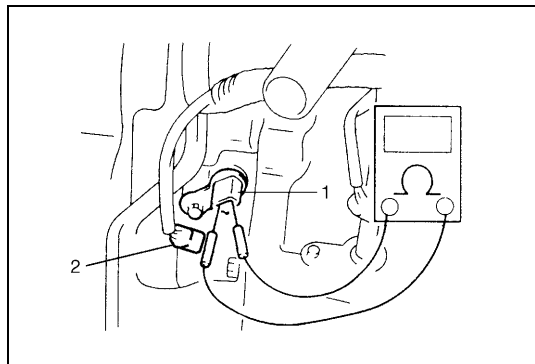
## Input Shaft Speed Sensor

### INSPECTION

- 1) Disconnect negative cable at battery.
- 2) Disconnect input shaft speed sensor connector (2).
- 3) Check resistance between input shaft speed sensor terminals.

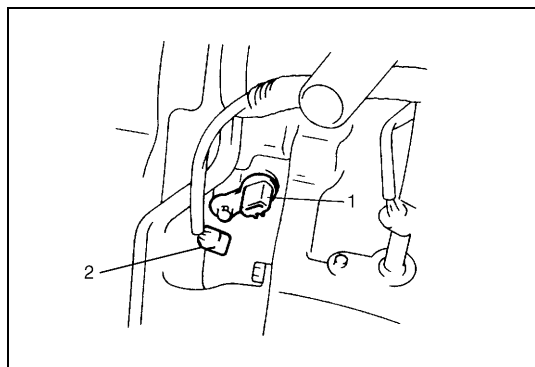
**Input shaft speed sensor resistance**  
**Standard : 387 – 473  $\Omega$  at 20°C (68°F)**

1. Input shaft speed sensor



### REMOVAL

- 1) Disconnect negative cable at battery.
- 2) Disconnect input shaft speed sensor connector (2).
- 3) Remove input shaft speed sensor (1) by removing its bolt.



### INSTALLATION

- 1) Apply A/T fluid to input shaft speed sensor O-ring.
- 2) Install input shaft speed sensor (1) to A/T case and tighten bolt to specified torque.

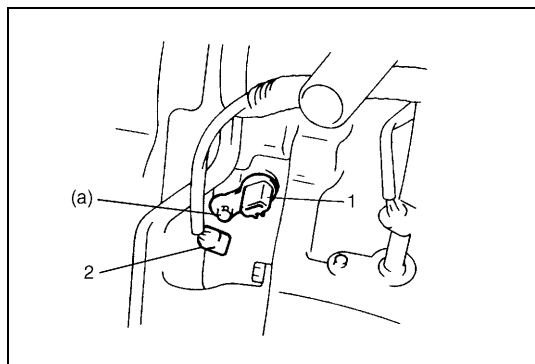
#### Tightening torque

**Input shaft speed sensor bolt**

**(a) : 5.5 N·m (0.55 kg-m, 4.0 lb-ft)**

- 3) Connect input shaft speed sensor connector (2) to input shaft speed sensor (1).

- 4) Connect negative cable to battery.



## Vehicle Speed Sensor (VSS)

Refer to Section 7A1 for removal, installation and inspection.

## Throttle Position Sensor

### INSPECTION

Check throttle position sensor referring to Section 6E1.

## Engine Coolant Temperature Sensor

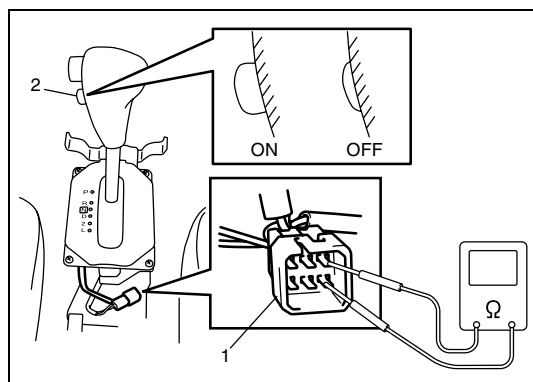
### INSPECTION

Check engine coolant temperature sensor referring to Section 6E1.

## O/D OFF Switch

### INSPECTION

- 1) Remove console box.
- 2) Disconnect O/D off switch connector (1).
- 3) Check continuity between O/D off switch terminals.

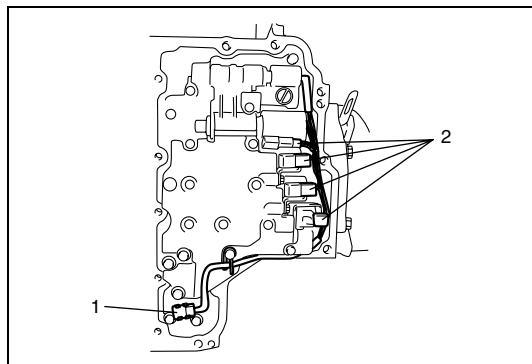
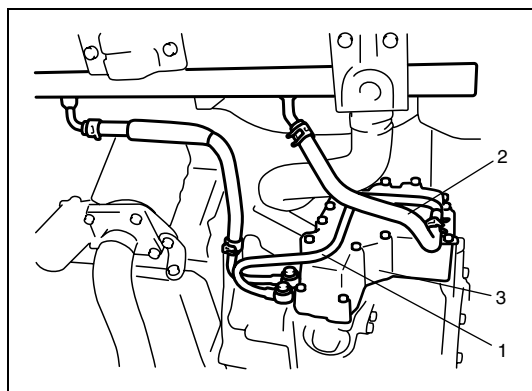


O/D off switch (2)	ON	OFF
Continuity	Continuity	No continuity

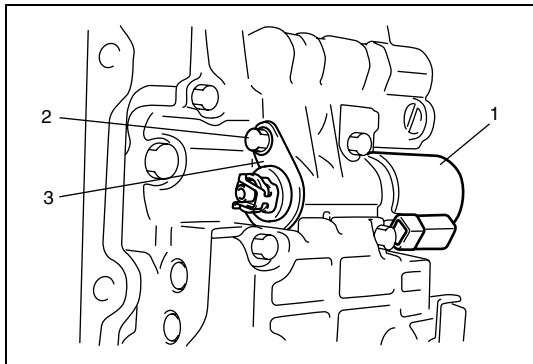
## Solenoid Valves (Shift Solenoid Valves, TCC Solenoid Valve and Pressure Control Solenoid Valve)

### REMOVAL

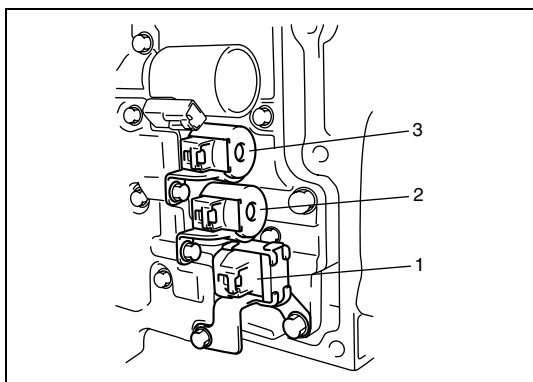
- 1) Disconnect negative cable at battery.
- 2) Drain A/T fluid.
- 3) Remove A/T fluid cooler pipe (1) and hose (2).
- 4) Remove A/T side cover (3).



- 5) Remove transmission fluid temperature sensor (1) and sensor harness from clamp.
- 6) Disconnect solenoid connectors (2).



- 7) Remove pressure control solenoid valve (1) by removing bolt (2) and clamp (3).



- 8) Remove TCC solenoid valve (1), shift solenoid valve-B (No.2) (2) and shift solenoid valve-A (No.1) (3) in that order by removing bolts.

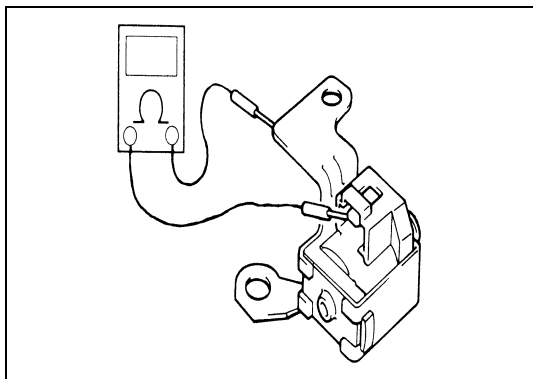
### **Solenoid valves (shift solenoid valves and TCC solenoid valve)**

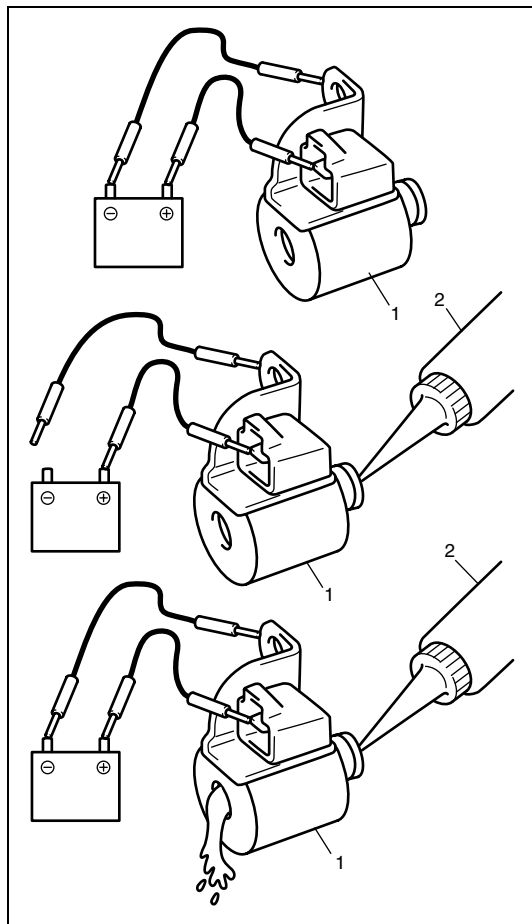
#### **INSPECTION**

##### **Resistance check**

**Shift solenoid valve-A (No.1), -B (No.2) and TCC solenoid valve**

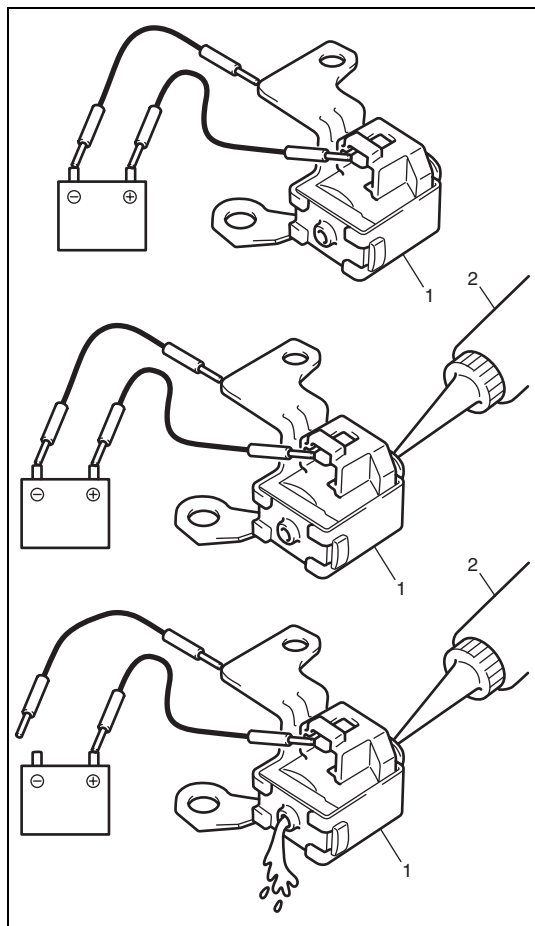
**Shift solenoid valves and TCC solenoid valve resistance**  
**Standard: 11 – 15  $\Omega$  at 20°C (68°F)**



**Operation check****Shift solenoid valve-A (No.1) and -B (No.2)**

- Check that solenoid valve (1) actuate with click sound when battery voltage is conducted.
- Apply oiler (2) to solenoid valve (1) and give compression by hands and then check to be sure that transaxle fluid from oiler does not come out of holes in solenoid valve when battery voltage is not conducted.
- Under the same conditions as above, conduct battery voltage and then make sure that fluid comes out with vigor. If check result is not as described, replace shift solenoid valve.



**TCC solenoid valve**

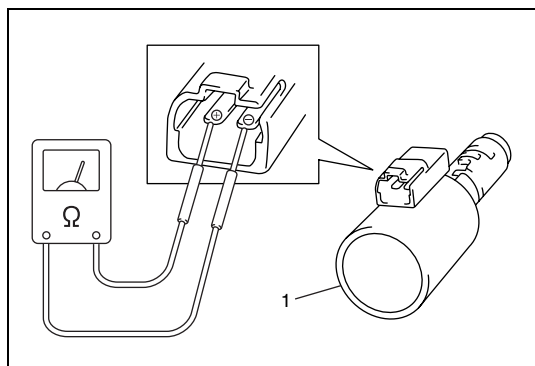
- Check that solenoid valve (1) actuate with click sound when battery voltage is conducted.
- Apply oiler (2) to solenoid valve (1) and give compression by hands and then check to be sure that transaxle fluid from oiler does not come out of holes in solenoid valve when battery voltage is conducted.
- Under the same conditions as above, release battery voltage and then make sure that fluid comes out with vigor. If check result is not as described, replace shift solenoid valve.

**Pressure control solenoid valve****INSPECTION****Resistance check**

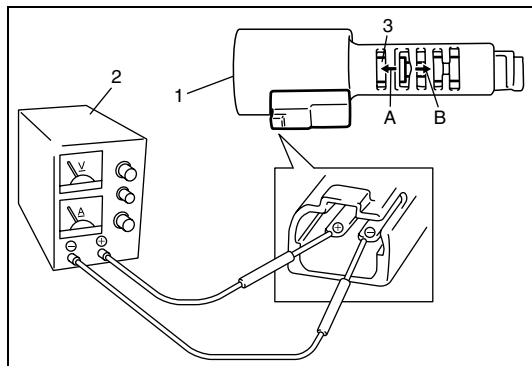
Measure resistance between pressure control solenoid valve (1) terminals.

**Pressure control solenoid valve resistance**

**Standard : 3.3 – 3.7  $\Omega$  (at 20°C (68°F))**

**Operation check**

Check pressure control solenoid valve operation in the either manner of the followings.

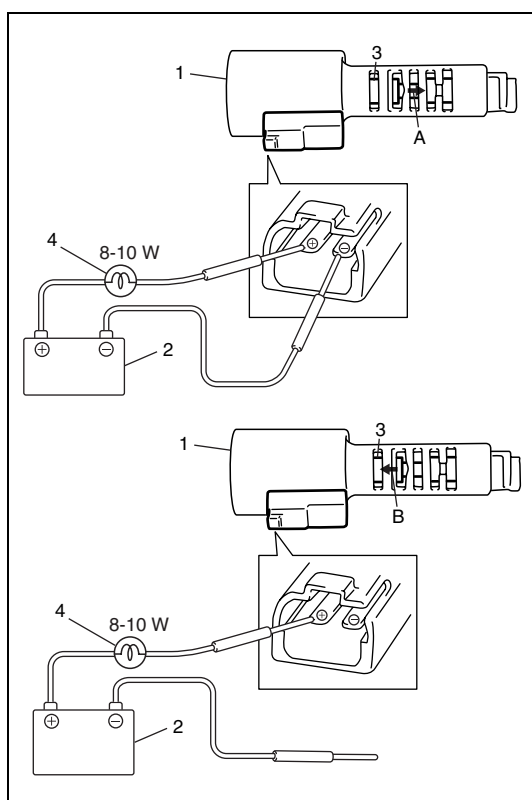


### [Using regulated DC power supply]

- 1) Connect pressure control solenoid valve (1) with regulated DC power supply (2) as shown in the figure.
- 2) Turn regulated DC power supply switch ON, increase voltage of power supply keeping current within 1.0 A.
- 3) Check for gradual movement of valve (3) in the direction of arrow "A" as increase voltage.
- 4) Check movement of valve (3) in the direction of arrow "B" as decrease voltage.
- 5) Turn power supply switch OFF.

### CAUTION:

**Do not pass current 1.0 A or more, or pressure control solenoid is burned out.**



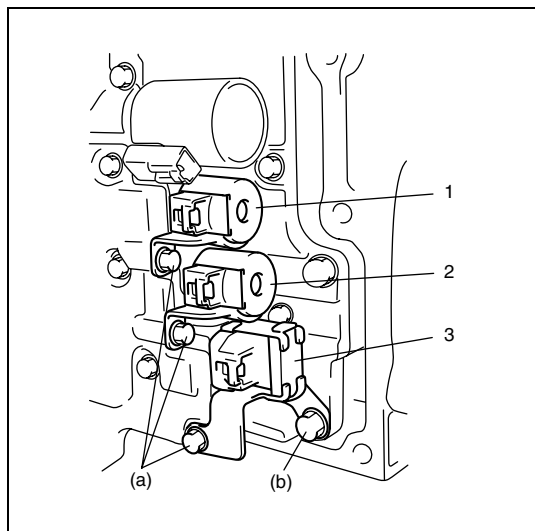
### [Not using regulated DC power supply]

- 1) Connect pressure control solenoid valve (1) to battery (2) setting the 8 – 10 W bulb (4) on the way as shown in the figure.
- 2) Check for movement of valve (3) in the direction of arrow "A".
- 3) Disconnect pressure control solenoid valve (1) from battery (2) and check movement of valve (3) in the direction of arrow "B" as shown in the figure.

### CAUTION:

**Set 8-10 W bulb on the way, or pressure control solenoid valve is burned out.**

## INSTALLATION

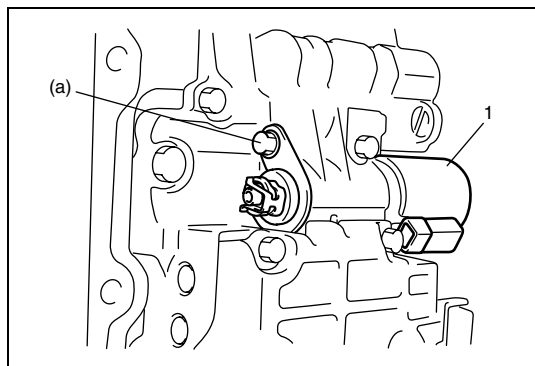


- 1) Install shift solenoid valve-A (No.1) (1), shift solenoid valve-B (No.2) (2) and TCC solenoid valve (3) in that order.

### Tightening torque

**Shift solenoid bolts (a) : 7.0 N·m (0.7 kg-m, 5.0 lb-ft)**

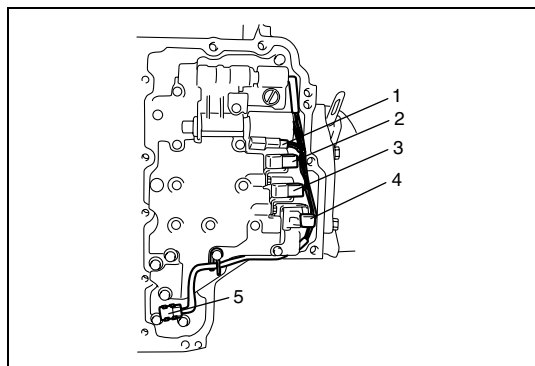
**Valve body bolts (b) : 10 N·m (1.0 kg-m, 7.5 lb-ft)**



- 2) Install pressure control solenoid (1).

### Tightening torque

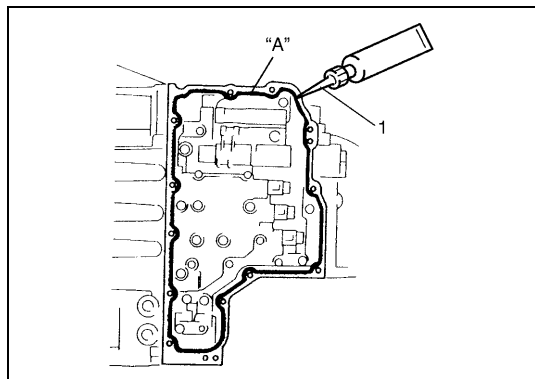
**Pressure control solenoid bolt (a) : 7.0 N·m (0.7 kg-m, 5.0 lb-ft)**



- 3) Connect solenoid connectors by identifying wire color.

Solenoid coupler	Wire color
Pressure control solenoid valve (1)	Pink + Brown
Shift solenoid valve-A (No.1) (2)	White
Shift solenoid valve-B (No.2) (3)	Black
TCC solenoid valve (4)	Yellow

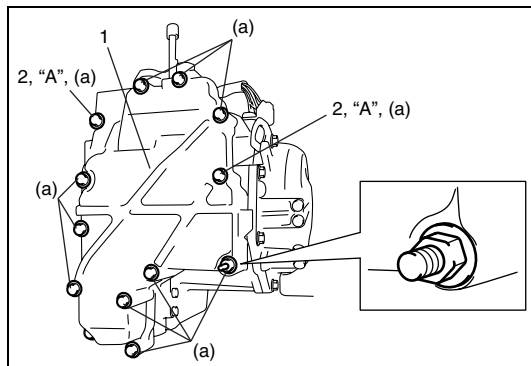
- 4) Install transmission fluid sensor (5) and sensor wire to clamp.



- 5) Clean mating surface of A/T side cover and A/T case.

- 6) Apply sealant to mating surface of A/T side cover and A/T case by using a nozzle (1) as shown in figure by such amount that its section is 1.5 mm (0.059 in) in diameter.

**“A” : Sealant 99000-31230**



7) Install transaxle side cover (1).

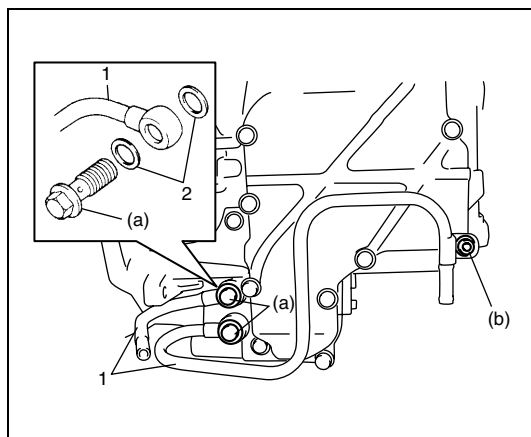
**NOTE:**

**Apply sealant to 2 bolts (2).**

**“A”: Sealant 99000-31230**

**Tightening torque**

**Transaxle side cover bolts (a) : 24 N·m (2.4 kg-m, 17.5 lb-ft)**



8) Install A/T fluid cooler pipes (1).

**Tightening torque**

**A/T fluid pipe union bolts (a) : 27 N·m (2.7 kg-m, 19.5 lb-ft)**

**A/T fluid pipe nut (b) : 18 N·m (1.8 kg-m, 13.0 lb-ft)**

**NOTE:**

**Make sure to use new gaskets (2) for A/T fluid pipe union bolts.**

9) Install A/T fluid cooler hoses.

10) Pour A/T fluid referring to “Fluid Change” in this section.

11) Verify that there is no A/T fluid leakage.

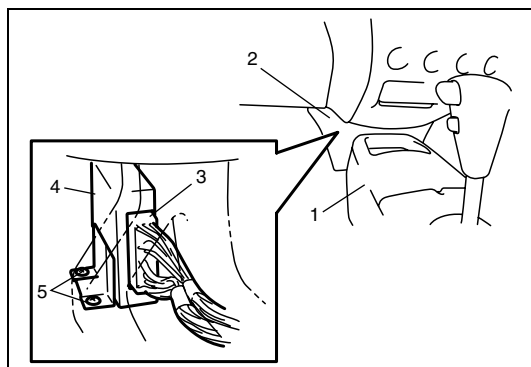
## Transmission Control Module (TCM)

**CAUTION:**

**TCM consists of highly precise parts, therefore when handling it, be careful not to expose to excessive shock.**

### REMOVAL

- 1) Disconnect negative cable at battery.
- 2) If the vehicle is equipped with air bag system, disable air bag system. Refer to “Disabling Air Bag System” in Section 10B.
- 3) Remove parking brake cover, console box (1) and console covers (2).
- 4) Disconnect connectors (3) from TCM (4).
- 5) Remove TCM (4) by removing its bolts (5).



### INSTALLATION

Reverse removal procedure noting the following.

- Connect TCM connectors securely.
- If the vehicle is equipped with air bag system, be sure to enable air bag system after TCM is back in place. Refer to “Enabling Air Bag System” in Section 10B.

## Transmission Fluid Temperature Sensor

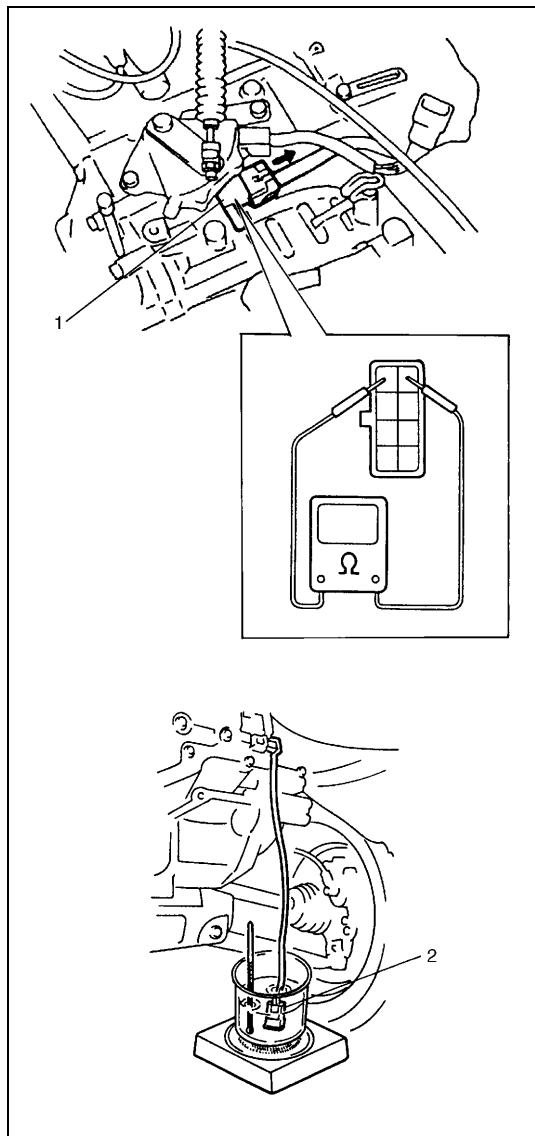
### INSPECTION

- 1) Lift up vehicle.
- 2) With engine is cool, remove drain plug and drain A/T fluid.
- 3) Install drain plug. (Refer to "Fluid Change" in this section.)
- 4) Disconnect fluid cooler inlet hose (outlet from fluid cooler) from pipe, and remove A/T fluid cooler pipe (lower side).
- 5) Remove A/T side cover.
- 6) Disconnect valve body connector (1).
- 7) Warm up transmission fluid temperature sensor (2). Check resistance between terminals of A/T side valve body connector. Thus make sure its resistance decrease with the increase of temperature.

After inspection, install transmission fluid temp. sensor and connect valve body connector.

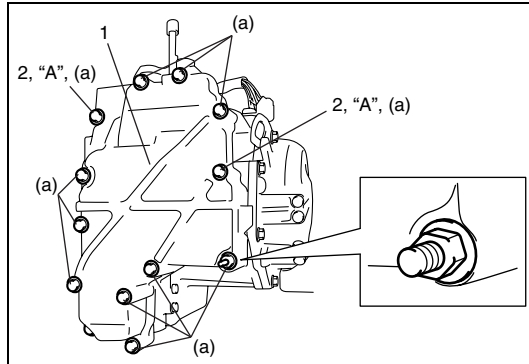
### Transmission fluid temperature sensor resistance

Temperature	Resistance
10°C (50°F)	5.8 – 7.1 kΩ
110°C (230°F)	231 – 263 Ω
145°C (293°F)	105 – 117 Ω



- 8) Clean mating surface of A/T side cover and A/T case.
- 9) Apply sealant to mating surface of A/T side cover and A/T case by using a nozzle, referring to "Unit Assembly" in this section.

**Sealant 99000-31230**



10) Install transaxle side cover (1).

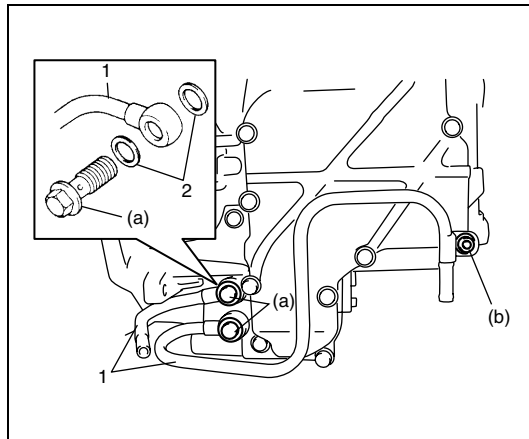
**NOTE:**

**Apply sealant to 2 bolts (2).**

**“A”: Sealant 99000-31230**

**Tightening torque**

**Transaxle side cover bolts (a) : 24 N·m (2.4 kg-m, 17.5 lb-ft)**



11) Install A/T fluid cooler pipes (1).

**Tightening torque**

**A/T fluid pipe union bolts (a) : 27 N·m (2.7 kg-m, 19.5 lb-ft)**

**A/T fluid pipe nut (b) : 18 N·m (1.8 kg-m, 13.0 lb-ft)**

**NOTE:**

**Make sure to use new gaskets (2) for A/T fluid pipe union bolts.**

12) Install A/T fluid cooler hoses.

13) Pour A/T fluid referring to “Fluid Change” in this section.

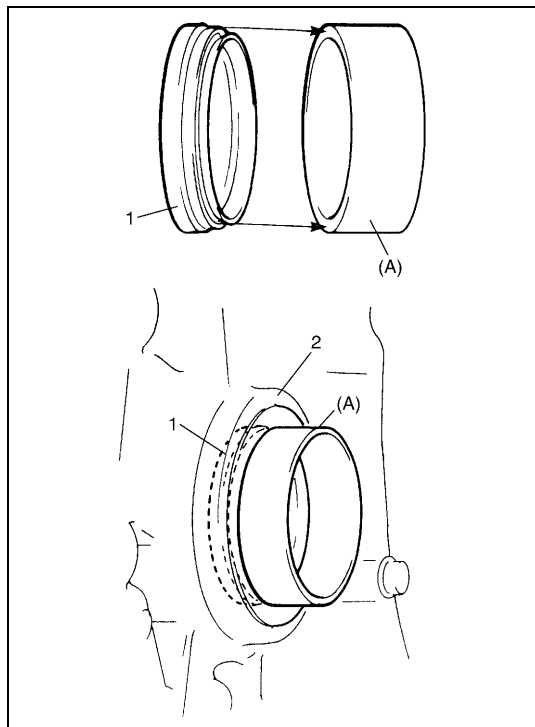
14) Verify that there is no A/T fluid leakage.

## Differential Side Oil Seal

### REPLACEMENT

- 1) Lift up vehicle and drain automatic transaxle fluid.
- 2) Remove drive shaft joints from differential gear of transaxle.  
Refer to Section 4A for procedure to disconnect drive shaft joints.  
For differential side oil seal removal, it is not necessary to remove drive shafts from steering knuckle.
- 3) Remove differential side oil seal by using screw driver or like.
- 4) Apply grease to new differential side oil seal lip.

**Grease 99000-25030**



5) Install new differential side oil seal (1) by using special tool.

**NOTE:**

For oil seal installation, press-fit oil seal so that transaxle case end face (2) is flush with oil seal end face.

**Special tool**

(A) : 09944-66020

6) Install drive shaft referring to Section 4A.

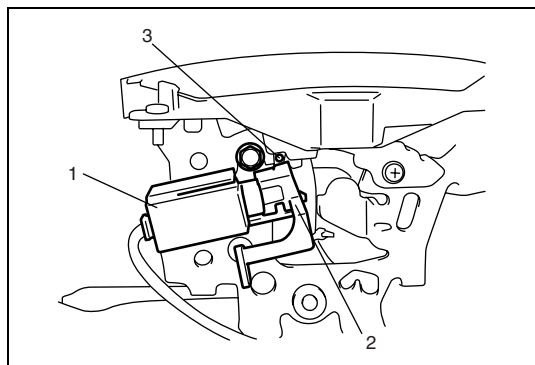
7) Pour A/T fluid referring to “Fluid Change” in this section.

## Shift Lock Solenoid (If Equipped)

1) Remove parking brake cover and console box.

2) Replace shift lock solenoid (1).

3) Install covers as they were.



**NOTE:**

- Check that detent pin (3) is locked at “P” position by solenoid cam (2).
- Check to confirm that lock plate (2) is pulled in when ignition key is turned to “ON” and brake pedal is depressed, so allowing detent pin (3) to be pushed down.

## Brake Interlock System (If Equipped)

### Shift lock solenoid control

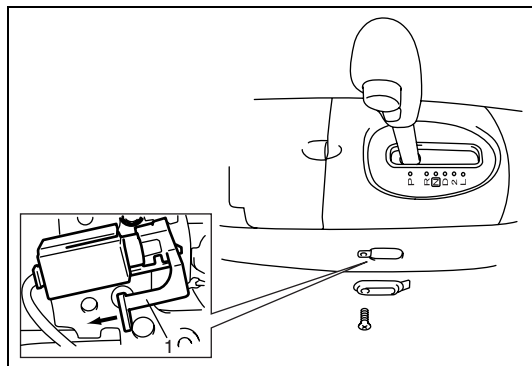
This system consists of shift lock solenoid control system and interlock cable control system.

The shift lock solenoid control system is so designed that the selector lever can not be shifted from “P” range position unless ignition switch is turned ON and the brake pedal is depressed.

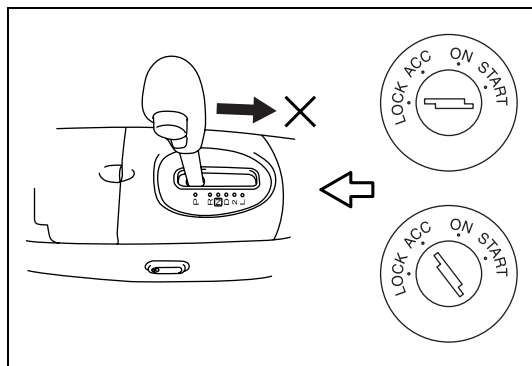
And interlock cable control system is so designed that select lever cannot be shifted from “P” range position unless ignition switch is turned to “ACC” or “ON” position. Also, ignition key cannot be pulled out of key slot unless selector lever is in “P” range.

### Shift lock solenoid manual release

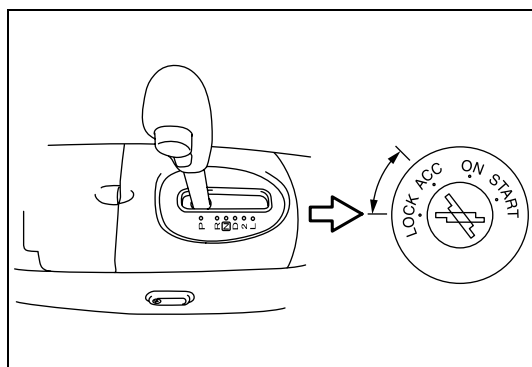
Without using brake pedal, shift lock plate be moved by pushing shift lock solenoid plate (1) with screw driver or like through hole (2). (To shift selector lever from “P” range to any other position, turn ignition switch to “ACC” or “ON” position.)



## INSPECTION

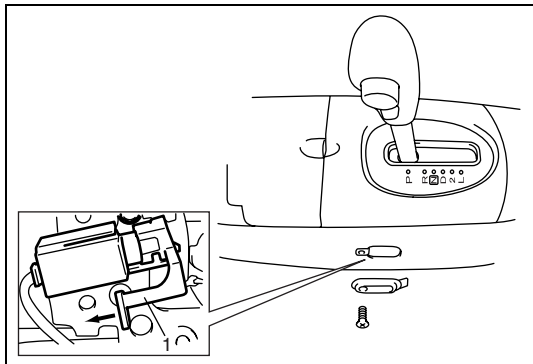


- 1) Check that selector lever cannot be moved to any other range from “P” range position when ignition switch key is at “ACC” position, at “LOCK” position (or it is removed from keyhole of ignition switch) or brake pedal is not depressed.

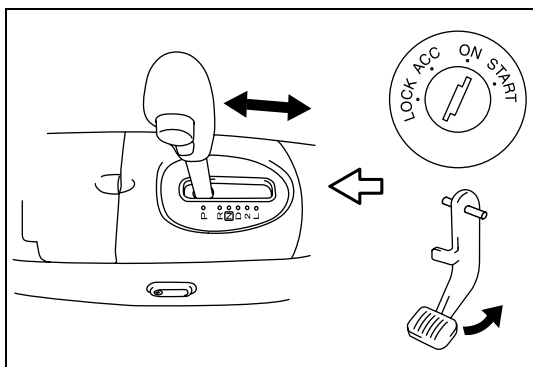


- 2) Shift selector lever to “P” range position, release knob button and check for the following.
  - Ignition key can be turned between “LOCK” and “ACC” positions back and forth and also it can be removed from ignition switch.

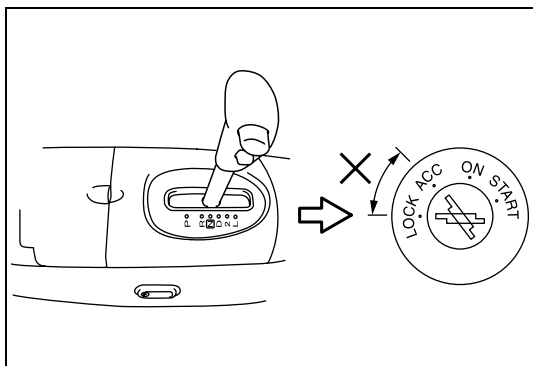




- With shift lock solenoid cam (1) moved in arrow direction and ignition key turned to “ACC” position, selector lever can be shifted from “P” range position to any other range.
- With shift lock solenoid cam (1) moved in arrow direction and ignition key turned to “LOCK” position, selector lever can not be shifted from “P” range position to any other range.



- When ignition switch is turned “ON” and brake pedal is depressed, selector lever can be shifted from “P” range position to any other range.



- 3) With ignition lever shifted to any position other than “P” range, check that ignition key cannot be turned “LOCK” position and it cannot be removed from ignition switch unless it is at “LOCK” position.

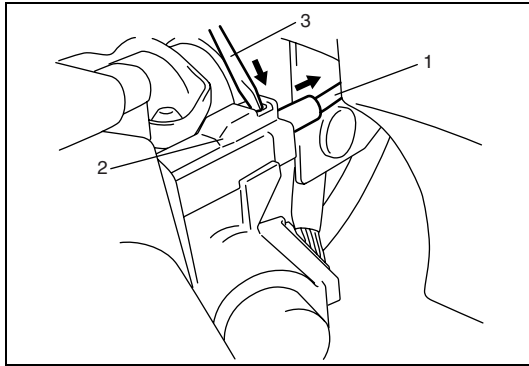
## Key Interlock Cable (If Equipped)

### NOTE:

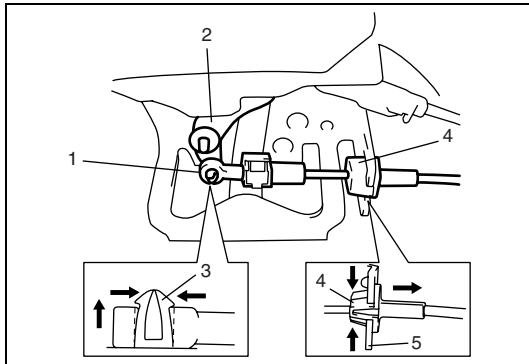
**Don't bend interlock cable excessively when removing and installing it, or system will not operate correctly.**

### REMOVAL

- 1) If the vehicle is equipped with air bag system, disconnect negative cable at battery and disable air bag system, referring to “Disabling Air Bag Systems” in Section 10B.
- 2) Remove steering column cover.
- 3) Turn ignition switch to “ACC” position.

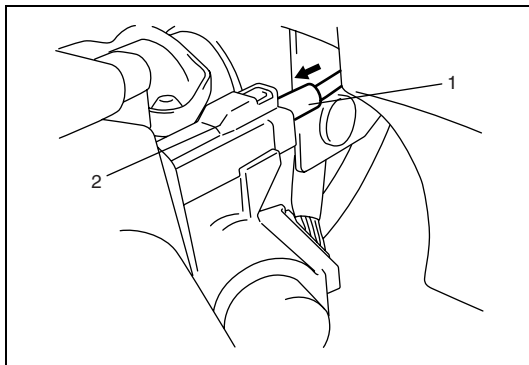


- 4) Pull out key interlock cable (1) from key cylinder cover (2) while pressing checkhook with slotted screwdriver (3) or the like.

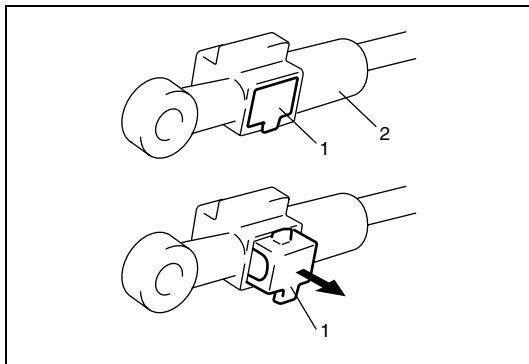


- 5) Turn ignition switch to "LOCK" position.
- 6) Remove parking brake cover and console box.
- 7) Detach cable end (1) from interlock cam (2) while pressing claws (3) of interlock cam boss.  
At this time, be careful not to cause damage to its claws.  
Detach cable casing cap (4) from selector bracket (5) while pressing checkhook.
- 8) Remove interlock cable.

## INSTALLATION



- 1) Lay interlock cable to its original cabling route.
- 2) Turn ignition switch to "ACC" position.
- 3) Insert cable casing cap (1) into key cylinder cover (2) securely.

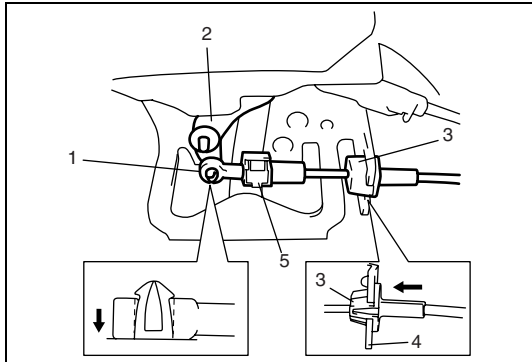


- 4) Pull out lock button (1) of selector side cable end (2).

- 5) Shift selector lever to "N" position.

**NOTE:**

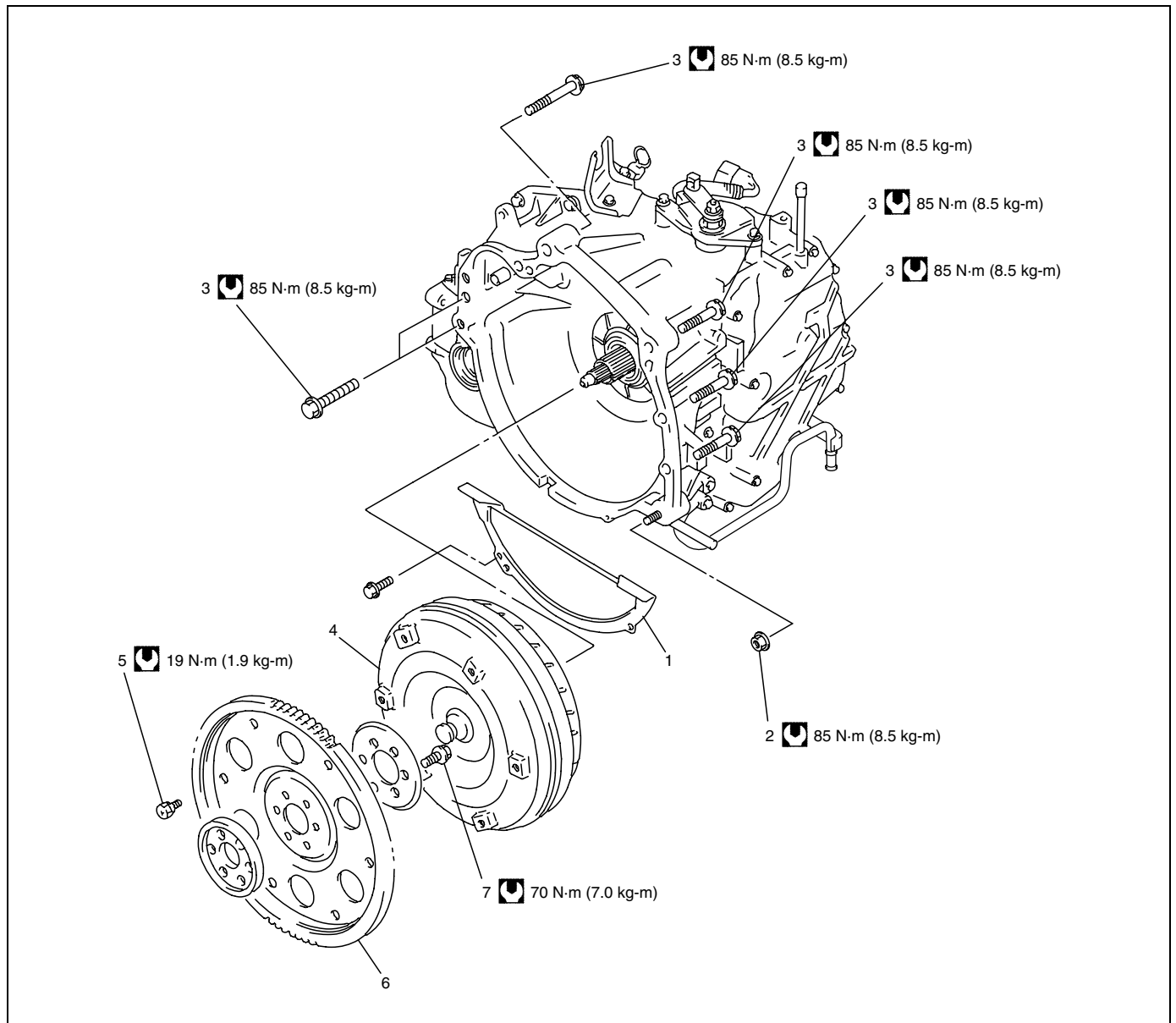
If selector lever is in “P” position, shift selector lever referring to “Shift Lock Solenoid Manual Release” in this section.



- 6) Install cable casing cap (3) to selector bracket (4).
- 7) Connect cable end (1) to interlock cam (2) with ignition switch turned to “ACC” position.
- 8) Drive lock button (5) in cable end until it locks cable expansion and contraction.
- 9) With selector lever set at “P” position, turn ignition key to “ACC” position and then check for the following conditions.
  - With knob button released, ignition key can be turned from “ACC” position to “LOCK” position.
  - With knob button pressed, ignition key cannot be turned from “ACC” position to “LOCK” position.
- 10) Install steering column cover.
- 11) If the vehicle is equipped with air bag system, connect negative cable at battery and enable air bag system, referring to “Enabling Air Bag System” in Section 10B.

# Automatic Transmission Assembly

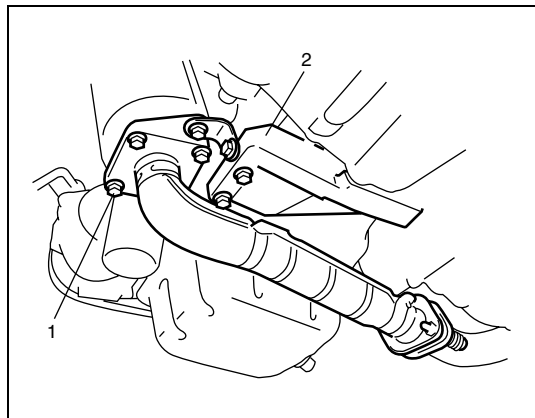
## Components



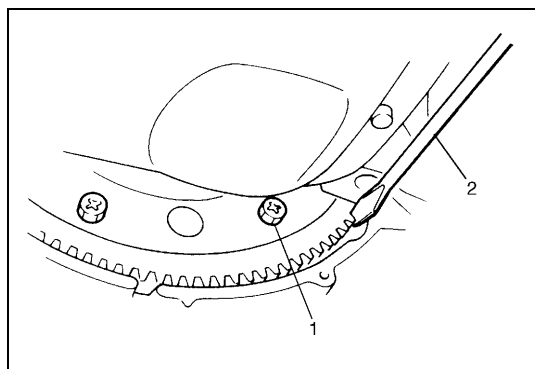
1. Transaxle housing lower plate	4. Torque converter	7. Drive plate bolt
2. Transaxle to engine nut	5. Drive plate to torque converter bolt	Tightening torque
3. Transaxle to engine bolt	6. Drive plate	

## DISMOUNTING

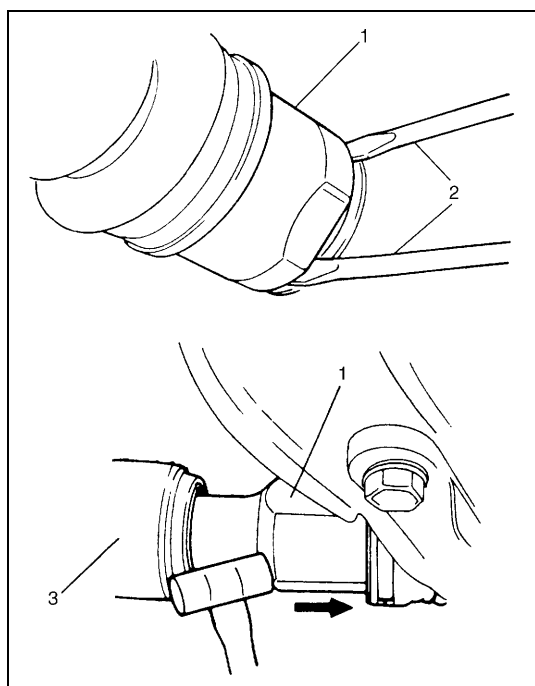
- 1) Disconnect negative cable at battery and transaxle.
- 2) Disconnect connector for valve body, vehicle speed sensor (for speedometer), transmission range sensor, input shaft speed sensor and output shaft speed sensor.
- 3) Undo wiring harness clamps.
- 4) Disconnect select cable from transaxle.
- 5) Remove water intake pipe bolts.
- 6) Remove transaxle-to-engine bolts.
- 7) Remove starting motor.



- 8) Support engine to prevent it from being declined excessively at removal of mountings.
- 9) Check around transaxle for any other parts required to be removed or disconnected for dismounting of transaxle and remove or disconnect whatever necessary.
- 10) Remove exhaust No.1 pipe to manifold bolts (1).
- 11) Drain transaxle fluid.
- 12) Remove engine under covers.
- 13) Disconnect fluid cooler hoses.
- 14) Remove mounting member (For 2WD model).
- 15) Remove exhaust pipe.
- 16) Remove stiffener (2).

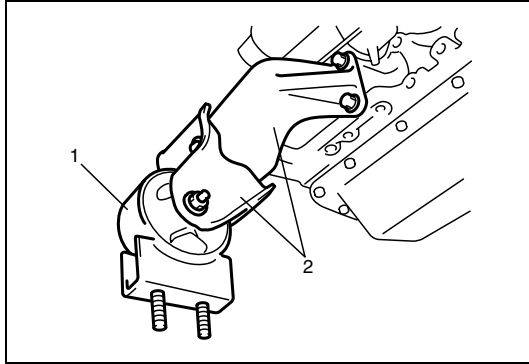


- 17) Remove transaxle housing lower plate.
- 18) Holding drive plate with a flat head rod or the like (2) against rotation, remove drive plate to torque converter bolts (1).



- 19) For 4WD model, remove transfer referring to Section 7D.
- 20) Using flat head rod or the like (2), pull out drive shaft joints (1) at differential side so as to release snap ring fitting. Using plastic hammer, drive out drive shaft joint (1) so as to release snap ring fitting of joint spline at intermediate shaft of transfer (3). (for right side of 4WD model)

- 21) Remove ball stud bolts and lock nuts from both knuckles and detach suspension arms and then pull out both drive shaft joints from differential.

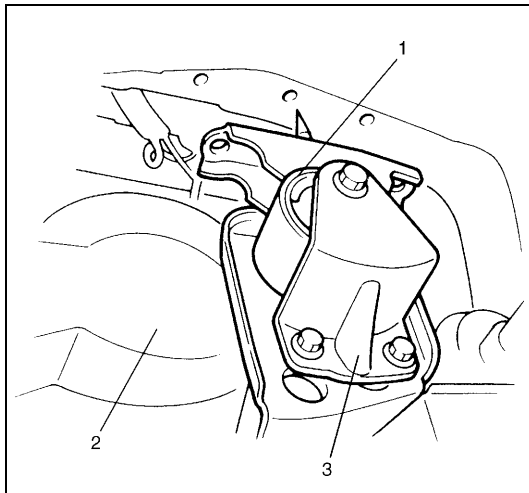


22) For 2WD vehicle, remove engine rear mounting (1) with its brackets (2).

23) Remove engine-to-transaxle bolts and nut.

24) Support transaxle with transmission jack.

25) Remove engine LH mounting (1) and its bracket (3).



2. Transaxle

26) Remove transaxle with torque converter from engine compartment.

**WARNING:**

**Be sure to keep transaxle with torque converter horizontal or facing up through out the work. Should it be tilted with torque converter down, converter may fall off and cause personal injury.**

## REMountING

For remounting, reverse dismounting procedure. Use following specified torques and note points listed below.

### Tightening torque

Transaxle to engine bolts and nut

(a) : 85 N·m (8.5 kg-m, 61.5 lb-ft)

Drive plate to torque converter bolts

(b) : 19 N·m (1.9 kg-m, 14.0 lb-ft)

Steering knuckle ball stud lock nuts

(c) : 60 N·m (6.0 kg-m, 43.5 lb-ft)

Exhaust No.1 pipe to manifold bolts

(d) : 50 N·m (5.0 kg-m, 36.5 lb-ft)

Exhaust No.2 pipe to No.1 pipe bolts

(e) : 43 N·m (4.3 kg-m, 31.5 lb-ft)

Engine front mounting nuts

(f) : 45 N·m (4.5 kg-m, 32.5 lb-ft)

Engine rear mounting nuts

(g) : 45 N·m (4.5 kg-m, 32.5 lb-ft)

Mounting member bolts

(h) : 55 N·m (5.5 kg-m, 40.0 lb-ft)

Suspension frame bolts

(i) : 90 N·m (9.0 kg-m, 65.0 lb-ft)

Engine rear mounting No.2 bracket bolt (M10)

(j) : 55 N·m (5.5 kg-m, 40.0 lb-ft)

Engine rear mounting No.2 bracket bolt (M8)

(k) : 25 N·m (2.5 kg-m, 18.0 lb-ft)

Engine LH No.1 bolt

(l) : 55 N·m 5.5 kg-m, 40.0 lb-ft)

Engine LH mounting No.2 bolts

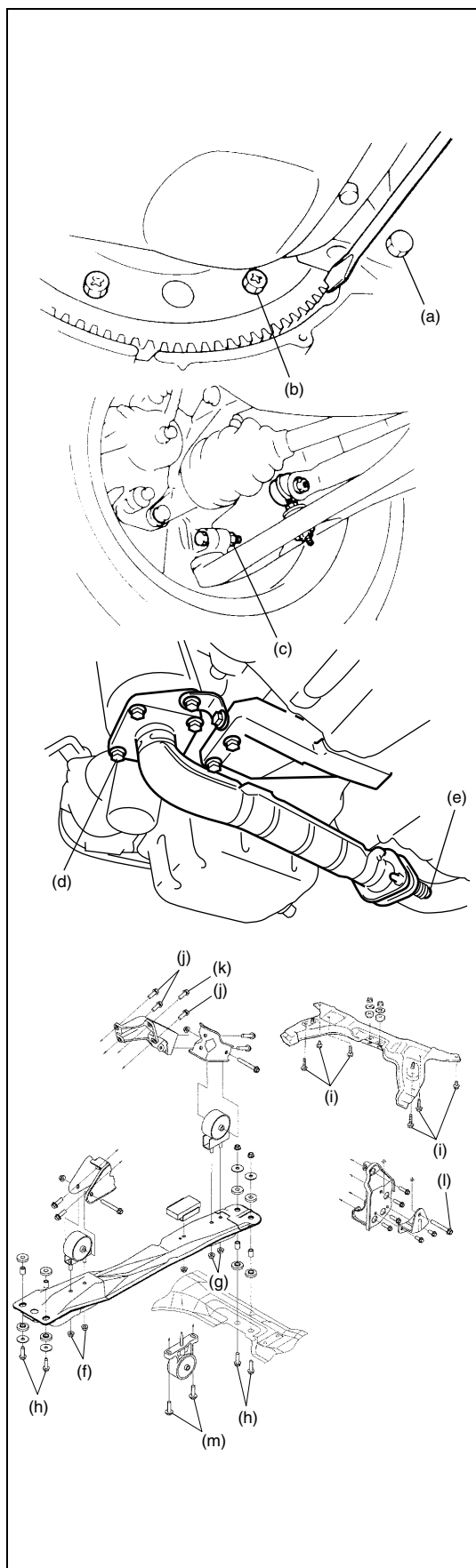
(m) : 55 N·m (5.5 kg-m, 40.0 lb-ft)

- Push in each drive shaft joint fully so that snap ring engages with differential gear or intermediate shaft of transfer.

### CAUTION:

- Care should be taken not to scratch oil seal lip with drive shaft while inserting drive shaft joint into transaxle.
- Do not hit drive shaft joint with hammer when installing it.

- Set each clamp for wiring securely.
- Adjust select cable.
- Refill fluid and adjust its level at normal operating temperature.
- Check that engine and transaxle function properly.
- Make sure that there is no evidence of fluid leakage.



## Unit Repair

When repairing automatic transaxle, it is necessary to conduct the on-vehicle test to investigate where the cause of the trouble lies first.

Then whether overhaul should be done or not is determined. If the transaxle is disassembled without such preliminary procedure, not only the cause of the trouble would be unknown, but also a secondary trouble may occur and often time would be wasted.

### Precautions

As the automatic transaxle consists of high precision component, the following cautions should be strictly observed when handling its parts in disassembly and reassembly.

- Disassembling valve body assembly is prohibited essentially. However, a few parts can be disassembled. When disassembling valve body component parts, confirm whether their parts are allowed to disassemble or not referring to "Valve Body Assembly" in this section.
- Make sure to wash dirt off from the transaxle so that no such dirt will enter the transaxle during dismounting and remounting.
- Select a clean place free from dust and dirt for overhauling.
- Place a rubber mat on the work bench to protect parts from damage.
- Work gloves or shop cloth should not be used. (Use a nylon cloth or a paper towel.)
- When separating the case joint, do not pry with a screwdriver or such but tap with a plastic hammer lightly.
- Make sure to wash dirt off from the transaxle so that no such dirt will enter the transaxle during disassembly and reassembly.
- Wash the disassembled parts in ATF (Automatic Transaxle Fluid) or kerosene (using care not to allow ATF or kerosene to get on your face, etc.) and confirm that each fluid passage is not clogged by blowing air into it. But use ATF to wash the friction plates resin washers and rubber parts.
- Replace each gasket, oil seal and O-ring with a new one.
- Apply ATF to sliding or rotating parts before reassembly.
- A new friction plates should be soaked in ATF at least 2 hours before use.

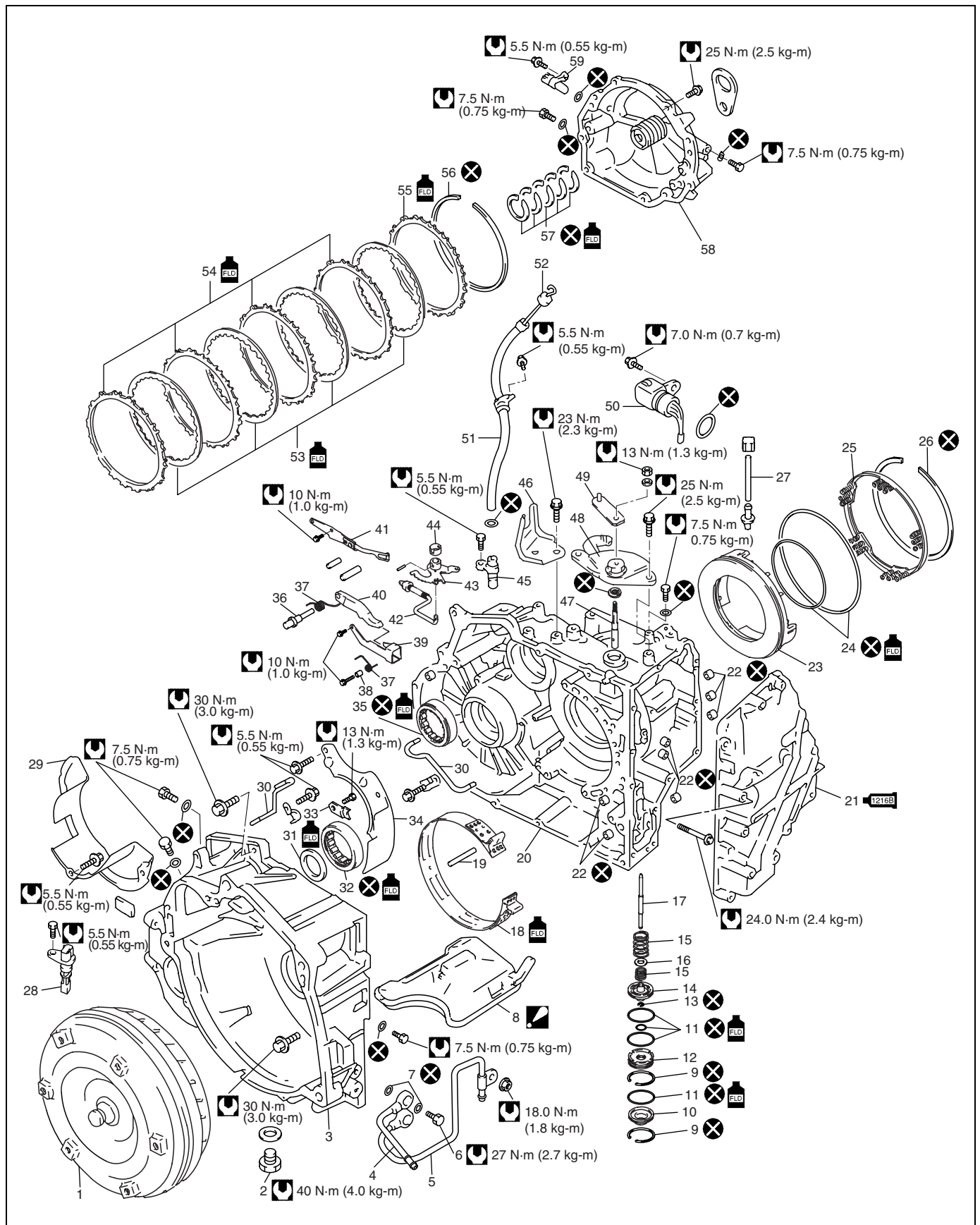







## Part Inspection and Correction Table

Part	Inspect for	Correction
Casted part, machined part	Small flaw, burr	Remove with oil stone.
	Deep or grooved flaw	Replace part.
	Clogged fluid passage	Clean with air or wire.
	Flaw on installing surface, residual gasket	Remove with oil stone or replace part.
	Crack	Replace part.
Bearing	Unsmooth rotation	Replace.
	Streak, pitting, flaw, crack	Replace.
Bushing, thrust washer	Flaw, burr, wear, burning	Replace.
Oil seal, gasket	Flawed or hardened seal ring	Replace.
	Worn seal ring on its periphery or side	Replace.
	Piston seal ring, oil seal, gasket, etc.	Replace.
Gear	Flaw, burr	Replace.
	Worn gear tooth	Replace.
Splined part	Burr, flaw, torsion	Correct with oil stone or replace.
Snap ring	Wear, flaw, distortion	Replace.
	No interference	Replace.
Thread	Burr	Replace.
	Damage	Replace.
Spring	Settling, sign of burning	Replace.
Friction plate	Wear, burning, distortion, damaged claw	Replace.
Separator plate, retaining plate	Wear, burning, distortion, damaged claw	Replace.
Sealing surface (where lip contacts)	Flaw, rough surface, stepped wear, foreign material	Replace.

# Automatic Transaxle Assembly

## Components



1. Torque converter	22. Gasket	43. Manual valve lever
2. A/T fluid drain plug	23. 1st/reverse brake piston	44. Spacer
3. Transaxle housing	24. O-ring	45. Output shaft speed sensor
4. A/T fluid outlet pipe	25. 1st/reverse brake return spring	46. Cable bracket
5. A/T fluid inlet pipe	26. Snap ring	47. Manual valve lever shaft
6. A/T fluid pipe union bolt	27. Breather hose	48. Transmission range sensor
7. Gasket	28. VSS	49. Manual shift lever
 8. Oil strainer : Replace oil strainer when overhauling	29. Oil reservoir plate	50. Valve body connector
9. Snap ring	30. Transaxle lubrication tube	51. Fluid filler tube
10. 2nd/4th brake cover	31. Counter shaft RH thrust roller bearing	52. Fluid level gauge
11. O-ring	32. Counter shaft RH cylindrical roller bearing	53. 1st/reverse brake separator plate
12. Brake inner cover	33. Cylindrical roller bearing retainer	54. 1st/reverse brake friction plate
13. E-ring	34. Oil reservoir plate	55. 1st/reverse brake retaining plate
14. Brake piston	35. Counter shaft LH cylindrical roller bearing	56. Snap ring
15. Spring	36. Pawl shaft	57. Gasket
16. Rod washer	37. Torsion spring	58. Transaxle rear case
17. Piston rod	38. Spacer	59. Input shaft speed sensor
18. 2nd/4th brake band assembly	39. Parking lock pawl bracket	 Apply automatic transaxle fluid.
19. Anchor pin	40. Parking lock pawl	 Tightening torque
 20. Transaxle case : Apply sealant 99000-31230 to mating surface.	41. Manual detent spring	 Do not reuse.
21. Transaxle side cover	42. Parking lock rod	

## Unit Disassembly

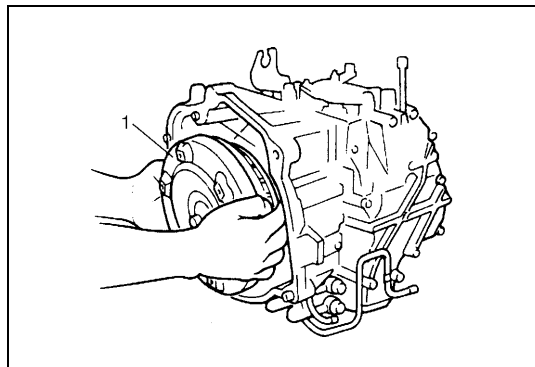
### CAUTION:

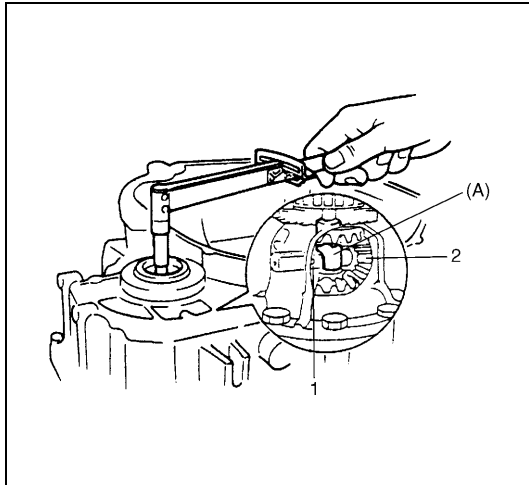
- Thoroughly clean transaxle exterior before overhauling it.
- Keep working table, tools and hands clean while overhauling.
- Use special care to handle aluminum parts so as not to damage them.
- Do not expose removed parts to dust. Keep them always clean.

1) Extract torque converter (1).

### CAUTION:

Remove torque converter as much straight as possible. Leaning it may cause to damage oil seal lip.





- 2) Measure starting torque of differential gear assembly using special tool.

**Special tool**

**(A): 09928-06050**

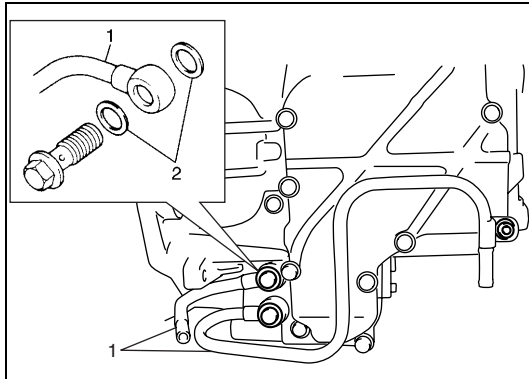
**Starting torque of differential assembly**

**0.8 – 1.4 N·m (0.08 – 0.14 kg-m, 0.58 – 1.0 lb-ft)**

**NOTE:**

**Record actual starting torque of differential assembly for installation reference.**

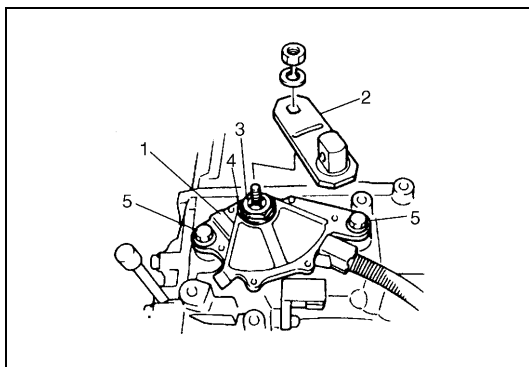
1. Differential pinion shaft
2. Differential pinion



- 3) Remove fluid cooler pipes (1).

**NOTE:**

**Never reuse gaskets (2) after removal.**

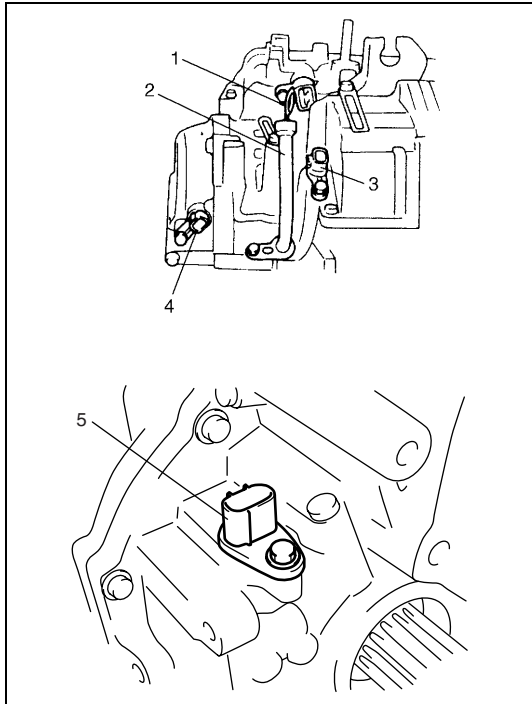


- 4) Pull out transmission range sensor assembly (1).

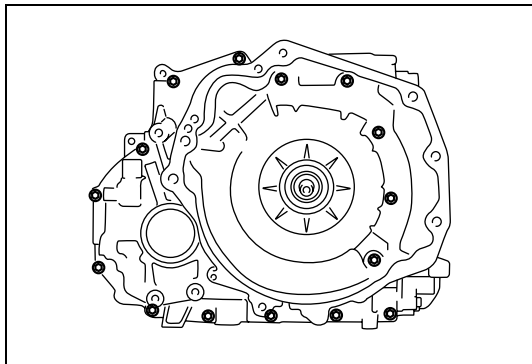
- Remove manual shift lever (2).
- Pry off lock washer (4).
- Remove lock nut (3).
- Remove lock washer (4) and rubber plate.
- Remove 2 bolts (5).

**NOTE:**

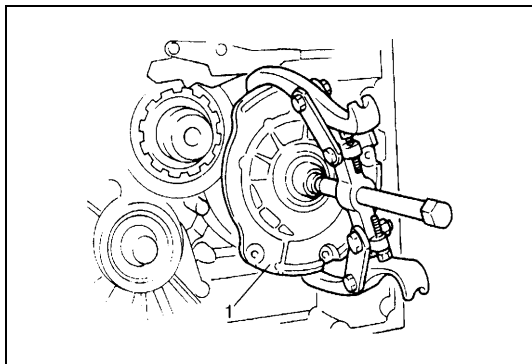
**Never reuse lock washer after removal.**



- 5) Remove fluid level gauge (1), fluid filler tube (2), output shaft speed sensor (3), input shaft speed sensor (4) and vehicle speed sensor (5) (for speedometer).



- 6) Remove transaxle housing by removing 15 bolts as shown.



- 7) Pull out differential gear assembly.  
 8) Clean and wipe off gasket sealant on mating surface between transaxle housing and transaxle case.  
 9) Remove three gaskets at transaxle case side.

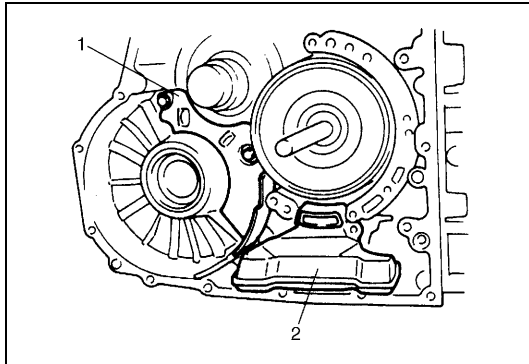
**NOTE:**

**Never reuse removed gaskets.**

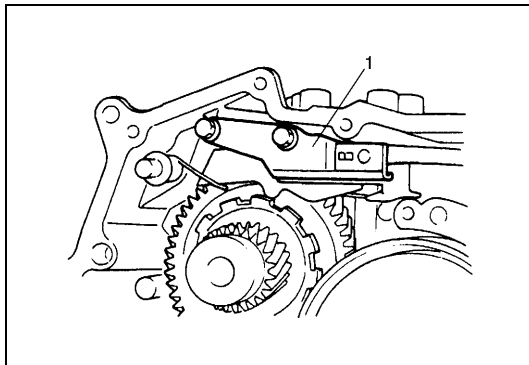
- 10) Remove 6 bolts of oil pump body, (1) then remove oil pump body by hand.

**NOTE:**

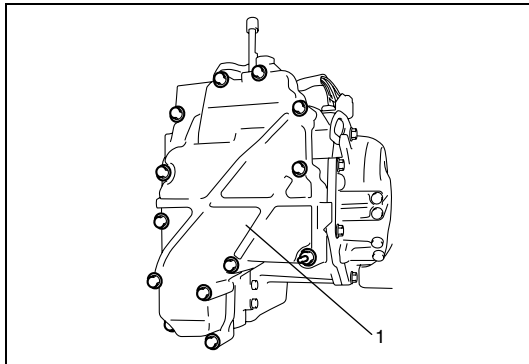
- Use care not to cause damage to shaft bushing surface.
- If oil pump body can't be removed by hand, remove it by using bearing puller as shown in figure.



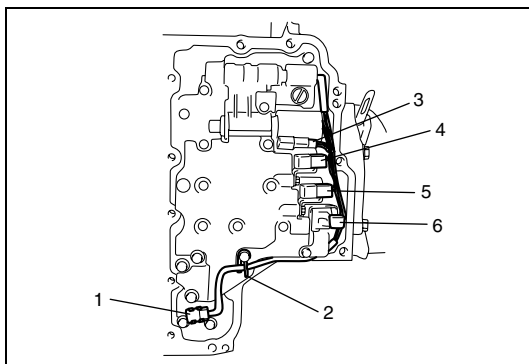
- 11) Remove oil reserve plate (1) by removing 2 bolts.
- 12) Remove oil strainer (2).



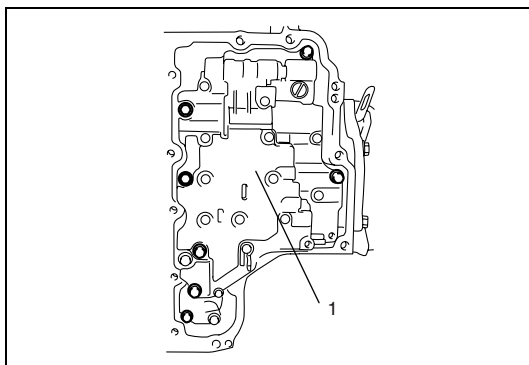
- 13) Remove manual detent spring (1) by removing 2 bolts.



- 14) Remove transaxle side cover (1) by removing bolts.



- 15) Remove transmission fluid temperature sensor (1) from clamp.
- 16) Remove sensor harness from clamp (2).
- 17) Disconnect pressure control solenoid, shift solenoid-A, shift solenoid-B and TCC solenoid connectors (3, 4, 5, 6).

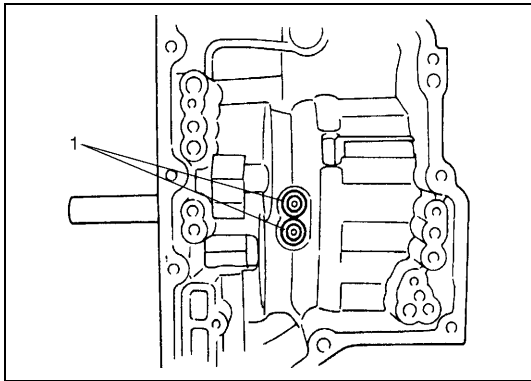


- 18) Remove valve body assembly (1) by removing seven bolts.

**CAUTION:**

**Be careful not to let manual valve fall off when removing valve body assembly.**

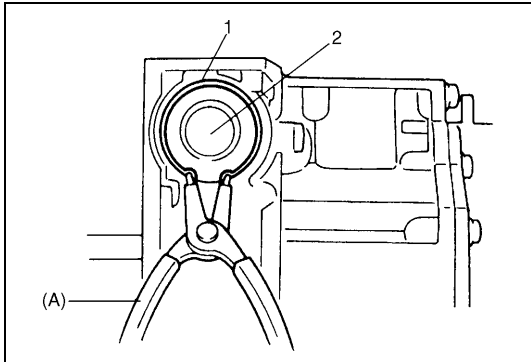
- 19) Remove valve body connector mounting bolt and remove valve body connector and its harness.



- 20) Remove 2 gaskets (1).

**NOTE:**

**Never reuse removed gaskets.**

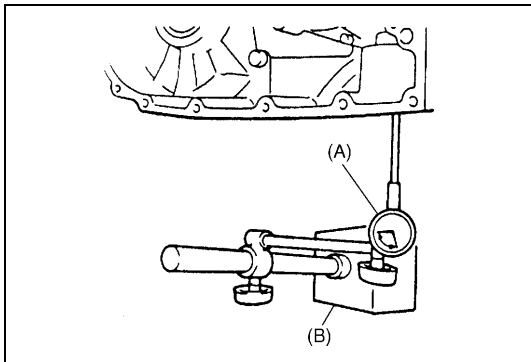


- 21) Remove snap ring (1) using special tool.

**Special tool**

**(A): 09900-06108**

- 22) Pull out 2nd and 4th brake cover (2) with O-ring by using plier or the like.



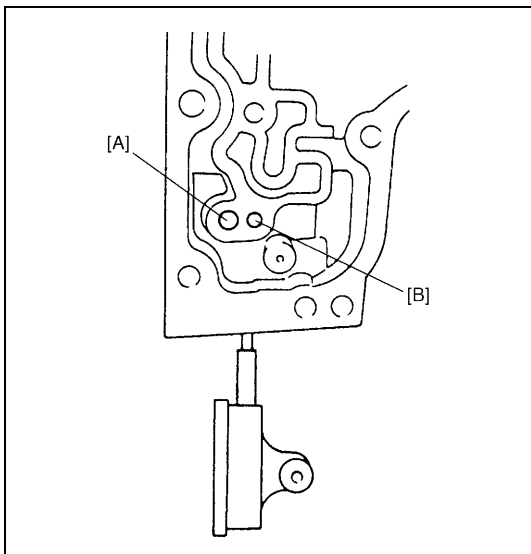
- 23) Inspect 2nd and 4th brake piston rod stroke.

- a) Set dial gauge and magnetic stand (special tools).

**Special tool**

**(A): 09900-20606**

**(B): 09900-20701**



- b) Plug oil hole [A].

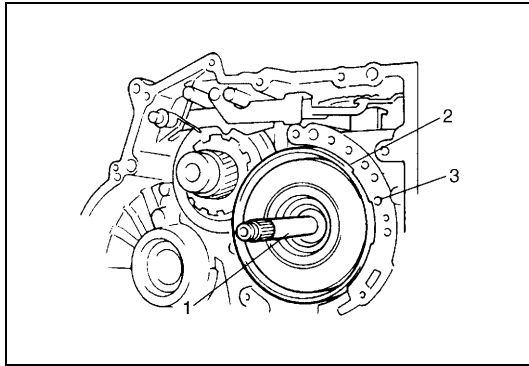
- c) Measure piston rod stroke while applying and releasing compressed air (400 – 800 kPa, 4 – 8 kg/cm<sup>2</sup>, 57 – 113 psi) from oil hole [B].

**2nd and 4th brake piston rod stroke**

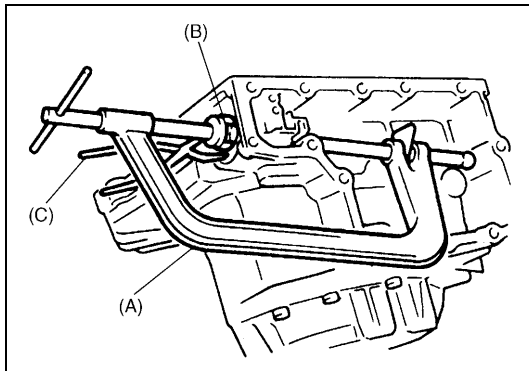
**Standard: 1.98 – 2.42 mm (0.078 – 0.095 in.)**

**NOTE:**

**If piston rod stroke exceeds above specification, adjust piston rod or inspect band assembly of 2nd and 4th brake for damage, wear or discoloration.**



- 24) Pull out reverse clutch assembly (1).
- 25) Remove 2nd and 4th brake band assembly (2).
- 26) Remove anchor pin (3).



- 27) Apply valve lifter as illustrated and push in brake inner cover.

**Special tool**

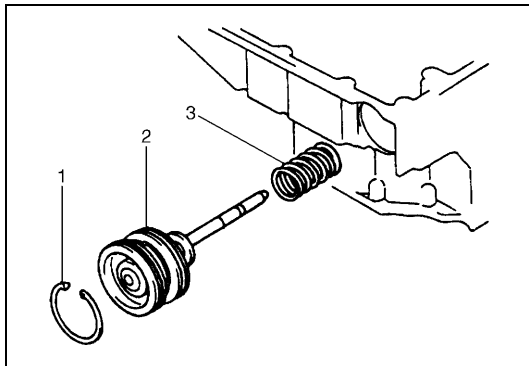
(A): 09916-14510

(B): 09916-48210

- 28) Remove snap ring by using snap ring plier (special tool).

**Special tool**

(C): 09900-06108



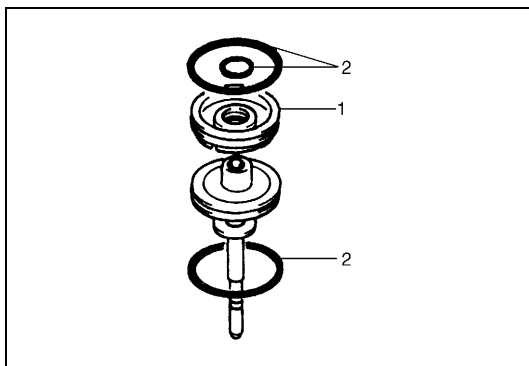
- 29) Remove tools and take out 2nd and 4th brake piston assembly (2).

**NOTE:**

If 2nd and 4th brake piston assembly doesn't come out, apply compressed air through oil hole in figure of step 23)-b).

- 30) Remove spring (3).

1. Snap ring

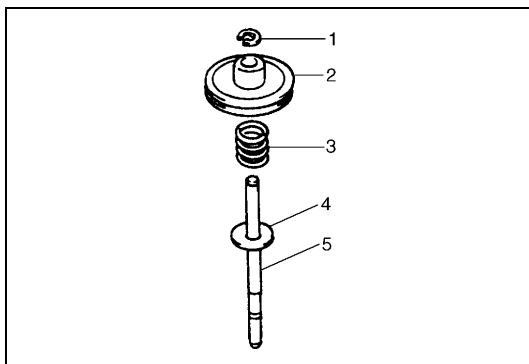


- 31) Disassemble 2nd and 4th brake piston assembly.

a) Remove brake inner cover (1) and O-rings (2).

**NOTE:**

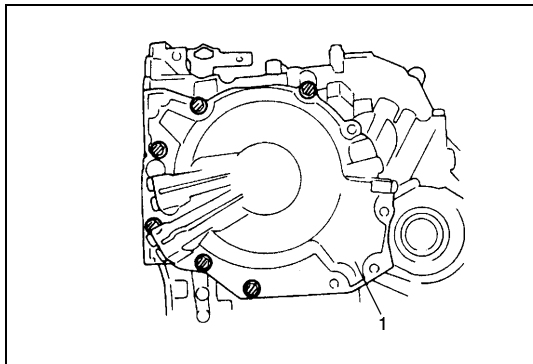
**Never reuse removed O-ring.**



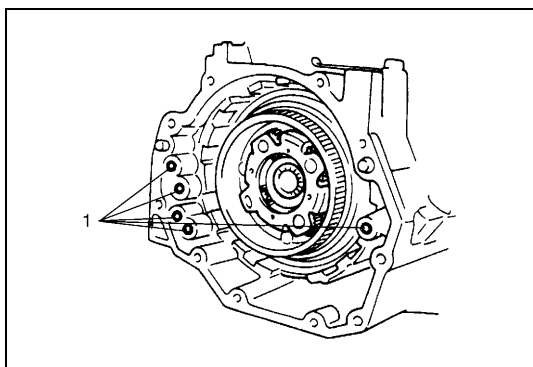
- b) Remove E-ring (1), brake piston (2), spring (3) and rod washer (4).

5. Piston rod





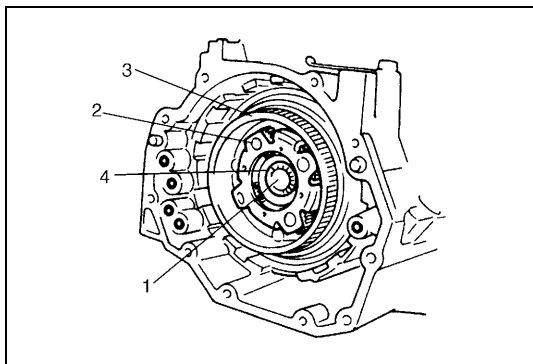
- 32) Loosen six bolts of transaxle rear cover (1).
- 33) Lightly and uniformly tap two rib sections of transaxle rear cover (1), using plastic hammer.
- 34) Remove ten bolts and engine mounting LH bracket.
- 35) Pull out transaxle rear cover (1) with forward clutch subassembly installed.



- 36) Remove 5 gaskets (1).

**NOTE:**

**Never reuse removed gaskets.**



- 37) Remove planetary carrier (2), planetary ring gear (3) and sun gear assembly (1) with the following sun gear thrust roller bearing (4) installed.

**Sun gear thrust roller bearing dimension.**

<b>Outside diameter</b>	<b>32.5 mm (1.28 in.)</b>
<b>Inside diameter</b>	<b>18.8 mm (0.74 in.)</b>
<b>Thickness</b>	<b>2.7 mm (0.11 in)</b>

- 38) Pull out sun gear assembly.

- 39) Inspect 1st and reverse brake piston stroke.
  - a) Set special tools (dial gauge and magnetic stand).

**Special tool**

**(A): 09900-20606**

**(B): 09900-20701**

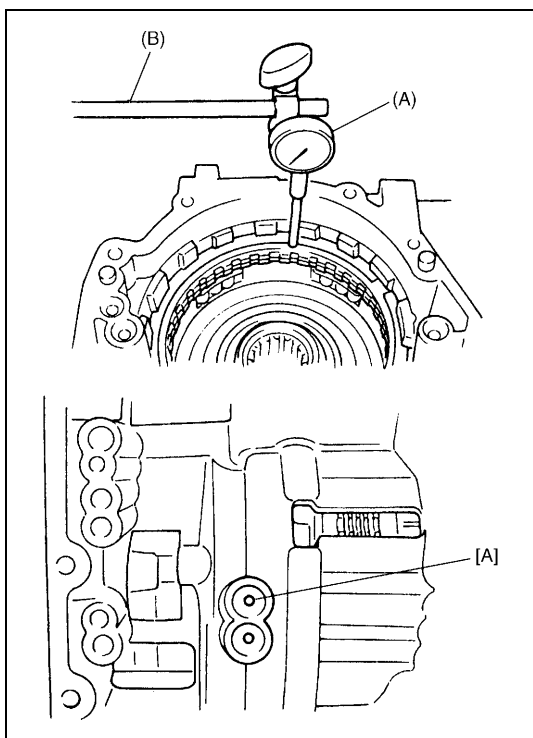
- b) Measure piston stroke while applying and releasing compressed air (400 – 800 kPa, 4 – 8 kg/cm<sup>2</sup>, 57 – 113 psi) from oil hole [A].

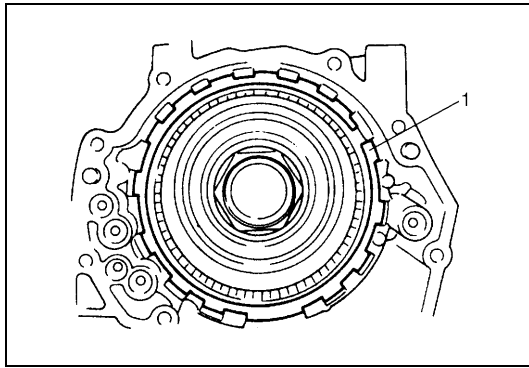
**1st and reverse brake piston stroke**

**Standard: 1.4 – 2.2 mm (0.055 – 0.087 in.)**

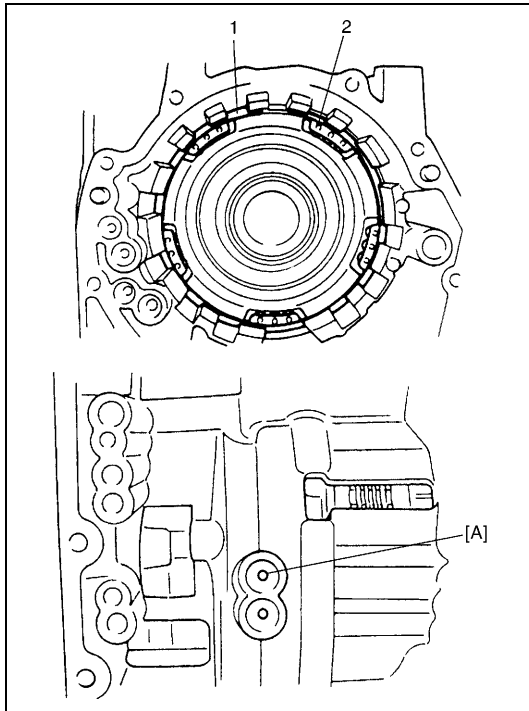
**NOTE:**

**If piston stroke exceeds specification above, inspect or replace plates.**





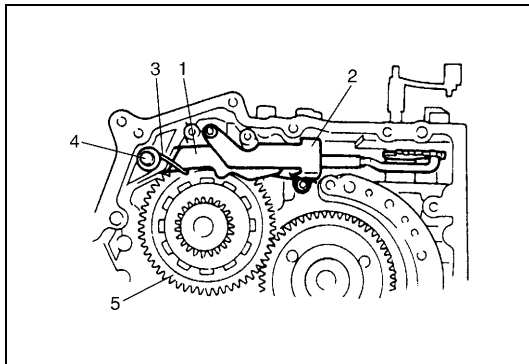
- 40) Remove snap ring (1) using flat end rod or the like.  
 41) Remove retaining plates "R", friction plates "F" and separator plates "S" in the following order.  
 R → F → S → F → S → F → S → F → S



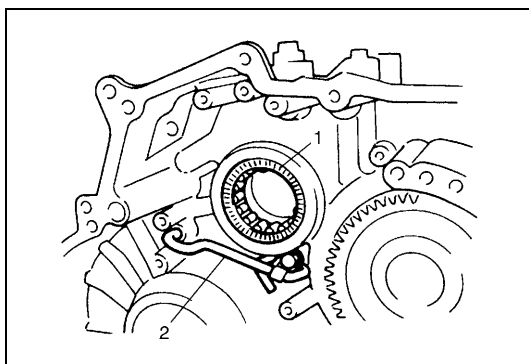
- 42) Remove retainer ring (1) and 1st and reverse brake piston return spring (2).  
 43) Remove 1st and reverse brake piston with O-ring installed while applying and releasing compressed air (400 - 800 kPa, 4 - 8 kg/cm<sup>2</sup>, 57 - 113 psi) through oil hole section [A].

**NOTE:**

- Never reuse removed O-rings.
- If piston will not pop out, it is recommended to use needle nose pliers for removal.



- 44) Remove parking lock pawl (1), pawl bracket (2) and torsion spring by removing two bolts.  
 45) Pry off torsion spring (3) of parking lock pawl (1).  
 46) Remove parking lock pawl (1) by pulling out pawl shaft (4) with torsion spring installed.  
 47) Pullout counter driven gear assembly (5) towards you.

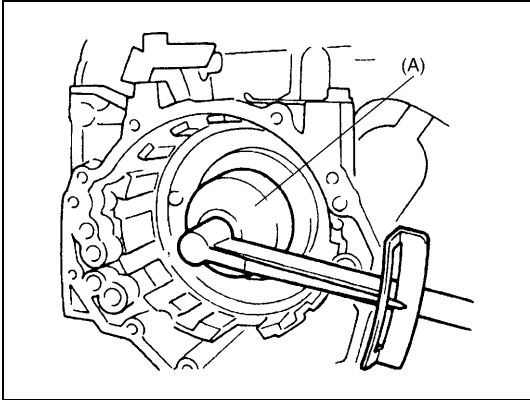


- 48) Remove countershaft thrust roller bearing (1) with race.

**Countershaft thrust roller bearing dimension**

Outside diameter	66.0 mm (2.60 in.)
Inside diameter	51.0 mm (2.01 in.)
Thickness	2.7 mm (0.11 in.)

- 49) Remove transaxle lubrication tube (2).

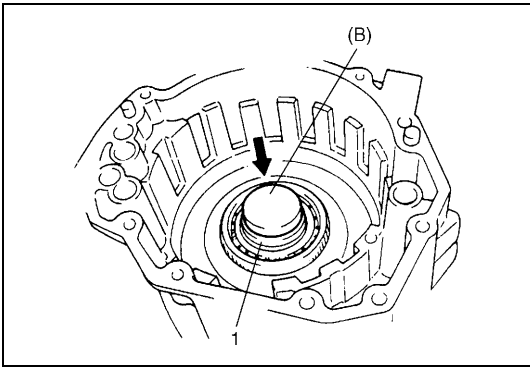


50) Measure torque (bearing preload) of counter drive gear sub-assembly using torque wrench and special tool.

**Special tool**  
**(A): 09927-26010**

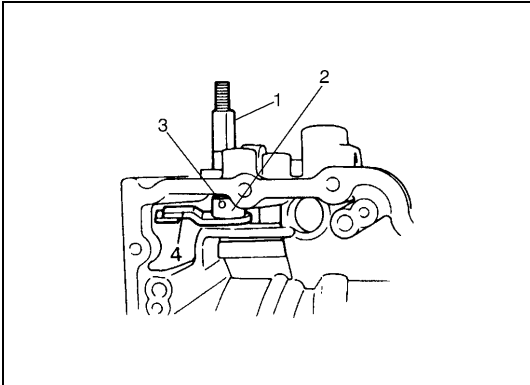
**Counter drive gear bearing preload**

Starting torque	0.05 – 0.25 N·m (0.005 – 0.025 kg-m, 0.037 – 0.180 lb-ft)
Rotational torque	0.05 – 0.15 N·m (0.005 – 0.015 kg-m, 0.037 – 0.108 lb-ft)



51) Remove snap ring.  
52) Press counter drive gear subassembly (1) using special tool.

**Special tool**  
**(B): 09925-86010**



53) Remove slotted spring pin (3) using pin punch or the like.

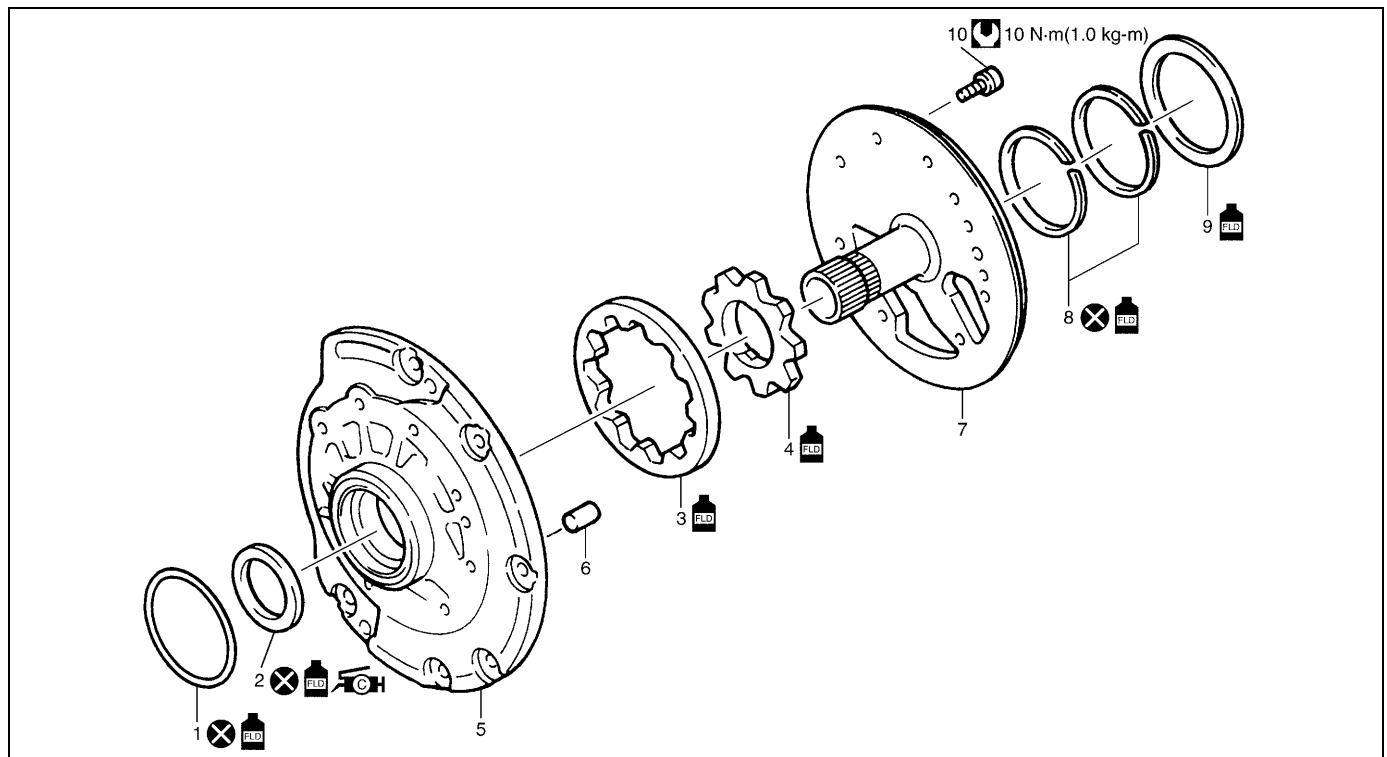
**NOTE:**  
**Never reuse removed spacer (2) and slotted spring pin (3).**

54) Remove manual valve lever shaft subassembly (1), manual valve lever (4) and oil seal.

**NOTE:**  
**Never reuse removed oil seal.**

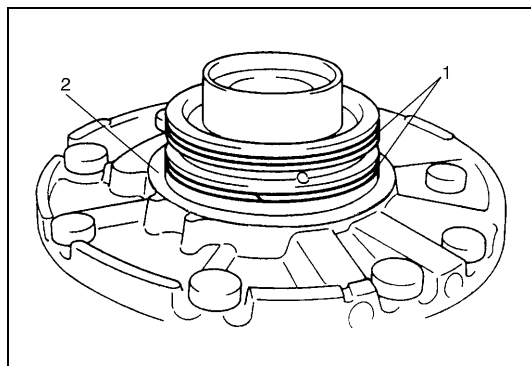
## Subassembly

### Oil pump



1. O-ring	6. Knock pin	Apply automatic transaxle fluid.
2. Oil pump body oil seal : Apply grease 99000-25030 to oil seal lip.	7. oil pump cover	Tightening torque
3. Driven gear	8. Seal ring	Do not reuse.
4. Driven gear	9. Clutch drum thrust washer	
5. Oil pump body	10. Torx bolt	

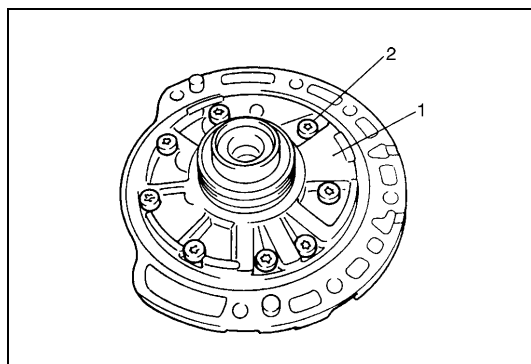
### DISASSEMBLY



- 1) Remove two seal rings (1) and clutch drum thrust washer (2) from stator shaft subassembly back side.

#### NOTE:

**Never reuse seal rings after removal.**

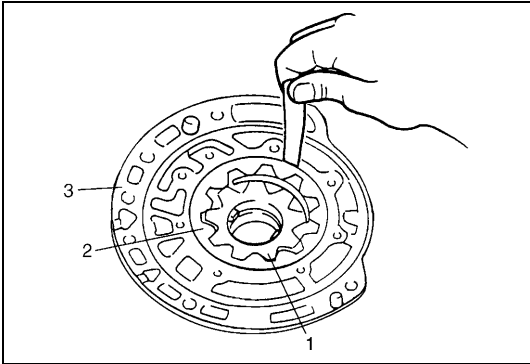


- 2) Remove oil pump cover (1) by removing eight torx bolts (2) using torx wrench.
- 3) Remove oil pump body oil seal.

#### NOTE:

**Never reuse oil seal after removal.**

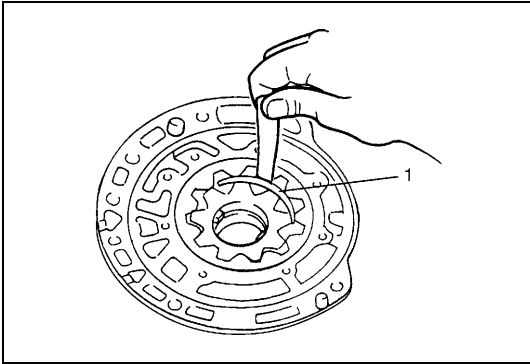
INSPECTION



- 1) Check body clearance of driven gear.  
Push driven gear (2) to one side of oil pump body (3). Using a feeler gauge, measure clearance between driven gear (2) and body (3).  
If clearance exceeds standard value, replace gear.

**Clearance between driven gear and body**  
**Standard: 0.075 – 0.15 mm (0.00295 – 0.0059 in.)**

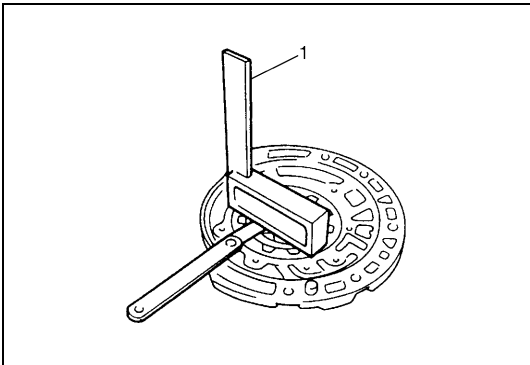
1. Drive gear



- 2) Check tip clearance of both drive and driven gears.  
Measure radial clearance between gear tooth tip and crescent (1).  
If clearance exceeds standard value, replace gears.

**Clearance between driven gear and crescent**  
**Standard: 0.010 – 0.248 mm (0.0004 – 0.0098 in.)**

**Clearance between drive gear and crescent**  
**Standard: 0.013 – 0.292 mm (0.0005 – 0.0115 in.)**



- 3) Check side clearance of both gears.  
Using a straightedge (1) and a feeler gauge, measure side clearance between gears and pump body.  
If clearance exceeds standard value, replace gears.

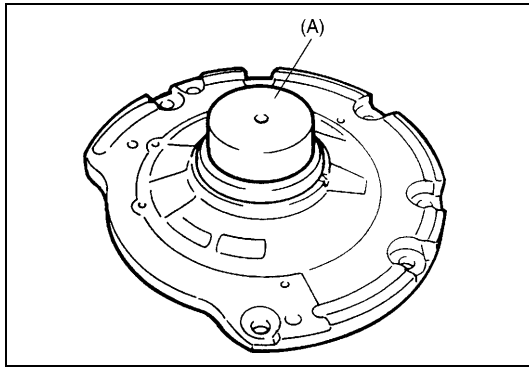
**Side clearance between gears and oil pump body**  
**Standard : 0.02 – 0.05 mm (0.0008 – 0.0019 in.)**

Drive gear and driven gear have some kinds of thickness as listed below.

Drive gear and driven gear thickness

Drive gear	9.440 – 9.449 mm (0.3717 – 0.3720 in.)
	9.450 – 9.459 mm (0.3721 – 0.3724 in.)
	9.460 – 9.470 mm (0.3725 – 0.3728 in.)
	9.471 – 9.480 mm (0.3729 – 0.3732 in.)
	9.481 – 9.490 mm (0.3733 – 0.3736 in.)
Driven gear	9.440 – 9.449 mm (0.3717 – 0.3720 in.)
	9.450 – 9.459 mm (0.3721 – 0.3724 in.)
	9.460 – 9.470 mm (0.3725 – 0.3728 in.)
	9.471 – 9.480 mm (0.3729 – 0.3732 in.)
	9.481 – 9.490 mm (0.3733 – 0.3736 in.)

If side clearance of the thickest gear is out of specification, replace oil pump body or assembly and stator shaft subassembly.

**REASSEMBLY**

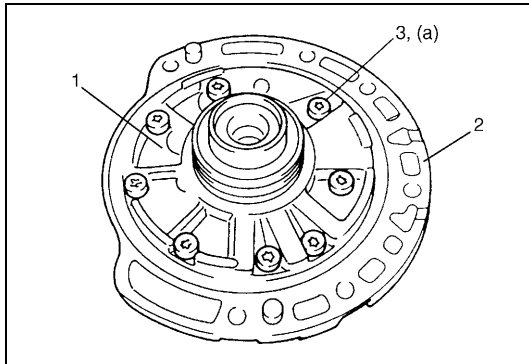
- 1) Install pump body oil seal.

Use special tool and hammer to install it, and then apply grease to its lip portion.

**Special tool**

**(A) : 09944-66020**

**Grease 99000-25030**



- 2) Install driven gear and drive gear to oil pump body after applying fluid to gears.

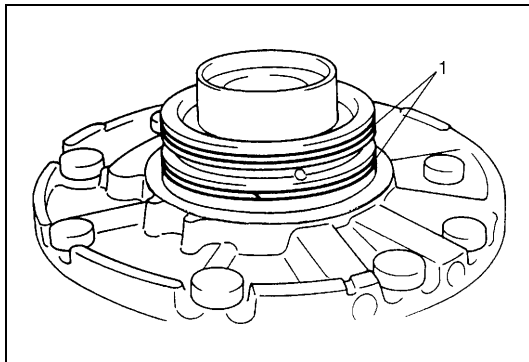
- 3) Install oil pump cover (1) to oil pump body (2) and tighten eight torx bolts (3) to specification.

**Tightening torque**

**Oil pump cover bolts (a) : 10 N·m (1.0 kg-m, 7.5 lb-ft)**

**NOTE:**

**Be sure to tighten bolts alternately and uniformly. (The figure indicates a typical example of the tightening sequence.)**



- 4) Install two new seal rings (1).

**NOTE:**

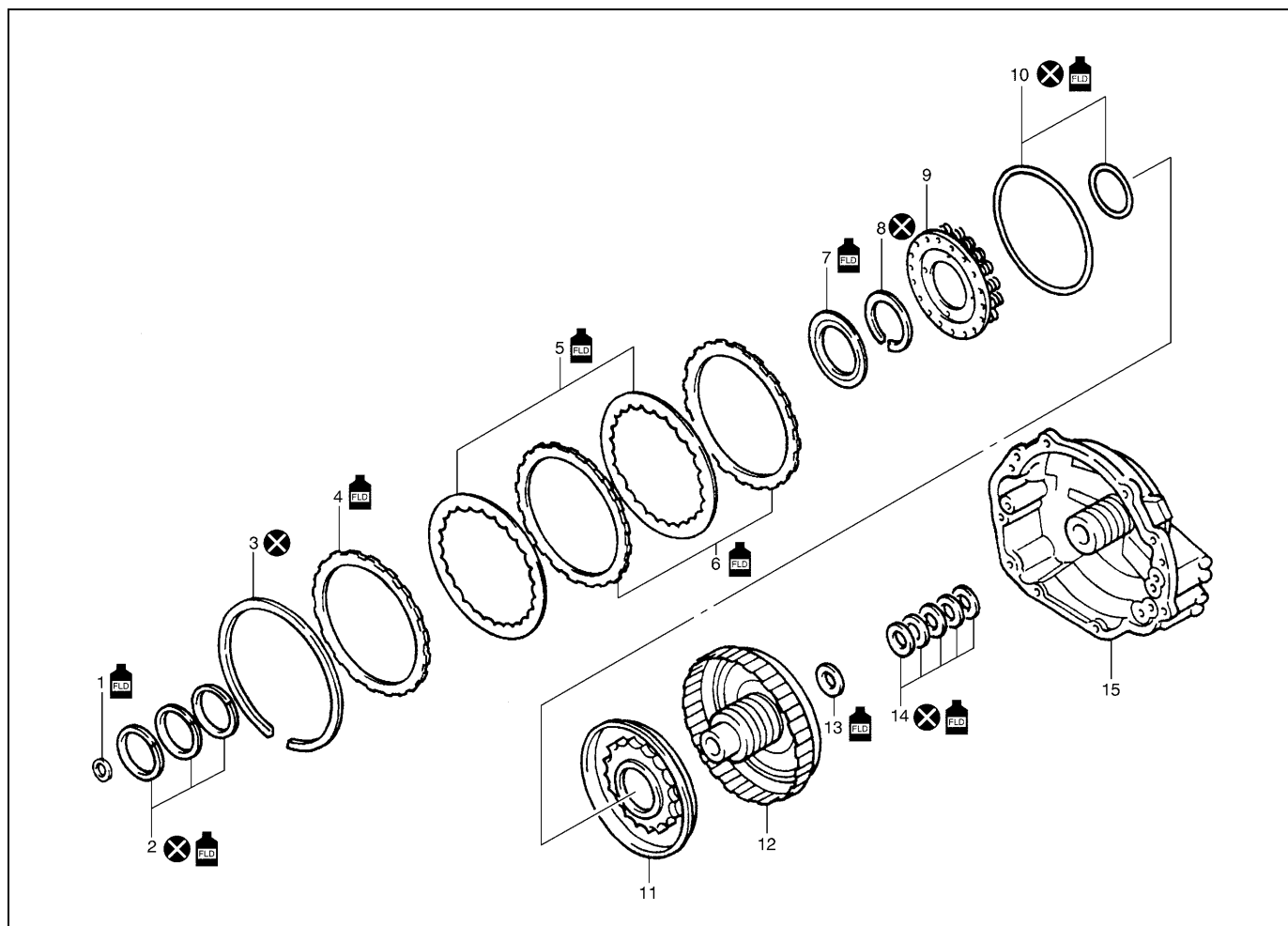
**Do not spread ring end excessively.**



- 5) Apply A/T fluid to clutch drum thrust washer and install them.
- 6) Check drive gear and driven gear rotation. Turn drive gear with two flat end rods or the like and make sure it rotates smoothly.

**NOTE:**

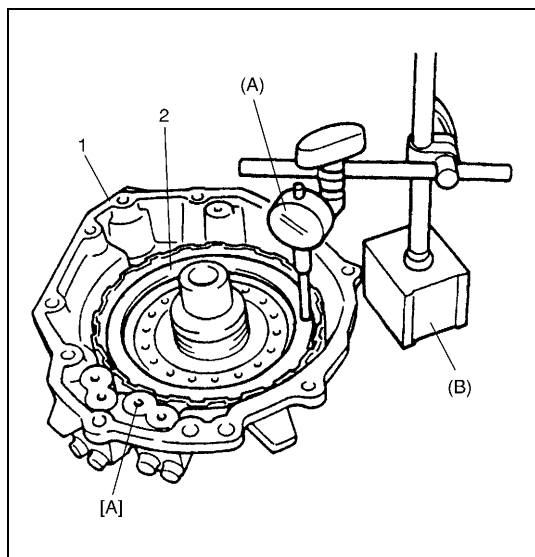
**Be very careful not to damage oil seal lip.**

## Forward Clutch



1. Race	7. Clutch drum thrust washer	13. Forward clutch roller thrust bearing
2. Clutch drum oil seal ring	8. Snap ring	14. Rear cover oil seal ring
3. Snap ring	9. Forward clutch return spring subassembly	15. Transaxle rear cover
4. Retaining plate	10. O-ring	 Apply automatic transaxle fluid.
5. Friction plate	11. Forward clutch piston subassembly	 Do not reuse.
6. Separator plate (t = 1.8 mm)	12. Forward clutch drum subassembly	

### PRELIMINARY CHECK



- 1) Measure piston stroke before disassembly.
  - a) Install forward clutch assembly (2) to transaxle rear cover (1).
  - b) Measure piston stroke while applying and releasing compressed air (400 – 800 kPa, 4 – 8 kg/cm<sup>2</sup>, 57 – 113 psi) through oil hole [A] using special tools.

#### Special tool

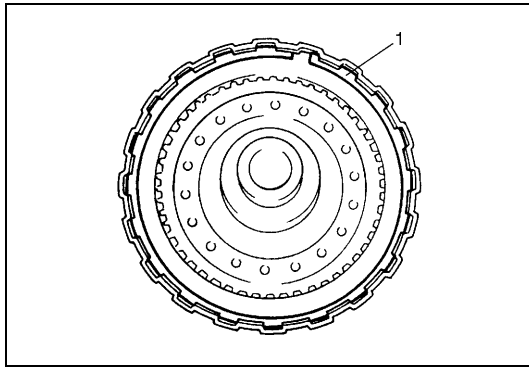
(A) : 09900-20606

(B) : 09900-20701

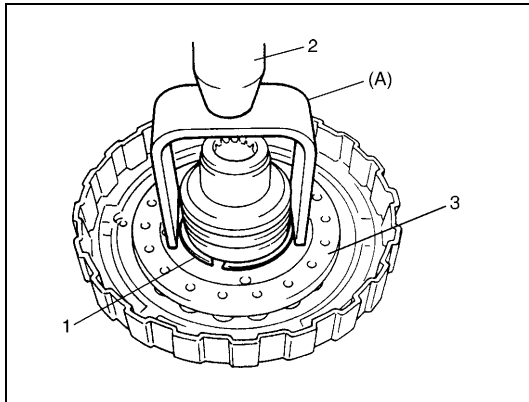
#### Forward clutch piston stroke

Standard : 0.76 – 1.04 mm (0.030 – 0.040 in.)

If measured piston stroke exceeds specified value, disassemble and inspect inner parts.

**DISASSEMBLY**

- 1) Remove snap ring (1).
- 2) Remove retaining plate "R", friction plates "F" and separator plates "S" in the following order.  
R → F → S → F → S



- 3) Remove clutch drum thrust washer.

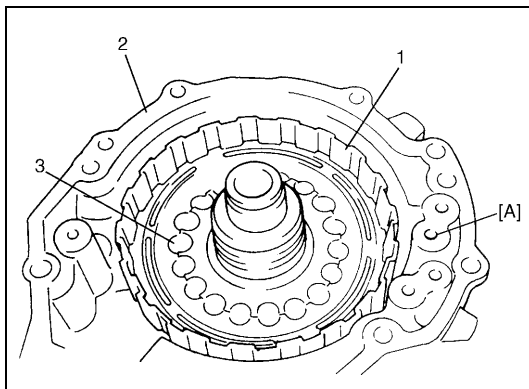
- 4) Using special tool and hydraulic press (2), compress forward clutch return spring subassembly and remove snap ring (1).

**Special tool**

(A) : 09926-98330

**CAUTION:**

**Be careful when applying pressure, for overpressure will cause plate section of forward clutch return spring subassembly to deform.**



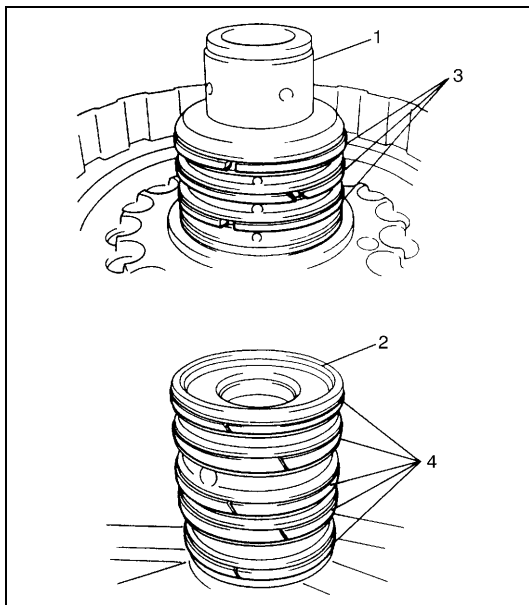
- 5) Remove forward clutch return spring subassembly (3).

- 6) Install forward clutch piston subassembly (1) to transaxle rear cover (2).

- 7) Remove forward clutch piston subassembly (3) with O-rings installed through oil hole [A] compressed air (400 – 800 kPa, 4 – 8 kg/cm<sup>2</sup>, 57 – 113 psi).

**NOTE:**

- If piston does not pop out, it is recommended to use needle-nose pliers for removal.
- Never reuse removed O-rings.

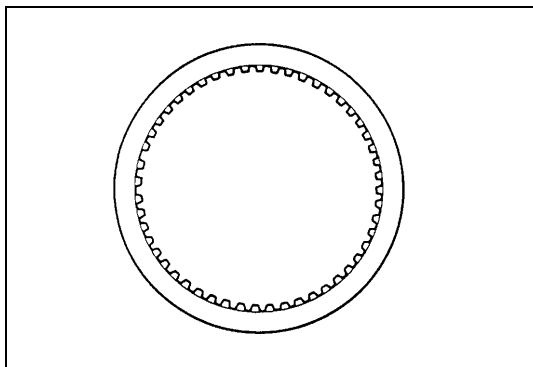


- 8) Remove clutch drum oil seal rings (3) from forward clutch drum subassembly (1).

- 9) Remove rear cover oil seal rings (4) from transaxle rear cover (2).



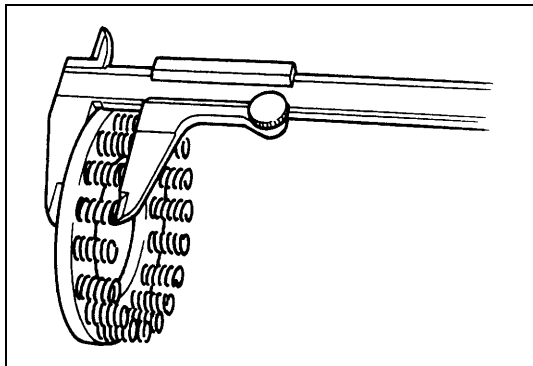
## INSPECTION



- 1) Check that sliding surfaces of friction, separator and retaining plates are not worn or burnt. If necessary, replace.

### NOTE:

- If friction plate lining is exfoliated, discolored or worn hardly, replace all friction plates.
- Before assembling new friction plates, soak them in A/T fluid for at least two hours.

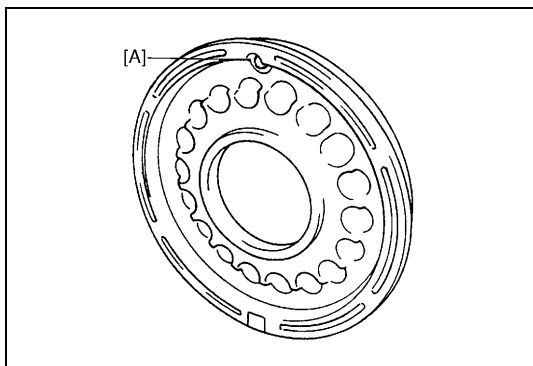


- 2) Measure height of forward clutch return spring.

**Forward clutch return spring height**  
Standard : 22 mm (0.87 in.)

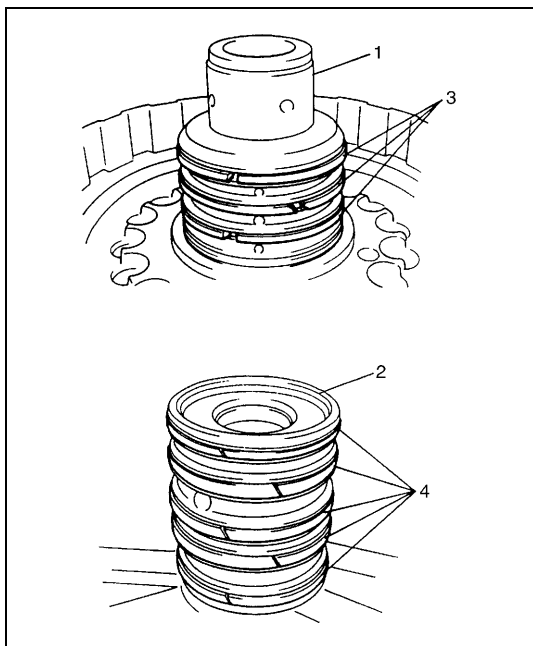
### NOTE:

**Do not apply excessive force when measuring spring height. Perform measurement at several points.**



- 3) Check that ball makes creaking noise when shaking forward clutch piston. (i.e., check that ball is free.)
- 4) Check that there is no leakage from backside of oil hole [A] by applying low pressure air.

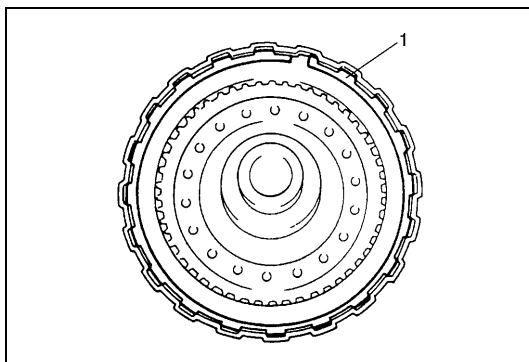
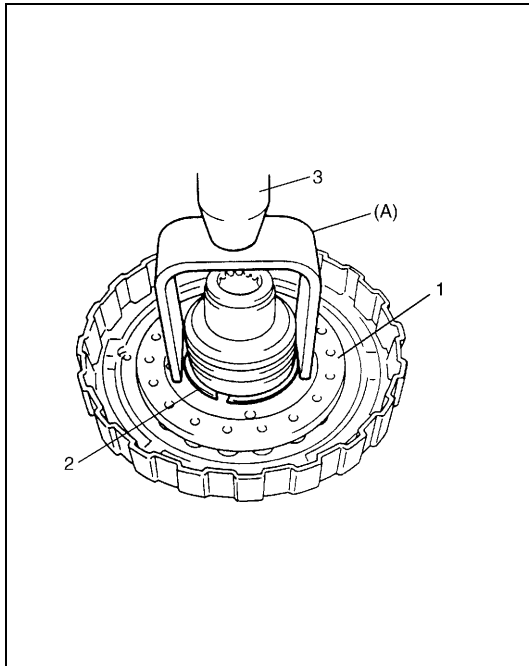
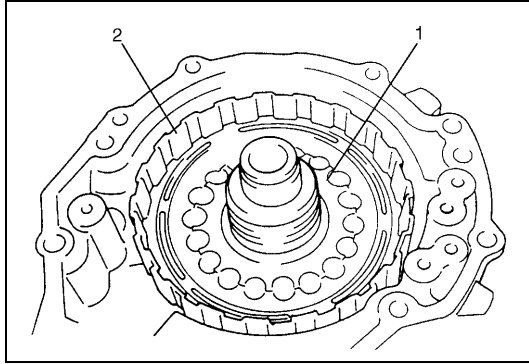
## REASSEMBLY



- 1) Coat new oil seal rings (3, 4) with A/T fluid.
- 2) Install them to transaxle rear case (2) and forward clutch drum subassembly (1).

### NOTE:

- Do not spread ring ends excessively.
- Make sure that opening ends of oil seal rings are not lined up so as to prevent fluid leakage.



- 3) Coat new O-rings with A/T fluid.
- 4) Install new O-rings to forward clutch piston subassembly.
- 5) Press forward clutch piston subassembly (1) to forward clutch drum subassembly (2) with fingers.

**NOTE:**

**Make sure that O-ring is not twisted or deviated from position during insertion of piston.**

- 6) Place forward clutch return spring subassembly (1).
- 7) Install snap ring (2) using special tool and hydraulic press (3).

**Special tool**

**(A) : 09926-98330**

**NOTE:**

- When installing return spring, be careful so that return spring will not fall or tilt.
- Do not align opening in snap ring with lug of forward clutch return spring subassembly at its retainer section.

**CAUTION:**

**Be careful when applying pressure, for overpressure will cause plate section of forward clutch return spring subassembly to deform.**

- 8) Select and measure correct thickness of forward clutch retaining plate.

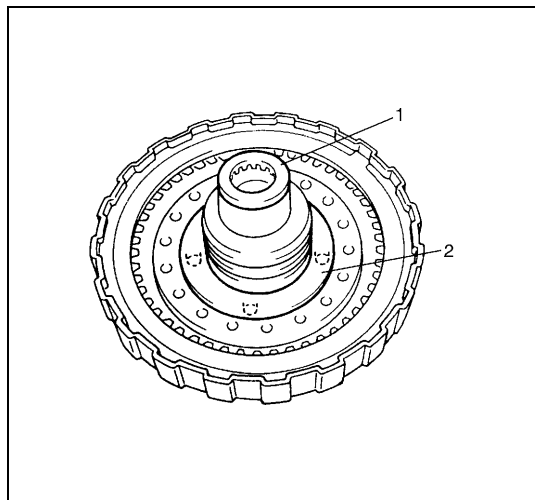
**Available forward clutch retaining plate thickness**

3.4 mm (0.134 in.)
3.5 mm (0.138 in.)
3.6 mm (0.142 in.)
3.7 mm (0.146 in.)
3.8 mm (0.150 in.)
3.9 mm (0.154 in.)

- 9) Install separate plates "S", friction plates "F" and retaining plate "R" in the following order.  
S → F → S → F → R
- 10) Install snap ring (1).

**NOTE:**

**Make sure that flat end of retaining plate faces toward upper side. Also, make sure that opening end of ring is not aligned with groove section.**



- 11) Apply A/T fluid to ring gear thrust roller bearing, race (1) and clutch drum thrust washer (2).

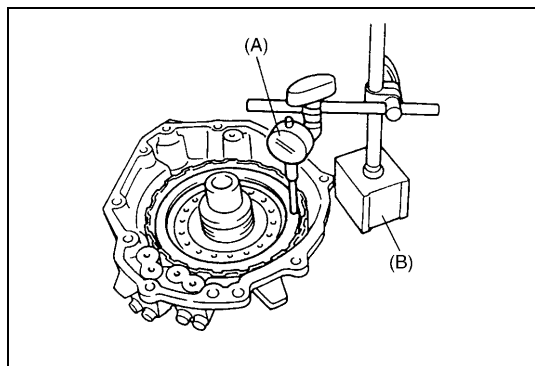
#### Ring gear thrust roller bearing dimension

Outside diameter	32.5 mm (1.28 in.)
Inside diameter	18.8 mm (0.74 in.)
Thickness	2.7 mm (0.11 in.)

#### Ring gear thrust roller bearing race dimension

Outside diameter	30.5 mm (1.20 in.)
Inside diameter	19.0 mm (0.75 in.)
Thickness	0.8 mm (0.03 in.)

- 12) Install them onto clutch drum subassembly.



- 13) Measure piston stroke of forward clutch piston subassembly again.

#### Special tool

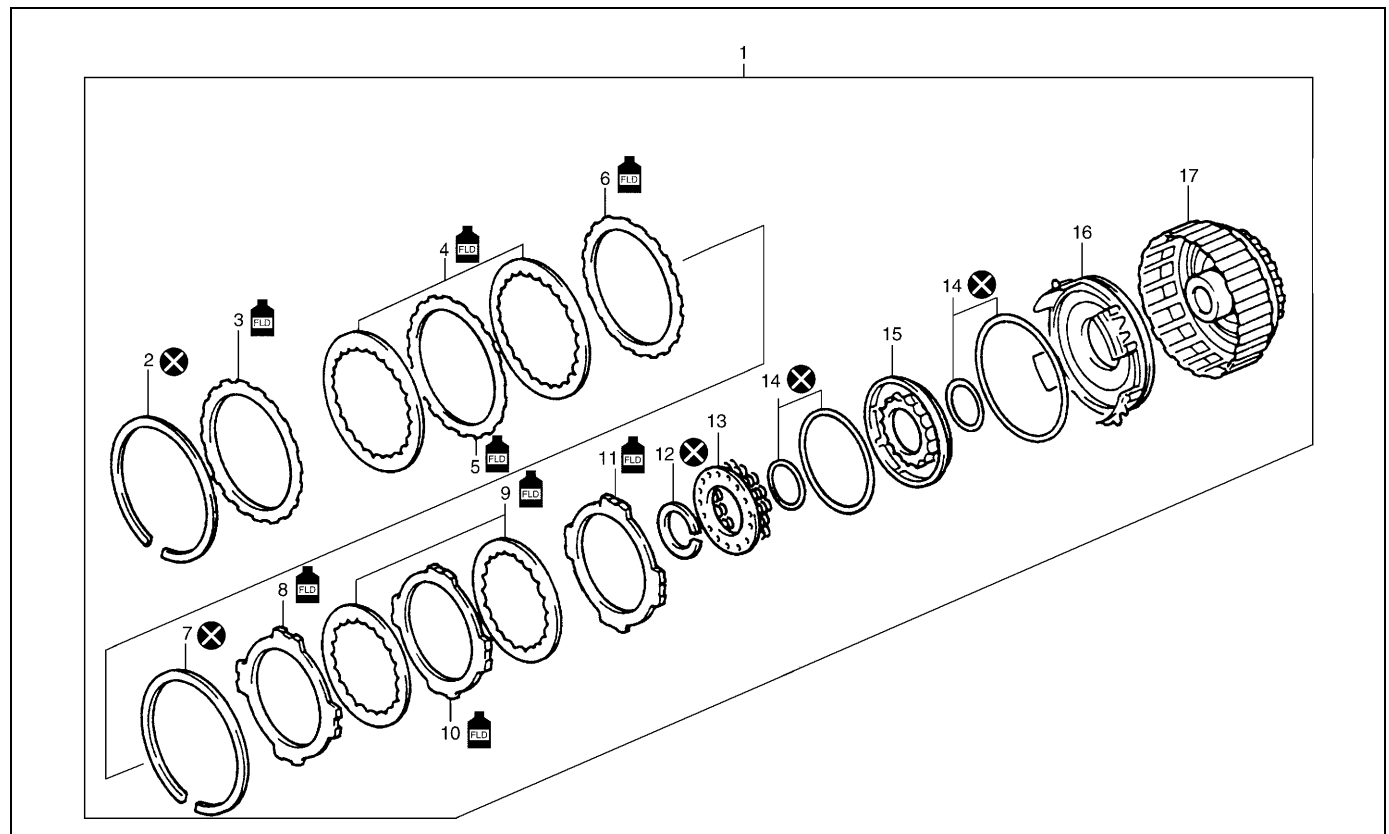
(A) : 09900-20606

(B) : 09900-20701

#### Forward clutch piston stroke

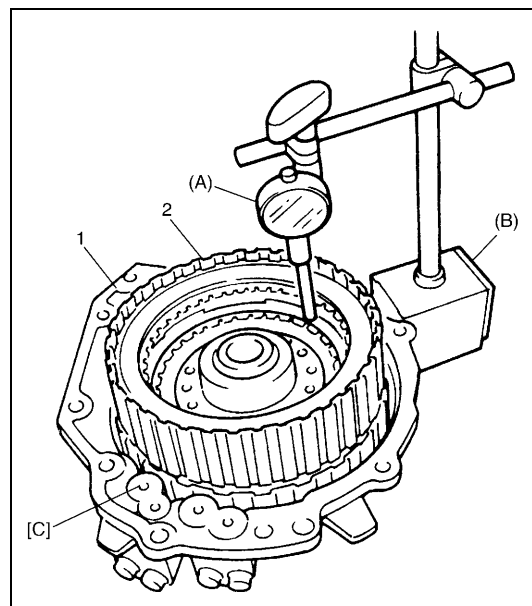
Standard : 0.76 – 1.04 mm (0.030 – 0.040 in.)

## Overdrive clutch and coast clutch



1. Overdrive and coast clutch assembly	8. Retaining plate	15. Coast clutch piston
2. Snap ring	9. Friction plate	16. Overdrive clutch piston
3. Retaining plate	10. Separator plate (t = 1.8 mm)	17. Overdrive clutch drum
4. Friction plate	11. Separator plate (t = 3.2 mm)	Apply automatic transaxle fluid.
5. Separator plate (t = 2.5 mm)	12. Snap ring	Do not reuse.
6. Separator plate (t = 3.6 mm)	13. Overdrive clutch return spring	
7. Snap ring	14. O-ring	

### PRELIMINARY CHECK



#### 1) Measure piston stroke.

Install forward clutch assembly and overdrive/coast clutch assembly (2) to transaxle rear cover (1).

#### 2) Measure overdrive clutch piston stroke while applying and releasing compressed air (400 – 800 kPa, 4 – 8 kg-cm<sup>2</sup>, 57 – 113 psi) through oil hole [C] by using special tools.

#### Special tool

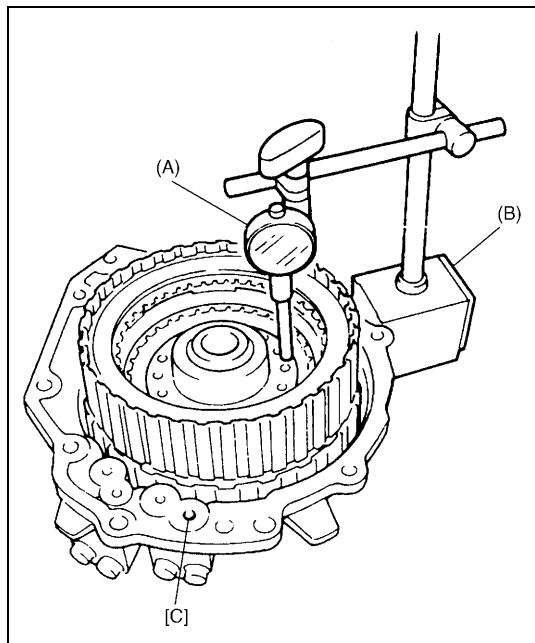
(A) : 09900-20606

(B) : 09900-20701

#### Overdrive clutch piston stroke

Standard : 0.76 – 1.04 mm (0.03 – 0.04 in.)

If piston stroke exceeds specified value, disassemble and inspect inner parts.



- 3) Measure coast clutch piston stroke while applying and releasing compressed air (400 – 800 kPa, 4 – 8 kg-cm<sup>2</sup>, 57 – 113 psi) through oil hole [C] by using special tools.

**Special tool**

(A) : 09900-20606

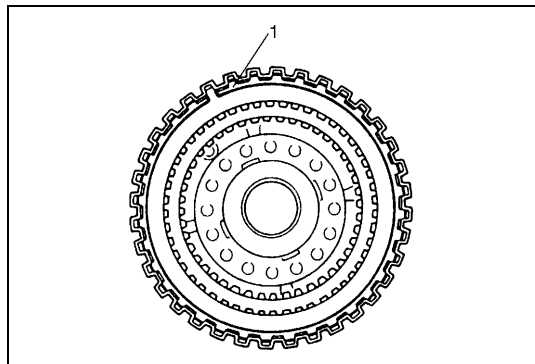
(B) : 09900-20701

**Coast clutch piston stroke**

**Standard : 2.68 – 3.02 mm (0.106 – 0.119 in.)**

If piston stroke exceeds specified value, disassemble and inspect inner parts.

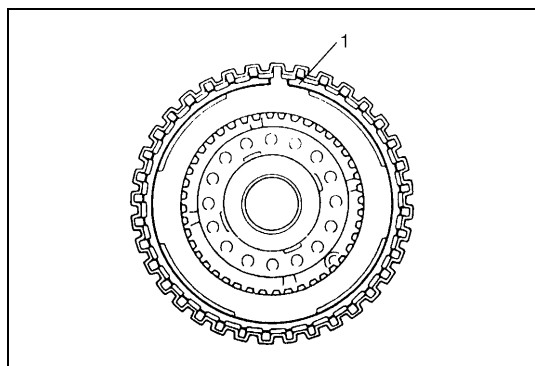
**DISASSEMBLY**



- 1) Remove snap ring (1).
- 2) Remove retaining plate “R”, friction plates “F” and separator plates “S” in the following order.  
R → F → S → F → S

**NOTE:**

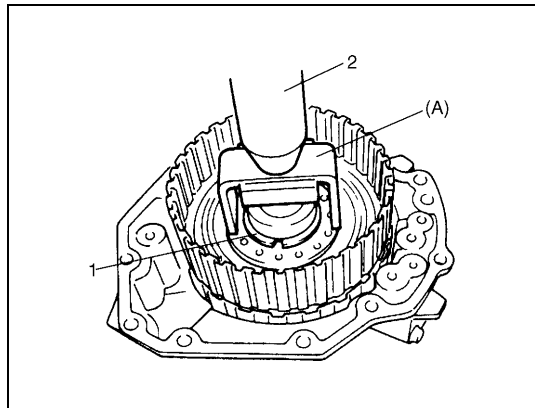
**Measure thickness of retaining plate and record for reference of piston stroke confirmation.**



- 3) Remove snap ring (1).
- 4) Remove retaining plate “R”, friction plates “F” and separator plates “S” in the following order.  
R → F → S → F → S

**NOTE:**

**Measure thickness of removed retaining plate and record for reference of piston stroke confirmation.**



- 5) Using special tool and hydraulic press (2), compress overdrive clutch return spring and remove snap ring (1).

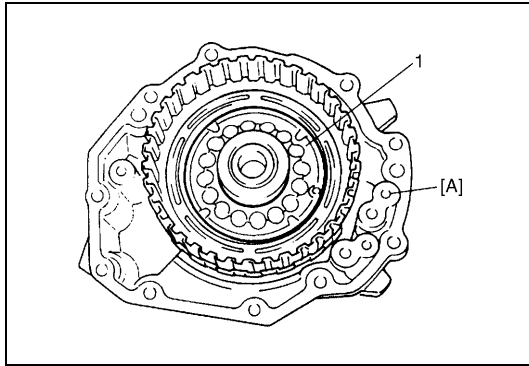
**Special tool**

(A) : 09926-98310

**CAUTION:**

**Be careful when applying pressure, for overpressure will cause plate section of overdrive clutch return spring to deform.**

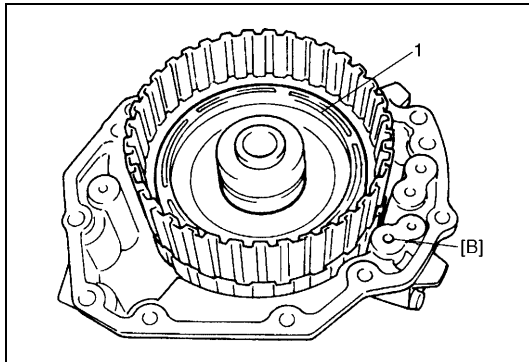
- 6) Remove overdrive clutch return spring.



- 7) For removing coast clutch piston (1), install forward clutch assembly.
- 8) Remove coast clutch piston with O-rings using compressed air (400 – 800 kPa, 4 – 8 kg/cm<sup>2</sup>, 57 – 113 psi) through oil hole [A].
- 9) Remove O-rings from coast clutch piston.

**NOTE:**

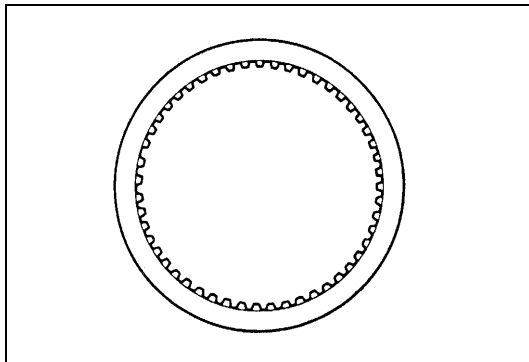
**Never reuse O-rings after removal.**



- 10) Remove coast clutch piston (1) with O-rings using compressed air (400 – 800 kPa, 4 – 8 kg/cm<sup>2</sup>, 57 – 113 psi) through oil hole [B].
- 11) Remove O-rings from overdrive clutch piston.

**NOTE:**

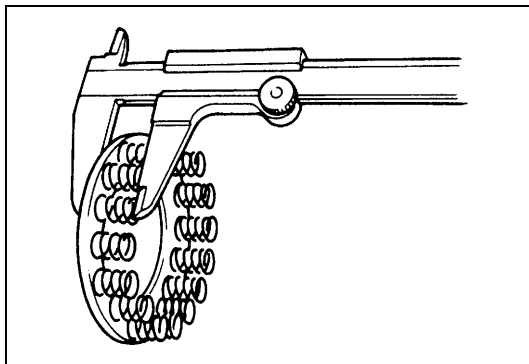
**Never reuse O-rings after removal.**

**INSPECTION**

- 1) Check that sliding surfaces of friction, separator and retaining plates are not worn or burnt. If necessary, replace.

**NOTE:**

- If friction plate lining is exfoliated, discolored or worn hardly, replace all friction plates.
- Before assembling new friction plates, soak them in A/T fluid for at least two hours.

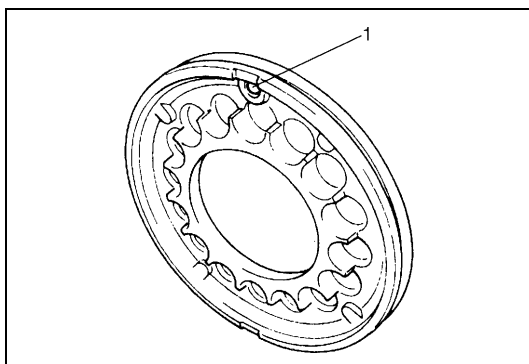


- 2) Measure height of overdrive clutch return spring.

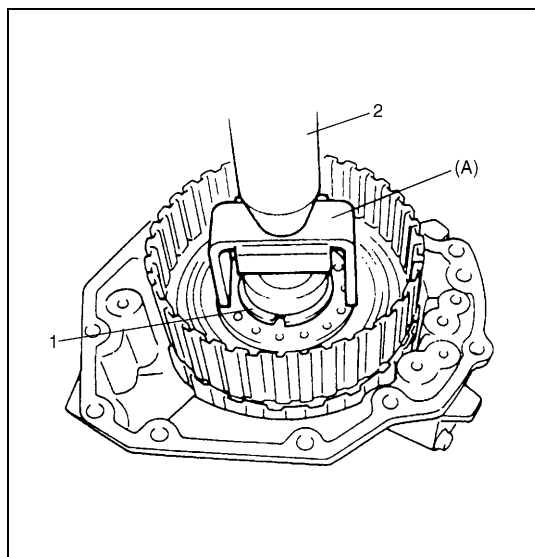
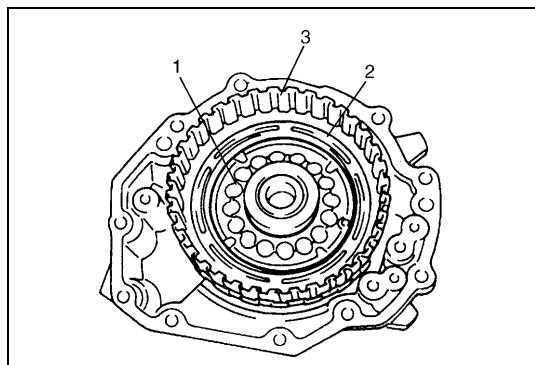
**Overdrive clutch return spring height**  
**Standard: 18.9 mm (0.74 in.)**

**NOTE:**

**Do not apply excessive force when measuring spring height. Perform measurement at several points.**



- 3) Check that ball (1) makes creaking noise when shaking piston clockwise and counterclockwise. (i.e., check that ball is free.)



## REASSEMBLY

- 1) Apply A/T fluid to new O-rings.
- 2) Install new O-rings to pistons.
- 3) Set coast clutch piston (1) to overdrive clutch piston (2) by pushing with fingers.
- 4) Press overdrive clutch and coast clutch piston to overdrive clutch drum (3).

### NOTE:

**Make sure that O-rings are not twisted or deviated from position during insertion of piston.**

- 5) Using special tool and hydraulic press (2), compress overdrive clutch return spring and install snap ring (1).

### Special tool

**(A) : 09926-98310**

### NOTE:

- When installing return spring, be careful so that return spring will not fall or tilt.
- Do not align opening in snap ring with lug of overdrive clutch return spring at its retainer section.

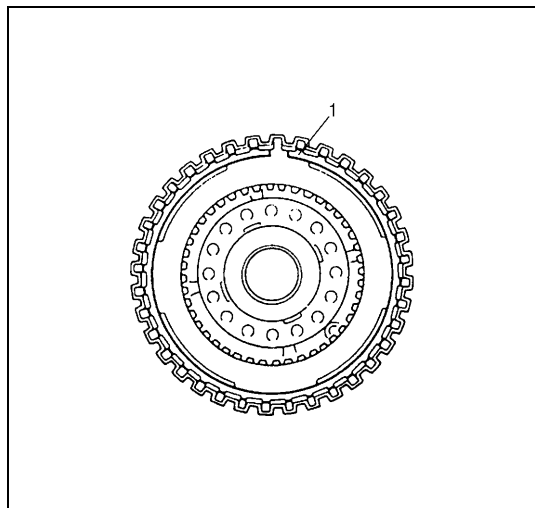
### CAUTION:

**Be careful when applying pressure, for overpressure will cause plate section of spring to deform.**

- 6) Select and measure correct thickness of coast clutch retaining plate.

### Available coast clutch retaining plate thickness

3.6 mm (0.142 in.)
3.8 mm (0.150 in.)
4.0 mm (0.157 in.)



- 7) Install separate plates "S", friction plates "F" and retaining plate "R" of coast clutch in the following order.  
S → F → S → F → R

### NOTE:

**Be sure to confirm that flat section of retaining plate faces toward piston side and also that of separate plate faces toward upper side.**

- 8) Install snap ring (1).

### NOTE:

**Make sure that opening end of ring is not aligned with groove section of drum.**

- 9) Select and measure correct thickness of overdrive clutch retaining plate.

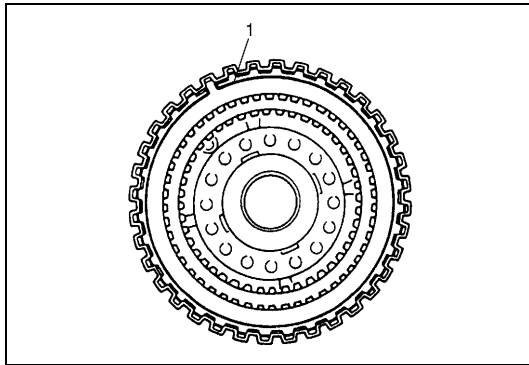
**Available overdrive clutch retaining plate thickness**

3.6 mm (0.142 in.)
3.8 mm (0.150 in.)
4.0 mm (0.157 in.)

- 10) Install separate plates "S", friction plates "F" and retaining plate "R" of overdrive clutch in the following order.  
S → F → S → F → R

**NOTE:**

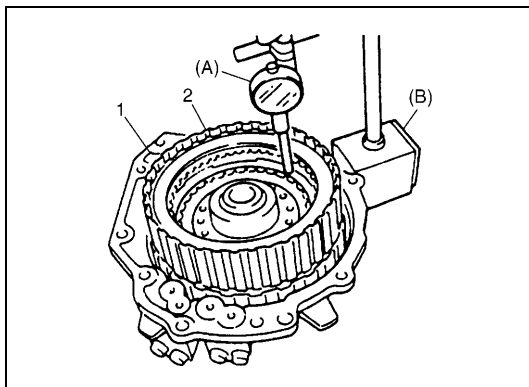
Be sure to confirm that flat section of retaining plate selected in Step 9) faces toward piston side and also that of retaining plate faces toward upper side.



- 11) Install snap ring (1).

**NOTE:**

Make sure that opening end of ring is not aligned with groove section of drum.



- 12) Install forward clutch assembly and overdrive and coast clutch assembly to transaxle rear cover.

- 13) Measure overdrive clutch piston stroke again, using special tools.

**Special tool**

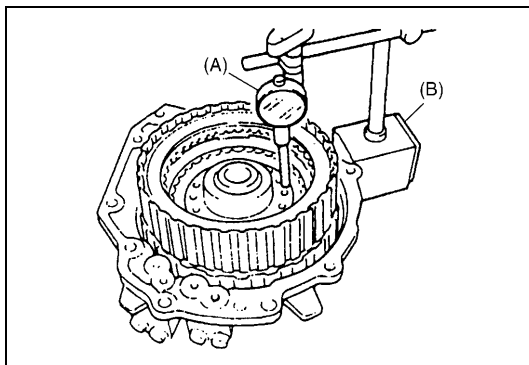
(A) : 09900-20606

(B) : 09900-20701

**Overdrive clutch piston stroke**

Standard: 0.76 – 1.04 mm (0.03 – 0.04 in.)

1. Transaxle rear cover
2. Overdrive/coast clutch assembly



- 14) Measure coast clutch piston stroke again, using special tools.

**Special tool**

(A) : 09900-20606

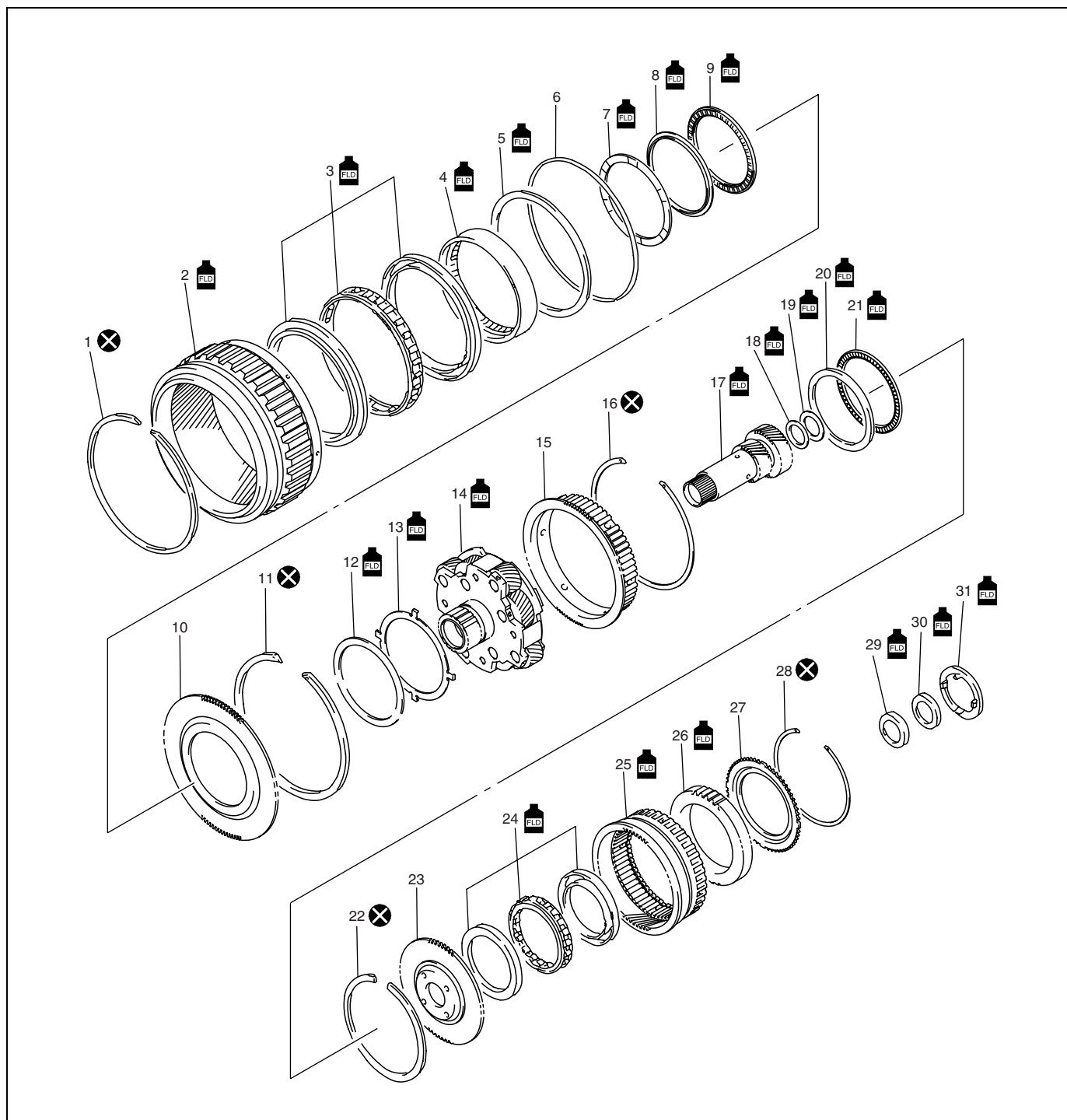
(B) : 09900-20701

**Coast clutch piston stroke**

Standard: 2.68 – 3.02 mm (0.106 – 0.119 in.)



## Planetary gear

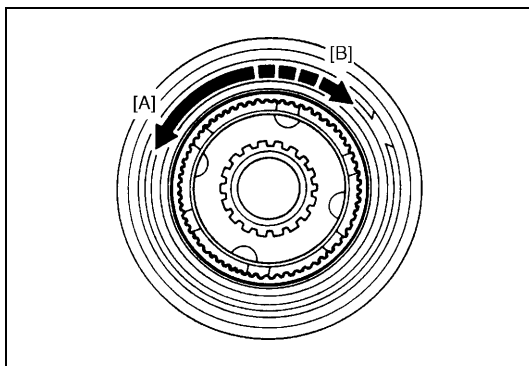
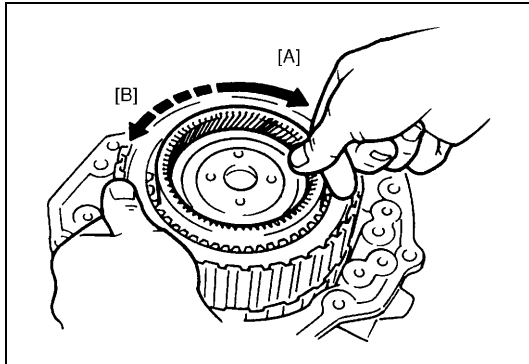


1. Snap ring	12. Carrier front thrust roller bearing	23. Rear ring gear flange
2. Front planetary ring gear	13. Carrier front thrust roller bearing race	24. One-way clutch No.0
3. One-way clutch No.1	14. Planetary pinion gear assembly	25. Rear planetary ring gear
4. One-way clutch No.1 inner race	15. Overdrive clutch hub	26. One-way clutch No.0 outer race
5. Thrust washer	16. Snap ring	27. One-way clutch No.0 retainer
6. O-ring	17. Planetary sun gear assembly	28. Snap ring
7. Front ring gear thrust washer	18. Sun gear thrust roller bearing	29. Rear ring gear thrust roller bearing
8. Front ring gear thrust roller bearing race	19. Sun gear thrust roller bearing race	30. Rear ring gear thrust roller bearing race
9. Front ring gear thrust roller bearing	20. Carrier rear thrust roller bearing race	31. Thrust washer
10. Front ring gear flange	21. Carrier rear thrust roller bearing	Apply automatic transaxle fluid.
11. Snap ring	22. Snap ring	Do not reuse.

## OPERATION CHECK

### One-way clutches

- 1) Install forward clutch assembly and overdrive/coast clutch assembly to transaxle rear cover.
- 2) Install rear planetary ring gear assembly to overdrive and coast clutch assembly.
- 3) Make sure that one-way clutch No.0 turns freely when turned clockwise [A] and locks when turned counterclockwise [B].

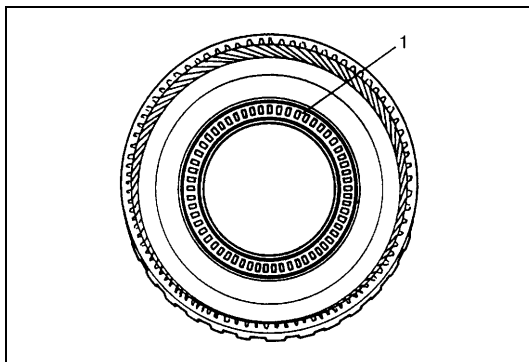
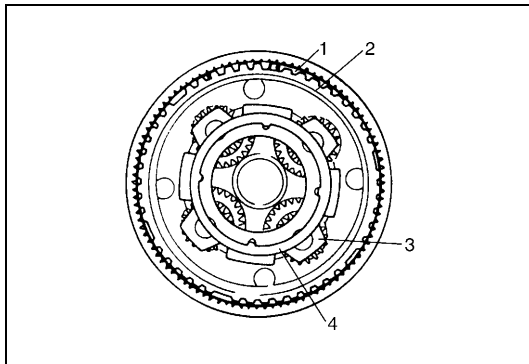


- 4) Make sure that one-way clutch No.1 turns freely when turned counterclockwise [A] and locks when turned clockwise [B].

## DISASSEMBLY

### Planetary gear assembly

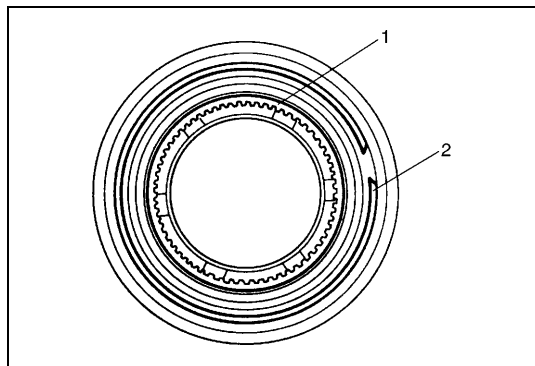
- 1) Remove the following parts by removing snap ring (1).
  - Overdrive clutch hub (2)
  - Planetary pinion gear assembly (3)
  - Two thrust bearing races (4)



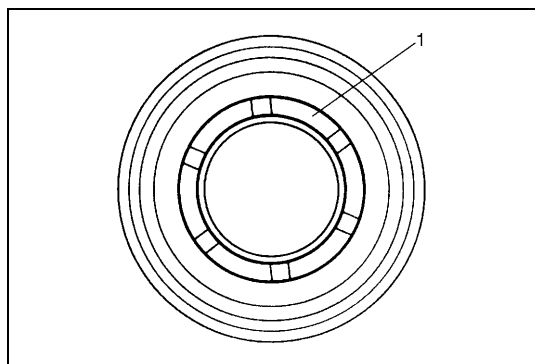
- 2) Pull out carrier front thrust roller bearing (1).

### Carrier front thrust roller bearing dimension

Outside diameter	83.5 mm (3.29 in.)
Inside diameter	68.1 mm (2.68 in.)
Thickness	2.7 mm (0.11 in.)



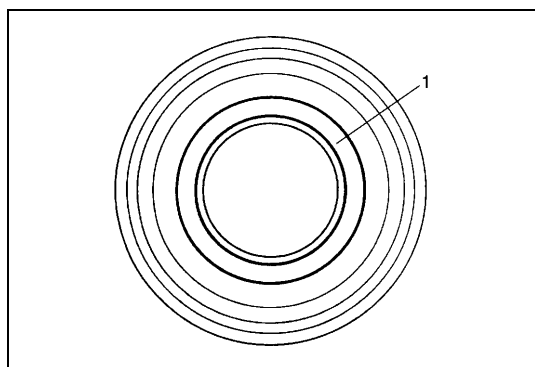
3) Remove one-way clutch No.1 (1) by removing snap ring (2).



4) Remove front ring gear thrust washer (1).

**Front ring gear thrust washer dimension**

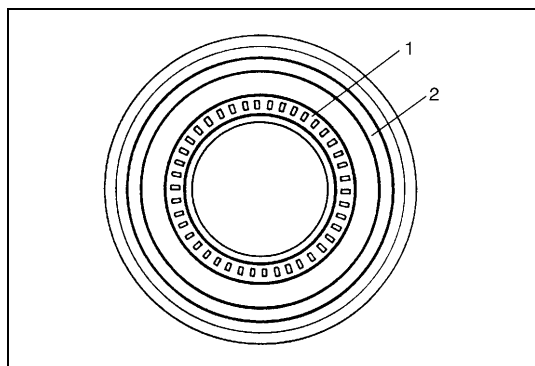
<b>Outside diameter</b>	<b>85.5 mm (3.67 in.)</b>
<b>Inside diameter</b>	<b>70.0 mm (2.76 in.)</b>
<b>Thickness</b>	<b>2.0 mm (0.08 in.)</b>



5) Remove front ring gear thrust roller bearing race (1).

**Front ring gear thrust roller bearing race dimension**

<b>Outside diameter</b>	<b>80.4 mm (3.17 in.)</b>
<b>Inside diameter</b>	<b>68.0 mm (2.68 in.)</b>
<b>Thickness</b>	<b>0.8 mm (0.03 in.)</b>

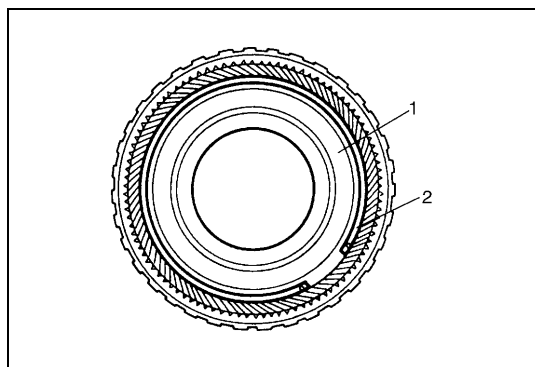


6) Remove front ring gear thrust roller bearing (1).

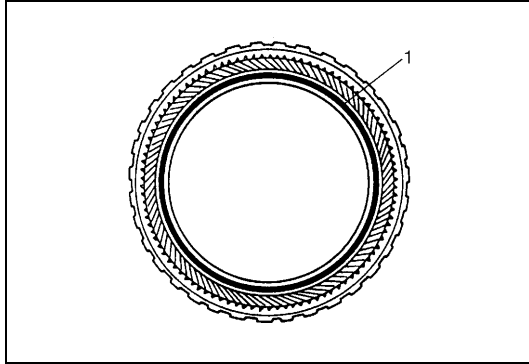
**Front ring gear thrust roller bearing dimension**

<b>Outside diameter</b>	<b>83.5 mm (3.29 in.)</b>
<b>Inside diameter</b>	<b>64.5 mm (2.54 in.)</b>
<b>Thickness</b>	<b>2.7 mm (0.11 in.)</b>

7) Remove thrust washer (2).



8) Remove front ring gear flange (1) by removing snap ring (2).

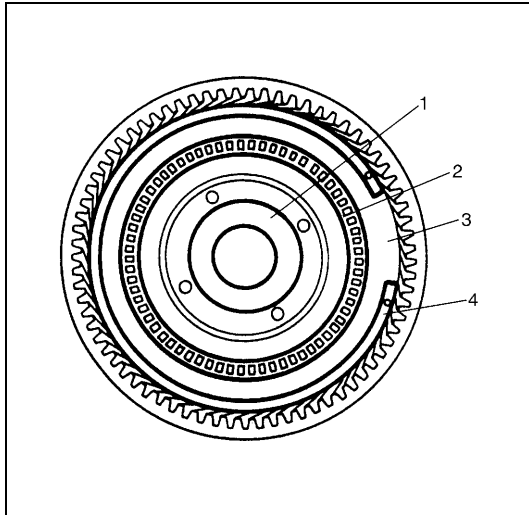


9) Remove O-ring (1).

**NOTE:**

**Never reuse O-ring after removal.**

**Rear planetary ring gear assembly**



1) Remove sun gear thrust roller bearing race (1).

**Sun gear thrust roller bearing race dimension**

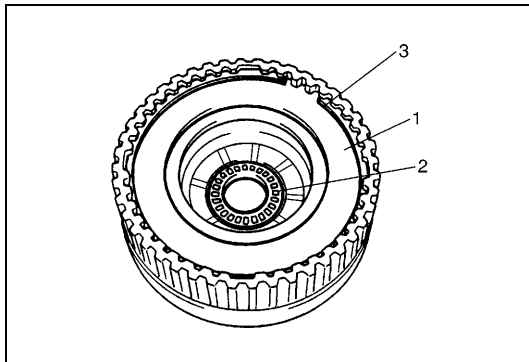
<b>Outside diameter</b>	<b>29.6 mm (1.17 in.)</b>
<b>Inside diameter</b>	<b>19.2 mm (0.76 in.)</b>
<b>Thickness</b>	<b>0.8 mm (0.03 in.)</b>

2) Remove carrier rear thrust roller bearing (2).

**Carrier rear thrust roller bearing dimension**

<b>Outside diameter</b>	<b>70.9 mm (2.79 in.)</b>
<b>Inside diameter</b>	<b>57.0 mm (2.24 in.)</b>
<b>Thickness</b>	<b>2.6 mm (0.10 in.)</b>

3) Remove rear ring gear flange (3) by removing snap ring (4).



4) Remove one-way clutch No.0 retainer (1) with rear ring gear thrust roller bearing (2) by removing snap ring (3).

**Rear ring gear thrust roller bearing dimension**

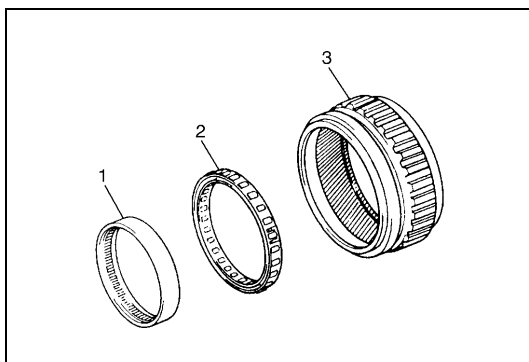
<b>Outside diameter</b>	<b>32.5 mm (1.28 in.)</b>
<b>Inside diameter</b>	<b>18.8 mm (0.74 in.)</b>
<b>Thickness</b>	<b>2.7 mm (0.11 in.)</b>

**INSPECTION**

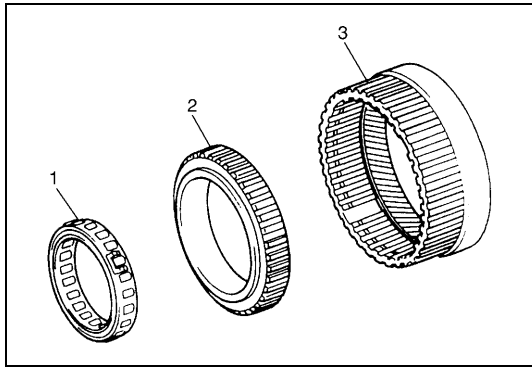
**Planetary gear assembly**

Visually check the following parts for scratches or discoloration.

- Outer surface of one-way clutch inner race (1).
- Outer surface of one-way clutch No.1 roller (2).
- Inner surface of front planetary ring gear (3).



## Rear planetary ring gear assembly

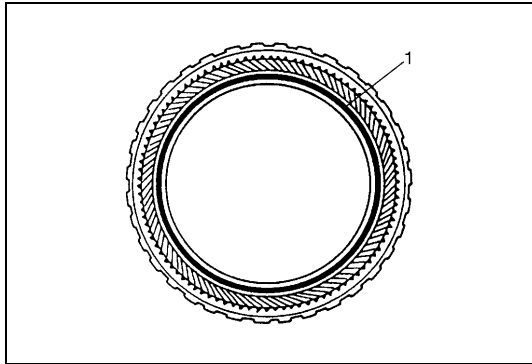


Visually check the following parts for scratches or discoloration.

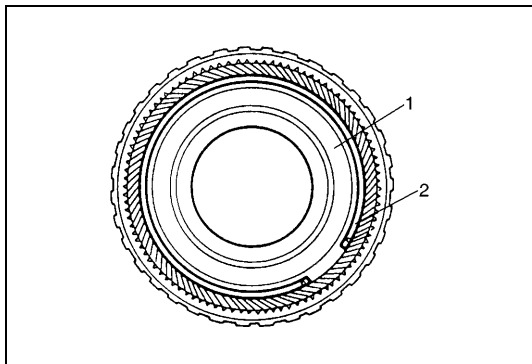
- Outer surface of one-way clutch No.0 roller (1).
- Inner surface of one-way clutch No.0 outer race (2).
- Inner surface of front planetary ring gear (3).

## REASSEMBLY

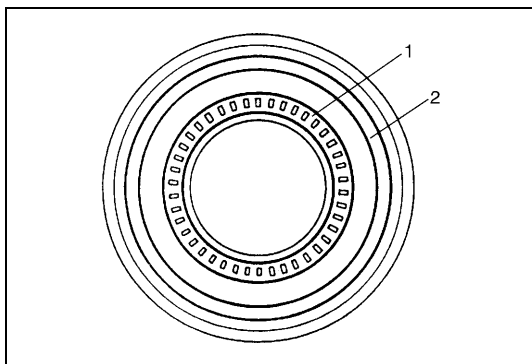
### Planetary gear assembly



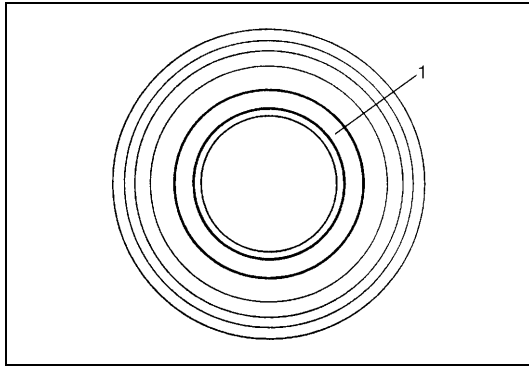
- 1) Apply A/T fluid to new O-ring (1).
- 2) Install O-ring (1).



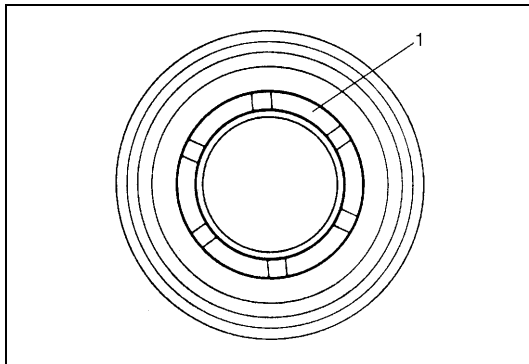
- 3) Install front ring gear flange (1) with snap ring (2).



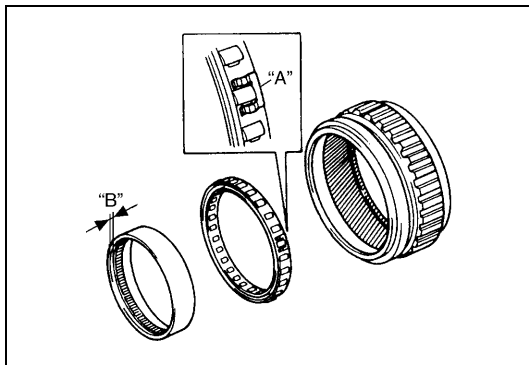
- 4) Coat thrust washer (2) with A/T fluid.
- 5) Install thrust washer (2).
- 6) Install front ring gear thrust roller bearing (1).



- 7) Apply A/T fluid to front ring gear thrust roller bearing race (1) and install it.



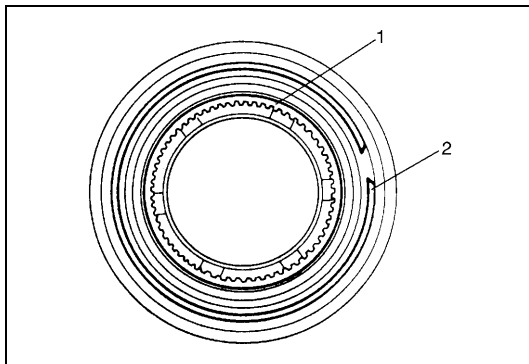
- 8) Apply A/T fluid to front ring gear thrust washer (1) and install it.



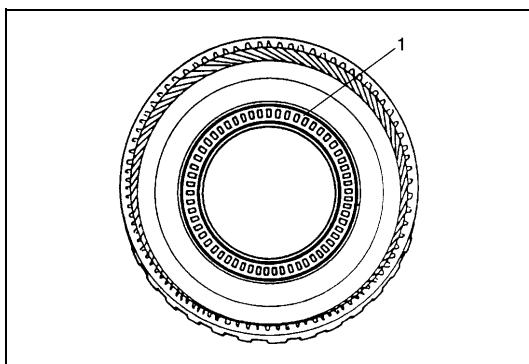
- 9) Set one-way clutch No.1 and one-way clutch No.1 inner race.

**NOTE:**

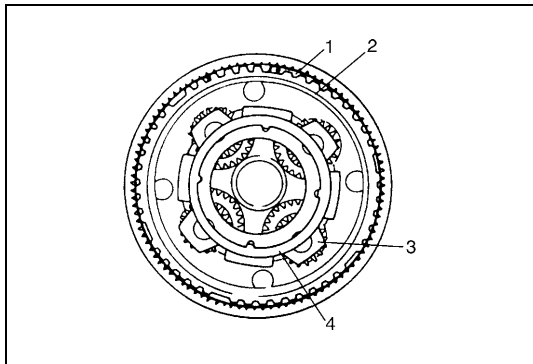
- Make sure that "A" section (shorter than rear) of inner race faces toward front side.
- Make sure that thinner section "B" of one-way clutch faces toward rear side.



- 10) Install one-way clutch No.1 (1) with snap ring (2).

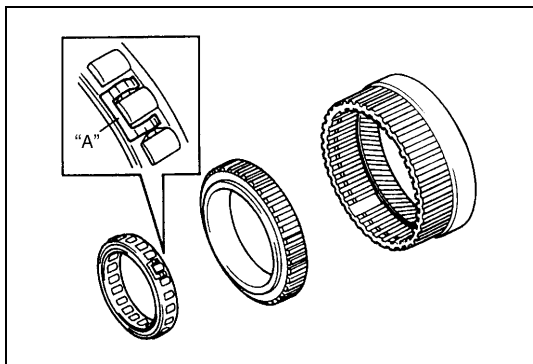


- 11) Install carrier front thrust roller bearing (1).



- 12) Coat two thrust bearing races (4) with A/T fluid.
- 13) Install planetary pinion gear assembly (3) and overdrive clutch hub (2) with snap ring (1).
- 14) Install two thrust bearing races (4).
- 15) Check operation of one-way clutch No.1.

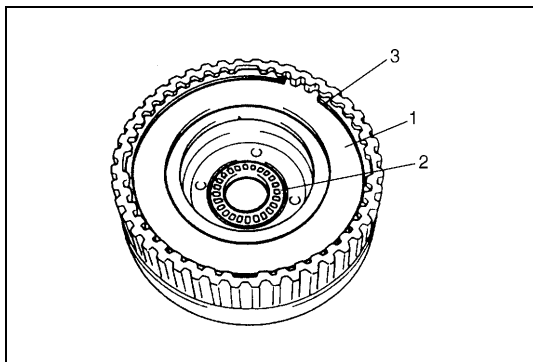
### Rear planetary ring gear assembly



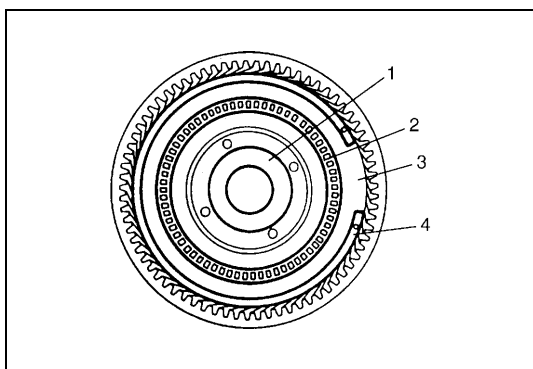
- 1) Set one-way clutch No.0 to one-way clutch No.0 outer race and rear planetary ring gear.

#### NOTE:

**Make sure that thinner section "A" of one-way clutch faces toward front side.**

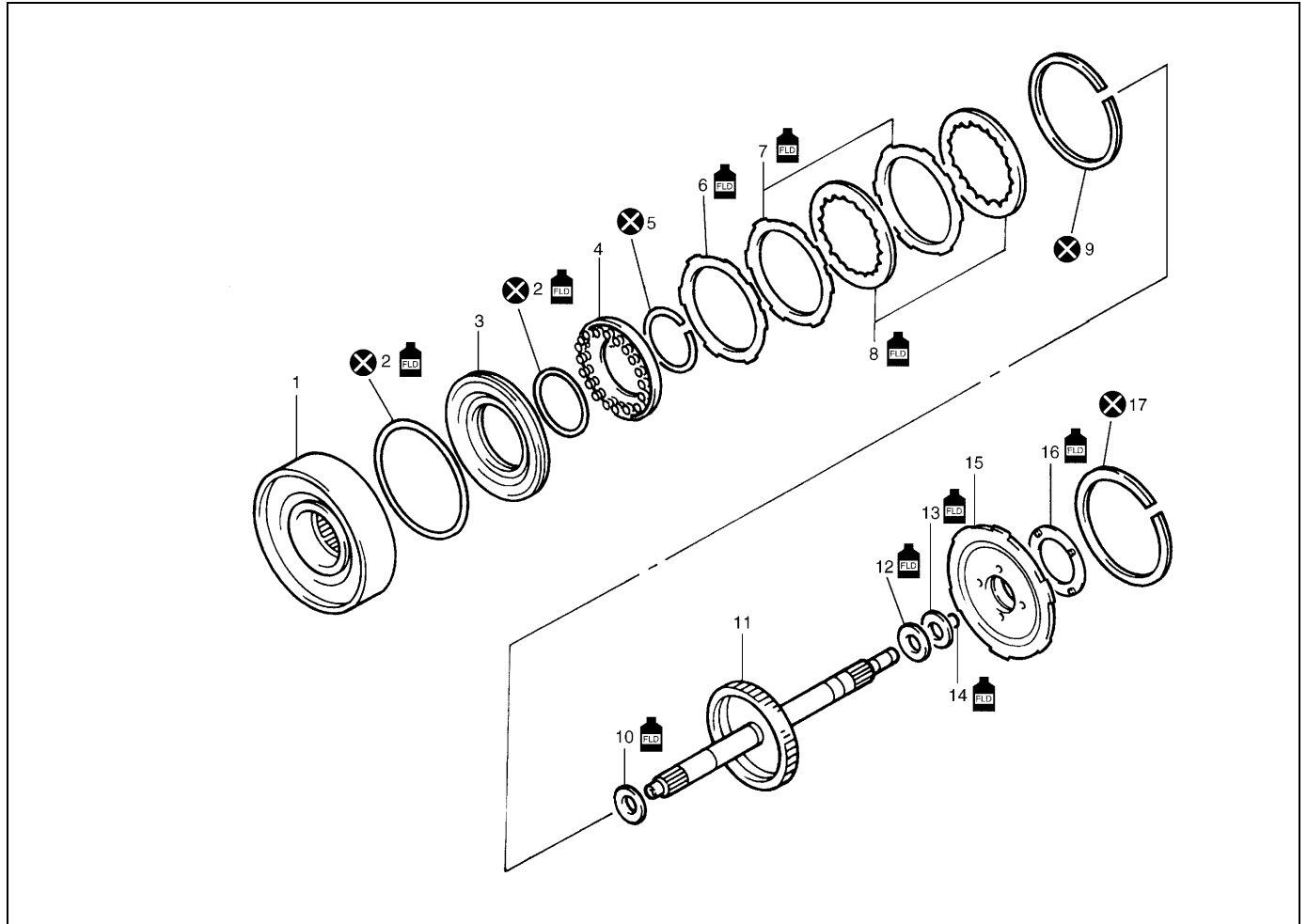




- 2) Install the following parts, previously mentioned parts, one-way clutch No.0 retainer (1) and rear ring gear thrust roller bearing (2).
- 3) Install snap ring (3).



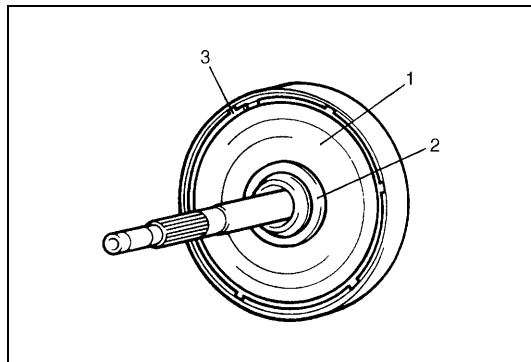
- 4) Install rear ring gear flange (3) with snap ring (4).
- 5) Coat sun gear thrust roller bearing race (1) and carrier rear thrust roller bearing (2) with A/T fluid.
- 6) Install them.

## Reverse clutch



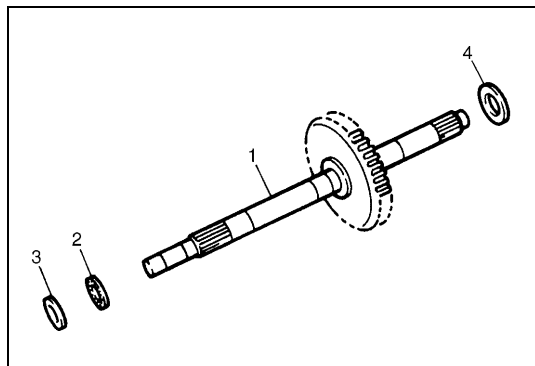
1. Reverse clutch drum with bearing	8. Friction plate	15. Sun gear input flange
2. O-ring	9. Snap ring	16. Thrust washer
3. Reverse clutch piston	10. Input shaft front thrust roller bearing	17. Retainer ring
4. Reverse clutch return spring	11. Input shaft	 Apply automatic transaxle fluid.
5. Snap ring	12. Input shaft rear thrust roller bearing	 Do not reuse.
6. Cushion plate	13. Input shaft rear thrust roller bearing race	
7. Separator plate	14. Seal ring	

## PRELIMINARY INSPECTION

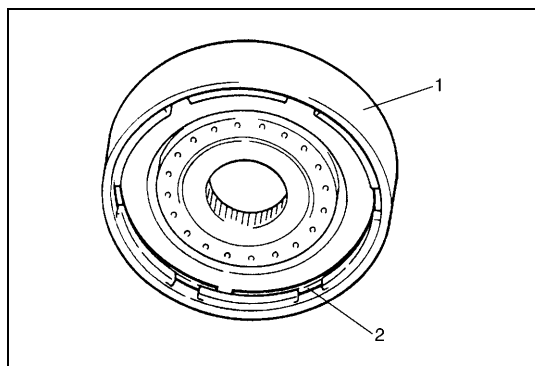


- 1) Remove sun gear input flange (1) with thrust washer (2) installed by removing retainer ring (3).

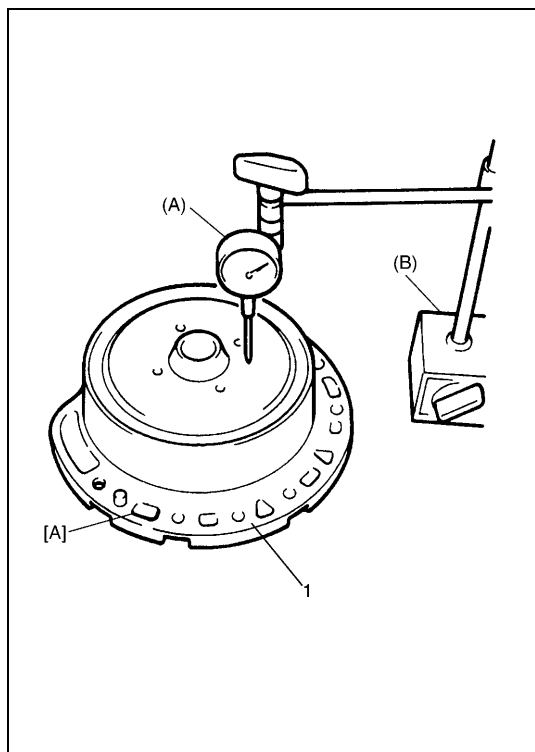




- 2) Remove input shaft (1) with input shaft rear thrust roller bearing race (3), input shaft rear thrust roller bearing (2) and input shaft front thrust roller bearing (4).



- 3) Remove snap ring (2) of reverse clutch drum with bearing (1).



- 4) Install sun gear input flange (thrust washer installed) with retainer ring.

- 5) Mount reverse clutch drum with bearing to oil pump body (1).
- 6) Measure piston stroke with compressed air (400 – 800 kPa, 4 – 8 kg/cm<sup>2</sup>, 57 – 113 psi) through oil hole section [A], using special tools.

#### Special tool

(A) : 09900-20606

(B) : 09900-20701

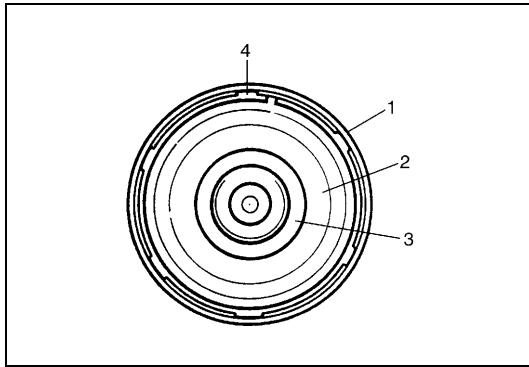
#### Reverse clutch piston stroke

Standard : 1.536 – 1.864 mm (0.060 – 0.073 in.)

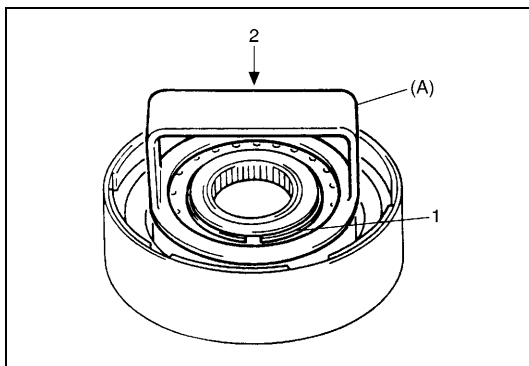
#### NOTE:

- To prevent air leakage from oil hole section [A] during piston stroke measurement with air nozzle gun, it is recommended to plug oil hole section around air nozzle gun with a clean cloth or the like because piston stroke cannot be measured otherwise.
- If it is difficult to obtain correct specified value above, it is recommended to align plate (Thickness: approximately 3 mm) with shape around oil hole section.

## DISASSEMBLY



- 1) Remove reverse clutch drum with bearing (1) from oil pump body.
- 2) Remove sun gear input flange (2) with thrust washer (3) installed by removing retainer ring (4).



- 3) Remove friction plates "F", separator plates "S" and cushion plate "C" in the following order.  
F → S → F → S → C

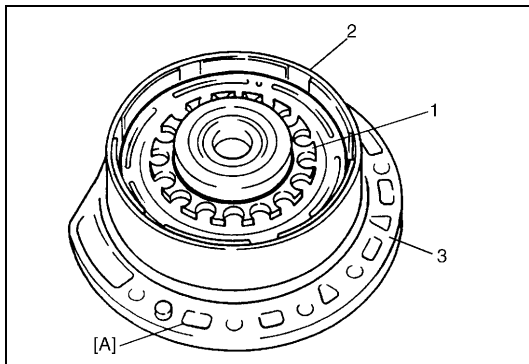
- 4) Remove reverse clutch return spring by removing snap ring (1), using special tool and hydraulic press (2).

### Special tool

(A) : 09926-96010

### NOTE:

To prevent deformation of spring seat, it is recommended to compress spring seat until claw section of snap ring is free.

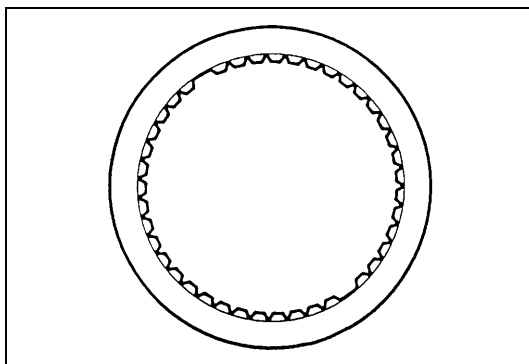


- 5) Mount reverse clutch drum with bearing (2) to oil pump body (3).
- 6) Remove reverse clutch piston (1) by blowing compressed air (400 – 800 kPa, 4 – 8 kg/cm<sup>2</sup>, 57 – 113 psi) through oil hole section [A].
- 7) Remove two O-rings from piston.

### NOTE:

Never reuse removed O-rings.

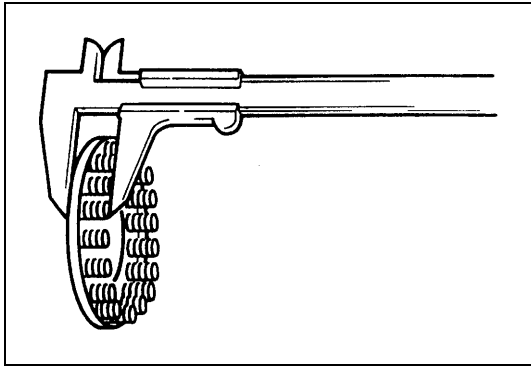
## INSPECTION



- 1) Check that sliding surfaces of friction, separator and cushion plates are not worn or burnt. If necessary, replace.

### NOTE:

- If friction plate lining is exfoliated, discolored or worn hardy, replace all friction plates.
- Before assembling new friction plates, soak them in A/T fluid for at least two hours.



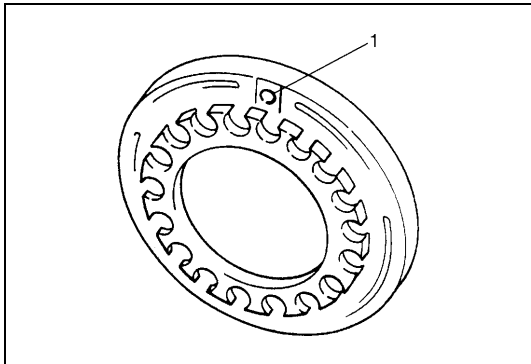
- 2) Measure height of reverse clutch return spring.

**Reverse clutch return spring height**

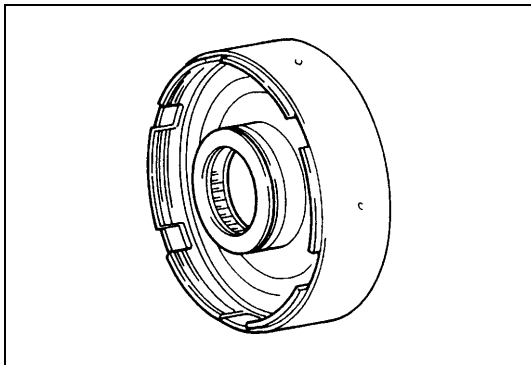
**Standard : 18.7 mm (0.74 in.)**

**NOTE:**

**Do not apply excessive force when measuring spring height. Perform measurement at several points.**



- 3) Make sure that ball (1) makes creaking noise when shaking the reverse clutch piston. (i.e., check that ball is free.)  
 4) Check that there is no leakage by applying low-pressure air onto ball.



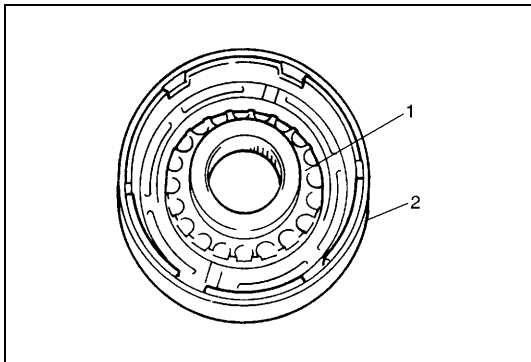
- 5) Check that outer surface of reverse clutch with bearing is not worn or burnt. If necessary, replace.

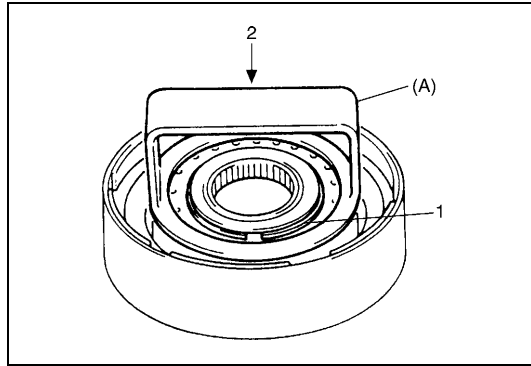
**REASSEMBLY**

- 1) Apply A/T fluid to new O-rings.  
 2) Install them to reverse clutch piston (1).  
 3) Press reverse clutch piston (1) into reverse clutch drum with bearing (2) with cup side up.

**NOTE:**

**Do not twist or deviate O-rings during installation.**





- 4) Place reverse clutch return spring onto reverse clutch piston.
- 5) Install snap ring (1), using special tool and hydraulic press (2).

**Special tool**

**(A): 09926-96010**

**NOTE:**

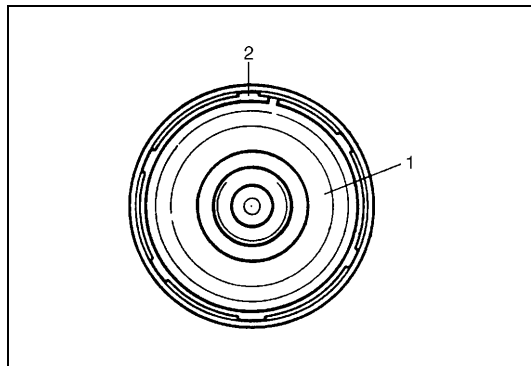
**To prevent spring seat deformation, be sure to keep clearance of 1 – 2 mm between return spring seat and snap ring.**

- 6) Install cushion plate “C”, separator plates “S” and friction plates “F” in the following order.

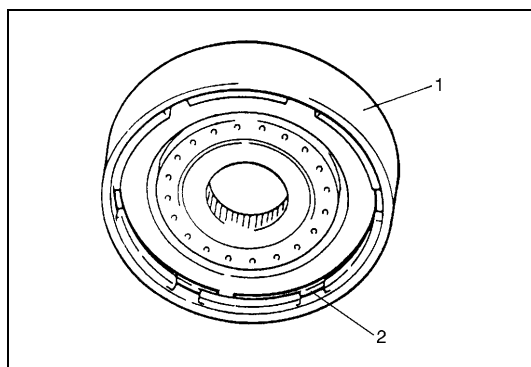
C → S → C → S → F

**NOTE:**

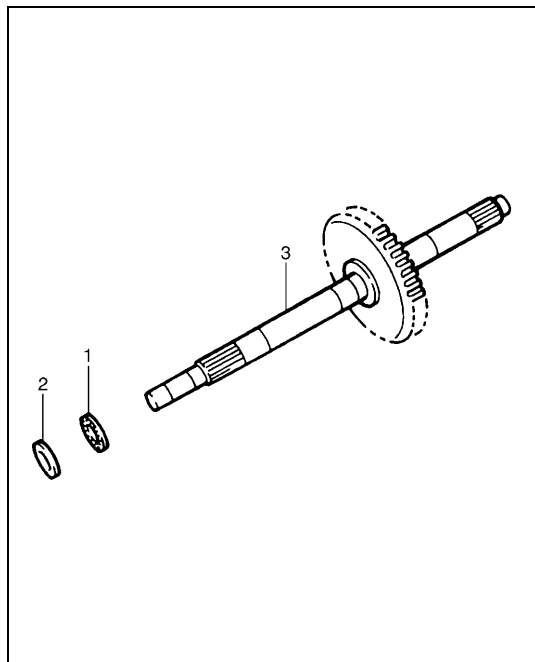
**Make sure that flat end section of plate faces toward piston side.**



- 7) Install sun gear input flange (1) with retainer ring (2).



- 8) Measure piston stroke, referring to “Preliminary Check”.
- 9) Remove reverse clutch from oil pump body.
- 10) Remove sun gear input flange by removing retainer ring.
- 11) Install snap ring (2) to reverse clutch drum with bearing (1).



- 12) Apply A/T fluid to input shaft rear thrust roller bearing (1).
- 13) Install input shaft rear thrust roller bearing (1) to input shaft (3).

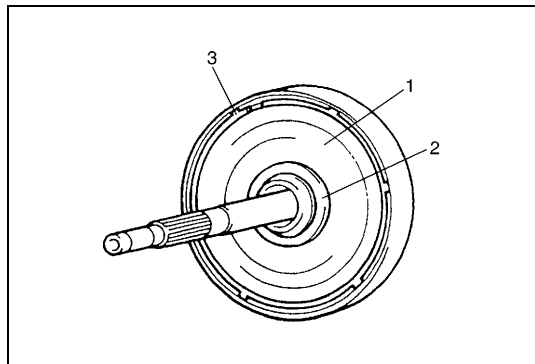
#### Input shaft rear thrust roller bearing dimension

Outside diameter	31.2 mm (1.23 in.)
Inside diameter	18.6 mm (0.73 in.)
Thickness	2.7 mm (0.11 in.)

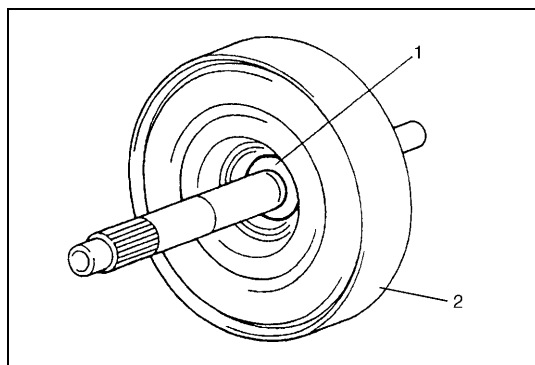
- 14) Apply A/T fluid to input shaft rear thrust roller bearing race (2).
- 15) Install input shaft rear thrust roller bearing race (2) to input shaft (3).

#### Input shaft rear thrust roller bearing race dimension

Outside diameter	33.4 mm (1.31 in.)
Inside diameter	21.5 mm (0.85 in.)
Thickness	2.0 mm (0.08 in.)



- 16) Install input shaft to reverse clutch drum.
- 17) Install sun gear input flange (1) with retainer ring (3).
- 18) Apply A/T fluid to thrust washer.
- 19) Install thrust washer (2) to reverse clutch assembly.

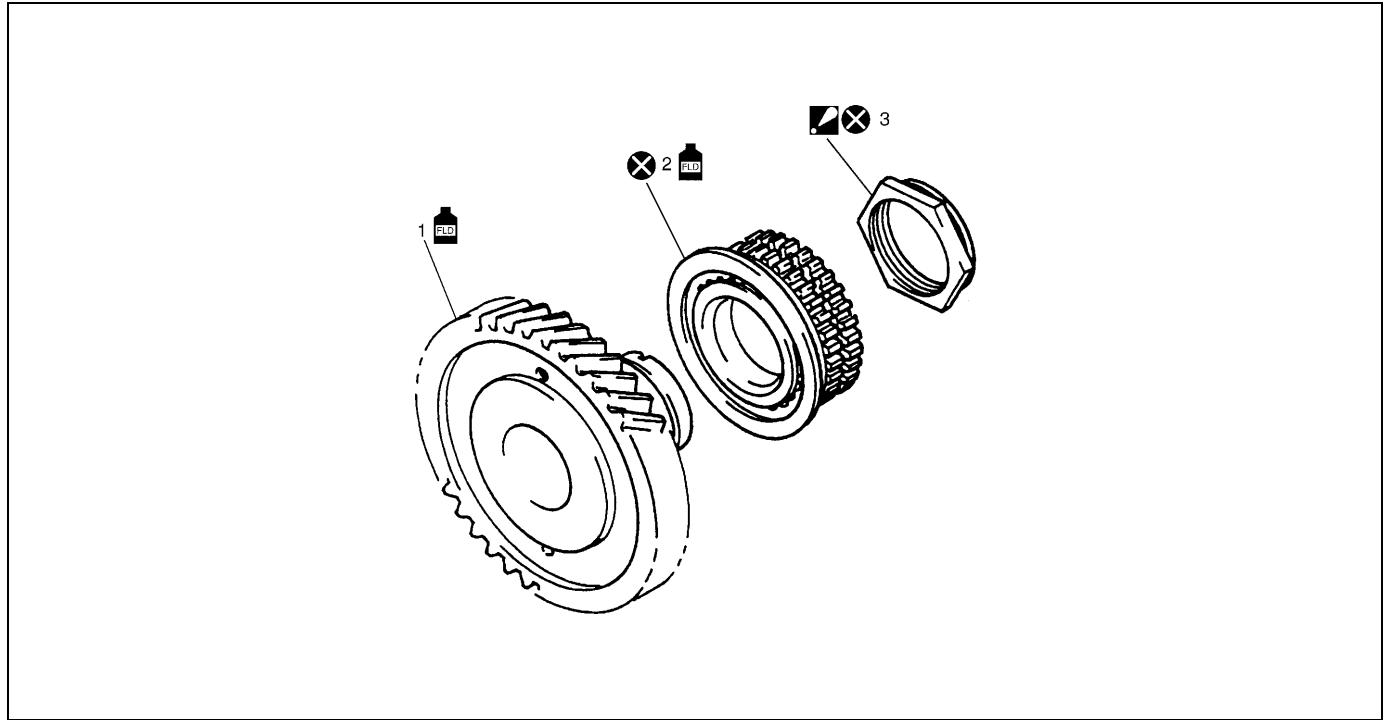





- 20) Apply A/T fluid to input shaft front thrust roller bearing.
- 21) Install thrust needle roller bearing (1) to reverse clutch assembly (2).

#### Input shaft front thrust roller bearing dimension

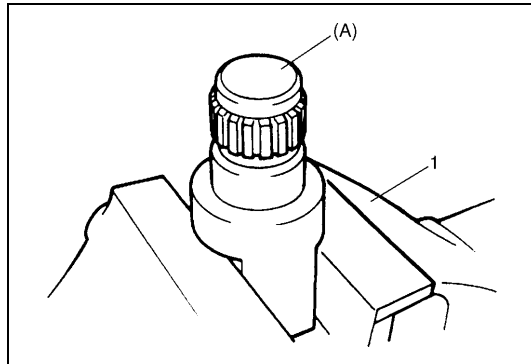
Outside diameter	33.1 mm (1.30 in.)
Inside diameter	18.6 mm (0.73 in.)
Thickness	3.4 mm (0.13 in.)

## Counter drive gear



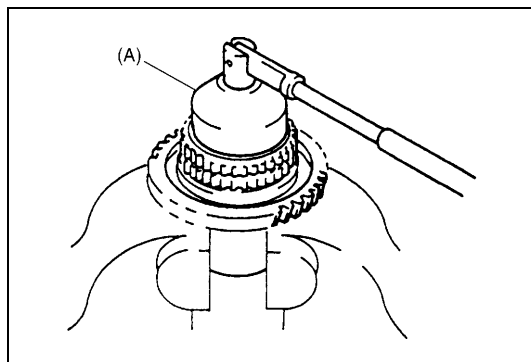
1. Counter drive gear	 Apply automatic transaxle fluid.
2. Angular ball bearing	 Do not reuse.
 3. Locknut : After tightening nut so as starting/rotational torque of counter drive gear to be in specified value, stake nut securely.	

## DISASSEMBLY



- 1) Clamp special tool in vise (1) and place counter drive gear onto the special tool.

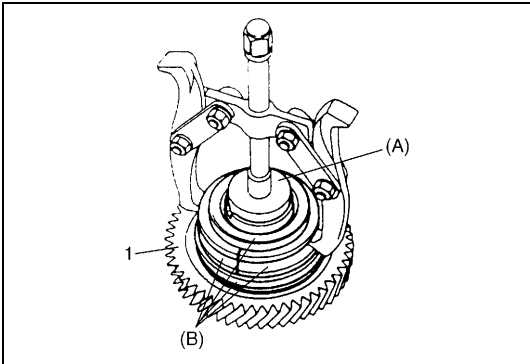
**Special tool**  
**(A) : 09927-76040**



- 2) Unstake lock section of lock nut and remove lock nut using special tool.

**Special tool**  
**(A) : 09927-26010**

- 3) Remove angular ball bearing from counter drive gear.

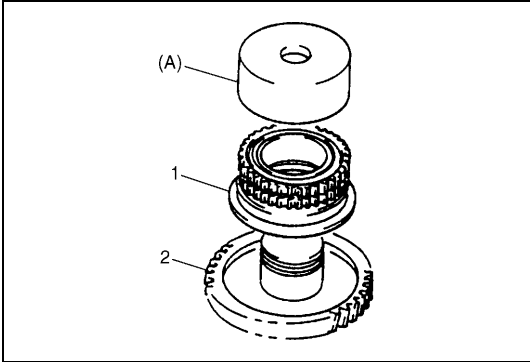


**NOTE:**

If inner race of angular ball bearing remains on counter drive gear (1), remove it using gear puller and special tools.

**Special tool**  
 (A) : 09925-86010  
 (B) : 09925-06010

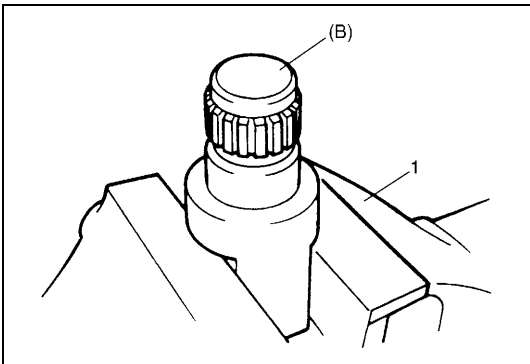
REASSEMBLY



- 1) Press new angular ball bearing (1) into counter drive gear (2) using special tool.

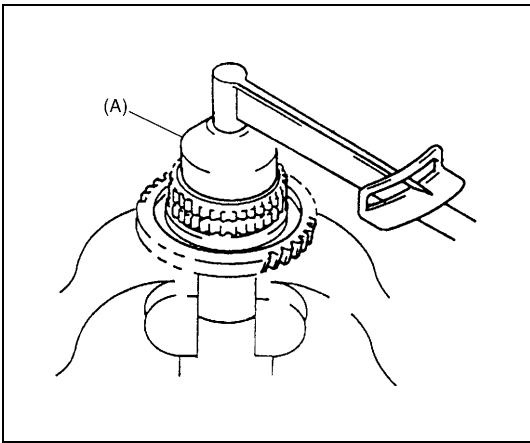
**Special tool**  
 (A) : 09951-46010

- 2) Temporally tighten new lock nut.



- 3) Clamp special tool in vise (1) and place counter drive gear onto the special tool.

**Special tool**  
 (B) : 09927-76040

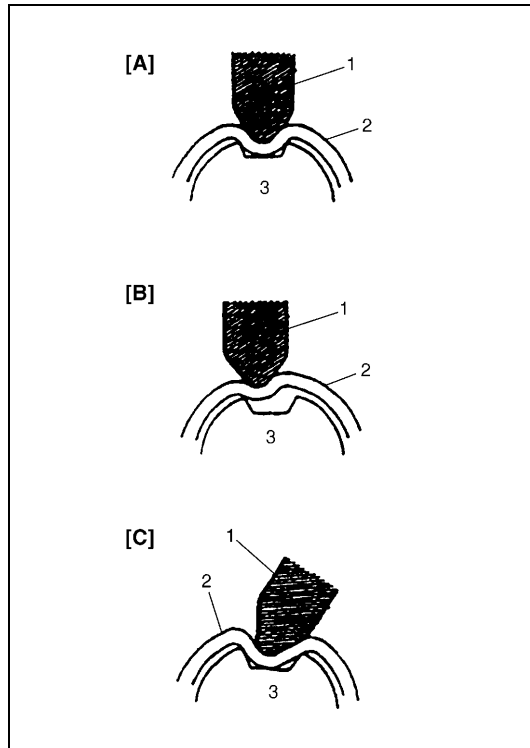


- 4) Tighten new lock nut using special tool until starting/rotation torque (bearing preload) will be in specified value shown below.

**Special tool**  
 (A) : 09927-26010

Counter drive gear bearing preload

Starting torque	0.05 – 0.25 N·m (0.005 – 0.025 kg-m, 0.037 – 0.180 lb-ft)
Rotational torque	0.05 - 0.15 N·m (0.005 – 0.015 kg-m, 0.037 – 0.108 lb-ft)



5) Stake new lock nut, using standard punch in combination with hammer.

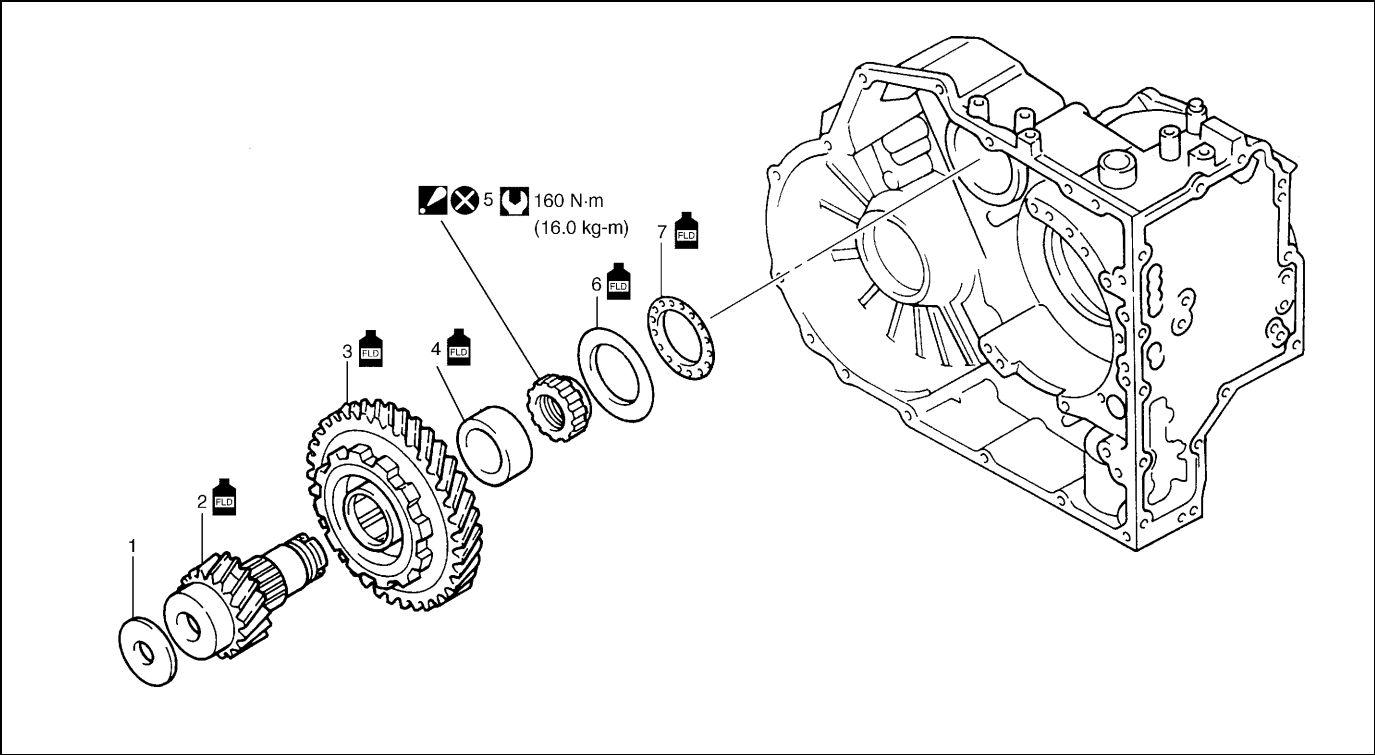
**NOTE:**

**When staking lock nut, point a suitable staking tool (1) toward axis center shaft (3) and stake lock nut (2) securely as shown in figure. (Poor staking may cause abnormal noise.)**

[A] : Correct
[B] : Wrong
[C] : Wrong

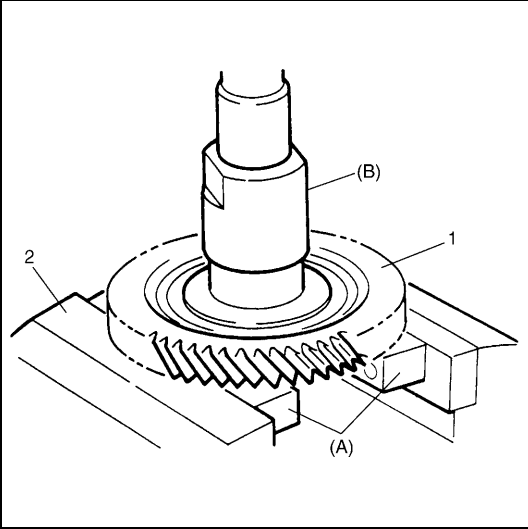


Counter driven gear



1. Counter shaft RH thrust roller bearing race	5. Counter shaft driven gear lock nut (for output shaft speed sensor) : After tightening nut to specified tightening torque, stake nut securely.	Apply automatic transaxle fluid.
2. Differential drive pinion	6. Counter shaft LH thrust roller bearing race	Tightening torque
3. Counter driven gear	7. Counter shaft LH thrust roller bearing	Do not reuse.
4. Cylindrical roller bearing inner race		

DISASSEMBLY



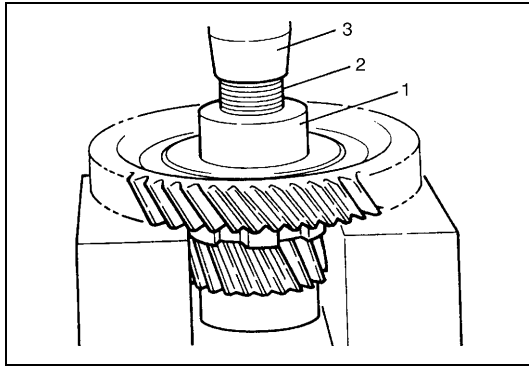
- 1) Clamp counter driven gear (1) with special tool and a vice (2).

**Special tool**  
**(A) : 09921-57810**

- 2) Unstake lock section of counter shaft driven gear lock nut.
- 3) Remove counter shaft driven gear lock nut, using special tool.

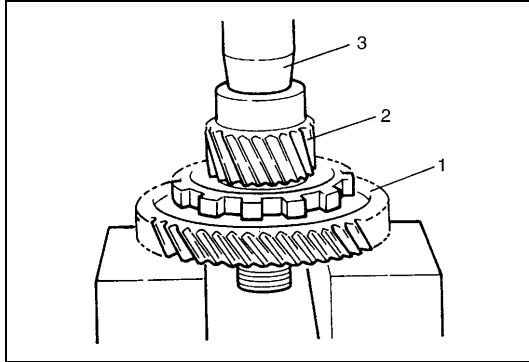
**Special tool**  
**(B) : 09927-76050**

**NOTE:**  
**Do not reuse counter shaft driven gear lock nut once removed.**

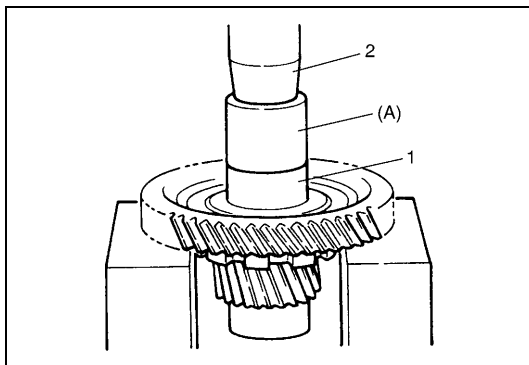


- 4) Remove cylindrical roller bearing inner race (1) by pressing differential drive pinion (2), using hydraulic press (3).

## REASSEMBLY



- 1) Press differential drive pinion (2) to counter driven gear (1), using hydraulic press (3).

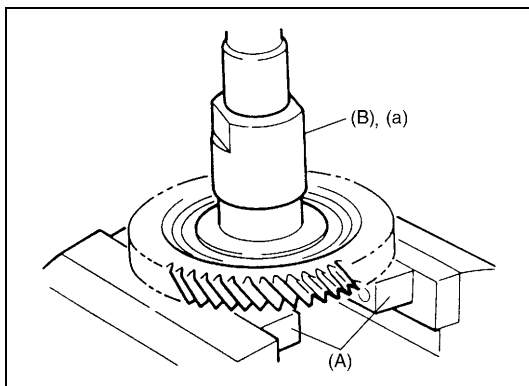


- 2) Apply A/T fluid to inner surface of cylindrical roller bearing inner race.

- 3) Press cylindrical roller bearing inner race (1), using special tool and hydraulic press (2).

### Special tool

(A) : 09951-16060



- 4) Tighten new counter shaft driven gear lock nut, using special tools.

### Special tool

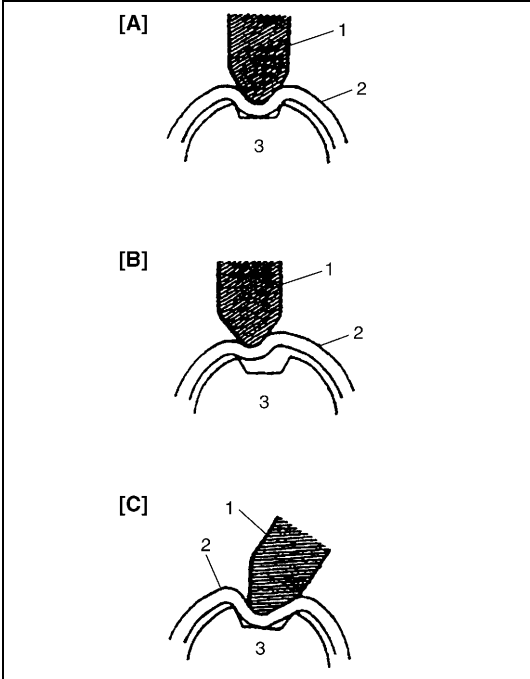
(A) : 09921-57810

(B) : 09927-76050

### Tightening torque

Counter shaft driven gear lock nut

(a) : 160 N·m (16.0 kg-m, 116 lb-ft)

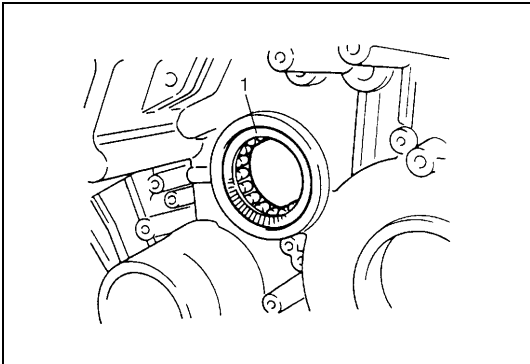


- Stake new counter shaft driven gear lock nut (2), using standard punch in combination with hammer.

**NOTE:**

When staking counter shaft driven gear lock nut (2), point a suitable staking tool (1) toward differential drive pinion shaft (3) axis center and stake lock nut securely, as shown in the figure. (Poor staking may cause abnormal noise.)

[A] :	Correct
[B] :	Wrong
[C] :	Wrong



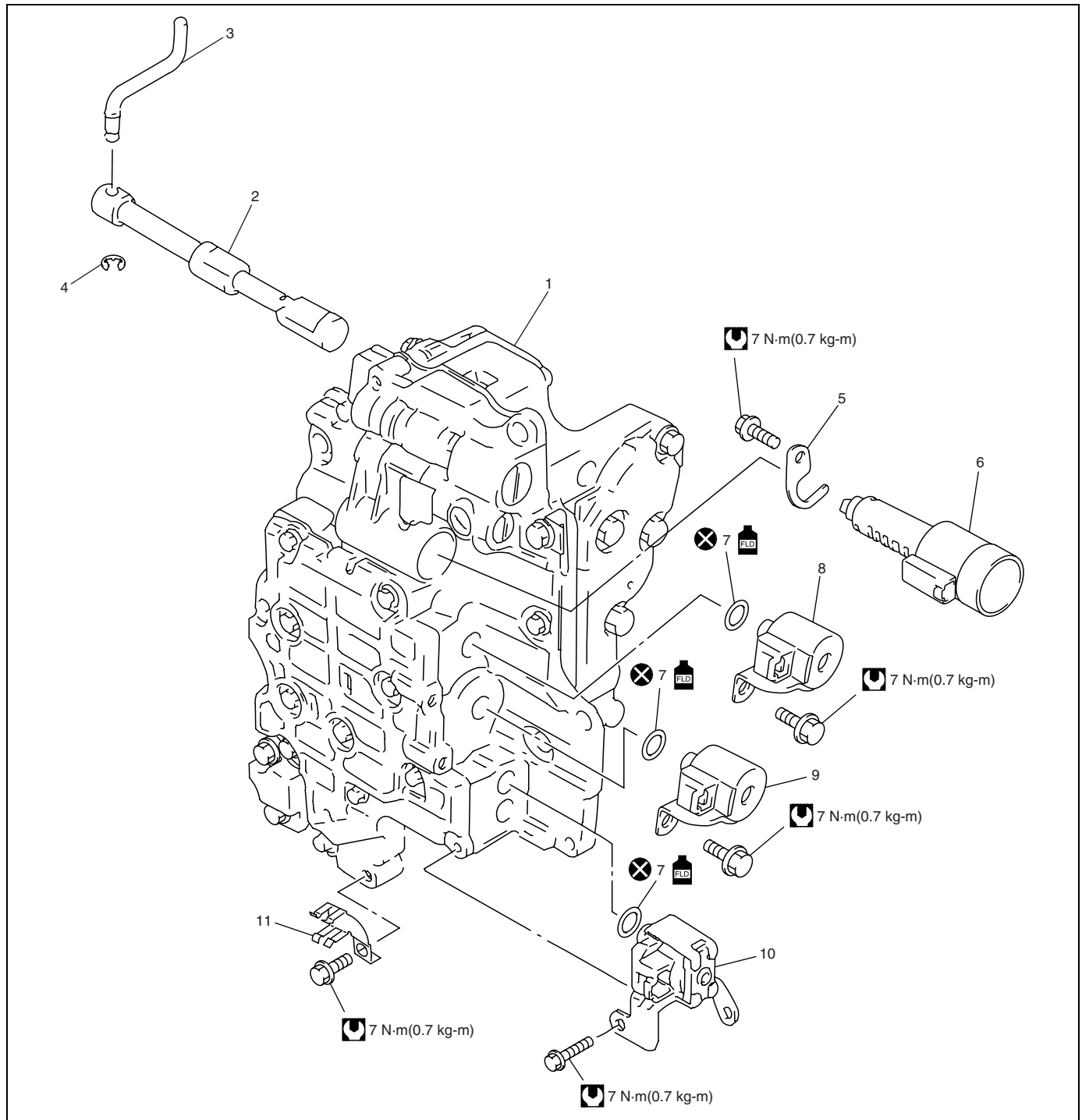
- Apply A/T fluid to counter shaft LH thrust roller bearing (1) and race.

**Counter shaft LH thrust roller bearing dimension**

Outside diameter	66.0 mm (2.60 in.)
Inside diameter	50.0 mm (1.97 in.)
Thickness	2.7 mm (0.11 in.)

- Place counter shaft LH thrust roller bearing (1) and race to transaxle case.
- Apply A/T fluid to counter shaft RH roller bearing race.
- Install counter shaft RH roller bearing race to transaxle housing.

## Valve body assembly



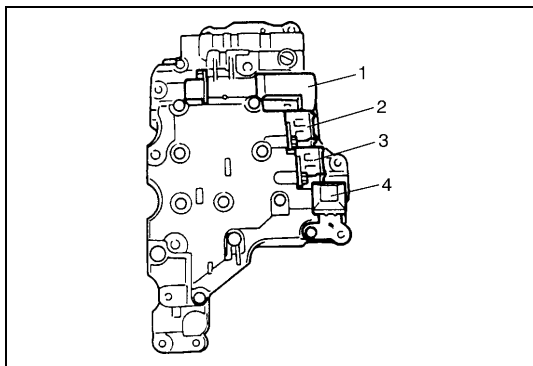
1. Valve body assembly	6. Pressure control solenoid valve	11. Transmission fluid temperature sensor clamp
2. Manual valve	7. O-ring	Apply automatic transaxle fluid.
3. Manual valve rod	8. Shift solenoid valve-A (No.1)	Tightening torque
4. E-ring	9. Shift solenoid valve-B (No.2)	Do not reuse.
5. Pressure control solenoid valve clamp	10. TCC solenoid valve	

### CAUTION:

**When replacing pressure control solenoid valve, it is strictly required to replace it together with valve body assembly as a set.**

**DISASSEMBLY**

- 1) Pull out manual valve.
- 2) Remove solenoid valves by removing bolts.



1. Pressure control solenoid valve
2. Shift solenoid valve-A (No.1)
3. Shift solenoid valve-B (No.2)
4. TCC solenoid valve

**REASSEMBLY**

- 1) Install solenoid valves to valve body and tighten bolts to specified torque.

**Tightening torque****Shift solenoid bolts**

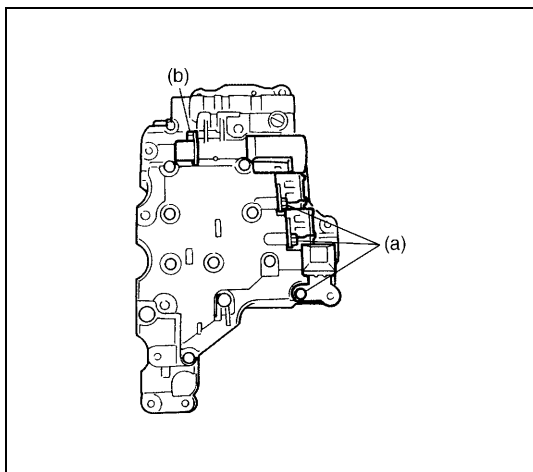
(a): 7.0 N·m (0.7 kg-m, 5.0 lb-ft)

**Pressure control solenoid bolt**

(b): 7.0 N·m (0.7 kg-m, 5.0 lb-ft)

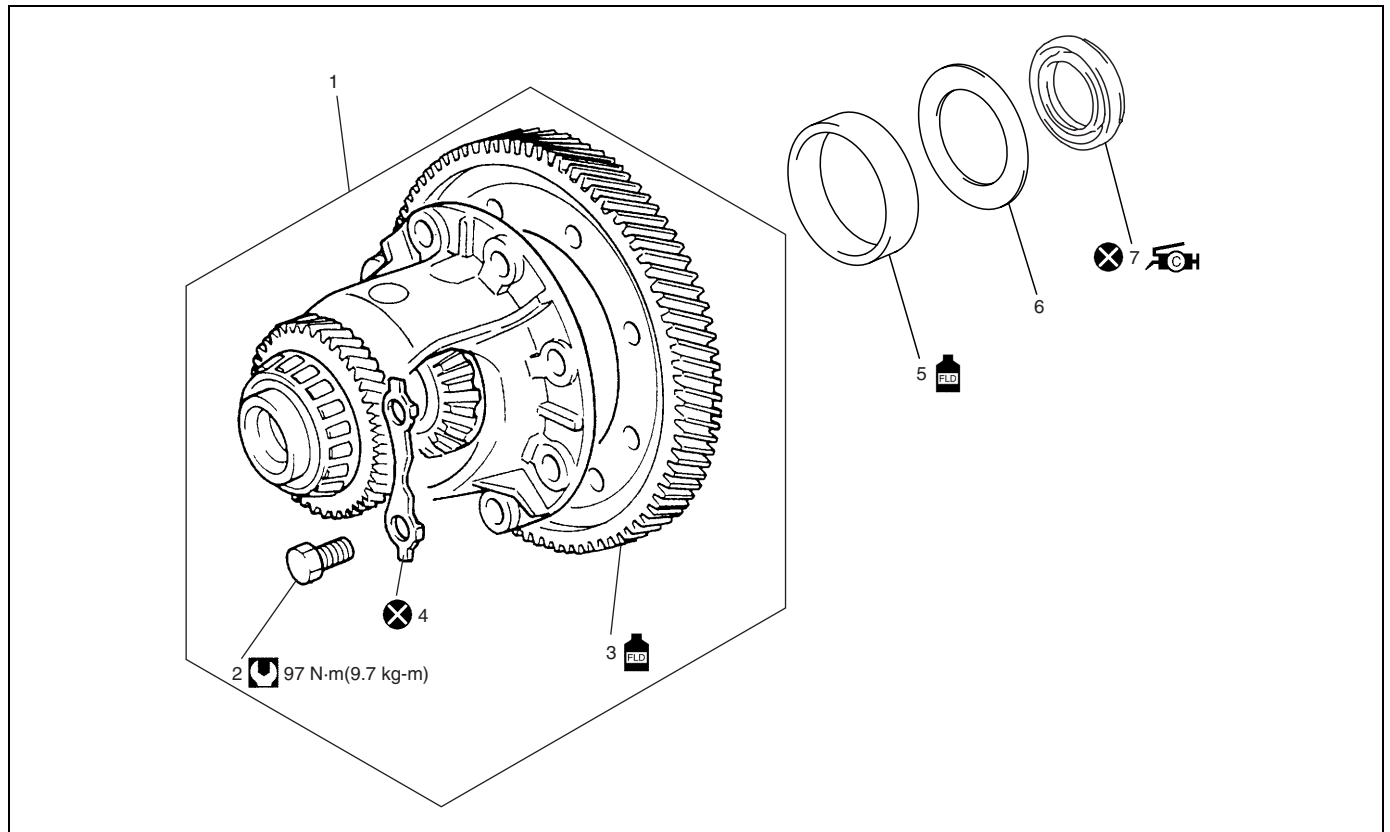
**NOTE:**

- Don't reuse solenoid valve O-rings.
- Shift solenoid valve-A (No.1) and shift solenoid valve-B (No.2) are interchangeable with each other.



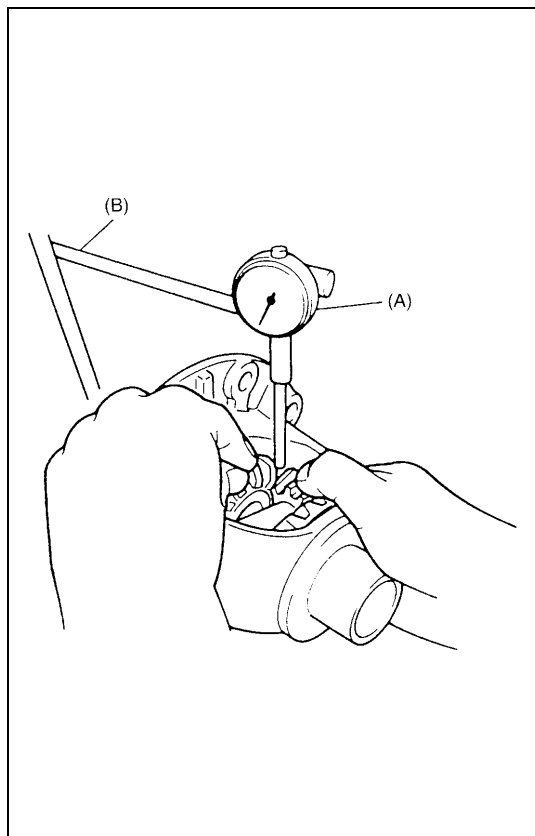
- 2) Install manual shift valve to valve body.

## Differential



1. Differential gear assembly	5. Differential side bearing outer race	Tightening torque
2. Bolt	6. Differential side bearing shim	Do not reuse.
3. Final gear	7. Oil seal : Apply grease 99000-25030 to oil seal lip.	
4. Ring gear set bolt lock plate	Apply automatic transaxle fluid.	

## INSPECTION



- 1) Hold differential assembly with soft jawed vice and set special tools as shown.

### Special tool

(A) : 09900-20606

(B) : 09900-20701

- 2) Measure differential gear thrust play.

### Differential gear thrust play

**Standard: 0.06 - 0.22 mm (0.0024 - 0.0087 in.)**

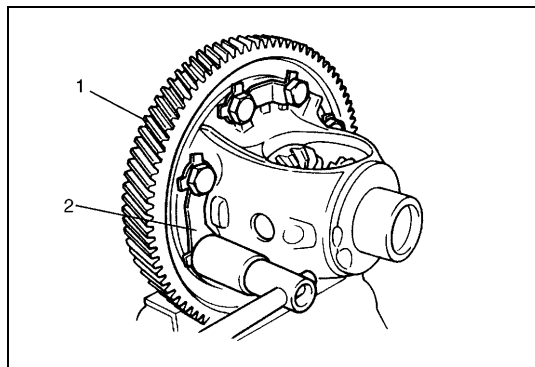
- 3) If thrust play is out of specification, replace thrust washer with other selective washer shown below so as thrust play to be in standard value.

### Available differential gear thrust washer thickness

0.95 mm (0.037 in.)
1.00 mm (0.039 in.)
1.05 mm (0.041 in.)
1.075 mm (0.042 in.)
1.10 mm (0.043 in.)
1.15 mm (0.045 in.)
1.20 mm (0.047 in.)

## REMOVAL

### Final gear



- 1) Unclamp 4 final gear set bolt lock plates (2).
- 2) Remove 8 bolts and 4 final gear set bolt lock plates (2).

### NOTE:

**Don't reuse lock plates.**

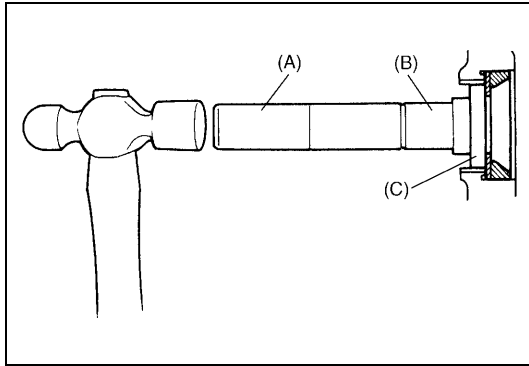
- 3) Remove final gear (1).

### Bearing outer race

- 1) Remove differential side oil seal.

### NOTE:

**Don't reuse removed side oil seal.**



- 2) Drive out taper roller bearing outer race and shim from transaxle case by using special tools or like.

#### Special tool

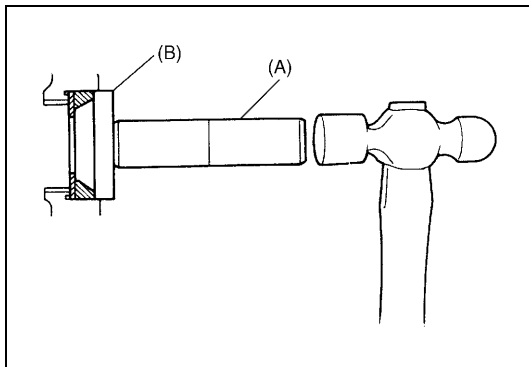
(A) : 09924-74510

(B) : 09924-74590

(C) : 09924-84510-005

### INSTALLATION

#### Bearing outer race



- 1) Install bearing outer race and shim by using special tool and hammer.

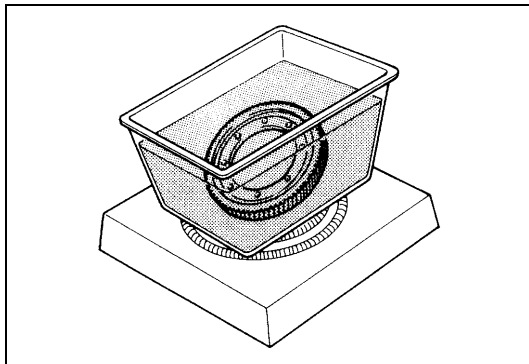
#### Special tool

(A) : 09924-74510

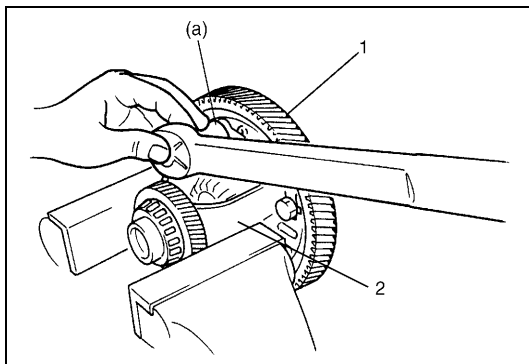
(B) : 09944-68210

### INSTALLATION

#### Final gear



- 1) Heat final gear to about 100°C (212°F) in oil bath.
- 2) Clean mating surfaces of final gear and differential case.



- 3) Install final gear (1) to differential case (2).
- 4) Install new 4 final gear set bolt lock plates and 8 bolts and tighten bolts to specified torque.

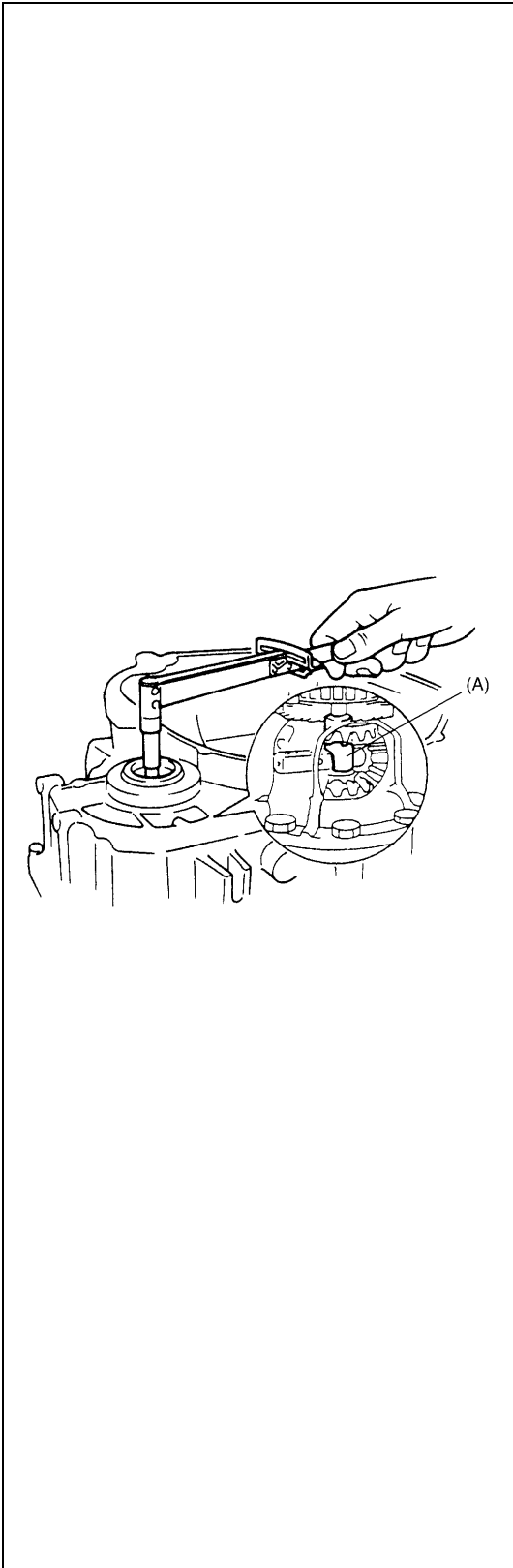
#### Tightening torque

#### Final gear bolts

(a) : 97 N·m (9.7 kg-m, 70.0 lb-ft)

- 5) Clamp bolts with lock plate securely.





- Install differential assembly to transaxle case and tighten case bolts to specified torque.

**Tightening torque**  
**Transaxle housing bolts**  
**: 30 N·m (3.0 kg-m, 22.0 lb-ft)**

- Measure differential assembly starting torque by using special tool.

**Special tool**  
**(A): 09928-06050**

**Starting torque of differential assembly**  
**0.8 – 1.4 N·m (0.08 – 0.14 kg-m, 0.58 – 1.01 lb-ft)**

- NOTE:**
- If starting torque exceeds specified value, reselect shim on both transaxle case and housing.
  - Starting torque changes about 0.3 – 0.4 N·m (0.03 – 0.04 kg-m, 0.22 – 0.29 lb-ft) with each shim thickness.

**Available differential side bearing shim thickness**

Thickness	Identification
2.35 mm (0.093 in.)	A
2.40 mm (0.094 in.)	B
2.45 mm (0.096 in.)	C
2.50 mm (0.098 in.)	D
2.55 mm (0.100 in.)	E
2.60 mm (0.102 in.)	F
2.65 mm (0.104 in.)	G
2.70 mm (0.106 in.)	H
2.75 mm (0.108 in.)	J
2.80 mm (0.110 in.)	K
2.85 mm (0.112 in.)	L
2.90 mm (0.114 in.)	M
2.10 mm (0.083 in.)	Q
2.15 mm (0.085 in.)	R
2.20 mm (0.087 in.)	S
2.25 mm (0.089 in.)	T
2.30 mm (0.091 in.)	U

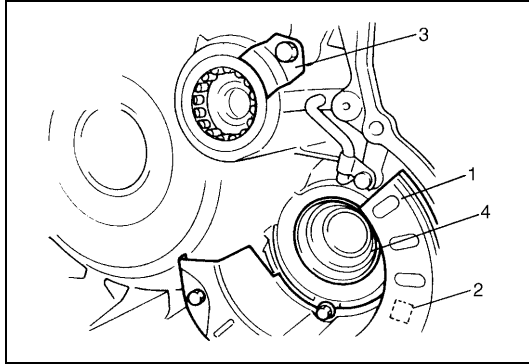
- Apply grease to new differential side oil seal lip.

**Grease 99000-25030**

- Install differential side oil seal.

## Transaxle housing

### REMOVAL

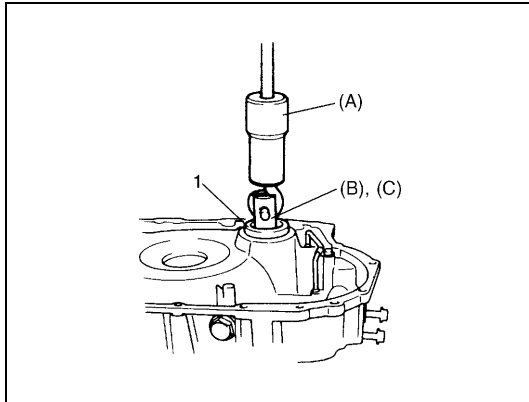


- 1) Remove oil seal (4).

#### NOTE:

**Never reuse removed oil seal.**

- 2) Remove oil reservoir plate (1) with three magnets (2) by removing bolts.
- 3) Remove cylindrical roller bearing retainer (3) by removing bolt.



- 4) Remove counter shaft RH cylindrical roller bearing (1), using special tools.

#### Special tool

**(A) : 09942-15511**

**(B) : 09941-54911 (remover)**

**(C) : 09921-26010 (coller)**

#### NOTE:

**Never reuse removed cylindrical roller bearing.**

- 5) Remove counter shaft RH thrust roller bearing.

### INSPECTION

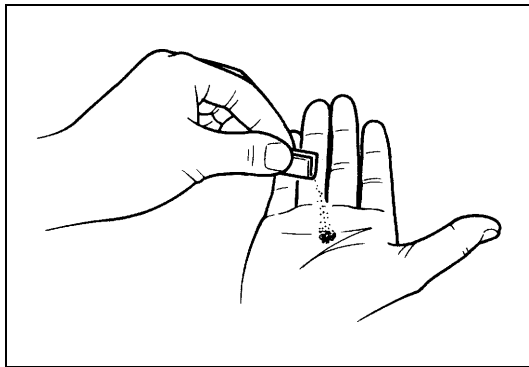
Check pan for particles.

Remove magnets and use them to collect any chips.

Inspect oil reservoir plate for any chips and particle collected on magnet.

Inspect them carefully to find out the type of wear on transaxle.

- Steel (magnetic).....Wear of bearing, gear and plate
- Brass (nonmagnetic).....Wear of bush



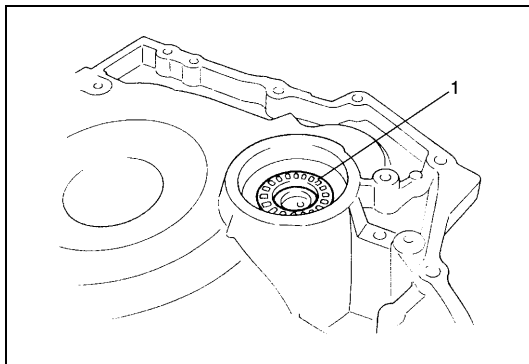
### INSTALLATION

- 1) Apply A/T fluid to counter shaft RH thrust roller bearing (1).

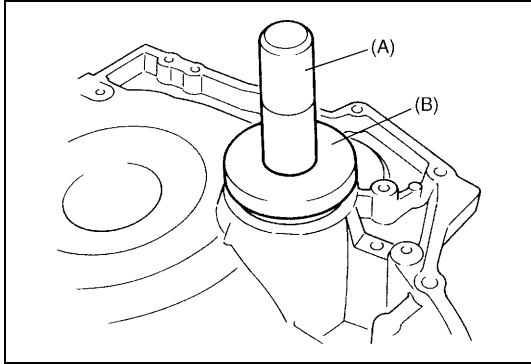
#### Counter shaft RH thrust roller bearing dimension

<b>Outside diameter</b>	<b>46.0 mm (1.81 in.)</b>
<b>Inside diameter</b>	<b>32.5 mm (1.28 in.)</b>
<b>Thickness</b>	<b>3.2 mm (0.13 in.)</b>

- 2) Install counter shaft RH thrust roller bearing (1) to transaxle housing.



- 3) Apply A/T fluid to outer surface of cylindrical roller bearing.

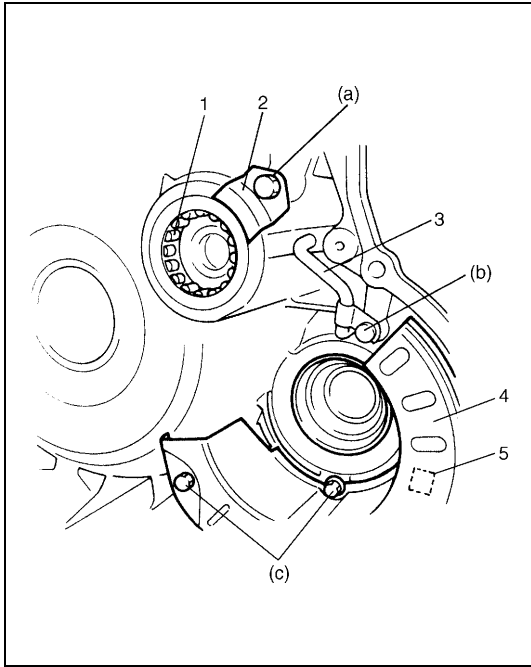


- 4) Tap cylindrical roller bearing, using special tools.

**Special tool**

(A) : 09924-74510

(B) : 09944-88210



- 5) Tighten cylindrical roller bearing retainer (2) with bolt.

**Tightening torque**

**Cylindrical roller bearing retainer bolt**

(a) : 13 N·m (1.3 kg-m, 9.5 lb-ft)

- 6) Install transaxle lubrication tube (3) and clamp.

- 7) Tighten them with bolt.

**Tightening torque**

**Lubrication tube clamp bolts**

(b) : 5.5 N·m (0.55 kg-m, 4.0 lb-ft)

- 8) Tighten oil reservoir plate (4) (with three magnets (5) installed) with bolts.

**Tightening torque**

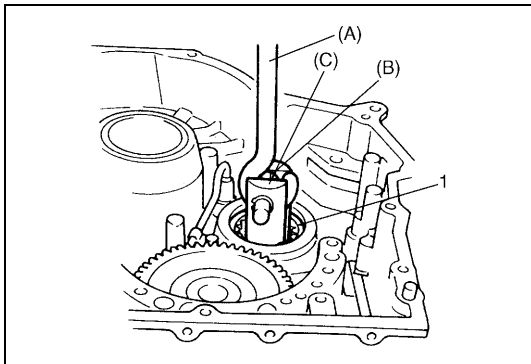
**Oil reservoir plate bolts**

(c) : 5.5 N·m 0.55 kg-m, 4.0 lb-ft)

1. Cylindrical roller bearing

## Transaxle case

### REMOVAL



- 1) Remove counter shaft LH cylindrical roller bearing (1), using special tools.

**Special tool**

(A) : 09942-15511

(B) : 09941-54911 (remover)

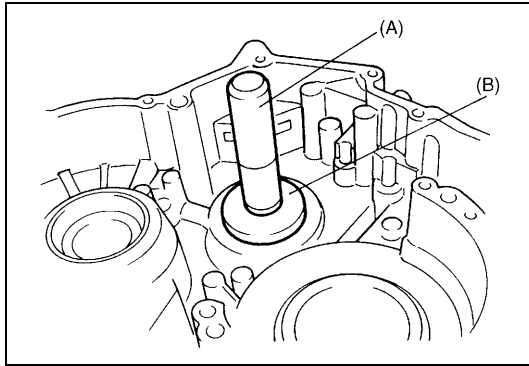
(C) : 09921-26010 (coller)

**NOTE:**

**Never reuse removed cylindrical roller bearing.**

### INSTALLATION

- 1) Apply A/T fluid to outer surface of cylindrical roller bearing.



- 2) Tap cylindrical roller bearing, using special tools.

**Special tool**

(A) : 09924-74510

(B) : 09944-88210

## Unit Assembly

- 1) Apply lithium grease to new oil seal lip.

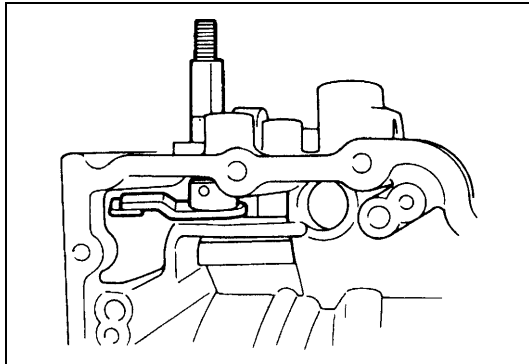
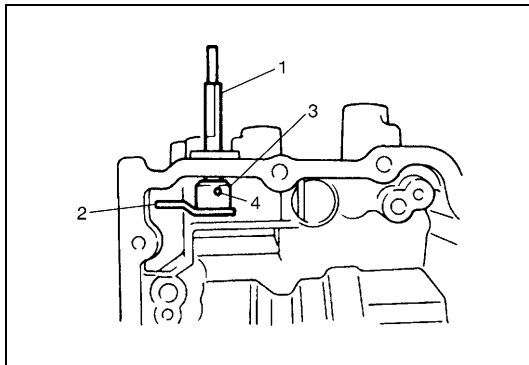
**Grease 99000-25030**

- 2) Install new oil seal to transaxle case.

- 3) Insert manual valve lever shaft (1) to transaxle case.

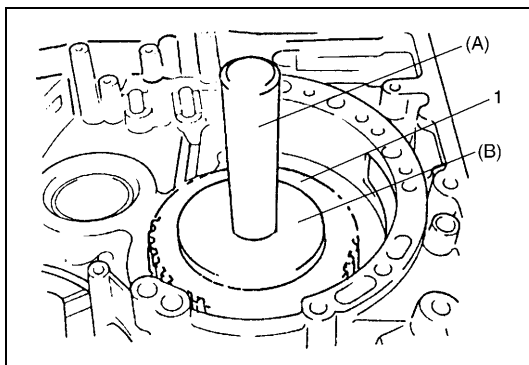
- 4) Install new spacer (3) and manual valve lever (2) to manual valve lever shaft (1).

- 5) Install new slotted spring pin (4).



- 6) Rotate new spacer approximately 180 degrees.

- 7) Stake small hole of new spacer.

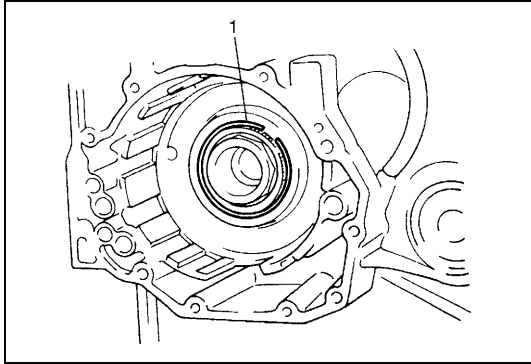


- 8) Press counter drive gear (1), using special tools.

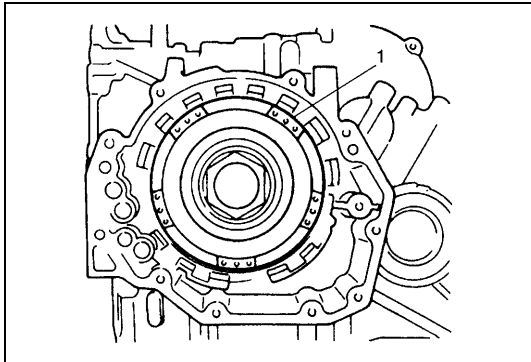
**Special tool**

(A) : 09924-74510

(B) : 09926-68310



9) Install new snap ring (1) to angular ball bearing.

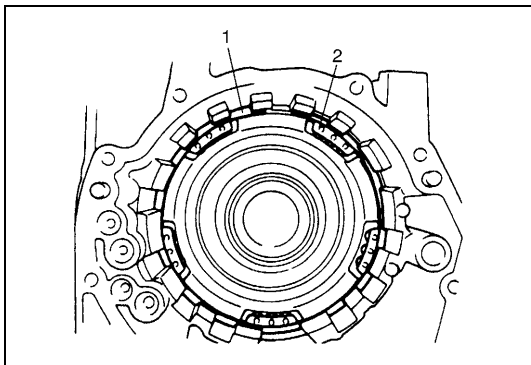


10) Apply A/T fluid to new O-rings.

11) Place 1st and reverse brake piston (1) with O-rings installed.

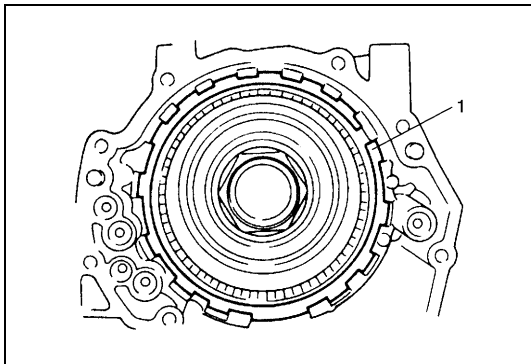
**NOTE:**

**Be careful not to damage O-rings during piston installation.**



12) Mount 1st and reverse brake piston return spring (2).

13) Install retainer ring (1) by compressing brake piston return spring with flat end rod or the like.



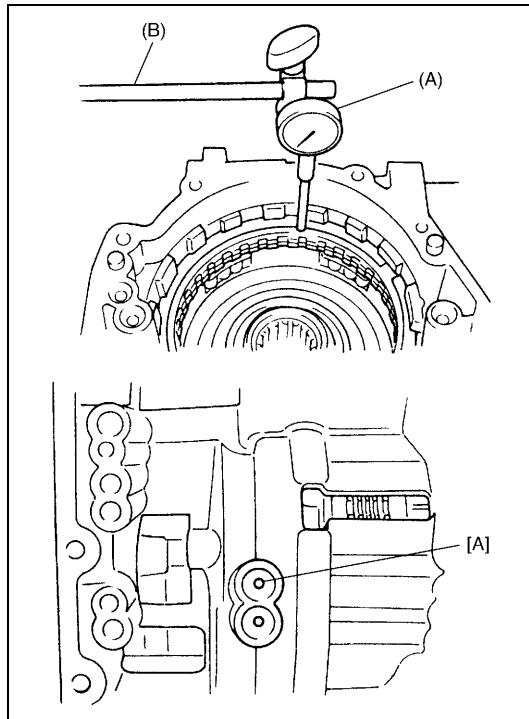
14) Install separator plates "S", friction plates "F" and retaining plate "R" in the following order.

S → F → S → F → S → F → S → F → R

15) Install snap ring (1).

**NOTE:**

**Make sure that opening end of snap ring should be aligned with protrusion of transaxle case.**



16) Install special tools on transaxle.

**Special tool**

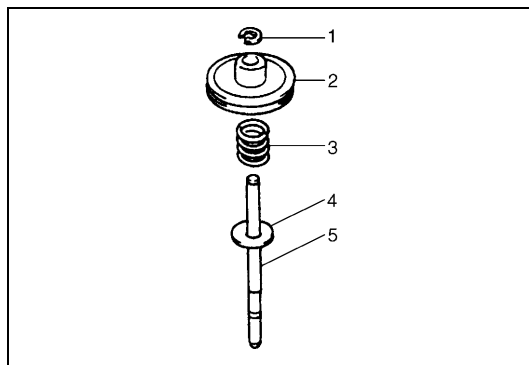
**(A) : 09900-20606**

**(B) : 09900-20701**

Measure 1st and reverse brake piston stroke by applying and releasing compressed air (400 – 800 kPa, 4 – 8 kg/cm<sup>2</sup>, 57 – 113 psi) through oil hole section [A].

**1st and reverse brake piston stroke**

**Standard: 1.40 – 2.20 mm (0.055 – 0.087 in.)**

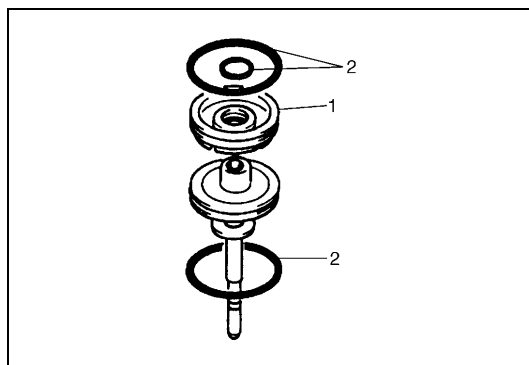


17) Place compression spring for 2nd and 4th brake into transaxle case.

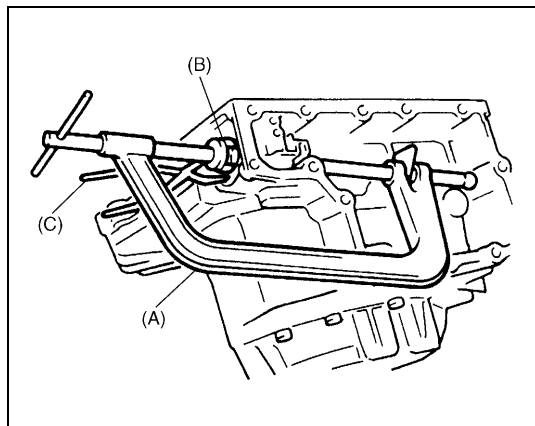
18) Apply A/T fluid to new O-rings.

19) Assemble 2nd and 4th brake piston assembly.

- a) Install rod washer (4), spring (3), brake piston (2) and new E-ring (1) to brake piston rod (5).



- b) Install brake inner cover (1) and new O-rings (2).



- 20) Put 2nd and 4th brake piston spring in transaxle case and insert piston assembly and brake inner cover into case.  
 21) Apply valve lifter as shown figure and push piston cover.

**Special tool**

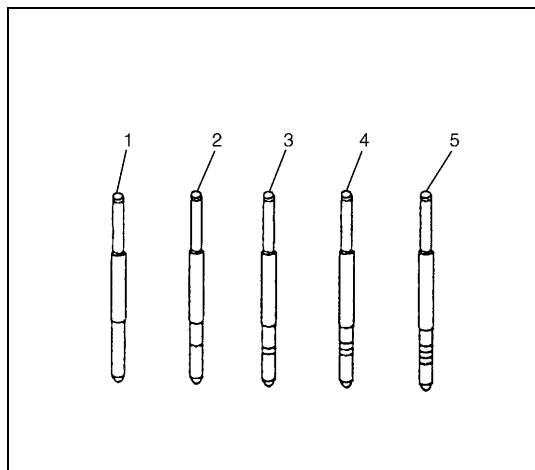
(A) : 09916-14510

(B) : 09916-48210

- 22) Install snap ring by using snap ring plier (special tool) and remove special tools (A) and (B).

**Special tool**

(C) : 09900-06108



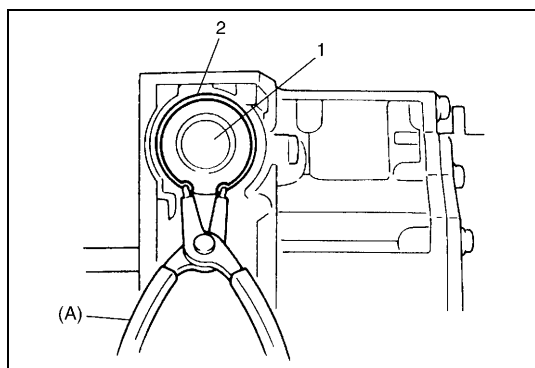
- 23) Check 2nd and 4th brake piston stroke.

For detail, refer to "Unit Disassembly" in this section.

If its stroke is out of specification, select proper piston rod of 5 type instead of original one and reinstall 2nd and 4th brake piston assembly so as to be within specification.

**Available piston rod length**

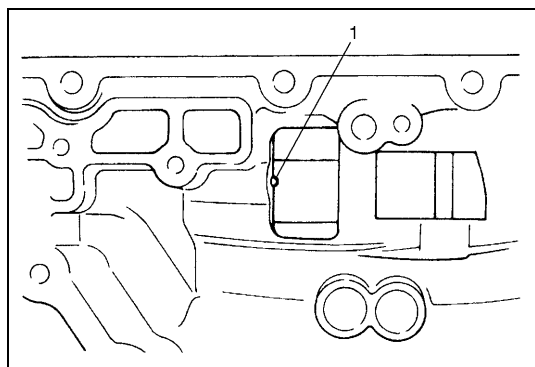
(1)	122.35 mm (4.817 in.)
(2)	122.60 mm (4.827 in.)
(3)	122.85 mm (4.837 in.)
(4)	123.10 mm (4.846 in.)
(5)	123.35 mm (4.856 in.)



- 24) Install brake cover (1) to transaxle case with snap ring (2), using snap ring plier.

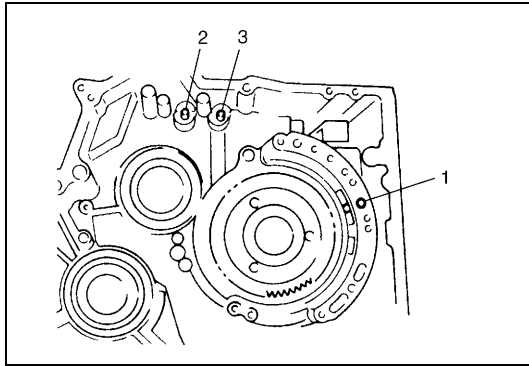
**Special tool**

(A): 09900-06108 (Snap ring plier)



**NOTE:**

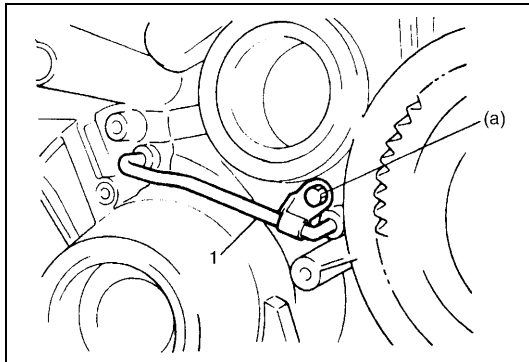
It is best for the head section of piston rod (1) to protrude from the inner side of transaxle case approx. 2 – 3 mm (0.079 – 0.118 in.)



- 25) Apply A/T fluid to outer surface of three pins (1, 2, 3).  
 26) Insert three pins to transaxle case.

#### Pin Dimension

	(1)	(2)	(3)
Outer diameter	8.0 mm (0.31 in.)	10.0 mm (0.39 in.)	12.0 mm (0.47 in.)
Length	45.0 mm (1.77 in.)	33.7 mm (1.33 in.)	45.9 mm (1.81 in.)

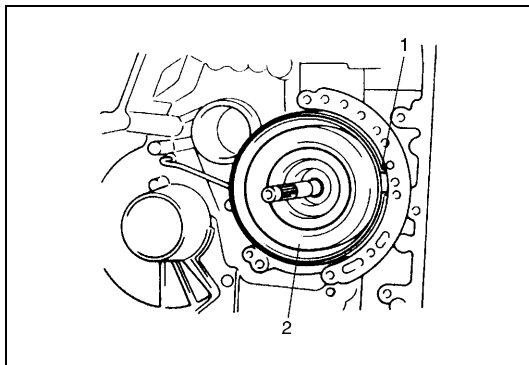


- 27) Apply A/T fluid to transaxle lubrication tube (1).  
 28) Install transaxle lubrication tube (1).  
 29) Tighten clamp with bolt.

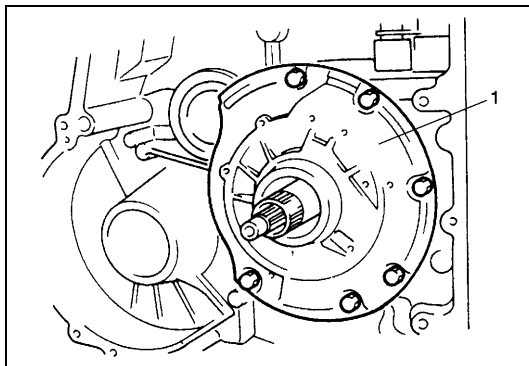
#### Tightening torque

#### Lubrication tube clamp bolt

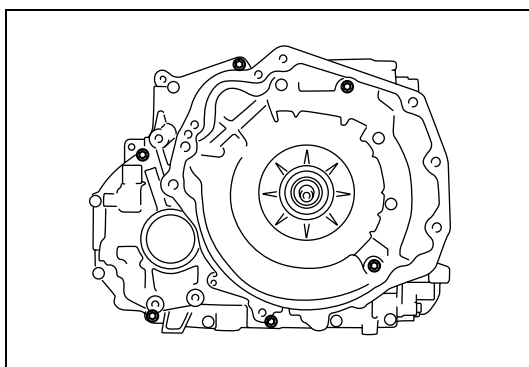
(a) : 5.5 N·m (0.55 kg-m, 4.0 lb-ft)



- 30) Install 2nd and 4th brake band (1).  
 31) Install 1st and reverse clutch assembly (2).

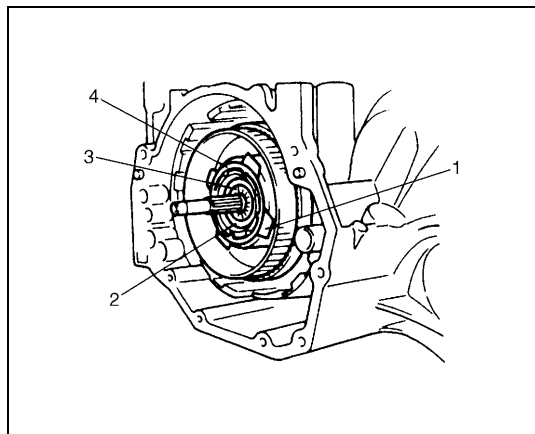


- 32) Temporarily tighten bolts of oil pump body (1).



- 33) Temporarily tighten transaxle housing to transaxle case with 5 – 6 bolts.  
 34) Stand transaxle up (i.e.: transaxle housing facing downward).



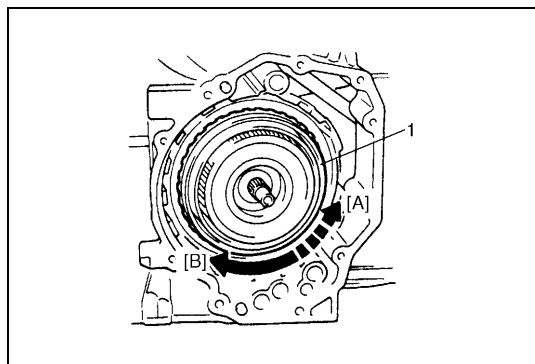


- 35) Install front and rear planetary carrier (1) while rotating counter-clockwise and clockwise.  
 36) Install sun gear (2) with sun gear thrust roller bearing (3).

#### Sun gear thrust roller bearing dimension

Outside diameter	32.5 mm (1.28 in.)
Inside diameter	18.8 mm (0.74 in.)
Thickness	2.7 mm (0.11 in.)

- 37) Apply A/T fluid to carrier rear thrust roller bearing race (4).  
 38) Install carrier rear thrust roller bearing race (4) to planetary carrier.

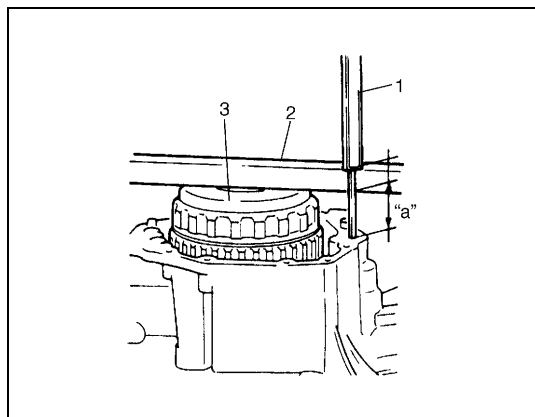


- 39) Install overdrive/coast clutch assembly (1) while rotating counterclockwise and clockwise.

#### NOTE:

**Make sure that overdrive/coast clutch assembly locks when turned counterclockwise [A] and moves freely when turned clockwise [B].**

- 40) Install forward clutch assembly while rotating.



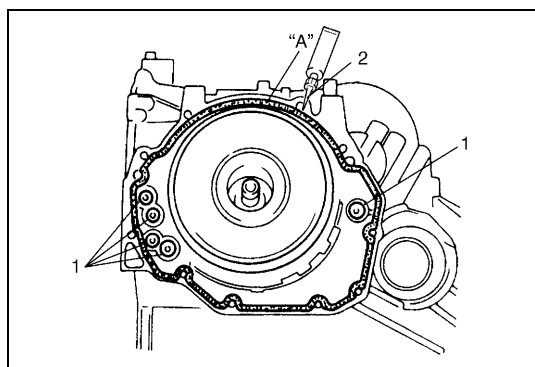
- 41) Check for correct installation of each component parts as follows.

Measure the distance "a" by using vernier (1) and straight-edge (2). If out of specification, remove forward clutch, overdrive/coast clutch, front and rear planetary carrier and reinstall them properly.

#### Distance between forward clutch drum and mating surface of transaxle case

"a" : 46.94 – 47.81 mm (1.848 – 1.882 in.)

3. Forward clutch drum



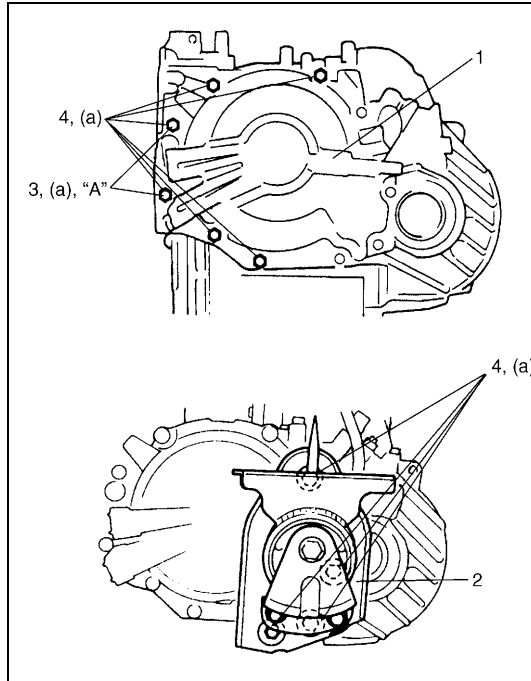
- 42) Apply sealant to mating surface of transaxle case by using a nozzle (2) as shown in figure by such amount that its section is 1.5 mm (0.059 in) in diameter.

"A" : Sealant 99000-31230

- 43) Install five gaskets (1).

#### NOTE:

**There is no installation direction for new gaskets.**



44) Apply sealant to thread parts of 2 bolts (3).

**“A” : Sealant 99000-31230**

45) Tighten transaxle rear cover (1) and engine mounting LH bracket (2) with ten bolts (3, 4).

#### **Tightening torque**

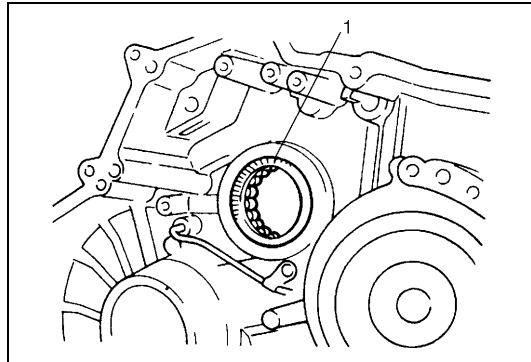
##### **Transaxle rear cover bolts**

**(a) : 25 N·m (2.5 kg-m, 18.0 lb-ft)**

46) Turn over transaxle.

47) Remove transaxle housing.

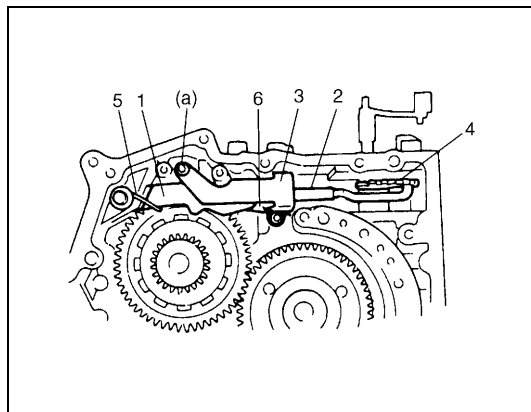
48) Remove oil pump body, reverse clutch assembly and 2nd and 4th brake band from transaxle case.



49) Apply A/T fluid to counter shaft LH thrust roller bearing (1).

#### **Counter shaft LH thrust roller bearing dimension**

<b>Outside diameter</b>	<b>66.0 mm (2.60 in.)</b>
<b>Inside diameter</b>	<b>50.0 mm (1.97 in.)</b>
<b>Thickness</b>	<b>2.7 mm (0.11 in.)</b>



50) Install counter driven gear.

51) Install parking lock rod (2) with parking lock pawl (1), parking lock pawl bracket (3) and torsion spring (5).

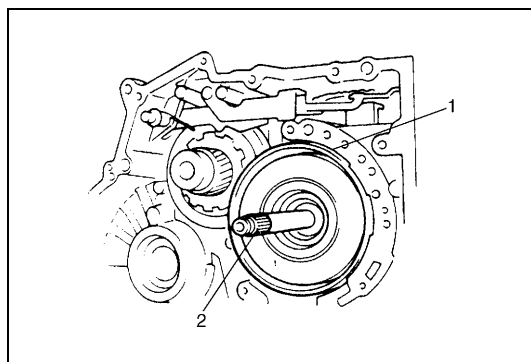
52) With spacer and torsion spring (6) placed, install bolt and tighten parking lock pawl bracket (3).

#### **Tightening torque**

##### **Parking lock pawl bracket bolts**

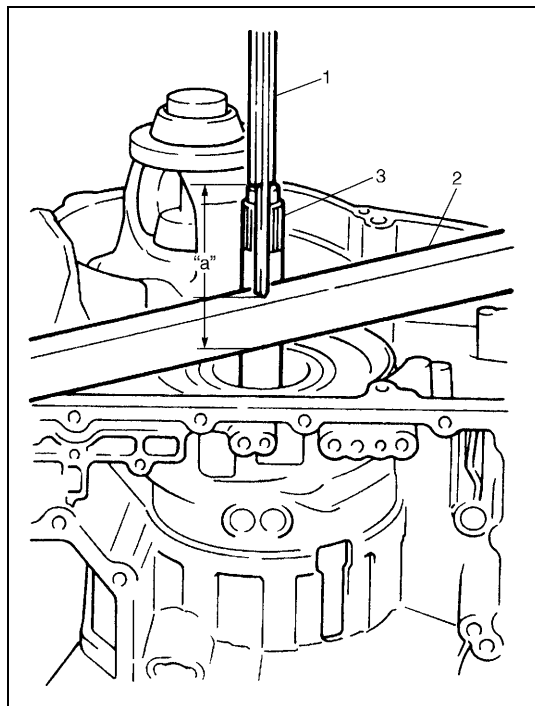
**(a) : 10 N·m (1.0 kg-m, 7.5 lb-ft)**

53) Insert parking lock rod (2) to parking lock pawl bracket (3) and connect parking lock rod (2) with manual valve lever (4).



54) Install 2nd and 4th brake band (1).

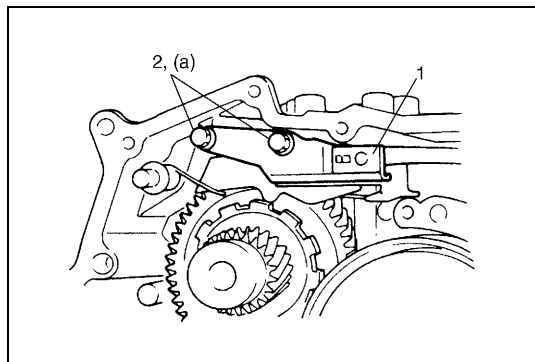
55) Install reverse clutch assembly (2) while rotating counter-clockwise and clockwise.



- 56) Check for correct installation of input shaft as follows.  
Measure the distance "a" by using vernier (1) and straight-edge (2). If out of specification, remove input shaft (3) with reverse clutch assembly and reinstall them properly.

**Distance between input shaft end and mating surface of transaxle case**

"a" : 85.65 – 86.39 mm (3.372 – 3.401 in.)



- 57) Tighten manual detent spring (1) with bolts (2).

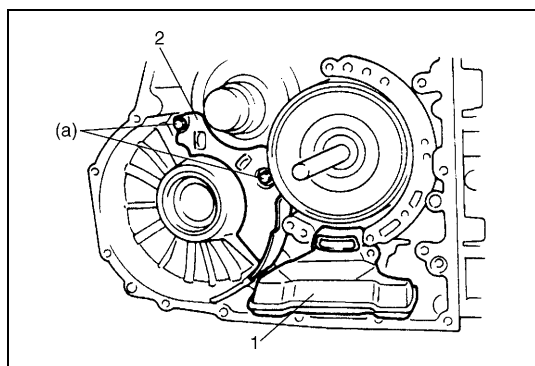
**Tightening torque**

**Manual detent spring bolts**

(a): 10 N·m (1.0 kg-m, 7.5 lb-ft)

**NOTE:**

It is recommended to set to neutral position between spring detent and lever manual valve and then tighten bolts.



- 58) Install oil strainer (1).

**NOTE:**

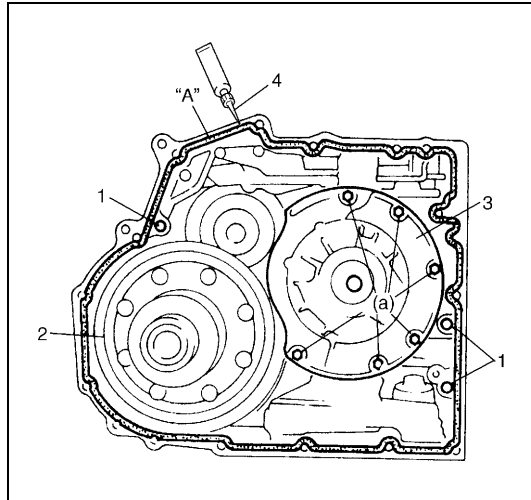
**When overhauling automatic transaxle, replace oil strainer.**

- 59) Tighten oil reservoir plate (2) with bolts.

**Tightening torque**

**Oil reservoir plate bolts**

(a) : 5.5 N·m (0.55 kg-m, 4.0 lb-ft)



- 60) Install three new gaskets (1).
- 61) Install differential gear assembly (2).
- 62) Tighten oil pump body (3) with six bolts.

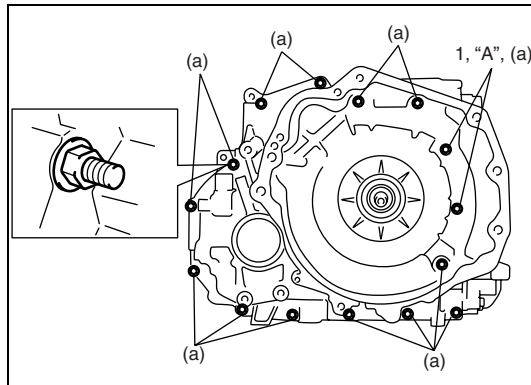
#### **Tightening torque**

##### **Oil pump body bolts**

**(a) : 30 N·m (3.0 kg-m, 22.0 lb-ft)**

- 63) Wipe off and clean mating surface between case and housing.
- 64) Apply sealant to transaxle case by using a nozzle (4) as shown in figure by such amount that its section is 1.5 mm (0.059 in) in diameter.

**“A” : Sealant 99000-31230**



- 65) Apply sealant to thread parts of 2 bolts (1).

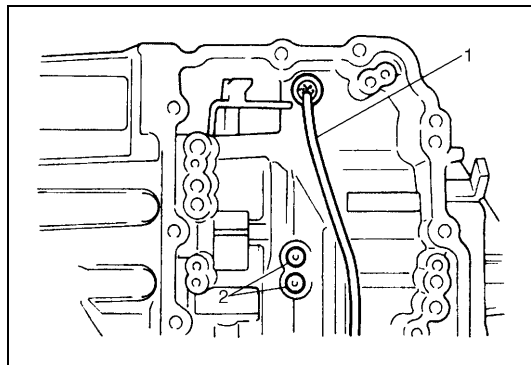
**“A” : Sealant 99000-31230**

- 66) Install transaxle housing to transaxle case by tightening bolts to specified torque.

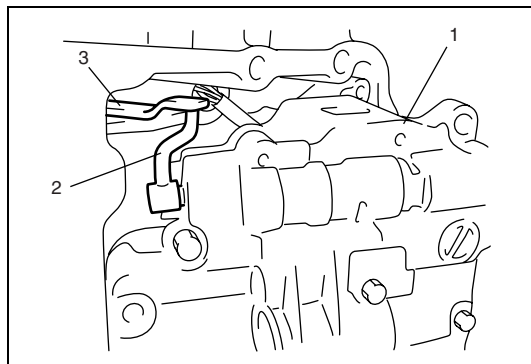
#### **Tightening torque**

##### **Transaxle case bolts**

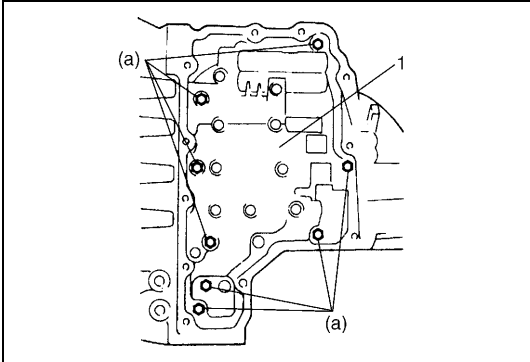
**(a) : 30 N·m (3.0 kg-m, 22.0 lb-ft)**



- 67) Insert wiring harness (1) of valve body connectors.
- 68) Apply A/T fluid to 2 new gaskets (2) and place them as shown in figure.



- 69) While holding valve body assembly (1), connect manual valve rod (2) to manual valve lever (3).

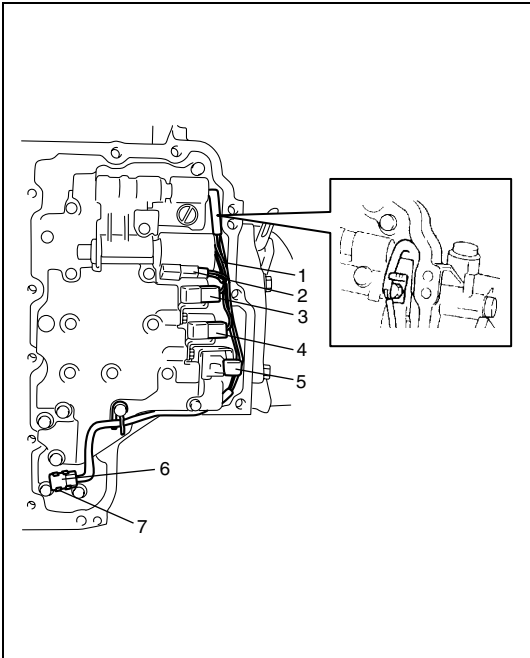


70) Tighten valve body assembly (1) with bolts.

**Tightening torque**

**Valve body bolts**

(a) : 10 N-m (1.0 kg-m, 7.5 lb-ft)



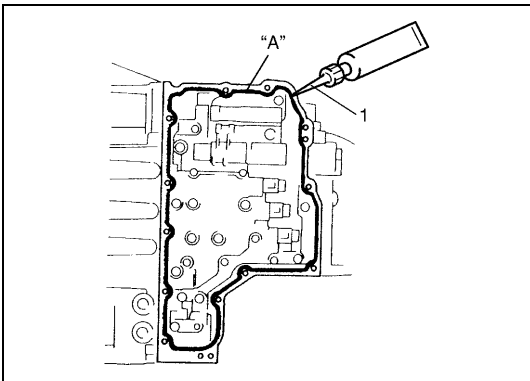
71) Clamp wiring harness (1) of solenoids and transmission fluid temperature sensor.

72) Connect couplers of solenoids by identifying wire color shown below and install transmission fluid temperature sensor (6) to its clamp (7).

Solenoid Coupler	Wire Color
Pressure control solenoid valve (2)	Pink + Brown
Shift solenoid valve-A (No.1) (3)	White
Shift solenoid valve-B (No.2) (4)	Black
TCC solenoid valve (5)	Yellow

**NOTE:**

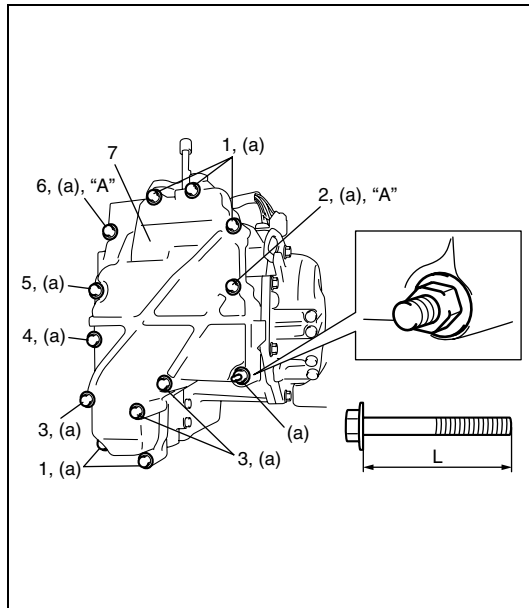
**There is an interchangeability between shift solenoid valve-A and shift solenoid valve-B for installation.**



73) Wipe off and clean mating surface between case and side cover.

74) Apply sealant to transaxle case by using a nozzle (1) as shown in figure by such amount that its section is 1.5 mm (0.059 in) in diameter.

**“A” : Sealant 99000-31230**



75) Apply sealant to thread parts of 2 bolts (2, 6).

**“A” : Sealant 99000-31230**

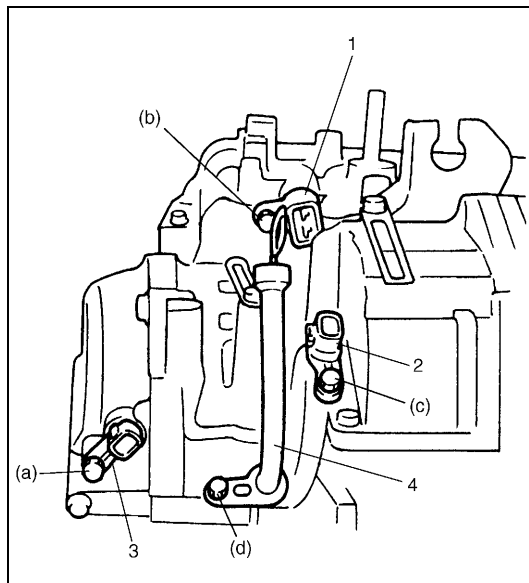
76) Install transaxle side cover (7) with bolts referring to length table shown below.

Bolt	Length “L”
(1)	38 mm (1.50 in.)
(2)	60 mm (2.36 in.)
(3)	72 mm (2.83 in.)
(4)	60 mm (2.36 in.)
(5)	55 mm (2.17 in.)
(6)	25 mm (0.98 in.)

**Tightening torque**

**Transaxle side cover bolts**

**(a) : 24 N·m (2.4 kg-m, 17.5 lb-ft)**



77) Install the following parts (with new O-rings installed) with bolts.

- Valve body connector (1)
- Output shaft speed sensor (2)
- Input shaft speed sensor (3)
- Fluid filler tube (4)

**Tightening torque**

**Input shaft speed sensor bolt**

**(a) : 5.5 N·m (0.55 kg-m, 4.0 lb-ft)**

**Valve body connector bolt**

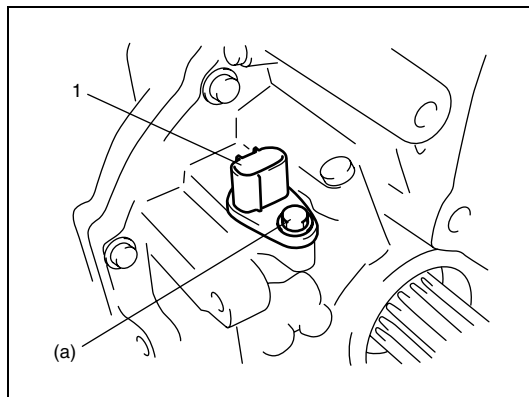
**(b) : 7.0 N·m (0.7 kg-m, 5.0 lb-ft)**

**Output shaft speed sensor bolt**

**(c) : 5.5 N·m (0.55 kg-m, 4.0 lb-ft)**

**Fluid filler tube bolt**

**(d) : 5.5 N·m (0.55 kg-m, 4.0 lb-ft)**



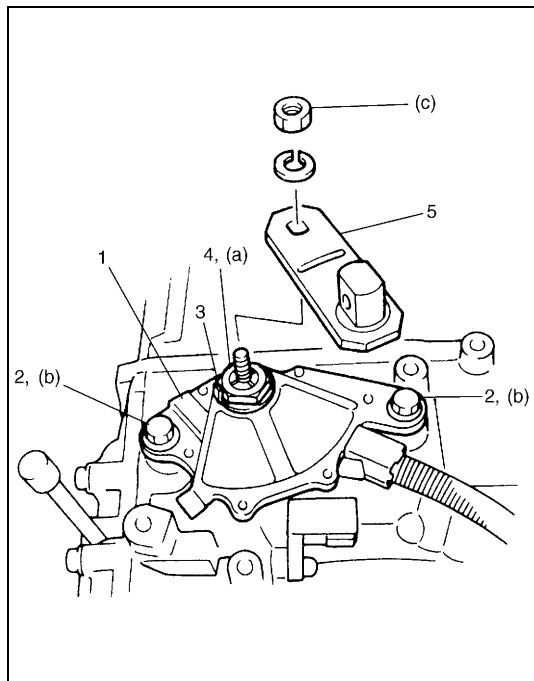
78) Apply A/T fluid to new O-ring.

79) Install vehicle speed sensor (with new O-ring installed) (1) with bolt.

**Tightening torque**

**Vehicle speed sensor bolt**

**(a) : 7.0 N·m (0.7 kg-m, 5.0 lb-ft)**



80) Install transmission range sensor assembly.

- a) Place new rubber plate and new lock washer (3) or transmission range sensor (1).
- b) Tighten transmission range sensor lock nut (4).

**Tightening torque**

**Transmission range sensor lock nut**

(a) : 7.0 N·m (0.7 kg-m, 5.0 lb-ft)

- c) Adjust transmission range sensor (1).
- d) Tighten transmission range sensor bolts (2).

**Tightening torque**

**Transmission range sensor bolts**

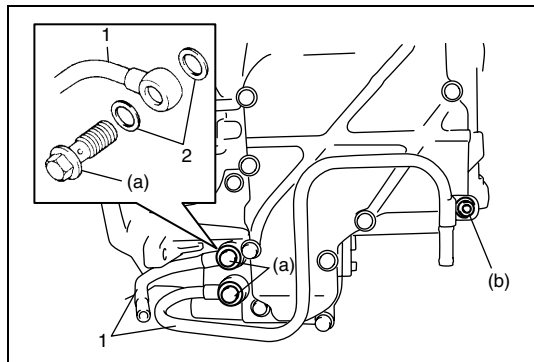
(b) : 25 N·m (2.5 kg-m, 18.0 lb-ft)

- e) Install manual shift lever (5) with spring washer and nut.

**Tightening torque**

**Manual lever nut**

(c) : 13 N·m (1.3 kg-m, 9.5 lb-ft)



81) Install oil cooler pipes (1).

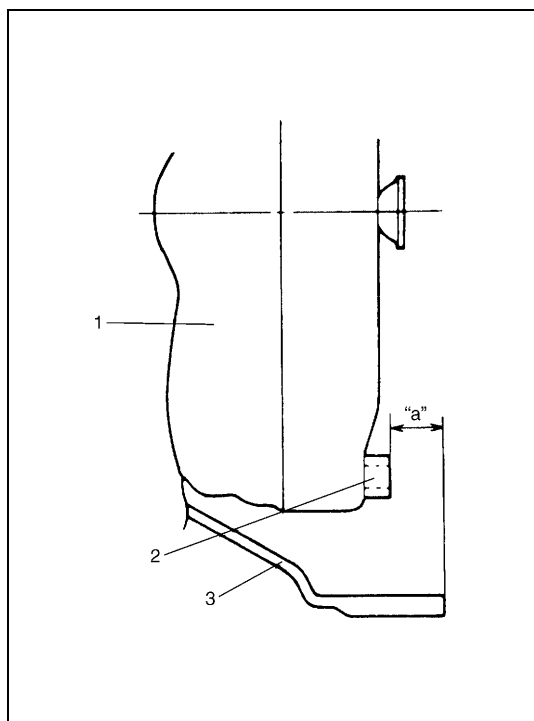
**Tightening torque**

**A/T fluid pipe union bolts (a) : 27 N·m (2.7 kg-m, 19.5 lb-ft)**

**A/T fluid pipe nut (b) : 18 N·m (1.8 kg-m, 13.0 lb-ft)**

**NOTE:**

**Make sure to use new gaskets (2) for A/T fluid pipe union bolts.**



82) Install torque converter (1) to input shaft.

- a) Install torque converter (1), using care not to damage oil seal of oil pump.
- b) After installing torque converter (1), check that distance "a" is within specification.

**Distance between torque converter and mating surface of transaxle housing (3)**

**"a" : More than 19.9 mm (0.783 in.)**

- c) Check torque converter (1) for smooth rotation.

**CAUTION:**

- Before installing converter, make sure that its pump hub portion is free from nicks, burrs or damage which may cause oil seal to leak.
- Be very careful not to drop converter on oil pump gear. Damage in gear, should it occur, may cause a critical trouble.

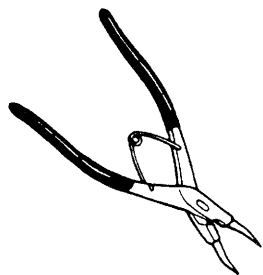
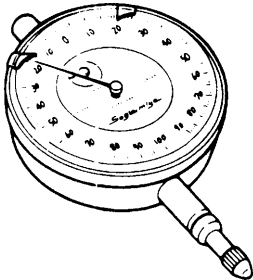
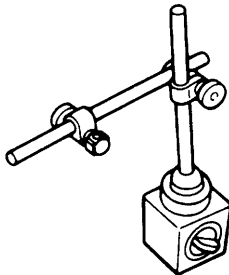
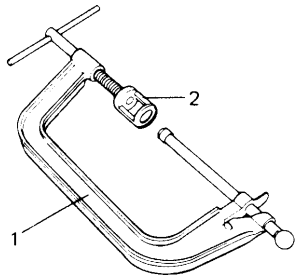

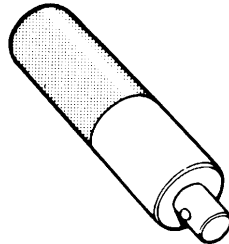
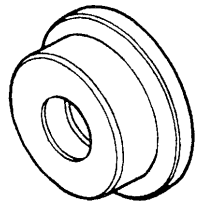
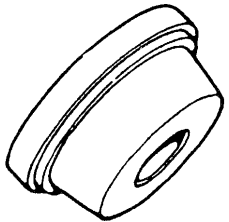
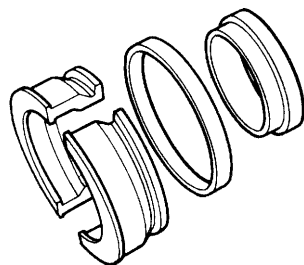
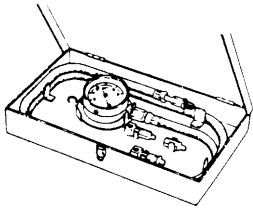
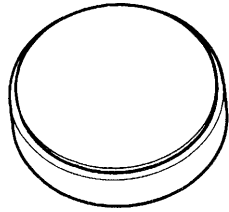
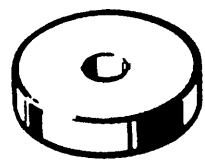
2. Flange nut

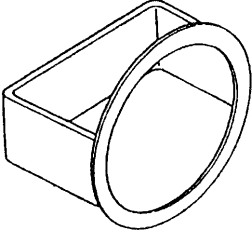
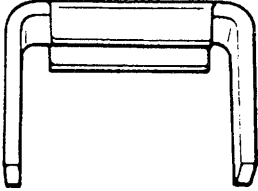
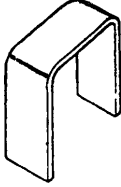
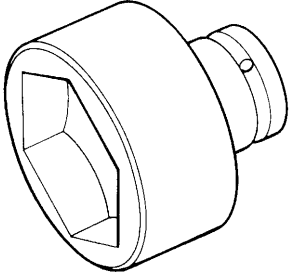
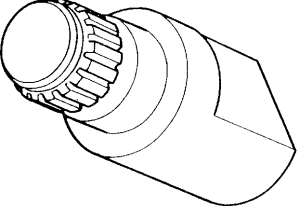
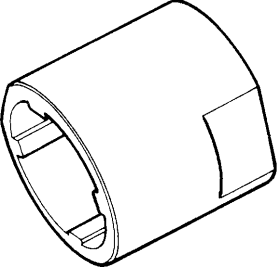
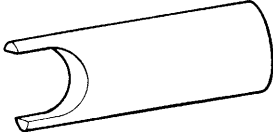
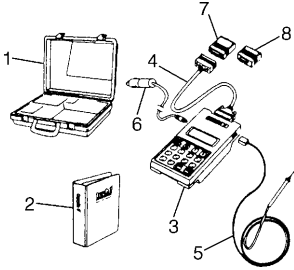
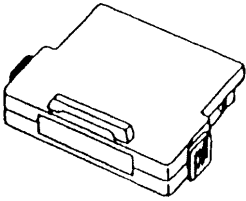
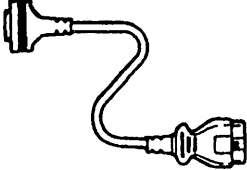
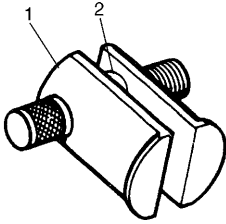
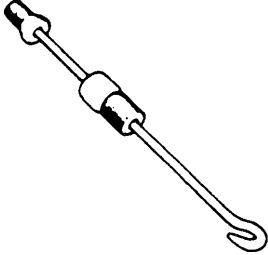
## Tightening Torque Specification

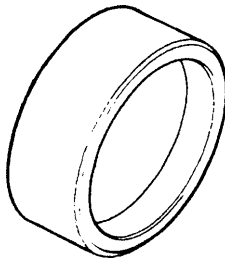
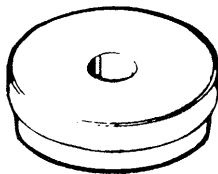

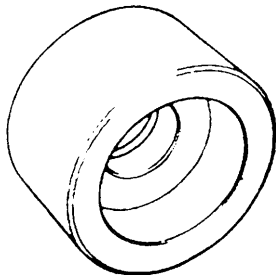
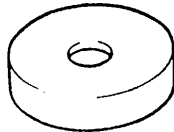
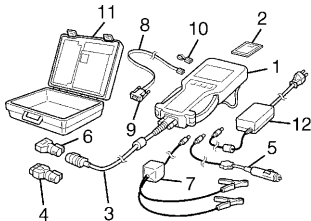
Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
A/T fluid drain plug	40	4.0	29.0
Transmission range sensor bolts	25	2.5	18.0
Output shaft speed sensor bolt	5.5	0.55	4.0
Input shaft speed sensor bolt	5.5	0.55	4.0
Shift solenoid bolts	7.0	0.7	5.0
Valve body bolts	10	1.0	7.5
Pressure control solenoid bolt	7.0	0.7	5.0
Transaxle side cover bolts	24	2.4	17.5
A/T fluid pipe union bolts	27	2.7	19.5
A/T fluid pipe nut	18	1.8	13.0
Transaxle to engine bolts and nut	85	8.5	61.5
Drive plate to torque converter bolts	19	1.9	14.0
Steering knuckle ball stud lock nuts	60	6.0	43.5
Exhaust No.1 pipe to manifold bolts	50	5.0	36.5
Exhaust No.2 pipe to No.1 pipe bolts	43	4.3	31.5
Engine front mounting nuts	45	4.5	32.5
Engine rear mounting nuts	45	4.5	32.5
Mounting member bolts	55	5.5	40.0
Suspension frame bolts	90	9.0	65.0
Engine rear mounting No.2 bracket bolt (M10)	55	5.5	40.0
Engine rear mounting No.2 bracket bolt (M8)	25	2.5	18.0
Engine LH No.1 bolt	55	5.5	40.0
Engine LH mounting No.2 bolts	55	5.5	40.0
Counter shaft driven gear lock nut	160	16.0	116
Oil pump cover bolts	10	1.0	7.5
Final gear bolts	97	9.7	70.0
Transaxle housing bolts	30	3.0	22.0
Cylindrical roller bearing retainer bolt	13	1.3	9.5
Lubrication tube clamp bolts	5.5	0.55	4.0
Oil reservoir plate bolts	5.5	0.55	4.0
Transaxle rear cover bolts	25	2.5	18.0
Parking lock pawl bracket bolts	10	1.0	7.5
Manual detent spring bolts	10	1.0	7.5
Oil pump body bolts	30	3.0	22.0
Transaxle case bolts	30	3.0	22.0
Transaxle side cover bolts	24	2.4	17.5
Valve body connector bolt	7.0	0.7	5.0
Fluid filler tube bolt	5.5	0.55	4.0
Vehicle speed sensor bolt	7.0	0.7	5.0
Transmission range sensor lock nut	7.0	0.7	5.0
Manual lever nut	13	1.3	9.5



## Special Tool

 <p>09900-06108</p> <p>Snap ring plier (Closing type)</p>	 <p>09900-20606</p> <p>Dial gauge</p>	 <p>09900-20701</p> <p>Magnetic stand</p>	 <p>1. 09916-14510 Valve lifter 2. 09916-48210 Attachment</p>
 <p>09921-57810</p> <p>Bearing remover</p>	 <p>09924-74510</p> <p>Installer handle</p>	 <p>09924-74590</p> <p>Input shaft oil seal installer attachment</p>	 <p>09924-84510-005</p> <p>Bearing installer adapter (C)</p>
 <p>09925-06010</p> <p>Bearing puller</p>	 <p>09925-37811-001</p> <p>Oil pressure gauge</p>	 <p>09925-86010</p> <p>Bearing puller attachment</p>	 <p>09926-68310</p> <p>Bearing installer</p>

 <p>09926-96010 Clutch spring compressor</p>	 <p>09926-98310 Clutch spring compressor</p>	 <p>09926-98330 Clutch spring compressor</p>	 <p>09927-26010 Counter drive gear socket</p>
 <p>09927-76040 Counter drive gear holder</p>	 <p>09927-76050 Counter driven gear socket</p>	 <p>09928-06050 Differential preload adaptor</p>	 <p>09931-76011 Tech 1A kit (SUZUKI scan tool) (See NOTE "A".)</p>
 <p>Mass storage cartridge for Tech 1A</p>	 <p>09931-76030 16/14 pin DLC cable for Tech 1A</p>	 <p>1. 09941-54911 Bearing outer race hammer 2. 09921-26010 Bearing outer race remover collar</p>	 <p>09942-15511 Sliding hammer</p>

			
09944-66020 Bearing installer	09944-68210 Bearing and oil seal installer	09944-88210 Bearing installer	09951-16060 Bush remover
			
09951-46010 Drive shaft oil seal installer	Tech 2 kit (SUZUKI scan tool) (See NOTE "B".)		

**NOTE:**

- **"A"** : This kit includes the following items and substitutes for the Tech 2 kit.
  1. Storage case, 2. Operator's manual, 3. Tech 1A, 4. DLC cable (14/26 pin, 09931-76040), 5. Test lead/probe, 6. Power source cable, 7. DLC cable adaptor, 8. Self-test adaptor
- **"B"** : This kit includes the following items and substitutes for the Tech 1A kit.
  1. Tech 2, 2. PCMCIA card, 3. DLC cable, 4. SAE 16/19 adapter, 5. Cigarette cable, 6. DLC loopback adapter, 7. Battery power cable, 8. RS232 cable, 9. RS232 adapter, 10. RS232 loopback connector, 11. Storage case, 12. Power supply

## Required Service Material

Material	Recommended SUZUKI product (Part Number)	Use
Automatic transmission fluid	An equivalent of DEXRON®-III or DEXRON®-IIE	<ul style="list-style-type: none"> <li>Automatic transmission</li> <li>Parts lubrication when installing</li> </ul>
Sealant	SUZUKI BOND No. 1216B (99000-31230)	<ul style="list-style-type: none"> <li>Mating surface of case and housing</li> <li>Mating surface of case and rear cover</li> <li>Mating surface of case and side cover</li> <li>Transaxle housing bolts</li> <li>Rear cover bolts</li> <li>Side cover bolts</li> </ul>
Lithium grease	SUZUKI SUPER GREASE C (99000-25030)	Oil seal lips
	SUZUKI SUPER GREASE A (99000-25010)	Cable ends



## SECTION 7C1

# CLUTCH

### WARNING:

For vehicles equipped with Supplement Restraint (Air Bag) System:

- Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to “Air Bag System Components and Wiring Location View” under “General Description” in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and “Service Precautions” under “On-Vehicle Service” in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.
- Technical service work must be started at least 90 seconds after the ignition switch is turned to the “LOCK” position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).

7C1

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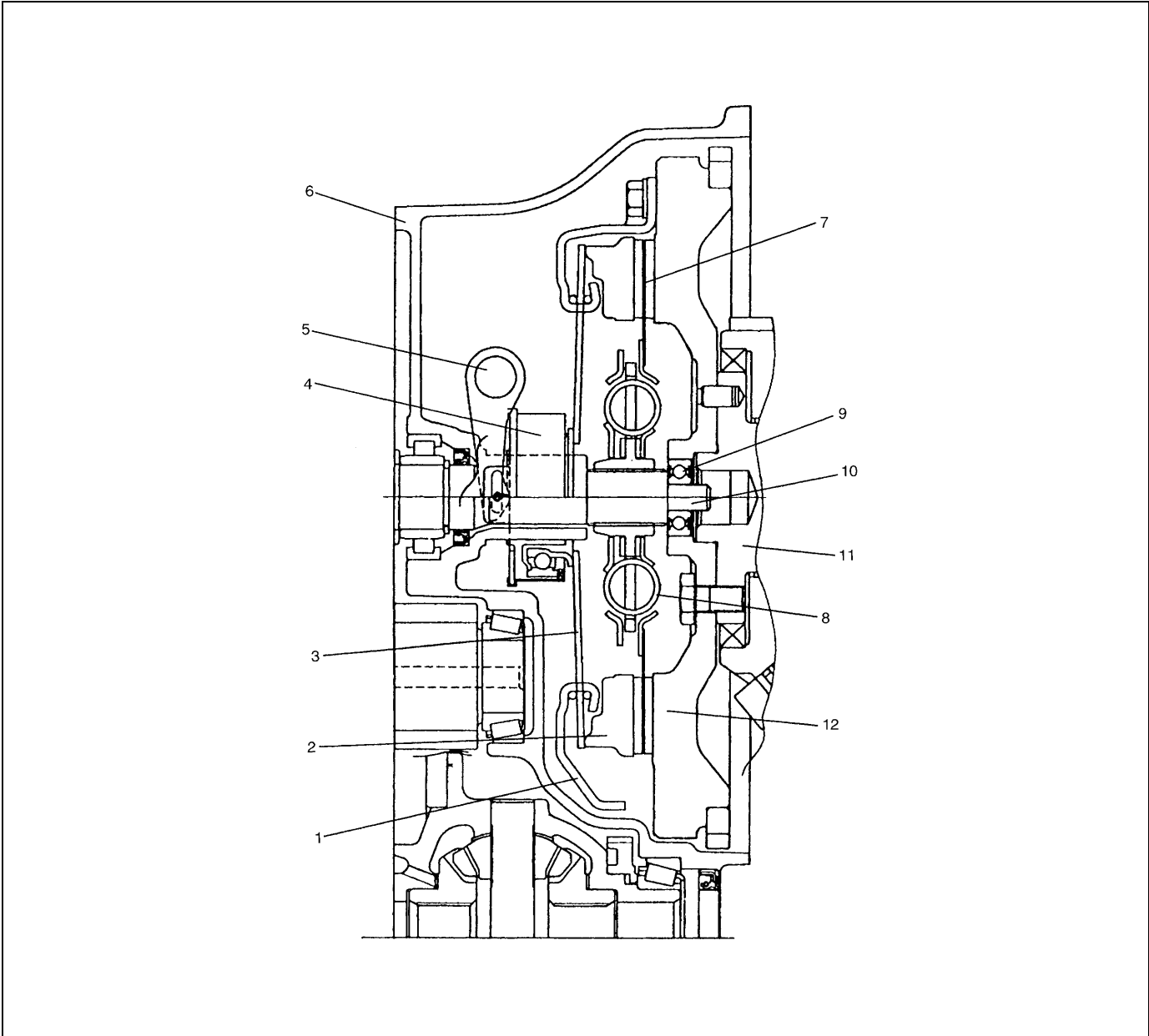
# General Description

The clutch is a hydraulically controlled diaphragm spring clutch of a dry single disc type. The diaphragm spring is of a tapering-finger type, which is a solid ring in the outer diameter part, with a series of tapered fingers pointing inward.

The disc, carrying four torsional coil springs, is positioned on the transmission input shaft with an involute spline fit.

The clutch cover is secured to the flywheel, and carries the diaphragm spring in such a way that the peripheral edge of the spring pushes on the pressure plate against the flywheel (with the disc in between), when the clutch release bearing is held back. This is the engaged condition of the clutch.

Depressing the clutch pedal causes the release bearing to advance and pushes on the tips of the tapered fingers of the diaphragm spring. When this happens, the diaphragm spring pulls the pressure plate away from the flywheel, thereby interrupting the flow of drive from flywheel through clutch disc to transaxle input shaft.



1. Clutch cover	5. Release shaft	9. Input shaft bearing
2. Pressure plate	6. Transmission right case	10. Input shaft
3. Diaphragm spring	7. Clutch disc	11. Crankshaft
4. Release bearing	8. Torsional spring	12. Flywheel

## Diagnosis

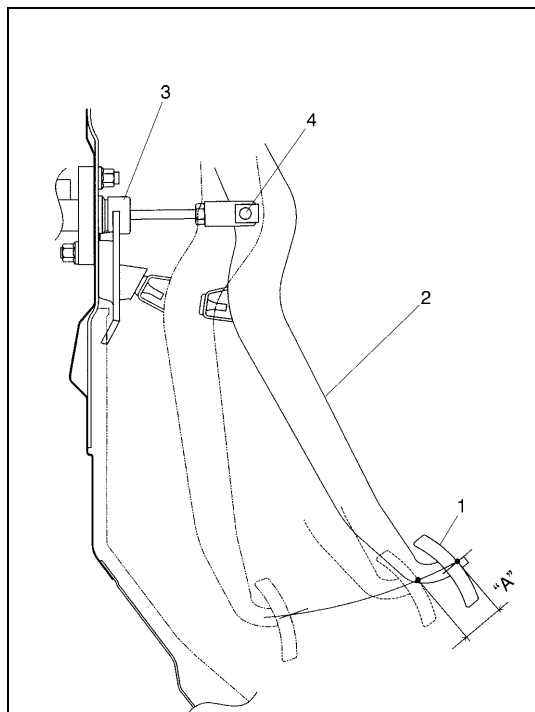
Condition	Possible Cause	Correction
<b>Slipping</b>	Improper clutch pedal free travel.	Replace clutch pedal arm or master cylinder.
	Worn or oily clutch disc facing.	Replace disc.
	Warped disc, pressure plate or flywheel surface.	Replace disc, clutch cover or flywheel.
	Weakened diaphragm spring.	Replace clutch cover.
	Master cylinder piston or seal cup not returning.	Repair master cylinder.
<b>Dragging clutch</b>	Improper clutch pedal free travel.	Replace clutch pedal arm or master cylinder.
	Weakened diaphragm spring, or worn spring tip.	Replace clutch cover.
	Rusted input shaft splines.	Lubricate.
	Damaged or worn splines of transaxle input shaft.	Replace input shaft.
	Excessively wobbly clutch disc.	Replace disc.
	Clutch facings broken or dirty with oil.	Replace disc.
	Fluid leakage.	Repair or replace.
<b>Clutch vibration</b>	Glazed (glass-like) clutch facings.	Repair or replace disc.
	Clutch facings dirty with oil.	Replace disc.
	Release bearing slides unsmoothly on input shaft bearing retainer.	Lubricate or replace input shaft bearing retainer.
	Wobbly clutch disc, or poor facing contact.	Replace disc.
	Weakened torsion springs in clutch disc.	Replace disc.
	Clutch disc rivets loose.	Replace disc.
	Distorted pressure plate or flywheel surface.	Replace clutch cover or flywheel.
	Weakened or loosened engine mounting bolt or nut.	Retighten or replace mounting.
<b>Noisy clutch</b>	Worn or broken release bearing.	Replace release bearing.
	Input shaft front bearing worn down.	Replace input shaft bearing.
	Excessive rattle of clutch disc hub.	Replace disc.
	Cracked clutch disc.	Replace disc.
	Pressure plate and diaphragm spring rattling.	Replace clutch cover.
<b>Grabbing clutch</b>	Clutch disc facings soaked with oil.	Replace disc.
	Clutch disc facings excessively worn.	Replace disc.
	Rivet heads showing out of facing.	Replace disc.
	Weakened torsion springs.	Replace disc.



## Clutch pedal

### INSPECTION

#### Clutch pedal free travel "A"



- 1) Depress clutch pedal (1), stop the moment clutch resistance is felt, and measure how much pedal has moved (clutch pedal free travel) as represented by "A" in the figure. Then check its conformance to below specification.

#### Clutch pedal free travel

"A": 15 - 20 mm (0.59 - 0.79 in.)

- 2) If "A" is not within specification, check pedal arm (2) and master cylinder (3) and replace defective part.

#### Cylinder push rod play "B"

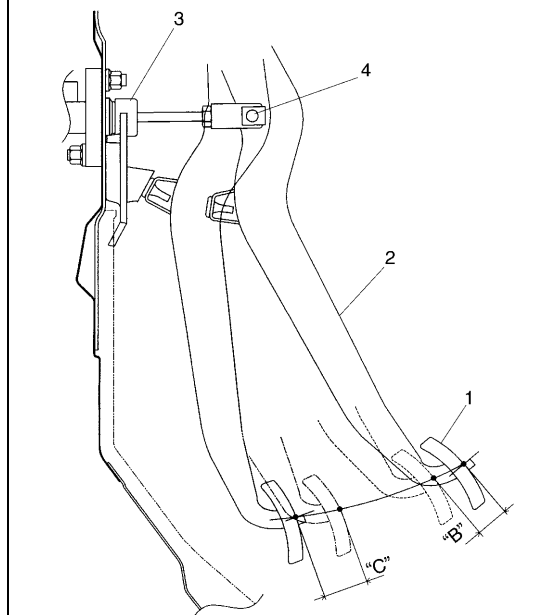
- 1) Press clutch pedal (1) gradually with finger, stop when slight increase of resistance is felt and measure how much pedal has moved (push rod play) as represented by "B" as shown. Then check its conformance to below specification.

#### Push rod play

"B": Max. 3 mm (0.12 in.)

- 2) If "B" is not within specification, replace clevis pin (4) or pedal arm (2).

#### Clutch release margin "C"



- 1) Pull up parking brake fully and block wheels.
- 2) Start engine and keep engine at idle with neutral gear position.
- 3) Without clutch pedal (1) depressed, be slow to shift the shift lever to reverse position until transaxle emits gear contact noise.
- 4) Be slow to depress clutch pedal (1), and at gear contact noise died position (release point (4)) stop depressing.
- 5) Measure distance between release point (4) and full stroke point (3) on clutch pedal (1) which is shown by "C" in the figure.

#### Clutch release margin

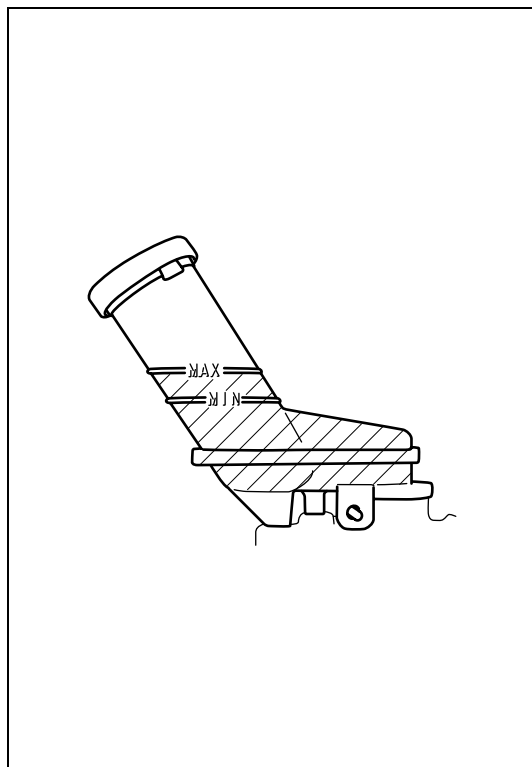
"C": 25 mm (1.0 in.) or more

- 6) If "C" is not within specification, it is possible that air is trapped in this system. If suspected so, bleed air.  
Upon completion of above inspection and adjustment, start engine and check clutch for proper operation.

## Clutch fluid

Fluid level should be always between MIN and MAX lines on reservoir. If fluid decreases quickly, check for leakage, repair leaky point, if any, and add fluid up to MAX level.

**Clutch fluid: SAE J1703 or DOT-3 brake fluid**



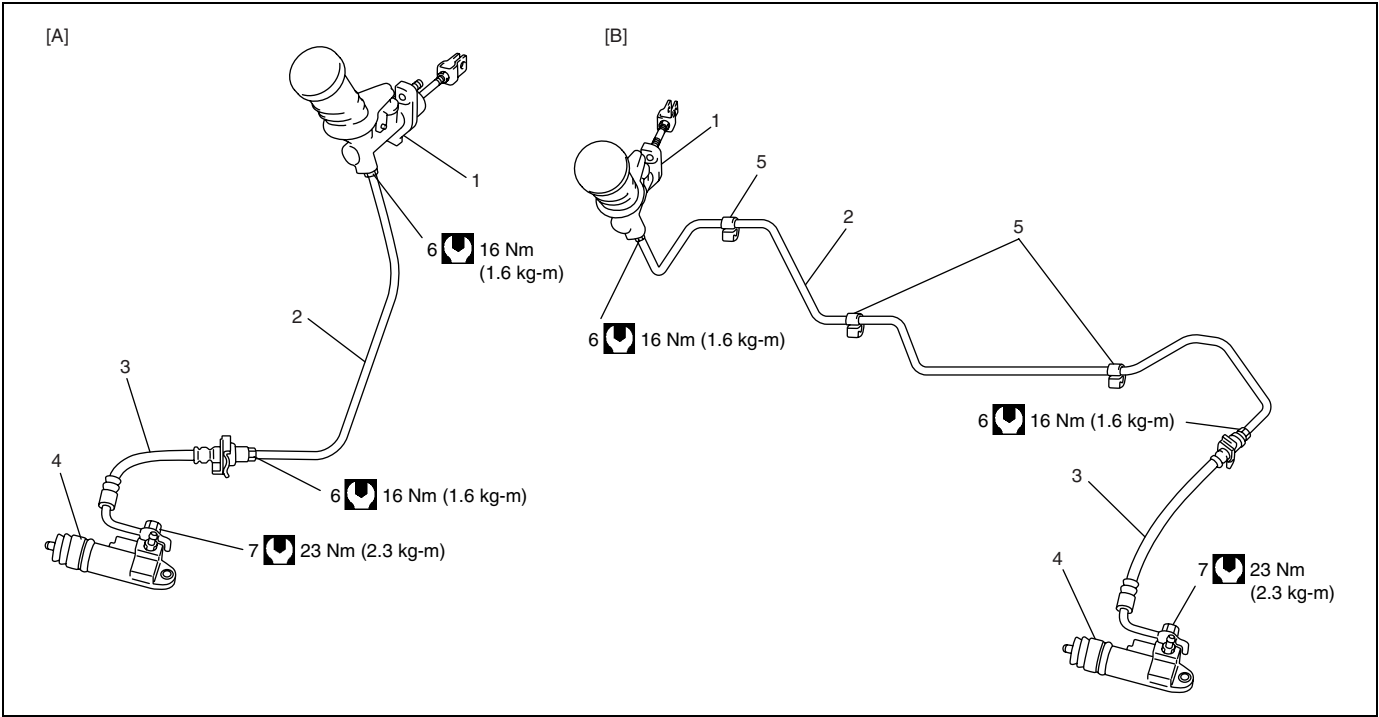
### CAUTION:

- Brake fluid damages painted surface badly. Should it get on painted surface, remove it immediately and clean surface thoroughly.
- Do not use shock absorber fluid or any other fluid which contains mineral oil. Do not use container which has been used for mineral oil or which is wet from water. Mineral oil will cause swelling and distortion of rubber parts in hydraulic clutch system and water will mix with brake fluid, lowering fluid boiling point. Keep all fluid containers capped to prevent contamination.
- Make sure not to use fluid whose container cap was first opened more than a year ago.

On-Vehicle Service

Clutch Fluid Pipe and Hose

COMPONENTS



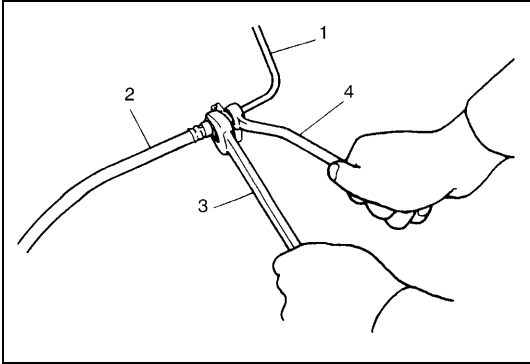
[A] : For left-hand steering vehicle	3. Hose	7. Union bolt
[B] : For right-hand steering vehicle	4. Operating cylinder	Tightening torque
1. Master cylinder	5. Clamp	
2. Pipe	6. Clutch pipe flare nut	

REMOVAL

NOTE:

Do not allow fluid to get on painted surface.

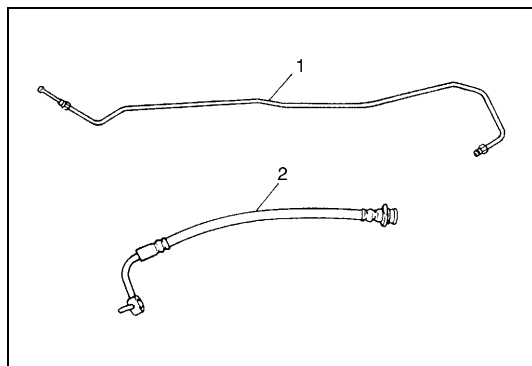
- 1) Remove dust and dirt from each joint of hose and pipe to be disconnected and clean around reservoir cap.
- 2) Take out fluid with syringe or such.
- 3) Disconnect fluid pipe from hose.



NOTE:

To disconnect pipe (1) from hose (2), separate them by using flare nut wrench (4) and spanner (3) so as not to kink them.

## INSPECTION



Check pipe (1) and hose (2) for dent, kink, crack, dirt and dust. Replace if check result is not satisfactory.

## INSTALLATION

Reverse removal procedure for installation, noting the following instruction.

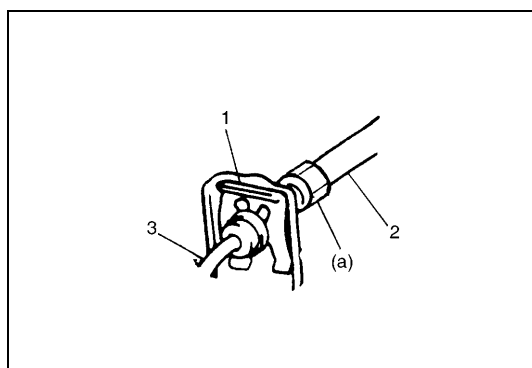
### CAUTION:

- Do not allow fluid to get on painted surface.
- Do not allow pipe and hose to contact hard against vehicle body or other parts.

- For air bleeding of master cylinder alone, it must be removed from vehicle body.  
(For procedures of removal and installation of master cylinder and air bleeding, refer to "Clutch Master Cylinder" in this section.)
- Install each clamp securely.
- For installation angle of each hose, refer to "Clutch Fluid Pipe and Hose Components" in this section.
- Install E-ring securely as shown.

### Tightening torque

**Clutch pipe flare nut (a): 16 N·m (1.6 kg-m, 11.5 lb-ft)**

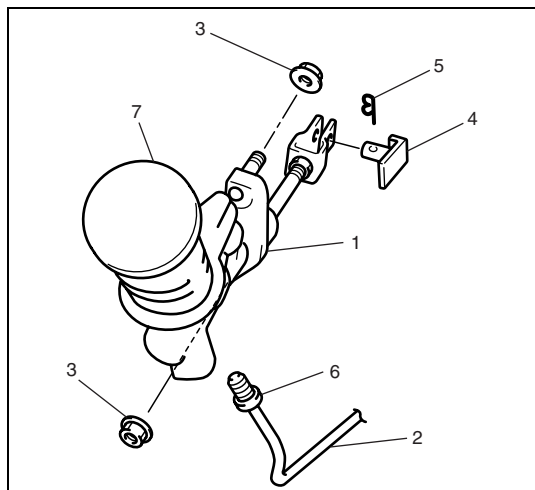


1.	E-ring
2.	Hose
3.	Pipe

- After installation, check clutch pedal free travel and bleed air from system.
- Check fluid leakage.
- Add fluid to MAX level of reservoir.

## Clutch Master Cylinder

### REMOVAL



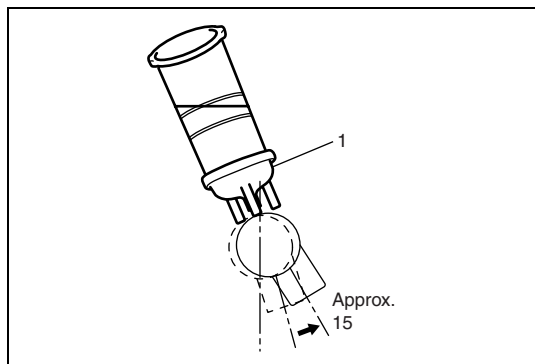
- 1) Clean around reservoir cap (7) and take out fluid with syringe or such.
- 2) Remove clevis β-pin (5) and clevis pin (4).
- 3) Disconnect fluid pipe (2) from master cylinder assembly (1) by loosening flare nut (6).

#### NOTE:

**Do not allow fluid to get on painted surfaces.**

- 4) Remove master cylinder attaching nuts (3).
- 5) Remove master cylinder assembly (1) and gasket.

### INSTALLATION



- 1) To bleed air from master cylinder (1) itself, tilt it as shown and add fluid into it.

#### NOTE:

**After bleeding air from master cylinder, plug pipe hole in it to prevent fluid from spilling out of it till pipe is connected.**

- 2) Install master cylinder assembly (1) and new gasket (2) to body, attaching nuts (3).

#### NOTE:

**Do not reuse gasket.**

- 3) Tighten attaching nuts (3) to specified torque.

#### Tightening torque

**Clutch master cylinder attaching nuts**

**(a): 13 N·m (1.3 kg-m, 9.5 lb-ft)**

- 4) Connect fluid pipe and tighten flare nut (4) to specified torque.

#### Tightening torque

**Clutch pipe flare nut**

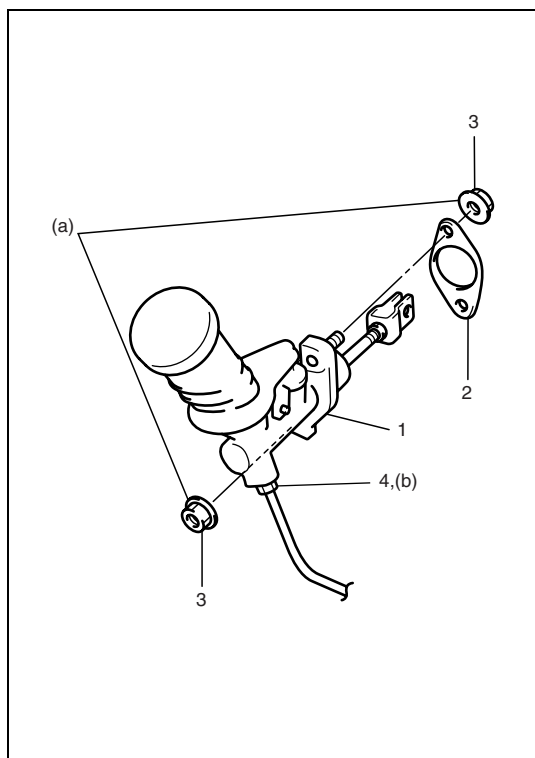
**(b): 16 N·m (1.6 kg-m, 11.5 lb-ft)**

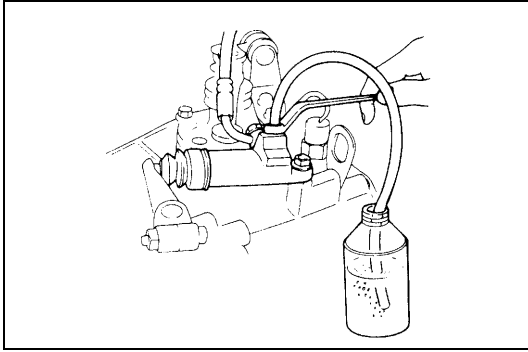
- 5) Apply grease to clevis pin and install clevis pin.

**Grease 99000-25010**

- 6) Install clevis β-pin.

- 7) Fill master cylinder reservoir with specified brake fluid and check fluid leakage.





8) After installation, bleed air from system. (Refer to Section 5 for air bleed procedure.)

9) Check clutch pedal free travel and clutch release margin. (Refer to "Clutch pedal inspection" in this section.)

## Clutch Operating Cylinder

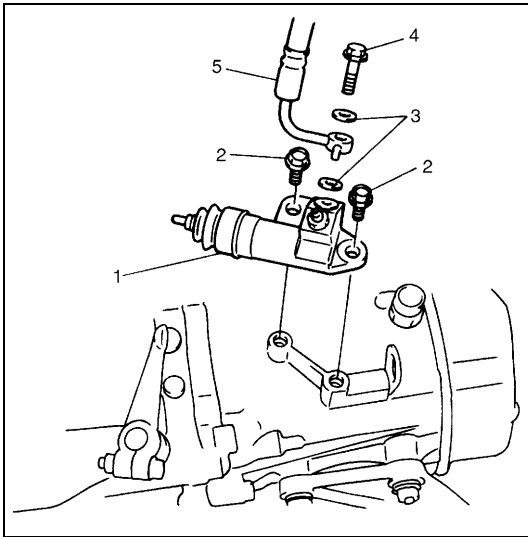
### REMOVAL

#### NOTE:

**Do not allow fluid to get on painted surfaces.**

- 1) Clean around master cylinder reservoir cap and take out fluid with syringe or such.
- 2) Disconnect fluid hose (5) from operating cylinder by loosening union bolt (4).
- 3) Remove operating cylinder attaching bolts (2) and operating cylinder assembly (1).

3. Gasket



### INSTALLATION

For air bleeding of master cylinder alone, it must be removed from vehicle body.

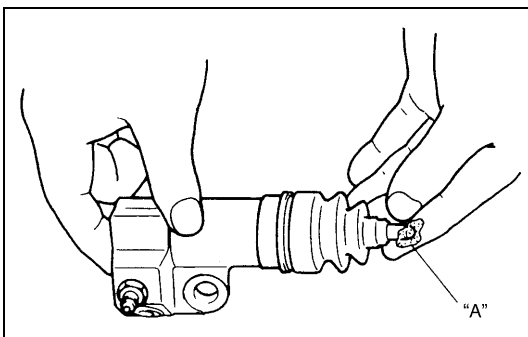
(For procedures of removal and installation of master cylinder assembly and air bleeding, refer to "Clutch pedal inspection" in this section.)

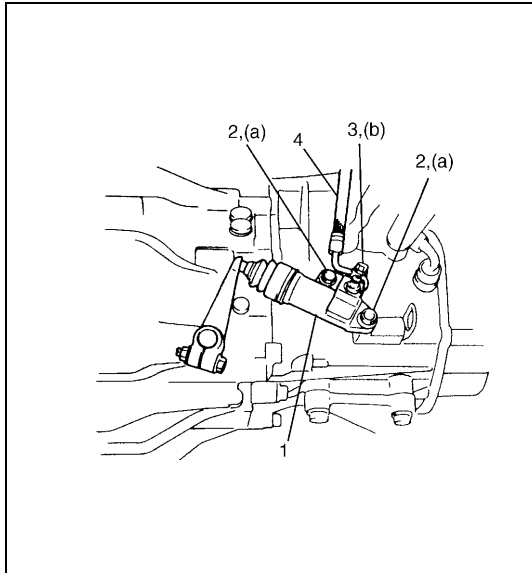
- 1) Apply small amount of grease to rod tip.

#### NOTE:

**Don't allow any grease to be on boot.**

**"A": Grease 99000-25010**





- 2) Install clutch operating cylinder assembly (1) and tighten attaching bolts (2) to specified torque.

**Tightening torque****Operating cylinder attaching bolts**

**(a): 23 N·m (2.3 kg-m, 17.0 lb-ft)**

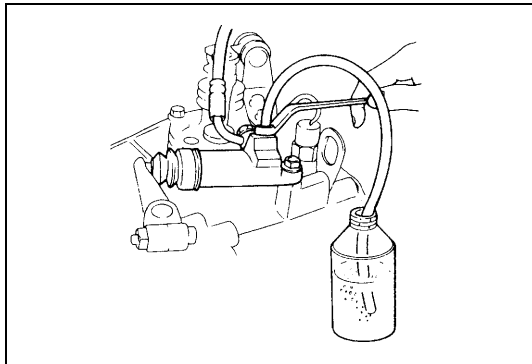
- 3) Connect clutch fluid hose (4) and tighten union bolt (3) to specified torque.

**Tightening torque**

**Union bolt (b): 23 N·m (2.3 kg-m, 17.0 lb-ft)**

**NOTE:**

**Do not reuse gaskets.**

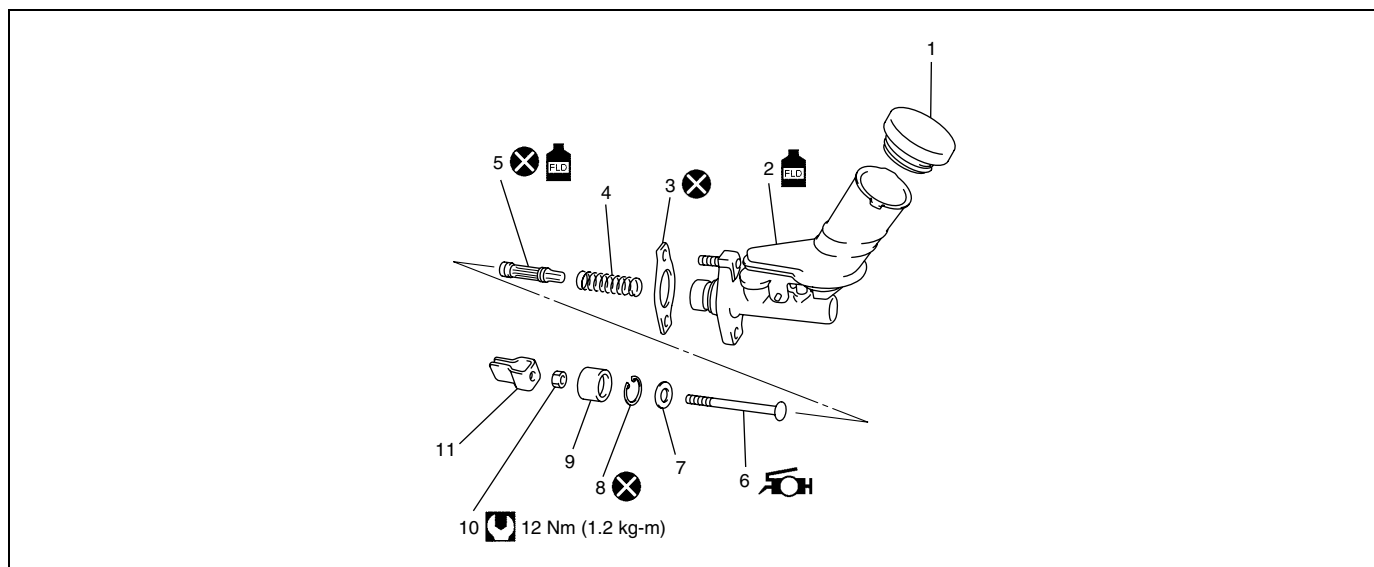


- 4) Fill master cylinder reservoir with specified brake fluid and check for fluid leakage.
- 5) After installation, bleed air from system. (Refer to Section 5 for air bleed procedure.)

- 6) Check clutch pedal free travel and clutch release margin. (Refer to "Clutch pedal inspection" in this section.)

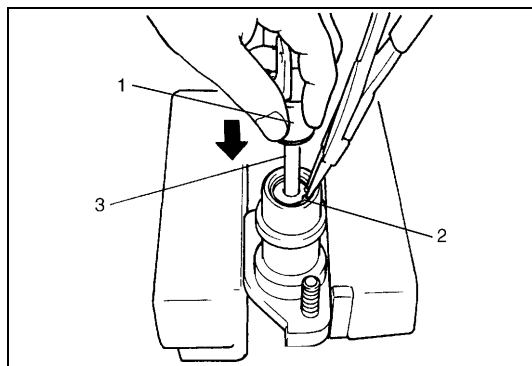
# Unit Repair Overhaul

## Clutch Master Cylinder

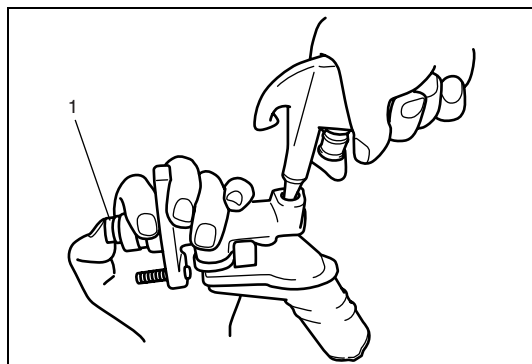


1. Reservoir cap		6. Push rod : Apply grease 99000-25100 to spherical end of push rod.	11. Clevis
2. Cylinder		7. Piston stopper	Do not reuse.
3. Gasket		8. Circlip	Apply brake fluid.
4. Return spring		9. Boot	Tightening torque.
5. Piston assembly		10. Push rod nut	

### DISASSEMBLY



- 1) Remove boot (1) and then circlip (2) with piston rod (3) pushed in.



- 2) Blow compressed air gradually into hole for pipe connection to remove piston assembly (1), using care to prevent it from jumping out.



## INSPECTION

Inspect all disassembled parts for wear or damage, and replace parts if necessary.

### NOTE:

- **Wash disassembled parts with brake fluid.**
- **Do not reuse piston assembly and circlip.**

Inspect cylinder bore for scoring or corrosion.

It is best to replace corroded cylinder. Corrosion can be identified as pits or excessive roughness.

### NOTE:

**Polishing bore of cylinder with cast aluminum body with anything abrasive is prohibited, as damage to cylinder bore may occur.**

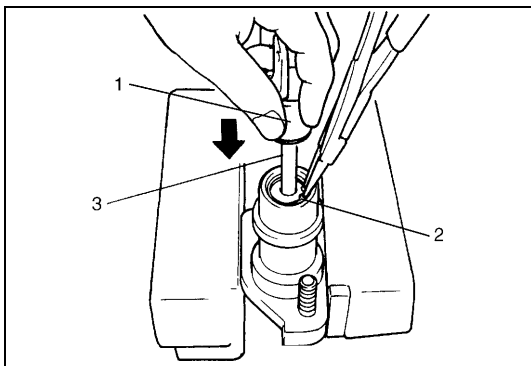
Rinse cylinder in clean brake fluid. Shake excess rinsing fluid from cylinder. Do not use a cloth to dry cylinder, as lint from cloth cannot be kept away from cylinder bore surfaces.

## REASSEMBLY

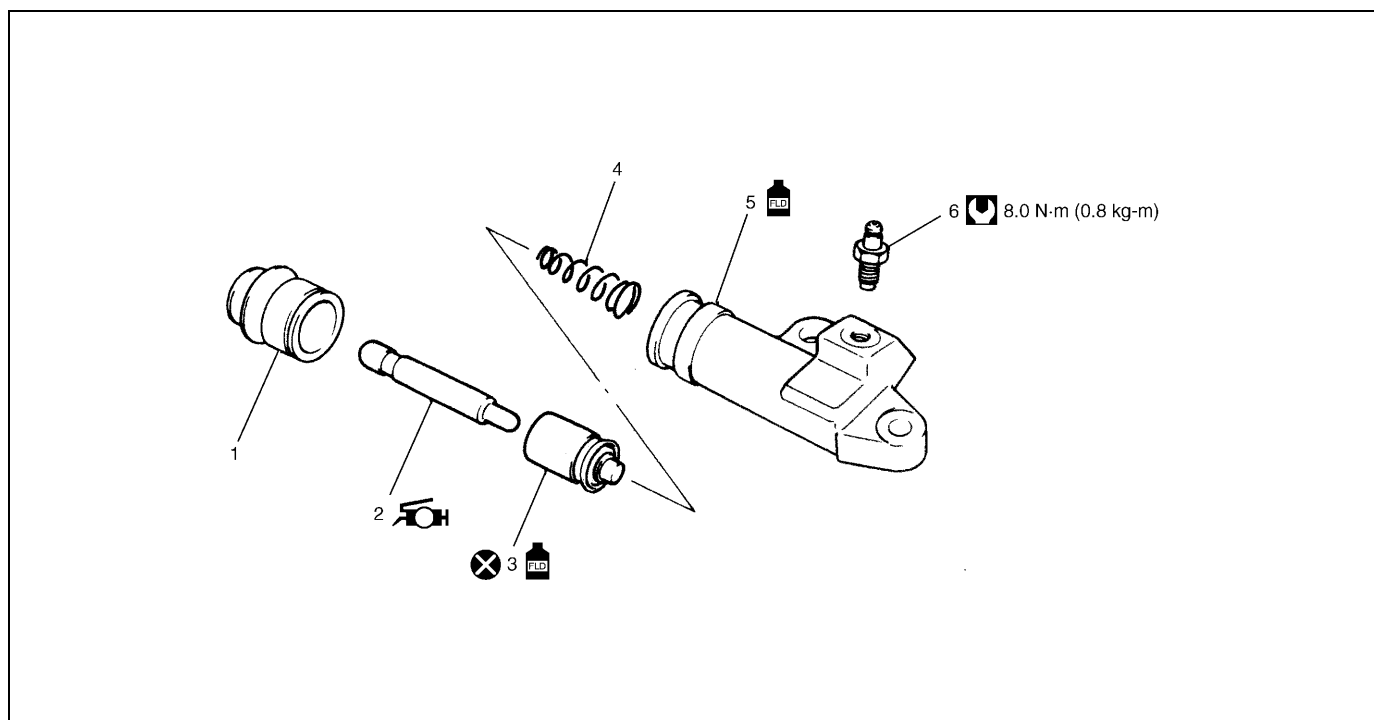
### NOTE:

**Before installation, wash each part in specified brake fluid.**

- 1) Apply brake fluid to piston assembly and inside of cylinder body.
- 2) Install piston assembly into cylinder.
- 3) With piston pushed rod (3) down, install circlip (2) as shown.
- 4) Install boot (1).

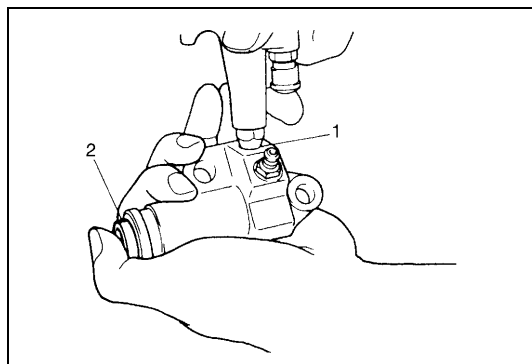


## Clutch Operating Cylinder



1. Boot	4. Return spring	⊗ Do not reuse.
2. Push rod : Apply grease 99000-25100 to piston side spherical end of push rod.	5. Cylinder	FLD Apply brake fluid.
3. Piston assembly	6. Bleeder screw	⌘ Tightening torque.

### DISASSEMBLY



- 1) Remove boot and then push rod.
- 2) Remove piston (2) by blowing compressed air into bolt hole (1) where hose was connected, using care to prevent it from jumping out.

### INSPECTION

Inspect all disassembled parts for wear or damage, and replace parts if necessary.

#### NOTE:

- Wash disassembled parts with brake fluid.
- Do not reuse piston assembly.

Inspect cylinder bore for scoring or corrosion. It is best to replace corroded cylinder. Corrosion can be identified as pits or excessive roughness.

**NOTE:**

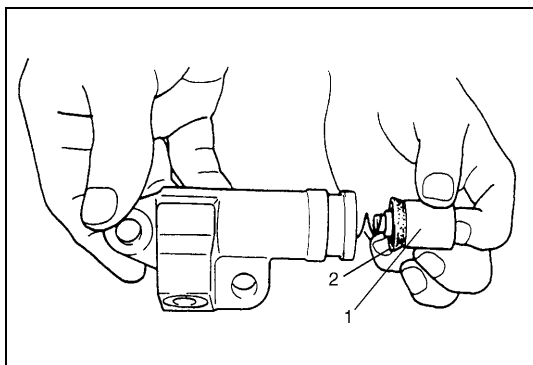
**Polishing bore of cylinder with anything abrasive is prohibited, as damage to cylinder bore may occur.**

Rinse cylinder in clean brake fluid. Shake excess rinsing fluid from cylinder. Do not use a cloth to dry cylinder, as lint from cloth cannot be kept away from cylinder bore surfaces.

**REASSEMBLY****NOTE:**

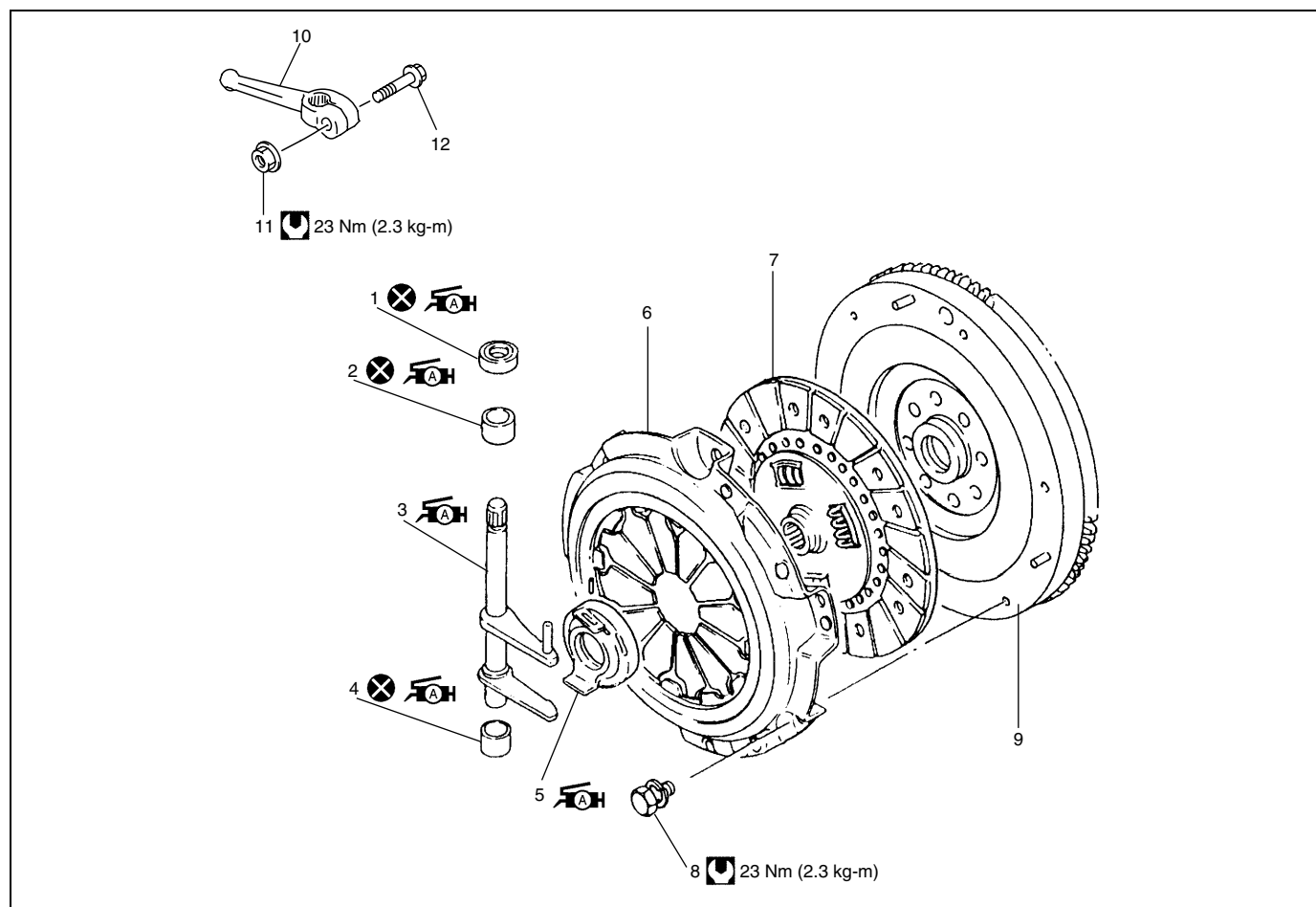
**Before installation, wash each part in specified brake fluid.**








- 1) Apply brake fluid to piston assembly and inside of cylinder.
- 2) Install piston assembly (1) into cylinder. When inserting it, be careful not to cause damage to lip of piston cup (2).



- 3) Install boot and push rod.

## Clutch Cover, Clutch Disc, Flywheel and Clutch Release System



	1. Release shaft oil seal : Apply grease 99000-25010 to oil seal lip.	8. Clutch cover bolt
	2. Release shaft No.2 bush : Apply grease 99000-25010 to bush inside.	9. Flywheel
	3. Release shaft : Apply grease 99000-25010 to contact part with release bearing	10. Release arm
	4. Release shaft No.1 bush : Apply grease 99000-25010 to bush inside	11. Release arm nut
	5. Release bearing : Apply grease 99000-25010 to bearing inside diameter.	12. Release arm bolt
	6. Clutch cover	 Do not reuse.
	7. Clutch disc	 Tightening torque

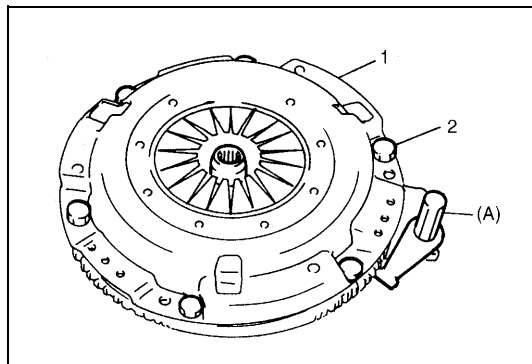
### Clutch cover, clutch disc and flywheel

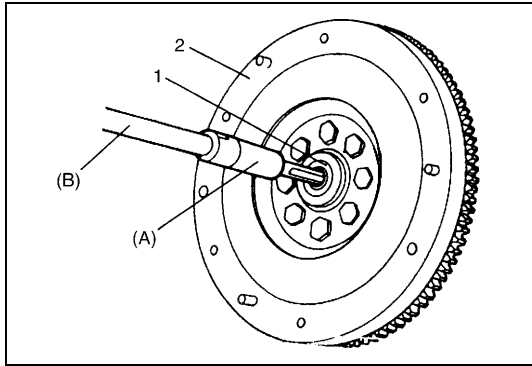
#### REMOVAL

- 1) Dismount transaxle referring to Section 7A1.
- 2) Hold flywheel stationary with special tool and remove clutch cover bolts (2), clutch cover (1) and clutch disc.

#### Special tool

(A): 09924-17811





- 3) When pulling out input shaft bearing (1) from flywheel (2), use the following special tool.

**Special tool**

(A): 09921-26020

(B): 09930-30104

## INSPECTION

### Input shaft bearing

Check bearing for smooth rotation and replace it if abnormality is found.

### Clutch disc

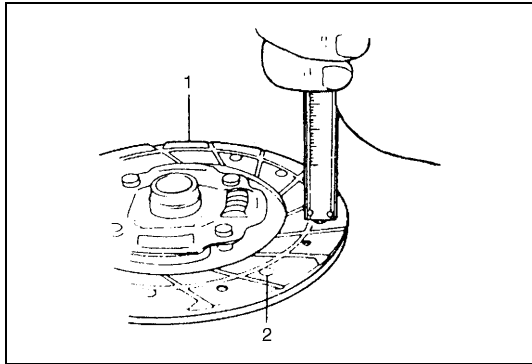
Measure depth of rivet head depression, i.e. distance between rivet head and facing surface.

If depression is found to have reached service limit at any of rivet holes (2), replace clutch disc assembly (1).

**Rivet head depth**

**Standard: 1.3 - 1.9 mm (0.051 - 0.074 in.)**

**Limit : 0.5 mm (0.02 in.)**



### Clutch cover

- 1) Check diaphragm spring for abnormal wear or damage.
- 2) Inspect pressure plate for wear or heat spots.
- 3) If abnormality is found, replace it as assembly.

Do not disassemble it into diaphragm and pressure plate.

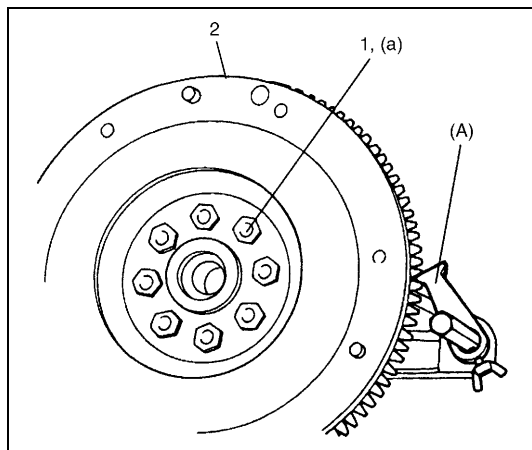
### Flywheel

Check surface contacting clutch disc for abnormal wear or heat spots. Replace or repair as required.

## INSTALLATION

### NOTE:

Before assembling, make sure that flywheel surface and pressure plate surface have been cleaned and dried thoroughly.



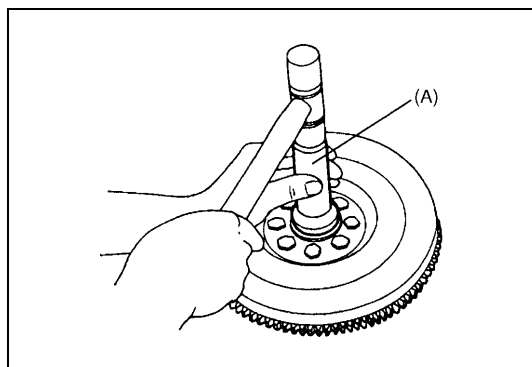
- 1) Install flywheel (2) to crankshaft and tighten bolts (1) to specification.

### Special tool

(A): 09924-17811

### Tightening torque

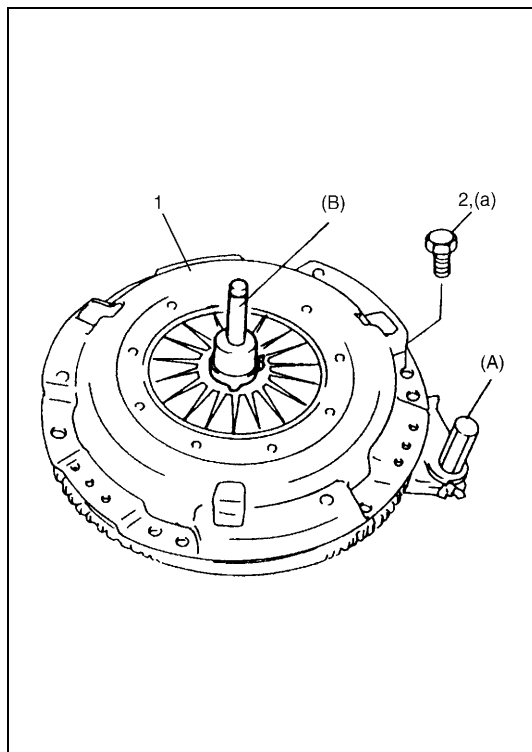
Flywheel bolts (a): 70 N·m (7.0 kg·m, 51.0 lb·ft)



- 2) Using special tool, install input shaft bearing to flywheel.

### Special tool

(A): 09913-76010



- 3) Aligning clutch disc with flywheel center by using special tool, install clutch cover (1) and bolts (2). Then tighten bolts (2) to specification.

### NOTE:

- While tightening clutch cover bolts, compress clutch disc with special tool (clutch center guide) by hand so that disc is centered.
- Tighten cover bolts little by little evenly in diagonal order.

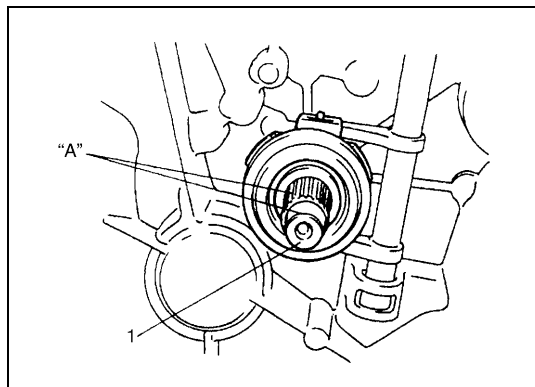
### Special tool

(A): 09924-17811

(B): 09923-36320

### Tightening torque

Clutch cover bolts (a): 23 N·m (2.3 kg·m, 17.0 lb·ft)



- 1) Slightly apply grease to input shaft (1), then join transaxle assembly with engine referring to Section 7A1.

**“A”:** Grease 99000-25210

**NOTE:**

When inserting transaxle input shaft to clutch disc, turn crankshaft little by little to match the spline mesh.

## Clutch release system

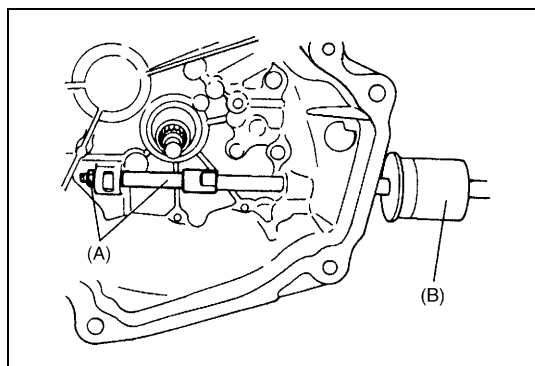
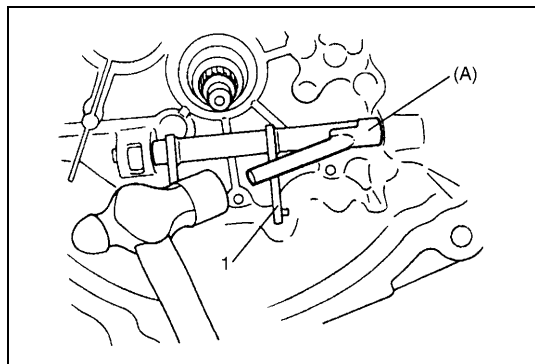
### REMOVAL

- 1) Remove release arm by loosening its nut and bolt.
- 2) Take out release bearing by turning release shaft.
- 3) Drive out No.2 bush by using special tool and hammer.  
Release shaft oil seal will also be pushed out.

**Special tool**

**(A): 09922-46010**

- 4) Remove release shaft (1).



- 5) Pull No.1 bush out by using special tools.

**Special tool**

**(A): 09925-46010**

**(B): 09930-30104**

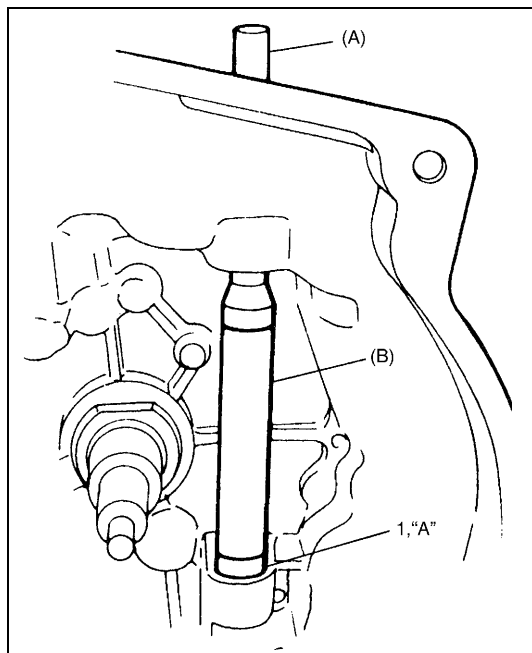
## INSPECTION

- 1) Check clutch release bearing for smooth rotation.
- 2) Inspect smoothness of release bearing retaining portion of transaxle case and correct or replace right case as necessary.

### CAUTION:

**Do not wash release bearing. Washing may cause grease leakage and consequential bearing damage.**

## INSTALLATION



- 1) Drive in a new No. 1 bush (1) by using special tools and hammer and then apply grease to bush inside.

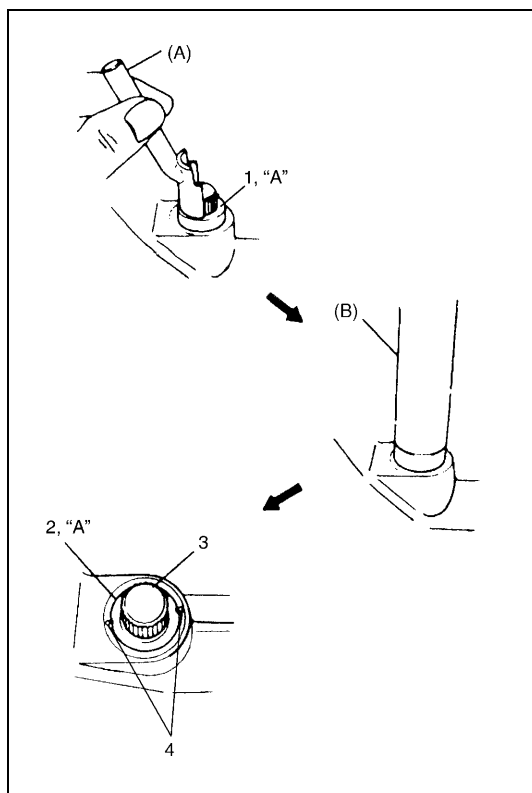
### Special tool

**(A): 09943-88211**

**(B): 09923-46020**

**“A”: Grease 99000-25010**

- 2) Install release shaft with return spring.



- 3) Apply grease to No.2 bush inside and press-fit it by using the same special tool as in removal.

**“A”: Grease 99000-25010**

### Special tool

**(A): 09922-46010**

- 4) Coat grease to release shaft oil seal (2) and then install it till it is flush with case surface. Use special tool for this installation and face seal lip downward (inside).

**“A”: Grease 99000-25010**

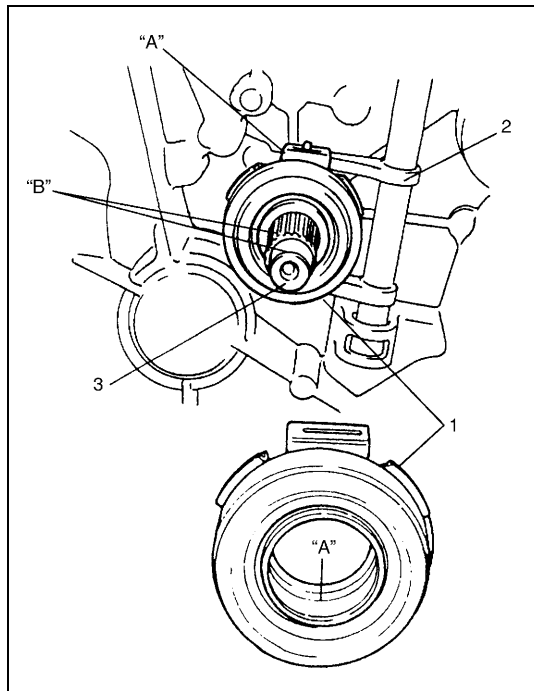
### Special tool

**(B): 09925-98221**

- 5) Caulk seal at A by using caulking tool and hammer.

1.	No.2 bush
3.	Release shaft
4.	Caulking





6) Hook return spring

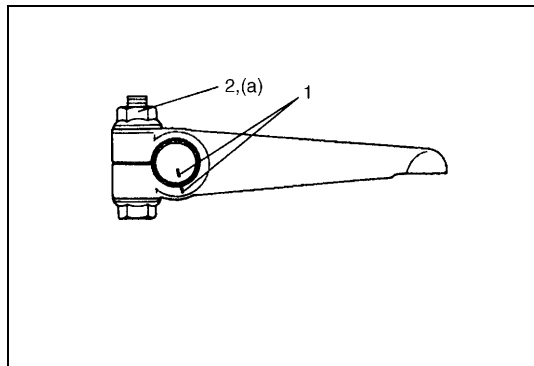
7) Apply grease to release bearing inside diameter and release shaft arm, then set release bearing (1).

**"A": Grease 99000-25010**

8) Apply small amount of grease to input shaft spline and front end as well.

**"B": Grease 99000-25210**

2.	Release shaft arm
3.	Input shaft



9) Set release arm to release shaft aligning their punch marks (1), then tighten nut (2) and bolt.

**Tightening torque**

**Release arm nut (a): 23 N·m (2.3 kg-m, 17.0 lb-ft)**

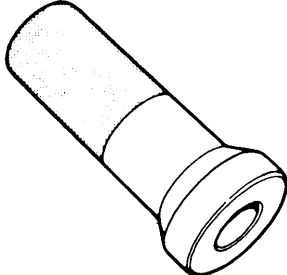
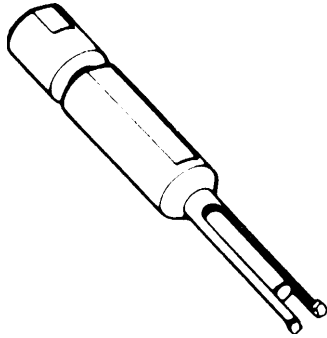
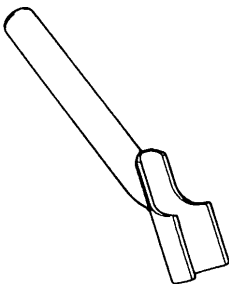
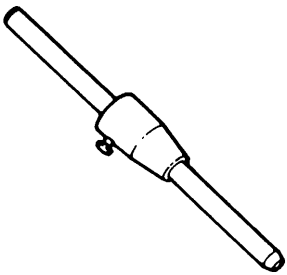
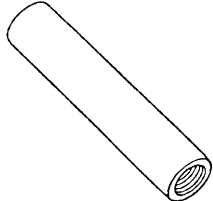
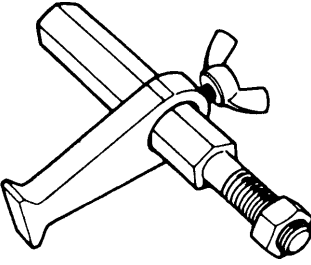
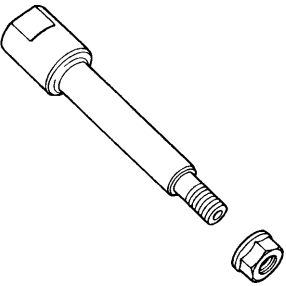
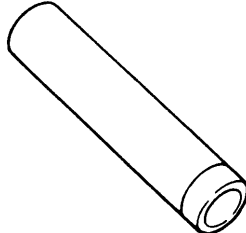
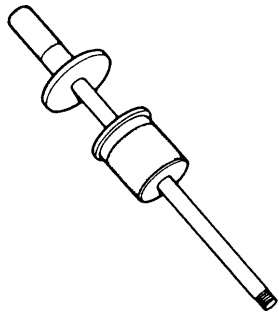
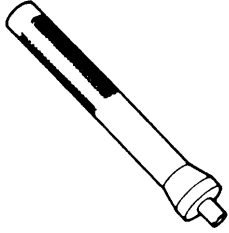
## Tightening Torque Specification

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Clutch pipe flare nut	16	1.6	11.5
Clutch master cylinder attaching nuts	13	1.3	9.5
Operating cylinder attaching bolts	23	2.3	17.0
Union bolt	23	2.3	17.0
Flywheel bolts	70	7.0	51.0
Clutch cover bolts	23	2.3	17.0
Release arm nut	23	2.3	17.0

## Required Service Material

Material	Recommended SUZUKI product (Part Number)	Use
Lithium grease	SUZUKI SUPER GREASE A (99000-25010)	<ul style="list-style-type: none"> <li>• Clutch master cylinder clevis pin</li> <li>• Release shaft bushes and seal</li> <li>• Release shaft arm</li> <li>• Push rod tip of operating cylinder</li> <li>• Release bearing inside diameter</li> </ul>
	SUZUKI SUPER GREASE I (99000-25210)	<ul style="list-style-type: none"> <li>• Input shaft spline and front end</li> </ul>
Silicone grease	SUZUKI SILICONE GREASE (99000-25100)	<ul style="list-style-type: none"> <li>• Push rod of master cylinder</li> <li>• Push rod of operating cylinder</li> </ul>
Clutch fluid (Brake fluid)	DOT3 or SAE J1703	<ul style="list-style-type: none"> <li>• Clutch reservoir</li> <li>• Clutch master cylinder</li> <li>• Clutch operating cylinder</li> </ul>

## Special Tool

 <p>09913-76010 Bearing installer</p>	 <p>09921-26020 Bearing recover</p>	 <p>09922-46010 Bush remover</p>	 <p>09923-36320 Clutch center guide</p>
 <p>09923-46020 Joint pipe</p>	 <p>09924-17811 Flywheel holder</p>	 <p>09925-46010 Bush remover</p>	 <p>09925-98221 Bearing installer</p>
 <p>09930-30104 Sliding shaft</p>	 <p>09943-88211 Bearing installer</p>		

SECTION 7D

TRANSFER

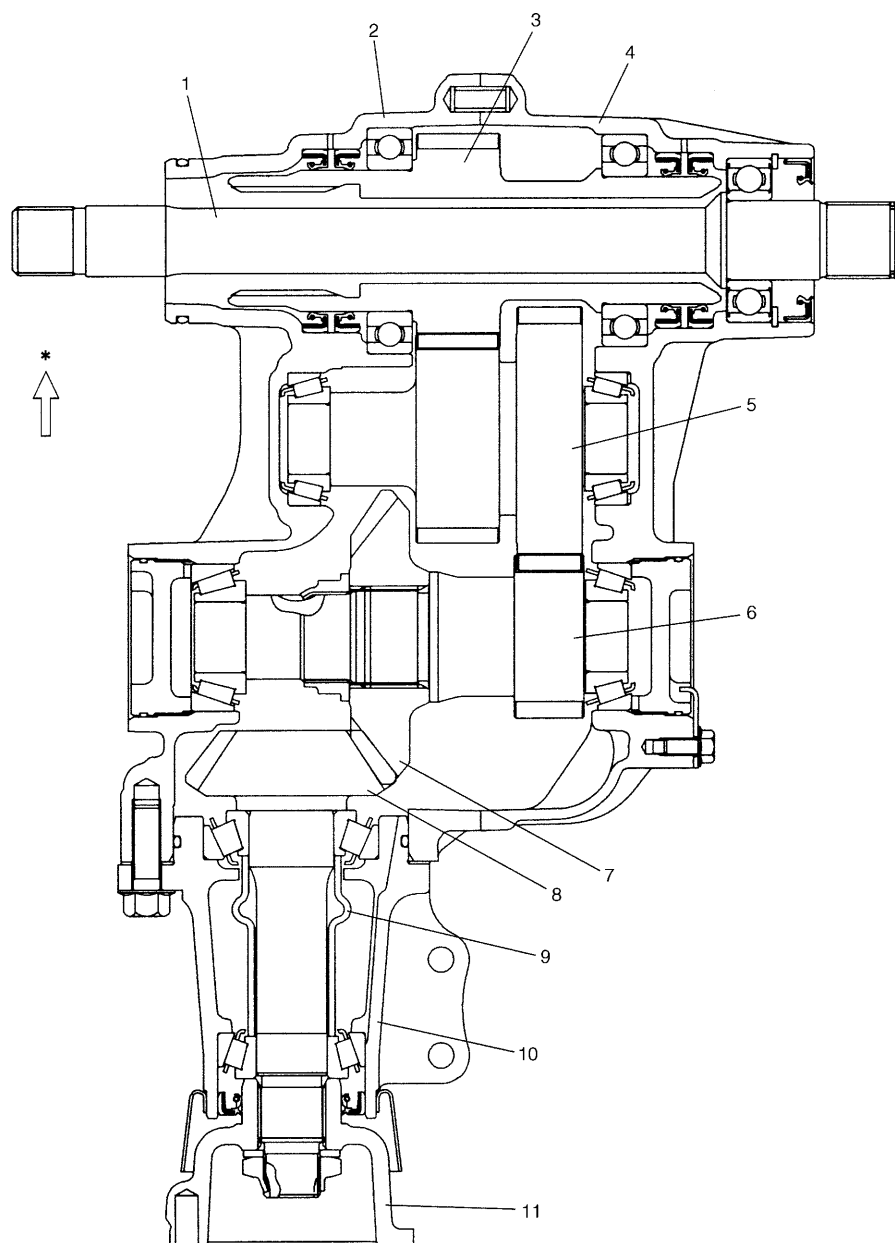
7D

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## General Description

The transfer is mounted on transaxle case by fastening bolt with reduction drive gear in transfer and differential case in transaxle coupled by involute spline. Driving force from transaxle is transmitted to propeller shaft through reduction drive gear, reduction idler gear, reduction driven gear and bevel gear of transfer. As bevel gears, which change the direction of driving torque axis to the direction of the angle with 90 degrees, hypoid gears are provided. Hypoid gears have an advantage of preventing gear noise, at the same time, they require accurate adjustment of tooth contact and backlash.



1. Intermediate shaft	5. Reduction idler gear	9. Spacer
2. Left case	6. Reduction driven gear	10. Transfer output retainer
3. Reduction drive gear	7. Bevel gear	11. Transfer output flange
4. Right case	8. Bevel pinion shaft	* : Forward

## Diagnosis

Condition	Possible Cause	Correction
<b>Noise</b>	Inadequate or insufficient lubricant	Replenish.
	Damaged or worn bearing(s)	Replace.
	Damaged or worn gear(s)	Replace.
	Preload of taper roller bearing is reduced	Adjust.

## On-Vehicle Service

### Oil Change

- 1) Before changing or inspecting oil, be sure to stop engine and lift vehicle horizontally.
- 2) With vehicle lifted up, check oil level and leakage. If leakage exists, correct or repair it.
- 3) Drain old oil, tighten drain plug (2) after applying sealant to its thread and pour new specified oil as shown below by specified amount (roughly up to level hole).

**“A” : Sealant 99000-31110**

#### Tightening torque

**Transfer oil drain plug (a) : 23 N·m (2.3 kg·m, 17.0 lb·ft)**

#### NOTE:

- It is highly recommended to use SAE 75W-90 Gear oil API GL-4.
- Whenever vehicle is hoisted for any other service work than oil change, also check for oil leakage.

#### Transfer gear oil

**:Gear oil API GL-4**

**For oil viscosity, refer to the chart.**

#### Oil Capacity

**: 0.55 liters (1.16/0.97 US/Imp. pt)**

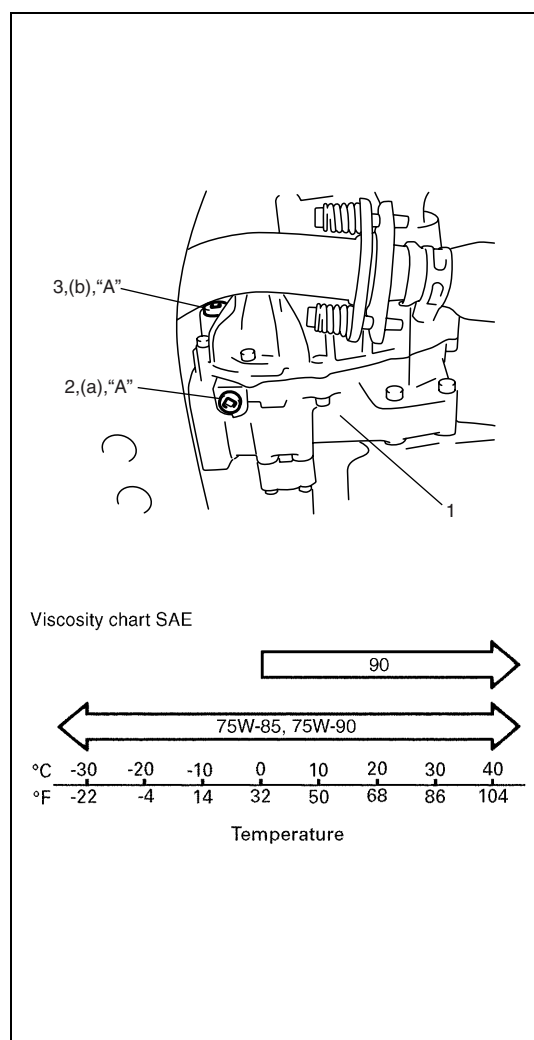
- 4) Torque level/filler plug (3) as specified below after applying sealant to its thread.

**“A” : Sealant 99000-31110**

#### Tightening torque

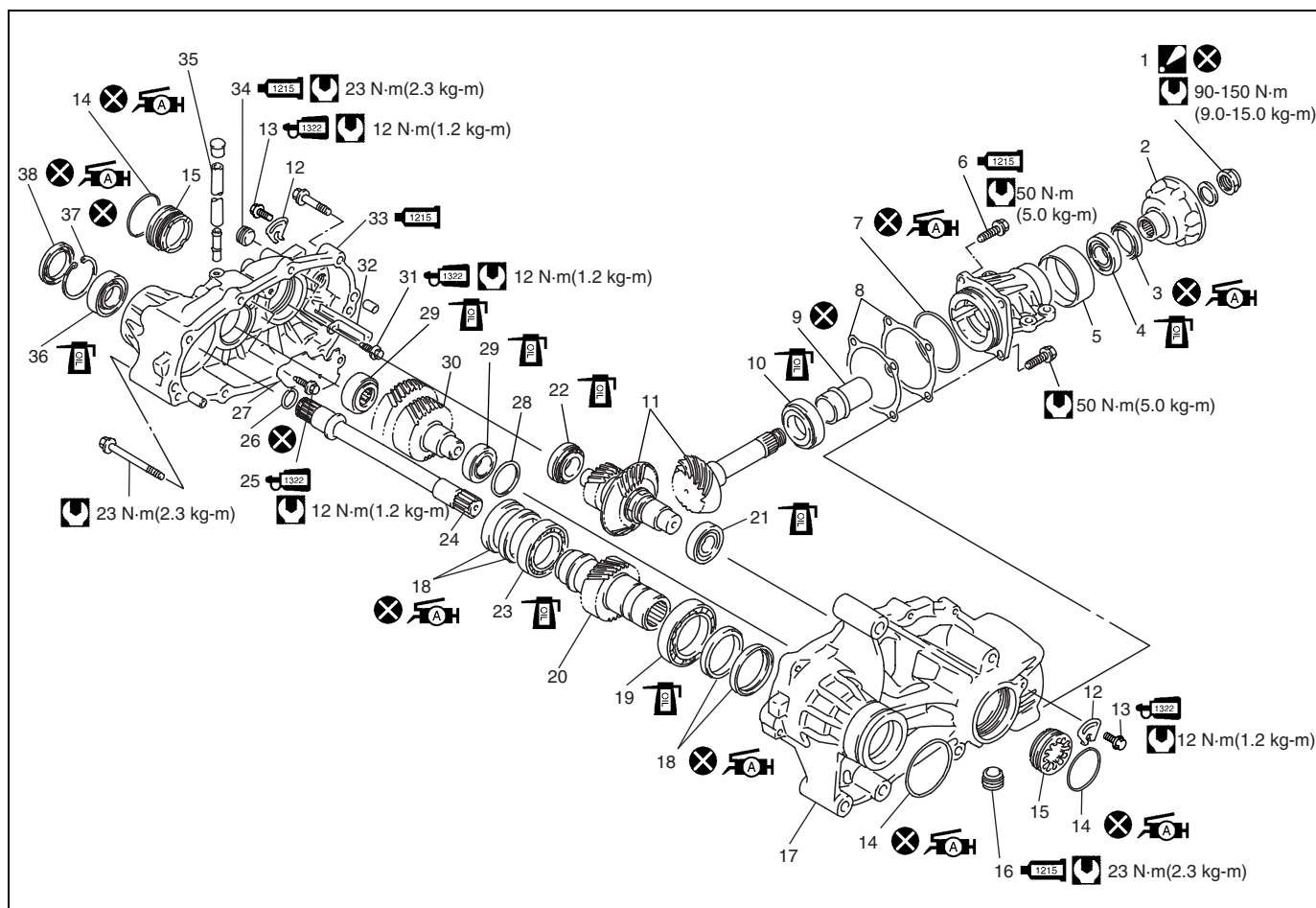
**Transfer oil level / filler plug**

**(b) : 23 N·m (2.3 kg·m, 17.0 lb·ft)**



1. Transfer

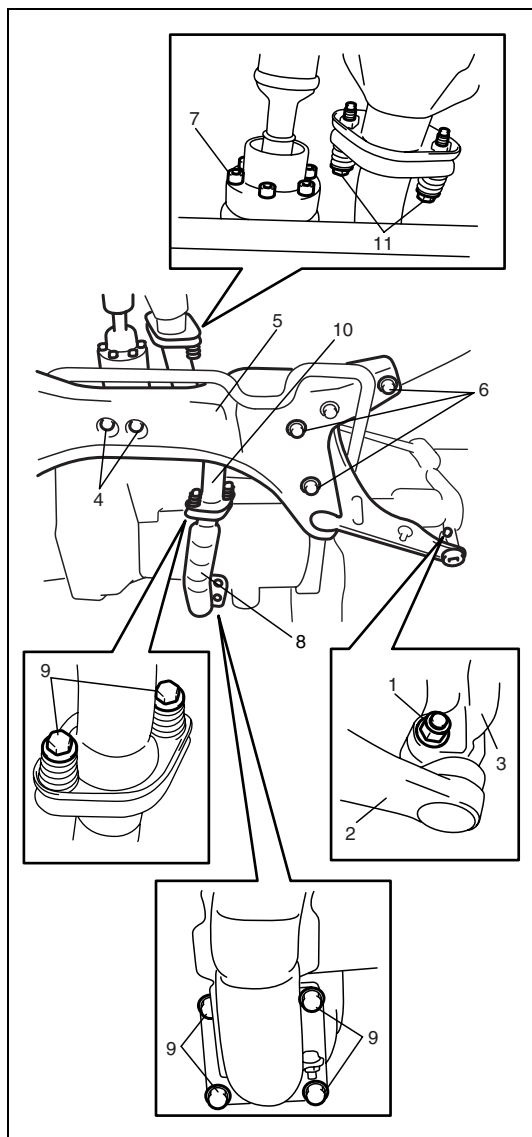
# Unit Repair Overhaul



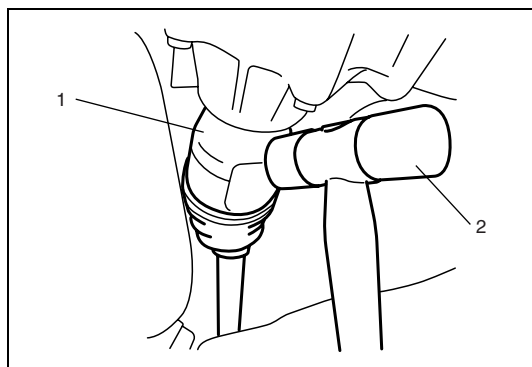
1. Transfer output flange nut : After tightening nut so as rotational torque of pinion shaft to be in specified value, caulk nut securely.	15. Bevel gear adjuster	29. Reduction idler gear taper roller bearing
2. Transfer output flange	16. Oil drain plug : Apply sealant 99000-31110 to thread part.	30. Reduction idler gear
3. Oil seal : Apply grease 99000-25010 to oil seal lip.	17. Transfer left case	31. Oil receiver bolt : Apply thread lock cement 99000-32110 to thread part.
4. Pinion shaft RR taper roller bearing	18. Oil seal : Apply grease 99000-25010 to oil seal lip.	32. Oil receiver
5. Retainer cover	19. Reduction drive gear LH bearing	33. Transfer right case : Apply sealant 99000-31110 to mating surface with right case.
6. Retainer bolt : Apply sealant 99000-31110 to thread part.	20. Reduction drive gear	34. Oil level/filler plug : Apply sealant 99000-31110 to thread part.
7. O-ring : Apply grease 99000-25010 to all around surface.	21. Reduction driven gear LH taper roller bearing	35. Breather hose
8. Shim	22. Reduction driven gear RH taper roller bearing	36. Intermediate shaft bearing
9. Spacer	23. Reduction drive gear RH bearing	37. Snap ring
10. Pinion shaft FR taper roller bearing	24. Intermediate shaft	38. Oil seal : Apply grease 99000-25010 to oil seal lip.
11. Reduction driven gear and bevel gear set	25. Oil protect plate bolt : Apply thread lock cement 99000-32110 to thread part.	Do not reuse.
12. Adjuster plate	26. Snap ring	Tightening torque
13. Adjuster plate bolt : Apply thread lock cement 99000-32110 to thread part.	27. Oil protect plate	Apply transfer oil.
14. O-ring : Apply grease 99000-25010 to all around surface.	28. Shim	

## Unit Dismounting

- 1) Disconnect negative cable at battery.
- 2) Remove transfer breather hose from clamp on intake manifold.
- 3) Hoist vehicle and remove front wheels.
- 4) Drain transfer oil and automatic transaxle fluid.

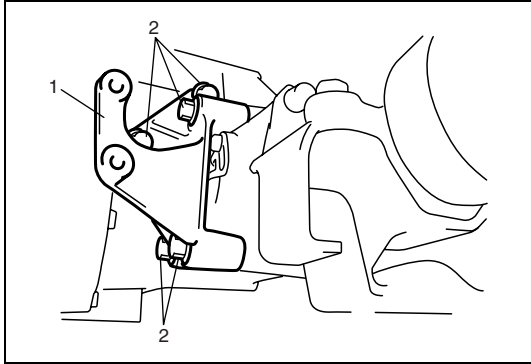


- 5) Remove ball stud bolts (both RH and LH) by removing ball stud lock nuts (1).
- 6) Disconnect ball studs of front suspension arms (2) (both RH and LH) from steering knuckles (3).
- 7) Remove engine rear mounting nuts (4).
- 8) Remove exhaust No.2 pipe hanger bush from suspension frame (5).
- 9) Support suspension frame (5) by transmission jack or the like to prevent suspension frame from drop down.
- 10) Remove 6 suspension frame bolts (6) (both RH and LH).
- 11) Lift down suspension frame with suspension arms and stabilizer.
- 12) Separate propeller shaft front end from transfer output flange by removing bolts (7).
- 13) Remove exhaust No.1 pipe (8) by removing its bolts (9).
- 14) Remove exhaust No.2 pipe (10) by removing its bolts (11).

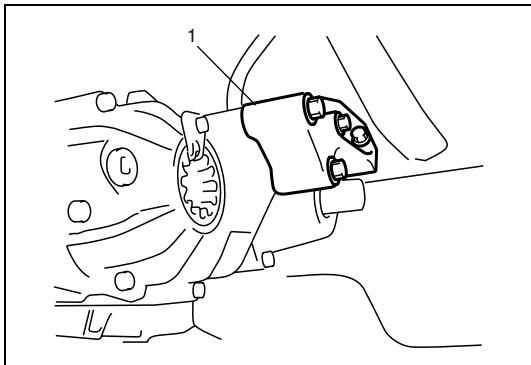


- 15) Remove right side drive shaft (1) tapping joint outer by plastic hammer (2).

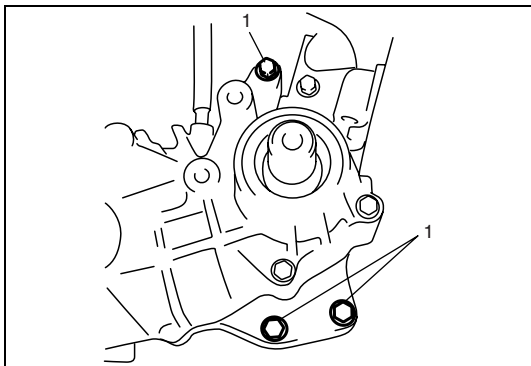




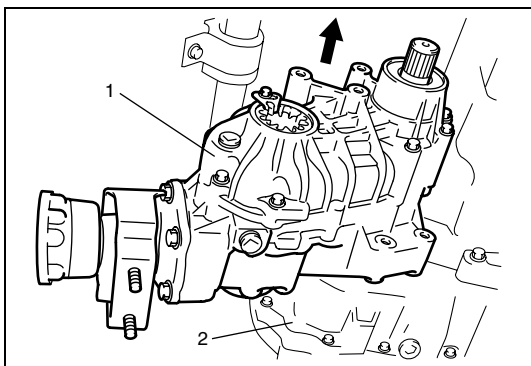
16) Remove transfer to transaxle stiffener (1) by removing its 5 bolts (2).



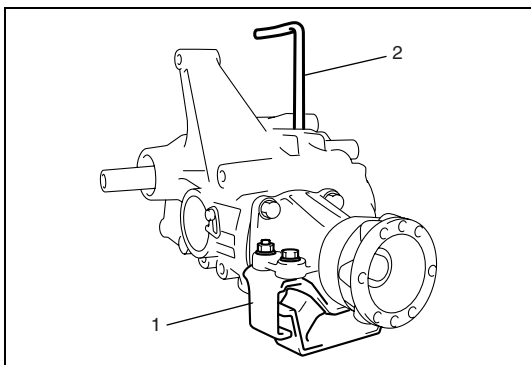
17) Remove transfer to engine stiffener (1) by removing its 6 bolts.



18) Remove transfer mounting bolts (1).



19) Separate transfer assembly (1) from transaxle (2).



20) Remove mounting (1) and breather hose (2) from transfer assembly.

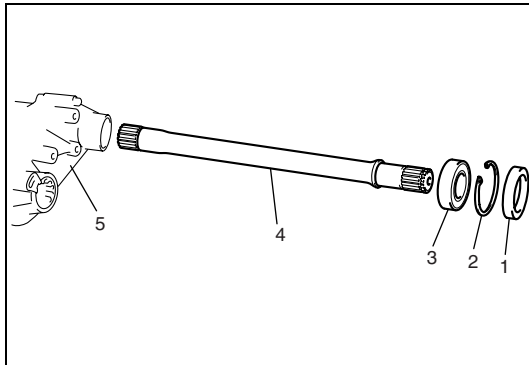
## Unit Disassembly

### Transfer assembly

#### DISASSEMBLY

##### NOTE:

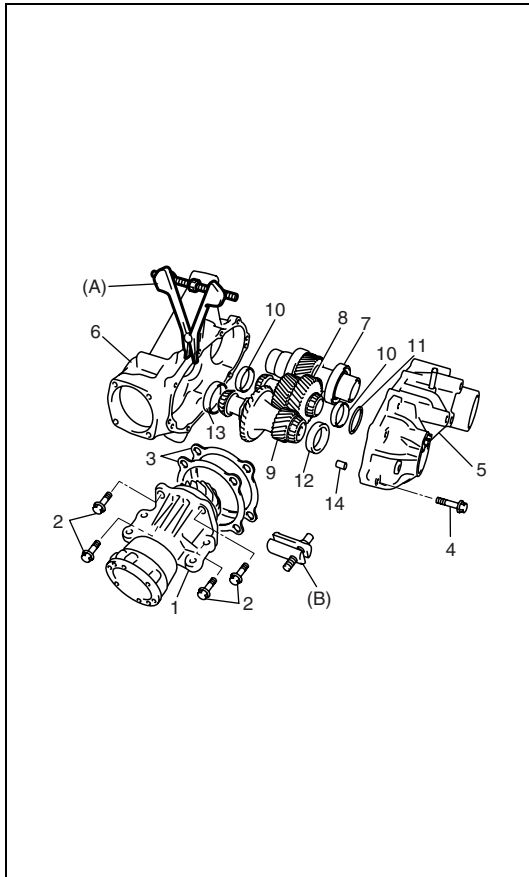
It is possible to disassemble transfer assembly without removing intermediate shaft with Step 1) to 4) performed if not necessary.



- 1) Remove intermediate output oil seal (1) from transfer right case (5).
- 2) Remove snap ring (2) by using special tool.

##### Special tool 09952-76011

- 3) Remove intermediate shaft (4) with intermediate shaft bearing (3).
- 4) Remove intermediate shaft bearing (3) from intermediate shaft (4) by using bearing puller and press.



- 5) Remove transfer output retainer assembly (1) and shims (3) by removing 4 bolts (2).
- 6) Remove 9 transfer case bolts (4).
- 7) Separate transfer right case (5) from transfer left case (6) by using special tool.

##### Special tool (A): 09912-34510

- 8) Remove reduction drive gear assembly (7), reduction idler gear assembly (8) and reduction driven gear assembly (9).
- 9) Remove reduction idler gear taper roller bearing outer race (10), shim (11) and reduction driven gear RH taper roller bearing outer race (12) from transfer right case (5).
- 10) Remove reduction idler gear taper roller bearing outer race (10), reduction driven gear LH taper roller bearing outer race (13) from transfer left case (6).

##### NOTE:

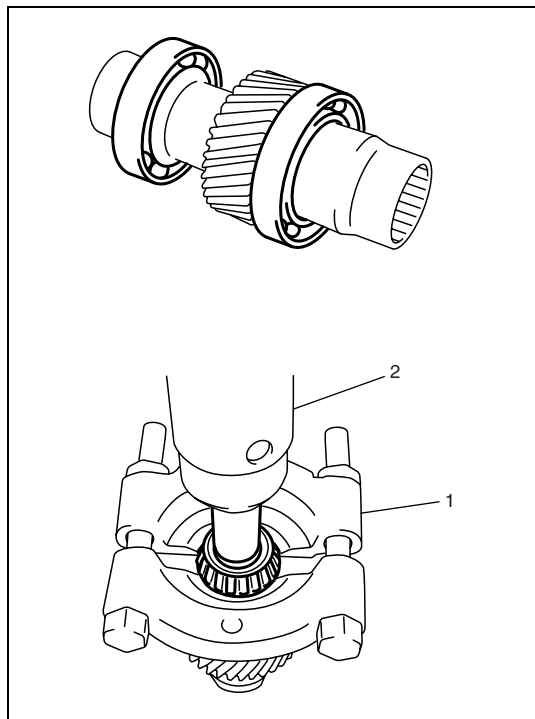
When it is difficult to remove taper roller bearing outer races from cases, remove them with special tool.

##### Special tool (B): 09941-54911

14. Knock pin

## Reduction drive gear, reduction idler gear and reduction driven gear

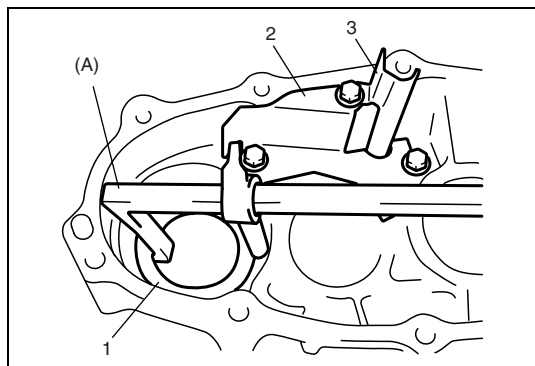
### DISASSEMBLY



- 1) Drive out bearings of reduction drive gear, reduction idler gear and reduction driven gear by using bearing puller (1) and hydraulic press (2).

## Transfer right case and left case

### DISASSEMBLY

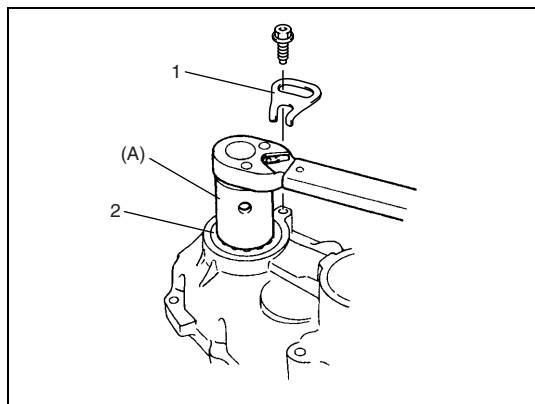


- 1) Remove oil seals (1) from transfer right case and left case by using special tool.

#### Special tool

(A): 09913-50121

- 2) Remove oil protect plate (2) and oil receiver (3) from transfer right case.



- 3) Remove adjuster plates (1) from transfer right and left cases.
- 4) Remove bevel gear adjuster (2) from transfer right and left cases by using special tool.

#### Special tool

(A) : 09940-14940

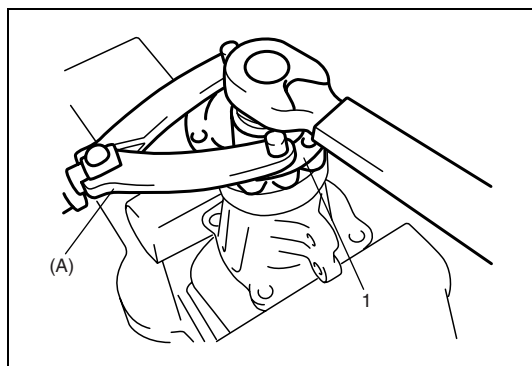
## Transfer output retainer assembly

### DISASSEMBLY

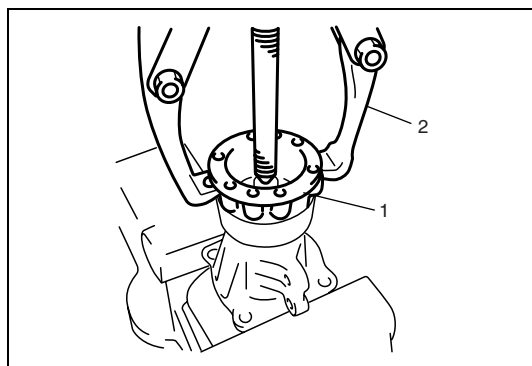
- 1) Uncaulk transfer output flange nut.
- 2) Remove transfer output flange nut while holding flange (1) by using special tool.

#### Special tool

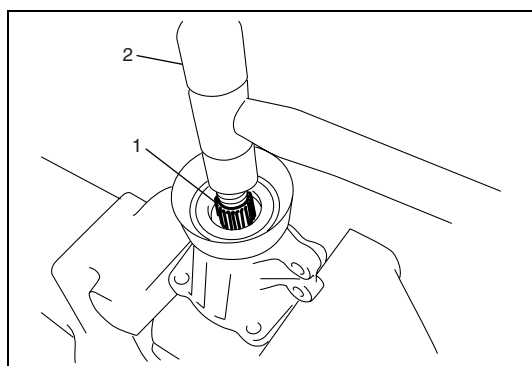
(A) : 09930-40113



- 3) Remove transfer output flange (1) by bearing puller (2).



- 4) Drive out bevel pinion shaft (1) from transfer output retainer by tapping it with plastic hammer (2).

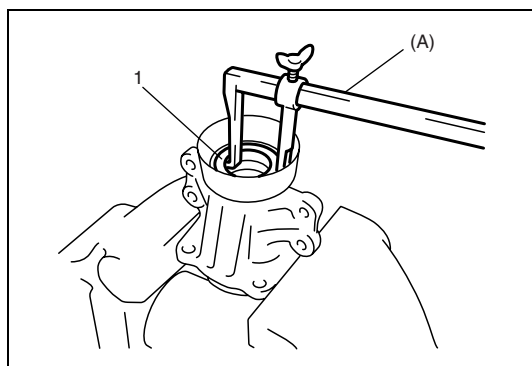


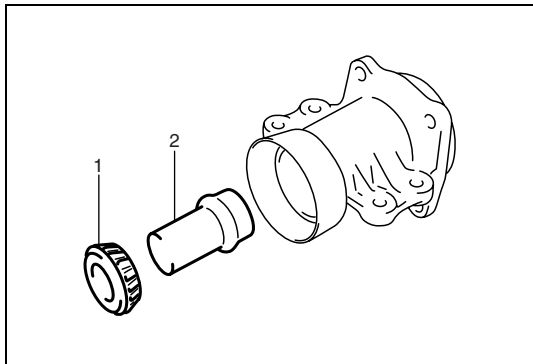
- 5) Drive out pinion shaft bearing from bevel pinion shaft by using bearing puller and hydraulic press.

- 6) Remove pinion shaft oil seal (1) by using special tool.

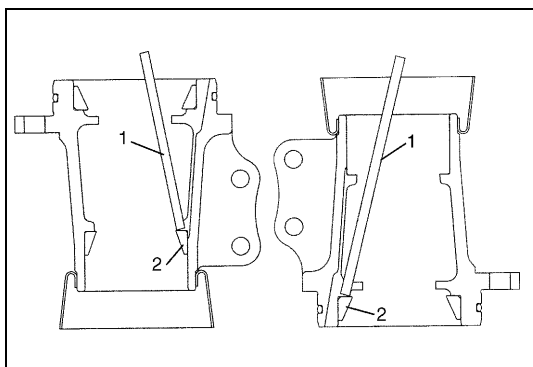
#### Special tool

(A) : 09913-50121





- 7) Remove pinion shaft RR taper roller bearing (1) and spacer (2).



- 8) Drive out pinion shaft taper roller bearing outer races (2) (front and rear) by using brass bar (1).

## Component Inspection

- Check each bearing for smooth rotation, wear or discoloration.  
If found abnormal, replace.
- Check oil seal for leakage and its lip for excessive hardness.  
If either is found, replace.
- Check transfer case for cracks.
- Check bevel pinion and bevel gear for wear or cracks.

## Unit Assembly

Judging from faulty conditions noted before disassembly and what is found through visual check of bearing and gear tooth etc. after disassembly, prepare replacing parts and proceed to reassembly according to procedures as described below.

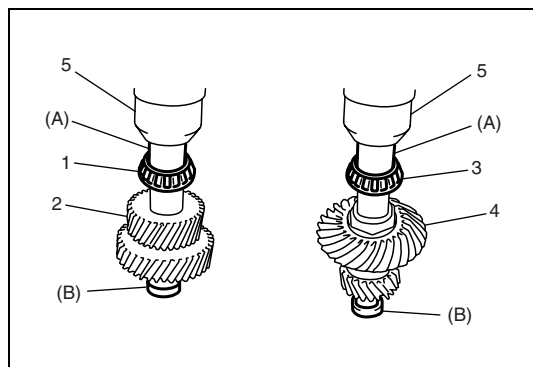
### CAUTION:

- **Bevel gear and pinion must be replaced as a set when either replacement becomes necessary.**
- **When replacing taper roller bearing, replace as inner race & outer race assembly.**

## Reduction drive gear, reduction idler gear and reduction driven gear

### ASSEMBLY

- 1) Drive in reduction drive gear bearings (right and left) to reduction drive gear by using bearing puller and hydraulic press.
- 2) Drive in reduction idler gear bearings (1) (right and left) to reduction idler gear (2) by using special tools and hydraulic press (5).
- 3) Drive in reduction driven gear bearings (3) (right and left) to reduction driven gear (4) by using special tools and hydraulic press (5).



### Special tool

(A) : 09944-66060

(B) : 09925-88210

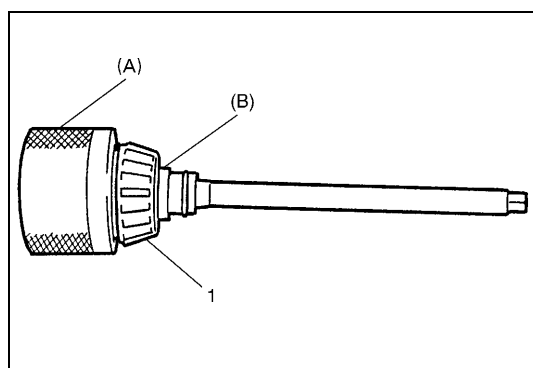
### Reduction gear taper roller bearings dimension

	Outside diameter	Width
Reduction idler gear taper roller bearing	47 mm (1.85 in.)	15 mm (0.59 in.)
Reduction driven gear RH taper roller bearing	52 mm (2.05 in.)	16.3 mm (0.64 in.)
Reduction driven gear LH taper roller bearing	52 mm (2.05 in.)	19.3 mm (0.76 in.)

## Transfer output retainer assembly

### ADJUSTMENT

To mesh bevel gears correctly, it is prrequired to install bevel pinion to transfer output retainer properly by using adjusting shim (bevel pinion shim) as described on following pages.

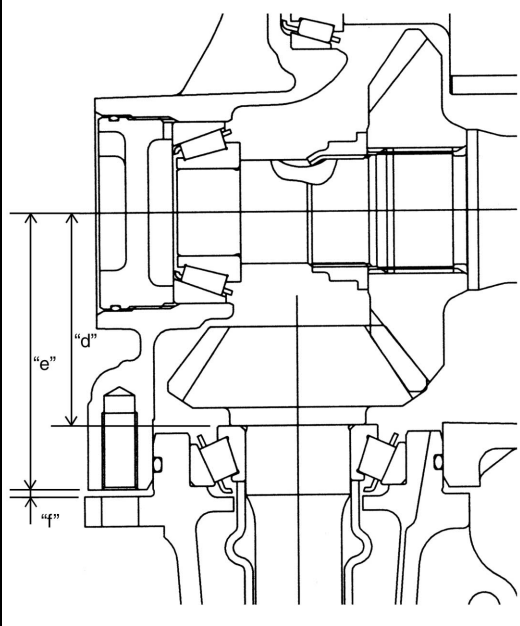
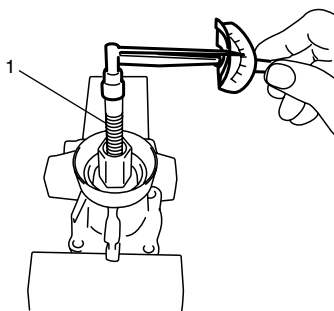
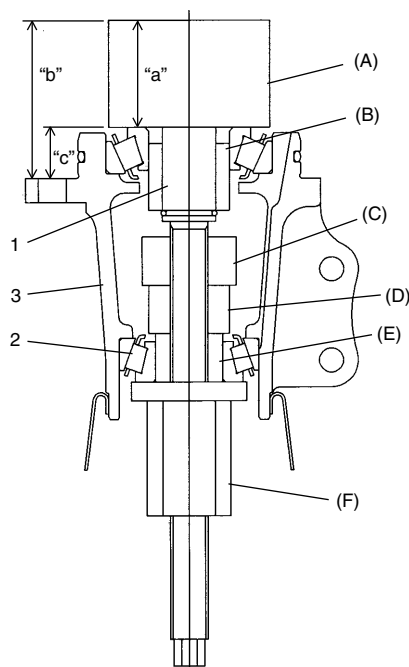


- Install pinion shaft FR taper roller bearing (1) to bevel pinion dummy (special tools).

### Special tool

(A) : 09922-76140

(B) : 09922-76420



- Install bevel pinion dummy (1), pinion shaft RR taper roller bearing (2) and special tools to transfer output retainer (3).

#### Special tool

(A) : 09922-76140

(B) : 09922-76420

(C) : 09922-76310

(D) : 09922-76320

(E) : 09922-76340

(F) : 09922-76150

#### NOTE:

**This installation requires no spacer or oil seal.**

- Tighten bevel pinion nut (special tool) so that specified bearing preload is obtained.

#### NOTE:

**Before taking measurement, check for rotation by hand more than 15 revolutions.**

**Rotational torque of bevel pinion shaft (Bearing preload)  
0.50 – 1.50 N·m (5.0 – 15.0 kg·cm, 0.35 – 1.10 lb·ft)**

- Measure height "b" in figure by using vernier caliper. Calculate "c" by using measured value.

Distance "c"	=	Height "b"	–	Height "a" 40 mm (1.575 in.)
--------------	---	------------	---	------------------------------------

"a": Pinion dummy height 40 mm (1.575 in.)

"b": Height from retainer installation face to top surface of pinion dummy

"c": Distance from retainer installation face to end face of bearing race

- Obtain adjusting shim thickness by the following equation.

Necessary shim thickness "f"	=	Distance "c"	–	Distance "e" 79.25 mm (3.120 in.)	+	Distance "d" 61.2 mm (2.409 in.)
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"d": Pinion shaft mounting distance 61.2 mm (2.409 in.)

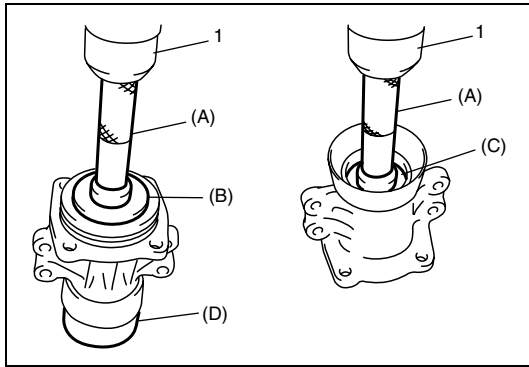
"e": Distance from end face of left case to axis of reduction driven gear  
79.25 mm (3.120 in.)

"f": Necessary shim thickness

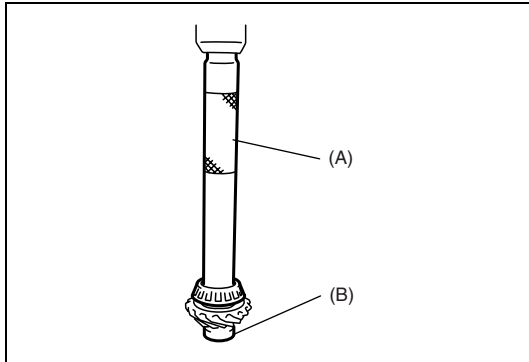
- Select adjusting shim closest to calculated value from among the following available sizes.

#### Available bevel pinion shim thickness

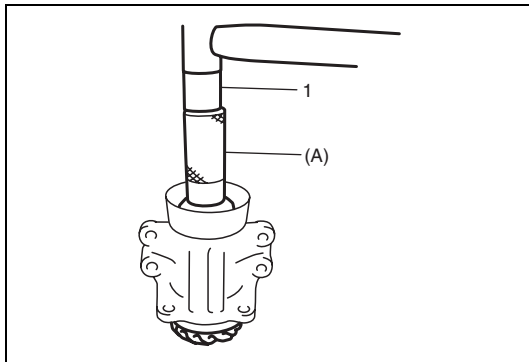
: 0.30, 0.60, 0.63, 0.66, 0.69, 0.72, 0.75, 0.78, 0.81, 0.84 and 0.87 mm (0.012, 0.024, 0.025, 0.026, 0.027, 0.028, 0.030, 0.031, 0.032, 0.033 and 0.034 in.)

**ASSEMBLY**

- 1) Press-fit pinion shaft taper roller bearing outer races (front and rear) by using special tools and hydraulic press (1).

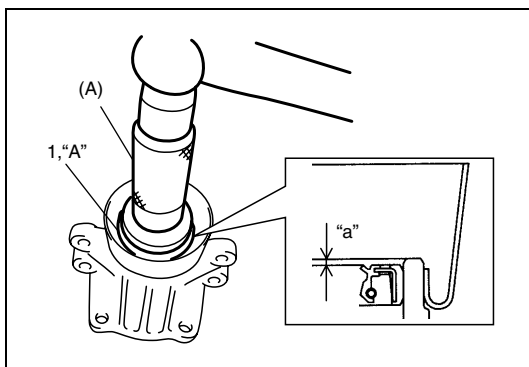
**Special tool****(A) : 09913-75821****(B) : 09924-84510-002****(C) : 09924-84510-005****(D) : 09951-18210**

- 2) Press-fit pinion shaft FR taper roller bearing by using special tools and hydraulic press.

**Special tool****(A) : 09941-74910****(B) : 09925-88210**

- 3) Install bevel pinion shaft with new pinion shaft spacer to transfer output retainer.

- 4) Drive in pinion shaft RR taper roller bearing by using special tool and tapping lightly with plastic hammer (1).

**Special tool****(A) : 09913-75810**

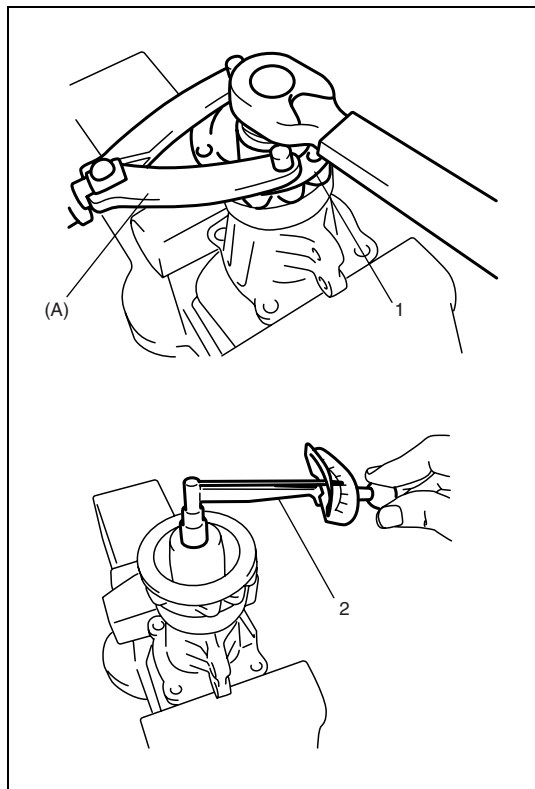
- 5) Apply grease to new oil seal lip.

**"A" : Grease 99000-25010**

- 6) Drive in oil seal (1) by using special tool and hammer.

**Special tool****(A) : 09913-75810****Transfer output flange oil seal installing depth****"a" : 1.0 – 2.0 mm (0.04 – 0.08 in.)**





- 7) Install transfer output flange nut (1) by tapping with plastic hammer and tighten transfer output flange nut gradually so as rotational torque of bevel pinion shaft to be in specified value.

**NOTE:**

- If rotational torque of bevel pinion shaft exceeds specification given below, replace pinion shaft spacer and tighten flange nut.
- Before taking measurement of rotational torque, rotate pinion shaft over ten rounds in advance.

**Special tool**

(A) : 09930-40113

**Tightening torque**

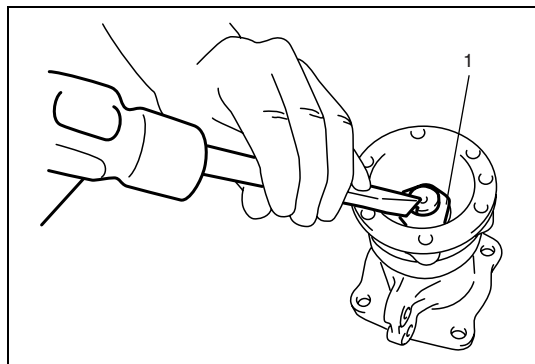
**Transfer output flange nut (reference)**

: 90 – 150 N·m (9.0 – 15.0 kg-m, 65.0 – 108 lb-ft)

**Rotational torque of bevel pinion shaft (Bearing preload)**

0.5 – 1.50 N·m (5.0 – 15.0 kg-cm, 0.35 – 1.10 lb-ft)

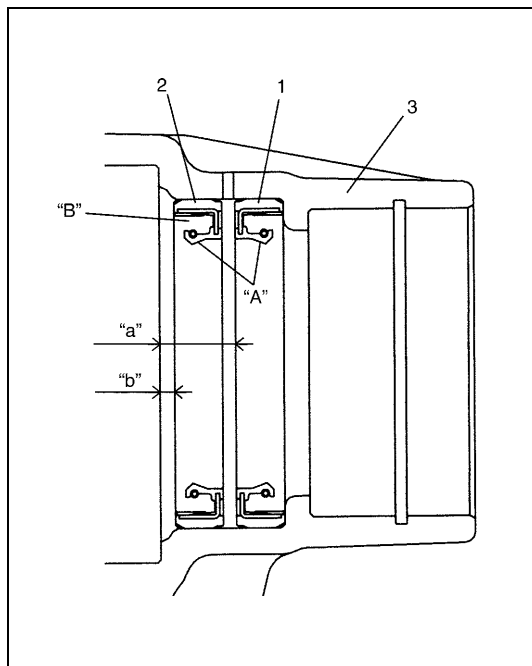
2. Torque wrench



- 8) Caulk transfer output flange nut (1).

## Transfer right case

### ASSEMBLY



- 1) Apply grease to reduction drive gear oil seal lips

**"A" : Grease 99000-25010**

- 2) Install reduction drive gear oil seals (1, 2) to right case (3) by using special tool.

#### CAUTION:

**Use care the installation direction and depth of oil seals for correct installation.**

#### Special tool

**09913-75520**

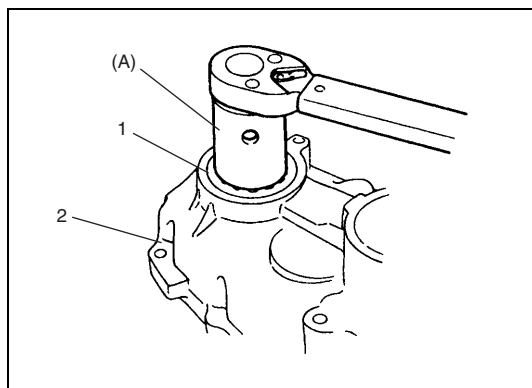
#### Transfer reduction drive gear oil seal installing depth

**"a" : 13.3 – 14.3 mm (0.524 – 0.563 in.)**

**"b" : 2.8 – 3.8 mm (0.110 – 0.150 in.)**

- 3) Fill inside of oil seal (2) with grease of about 3 g (0.11 oz).

**"B" : Grease 99000-25010**



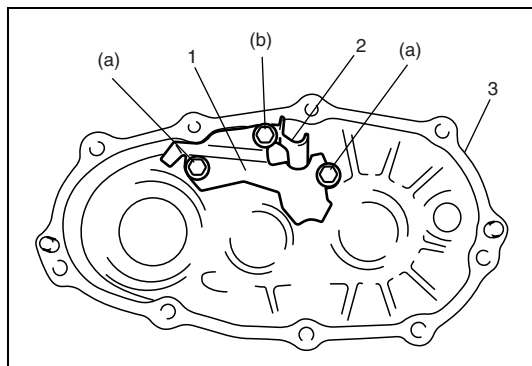
- 4) Screw bevel gear adjuster (1) in right case (2) until side face of bevel gear adjuster (1) come to flush position with side face of right case (2) by using special tool.

#### Special tool

**(A) : 09940-14940**

#### NOTE:

**Do not screw in bevel gear adjuster excessively, or pre-load of reduction idler gear taper roller bearing may not be adjusted accurately.**



- 5) Install oil protect plate (1) and oil receiver (2) to right case (3).

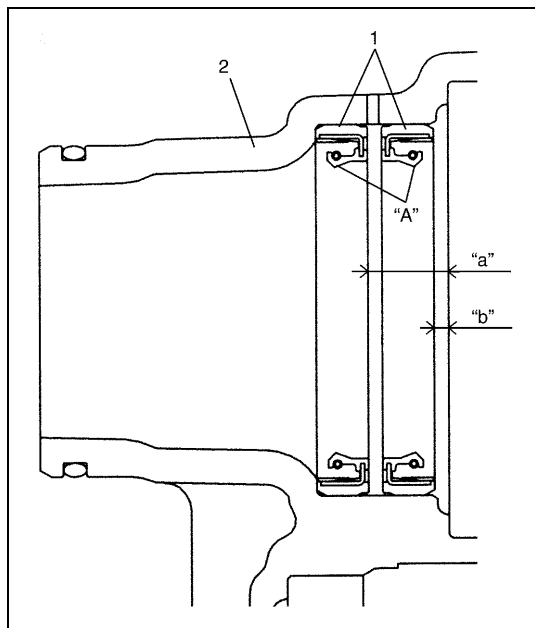
#### Tightening torque

**Oil protect plate bolts (a) : 12 N·m (1.2 kg-m, 9.0 lb-ft)**

**Oil receiver bolt (b) : 12 N·m (1.2 kg-m, 9.0 lb-ft)**

## Transfer left case

### ASSEMBLY



- 1) Apply grease to reduction drive gear oil seal lips.

**“A” : Grease 99000-25010**

- 2) Install reduction drive gear oil seals (1) to left case (2) by using special tool.

#### CAUTION:

**Use care the installation direction and depth of oil seals for correct installation.**

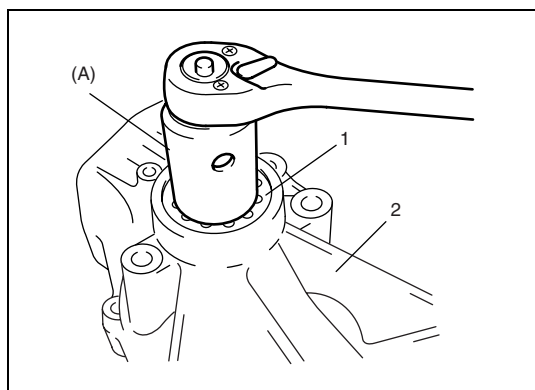
#### Special tool

**09913-85210**

#### Transfer reduction drive gear oil seal installing depth

**“a” : 13.0 – 14.0 mm (0.512 – 0.551 in.)**

**“b” : 2.5 – 3.5 mm (0.098 – 0.138 in.)**



- 3) Screw bevel gear adjuster (1) in left case (2) until side face of bevel gear adjuster (1) come to flush position with side face of left case (2) by using special tool.

#### Special tool

**(A) : 09940-14940**

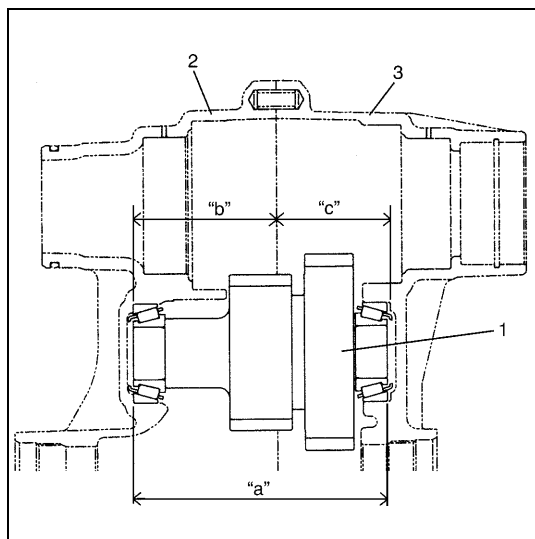
#### NOTE:

**Do not screw in bevel gear adjuster excessively, or preload of reduction idler gear taper roller bearing may not be adjusted accurately.**

## Transfer assembly

### ADJUSTMENT

#### Reduction idler gear shim



- Measure distance “a” between taper roller bearing outer races of reduction idler gear (1).
- Measure depth “b” of left case (2) and “c” of right case (3).
- Obtain adjusting shim thickness by the following equation.

Neces- sary shim thickness	=	Depth “b”	+	Depth “c”	-	Distance “a”	+	0.05 mm (0.002 in.)
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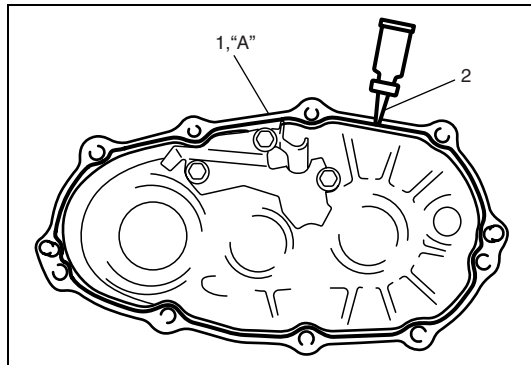
- Select adjusting shim closest to calculated value from among the following available sizes.

#### Available reduction idler gear shim thickness

**: 0.55, 0.60, 0.65, 0.70, 0.75, 0.80, 0.85, 0.90, 0.95, 1.00, 1.05, 1.10 and 1.15 mm (0.022, 0.024, 0.026, 0.028, 0.030, 0.031, 0.033, 0.035, 0.037, 0.039, 0.041, 0.043 and 0.045 in.)**

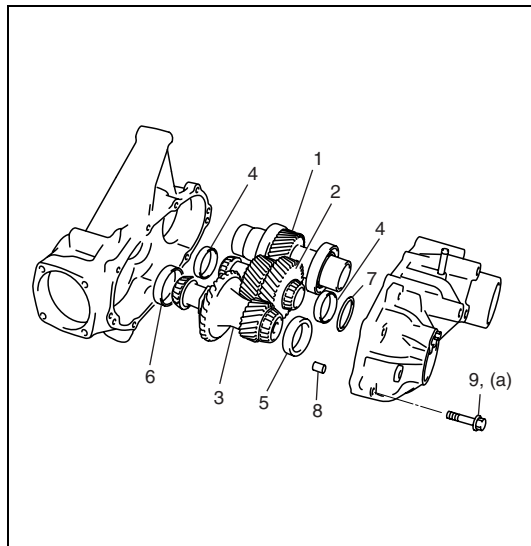
## ASSEMBLY

### Transfer sub-assembly



- 1) Clean mating surface of right and left cases, and apply sealant to right case (1) by using a nozzle (2) as shown in figure by such amount that its section is 1.2 mm (0.047 in.) in diameter.

**“A” : Sealant 99000-31110**



- 2) Assemble the following parts in right and left cases by reversing disassembling procedure.

- Reduction drive gear assembly (1)
- Reduction idler gear assembly (2)
- Reduction driven gear assembly (3)
- Reduction idler gear taper roller bearing outer races (4)
- Reduction driven gear RH taper roller bearing outer race (5)
- Reduction driven gear LH taper roller bearing outer race (6)
- Reduction idler gear shim (7)
- Knock pin (8)

- 3) Tighten 9 transfer case bolts (9) to specified torque.

#### Tightening torque

#### Transfer case bolts

**(a) : 23 N·m (2.3 kg-m, 17.0 lb-ft)**

## ADJUSTMENT

### Reduction idler gear taper roller bearing preload

- Measure reduction drive gear starting torque (i.e., preload of reduction idler gear taper roller bearings) by using special tool and torque wrench (1).

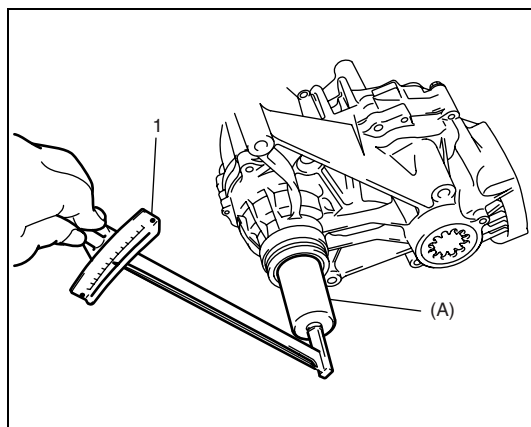
#### Special tool

**(A) : 09928-36010**

#### Starting torque of reduction drive gear (reduction idler gear bearing preload)

**0.5 – 1.4 N·m (5 – 14 kg-cm, 0.35 – 1.0 lb-ft)**

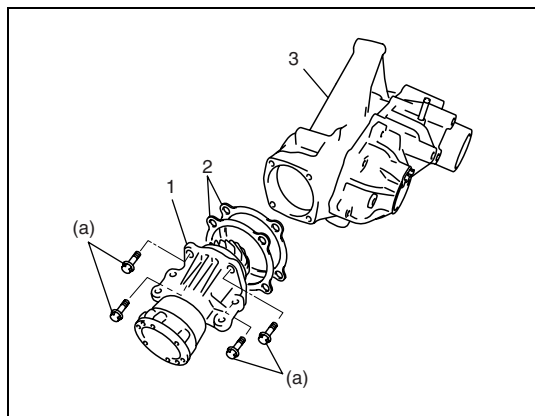
If starting torque is out of specification, replace reduction idler gear shim and measure starting torque again.



#### NOTE:

**Make a record of starting torque of reduction drive gear because it is used for adjusting reduction driven gear taper roller bearing preload.**

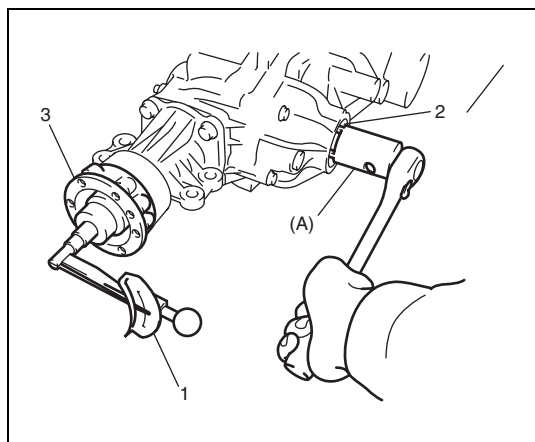
## Bevel gear back lash



- 1) Install transfer output retainer assembly (1) with bevel pinion shims (2) selected in "Transfer output retainer assembly adjustment" in this section to transfer sub-assembly (3).

### Tightening torque

**Transfer output retainer bolts (a) : 50 N·m (5.0 kg·m, 36.5 lb·ft)**



- 2) Set torque wrench (1) on transfer output flange nut.
- 3) Screw bevel gear adjuster (2) on right case until transfer output flange (3) does not rotate by rotational torque with 10 – 20 N·m (100 – 200 kg·cm, 7.5 – 14.5 lb·ft) by using special tool.
- 4) Loosen bevel gear adjuster (2) on right case to angle with 24 – 36° to make backlash between bevel gears.

### Special tool

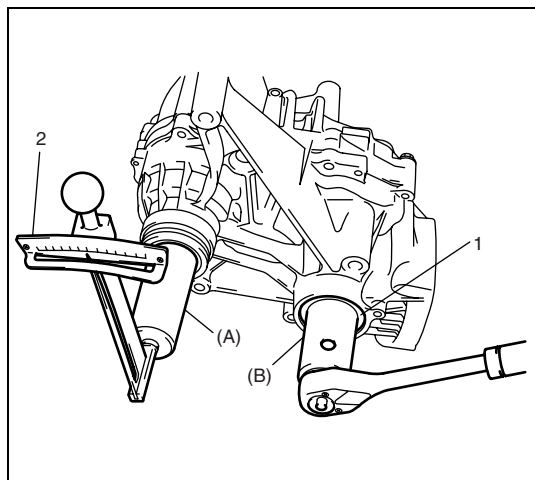
**(A) : 09940-14940**

### Bevel gear backlash

**0.1 – 0.15 mm (0.004 – 0.006 in.)**

- 5) Remove transfer output retainer assembly and bevel gear shims to measure reduction driven gear taper roller bearing preload.

## Reduction driven gear taper roller bearing preload



- Screw bevel gear adjuster (1) on right case by using special tool while measuring starting torque of reduction drive gear (i.e., preload of reduction idler gear and driven gear taper roller bearings) by using special tool and torque wrench (2) until corrected starting torque value of reduction drive gear is in specified value shown below.

### Special tool

**(A) : 09928-36010**

**(B) : 09940-14940**

- Correct starting torque to starting torque caused by only preload of reduction driven gear taper roller bearings by the following equation.

Corrected starting torque of reduction drive gear (reduction driven gear bearing preload)

=

Measured starting torque of reduction drive gear as reduction idler gear and driven gear bearing preload

–

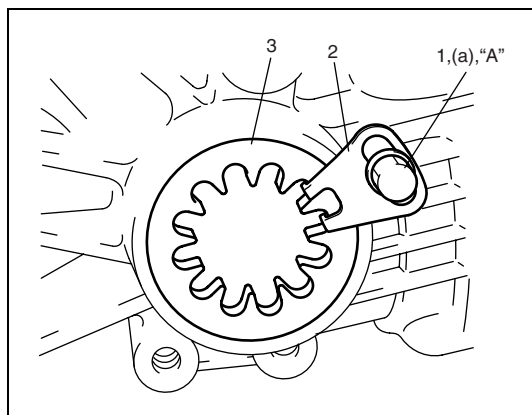
Measured starting torque of reduction drive gear as reduction idler gear bearing preload

**Corrected starting torque of reduction drive gear (reduction driven gear bearing preload)**

**0.35 – 2.5 N·m (3.5 – 25 kg-cm, 0.25 – 1.8 lb-ft)**

## ASESEMBLY

### Adjuster plate



- 1) Apply thread lock cement to thread part of adjuster plate bolts (1).

**“A” : Cement 99000-32110**

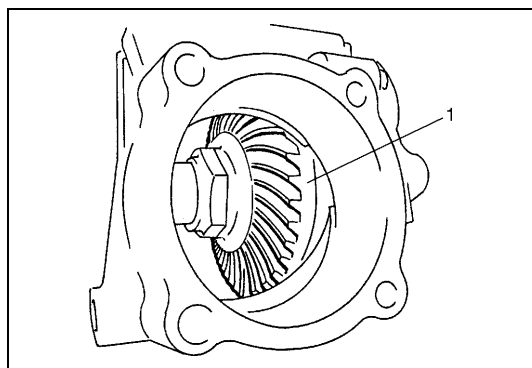
- 2) Install adjuster plates (2) to transfer right and left case so as one side of plate claw to touch dent wall of bevel gear adjuster (3) as shown in figure to prevent bevel gear adjusters (3) from loosening.

### Tightening torque

**Adjuster plate bolts (a) : 12 N·m (1.2 kg-m, 9.0 lb-ft)**

## INSPECTION

### Bevel gear tooth contact



- 1) After cleaning tooth surface of bevel gear (1), paint them with gear marking compound evenly by using brush or sponge etc.

### NOTE:

**When applying red lead paste to teeth, be sure to paint tooth surfaces uniformly. The paste must not be too dry or too fluid.**

- 2) Install transfer output retainer assembly with bevel pinion shims selected in “Transfer output retainer assembly adjustment” in this section to transfer sub-assembly.

### Tightening torque

**Transfer output retainer bolts : 50 N·m (5.0 kg-m, 36.5 lb-ft)**

- 3) Turn transfer output flange clockwise and counterclockwise repeatedly, and remove transfer output retainer assembly and bevel gear shims from transfer sub-assembly.

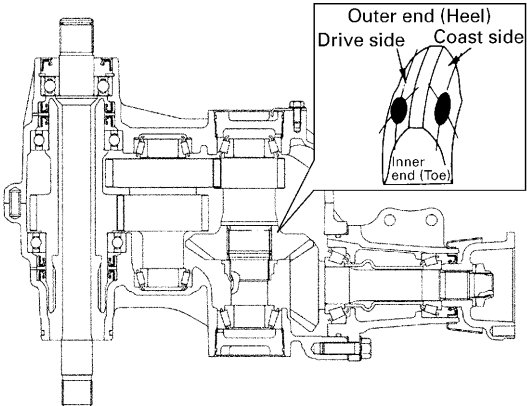

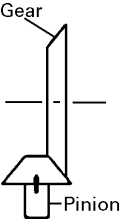

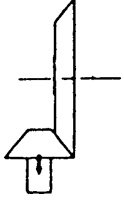
- 4) Bring painted part up and check contact pattern, referring to following chart.

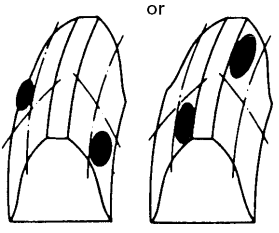
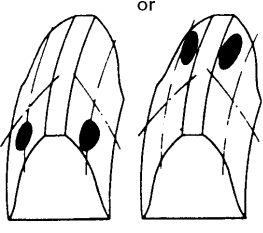
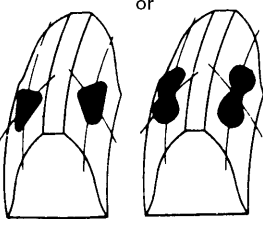
If contact pattern is not normal, readjust or replace as necessary according to instruction in chart.

**NOTE:**

- Be careful not to turn bevel gear more than one full revolution, for it will hinder accurate check.
- If bevel gear back lash and bevel pinion shims are adjusted properly, correct tooth contact should be provided.

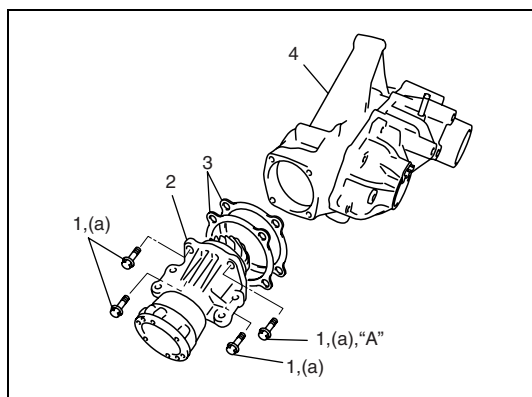
If correct tooth contact is not provided even when they are adjusted properly, however, there may be an abnormal condition in worn tooth, transfer case or retainer. Check each component and replace as necessary.

TOOTH CONTACT PATTERN	DIAGNOSIS AND REMEDY
	<p><b>NORMAL</b></p>
	<p><b>HIGH CONTACT</b> Pinion is positioned too far from the center of drive bevel gear.</p> <ol style="list-style-type: none"> <li>1) Decrease thickness of bevel pinion shim and position pinion closer to gear center.</li> <li>2) Adjust drive bevel gear backlash to specification.</li> </ol> 
	<p><b>LOW CONTACT</b> Pinion is positioned too close to the center of drive bevel gear.</p> <ol style="list-style-type: none"> <li>1) Increase thickness of bevel pinion shim and position pinion farther from gear center.</li> <li>2) Adjust drive bevel gear backlash to specification.</li> </ol> 

TOOTH CONTACT PATTERN	DIAGNOSIS AND REMEDY
	<p>These contact patterns indicate that the “offset” of reduction driven gear is too much or too little. The remedy is to change the division of the bevel gear shim(s).</p>
	<p>These contact patterns, located on toe or heel on both drive and coast sides, mean that 1) both pinion and gear are defective, 2) retainer is not true, or 3) gear is not properly seated on transfer case. The remedy is to replace the defective member.</p>
	<p>Irregular patterns: If the pattern is not oval, it means that bevel gear is defective. High or low spots on tooth surfaces or on the seat of bevel gear are the cause of irregular patterns appearing on some teeth. The remedy is to replace the pinion and gear set and, if the seat is defective, so is transfer case.</p>

## ASSEMBLY

### Transfer output retainer assembly



- 1) Apply sealant to one of retainer bolts (1).

**“A” : Sealant 99000-31110**

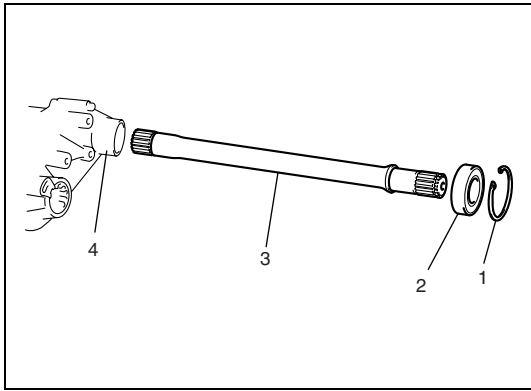
- 2) Install transfer output retainer assembly (2) with bevel pinion shims (3) selected in “Transfer output retainer assembly adjustment” in this section to transfer sub-assembly (4) by tightening retainer bolts (1) to specified torque.

#### Tightening torque

**Transfer output retainer bolts (a) : 50 N·m (5.0 kg-m, 36.5 lb-ft)**



### Intermediate shaft and oil seal

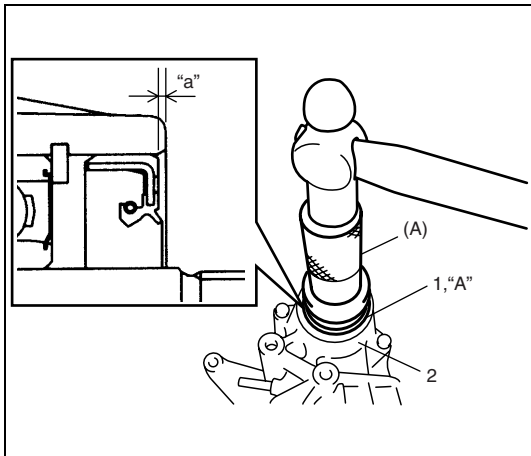


- 1) Install intermediate shaft bearing (2) to intermediate shaft (3) by using special tool.

**Special tool**  
**09941-74910**

- 2) Install intermediate shaft with bearing in transfer (4).
- 3) Install snap ring (1) to transfer right case by using special tool.

**Special tool**  
**09952-76011**



- 4) Apply grease to new intermediate output oil seal lip.

**“A” : Grease 99000-25010**

- 5) Drive intermediate output oil seal (1) in transfer right case (2) by using special tool and hammer.

**Special tool**  
**(A) : 09925-15410**

**Intermediate output oil seal installing depth**

**“a” : 1.0 – 2.0 mm (0.04 – 0.08 in.)**

## Unit Installation

Install transfer assembly by reversing removal procedure noting the following points.

- Tighten bolts and nuts to specified torque shown below.

### Tightening torque

#### Engine rear mounting bracket nuts

(a) : 25 N·m (2.5 kg-m, 18.0 lb-ft)

#### Transfer mounting bolts

(b) : 50 N·m (5.0 kg-m, 36.5 lb-ft)

#### Transfer to engine stiffener bolts

(c) : 50 N·m (5.0 kg-m, 36.5 lb-ft)

#### Transfer to transaxle stiffener bolts

(d) : 50 N·m (5.0 kg-m, 36.5 lb-ft)

#### Propeller shaft No.1 bolts

(e) : 23 N·m (2.3 kg-m, 17.0 lb-ft)

#### Exhaust No.2 pipe to muffler bolts

(f) : 43 N·m (4.3 kg-m, 31.5 lb-ft)

#### Suspension frame bolts

(g) : 90 N·m (9.0 kg-m, 65.0 lb-ft)

#### Engine rear mounting nuts

(h) : 45 N·m (4.5 kg-m, 32.5 lb-ft)

#### Ball stud lock nuts

(i) : 60 N·m (6.0 kg-m, 43.5 lb-ft)

#### Exhaust No.2 pipe to No.1 pipe bolts

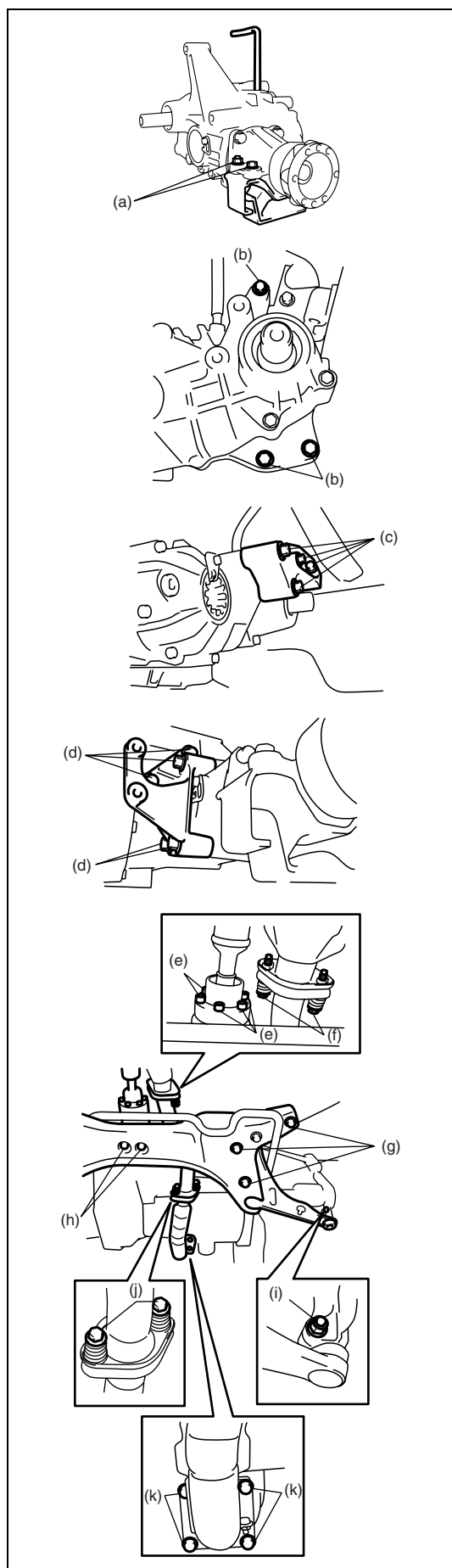
(j) : 43 N·m (4.3 kg-m, 31.5 lb-ft)

#### Exhaust No.1 pipe to exhaust manifold bolts

(k) : 50 N·m (5.0 kg-m, 36.5 lb-ft)

Wheel nuts : 85 N·m (8.5 kg-m, 61.5 lb-ft)

- Pour transfer oil to transfer referring to "Oil Change" in this section.
- Pour automatic transaxle fluid to automatic transaxle referring to Section 7B1.
- Check oil level and leakage.



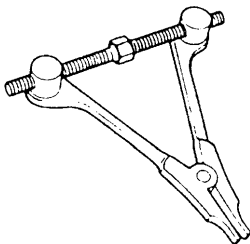
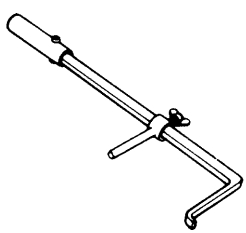
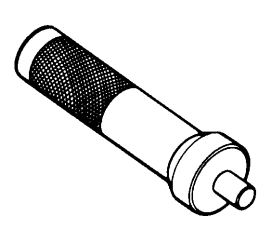
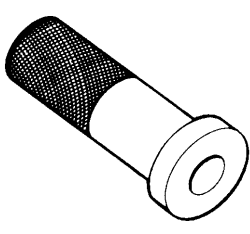
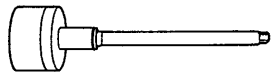
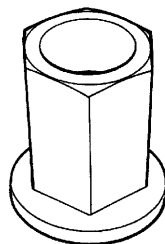
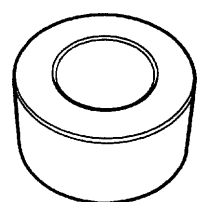
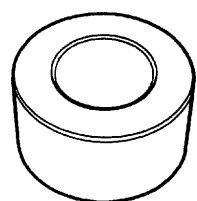
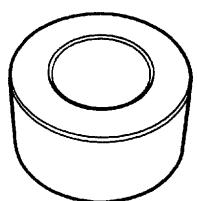
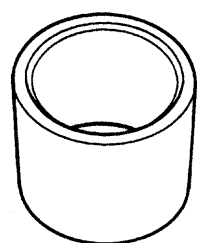
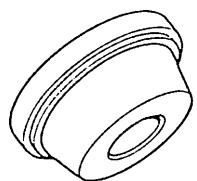
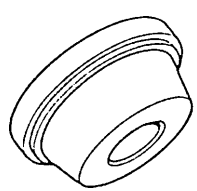
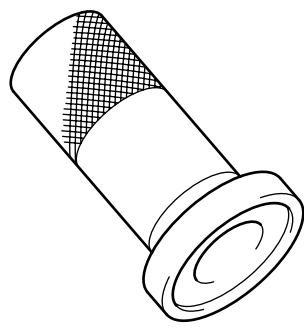
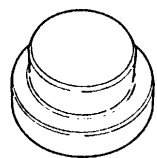
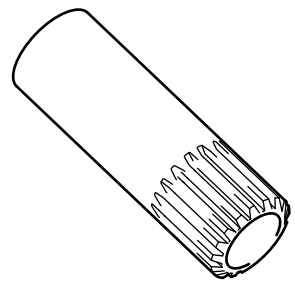
## Tightening Torque Specification

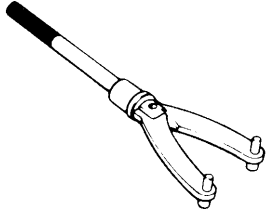
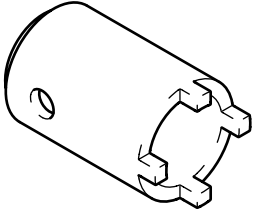
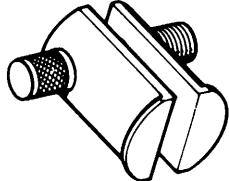
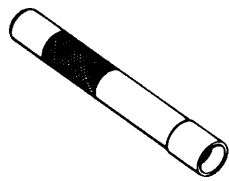
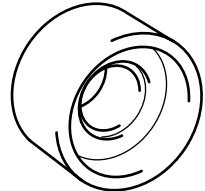
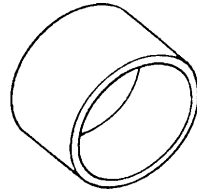
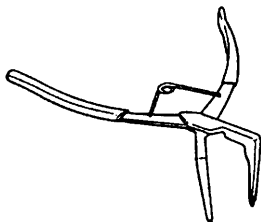
Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Transfer oil drain plug	23	2.3	17.0
Transfer oil level/filler plug	23	2.3	17.0
Transfer output flange nut (reference)	90 – 150	9.0 – 15.0	65.0 – 108
Oil protect plate bolts	12	1.2	9.0
Oil receiver bolt	12	1.2	9.0
Transfer case bolts	23	2.3	17.0
Adjuster plate bolts	12	1.2	9.0
Transfer output retainer bolts	50	5.0	36.5
Engine rear mounting bracket nuts	25	2.5	18.0
Transfer mounting bolts	50	5.0	36.5
Transfer to engine stiffener bolts	50	5.0	36.5
Transfer to transaxle stiffener bolts	50	5.0	36.5
Propeller shaft No.1 bolts	23	2.3	17.0
Exhaust No.2 pipe to muffler bolts	43	4.3	31.5
Suspension frame bolts	90	9.0	65.0
Engine rear mounting nuts	45	4.5	32.5
Ball stud lock nuts	60	6.0	43.5
Exhaust No.2 pipe to No.1 pipe bolts	43	4.3	31.5
Exhaust No.1 pipe to exhaust manifold bolts	50	5.0	36.5
Wheel nuts	85	8.5	61.5

## Required Service Material

Material	Recommended SUZUKI products (Part Number)	Use
Lithium grease	SUZUKI SUPER GREASE A (99000-25010)	<ul style="list-style-type: none"> <li>• Oil seal lips</li> <li>• O-rings</li> </ul>
Sealant	SUZUKI BOND NO. 1215 (99000-31110)	<ul style="list-style-type: none"> <li>• Oil drain plug</li> <li>• Oil level plug</li> <li>• Retainer bolt</li> <li>• Mating surface of transfer case</li> </ul>
Thread lock cement	THREAD LOCK CEMENT 1322 (99000-32110)	<ul style="list-style-type: none"> <li>• Adjuster plate bolts</li> <li>• Oil protect plate bolts</li> <li>• Oil receiver bolt</li> </ul>

## Special Tool

 <p>09912-34510 Case separator</p>	 <p>09913-50121 Oil seal remover</p>	 <p>09913-75810 Bearing installer</p>	 <p>09913-75821 Bearing installer attach- ment</p>
 <p>09913-85210 Bearing installer</p>	 <p>09922-76140 Bevel pinion shaft</p>	 <p>09922-76150 Bevel pinion nut</p>	 <p>09922-76310 Rear collar</p>
 <p>09922-76320 Rear collar</p>	 <p>09922-76340 Rear collar</p>	 <p>09922-76420 Front collar</p>	 <p>09924-84510-002 Bearing installer attach- ment</p>
 <p>09924-84510-005 Bearing installer attach- ment</p>	 <p>09925-15410 Oil seal installer</p>	 <p>09925-88210 Bearing puller attachment</p>	 <p>09928-36010 Reduction drive holder</p>

 <p>09930-40113 Rotor holder</p>	 <p>09940-14940 Adjuster</p>	 <p>09941-54911 Bearing outer race remover</p>	 <p>09941-74910 Bearing installer</p>
 <p>09944-66060 Bearing installer</p>	 <p>09951-18210 Oil seal installer</p>	 <p>09952-76011 Snap ring pliers (closing type)</p>	

SECTION 7F

REAR DIFFERENTIAL

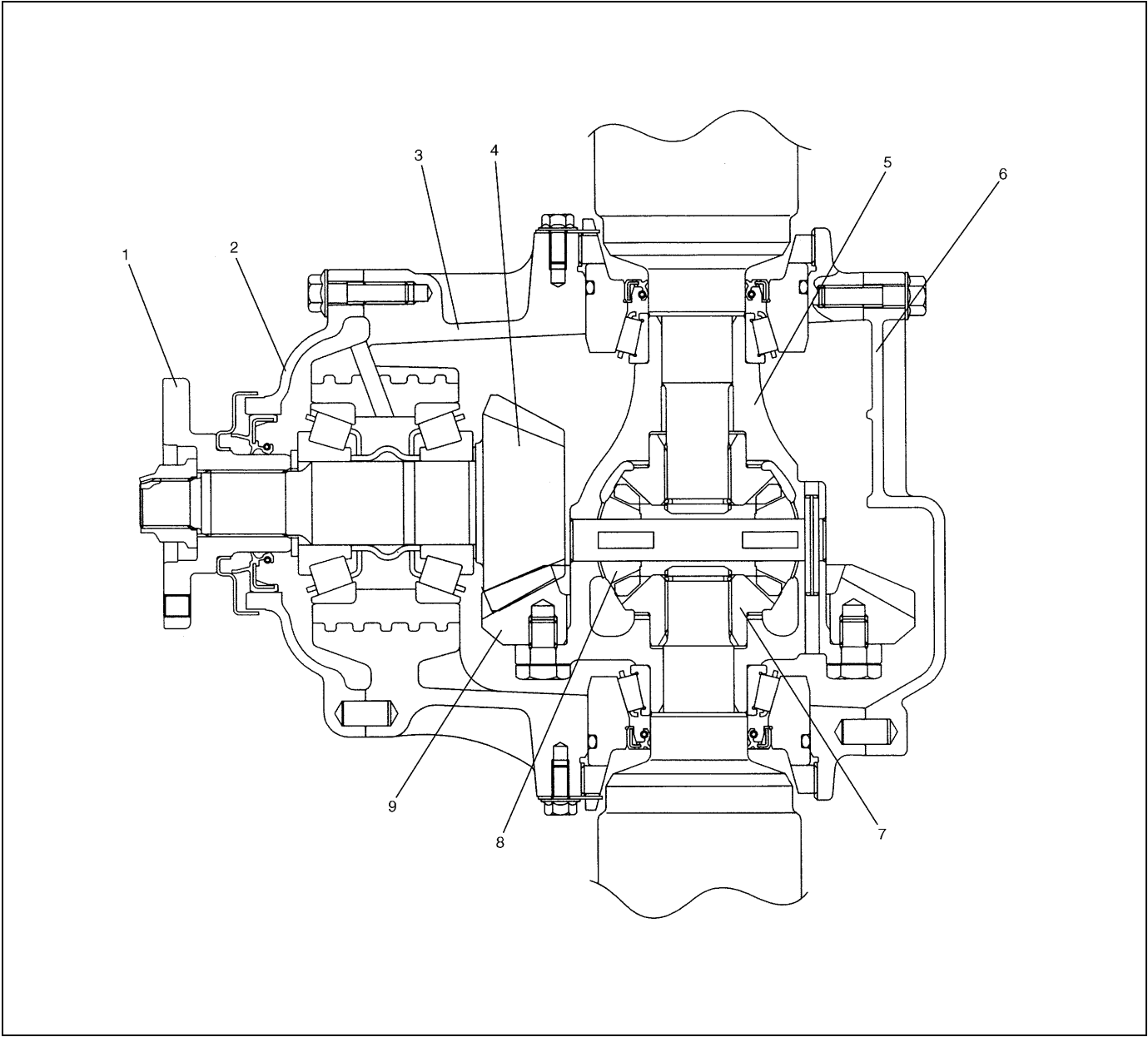
CONTENTS

7F

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Differential front mounting .....	7F-5		

# General Description

The differential assembly uses a hypoid bevel pinion and gear.  
 The differential assembly is decisive in that the drive power is concentrated there. Therefore, use of genuine parts and specified torque is compulsory. Further, because of sliding tooth meshing with high pressure between hypoid bevel pinion and gear, it is mandatory to lubricate them by hypoid gear oil.



1. Companion flange	4. Drive bevel pinion (hypoid gear)	7. Differential side gear
2. Front case	5. Differential case	8. Differential pinion
3. Differential carrier	6. Differential cover	9. Drive bevel gear (hypoid gear)

## Diagnosis

Condition	Possible Cause	Correction
<b>Gear noise</b>	Deteriorated or water mixed lubricant	Repair and replenish
	Inadequate or insufficient lubricant	Repair and replenish
	Maladjusted backlash between bevel pinion and gear	Adjust as prescribed
	Improper tooth contact in the mesh between bevel pinion and gear	Adjust or replace
	Loose bevel gear securing bolts	Replace or retighten
	Damaged side gear(s) or side pinion(s)	Replace
<b>Bearing noise</b>	(Constant noise) Deteriorated or water mixed lubricant	Repair and replenish
	(Constant noise) Inadequate or Insufficient lubricant	Repair and replenish
	(Noise while coasting) Damaged bearing(s) of bevel pinion	Replace
	(Noise while turning) Damaged differential side bearing(s)	Replace
<b>Oil leakage</b>	Clogged breather plug	Clean
	Worn or damaged oil seal	Replace
	Excessive oil	Adjust oil level



# On-Vehicle Service

## Maintenance Service

**NOTE:**

Whenever vehicle is hoisted for any other service work than oil change, also be sure to check for oil leakage.

Oil change

**NOTE:**

It is highly recommended to use SAE 80W-90 viscosity.

- 1) Before oil change or inspection, be sure to stop engine and set vehicle horizontally.
- 2) Check oil level and existence of leakage. If leakage is found, correct its cause.
- 3) Remove level/filler and drain plugs, then drain old oil.
- 4) Apply sealant to thread of drain plug (2), if reused.
- 5) Tighten drain plug (2) to specified torque.

**“A”:** Sealant 99000-31110

**Tightening torque**

**Oil drain plug (b):** 21 N·m (2.1 kg-m, 15.5 lb-ft)

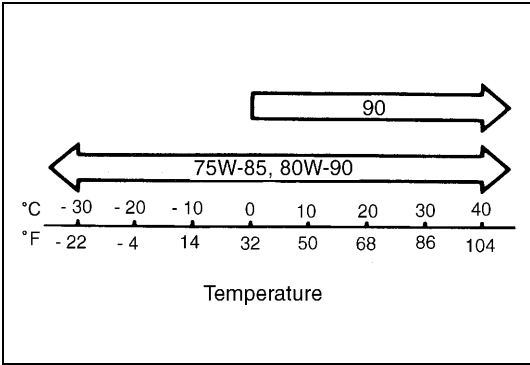
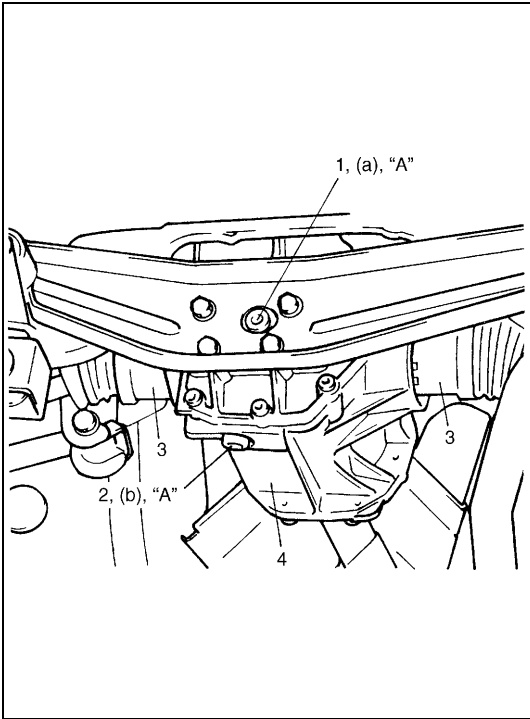
- 6) Pour proper amount of new gear oil as specified below (roughly up to level hole).
- 7) Apply sealant to thread of level/filler plug (1) if reused.
- 8) Tighten level/filler plug (1) to specified torque, after applying sealant to its thread.

**“A”:** Sealant 99000-31110

**Tightening torque**

**Oil level/filler plug (a):** 21 N·m (2.1 kg-m, 15.5 lb-ft)

3.	Rear drive shaft
4.	Rear differential



**Specified gear oil:**

**Hypoid gear oil API GL-5**

**SAE 75W-85 or 80W-90**

**For oil viscosity, refer to the chart.**

**Oil capacity:**

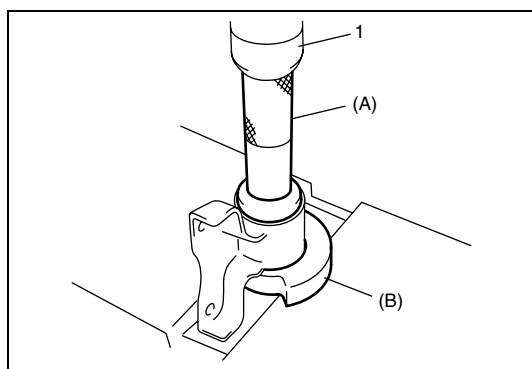
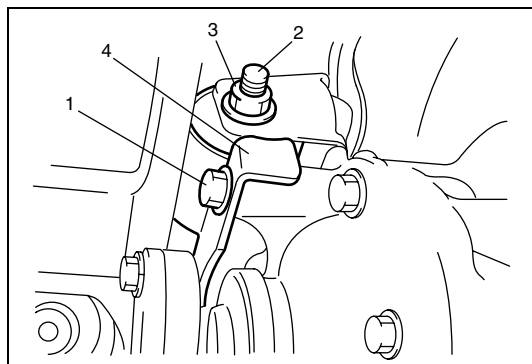
**0.7 liters (1.5/1.2 US/Imp. pt)**

# Differential Mountings

## Differential front mounting

### REMOVAL

- 1) Hoist vehicle.
- 2) Remove mounting bracket bolts (1), mounting bolt (2), nut (3) and differential front mounting (4).



- 3) Drive mounting out with special tools and hydraulic press (1).

### Special tool

(A): 09951-16080

(B): 09951-26020

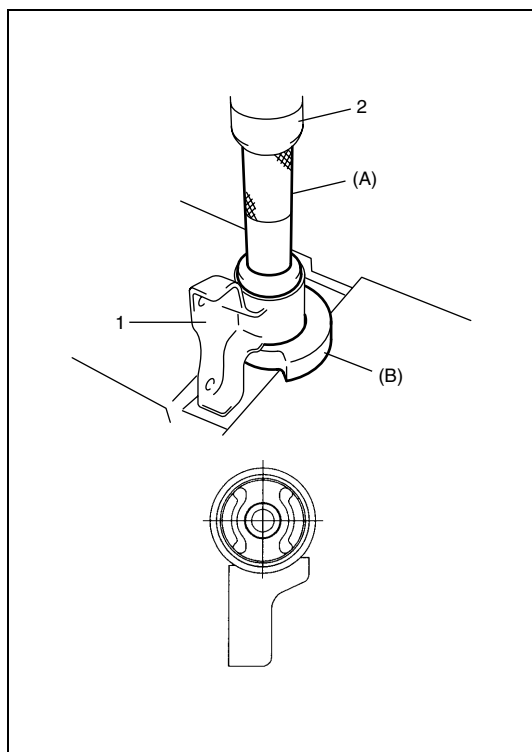
### INSTALLATION

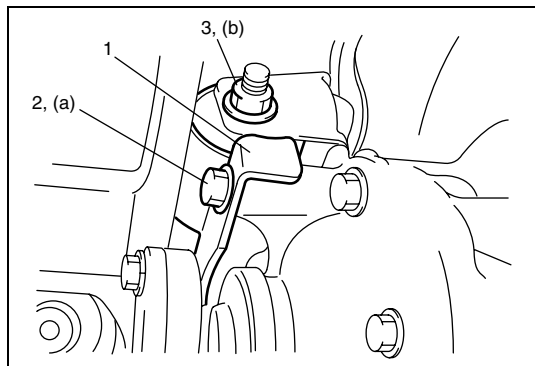
- 1) Press mounting in front mounting bracket (1) by using special tools and hydraulic press (2) with caring its installation position shown in figure.

### Special tool

(A): 09951-16080

(B): 09951-26020





- 2) Install differential front mounting (1), and tighten mounting bracket bolts (2) and mounting nut (3) to specified torque.

#### Tightening torque

##### Differential front mounting bracket bolts

(a): 50 N·m (5.0 kg-m, 36.5 lb-ft)

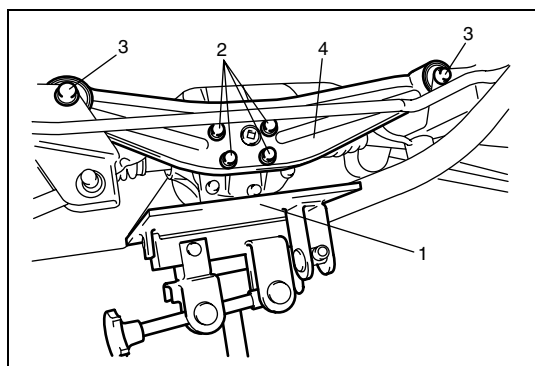
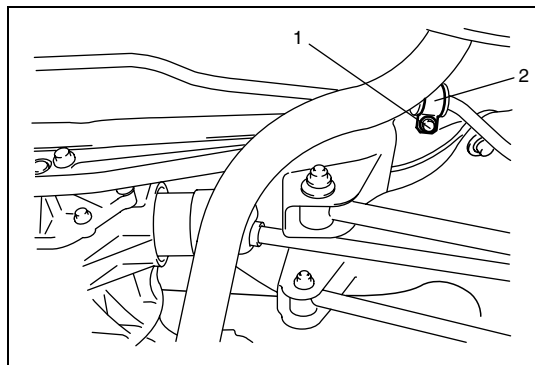
##### Differential front mounting bolt

(b): 80 N·m (8.0 kg-m, 58.0 lb-ft)

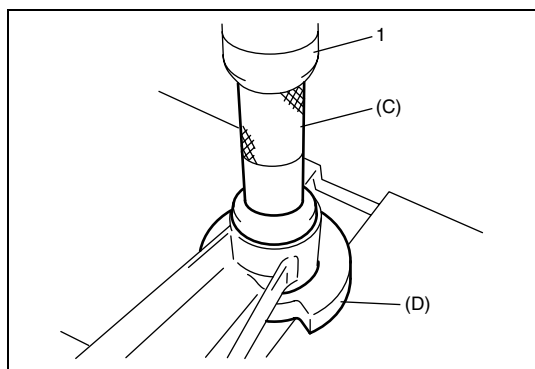
## Differential rear mounting

### REMOVAL

- 1) Hoist vehicle.
- 2) Remove stabilizer bar mount bolt (1) and stabilizer bar bracket (2) installed on right side of vehicle.



- 3) Place jack (1) under rear differential.
- 4) Remove mounting bracket bolts (2), mounting bolts (3) and differential rear mounting (4).



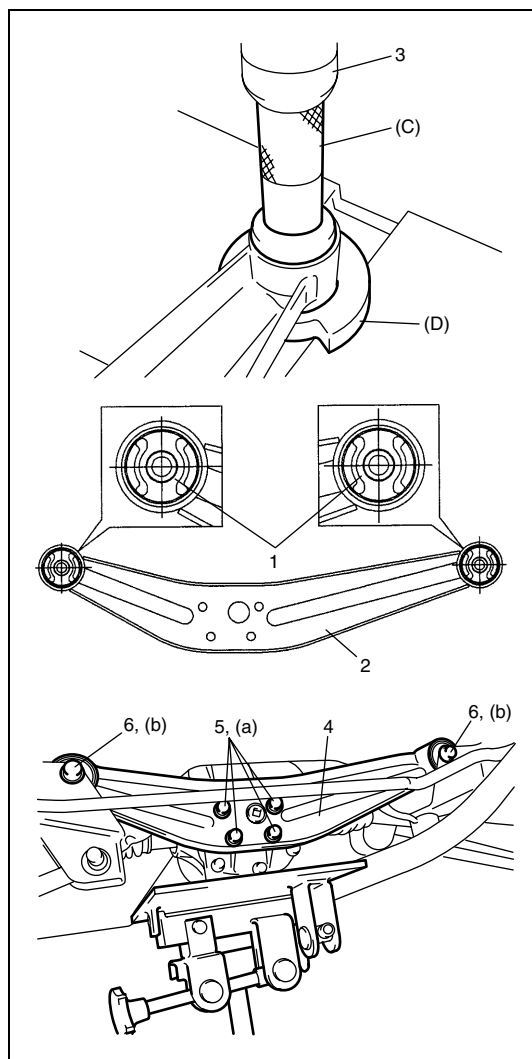
- 5) Drive mountings out with special tools and hydraulic press (1).

#### Special tool

(C): 09951-16080

(D): 09951-26020

# INSTALLATION



- 1) Press mountings (1) in rear mounting bracket (2) by using special tools and hydraulic press (3) with caring its installation position shown in figure.

## Special tool

(C): 09951-16080

(D): 09951-26020

- 2) Install differential rear mounting (4), and tighten mounting bracket bolts (5) and mounting bolts (6) to specified torque.

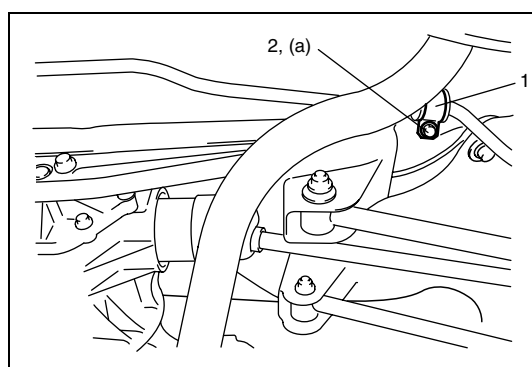
## Tightening torque

### Differential rear mounting bracket bolts

(a): 50 N·m (5.0 kg-m, 36.5 lb-ft)

### Differential rear mounting bolts

(b): 80 N·m (8.0 kg-m, 58.0 lb-ft)



- 3) Install stabilizer bar bracket (1) and tighten stabilizer bar mount bolt (2) to specified torque.

## Tightening torque

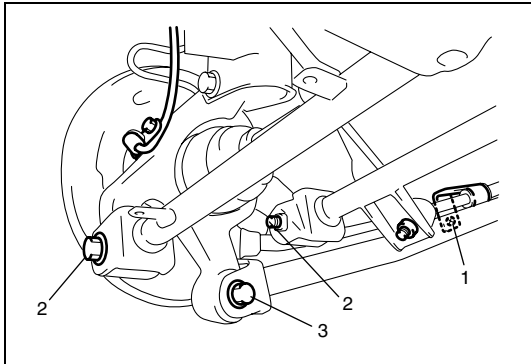
### Stabilizer bar mount bolt

(a): 23 N·m (2.3 kg-m, 17.0 lb-ft)

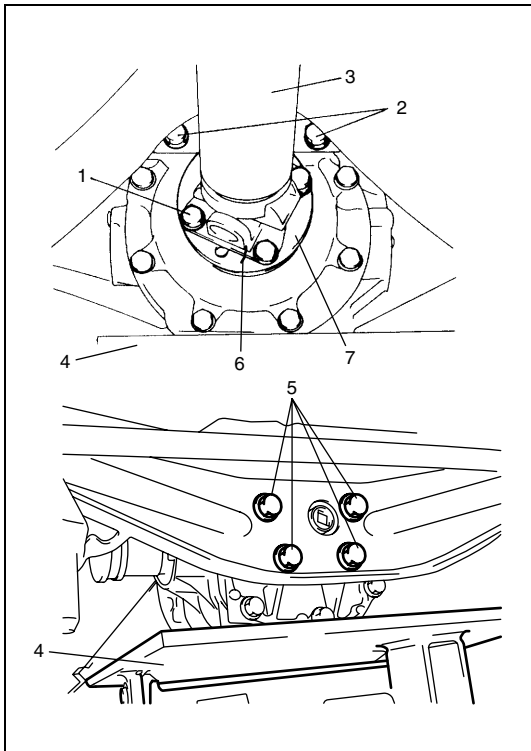
## Rear Differential Assembly

### DISMOUNTING

- 1) Hoist vehicle and remove wheels.
- 2) Drain oil from rear differential. (Refer to "Oil change" in this section.)
- 3) Remove parking brake wire mounting bolt (1), rear control rod outer bolts (2) and rear trailing rod rear bolt (3).



- 4) Remove rear drive shafts referring to Section 4C.
- 5) Place jack (4) so that differential assembly will not tilt.
- 6) Apply match marks (6) to companion flange (7) and propeller shaft (3).
- 7) Remove 4 propeller shaft flange bolts (1) from rear differential, and then pull out propeller shaft (3) from rear differential.
- 8) Remove differential front mounting bracket bolts (2).
- 9) Remove differential rear mounting bracket bolts (5).
- 10) Lower jack (4) with rear differential assembly.



## REMOUNTING

Reverse dismounting procedure for remounting noting the following points.

- Install propeller shaft (1) to companion flange (2) aligning match marks (3).
- Tighten each bolt to specified torque.

### Tightening torque

#### Differential front mounting bracket bolts

(a): 50 N·m (5.0 kg-m, 36.5 lb-ft)

#### Differential rear mounting bracket bolts

(b): 50 N·m (5.0 kg-m, 36.5 lb-ft)

#### Propeller shaft flange bolts

(c): 23 N·m (2.3 kg-m, 17.0 lb-ft)

#### Rear control rod outer bolts

(d): 90 N·m (9.0 kg-m, 65.0 lb-ft)

#### Rear trailing rod rear bolts

(e): 90 N·m (9.0 kg-m, 65.0 lb-ft)

#### Parking cable wire mounting bolts

(f): 10 N·m (1.0 kg-m, 7.5 lb-ft)

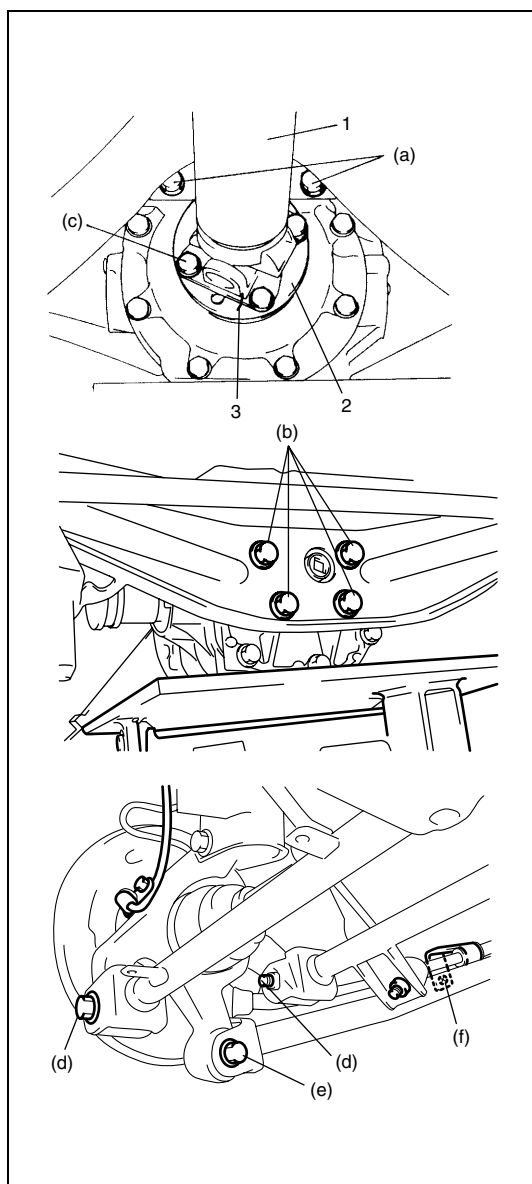
#### Rear drive shaft nuts:

175 N·m (17.5 kg-m, 126.5 lb-ft)

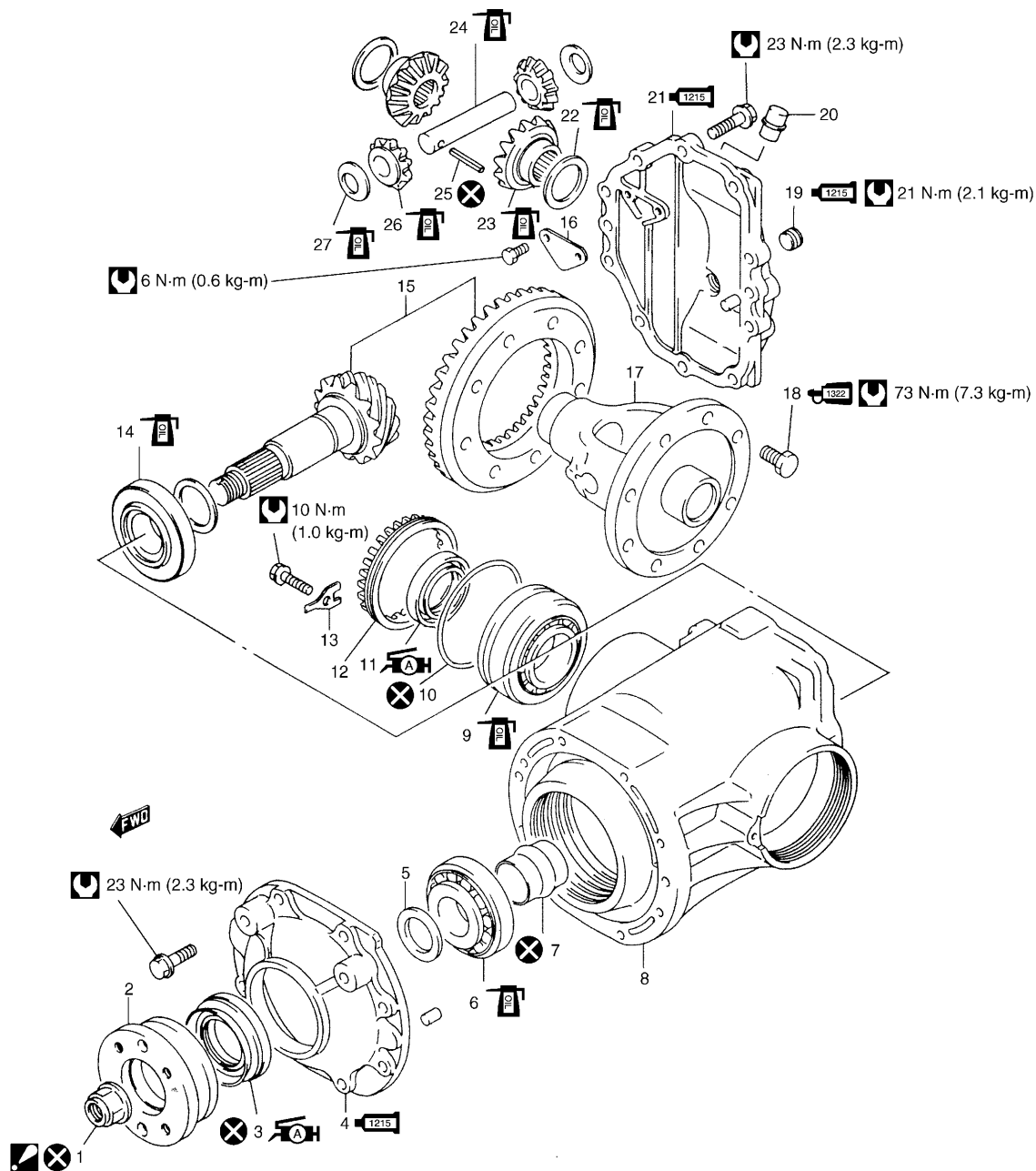
#### Wheel nuts:

85 N·m (8.5 kg-m, 61.5 lb-ft)

- Pour hypoid gear oil as specified referring to “Oil change” in this section.

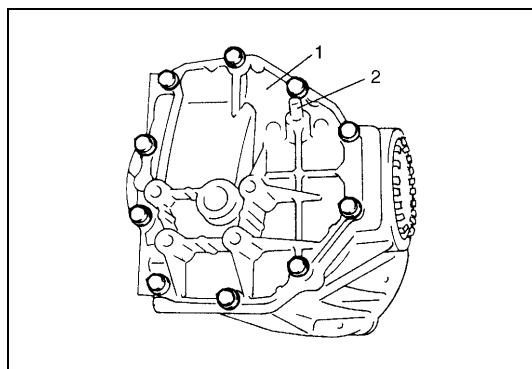


# Unit Repair Overhaul

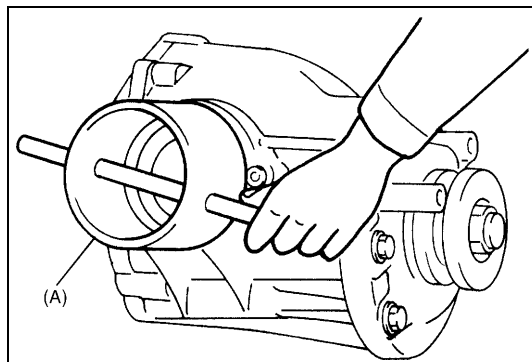


	1. Bevel pinion nut : Caulk nut after tightening nut so as rotational torque of bevel pinion shaft to be in specified torque.		11. Differential side oil seal : Apply grease 99000-25010 to seal lip.		21. Differential cover : Apply sealant 99000-31110 to mating surface with differential carrier.
	2. Companion flange		12. Retainer		22. Differential side washer
	3. Input oil seal : Apply grease 99000-25010 to seal lip.		13. Retainer stopper		23. Differential side gear
	4. Front case : Apply sealant 99000-31110 to mating surface with differential carrier.		14. Rear taper roller bearing		24. Differential pinion shaft
	5. Drive bevel pinion washer		15. Drive bevel gear set		25. Differential pinion shaft pin
	6. Front taper roller bearing		16. Breather cover		26. Differential pinion
	7. Spacer		17. Differential case		27. Differential pinion washer
	8. Differential carrier		18. Bevel gear bolt : Apply thread lock cement 99000-32110 to thread.		Do not reuse.
	9. Differential side taper roller bearing		19. Oil level plug : Apply sealant 99000-31110 to thread.		Apply differential oil.
	10. O-ring		20. Breather plug		Tightening torque

## DISASSEMBLY



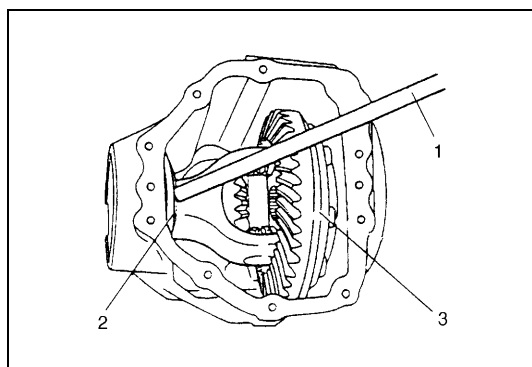
- 1) Remove differential cover (1).
- 2) Remove breather plug (2) from differential cover (1).



- 3) Remove differential side bearing stopper and then remove differential side bearing retainer.

### Special tool

(A): 09923-58520

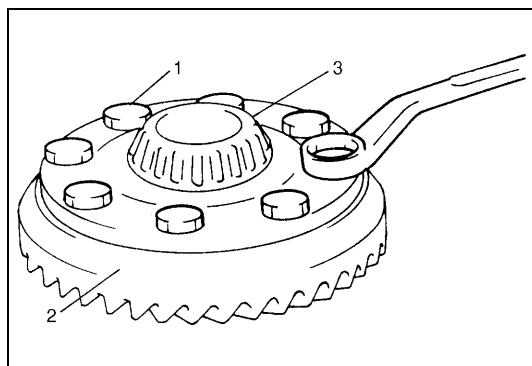


- 4) Using some appropriate rod (1), drive out differential side bearing outer races (2).

### NOTE:

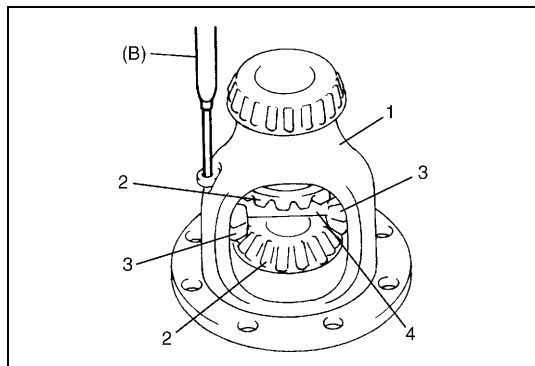
**When driving out differential side bearing outer races, be very careful not to cause damage to tooth surface of bevel gear.**

- 5) Remove bevel gear assembly (3).



- 6) Remove bevel gear bolts (1) and then remove drive bevel gear (2).
- 7) Remove differential side bearings (3).



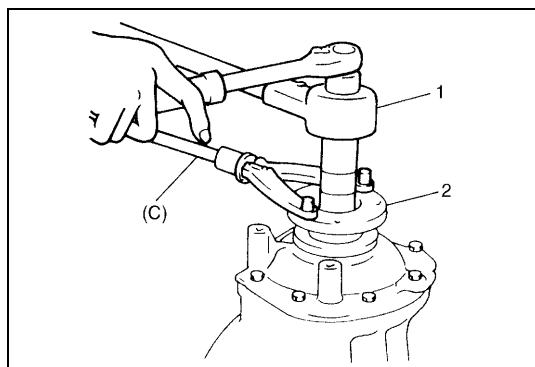


- 8) Drive out differential side pinion shaft pin with special tool and hammer.

**Special tool**

**(B): 09922-85811**

- 9) Disassemble differential side gears (2), pinions (3), washers and shaft (4) in differential case (1).

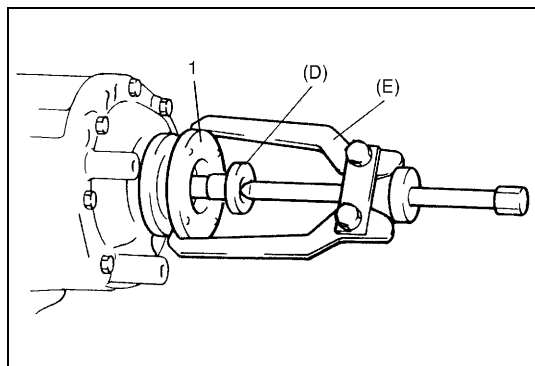


- 10) Remove caulking of bevel pinion nut with special tool and power wrench (1).

**Special tool**

**(C): 09930-40113**

2. Companion flange

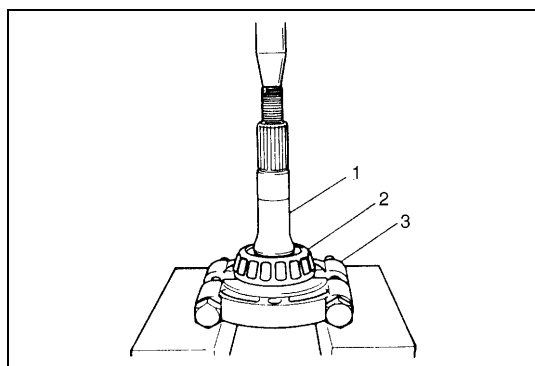


- 11) Remove companion flange (1) and washer from drive bevel pinion, and then drive out drive bevel pinion.

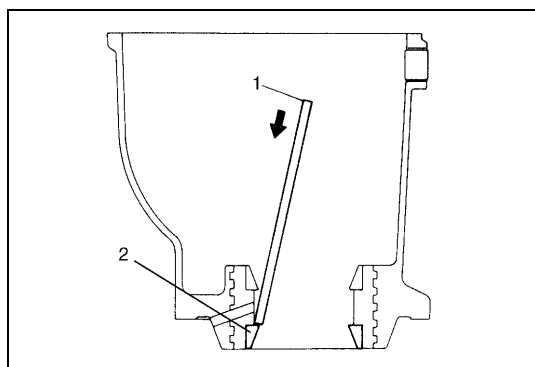
**Special tool**

**(D): 09913-85230**

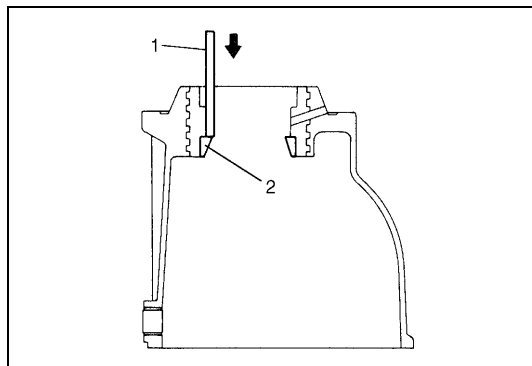
**(E): 09913-65135**



- 12) Remove rear bearing (2) from drive bevel pinion (1) by using bearing puller (3) and press.



- 13) Using a hammer and brass bar (1), drive out front bearing outer race (2).



- 14) Using a hammer and brass bar (1), drive out rear bearing outer race (2).

## INSPECTION

- Check companion flange for wear or damage.
- Check bearings for wear or discoloration.
- Check differential carrier for cracks.
- Check drive bevel pinion and bevel gear for wear or cracks.
- Check side gears, pinion gears and pinion shaft for wear or damage.
- Check side gear spline for wear or damage.

## ADJUSTMENT AND REASSEMBLY

Judging from faulty conditions noted before disassembly and what is found through visual check of bearing and gear tooth etc. after disassembly, prepare replacing parts and proceed to reassembly according to procedures as described below.

### CAUTION:

- Bevel gear and pinion must be replaced as a set when either replacement becomes necessary.
- When replacing taper roller bearing, replace as inner race & outer race assembly.

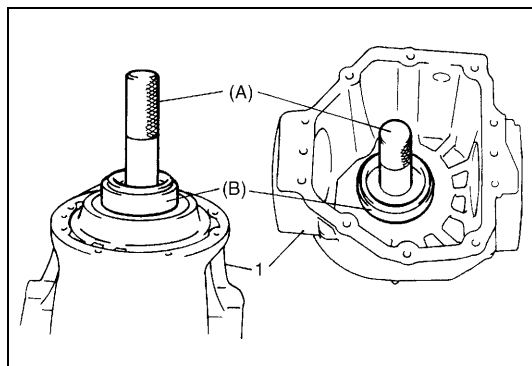
## DIFFERENTIAL CARRIER

Press-fit bevel pinion bearing outer races to differential carrier (1) by using special tools as shown in figure.

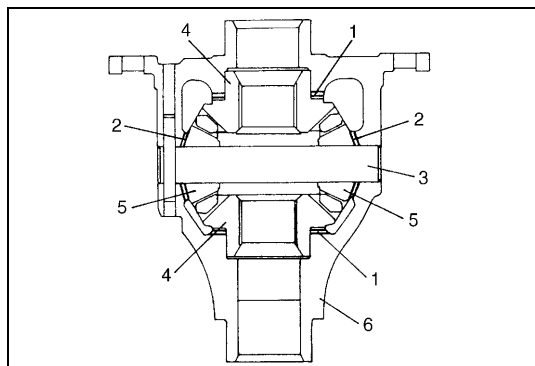
### Special tool

(A): 09924-74510

(B): 09951-16090



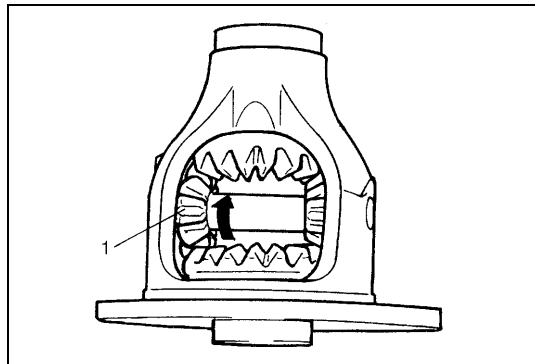
## DIFFERENTIAL CASE



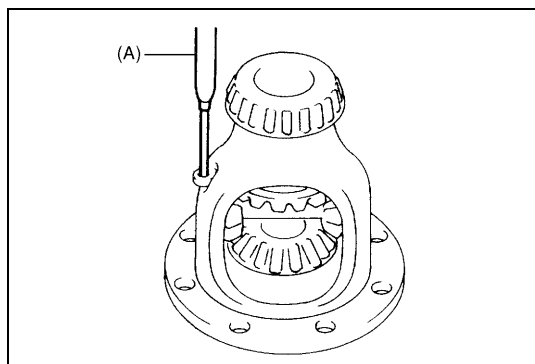
- 1) After applying differential oil to side gears (4), pinions (5), pinion shaft (3), side washers (1) and pinion washers (2), install them in differential case (6).

**NOTE:**

**Used left and right differential side washers are not interchangeable.**



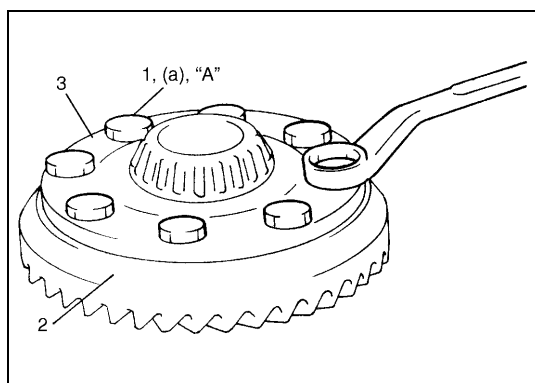
- 2) Check pinion gear (1) for smooth rotation.



- 3) Align pinion shaft hole position with differential case and drive in differential pinion shaft pin till they are flush with end surface of case.

**Special tool**

**(A): 09922-85811**



- 4) Apply thread lock cement to thread of bevel gear bolts (1).
- 5) Put bevel gear (2) on differential case (3) and fasten them with 8 bolts (1) by tightening them to specified torque.

**CAUTION:**

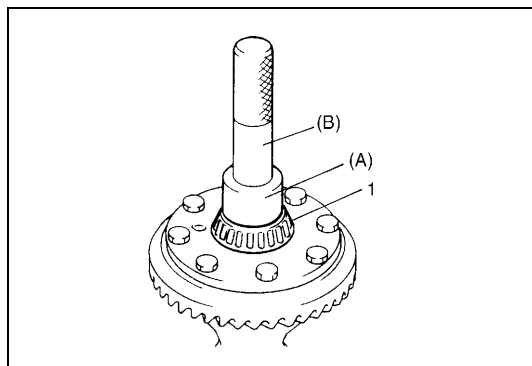
**Use of any other bolts than that specified is prohibited.**

**"A": Cement 99000-32110**

**Tightening torque**

**Bevel gear bolts (a): 73 N·m (7.3 kg-m, 52.0 lb-ft)**

## DIFFERENTIAL SIDE BEARING

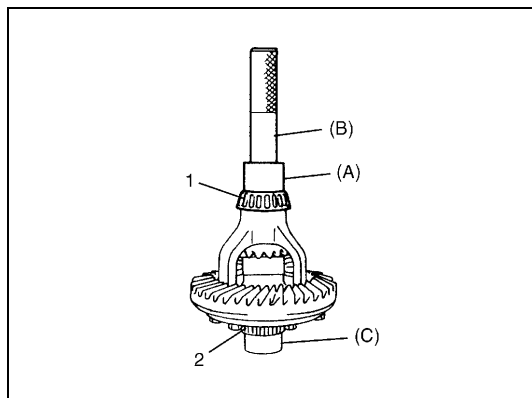


- 1) Press-fit differential side bearing (1) with special tool.

### Special tool

(A): 09951-16060

(B): 09924-74510



- 2) Hold bearing (2) press-fitted in Step 1) with holder and press-fit differential side bearing (1) on the other side.

### NOTE:

**Be sure to use bearing holder for the purpose of protecting lower bearing.**

### Special tool

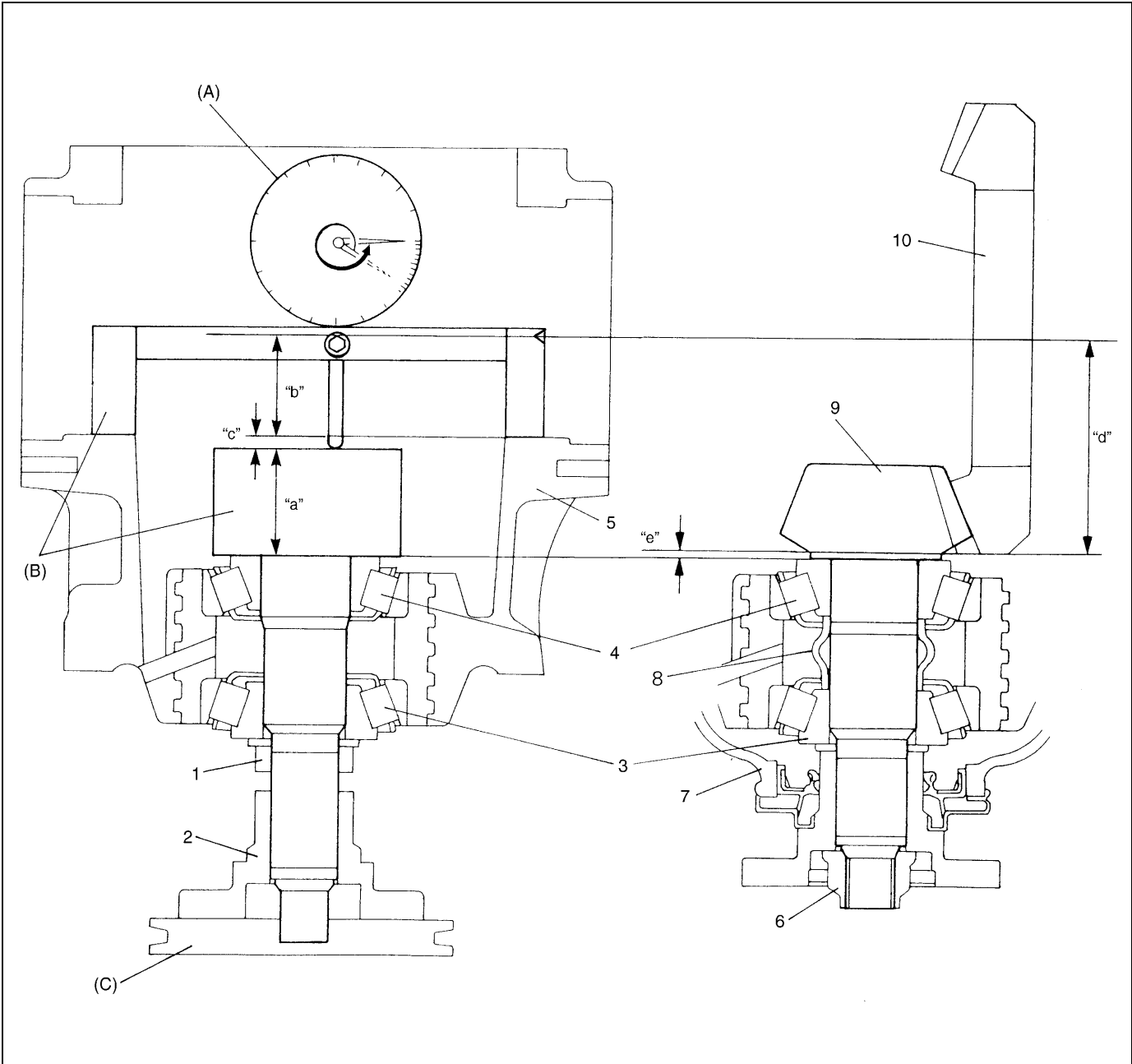
(A): 09951-16060

(B): 09924-74510

(C): 09923-78210

DRIVE BEVEL PINION

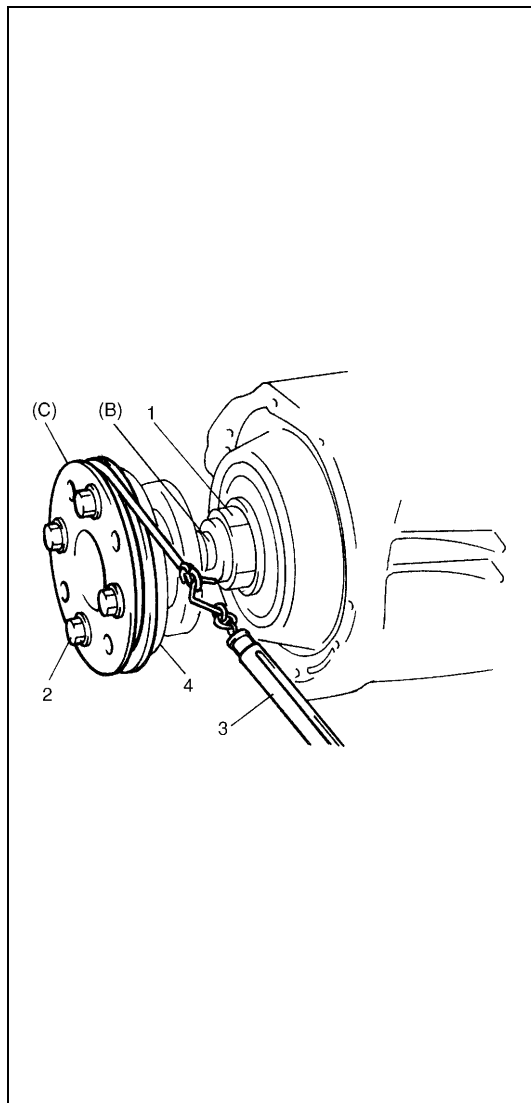
To mesh bevel pinion and gear correctly, it is prrequired to install bevel pinion to differential carrier properly by using adjusting shim as described on following pages. Shown in this page are relative positions of bevel pinion, differential carrier and mounting dummy.



"a": Pinion dummy height	1. 36 mm nut (Spare parts No.09159-28002)	6. Bevel pinion nut
"b": Mounting dummy height	2. Flange	7. Front case
"c": Measured dimension	3. Front bearing	8. Spacer
"d": Bevel pinion mounting distance (=A+B=80mm (3.150 in.))	4. Rear bearing	9. Bevel pinion
"e": Shim size for mounting distance adjustment (=C)	5. Differential carrier	10. Bevel gear

Special tool

- (A): 09900-20606
- (B): 09922-77280
- (C): 09922-75222



- 1) Install bevel pinion dummy with front and rear bearings into differential carrier and then tighten 36 mm nut (Spare parts No.09159-28002) (1) lightly by hand.

#### Special tool

(B): 09922-77280

- 2) Install companion flange (4) to bevel pinion dummy.
- 3) Install special tool to companion flange (4) by using 4 flange bolts (2).

#### Special tool

(C): 09922-75222

- 4) Tighten 36 mm nut (1) while turning dummy about 50 rpm so that specified bearing preload is obtained.

#### NOTE:

- This installation requires no spacer or oil seal.
- Before taking measurement with special tool, apply thin coat of differential oil to bearings and turn bevel pinion dummy 15 revolutions or more to ensure its good fitting.

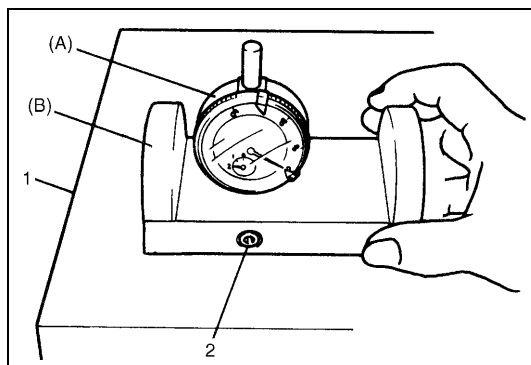
**Pinion bearing preload (Pinion dummy rotational torque)**

: 5.0 – 13.0 kg-cm (4.4 – 11.2 lb-in)

**Rotational force with special tool and spring balance**

: 1.0 – 2.6 kg (2.2 – 5.7 lb)

3. Spring balance (1 – 5 or 1 – 10 kg range)

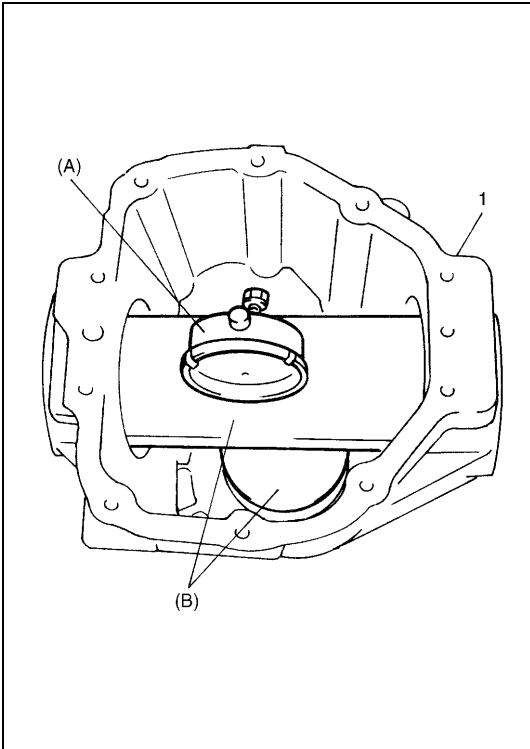


- 5) Set dial gauge to bevel pinion mounting dummy and make 0 (zero) adjustment on surface plate (1) by screw (2).

#### Special tool

(A): 09900-20606

(B): 09922-77280



- Place zero-adjusted mounting dummy and dial gauge set on pinion dummy and take measurement between zero position and extended dial gauge measuring tip.

**NOTE:**

- Repeat turning back and force of dummy and measure distance as far as top surface of pinion dummy accurately.
- When dial gauge measuring tip extends from 0 (zero) position, pointer turns counterclockwise.

**Special tool**

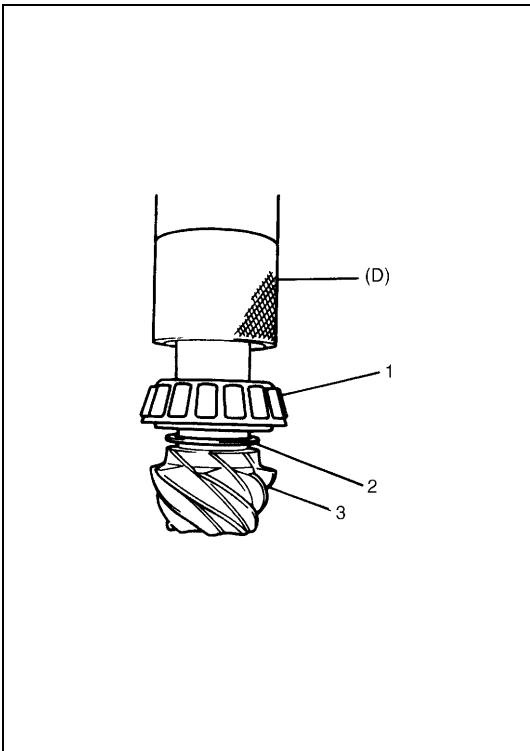
**(A): 09900-20606**

**(B): 09922-77280**

1. Differential carrier

- Necessary adjusting shim thickness is the same value as measured value by dial gauge.

Necessary shim thickness “e”	=	Dial gauge measured value “c”
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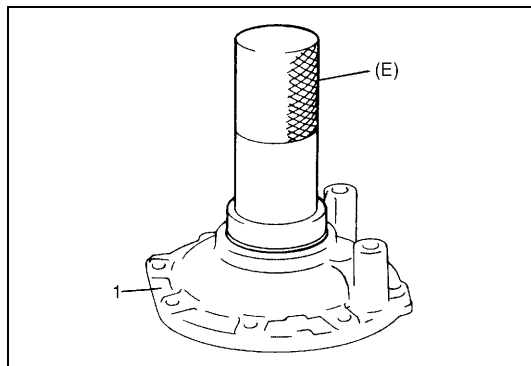


- Select adjusting shim (2) closest to obtained value from among following available sizes and put it in place and then press-fit rear bearing (1) to bevel pinion (3).

Available shim thickness	0.30, 0.87, 0.84, 0.81, 0.78, 0.75, 0.72, 0.69, 0.66, 0.63 and 0.60 mm (0.012, 0.034, 0.033, 0.032, 0.031, 0.029, 0.028, 0.027, 0.026, 0.025 and 0.024 in.)
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**Special tool**

**(D): 09925-18011**

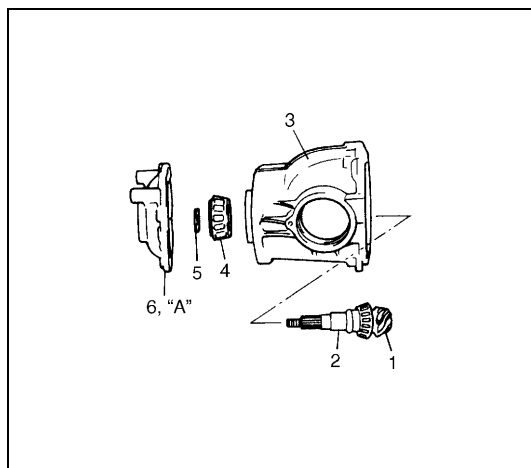


- 9) Using special tool and plastic hammer, drive oil seal into front case (1) till it becomes flush with front case end. Then apply grease to oil seal lip.

**Grease 99000-25010**

**Special tool**

**(E): 09913-85210**



- 10) With new pinion spacer (2) inserted as shown in figure, install front bearing (4) to differential carrier (3).

**NOTE:**

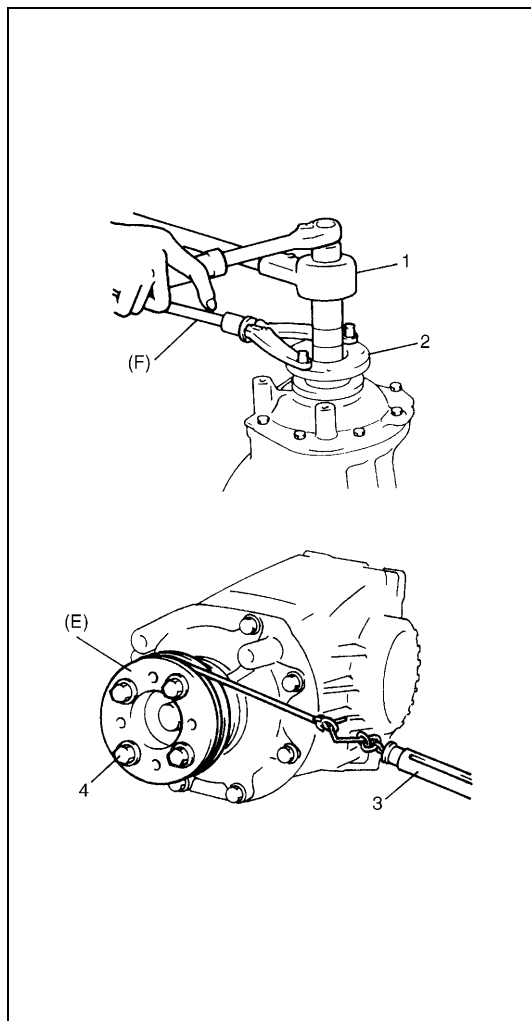
**Apply differential oil to front and rear bearings.**

- 11) Install washer (5) to bevel pinion (1).  
12) After applying sealant to mating surface of front case (6), install it to differential carrier (3).

**“A”: Sealant 99000-31110**

**Tightening torque**

**Front case bolts: 23 N·m (2.3 kg·m, 17.0 lb·ft)**



- 13) Install companion flange (2) to bevel pinion and tightening bevel pinion nut gradually with special tool and power wrench (1) to specified torque while turning bevel pinion. Set bearing preload of bevel pinion to specification.

**NOTE:**

- Before taking measurement with spring balance, check for smooth rotation with turning bevel pinion 15 revolutions or more by hand.
- Be sure to tighten gradually and carefully till specified pinion bearing preload is obtained. Turning back over-tightened flange nuts should be avoided.
- Measure pinion bearing preload while turning bevel pinion about 50 rpm.

**Special tool**

**(E): 09922-75222**

**(F): 09930-40113**

**Tightening torque**

**Bevel pinion nut: Reference 100 – 300 N·m (10.0 – 30.0 kg·m, 72.5 – 217.0 lb·ft)**

**Bevel pinion bearing preload (Bevel pinion rotational torque)**

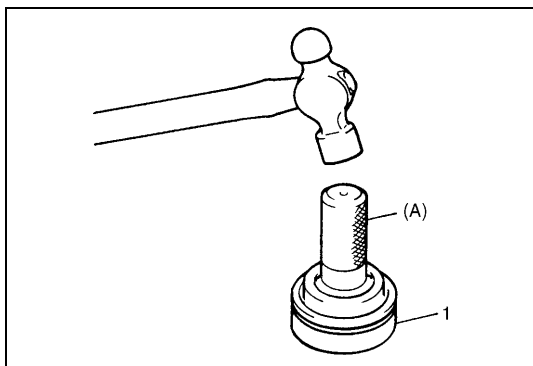
**: 5 – 13 kg·cm (4.4 – 11.2 lb·in)**

**Rotational force with special tool: 1 – 2.6 kg (2.2 – 5.7 lb)**

3. Spring balance (1 – 5 or 1 – 10 kg range)

4. Flange bolt



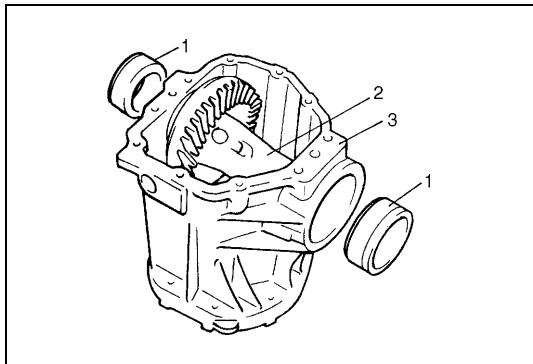
**DIFFERENTIAL UNIT**

- 1) Install side oil seal to bearing outer race (1).  
Then apply grease to oil seal lip.

**Grease 99000-25010**

**Special tool**

**(A): 09913-75520**

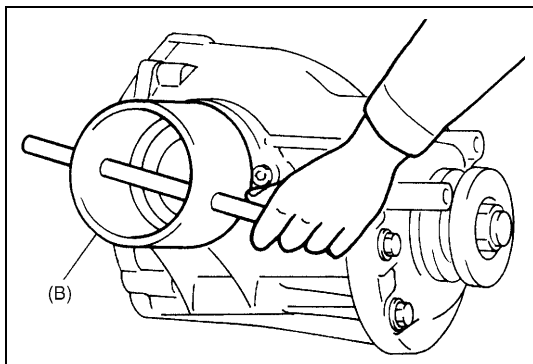


- 2) Place bearing outer races (1) on their respective bearings.

**NOTE:**

**Used left and right outer races are not interchangeable.**

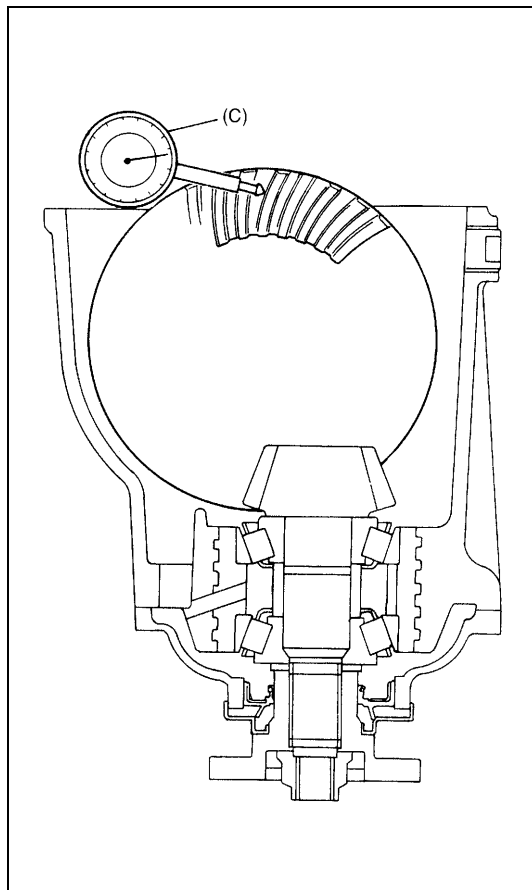
- 3) After applying differential oil to side bearings, install case assembly (2) in differential carrier (3).



- 4) Tighten bearing retainer.

**Special tool**

**(B): 09923-58520**



- 5) To measure bevel gear backlash, set dial gauge at right angle to bevel gear tooth, fix drive bevel pinion, tighten both retainers and read dial gauge while moving bevel gear.

#### NOTE:

- Be sure to apply measuring tip of dial gauge at right angles to convex side of tooth.
- As a practical measure following would be recommended to obtain specified backlash and side bearing preload at the same time.
  - Obtain specified backlash by turning both retainers inward lightly.
  - Tighten both retainers further by one notch at a time.
- Measure at least 4 points on drive bevel gear periphery.

#### Special tool

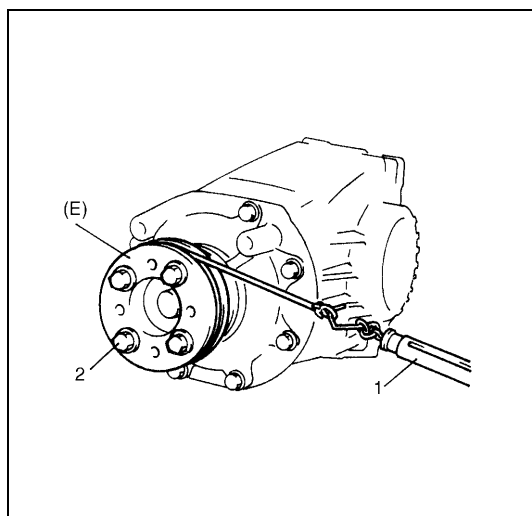
(C): 09900-20606

09923-58520

09900-20701

#### Drive bevel gear backlash

Standard: 0.1 – 0.2 mm (0.004 – 0.008 in.)



- 6) With bevel gear installed, measure rotational torque while turning bevel pinion about 50 rpm by using special tool.

#### Special tool

(E): 09922-75222

#### Differential side bearing preload:

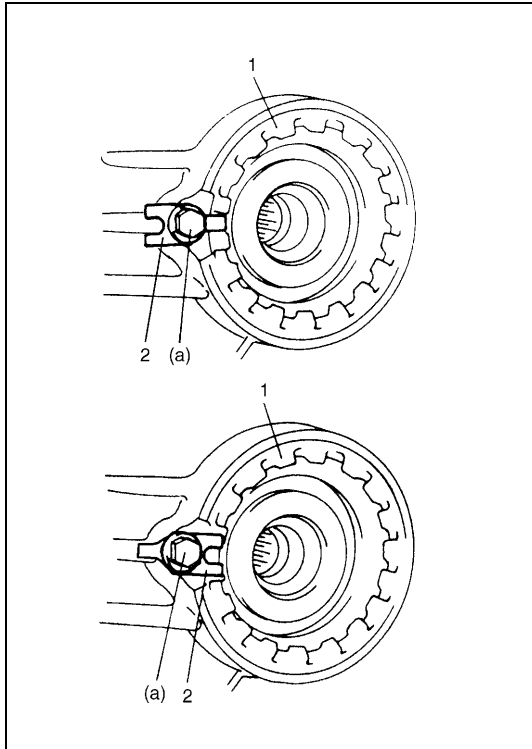
(Measured bevel pinion bearing preload) + (3 – 5 kg-cm  
(2.6 – 4.3 lb-in))

#### Rotational force with special tool:

(Measured bevel pinion rotational force) + (0.6 – 1 kg (1.3 – 2.2 lb))

1. Spring balance (1 – 5 or 1 – 10 kg range)

2. Flange bolt



7) Install retainer stoppers (2).

**NOTE:**

**Change shape of retainer stopper depending on position of tooth on retainer (1).**

**Tightening torque**

**Retainer stopper bolts (a): 10 N·m (1.0 kg-m, 7.5 lb-ft)**

8) Check gear tooth contact.

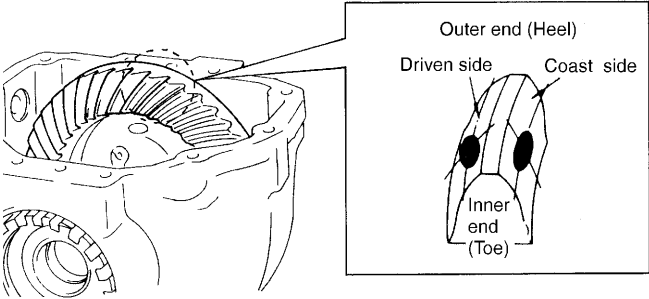

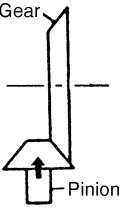

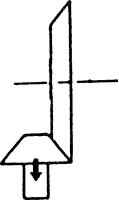
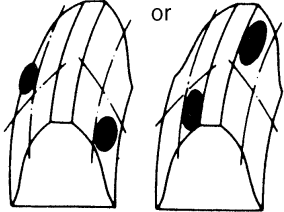
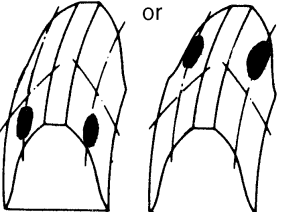
Apply red lead paste to tooth of drive bevel gear and turn it by hand to check its contact with drive bevel pinion.

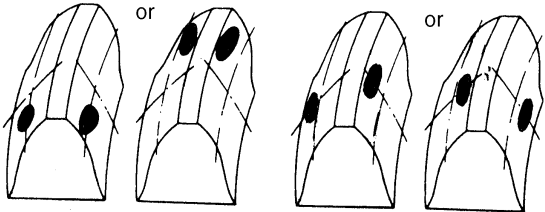
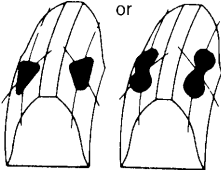
Check contact pattern, referring to following chart. If contact pattern is not normal, readjust or replace as necessary according to instruction in chart.

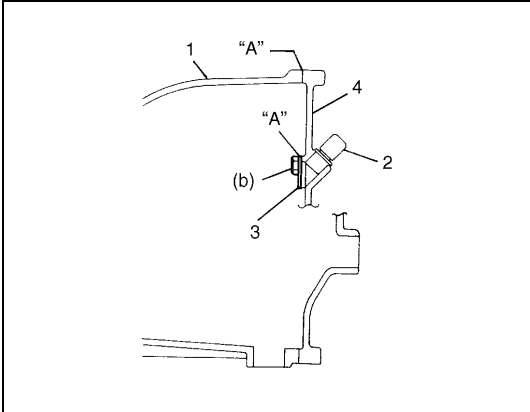
**NOTE:**

- **Apply red lead paste all around bevel gear but not so much as to become sticky.**
- **Be careful not to turn bevel gear more than one full revolution, for it will hinder accurate check.**

# GEAR TOOTH CONTACT

TOOTH CONTACT PATTERN	DIAGNOSIS AND REMEDY
	<p style="text-align: center;">NORMAL</p>
	<p><b>HIGH CONTACT</b> Pinion is positioned too far from the center of drive bevel gear.</p> <ol style="list-style-type: none"> <li>1) Increase thickness of pinion height adjusting shim and position pinion closer to gear center.</li> <li>2) Adjust drive bevel gear backlash to specification.</li> </ol> 
	<p><b>LOW CONTACT</b> Pinion is positioned too close to the center of drive bevel gear.</p> <ol style="list-style-type: none"> <li>1) Decrease thickness of pinion height adjusting shim and position pinion farther from gear center.</li> <li>2) Adjust drive bevel gear backlash to specification.</li> </ol> 
	<p>If adjustment is impossible, replace differential carrier.</p>
	<ul style="list-style-type: none"> <li>• Drive bevel gear or drive bevel pinion defective.</li> <li>• Poor squareness of differential carrier.</li> <li>• Differential carrier surface where gear is installed is defective.</li> </ul> <p>Replace defective part as an assembly.</p>

TOOTH CONTACT PATTERN	DIAGNOSIS AND REMEDY
	<p>1) Check seating of bevel gear or differential case. (Check bevel gear for runout).</p> <p>2) If adjustment is impossible, replace drive bevel gear and pinion as a set or differential carrier.</p>
	<p>Replace drive bevel gear and pinion as a set or differential case, if found defective.</p>



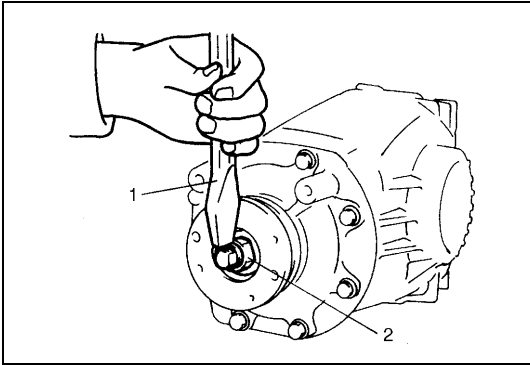
- 9) Upon completion of gear tooth contact check in Step 8), after applying sealant to breather cover (3), install breather plug (2) to differential cover (4).
- 10) After applying sealant to differential cover (4), install differential cover (4) to differential carrier (1).

**“A”: Sealant 99000-31110**

**Tightening torque**

**Breather cover bolt (b): 6.0 N·m (0.6 kg-m, 4.5 lb-ft)**

**Differential cover bolts: 23 N·m (2.3 kg-m, 17.0 lb-ft)**



- 11) Caulk bevel pinion nut (2) with caulking tool (1) and hammer.

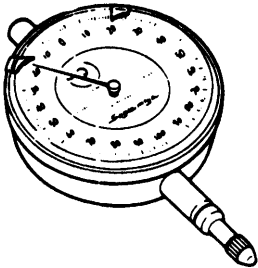
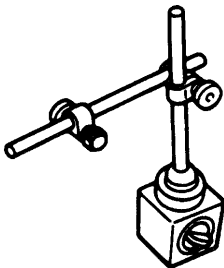
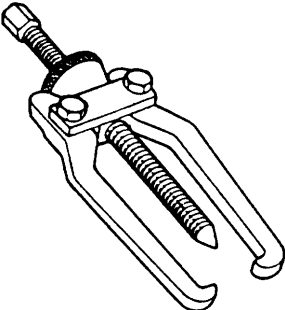
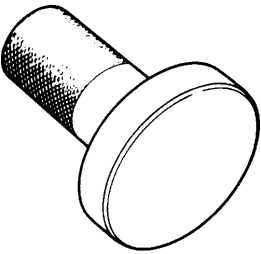
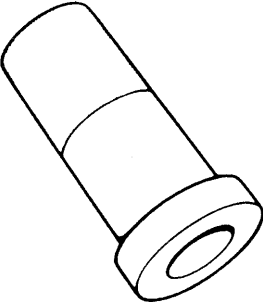
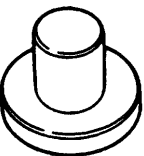
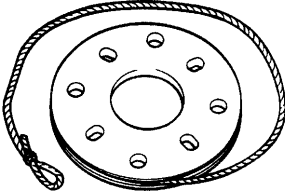
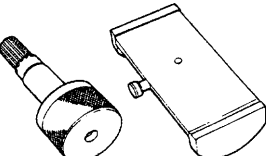
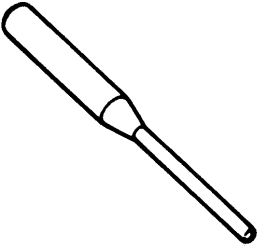
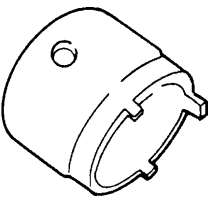
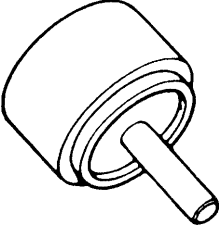
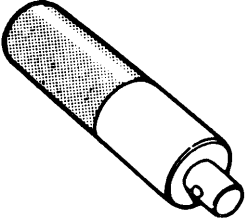
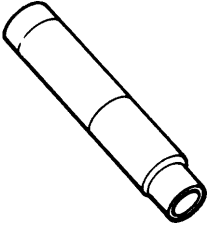
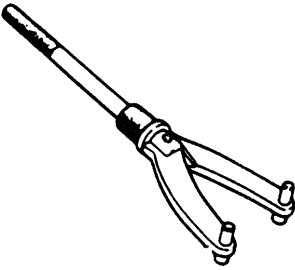
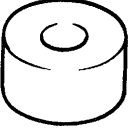
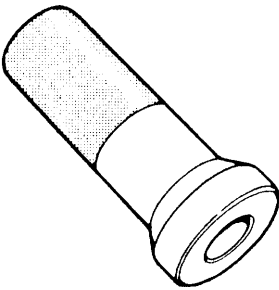
## Tightening Torque Specification

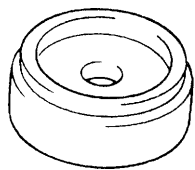
Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Oil drain plug	21	2.1	15.5
Oil level/filler plug	21	2.1	15.5
Differential front mounting bracket bolts	50	5.0	36.5
Differential front mounting bolt	80	8.0	58.0
Differential rear mounting bracket bolts	50	5.0	36.5
Differential rear mounting bolts	80	8.0	58.0
Stabilizer bar mount bolt	23	2.3	17.0
Propeller shaft flange bolts	23	2.3	17.0
Rear control rod outer bolts	90	9.0	65.0
Rear trailing rod rear bolts	90	9.0	65.0
Parking cable wire mounting bolts	10	1.0	7.5
Rear drive shaft nuts	175	17.5	126.5
Wheel nuts	85	8.5	61.5
Bevel gear bolts	73	7.3	52.0
Front case bolts	23	2.3	17.0
Bevel pinion nut (Reference)	100 – 300	10.0 – 30.0	72.5 – 217.0
Retainer stopper bolts	10	1.0	7.5
Breather cover bolt	6	0.6	4.5
Differential cover bolts	23	2.3	17.0

## Required Service Material

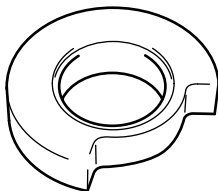
Material	Recommended SUZUKI product (Part Number)	Use
Thread lock cement	THREAD LOCK CEMENT 1322 (99000-32110)	Bevel gear bolts
Lithium grease	SUZUKI SUPER GREASE A (99000-25010)	Oil seal lips
Sealant	SUZUKI BOND NO.1215 (99000-31110)	<ul style="list-style-type: none"> <li>Oil drain and level/filler plugs</li> <li>Breather cover</li> <li>Mating surface of front case and differential cover</li> </ul>

## Special Tool

 <p>09900-20606 Dial gauge</p>	 <p>09900-20701 Magnetic stand</p>	 <p>09913-65135 Bearing puller</p>	 <p>09913-75520 Bearing installer</p>
 <p>09913-85210 Bearing installer</p>	 <p>09913-85230 Bearing removing jig</p>	 <p>09922-75222 Preload adjuster</p>	 <p>09922-77280 Bearing pinion adjuster set</p>
 <p>09922-85811 Spring pin remover</p>	 <p>09923-58520 Differential side bearing adjuster No.2</p>	 <p>09923-78210 Bearing installer</p>	 <p>09924-74510 Installer attachment</p>
 <p>09925-18011 Bearing installer</p>	 <p>09930-40113 Rotor holder</p>	 <p>09951-16060 Lower arm bush remover</p>	 <p>09951-16080 Bearing installer</p>



09951-16090  
Oil seal installer



09951-26020  
Bush remover & installer  
support





## SECTION 8

## BODY ELECTRICAL SYSTEM

**WARNING:**

For vehicles equipped with Supplemental Restraint (Air Bag) System :

- Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to “Air Bag System Components and Wiring Location View” under “General Description” in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and “Service Precautions” under “On-Vehicle Service” in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.
- Technical service work must be started at least 90 seconds after the ignition switch is turned to the “LOCK” position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).

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## Diagnosis

### NOTE:

Fuse name (“ ”) in the table below is shown on the fuse box cover.

### Headlight

Condition	Possible Cause	Correction
<b>Headlights do not light up</b>	Lighting or dimmer switch faulty	Check headlight switch.
	Headlight R and L fuses blown	Replace fuse to check for short.
	Wiring or grounding faulty	Repair circuit.
<b>Only one headlight does not light up</b>	Bulb blown	Replace bulb.
	Headlight R or L fuse blown	Replace fuse to check for short.
	Wiring or grounding faulty	Repair circuit.
<b>Only one beam (“Hi” or “Lo”) does not light</b>	Bulb blown	Replace bulb.
	Lighting or dimmer switch faulty	Check switch.
	Wiring or grounding faulty	Repair circuit.

### Headlights with Leveling System (If Equipped)

Condition	Possible Cause	Correction
<b>Both headlights do not move</b>	“WIPER/WASHER” fuse blown	Replace fuse to check for short.
	Leveling switch faulty	Check switch.
	Supply voltage too low	Recharge or replace battery.
<b>One of headlights (either Right or Left) does not move</b>	Socket, wiring or grounding faulty	Repair circuit.
	Actuator faulty	Check actuator.
	Vehicle body around headlight deformed	Repair body.
	Headlight assembly itself deformed	Replace headlight assembly.

### Turn Signal and Hazard Warning Light

Condition	Possible Cause	Correction
<b>Flash rate high or one side only flashes</b>	Bulb blown on “flash rate high”-side	Replace bulb.
	Incorrect bulb	Replace bulb.
	Turn signal/hazard warning relay faulty	Check relay.
	Open circuit or high resistance existing between combination switch (turn signal/hazard warning switch) and light on one side	Repair circuit.
	Wiring or grounding faulty	Repair circuit.
<b>No flashing</b>	“HAZARD” fuse and/or “TURN/BACK” fuse(s) blown	Replace fuse(s) to check for short.
	Open circuit or high resistance existing between battery and switch	Repair circuit.
	Turn signal/hazard relay faulty	Check relay.
	Combination switch or hazard switch faulty	Check switch.
	Wiring or grounding faulty	Repair circuit.
<b>Flash rate low</b>	Supply voltage low	Check charging system.
	Turn signal/hazard relay faulty	Check relay.

## Clearance, Tail and License Plate Light

Condition	Possible Cause	Correction
All lights do not light up	"TAIL" fuse blown	Replace fuse to check for short.
	Combination switch (lighting and dimmer switch) faulty	Check switch.
	Wiring or grounding faulty	Repair circuit.
Some lights do not light up	Bulb(s) blown	Replace bulb(s).
	Wiring or grounding faulty	Repair circuit.

## Back-Up Light

Condition	Possible Cause	Correction
Back-up lights do not light up	Bulb(s) blown	Replace bulb(s).
	"TURN/BACK" fuse blown	Replace fuse to check for short.
	Back-up light switch faulty	Check switch.
	Wiring or grounding faulty	Repair circuit.
Back-up lights stay on	Back-up light switch faulty	Check or replace switch.

## Brake Light

Condition	Possible Cause	Correction
Brake lights do not light up	Bulb(s) blown	Replace bulb(s).
	15A fuse (stop lamp fuse) installed at end of right side in fuse box on engine room blown	Replace fuse to check for short.
	Brake light (stop lamp) switch faulty	Check switch.
	Wiring or grounding faulty	Repair circuit.
Brake lights stay on	Brake light (stop lamp) switch faulty	Check, adjust or replace switch.

## Front Fog Light (If Equipped)

Condition	Possible Cause	Correction
Only one light does not light	Bulb blown	Replace bulb.
	Wiring or grounding faulty	Repair circuit.
Front fog lights do not light	Rear side 15A fuse (front fog light fuse) in relay box on engine room blown	Replace fuse to check for short.
	Front fog light switch faulty	Check switch.
	Front fog light relay faulty	Replace relay.
	Wiring or grounding faulty	Repair circuit.

## Rear Fog Light (If Equipped)

Condition	Possible Cause	Correction
Rear fog light does not come on	"REAR FOG" fuse blown	Replace fuse to check for short.
	Rear fog light switch faulty	Check fog light switch.
	Lighting switch faulty	Check switch.
	Rear fog controller faulty	Repair rear fog controller
	Wiring or grounding faulty	Repair circuit.
	Bulb blown	Replace bulb.

## Interior Light

Condition	Possible Cause	Correction
<b>Dome light does not light up</b>	Bulb blown	Replace bulb.
	"RADIO/DOME" fuse blown	Replace fuse to check for short.
	Dome light switch faulty	Check switch.
	Door switch faulty	Check switch.
	Wiring or grounding	Repair circuit.
<b>Front spot lights do not light up (if equipped)</b>	Bulb(s) blown	Replace bulb(s).
	Spot light switch faulty	Check switch.
	Wiring or grounding	Repair circuit.
<b>Luggage compartment light does not light up (if equipped)</b>	Bulb blown	Replace bulb.
	Back door switch faulty	Check switch.
	Wiring or grounding faulty	Repair circuit.

## Combination Meter

Condition	Possible Cause	Correction
<b>Display and indicator lamps do not light up</b>	"METER" fuse blown	Replace fuse to check for short.
	Power source circuit (between ignition switch and combination meter) open or short	Repair circuit.
	Wiring or grounding faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.

## Speedometer and VSS

Condition	Possible Cause	Correction
<b>Speedometer shows no operation or incorrect operation</b>	VSS faulty	Check VSS.
	Wiring harness connected to VSS is open or short	Repair circuit.
	Combination meter faulty	Replace combination meter.

## Fuel Meter and Fuel Gauge Unit

Condition	Possible Cause	Correction
<b>Fuel meter display blinks for 10 seconds and then goes off when ignition switch is turned to ON position</b>	Wiring harness between combination meter and fuel gauge unit is short to ground	Repair short. [After repair, fuel meter display comes on when ignition switch is turned to ON position again.]
<b>Fuel meter shows no operation or incorrect operation</b>	Fuel gauge unit faulty	Check fuel gauge unit.
	Wiring harness connected to fuel gauge unit is open	Repair open.
	Grounding of fuel gauge unit faulty	Repair.

## Engine Coolant Temperature (ECT) Meter and Sensor

Condition	Possible Cause	Correction
ECT meter display blinks for 10 seconds after 60 seconds with ignition switch turned ON, and then goes off	ECT sensor wiring harness between combination meter and ECM is open or short to ground	Repair.
	ECT sensor faulty	Check ECT sensor. [After repair, ECT meter display comes on when ignition switch is turned to ON position again.]

## Oil Pressure Warning Light

Condition	Possible Cause	Correction
Oil pressure warning light does not light up when ignition switch is turned to ON position at engine off	Oil pressure switch faulty	Check oil pressure switch.
	Wiring or grounding faulty	Repair circuit.
Oil pressure warning light stays on	Oil pressure switch faulty	Check oil pressure switch.

## Brake and Parking Brake Warning Light

Condition	Possible Cause	Correction
Brake warning light does not light up (when fluid low level and/or parking brake pull up)	Brake fluid level switch faulty	Check brake fluid level switch.
	Parking brake switch faulty	Check parking brake switch.
	Wiring or grounding faulty	Repair circuit.
Brake warning light does not light up when cranking when ignition switch is turned to ON position (with ABS vehicle only)	ABS system faulty	Refer to Section 3.
	Wiring or grounding faulty	Repair circuit.
	Ignition switch faulty	Check ignition switch.
	combination meter faulty	Check combination meter.
Brake warning light stays on	Brake fluid level switch and/or parking brake switch faulty	Check switch.
	EBD system faulty	Refer to Section 3.

## Seat Belt Warning Light (If Equipped)

Condition	Possible Cause	Correction
Seat belt warning light does not light up	Seat belt switch faulty	Check seat belt switch.
	Wiring or grounding faulty	Repair circuit.

## Ignition Key Remainder and Light Remainder Warning Buzzer

Condition	Possible Cause	Correction
<b>Ignition key remainder and light remainder warning buzzer does not sound</b>	Driver side door switch faulty	Check door switch.
	"RADIO/DOME" fuse blown	Replace fuse to check for short.
	Wiring harness between "RADIO/DOME" fuse and combination meter is open	Repair open.
	Wiring or grounding of door switch faulty	Repair circuit.
	Combination meter faulty	Replace combination meter.

## A/T Shift Position Display (A/T Vehicle Only)

Condition	Possible Cause	Correction
<b>A/T shift position display goes off after 2 seconds since ignition switch is turned to ON position. After 60 seconds, A/T shift position display blinks for 10 seconds, and then goes off again</b>	Wiring harness between combination meter and TCM is open or short to ground	Replace circuit.
	Transmission range switch circuit faulty	Check circuit referring to Section 7B1 in this manual.
	TCM faulty	Repair TCM.

## O/D Off Display (A/T Vehicle Only)

Condition	Possible Cause	Correction
<b>O/D off display goes off after 2 seconds since ignition switch is turned to ON position. After 60 seconds or immediately, O/D off display blinks for 10 seconds, and then goes off again</b>	Wiring harness between combination meter and TCM is open or short to ground	Replace circuit.
	O/D cut switch faulty	Check switch referring to Section 7B1 in this manual.
	TCM faulty	Repair TCM.

## Rear Window Defogger

Condition	Possible Cause	Correction
<b>Defogger does not operate</b>	"REAR DEFG" fuse blown	Replace fuse to check for short.
	Heat wire faulty	Repair heat wire.
	Rear window defogger switch faulty	Check switch.
	Wiring or grounding faulty	Repair circuit.



## Wipers and Washers (Front/Rear)

Condition	Possible Cause	Correction
<b>Wiper malfunctions</b>	“WIPER/WASHER” fuse blown	Replace fuse to check for short.
	Wiper motor faulty	Check wiper motor.
	Combination switch (wiper switch) faulty	Check wiper switch.
	Wiring or grounding faulty	Repair circuit.
<b>Washer malfunctions</b>	Washer hose or nozzle clogged	Clean or repair clogged hose or nozzle.
	“WIPER/WASHER” fuse blown	Replace fuse to check for short.
	Washer motor faulty	Check washer motor.
	Combination switch (washer switch) faulty	Check washer switch.
	Wiring or grounding faulty	Repair circuit.

## Power Window Control System

Condition	Possible Cause	Correction
<b>All power windows do not operate</b>	“P/W” fuse blown	Replace fuse to check for short.
	Ignition switch faulty	Check ignition switch.
	Power window main switch faulty	Check power window main switch.
	Wiring or grounding faulty	Repair circuit.
<b>Only one power window does not operate</b>	Wiring and/or coupler faulty	Check wiring and/or coupler.
	Power window switch (main or sub) faulty	Check power window switch.
	Power door lock actuator faulty	Check power door lock actuator.
	Grounding faulty	Repair.

## Cigarette Lighter

Condition	Possible Cause	Correction
<b>Cigarette lighter shows no operation</b>	“CIGAR” fuse blown	Replace fuse to check for short.
	Ignition switch faulty	Check ignition switch.
	Cigarette lighter faulty	Check cigarette lighter.
	Wiring or grounding faulty	Repair circuit.

## Power Door Lock Control System (If Equipped)

Condition	Possible Cause	Correction
All power doors are not locked/unlocked by all of switches	Without Dead Lock System	
	“DOOR LOCK” fuse blown	Replace fuse to check for short.
	Power door lock controller faulty	Check controller.
	Wiring or grounding faulty	Repair circuit.
	With Dead Lock System	
	“DOOR LOCK” fuse blown	Replace fuse to check for short.
	Power door lock controller faulty	Check system referring to POWER DOOR LOCK SYSTEM (WITH DEAD LOCK SYSTEM) in this section.
	Wiring or grounding faulty	
All power doors are not locked/unlocked by only power door lock switch	Without Dead Lock System	
	Power door lock switch faulty	Check switch.
	Wiring harness connected to power door lock switch faulty	Repair.
	With Dead Lock System	
	Power door lock switch faulty	Check switch.
	Wiring harness connected to power door lock switch faulty	Repair.
	Power door lock controller faulty	Check system referring to POWER DOOR LOCK SYSTEM (WITH DEAD LOCK SYSTEM) in this section.
	Wiring or grounding faulty	
All power doors are not locked/unlocked by only door key switches (driver and passenger side)	Without Dead Lock System	
	Wiring harness connected to door key switches faulty	Repair.
	With Dead Lock System	
	Wiring harness connected to door key switches faulty	Repair circuit.
	Power door lock controller faulty	Check system referring to POWER DOOR LOCK SYSTEM (WITH DEAD LOCK SYSTEM) in this section.
	Wiring or grounding faulty	
All power doors are not locked/unlocked by only driver side door key switch or only passenger side door key switch	Driver side or passenger side door key switch faulty	Check door key switch.
	Wiring harness connected to door key switches faulty	Repair.
Only one power door is not locked/unlocked	Wiring harness faulty	Repair.
	Power door lock actuator faulty	Check actuator.

## Power Door Mirror Control System (If Equipped)

Condition	Possible Cause	Correction
<b>All power mirrors do not operate</b>	"CIGAR" fuse blown	Replace fuse to check for short.
	Power door mirror switch faulty	Check switch.
	Wiring or grounding faulty	Repair circuit.
<b>One power mirror does not operate</b>	Power door mirror switch faulty	Check switch.
	Power door mirror actuator faulty	Check actuator.
	Wiring or grounding faulty	Repair circuit.

## Front Seat Heater (If Equipped)

Condition	Possible Cause	Correction
<b>Both seat back and cushion do not become hot although seat heater switch is LO/Hi position</b>	"SEAT HEATER" fuse blown	Replace fuse to check for short.
	Seat heater switch faulty	Check switch.
	Seat heater circuit in seat back and/or seat cushion faulty	Check heater front back and/or heater front cushion.
	Wiring or grounding faulty	Repair circuit.
<b>Only seat back does not become hot although seat heater switch is Hi position</b>	Seat heater circuit in seat back faulty	Check heater front back.
	Seat heater switch faulty	Check switch.
	Wiring faulty	Repair.
<b>Only seat cushion does not become hot although seat heater switch is Hi position</b>	Seat heater circuit in seat back and/or seat cushion faulty	Check heater front back and/or heater front cushion.
	Seat heater switch faulty	Check switch.
	Wiring faulty	Repair.

## Horn

Condition	Possible Cause	Correction
<b>Horn does not operate</b>	Front side 15 A fuse (horn fuse) in relay box on engine room blown	Replace fuse to check for short.
	Horn switch faulty	Check horn switch.
	Horn relay faulty	Check horn relay.
	Horn faulty	Replace horn.

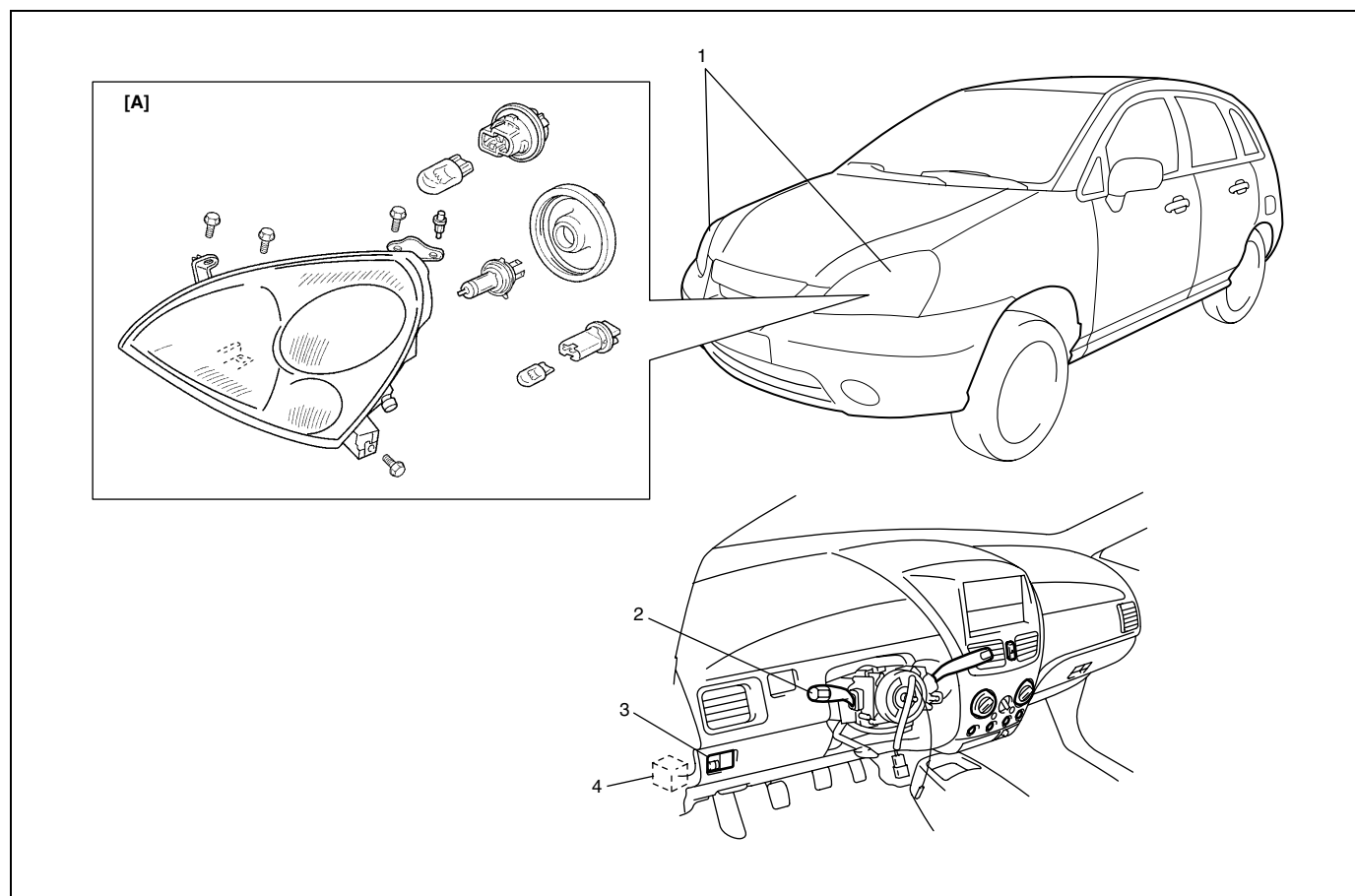
## On-Vehicle Service

### Cautions in Servicing

When performing works related to electric systems, observe the cautions described in GENERAL INFORMATION (Section 0A) of this manual for the purpose of protection of electrical parts and prevention of a fire from occurrence.

### Headlight

#### Headlight system location



1. Headlight

2. Lighting switch

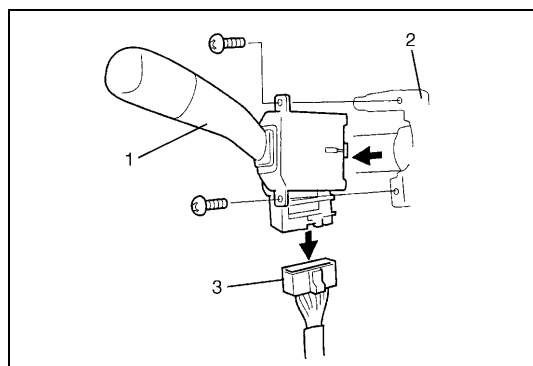
3. Headlight leveling switch

4. Headlight relay

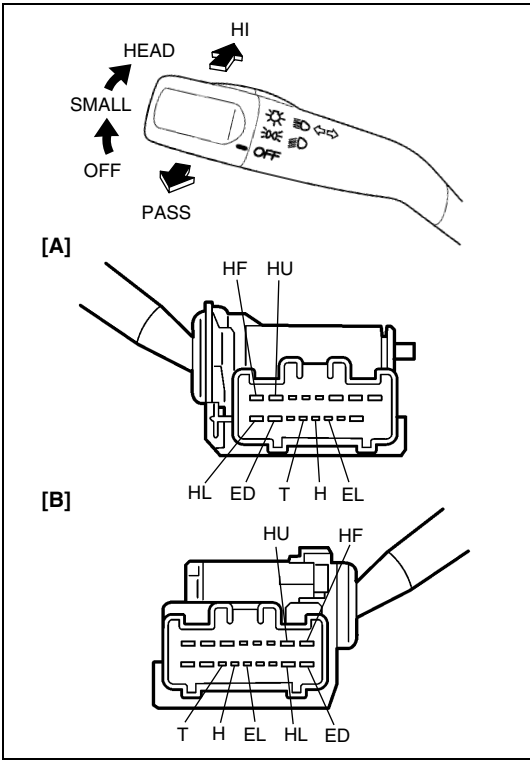
[A]: Headlight component

### Headlight switch (in lighting switch)

#### REMOVAL



- 1) Disconnect negative cable at battery.
- 2) Remove steering column hole cover.
- 3) Remove steering column covers.
- 4) Remove lighting switch (1) from combination switch (2) and disconnect its coupler (3).



INSPECTION

Check for continuity between terminals at each switch position as shown below. If check result is not as specified, replace.

Terminal		ED	HL	HU	HF	EL	T	H
Switch Position								
OFF	LO							
	PASS							
	HI							
SMALL	LO							
	PASS							
	HI							
HEAD	LO							
	PASS							
	HI							

[A]: LH steering vehicle

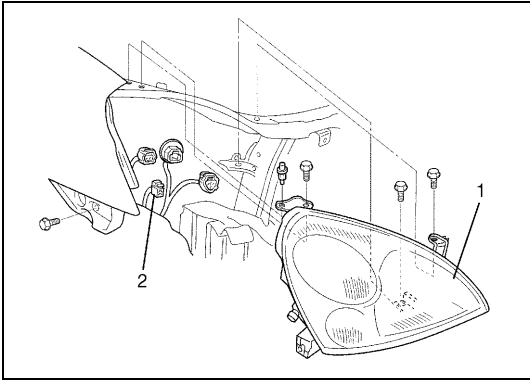
[B]: RH steering vehicle

INSTALLATION

Reverse removal procedure for installation.

Headlight assembly

REMOVAL



- 1) Disconnect negative cable at battery.
- 2) Remove front bumper. Refer to Section 9.
- 3) Remove headlight mounting bolts.
- 4) Detach headlight assembly (1) from vehicle.
- 5) Disconnect couplers (2) from headlight assembly (1).

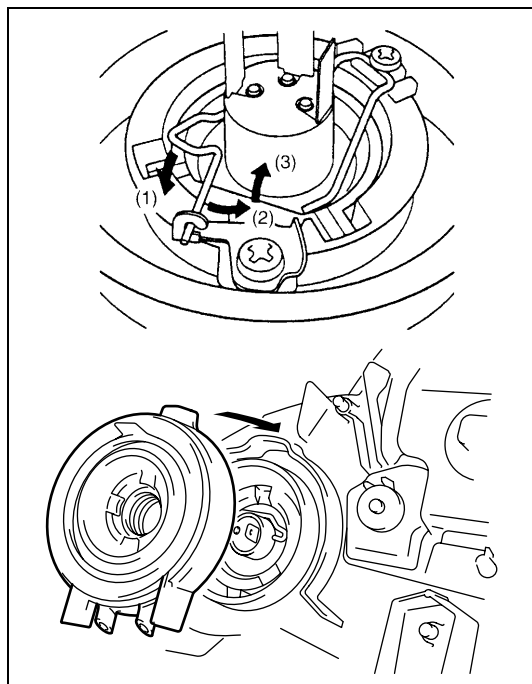
INSTALLATION

Reverse removal procedure for installation.

## Headlight bulb REPLACEMENT

**WARNING:**

- To avoid danger of being burned, don't touch when the bulb is hot.
- Don't touch glass surface of bulb, to avoid deteriorate as the case may be unclear when bulb light on at dirty condition.

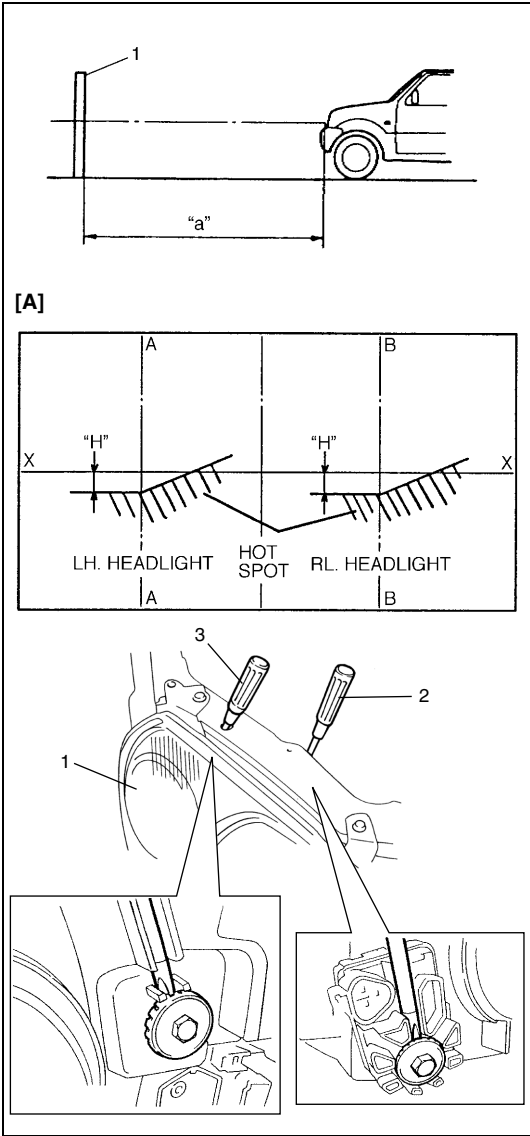


- 1) Disconnect negative cable at battery.
- 2) Disconnect coupler from bulb.
- 3) Remove socket cover.
- 4) Replace bulb and assemble all removed parts.

## Headlight aiming adjustment with screen

**NOTE:**

- Unless otherwise obligated by local regulations, adjust headlight aiming according to following procedure.
- After replacing headlight, be sure to adjust aiming.



- 1) Make sure the following items.
  - Place vehicle on a flat surface in front of blank wall (screen) (1) ahead of headlight surface.

**Distance “a” : 10 m (32.8 ft.)**

- Adjust air pressure of all tires to a specified value respectively.
- Bounce vehicle body up and down by hand to stabilize suspension.
- Carry out with one driver aboard.

**Driver’s weight : 75 kg (165 lb)**

- 2) Check to see if hot spot (high intensity zone) of each main (low) beam axis falls as shown in figure.

**Clearance “H” : Approx. 130 mm (5.15 in.)**

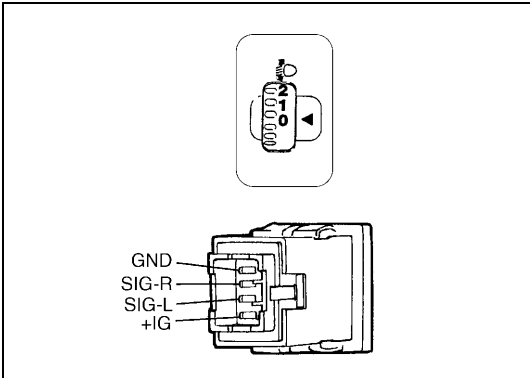
- 3) Align headlight aiming to specification by adjusting aiming gear if it is not set properly.

1. Headlight assembly
2. Aiming (for up/down adjustment)
3. Aiming (for right/left adjustment)
[A] : The illustration shows LH steering vehicle. And RH steering vehicle is symmetrical.
X-X : Horizontal center line of headlight bulbs
A-A : Vertical center line of left headlight bulb
B-B : Vertical center line of right headlight bulb

**Headlight leveling switch (if equipped)**

**INSPECTION**

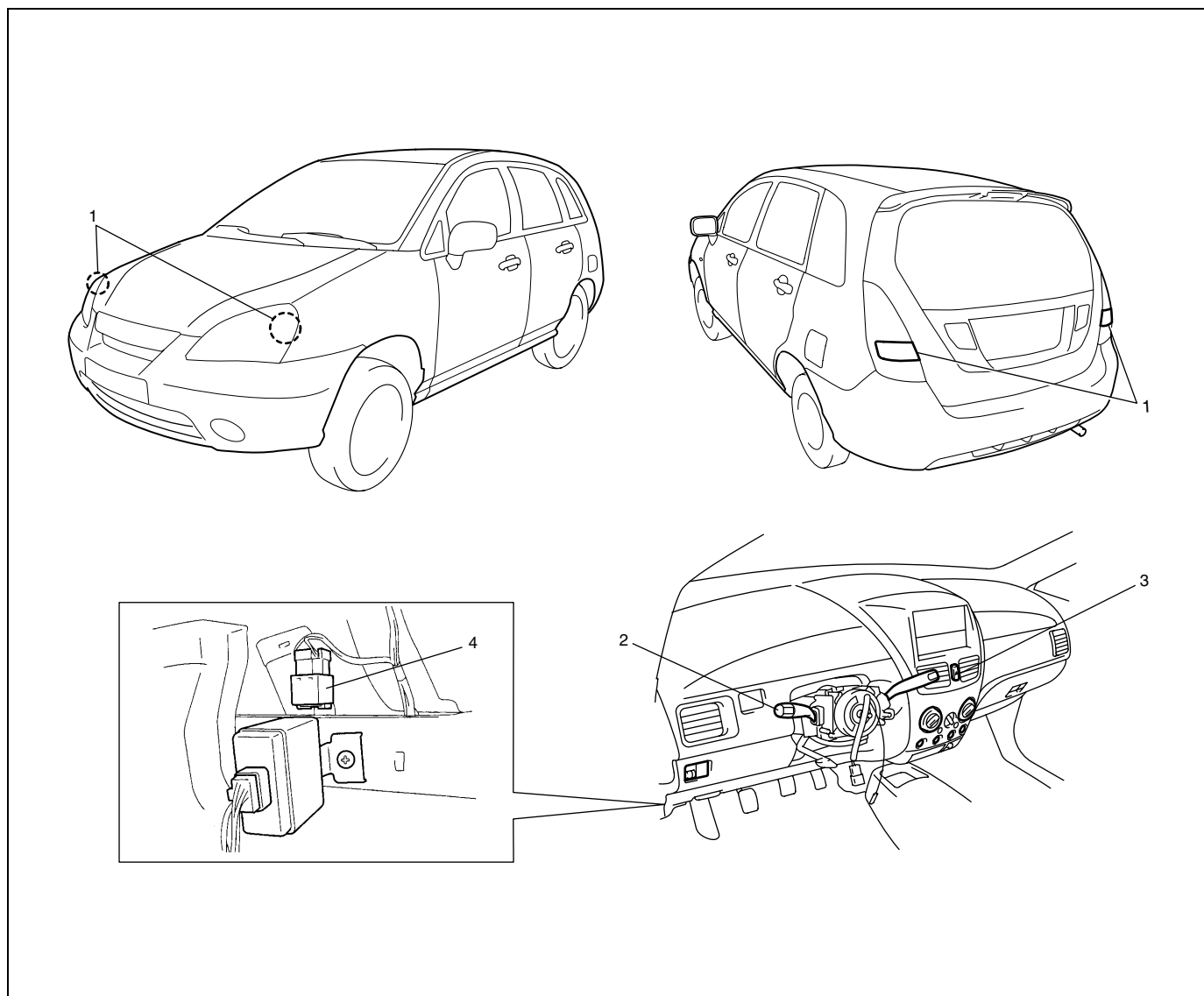
Check for resistance between terminals at each switch position as shown below. If check result is not as specified, replace.



Position	Terminals	Resistance (KΩ)
–	+IG and GND	3.7 – 5.6
0	<ul style="list-style-type: none"> <li>• SIG-R and GND</li> <li>• SIG-L and GND</li> </ul>	4.0 – 4.5
1		3.4 – 3.8
2		2.8 – 3.2
3		2.2 – 2.5
4		1.6 – 1.8

## Turn Signal and Hazard Warning Lights

### Turn signal and hazard warning system location



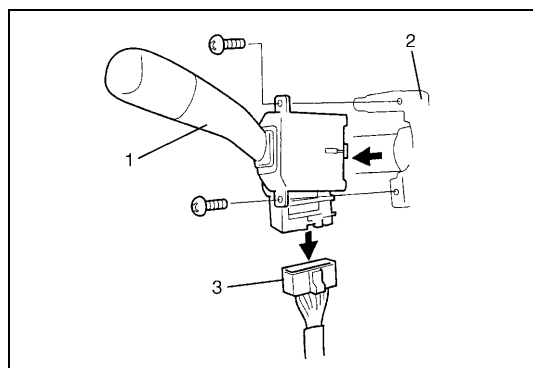
1. Turn signal lights

2. Lighting switch

3. Hazard switch

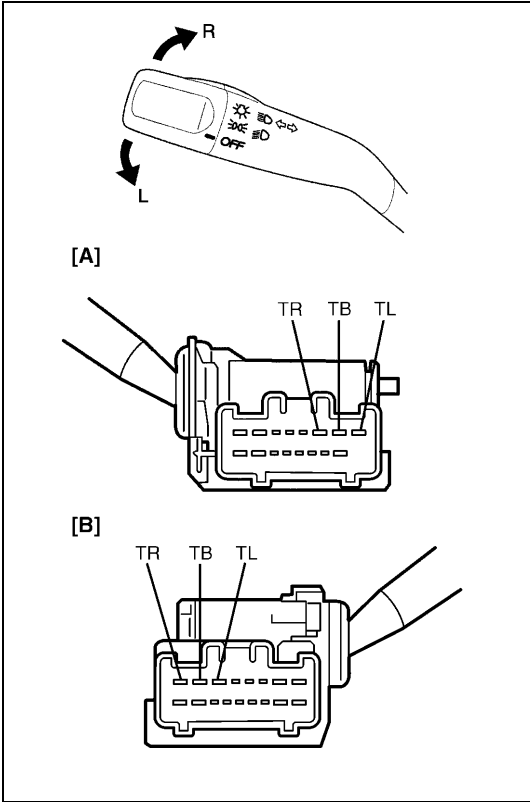
4. Turn signal/hazard relay

### Turn signal light switch (in lighting switch)



- 1) Disconnect negative cable at battery.
- 2) Remove steering column hole cover.
- 3) Remove steering column covers.
- 4) Remove lighting switch (1) from combination switch (2) and disconnect its coupler (3).





INSPECTION

Check for continuity between terminals at each switch position as shown below. If check result is not as specified, replace.

Turn signal SW \ Terminal	TL	TB	TR
L			
N			
R			

[A]: LH steering vehicle      [B]: RH steering vehicle

INSTALLATION

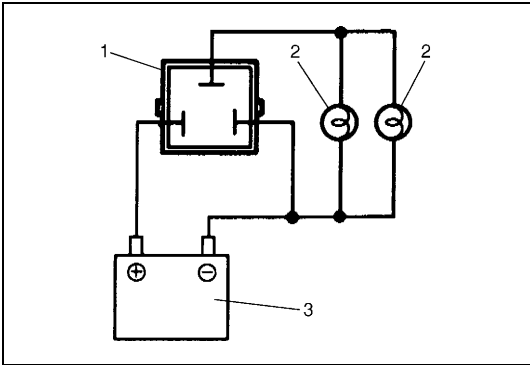
Reverse removal procedure for installation.

Turn signal and hazard relay

INSPECTION

Connect turn signal and hazard relay (1), battery (3) and two test bulbs (12 V, 27 W) (2) as shown. Unless a continued flash on and off is visible, replace.

Reference flashing cycle  
: 60 - 120 cycle/minute

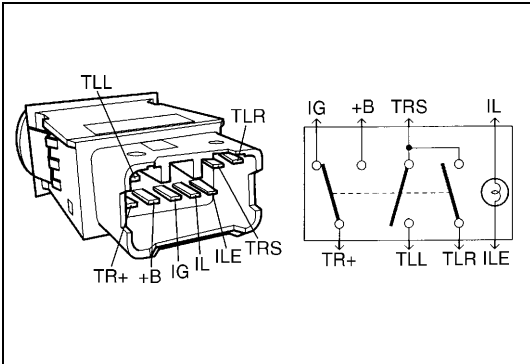


Hazard switch

INSPECTION

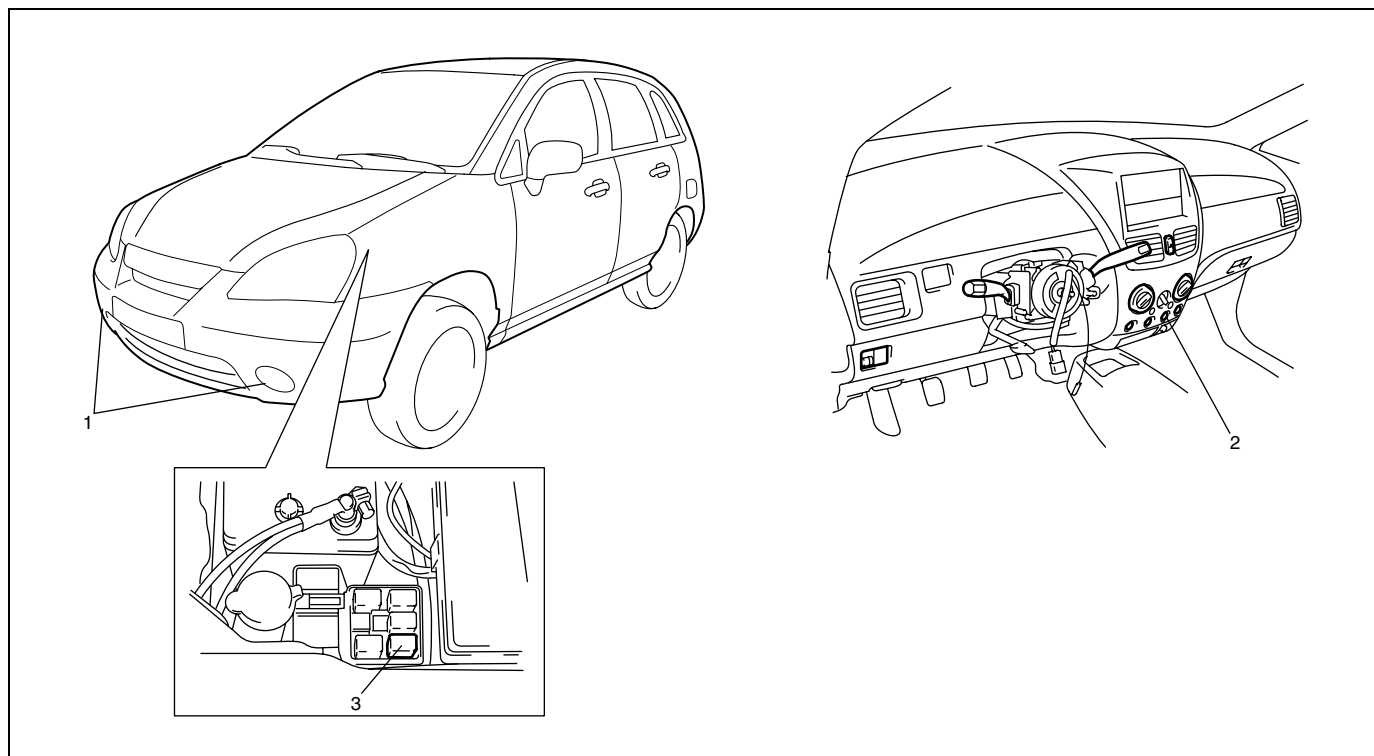
Check for continuity between terminals at each switch position as shown below. if check result is not as specified, replace.

Hazard SW \ Terminal	+B	TR+	IG	TRS	TLL	TLR	IL	ILE
OFF								
ON								



## Front Fog Lights (If Equipped)

### Front fog light system location



1. Front fog lights

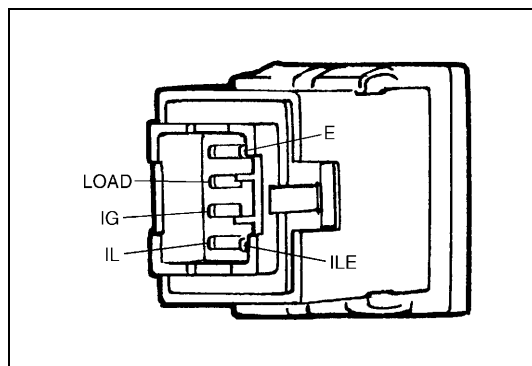
2. Front fog light switch

3. Front fog light relay

## Front fog light switch

### INSPECTION

Check for continuity between terminals at each switch position as shown below. If check result is not as specified, replace.



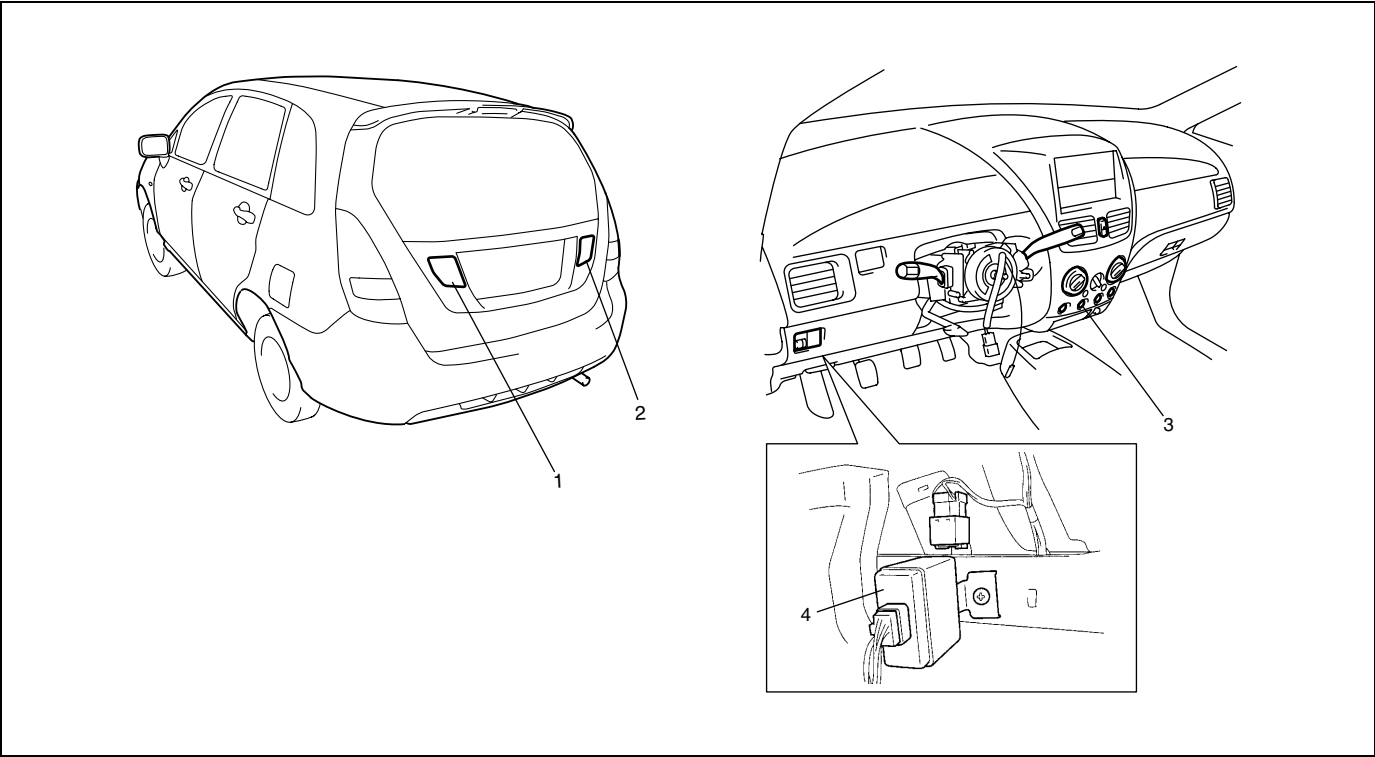
Terminal Switch Position	IG	LOAD	E	IL	ILE
OFF		○—○	○—○	○—○	○—○
ON	○—○	○—○	○—○	○—○	○—○

### NOTE:

Front fog lights light up only when headlight switch is in **HEADLIGHT** position (low or high beams) or **SMALL** position. Front fog lights turn OFF automatically when headlight switch is turned to OFF position. If front fog light switch holds ON position, front fog lights turn ON automatically when headlight switch is tuned to **HEADLIGHT** position (low or high beams) or **SMALL** position again.

# Rear Fog Light (If Equipped)

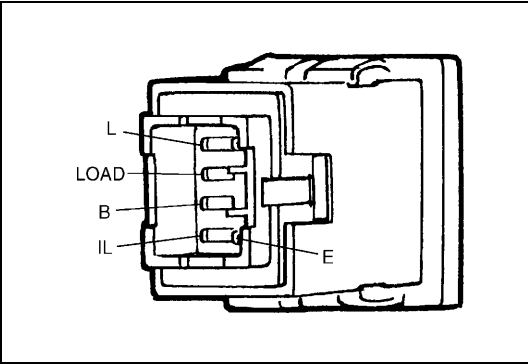
## Rear fog light system location



1. Rear fog light (for LH model)	2. Rear fog light (for RH model)	3. Rear fog light switch	4. Rear fog controller
----------------------------------	----------------------------------	--------------------------	------------------------

## Rear fog light switch

### INSPECTION



Check for continuity between terminals at each switch position as shown below. if check result is not satisfied, replace.

Terminal SwitchPosition	B	LOAD	L	E	IL
OFF			○	○	○
ON (PUSH IN)	○	○	○	○	○

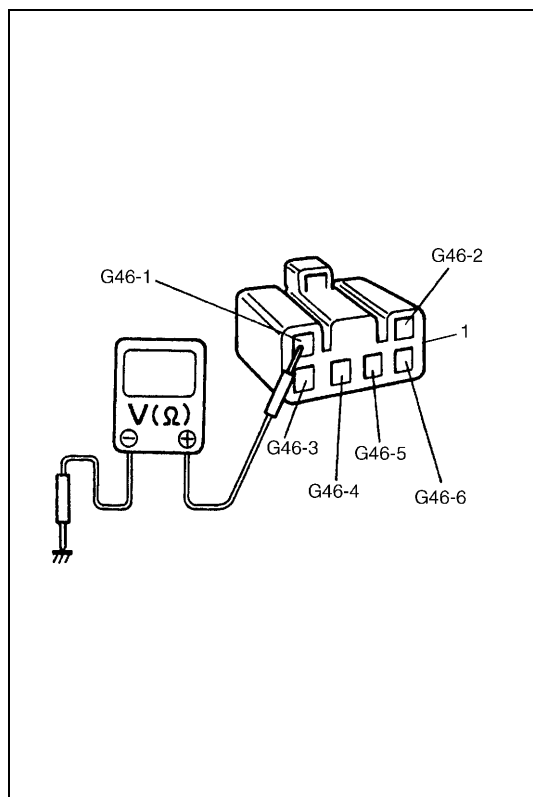
### NOTE:

Rear fog light lights up only when headlight switch is in HEADLIGHT position (low or high beams), or it is in SMALL position and front fog light switch (if equipped) is in ON position. Rear fog light turns OFF automatically when headlight switch is turned to OFF position, or it is turned to SMALL position and front fog light switch is turned OFF position. Although headlight switch is turned to HEADLIGHT position, or it is turned to SMALL position and front fog light switch is turned to ON position again, rear fog light does not light up. You should push rear fog light switch again.

## Rear fog light operation inspection

- 1) Turn headlight switch to HEADLIGHT position (low or high beam), and push rear fog light switch.
- 2) Check that rear fog light lights up.
- 3) Turn headlight switch to OFF position. Check that rear fog light goes out.
- 4) Turn headlight switch to HEADLIGHT position again. Check that rear fog light remains going out.
- 5) Push rear fog light switch again. Check that rear fog light lights up again.
- 6) If check result of Step 1) to 5) is as specified, this system is OK. If check result is not satisfactory, go to next Step 7).
- 7) Disconnect negative cable at battery.
- 8) Disconnect rear fog controller coupler (1) and connect negative cable at battery.
- 9) Check that the voltage and resistance between following terminals are specifications.

If check result is not satisfactory, repair. If check result is OK, replace rear fog light controller.



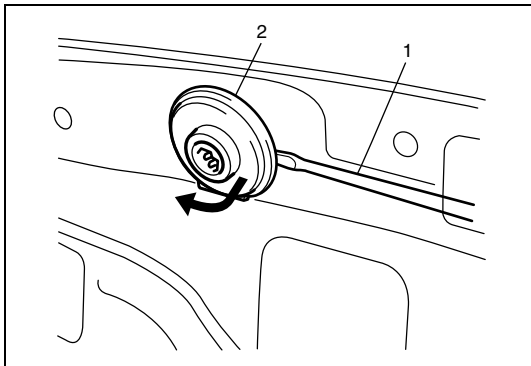
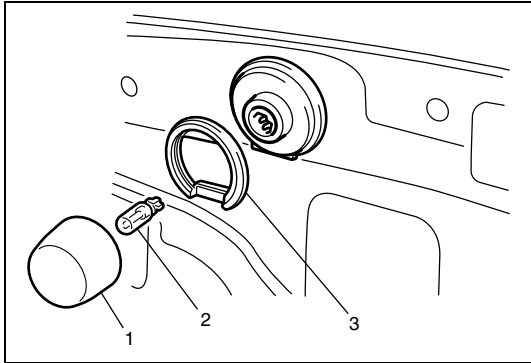
Terminals	Condition	Specification
G46-1 and ground	Any time	10 – 14 V
G46-2 and ground	When headlight switch is in OFF	10 – 14 V
	When headlight switch is in ON	0 – 1 V
G46-3 and ground	Any time	Continuity
	When rear fog light bulb is removed	No continuity
G46-4 and ground	Any time	Continuity
G46-5 and ground	When rear fog light switch is pushed	10 – 14 V
	When rear fog light switch is free	0 – 1 V

## Licence Lamp

### Licence lamp assembly

#### REMOVAL

- 1) Remove back door garnish referring to "BACK DOOR ASSEMBLY" in Section 9.
- 2) Remove licence lamp lens (1), licence lamp bulb (2) and licence lamp socket cover (3).



- 3) Using flat head screw driver or the like (1), push locking part of licence lamp socket (2). And then, remove licence lamp socket (2) as shown.

#### CAUTION:

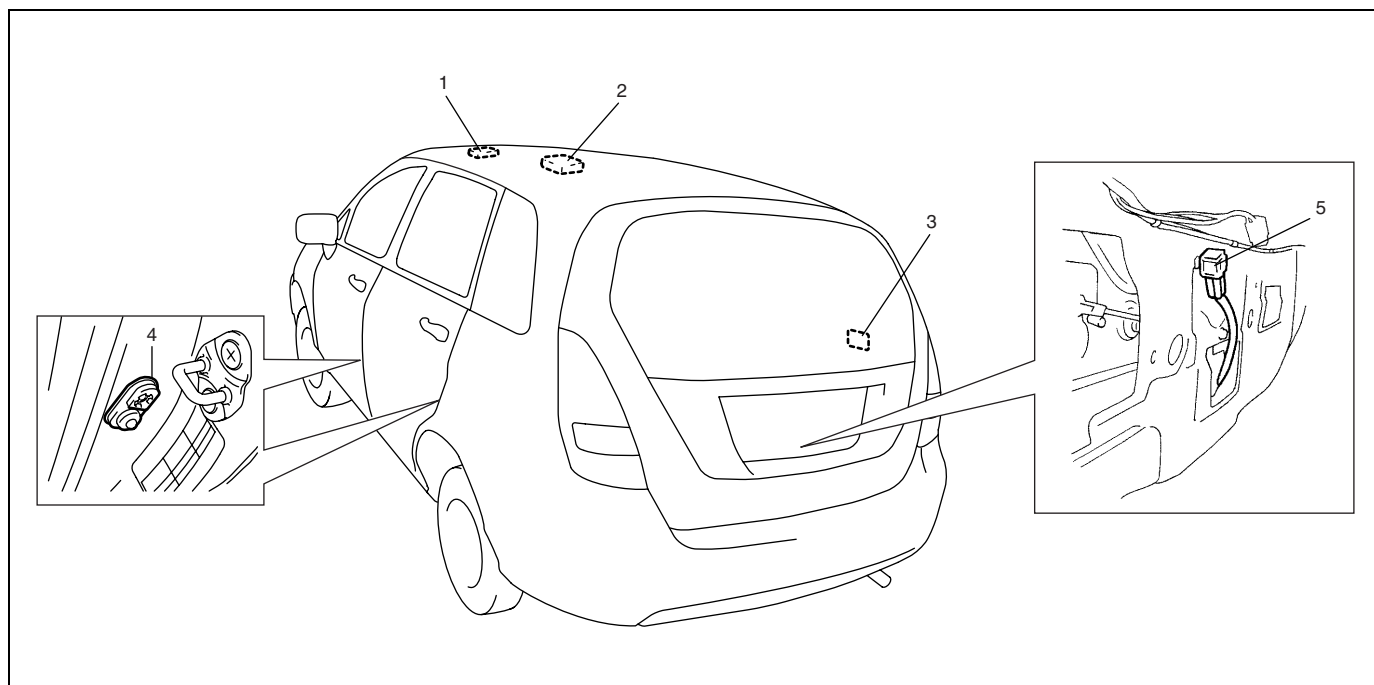
To prevent vehicle body from scratch, wrap flat head screw driver or the like (2) with tape.

#### INSTALLATION

Reverse removal procedure to install licence lamp.

## Interior Light

### Interior light system location



1. Front spot lights

2. Dome light

3. Luggage compartment light

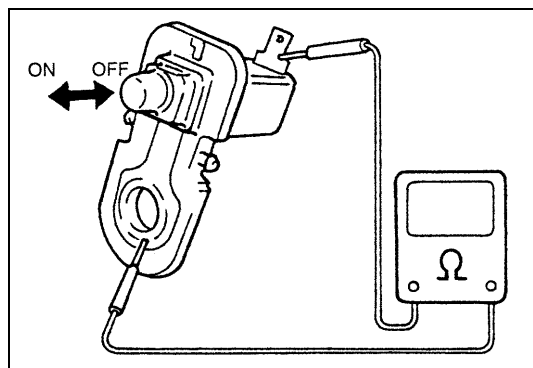
4. Door switches (both sides)

5. Back door switch

### Door switch (front/rear door)

#### INSPECTION

Remove door switch from body and check switch for continuity. if found defective, replace switch.



OFF position (Door closed)	No continuity
ON position (Door open)	Continuity

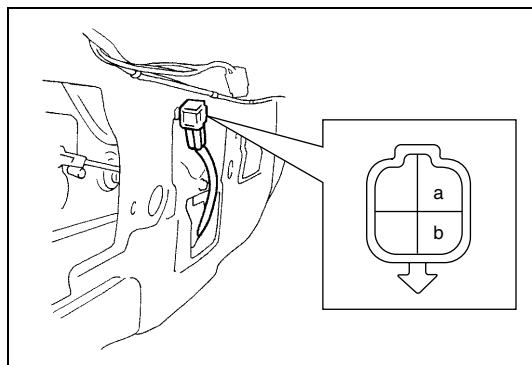
### Back door switch

#### INSPECTION

Check for continuity between terminal “a” and “b” shown below.

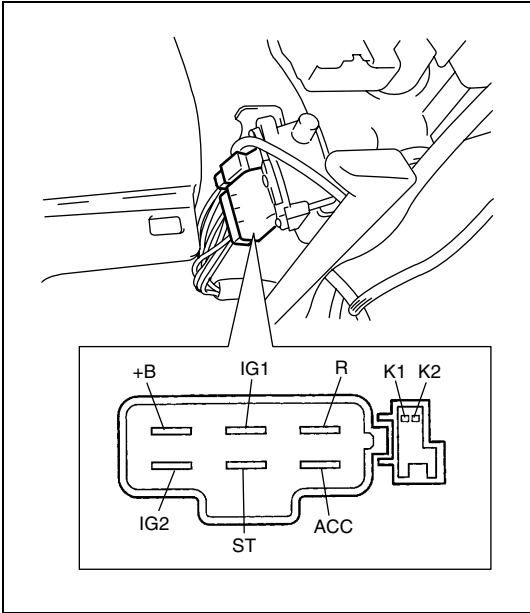
**Back door closed: No continuity**

**Back door opened: Continuity**



# Ignition switch

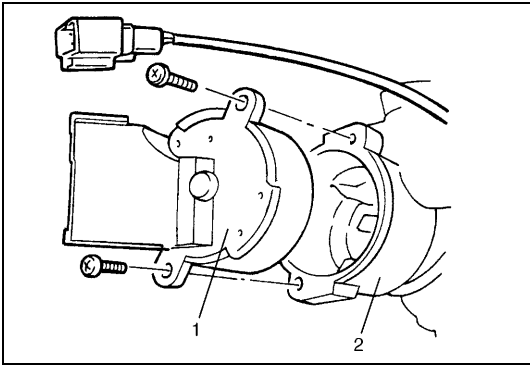
## INSPECTION



- 1) Disconnect negative cable at battery.
- 2) Remove steering column hole cover.
- 3) Remove steering column upper and lower cover.
- 4) Disconnect couplers from ignition switch.
- 5) Check for continuity between terminals at each switch position as shown below. If check result is not as specified, replace.

		Terminal						
Key	Position	+B	+ACC	IG1	IG2	ST	K1	K2
OFF	LOCK	○						
	ACC	○	○					
	ON	○	○	○	○		○	○
	START	○		○		○		

## REMOVAL



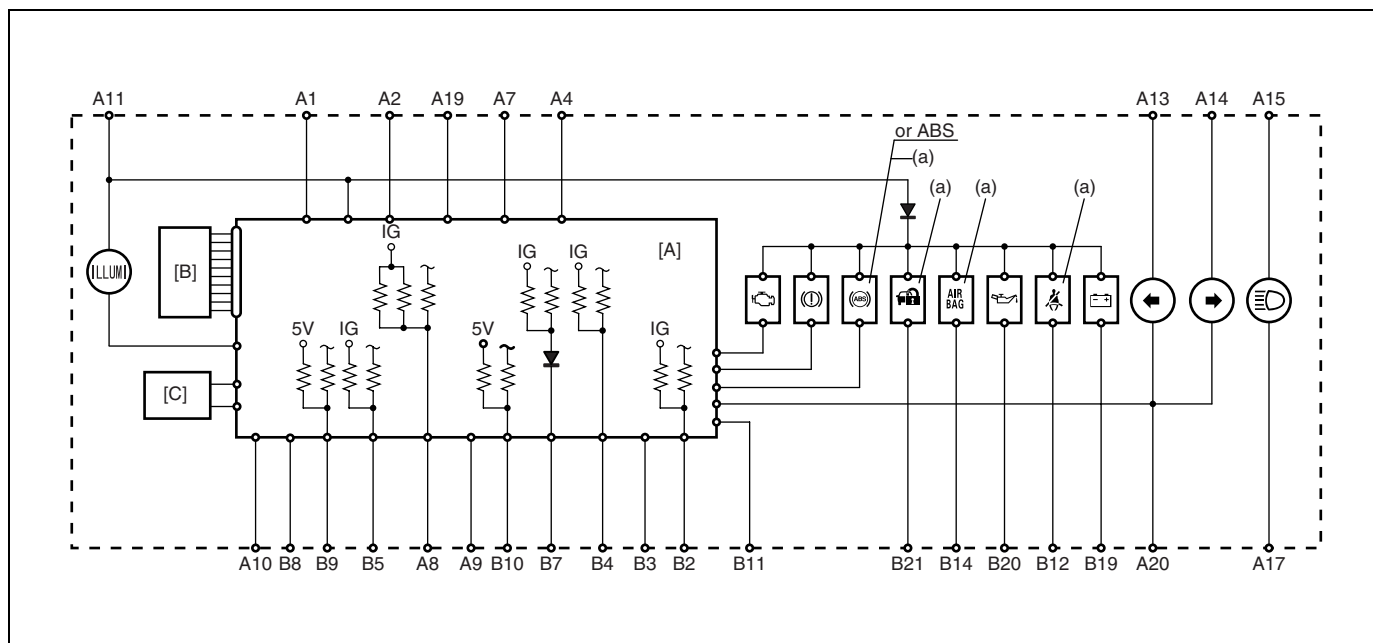
- 1) Disconnect negative cable at battery.
- 2) Confirm that ignition key is removed.
- 3) Remove steering column hole cover.
- 4) Remove steering column upper and lower cover.
- 5) Disconnect couplers from ignition switch (1).
- 6) Remove ignition switch (1) from key cylinder (2).

## INSTALLATION

Reverse removal procedure for installation.

# Combination Meter

## Circuit



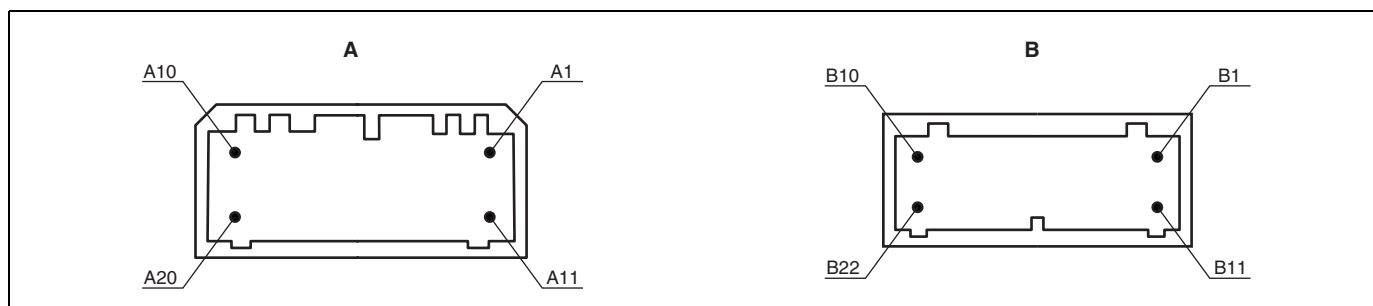
[A]: Computer assembly

[C]: Buzzer unit

[B]: Display (speed/Tacho/Fuel/Temp. meter, Shift position indicator (A/T vehicle only), O/D OFF indicator (A/T vehicle only), ODO/TRIP METER

(a): If equipped

## Terminal arrangement of coupler viewed from harness side



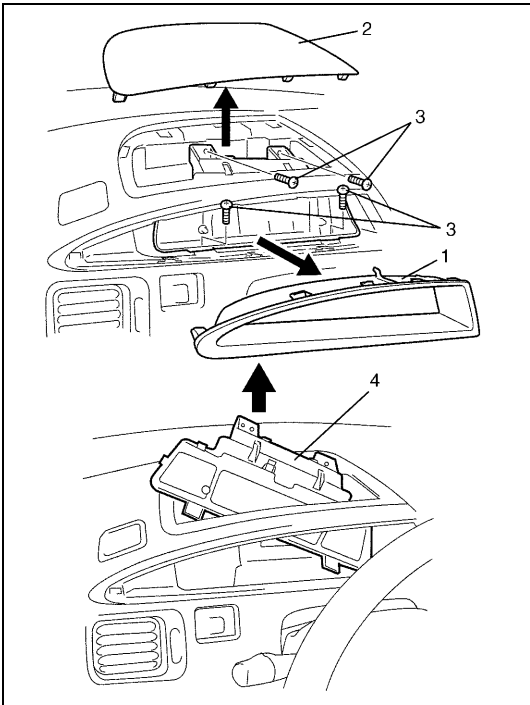
[A]: Connector A

[B]: Connector B

1. To main fuse	WHT/RED	1. Blank	—
2. To headlight relay	RED/YEL	2. To ABS control module (if equipped)	RED/BLU
3. Blank	—	3. To ABS control module (if equipped)	PNK/GRN
4. To ignition switch	BLU/YEL	4. To brake fluid level switch and parking brake switch	RED/BLK
5. Blank	—	5. To ECM	PPL/YEL
6. Blank	—	6. Blank	—
7. SDL	BLU	7. To VSS	PPL
8. To fuel level gauge	YEL/RED	8. To ECM	BRN
9. To ground of fuel level gauge	BLK/ORN	9. To ECM	YEL/GRN
10. To ground	BLK/ORN	10. To TCM	RED/YEL
11. To ignition switch	BLK/WHT	11. To door switch	BLK/YEL
12. Blank	—	12. To seat belt switch (if equipped)	BRN/YEL
13. To combination switch (turn L)	GRN/RED	13. Blank	—
14. To combination switch (turn R)	BLU/YEL	14. To air bag control module (if equipped)	YEL/RED
15. To main fuse	WHT/RED	15. Blank	—
16. Blank	—	16. Blank	—
17. To combination switch (dimmer switch)	RED	17. Blank	—
18. Blank	—	18. Blank	—
19. To illumination lights (if equipped)	BLK	19. To generator	WHT/BLU
20. To ground of illumination	BLK	20. To oil pressure switch	YEL/BLK
		21. To ECM (if equipped)	PNK
		22. Blank	—



REMOVAL



- 1) Disconnect negative cable at battery.
- 2) Remove instrument cluster panel (1) and combination meter hole cover (2).
- 3) Remove screws (3) fastening combination meter.
- 4) Disconnect combination meter connectors and pull out combination meter (4) through combination meter hole.

INSTALLATION

Reverse removal procedure for installation.

Fuel level sensor (gauge unit)

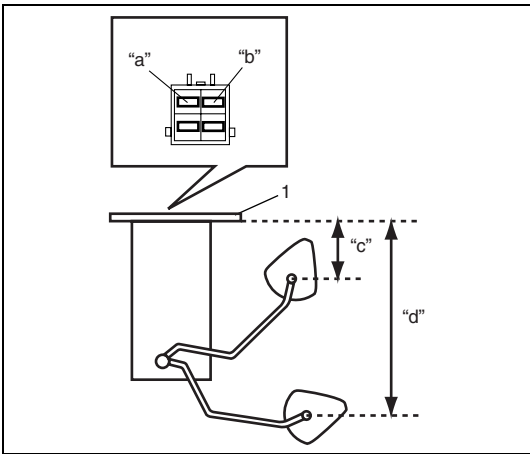
REMOVAL

Remove fuel pump assembly referring to Section 6C.

INSTALLATION

Install fuel pump assembly referring to Section 6C.

INSPECTION



- Check that resistance between terminals “a” and “b” of fuel level sensor changes with change of float position.
- Check resistance between terminals “a” and “b” in each float position below.

If the measured value is out of specification, replace.

Float Position		Resistance (Ω)
Full Upper “c”	25.3 mm (1.00 in.)	10 ± 1
Full Lower “d”	191.2 mm (7.53 in.)	130 ± 1

## Speed Meter and VSS

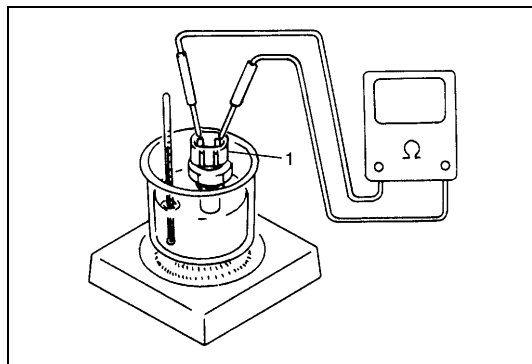
### VSS

#### REMOVAL AND INSTALLATION

Refer to "VSS" in Section 6E1.

## Engine Coolant Temperature (ECT) Sensor

### INSPECTION



Warm up sender gauge. Thus make sure its resistance is decreased with increase of its temperature.

#### ECT sensor specification

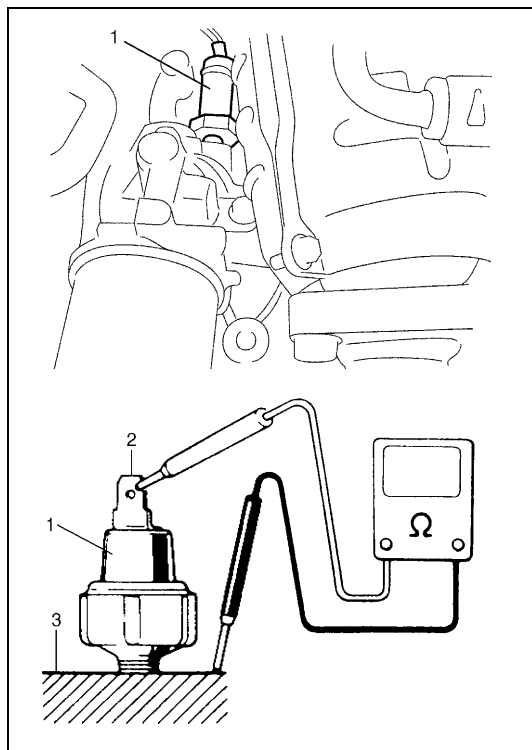
Temperature	Resistance
20°C (68°F)	2.28 – 2.63 kΩ
80°C (176°F)	305 – 331 Ω

1. ECT sensor

## Oil Pressure Warning Light

### Oil pressure switch

#### INSPECTION



- 1) Disconnect oil pressure switch (1) lead wire.
- 2) Check for continuity between oil pressure switch terminal (2) and cylinder block (3) as shown in figure.  
If not, replace oil pressure switch (1).

**During engine running : No continuity**

**At engine stop : Continuity**

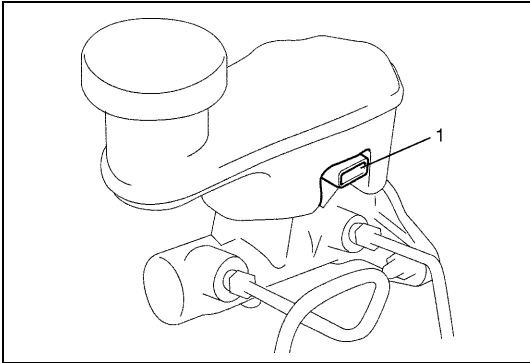
#### REMOVAL AND INSTALLATION

Refer to "OIL PRESSURE CHECK" in Section 6A1.

# Brake Fluid Level and Parking Brake Warning Light

## Brake fluid level switch

### INSPECTION



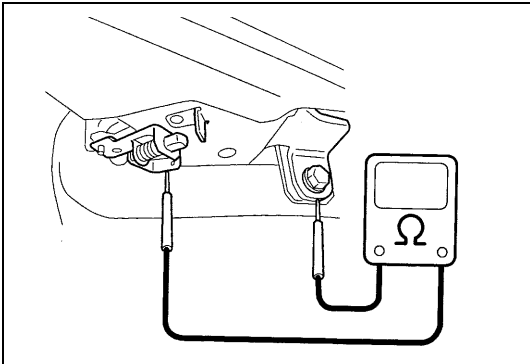
Check for continuity between terminals of brake fluid level switch coupler (1). If found defective, replace switch.

**OFF position (float up) : No continuity**

**ON position (float down) : Continuity**

## Parking brake switch

### INSPECTION



Check for continuity between parking brake switch terminal and body ground as shown in figure. If found defective, replace switch.

**OFF position (parking brake released) :**

**No continuity**

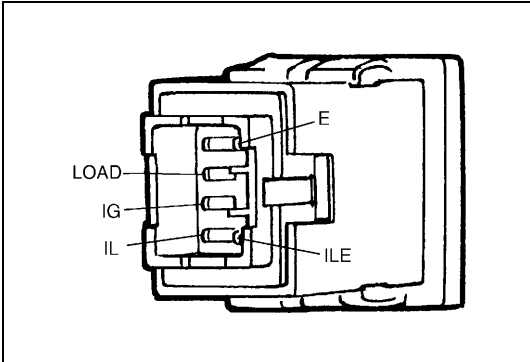
**ON position (parking brake lever pulled up) :**

**Continuity**

# Rear Window Defogger

## Defogger switch

### INSPECTION

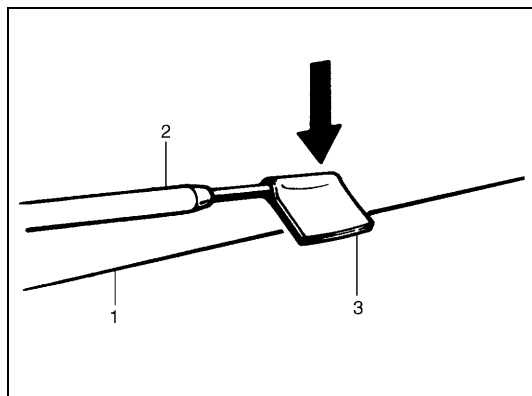


Check for continuity between terminals at each switch position as shown below. If check result is not satisfied, replace.

Terminal Switch Position	IG	LOAD	E	IL	ILE
OFF		○—○	○	○—○	○
ON (PUSH IN)	○	○—○	○	○—○	○

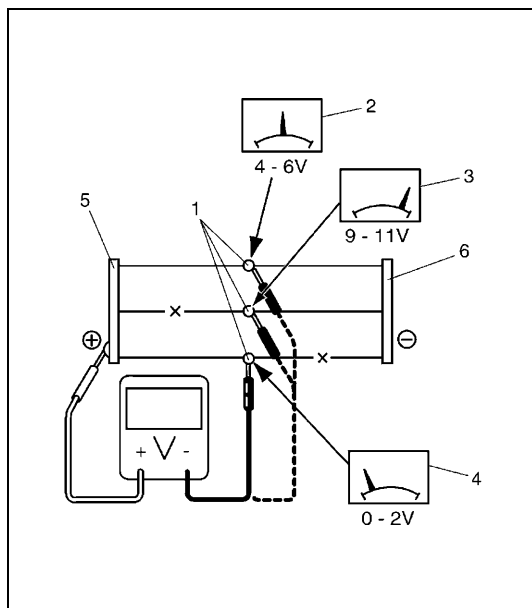
## Defogger wire

## INSPECTION



## NOTE:

- When cleaning rear window glass, use a dry cloth to wipe it along heat wire (1) direction.
- When cleaning glass, do not use detergent or abrasive-containing glass cleaner.
- When measuring wire voltage, use a tester with negative probe (2) wrapped with a tin foil (3) which should be held down on wire by finger pressure.



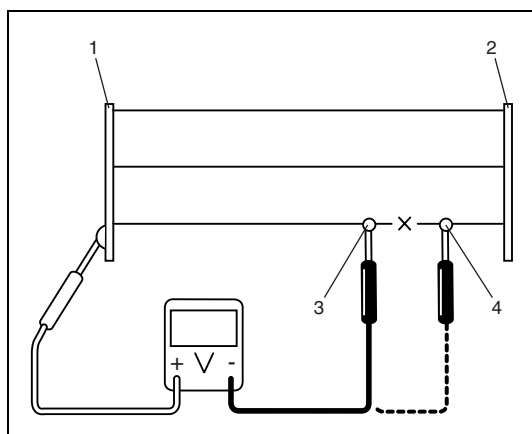
- Wire damage inspection.
  - a) Turn ignition switch ON.
  - b) Turn defogger switch ON.
  - c) Check voltage at the center (1) of each heat wire as shown below.

Voltage	Criteria
Approx. 4 – 6 V (2)	Good (No break in wire)
Approx. 9 – 11 V (3) or 0 – 2 V (4)	Broken wire

If measured voltage is 10 V, wire must be damaged between its center and positive end (5).

If voltage is 0 V, wire must be damaged between its center and ground end (6).

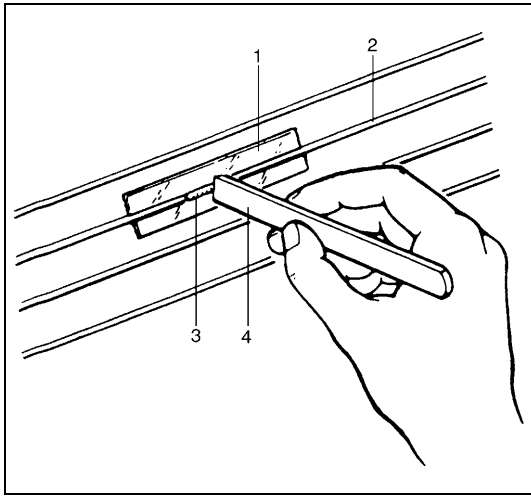
X : Damage point



- Damage point locating.
  - a) Turn ignition switch ON.
  - b) Turn defogger switch ON.
  - c) Touch voltmeter positive (+) lead to heat wire positive terminal end (1).
  - d) Touch voltmeter negative (–) lead with a foil strip to heat wire positive terminal end (1), then move it along wire to the negative terminal end (2).
  - e) The place where voltmeter fluctuates from 0 – 2 V (3) to several volts (4) is where there is damage.

X : Damage point

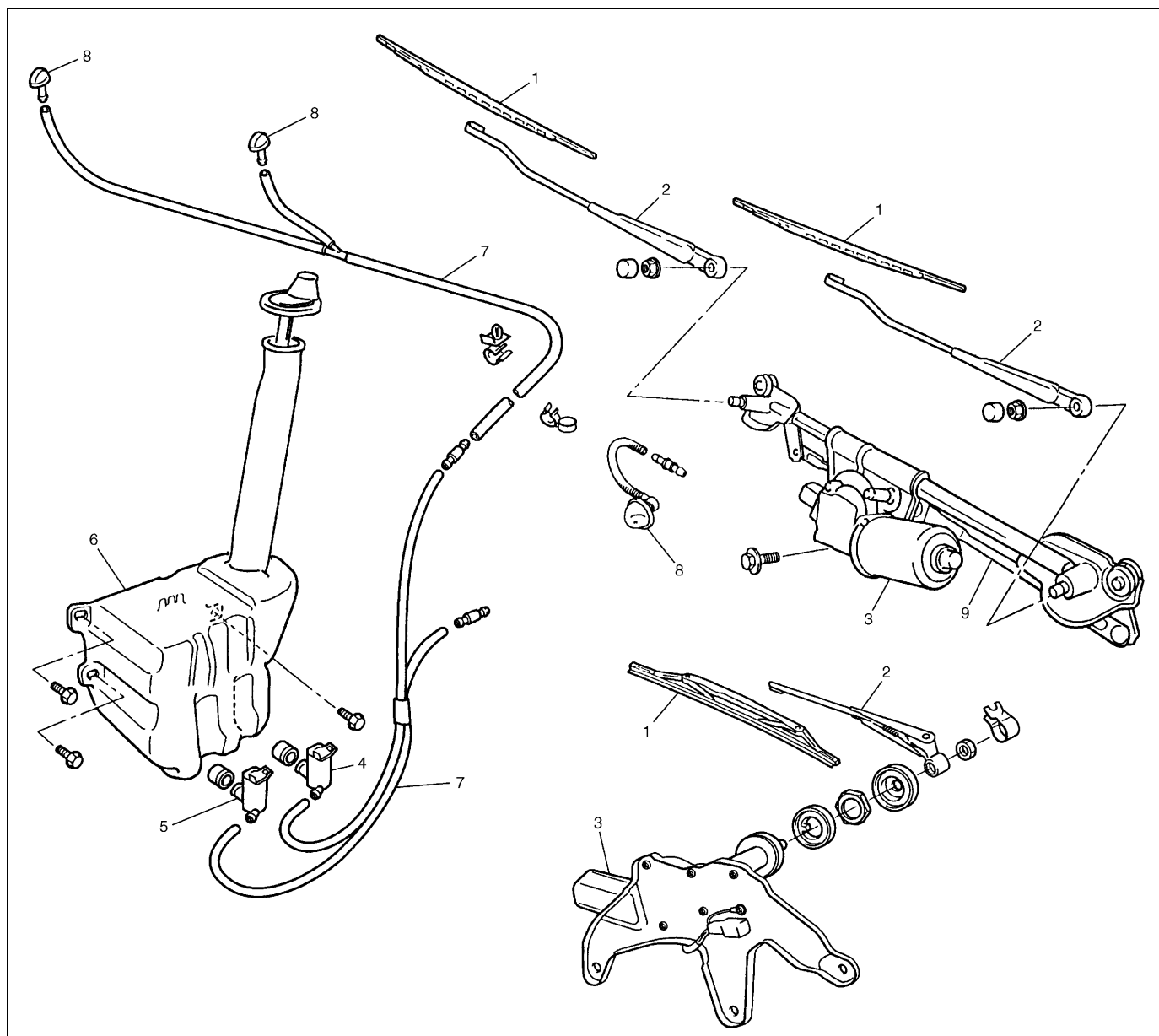
## REPAIR



- 1) Use white gasoline for cleaning.
- 2) Apply masking tape (1) at both upper and lower sides of heat wire (2) to be repaired.
- 3) Apply commercially-available repair agent (3) with a fine-tip brush (4).
- 4) 2 to 3 minutes later, remove masking tapes (1).
- 5) Leave repaired heat wire as it is for at least 24 hours before operating rear defogger again.

# Wipers and Washers

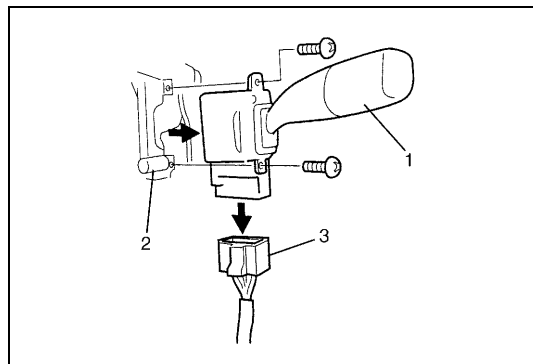
## Components



1. Wiper blade	4. Washer pump (for front washer)	7. Washer hose
2. Wiper arm	5. Washer pump (for rear washer)	8. Washer nozzle
3. Wiper motor	6. Washer tank	9. Wiper link

## Front wiper and washer switch

### REMOVAL



- 1) Disconnect negative cable at battery.
- 2) Remove steering column hole cover.
- 3) Remove steering column covers.
- 4) Remove wiper and washer switch (1) from combination switch (2) and disconnect its coupler (3).

INSPECTION

Front wiper and washer switch

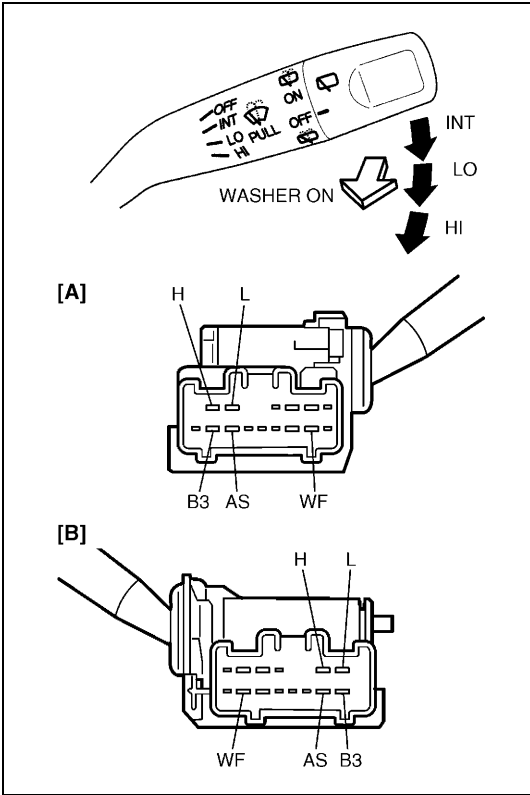
Check for continuity between terminals at each switch position as shown below. If check result is not as specified, replace.

Wiper SW \ Terminal	B3	H	L	AS
OFF				
INT				
LO				
HI				

Washer SW \ Terminal	B3	WF
OFF		
ON		

[A] : LH steering vehicle

[B] : RH steering vehicle

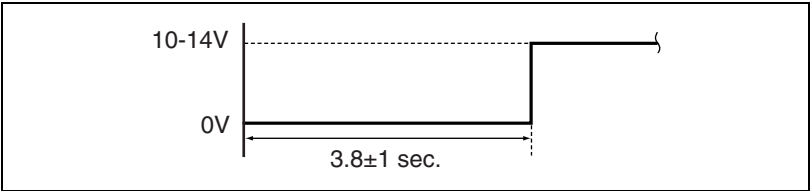
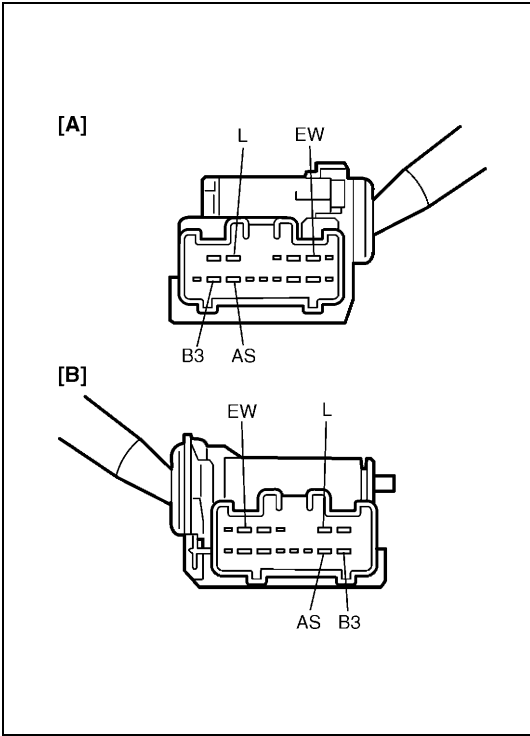


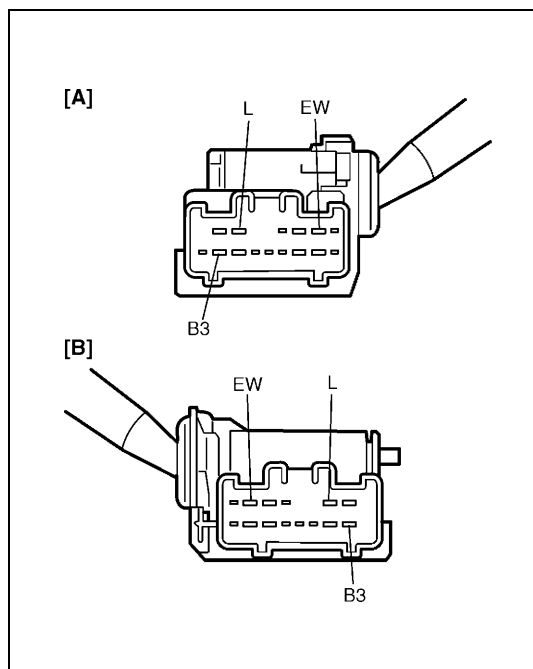
Intermittent wiper relay circuit

- 1) Turn the front wiper switch to “INT” position.
- 2) Connect battery positive terminal to terminal “B3” and its negative terminal to terminal “EW”
- 3) Connect voltmeter positive lead to terminal “L” and its negative lead to terminal “EW”. Check that the voltmeter indicates the battery voltage (10 – 14 V).
- 4) Connect terminal “AS” and terminal “B3” by a jumper wire.
- 5) Then connect terminal “B3” end to terminal “EW”. Observe the voltmeter voltage drops to 0 V right after connecting the jumper wire from terminal “B3” to “EW”. Then the voltage rises to battery voltage (10 – 14 V) within the time as shown in the figure.

[A] : LH steering vehicle

[B] : RH steering vehicle

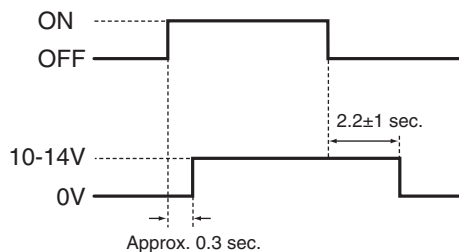


**Washer linked circuit**

- 1) Make sure that front wiper switch is at “OFF” position.
- 2) Connect battery positive terminal to terminal “B3” and its negative terminal to terminal “EW”.
- 3) Connect voltmeter positive lead to terminal “L” and its negative lead to terminal “EW”.
- 4) When front washer switch is ON, check that voltage changes as shown in figure.

[A] : LH steering vehicle

[B] : RH steering vehicle

**INSTALLATION**

Reverse removal procedure for installation.



## Front wiper motor

### INSPECTION

#### Motor operation (low speed)

- 1) Connect battery positive terminal to terminal "L" and its negative terminal to terminal "E".
- 2) Check motor revolution speed as specification.

**Specification : 44 - 52 r/min (rpm)**

#### Motor operation (high speed)

- 1) Connect battery positive terminal to "H" and its negative terminal to terminal "E".
- 2) Check motor revolution speed as specification.

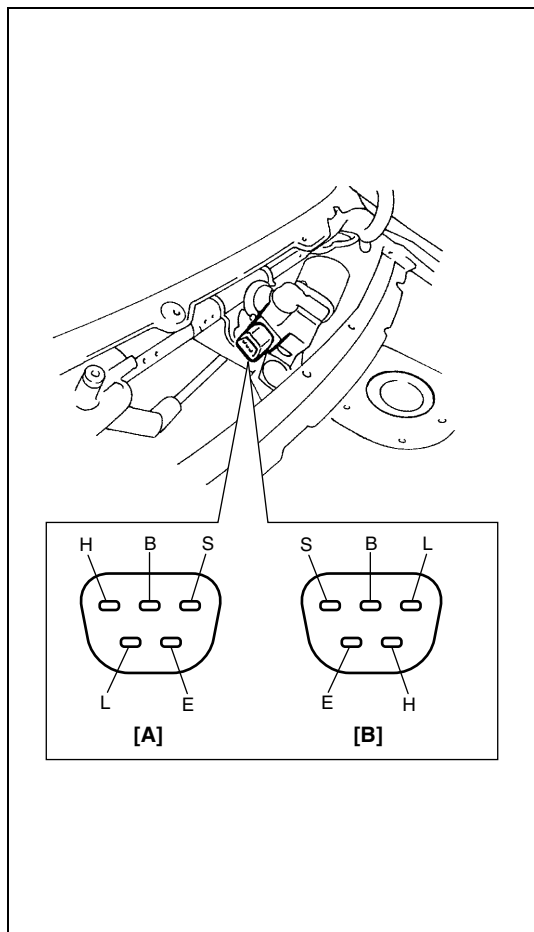
**Specification : 64 - 78 r/min (rpm)**

#### Automatic stop operation

- 1) Connect battery positive terminal to terminal "L" and its negative terminal to terminal "E" and let the motor turn.
- 2) Disconnect terminal "L" from battery positive terminal, and let the motor stop.
- 3) Connect terminal "L" and "S" with a jumper wire, and connect terminal "B" to battery positive terminal. Observe the motor turns once again then stops at a specified position.
- 4) Repeat Step 1) to 3) several times and check that the motor stops at the specified position every time.  
If check result is not satisfied, replace.

[A] : LH steering vehicle

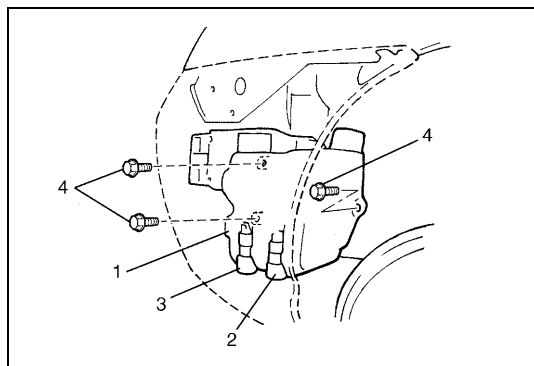
[B] : RH steering vehicle



## Washer tank and washer pump

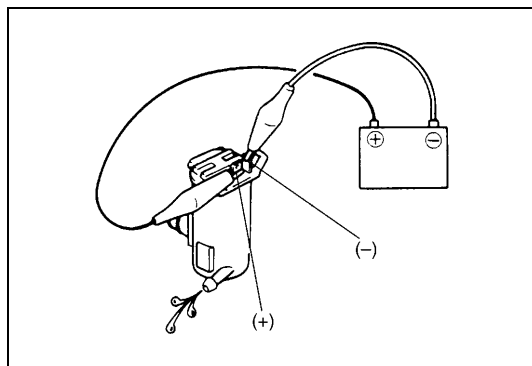
### REMOVAL

- 1) Disconnect negative cable at battery.
- 2) Remove front fender (LH) and front fender lining (LH) referring to "FRONT FENDER" in Section 9.
- 3) Remove washer tank attaching bolts (4).
- 4) Disconnect pump lead wire couplers and hoses.
- 5) Remove washer tank (1).
- 6) Remove front washer pump (2) and rear washer pump (3) from washer tank (1).

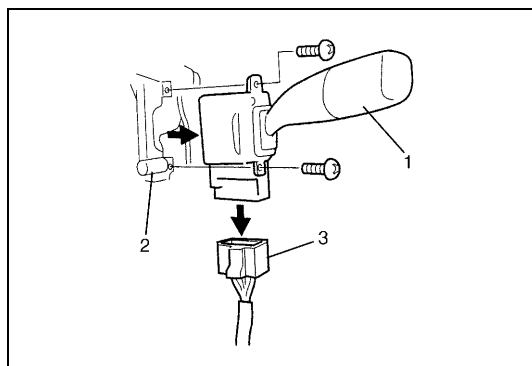


### INSTALLATION

Reverse removal procedure for installation.

**INSPECTION**

- 1) Connect battery (+) and (-) terminals to pump (+) and (-) terminals respectively.
- 2) Check motor operation for both front and rear (if equipped) washer pump.

**Rear wiper and washer switch****REMOVAL**

- 1) Disconnect negative cable at battery.
- 2) Remove steering column hole cover.
- 3) Remove steering column covers.
- 4) Remove wiper and washer switch (1) from combination switch (2) and disconnect its coupler (3).

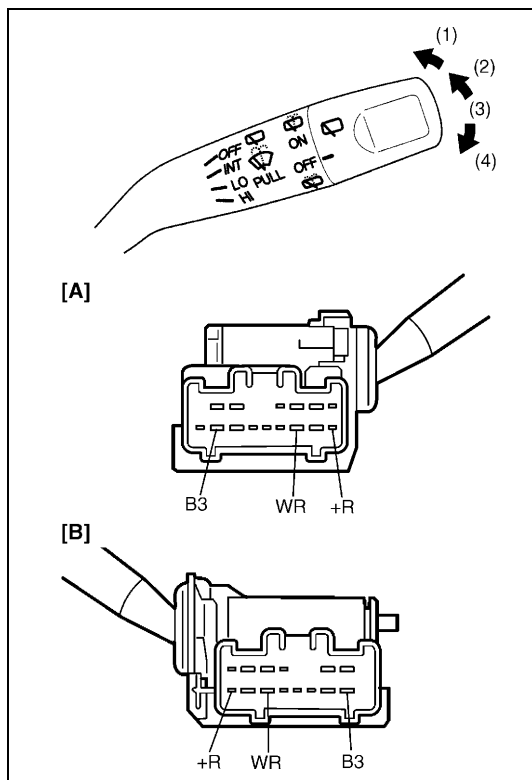
**INSPECTION**

Check for continuity between terminals at each switch position as shown below. If check result is not as specified, replace.

Position \ Terminal	B3	+R	WR
(1) WIPER and WASHER ON	○	○	○
(2) WIPER ON	○	○	
(3) OFF			
(4) WASHER and WASHER ON	○	○	○

[A] : LH steering vehicle

[B] : RH steering vehicle

**INSTALLATION**

Reverse removal procedure for installation.

## Rear wiper motor

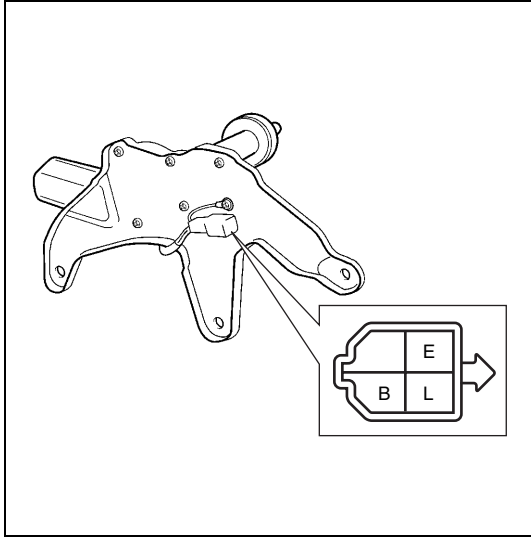
### INSPECTION

#### Wiper motor

Use a 12 V battery to connect its (+) and (–) terminals to terminal “L” and terminal “E” respectively. Then motor should rotate at 35 to 45 rpm.

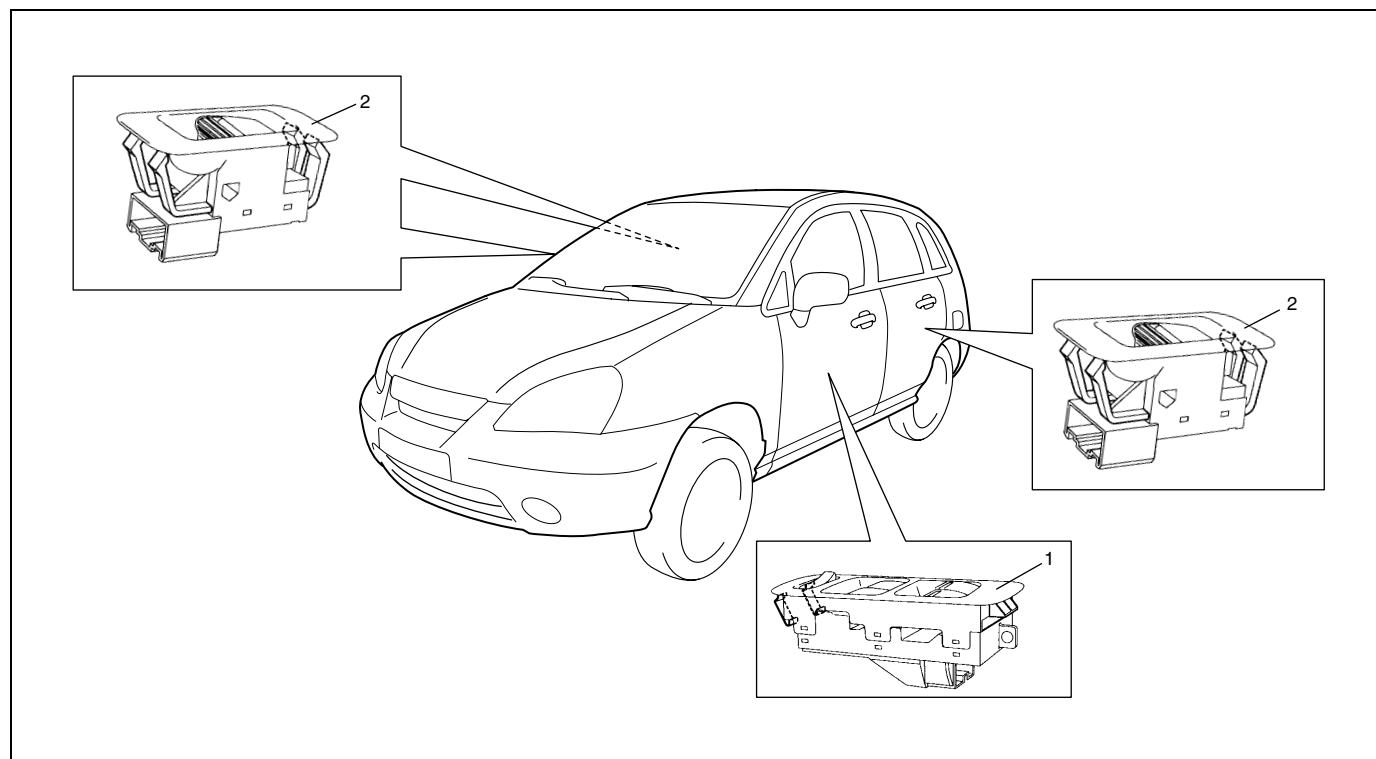
#### Automatic stop operation

- 1) Connect battery positive terminal to terminal “L” and its negative terminal to terminal “E” and let the motor turn.
- 2) Disconnect terminal “L” from battery positive terminal and let the motor stop.
- 3) Connect terminal “B” to battery positive terminal. Observe the motor turns once again then stops at a specified position.
- 4) Repeat Step 1) to 3) several times, and check that the motor stops at the specified position every time.



# Power Window Control System

## Power window control system location



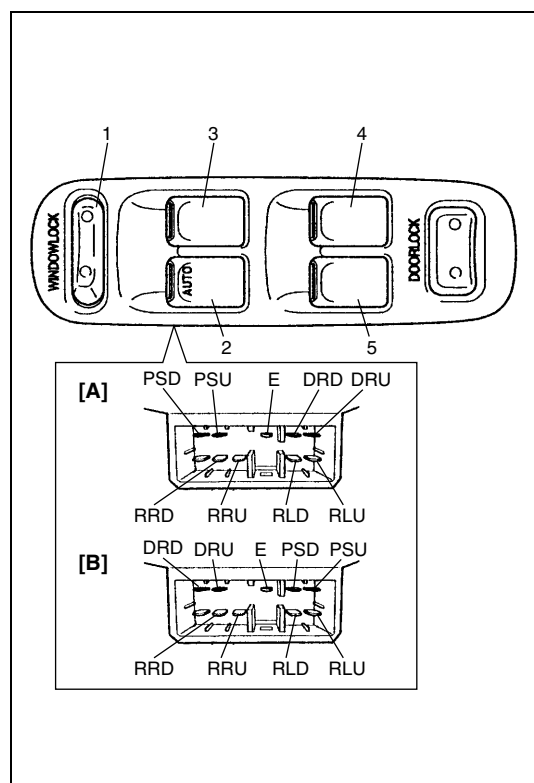
1. Main switch (driver side)

2. Sub switch (passenger side/rear RH and LH)

## Power window main switch

### INSPECTION

Check for continuity between terminals at each switch position as shown below. If check result is not as specified, replace.



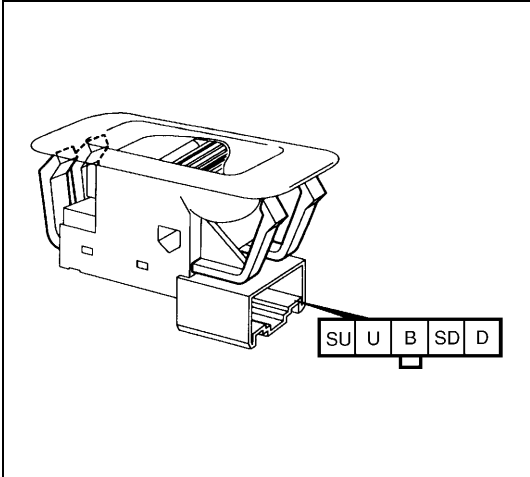
Window Lock Switch (1)	Terminal Switch	Driver Side Window Switch (2)				Passenger Side Window Switch (3)				Rear RH Window Switch (4)				Rear LH Window Switch (5)			
		B	E	DRU	DRD	B	E	PSU	PSD	B	E	RRU	RRD	B	E	RLU	RLD
OFF	UP	○		○		○		○		○		○		○		○	
	OFF		○	○			○	○			○	○			○	○	
	DOWN	○		○		○		○		○		○		○		○	
ON	UP	○		○		○				○				○		○	
	OFF		○	○			○				○	○			○	○	
	DOWN	○		○		○			○	○			○	○			○

[A] : LH steering vehicle

[B] : RH steering vehicle

Power window sub switch

INSPECTION



Check for continuity between terminals at each switch condition as shown below.

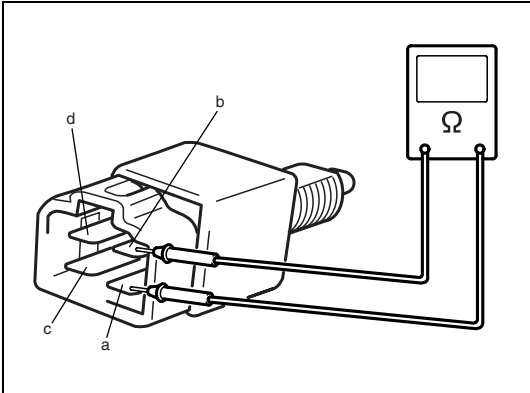
If check result is not as specified, replace.

Switch Position \ Terminal	B	SD	SU	D	U
UP					
OFF					
DOWN					

Stop (Brake) Lamp

Stop (brake) lamp switch

INSPECTION



Check stop lamp (brake) switch for continuity as shown below.

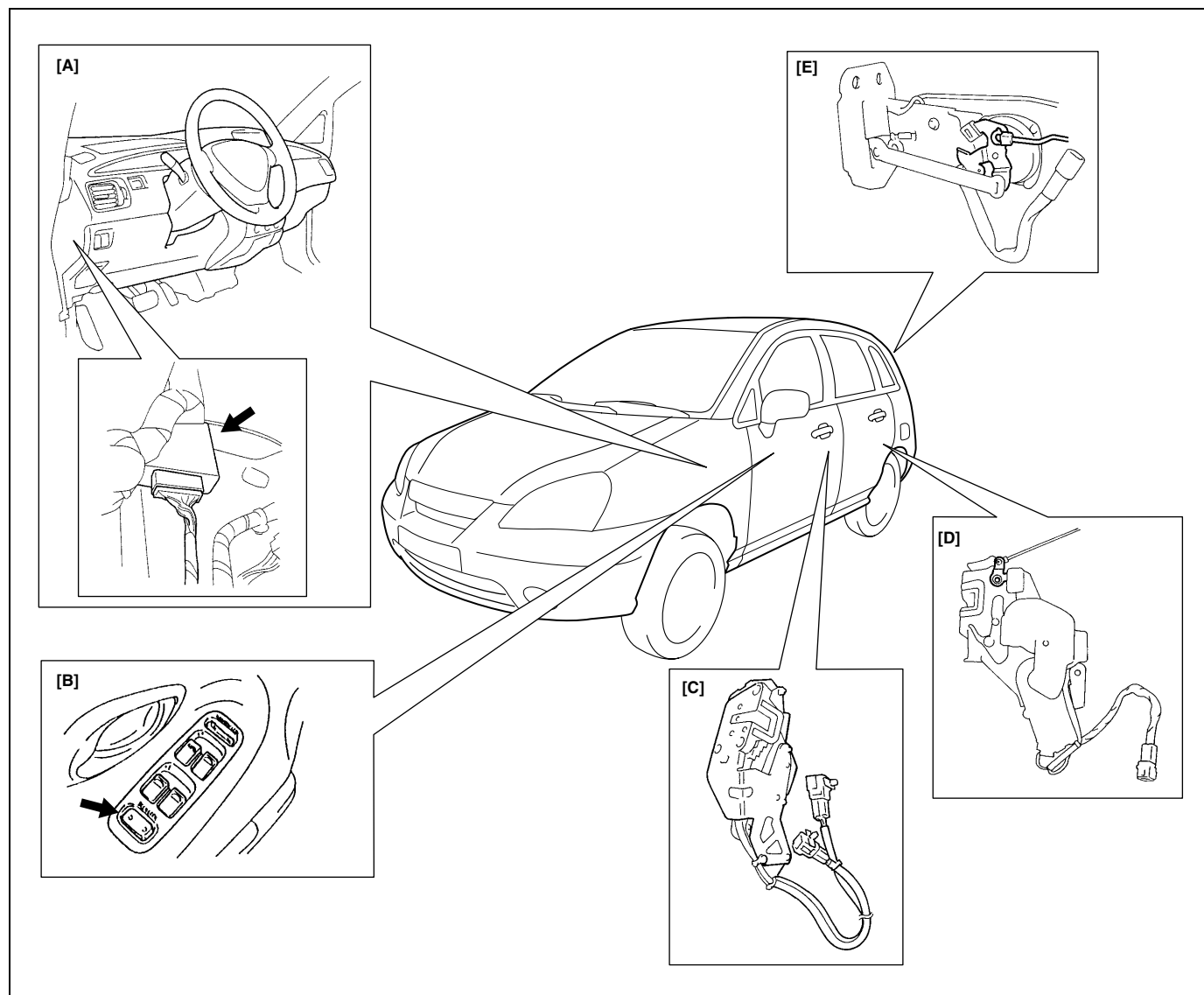
If check result is not as specified, replace switch.

TYPE	[A] / [B]		[A]		[B]	
Shaft (1) \ Terminal	a	b	c	d	c	d
FREE						
PUSH						

- [A] : TYPE 1 (Connector color: white)
- [B] : TYPE 2 (Connector color: blue)

## Power Door Lock System (If Equipped)

### Power door lock system location



[A] : Power door lock controller (the illustration shows LH steering vehicle. And RH steering vehicle is symmetrical.)

[C] : Front door actuator

[E] : Back door actuator

[B] : Power door lock switch

[D] : Rear door actuator

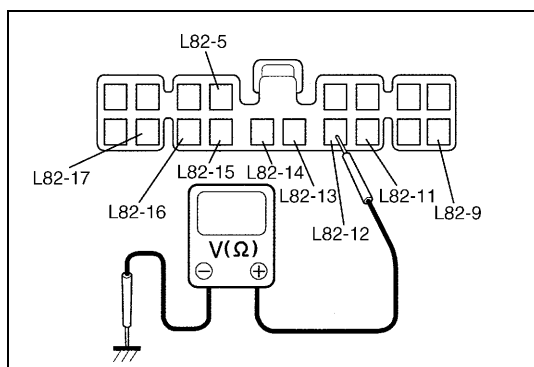
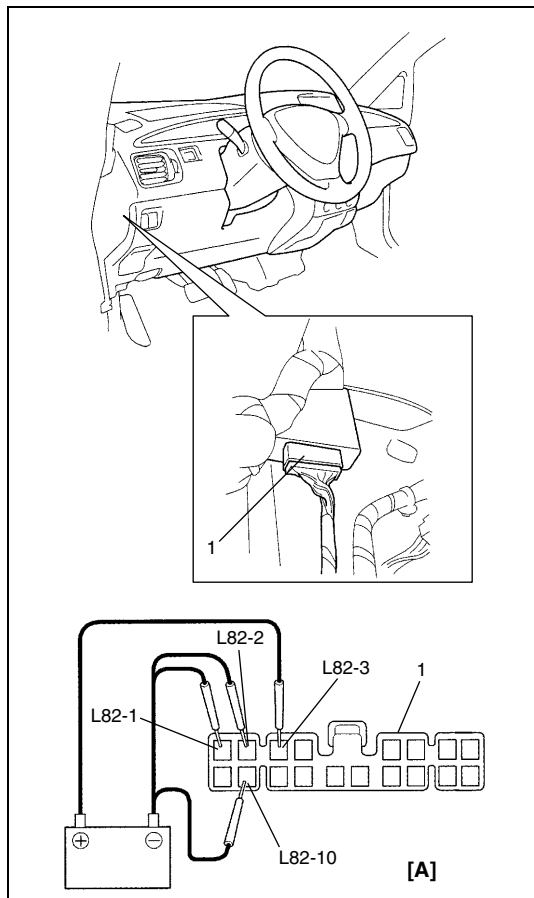
### Power door lock system (with dead lock system)

#### SYSTEM INSPECTION

- 1) When the driver side door key is turned LOCK, check all power doors are lock.
- 2) When the driver side door key is turned UNLOCK, check all power doors are unlocked.
- 3) When the driver side door key is turned LOCK two times within two seconds, check all power doors are locked and not pulled up all door lock knobs. And then when the driver side key is turned UNLOCK two times, check all power doors are unlocked.

If check result of Step 1) to 3) is OK, this system is OK.

If check result is not satisfied, go to next step.



- 4) Disconnect negative cable at battery.
- 5) Disconnect door lock controller coupler (1).
- 6) Confirm that all power doors are unlocked. Connect battery positive and negative terminals to door lock controller coupler terminals and check operation in order (1) – (3) as shown below.

If it does not operate as specified, repair circuit.

If it operates as specified, go to next step.

	TERMINAL			OPERATION
	L82-2 and -10	L82-3	L82-1	
(1)	⊖	⊕	⊖	UNLOCK → LOCK
(2)	⊖	⊕	⊕	LOCK → DEAD LOCK
(3)	⊕	⊖	⊖	DEAD LOCK → UNLOCK

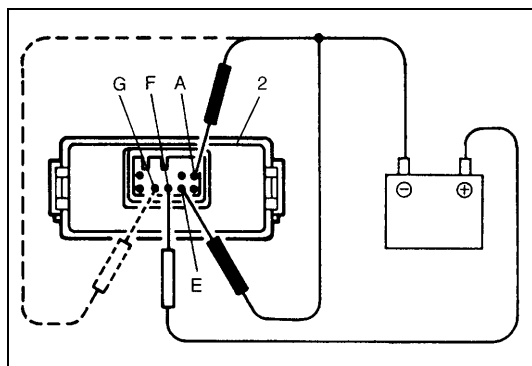
[A] : Example ...OPERATION (1)

- 7) Connect negative cable at battery.
- 8) Check that the voltage and resistance between following terminals are specifications. If check result is not as specified, repair circuit. If check result is OK, replace door lock controller.

TERMINALS	CONDITION	SPECIFICATION
L82-9 and ground	Anytime	10 – 14 V
L82-17 and ground	Anytime	0 – 1 V
L82-11 and ground	When ignition key is not inserted	0 – 1 V
	When ignition key is inserted into ignition switch	10 – 14 V
L82-12 and ground	When ignition switch is in OFF position	0 – 1 V
	When ignition switch is in ON position	10 – 14 V
L82-13 and ground	When driver side door key is in OFF position	No continuity
	When driver side door key is in UNLOCK position	Continuity
L82-14 and ground	When driver side door key is in OFF position	No continuity
	When driver side door key is in LOCK position	Continuity
L82-16 and ground	When door lock switch is in OFF position	No continuity
	When door lock switch is in UNLOCK position	Continuity
L82-5 and ground	When door lock switch is in OFF position	No continuity
	When door lock switch is in LOCK position	Continuity
L82-15 and ground	When all doors are closed	No continuity

## Power door lock controller (without dead lock system)

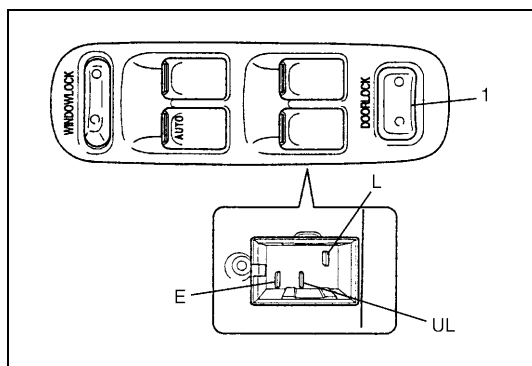
### INSPECTION



- 1) Disconnect negative cable at battery.
- 2) Disconnect power door lock controller (2) coupler.
- 3) Connect battery positive and negative terminals to terminal "A", "E" and "F" as shown in the figure.
- 4) Disconnect cord from terminal "E" and connect it to terminal "G".
- 5) Repeat Step 2) and 3) several times and if relay operation is heard every time, it means that controller is operating.

## Power door lock switch

### INSPECTION

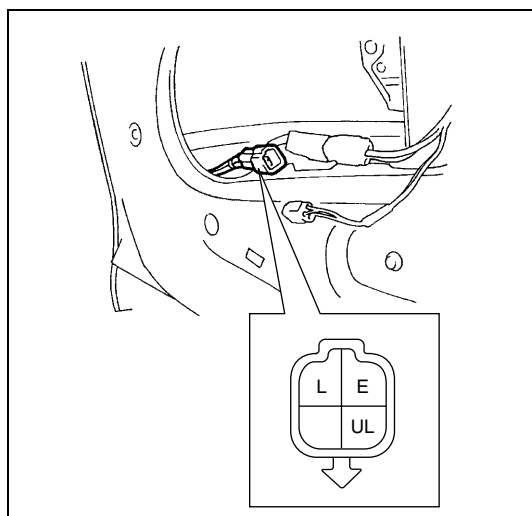


Check for continuity between terminals at each switch position as shown below. If check result is not as specified, replace.

Terminal	E	UL	L
Switch (1)			
LOCK			
OFF			
UNLOCK			

## Door key cylinder switch (driver and passenger side)

### INSPECTION



Check for continuity between terminals at each switch position as shown below. If check result is not as specified, replace.

Terminal	E	UL	L
Key Position			
LOCK			
OFF			
UNLOCK			



Power door lock actuator

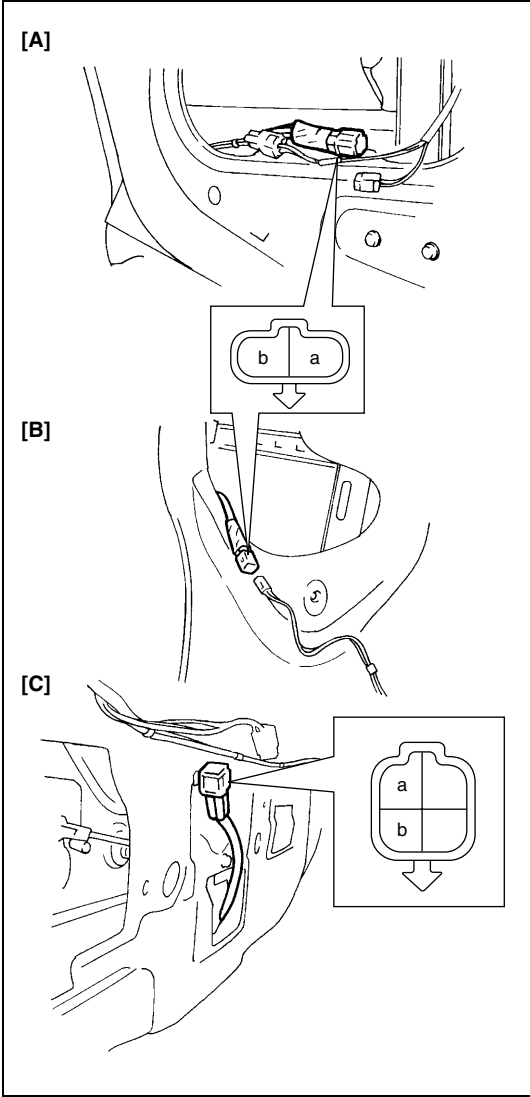
INSPECTION

- 1) Disconnect power door lock actuator coupler.
- 2) Connect battery positive and negative terminals to the door lock actuator terminals as shown below. If it does not operate as specified in table below, replace door lock actuator.

Type 1 : Without Dead Lock System

Operation \ Terminal	a	b
UNLOCK → LOCK	⊖	⊕
LOCK → UNLOCK	⊕	⊖

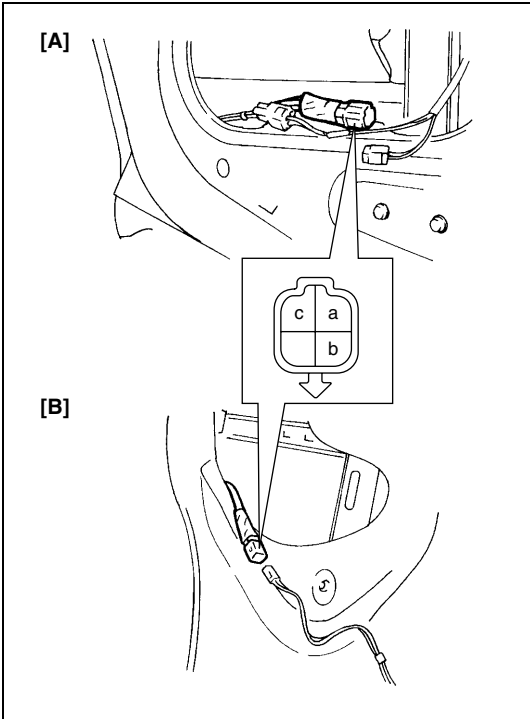
[A] : Front door (driver and passenger side)
[B] : Rear door (RH and LH)
[C] : Back door



Type 2 : With Dead Lock System

Operation \ Terminal	a	b	c
UNLOCK → LOCK	⊖	⊕	⊖
LOCK → DEAD LOCK	⊖	⊕	⊕
LOCK → UNLOCK	⊕	⊖	⊖
DEAD LOCK → UNLOCK			

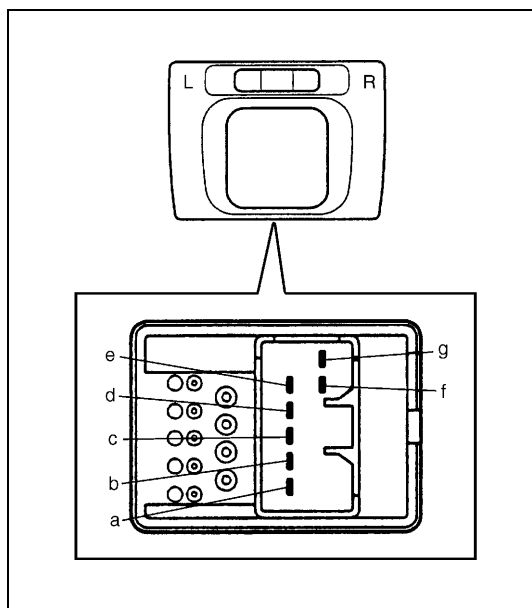
[A] : Front door (driver and passenger side)
[B] : Rear door (RH and LH)



## Power Door Mirror Control System (If Equipped)

### Mirror switch

#### INSPECTION



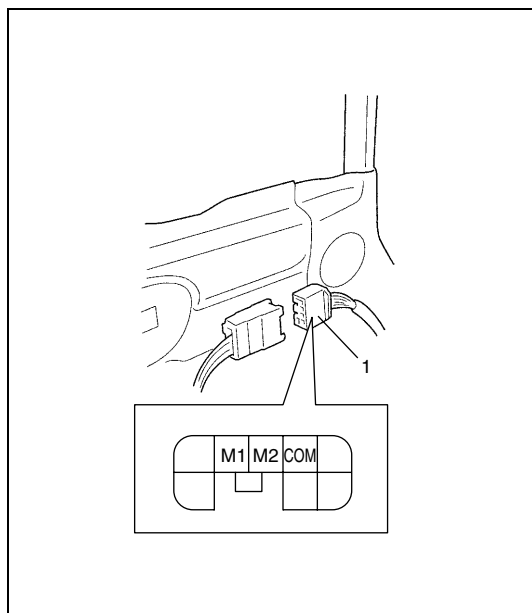
- 1) Remove mirror switch from instrument panel.
- 2) Check for continuity between terminals at each switch position as show below.

If check result is not as specified, replace mirror switch.

L	a	b	c	d	g
				e	f
UP	○	○	○		○
DOWN	○	○	○		○
LEFT	○	○	○	○	
RIGHT	○	○	○	○	

### Door mirror actuator

#### INSPECTION



- 1) Remove door trim referring to FRONT DOOR GLASS in Section 9.
- 2) Disconnect door mirror coupler (1).
- 3) Check that door mirror operates properly when battery voltage is applied to connector terminals.

Connect battery positive and negative terminal to the door mirror terminal shown below.

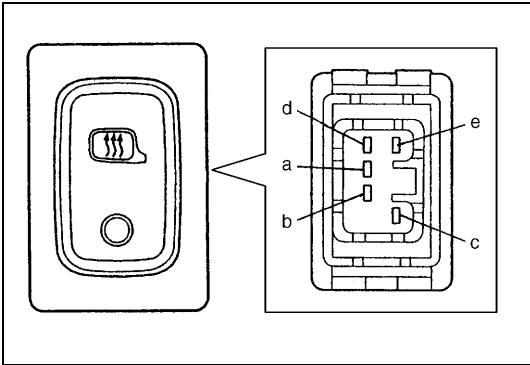
If it does not follow the table's operation, replace door mirror assembly.

Terminal Operation	COM	M1	M2
Up	⊖	⊕	
Down	⊕	⊖	
Left	⊖		⊕
Right	⊕		⊖

Door Mirror Heater (If Equipped)

Mirror heater switch

INSPECTION

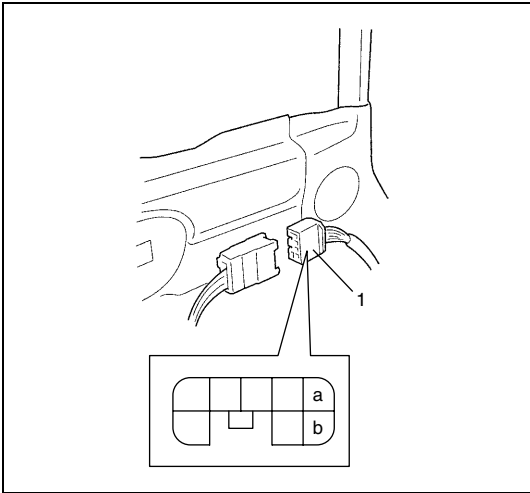


- 1) Remove mirror heater switch from instrument panel.
- 2) Check for continuity between terminals at each switch position as show below. If check result is not as specified, replace switch.

Terminal Position	a	b	c	d	e
FREE		○—○	○—○	○—○	○—○
PUSH	○—○	○—○	○—○	○—○	○—○

Mirror heater (if equipped)

INSPECTION

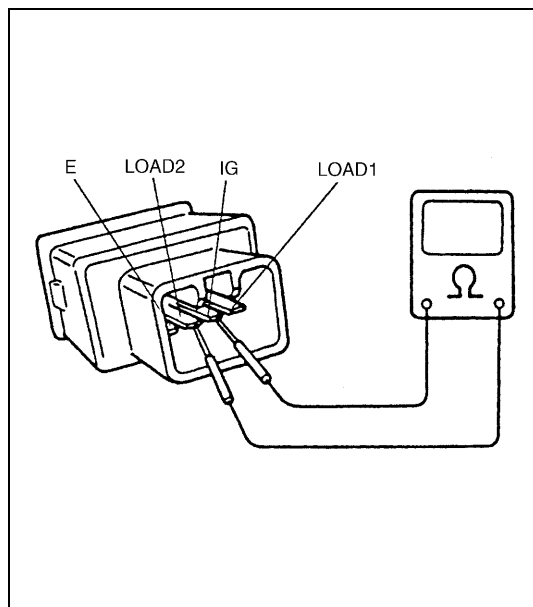


- 1) Remove door trim referring to FRONT DOOR GLASS in Section 9.
- 2) Disconnect door mirror coupler (1).
- 3) Check for continuity between terminals “a” and “b”. if not continuity, replace outside mirror.

## Front Seat Heater (If Equipped)

### Seat heater switch (driver and passenger side)

#### INSPECTION

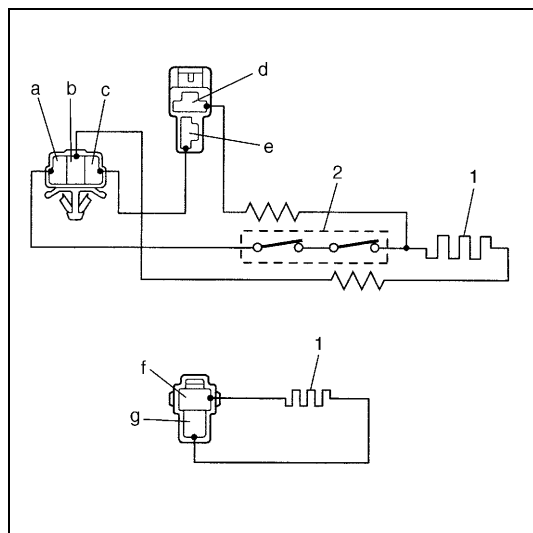


- 1) Confirm that ignition switch is OFF position.
- 2) Remove parking lever garnish on center console box.
- 3) Pull out seat heater switch from front parking lever garnish.
- 4) Disconnect seat heater switch coupler.
- 5) Check for continuity between terminals at each switch position as show below. If check result is not as specified, replace.

Terminal Switch Position	IG	LOAD1	LOAD2	E
OFF				
LO	○ ○	○ ○	○ ○	○ ○
HI	○ ○	○ ○	○ ○	○ ○

#### Seat heater wire

#### INSPECTION



- 1) Confirm that seat heater switch is OFF position.
- 2) Disconnect two couplers of seat heater under the seat cushion.
- 3) Check for continuity between terminals as show below.  
If not continuity, replace faulty seat heater.

#### Seat heater circuit in seat back

Between "a" and "b"

Between "b" and "d"

Between "c" and "e"

#### Seat heater circuit in seat cushion

Between "f" and "g"

- |                |
|----------------|
| 1. Heater wire |
| 2. Thermostat  |



## SECTION 8G

# IMMOBILIZER CONTROL SYSTEM (IF EQUIPPED)

**WARNING:**

For vehicles equipped with Supplemental Restraint (Air Bag) System:

- Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to “Air Bag System Components and Wiring Location View” under “General Description” in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and “Service Precautions” under “On-Vehicle Service” in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.
- Technical service work must be started at least 90 seconds after the ignition switch is turned to the “LOCK” position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).

**NOTE:**

Whether the immobilizer indicator lamp is used in the particular vehicle or not depends on vehicle specifications. If there is a heated oxygen sensor (sensor 2) in exhaust pipe, the vehicle is equipped with immobilizer indicator lamp and if there isn't, it is not equipped with immobilizer indicator lamp. For details of heated oxygen sensor (sensor 2), refer to Section 6E in this manual. Be sure to bear this in mind when performing service work.

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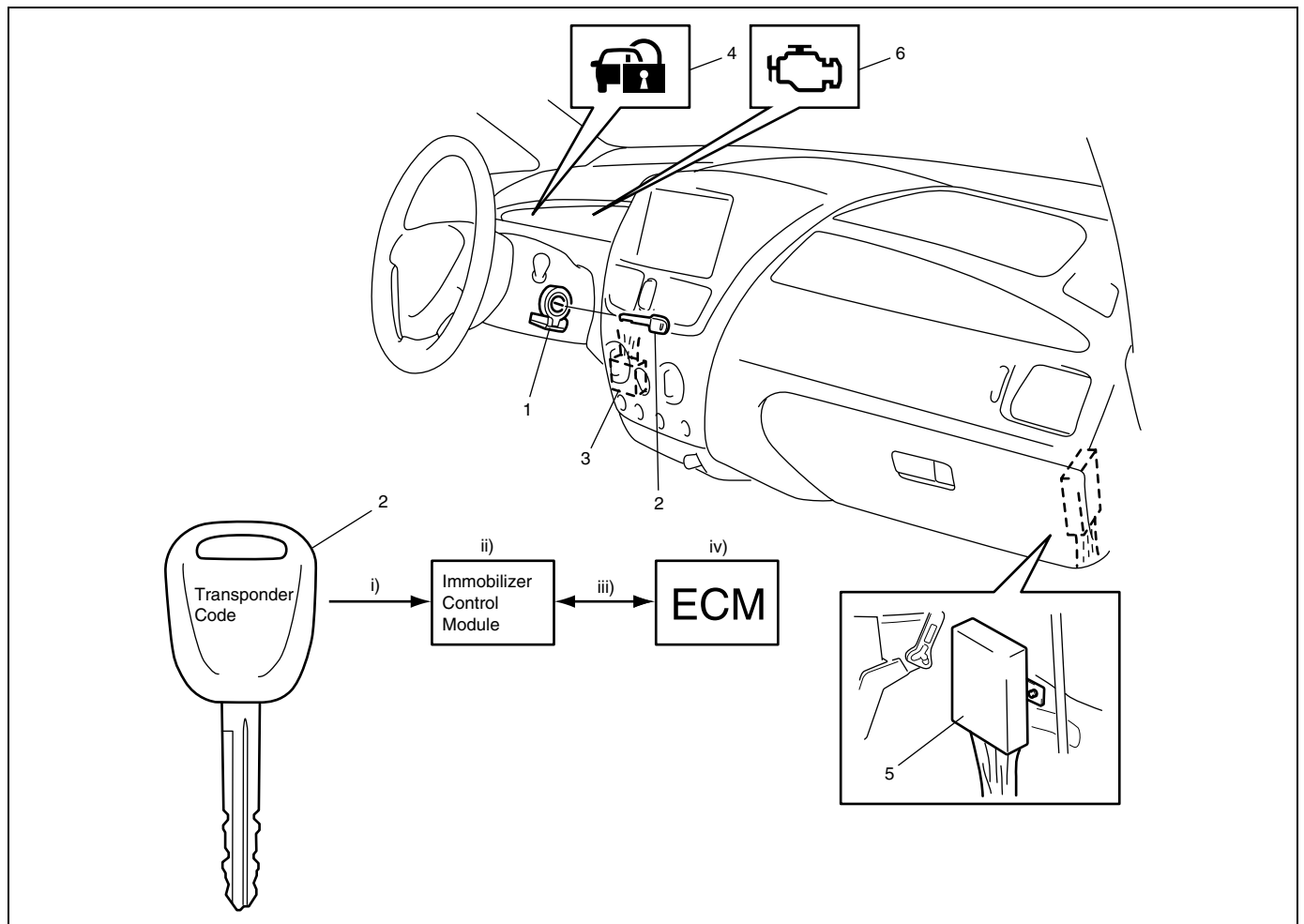
## General Description

The immobilizer control system designed to prevent vehicle burglar consists of following components.

- Engine control module (ECM)
- Immobilizer control module (1) with coil antenna
- Ignition key (2) with built-in transponder

Operation of this system is as follows.

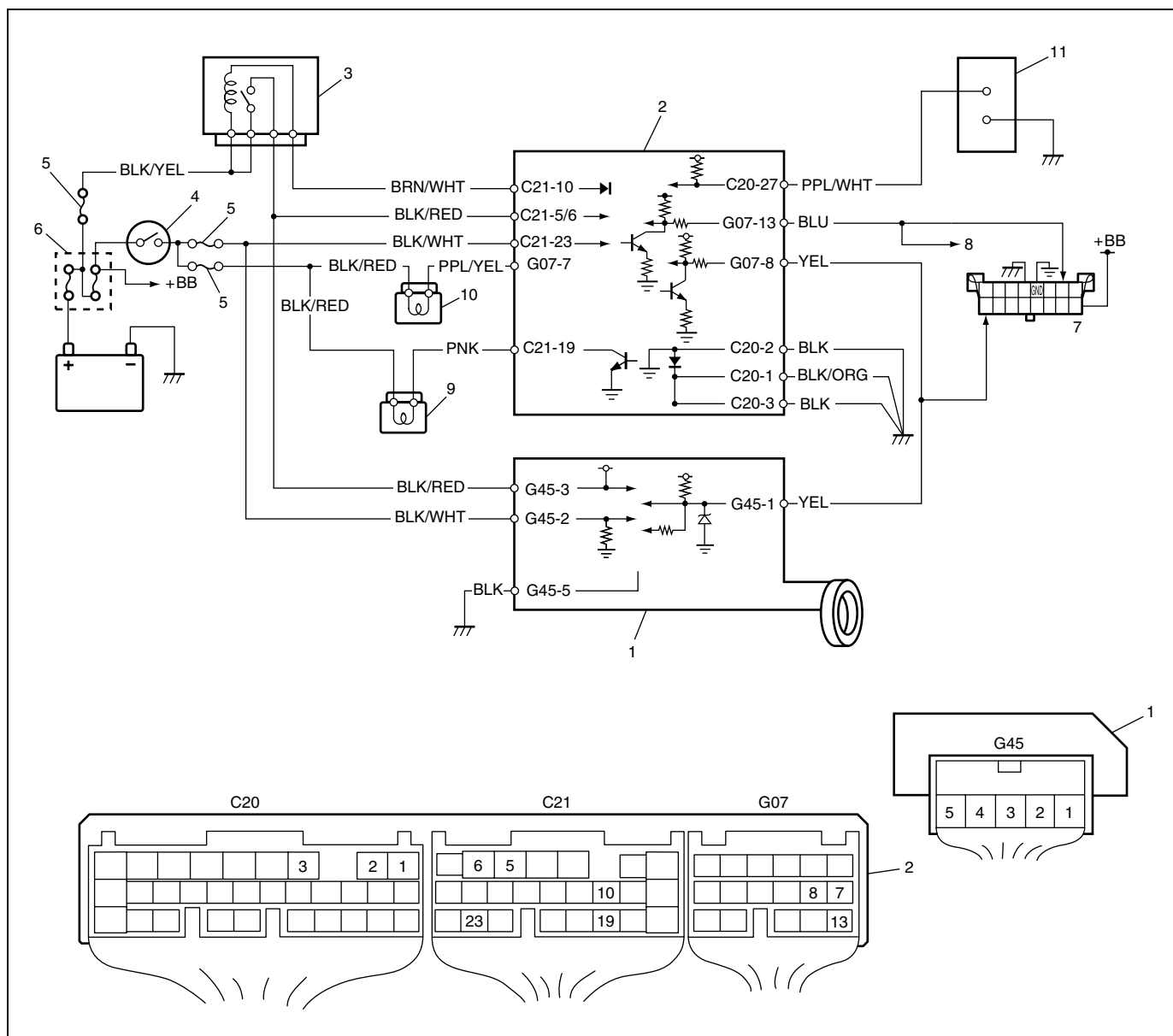
- Each ignition key has its own code (Transponder code) stored in memory. When the ignition switch is turned ON, Immobilizer Control Module tries to read the Transponder code through the coil antenna installed to the steering lock assembly.
- Immobilizer Control Module compares the Transponder code read in Step (i) and that registered in Immobilizer Control Module and checks if they match.
- When it is confirmed that two Transponder codes match each other as described above, Immobilizer Control Module and ECM check if ECM/Immobilizer Control Module (ECU) codes registered in them respectively match.
- Only when it is confirmed that ECM/Immobilizer Control Module codes match, the engine starts running. If Transponder codes in Step (ii) or ECM/Immobilizer Control Module (ECU) codes in Step (iii) do not match, ECM will stop operation of the injector and ignition of spark plug.



- |   |
|---|
| 3. Data link connector (DLC)                |
| 4. Immobilizer indicator lamp (if equipped) |
| 5. ECM                                      |
| 6. Malfunction indicator lamp               |



## Wiring Circuit



1. Immobilizer Control Module	5. Fuse	9. Immobilizer indicator lamp (if equipped)
2. ECM	6. Main fuse	10. Malfunction indicator lamp
3. Main relay	7. Data link connector	11. Monitor coupler (Vehicle not equipped with immobilizer indicator lamp)
4. Ignition switch	8. To ABS control module, SDM and TCM	

## On-board Diagnostic System (Self-diagnosis Function)

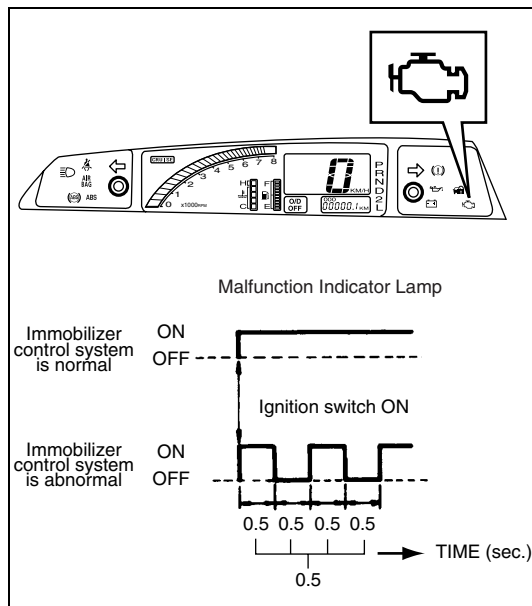
Immobilizer Control Module and ECM diagnose troubles which may occur in the area including the following parts when the ignition switch is ON.

ECM :

- ECM/Immobilizer Control Module (ECU) code
- Serial data link circuit
- ECM

Immobilizer Control Module :

- Transponder code
- Coil antenna
- ECM/Immobilizer Control Module (ECU) code
- Serial data link circuit
- Immobilizer Control Module
- Ignition signal



### <Vehicle not equipped with immobilizer indicator lamp>

With the diagnosis switch terminal of monitor coupler for ECM not grounded, the ignition switch turned ON (but the engine at stop) and regardless of the condition of the engine fuel injection system, ECM indicates whether a trouble has occurred in the immobilizer control system or not by causing the malfunction indicator lamp to flash or turn ON.

Malfunction indicator lamp is ON :

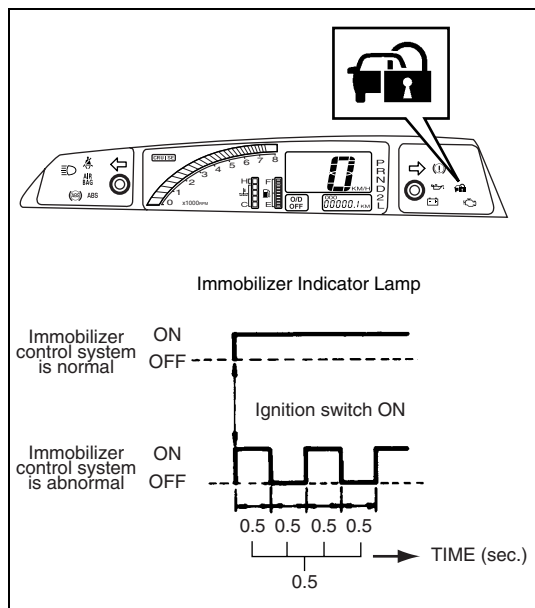
No trouble exists in the immobilizer control system.

Malfunction indicator lamp is flashing :

ECM or Immobilizer Control Module has detected some trouble in the immobilizer control system.

### NOTE:

As soon as the ignition switch is turned ON, ECM and Immobilizer Control Module diagnose if a trouble has occurred in the immobilizer control system. While the diagnosis is being made, the malfunction indicator lamp stays ON and if the diagnosis result is “abnormal”, it immediately changes to flashing but if the result is “normal”, it remains ON. Diagnosis takes about 3 seconds at maximum.



### <Vehicle equipped with immobilizer indicator lamp>

With the ignition switch turned ON (but the engine at stop) regardless of the condition of the engine and emission control system, ECM indicates whether a trouble has occurred in the immobilizer control system or not by causing the immobilizer indicator lamp to flash or turn ON.

Immobilizer indicator lamp is ON :

No trouble exists in the immobilizer control system.

Immobilizer indicator lamp is flashing :

ECM or Immobilizer Control Module has detected some trouble in the immobilizer control system.

### NOTE:

As soon as the ignition switch is turned ON, ECM and Immobilizer Control Module diagnose if a trouble has occurred in the immobilizer control system. While the diagnosis is being made, the immobilizer indicator lamp stays ON and if the diagnosis result is “abnormal”, it immediately changes to flashing but if the result is “normal”, it remains ON. Diagnosis takes about 3 seconds at maximum.

When ECM and Immobilizer Control Module detects a trouble which has occurred in the above areas, it stores DTC corresponding to the exact trouble area in ECM and Immobilizer Control Module memory.

DTCs stored in memory of each controller (Immobilizer Control Module and ECM) can be read by using the procedure described in “DIAGNOSTIC TROUBLE CODE CHECK (IMMOBILIZER CONTROL MODULE)” and “DIAGNOSTIC TROUBLE CODE CHECK (ECM)” in this section.

## Diagnosis

### Precautions in Diagnosing Troubles

#### Precautions in identifying diagnostic trouble code

##### ECM

##### <Vehicle not equipped with immobilizer indicator lamp>

- Before identifying diagnostic trouble code indicated by malfunction indicator lamp or Suzuki scan tool, don't disconnect couplers from ECM, battery cable from battery, ECM ground wire harness from engine. Such disconnection will clear trouble codes for engine and emission control system and immobilizer control system stored in memory of ECM.
- If abnormality or malfunction lies in two or more areas, malfunction indicator lamp indicates applicable codes three times each.  
And flashing of these codes is repeated as long as diagnosis terminal is grounded and ignition switch is held at ON position.
- When ECM detects a trouble in both engine and emission control system and immobilizer control system, malfunction indicator lamp indicates trouble codes of both systems alternately while the ignition switch is turned ON and the diagnosis terminal is grounded.
- Take a note of diagnostic trouble code indicated first.

##### <Vehicle equipped with immobilizer indicator lamp>

- Before identifying diagnostic trouble code indicated through Suzuki scan tool, don't disconnect couplers from ECM, battery cable from battery, ECM ground wire harness from engine. Such disconnection will clear trouble codes for engine and emission control system and immobilizer control system stored in memory of ECM.
- Take a note of diagnostic trouble code indicated first.

#### IMMOBILIZER CONTROL MODULE

- Take a note of diagnostic trouble code indicated first.

#### INTERMITTENT TROUBLES

- There is case where Suzuki scan tool or malfunction indicator lamp (if not equipped with immobilizer indicator lamp) indicate a diagnostic trouble code representing a trouble which occurred only temporarily and has gone. In such case, it may occur that good parts are replaced unnecessarily. To prevent such accident, be sure to follow instructions given below when checking by using "Diagnostic Flow Table".
  - When trouble can be identified, it is not an intermittent one :  
Check coil antenna, ignition key, wires and each connection and if they are all in good condition, substitute a known-good ECM and recheck.
  - When trouble can not be identified but Suzuki scan tool or malfunction indicator lamp (if not equipped with immobilizer indicator lamp) indicate a trouble code :  
Diagnose trouble by using that code No. and if ignition key, coil antenna, wires and each connection are all in good condition, turn OFF ignition switch and then ON.

Then check what Suzuki scan tool indicate. Only when they indicate trouble code again, substitute a known-good ECM or Immobilizer Control Module and check again.

If they indicate not trouble code but normal code, it means that an intermittent trouble did occur and has gone. In this case, check wires and connections carefully again.

## Diagnostic Flow Table

<Vehicle not equipped with immobilizer indicator lamp>

Step	Action	Yes	No
1	1) Make sure that diagnosis switch terminal in monitor coupler (color : white) is not grounded by service wire. See Fig.1. 2) Check malfunction indicator lamp while ignition switch is ON (but without starting engine). See Fig. 2. Does malfunction indicator lamp flash?	Go to Step 3.	<ul style="list-style-type: none"> <li>If malfunction indicator lamp remains ON, go to Step 2.</li> <li>If malfunction indicator lamp remains OFF, go to "MALFUNCTION INDICATOR LAMP CHECK" in Section 6.</li> </ul>
2	1) Using service wire, ground diagnostic switch terminal in monitor coupler. See Fig.3. Does malfunction indicator lamp flash?	Immobilizer control system is in good condition.	Go to "MALFUNCTION INDICATOR LAMP CHECK" in Section 6.
3	Does malfunction indicator lamp flash as Fig.4?	Go to Step 4.	Go to "MALFUNCTION INDICATOR LAMP CHECK" in Section 6.
4	1) Check DTC stored in immobilizer control module referring to "DIAGNOSTIC TROUBLE CODE CHECK (IMMOBILIZER CONTROL MODULE)" in this section. Is there any DTC(s)?	Go to flow table for DTC No.	Go to Step 5.
5	1) Check DTC stored in ECM referring to "DIAGNOSTIC TROUBLE CODE CHECK (ECM)" in this section. Is there any DTC(s)?	Go to flow table for DTC No.	Substitute a known-good ECM and recheck. See NOTE below.

### NOTE:

After replacing with a known-good ECM, register ECM/Immobilizer Control Module (ECU) code in ECM by performing procedure described in "Procedure after ECM Replacement" section.

Fig. 1 for Step 1

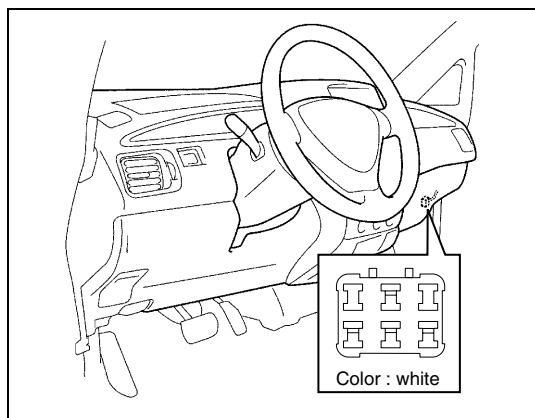


Fig. 2 for Step 1

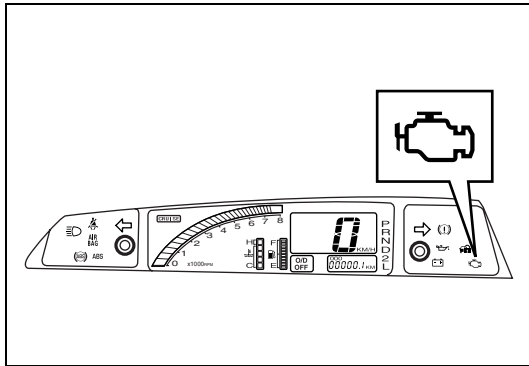
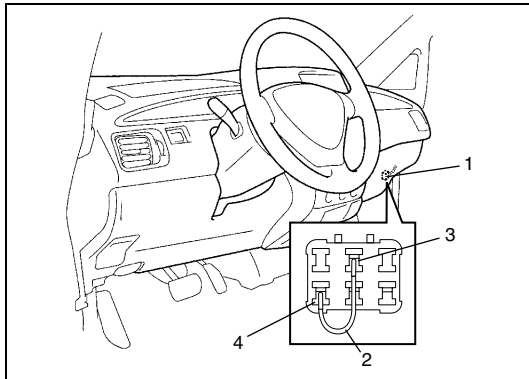
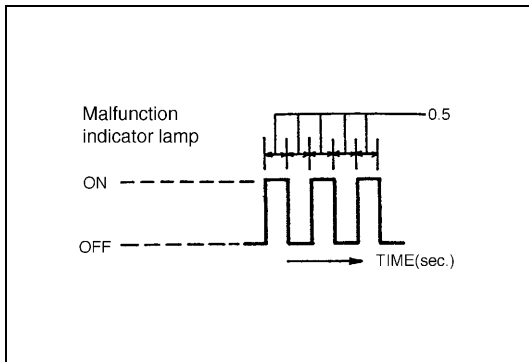


Fig. 3 for Step 2



- |                                    |
|------------------------------------|
| 1. Monitor coupler (color : white) |
| 2. Service wire                    |
| 3. Diagnostic switch terminal      |
| 4. Ground terminal                 |

Fig. 4 for Step 3



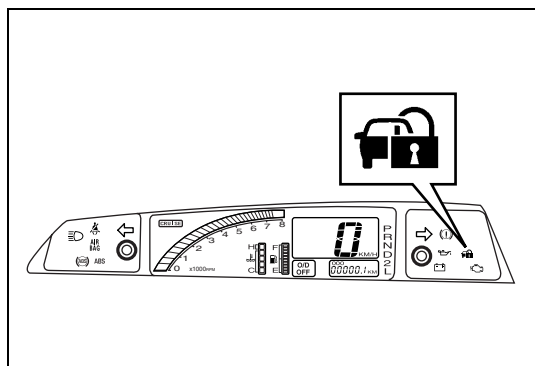
## &lt;Vehicle equipped with immobilizer indicator lamp&gt;

Step	Action	Yes	No
1	1) Check immobilizer indicator lamp while ignition switch is ON (but without starting engine). See Fig. 1. Does immobilizer indicator lamp flash?	Go to Step 3.	If immobilizer indicator lamp remains ON, go to Step 2. If immobilizer indicator lamp remains OFF, go to "TABLE A IMMOBILIZER INDICATOR LAMP CHECK" in this section.
2	1) Check DTC stored in ECM referring to "DIAGNOSTIC TROUBLE CODE CHECK (ECM)" in this section. Is there any DTC(s)?	Go to "TABLE B IMMOBILIZER INDICATOR LAMP CHECK" in this section.	Immobilizer control system is in good condition.
3	1) Check DTC stored in immobilizer control module referring to "DIAGNOSTIC TROUBLE CODE CHECK (IMMOBILIZER CONTROL MODULE)" in this section. Is there any DTC(s)?	Go to flow table for DTC No.	Go to Step 4.
4	1) Check DTC stored in ECM referring to "DIAGNOSTIC TROUBLE CODE CHECK (ECM)" in this section. Is there any DTC(s) for immobilizer control system?	Go to flow table for DTC No.	Substitute a known-good ECM and recheck. See NOTE below.

**NOTE:**

After replacing with a known-good ECM, register ECM/Immobilizer Control Module (ECU) code in ECM by performing procedure described in "Procedure after ECM Replacement" section.

Fig. 1 for Step 1



## Diagnostic Trouble Code (DTC) Check (Immobilizer Control Module)

### [Using SUZUKI scan tool]

- 1) Turn ignition switch OFF.
- 2) After setting cartridge or program card to Suzuki scan tool, connect it to data link connector (DLC) (1) located on under-side of instrument panel at driver's seat side.

### Special tool

#### (A) : Suzuki scan tool

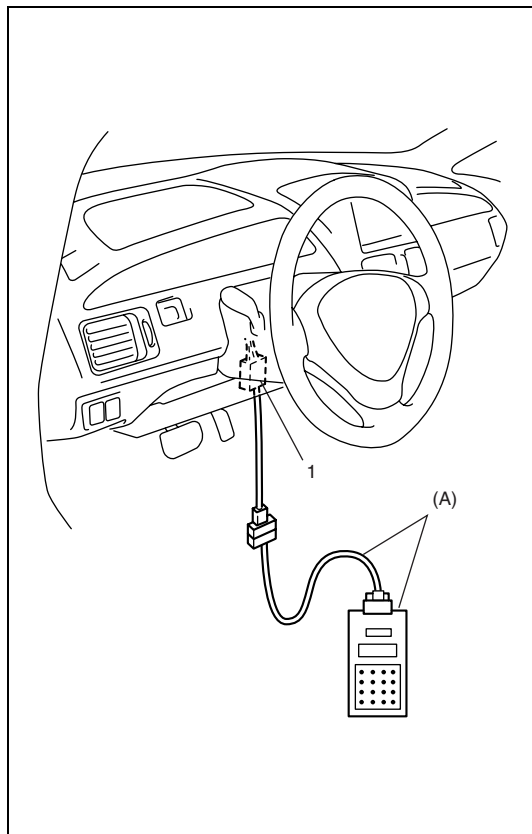
- 3) Turn ignition switch ON.
- 4) Read DTC stored in immobilizer control module according to instructions displayed on Suzuki scan tool and print it or write it down. Refer to Suzuki scan tool operator's manual for further details.

If communication between Suzuki scan tool and immobilizer control module is not possible, go to "Diagnostic Flow Table C".

### NOTE:

**When reading DTC stored in immobilizer control module using Suzuki scan tool (Tech 1), select "BCM" from the applications menu and "IMMOBILIZER" from the select system menu displayed on Suzuki scan tool.**

- 5) After completing the check, turn ignition switch OFF and disconnect Suzuki scan tool from data link connector (DLC).





## Diagnostic Trouble Code (DTC) Check (ECM)

### [Using SUZUKI scan tool]

- 1) Turn ignition switch OFF.
- 2) After setting cartridge or program card to Suzuki scan tool, connect it to data link connector (DLC) (1) located on underside of instrument panel at driver's seat side.

#### Special tool

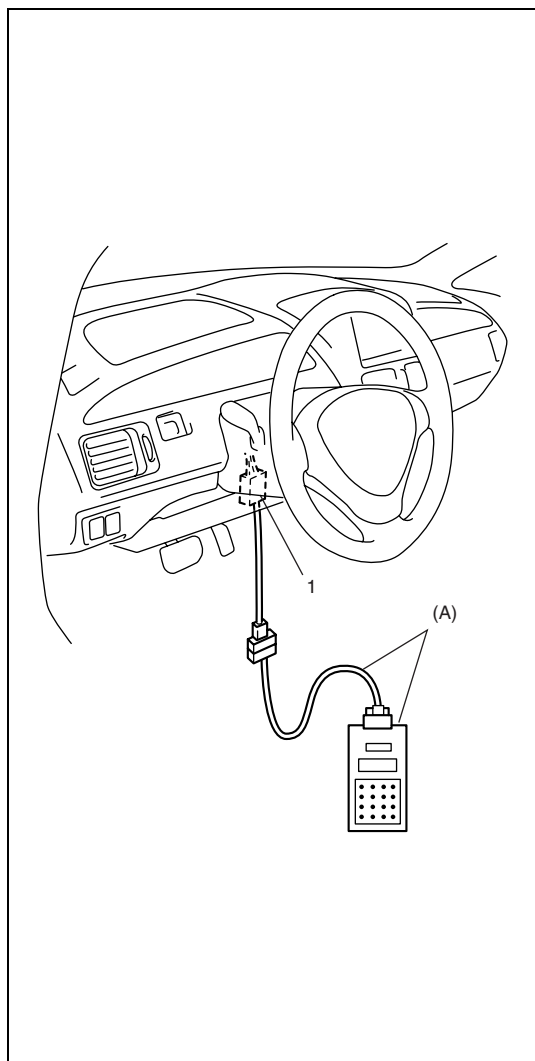
##### (A) : Suzuki scan tool

- 3) Turn ignition switch ON.
- 4) Read DTC stored in ECM according to instructions displayed on Suzuki scan tool and print it or write it down. Refer to Suzuki scan tool operator's manual for further details.

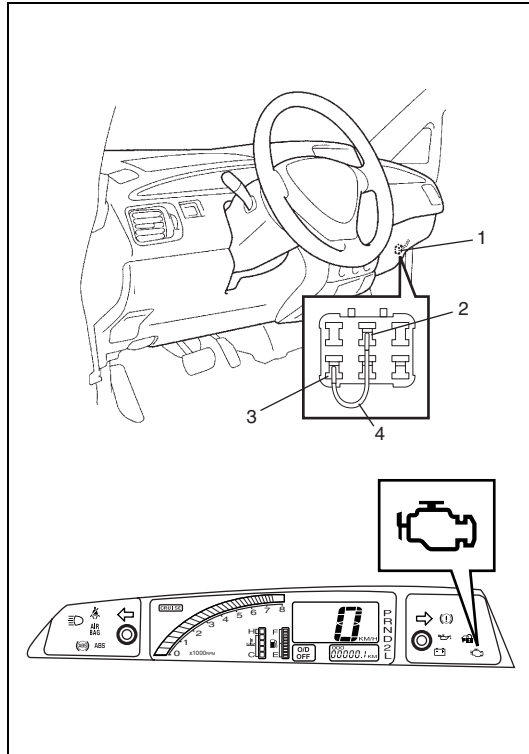
If communication between Suzuki scan tool and ECM is not possible, check if Suzuki scan tool is communicable by connecting it to ECM in another vehicle. If communication is possible in this case, Suzuki scan tool is in good condition. Then check data link connector and serial data line (circuit) in the vehicle with which communication was not possible.

#### NOTE:

- When reading DTC stored in ECM using Suzuki scan tool (Tech 1), select "ECM" from the applications menu and "SUZUKI mode" from the communication mode menu displayed on Suzuki scan tool.
  - If ECM detects a trouble in both engine and emission control system and immobilizer control system, Suzuki scan tool indicates trouble codes of both systems.
- 5) After completing the check, turn ignition switch OFF and disconnect Suzuki scan tool from data link connector (DLC).



**[Not using SUZUKI scan tool] (Except for vehicle equipped with immobilizer indicator lamp)**



- 1) Using service wire, ground diagnostic switch terminal in monitor coupler (color : white).
- 2) Read DTC from flashing pattern of malfunction indicator lamp as shown in example below and write it down. For details of DTC, refer to ECM side in "Diagnostic Trouble Code Table".

If lamp remains ON, go to "Malfunction Indicator Lamp Check" in Section 6.

**NOTE:**

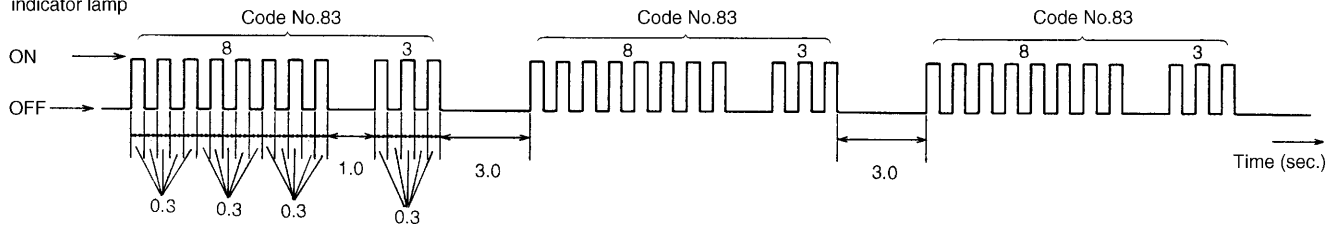
**If abnormality or malfunction lies in two or more areas, malfunction indicator lamp indicates applicable codes three times each.**

**And flashing of these codes is repeated as long as diagnosis terminal is grounded and ignition switch is held at ON position.**

- |                                    |
|------------------------------------|
| 1. Monitor coupler (color : white) |
| 2. Diagnostic switch terminal      |
| 3. Ground terminal                 |
| 4. Service wire                    |

**EXAMPLE : When serial data link wire is defective (Code No.83)**

Malfunction indicator lamp



- 3) After completing the check, turn ignition switch OFF and disconnect service wire from monitor coupler.






## Diagnostic Trouble Code Table

### IMMOBILIZER CONTROL MODULE

DTC (indicated on Suzuki scan tool)	DIAGNOSTIC AREA	DIAGNOSIS
NO DTC	Normal (No code)	This code appears when none of the other codes are identified.
11	Transponder code	Diagnose trouble according to “Diagnostic Flow Table” corresponding to each code No.
31		
32		
12	Immobilizer Control Module	
13	Coil antenna or ignition key with built-in transponder	
21	ECM/Immobilizer Control Module (ECU) code	
22	Ignition switch circuit	
23	Serial data link circuit	

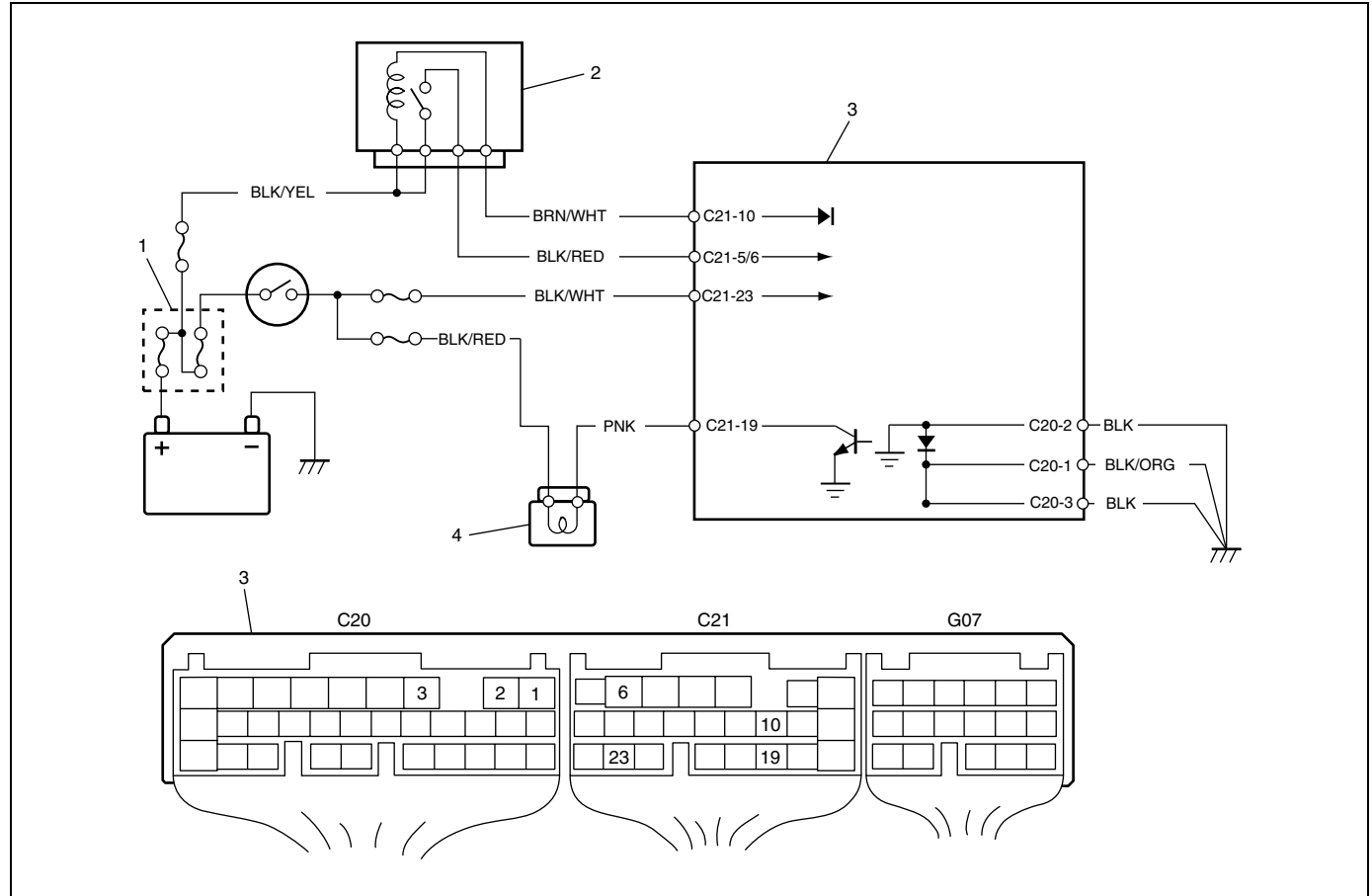
### ECM

To learn how to read diagnostic trouble code (DTC) from flashing of malfunction indicator lamp, refer to Section 6.

DTC (indicated on Suzuki scan tool)	DTC (indicated by MIL)	Malfunction Indicator Lamp (MIL) flashing pattern	DIAGNOSTIC AREA	DIAGNOSIS
NO DTC	12		Normal	This code appears when it is confirmed that none of other trouble codes is set for immobilizer control system or engine and emission control system.
P1623	81		ECM/Immobilizer Control Module (ECU) code	Diagnose trouble according to “DIAGNOSTIC FLOW TABLE” corresponding to each code No.
P1620	84			
P1622	82		ECM	
P1621	83		Serial data link wire	

# Table A - Immobilizer Indicator Lamp Check: Immobilizer Indicator Lamp Does Not Light at Ignition Switch ON (Equipped with Immobilizer Indicator Lamp)

## WIRING DIAGRAM



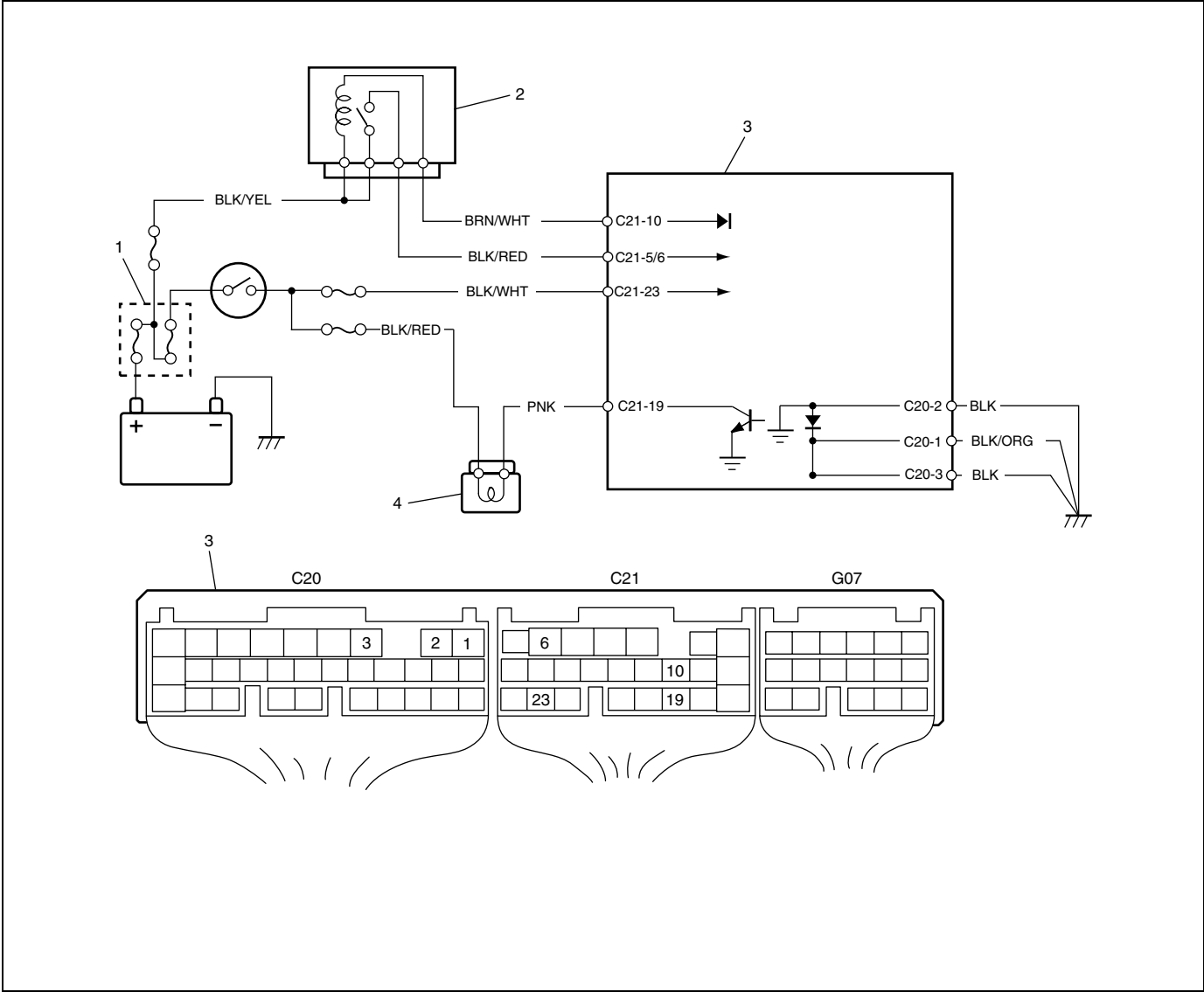
1. Main fuse	2. Main relay	3. ECM	4. Immobilizer indicator lamp
--------------	---------------	--------	-------------------------------

## INSPECTION

Step	Action	Yes	No
1	1) Turn ignition switch ON. Do other indicator/warning lights in combination meter come ON?	Go to Step 2.	"IG" fuse blown, main fuse blown, ignition switch malfunction, "BLK/WHT" circuit between "IG" fuse and combination meter or poor coupler connection at combination meter.
2	1) Turn ignition switch OFF and disconnect connectors from ECM. 2) Check for proper connection to ECM at terminal C21-19. 3) If OK, then using service wire, ground terminal C21-19 in connector disconnected. Does immobilizer indicator lamp turn on at ignition switch ON?	Substitute a known-good ECM and recheck.	Bulb burned out or "PNK" wire circuit open.

**Table B - Immobilizer Indicator Lamp Check: Immobilizer Indicator Lamp Remains ON after Engine Starts (Equipped with Immobilizer Indicator Lamp)**

**WIRING DIAGRAM**



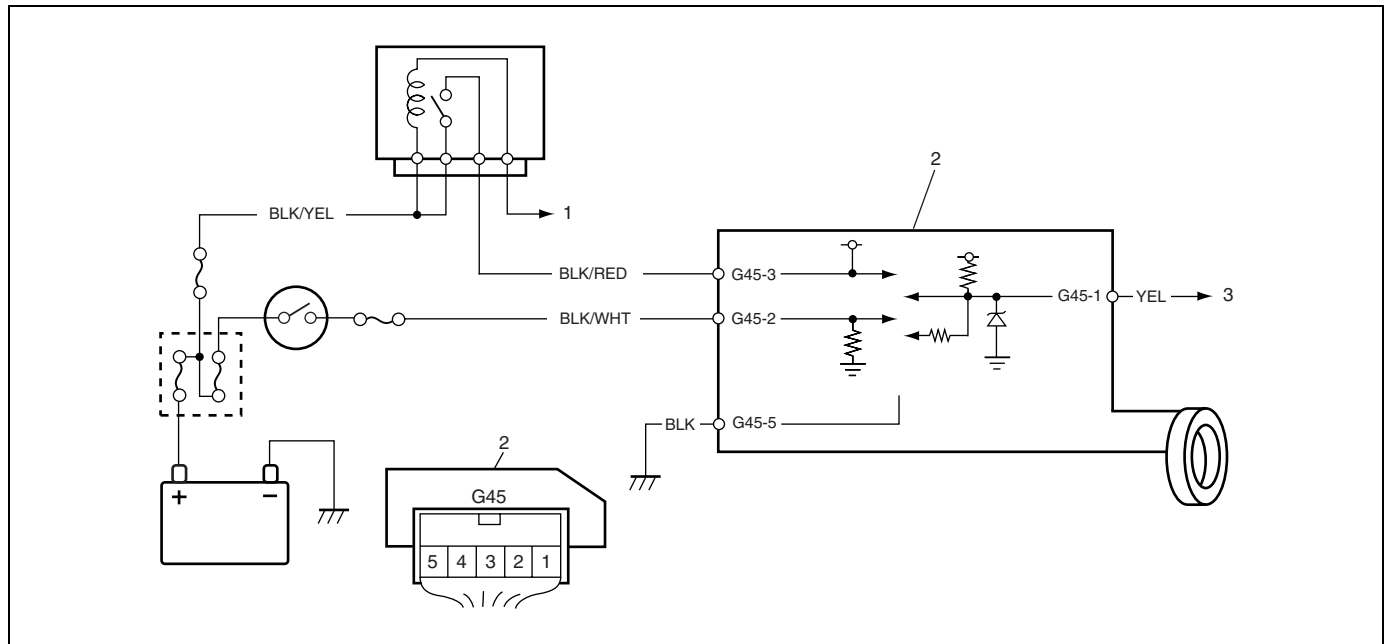
1. Main fuse	2. Main relay	3. ECM	4. Immobilizer indicator lamp
--------------	---------------	--------	-------------------------------

**INSPECTION**

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect couplers from ECM. Does immobilizer indicator lamp turn ON at ignition switch ON?	“PNK” wire shorted to ground circuit.	Substitute a known-good ECM and recheck.

## Table C - DTC Is Not Output from Immobilizer Control Module

### WIRING DIAGRAM



1. To ECM	2. Immobilizer control module	3. To #9-pin in DLC
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### INSPECTION

Step	Action	Yes	No
1	Check voltage between G45-3 terminal and body ground with ignition switch turned ON. See Fig. 1. Is it 10 – 14 V?	Go to Step 2.	“BLK/RED” wire open or short to ground.
2	1) Disconnect coupler (1) at immobilizer control module. Is there continuity between coupler terminal G45-5 and body ground? See Fig. 2.	<ul style="list-style-type: none"> <li>Poor G45-3 or G45-5 connection</li> <li>Poor #9-pin connection in DLC</li> <li>Serial data line “YEL” open or short to ground</li> </ul> If connections and line are OK, substitute a known-good Immobilizer Control Module and recheck. See NOTE below.	“BLK” wire open.

#### NOTE:

After replacing with a known-good Immobilizer Control Module, register ECM/Immobilizer Control Module (ECU) code in ECM and Transponder code and ECM/Immobilizer Control Module (ECU) code in Immobilizer Control Module by performing procedure described in “PROCEDURE AFTER IMMOBILIZER CONTROL MODULE REPLACEMENT” in this section.

Fig. 1 for Step 1

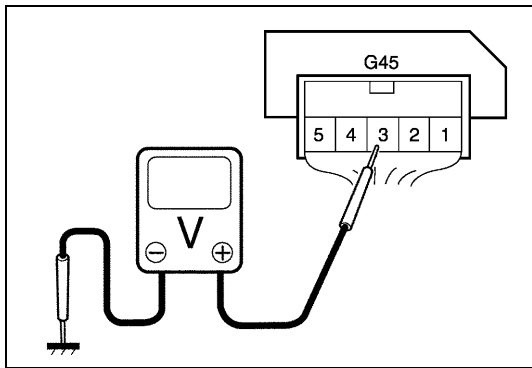
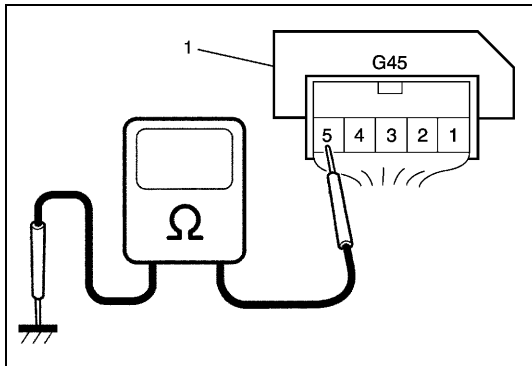


Fig. 2 for Step 2



## DTC11/32 Transponder Code Not Matched

### DESCRIPTION

Immobilizer Control Module checks if Transponder code transmitted from ignition key and that registered in Immobilizer Control Module match when ignition switch is ON. If they do not, DTC 11 and/or 32 are set.

### INSPECTION

Register ignition key with built-in transponder by using SUZUKI scan tool and performing following steps.

- 1) Register Transponder code in Immobilizer Control Module by performing procedure described in "How To Register Ignition Key".
- 2) Turn ignition switch OFF, then turn it ON and check that DTC11 and/or 32 are not set.

## DTC31 Transponder Code Not Registered

### DESCRIPTION

Immobilizer Control Module checks if Transponder code transmitted from ignition key and that registered in Immobilizer Control Module match when ignition switch is ON. If there is no Transponder code registered in Immobilizer Control Module, this DTC is set.

### INSPECTION

Register ignition key with built-in transponder by using SUZUKI scan tool and performing following steps.

- 1) Register Transponder code in Immobilizer Control Module by performing procedure described in "How To Register Ignition Key".
- 2) Turn ignition switch OFF, then turn it ON and check that DTC31 is not set.

## DTC12 Fault in Immobilizer Control Module

### DESCRIPTION

This DTC is set when an internal fault is detected in Immobilizer Control Module.

### INSPECTION

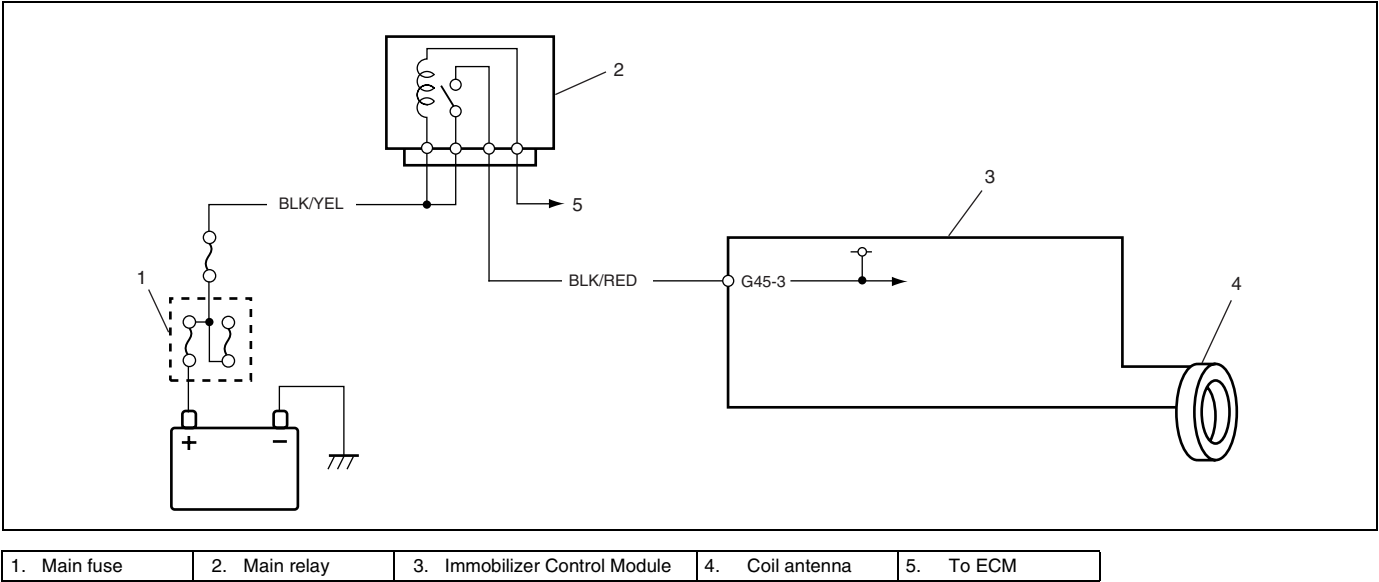
Step	Action	Yes	No
1	1) Ignition switch OFF. 2) Disconnect connectors from Immobilizer Control Module. 3) Check for proper connection to Immobilizer Control Module at all terminals. Are they in good condition?	Substitute a known-good Immobilizer Control Module and recheck. See NOTE below.	Repair or replace.

### NOTE:

After replacing with a known-good Immobilizer Control Module, register ECM/Immobilizer Control Module (ECU) code in ECM and Transponder code and ECM/Immobilizer Control Module (ECU) code in Immobilizer Control Module by performing procedure described in "PROCEDURE AFTER IMMOBILIZER CONTROL MODULE REPLACEMENT" in this section.



DTC13 No Transponder Code Transmitted or Coil Antenna Opened/Shorted



DESCRIPTION

Immobilizer Control Module energizes the coil antenna when the ignition switch is ON and reads Transponder code from the ignition key. When Immobilizer Control Module cannot read Transponder code from the ignition key even when the coil antenna is energized, this DTC is set.

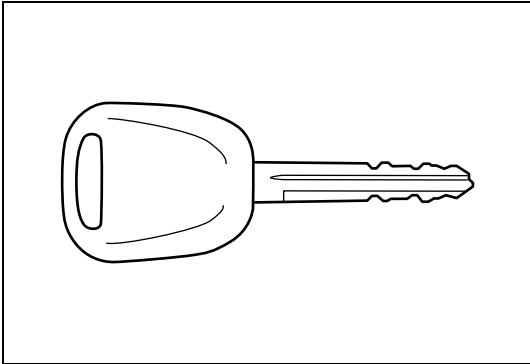
INSPECTION

Step	Action	Yes	No
1	Check that knob shape and color for ignition key are as shown below. <ul style="list-style-type: none"> <li>Knob color : Black</li> <li>Knob shape : the same as shown in Fig.1.</li> </ul> Is it the original one?	Substitute a known-good Immobilizer Control Module and recheck. See NOTE below.	Replace ignition key with original one and follow “Diagnostic Flow Table” again.

NOTE:

After replacing with a known-good Immobilizer Control Module, register ECM/Immobilizer Control Module (ECU) code in ECM and Transponder code and ECM/Immobilizer Control Module (ECU) code in Immobilizer Control Module by performing procedure described in “PROCEDURE AFTER IMMOBILIZER CONTROL MODULE REPLACEMENT” in this section.

Fig. 1 for Step 1



## DTC21 ECM/Immobilizer Control Module Code Not Matched (Immobilizer Control Module Side)

## DTC81 (P1623) ECM/Immobilizer Control Module Code Not Matched (ECM Side)

## DTC84 (P1620) ECM/Immobilizer Control Module Code Not Registered

### DESCRIPTION

- DTC21  
Immobilizer Control Module checks if ECM/Immobilizer Control Module code transmitted from ECM and that registered in Immobilizer Control Module match when ignition switch is ON. If they do not, this DTC is set.
- DTC 81 (P1623)  
ECM checks if ECM/Immobilizer Control Module code transmitted from Immobilizer Control Module and that registered in ECM match when ignition switch is ON. If they do not, this DTC is set.
- DTC 84 (P1620)  
ECM checks if code transmitted from Immobilizer Control Module and that registered in ECM match when ignition switch is ON. If there is no ECM/Immobilizer Control Module code registered in ECM, this DTC is set.

### INSPECTION

Perform procedure described in “PROCEDURE AFTER ECM REPLACEMENT” in the section.

## DTC82 (P1622) Fault in ECM

### DESCRIPTION

This DTC is set when an internal fault is detected in ECM.

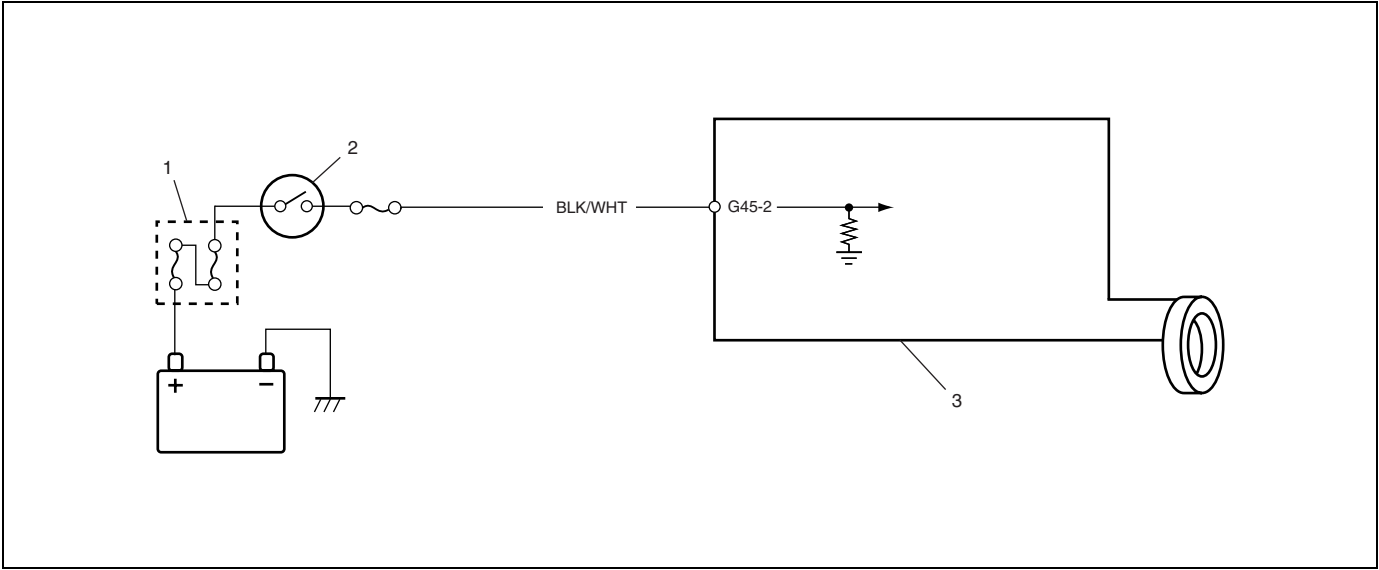
### INSPECTION

Step	Action	Yes	No
1	1) Ignition switch OFF. 2) Disconnect connectors from ECM. 3) Check for proper connection to ECM at all terminals. Are they in good condition?	Substitute a known-good ECM and recheck. See NOTE below.	Repair or replace.

### NOTE:

After replacing with a known-good ECM, register ECM/Immobilizer Control Module (ECU) code in ECM by performing procedure described in “PROCEDURE AFTER ECM REPLACEMENT” in this section.

DTC22 Ignition Switch Circuit Open/Short



1. Main fuse	2. Ignition switch	3. Immobilizer Control Module
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DESCRIPTION

Immobilizer Control Module monitors ignition signal when the ignition switch is ON. This DTC is set when no ignition signal input is detected by Immobilizer Control Module.

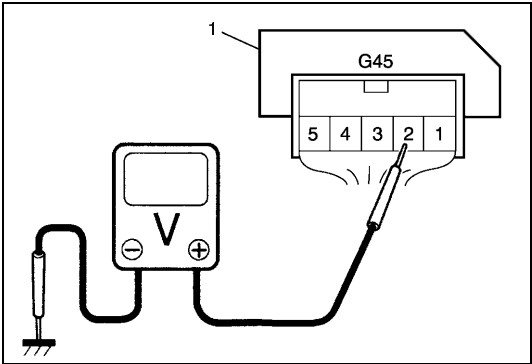
INSPECTION

Step	Action	Yes	No
1	Check voltage between Immobilizer Control Module (1) coupler terminal G45-2 and body ground with ignition switch turned ON. See Fig. 1. Is it 10 – 14V?	Poor G45-2 terminal connection. If connection is OK, substitute a known-good Immobilizer Control Module and recheck. See NOTE below.	“BLK/WHT” wire open or short.

NOTE:

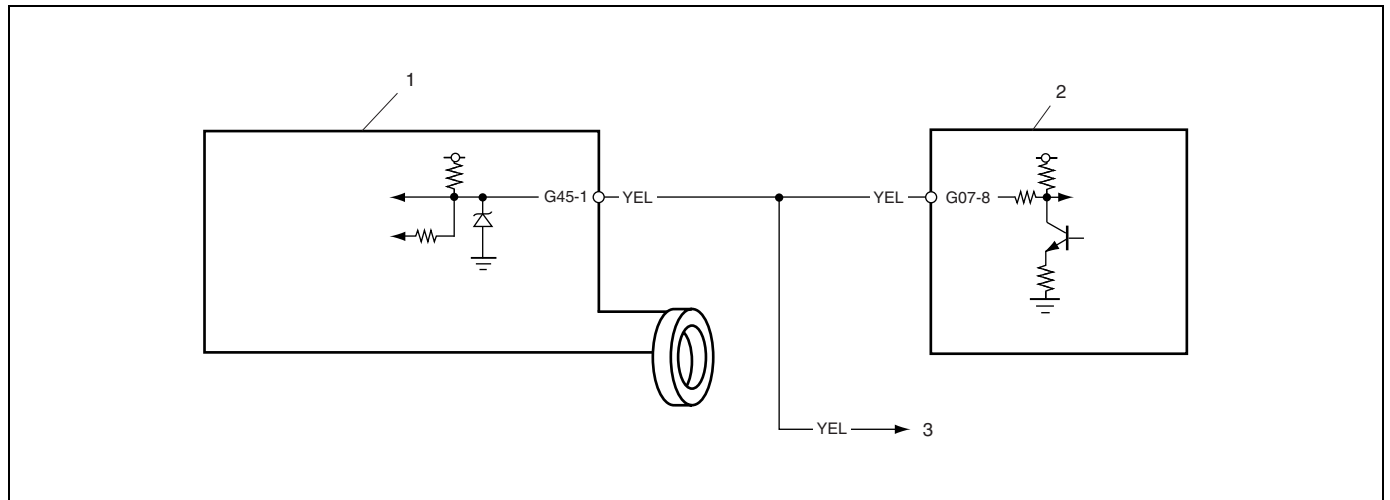
After replacing with a known-good Immobilizer Control Module, register ECM/Immobilizer Control Module (ECU) code in ECM and Transponder code and ECM/Immobilizer Control Module (ECU) code in Immobilizer Control Module by performing procedure described in “PROCEDURE AFTER IMMOBILIZER CONTROL MODULE REPLACEMENT” in this section.

Fig. 1 for Step 1



## DTC23 No ECM/Immobilizer Control Module Code Transmitted from ECM or DLC Circuit Opened/Shorted

## DTC83 (P1621) No ECM/Immobilizer Control Module Code Transmitted from Immobilizer Control Module or DLC Circuit Opened/Shorted



1. Immobilizer Control Module	2. ECM	3. To #9-pin in DLC
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### DESCRIPTION

When the ignition switch is ON, Immobilizer Control Module requests ECM and ECM requests Immobilizer Control Module to transmit ECM/Immobilizer Control Module code. If ECM/Immobilizer Control Module code is not transmitted from ECM or Immobilizer Control Module, Immobilizer Control Module sets DTC23 and ECM sets DTC 83 (P1621).

### INSPECTION

Step	Action	Yes	No
1	Check voltage between Immobilizer Control Module (1) coupler terminal G45-1 and body ground with ignition switch turned ON. See Fig. 1. Is it 4 – 5V?	Go to Step 2.	“YEL” wire short.
2	1) Disconnect ECM coupler with ignition switch turned OFF. 2) Is there continuity between Immobilizer Control Module coupler (1) terminal G45-1 and serial data link terminal (G07-8) of ECM coupler? See Fig. 2. (For positions of Data link connector terminal of ECM coupler, refer to “WIRING CIRCUIT” in this section.)	Poor G45-1 terminal connection (Immobilizer Control Module) or Poor Data link connector terminal connection (ECM). If connections are OK, substitute a known-good ECM or Immobilizer Control Module and recheck. See NOTE below.	“YEL” wire between Immobilizer Control Module and ECM open.

**NOTE:**

- After replacing with a known-good ECM, register ECM/Immobilizer Control Module (ECU) code in ECM by performing procedure described in “PROCEDURE AFTER ECM REPLACEMENT” in this section.
- After replacing with a known-good Immobilizer Control Module, register ECM/Immobilizer Control Module (ECU) code in ECM and Transponder code and ECM/Immobilizer Control Module (ECU) code in Immobilizer Control Module by performing procedure described in “PROCEDURE AFTER IMMOBILIZER CONTROL MODULE REPLACEMENT” in the section.

Fig. 1 for Step 1

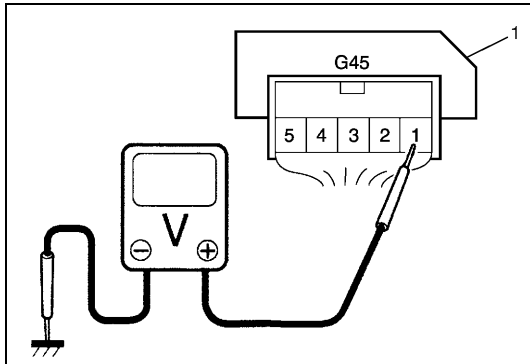
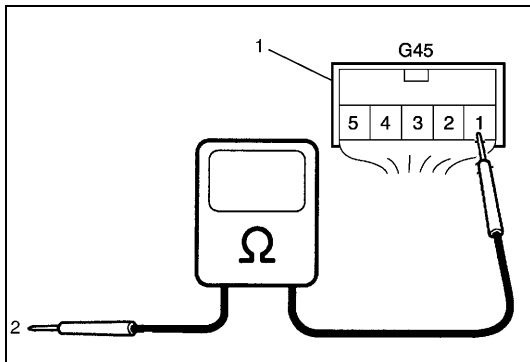


Fig. 2 for Step 2



2. Connect to serial data link terminal (G07-8) of ECM coupler disconnected

## Inspection of ECM, Immobilizer Control Module and Its Circuit

ECM, Immobilizer Control Module and its circuit can be checked at ECM wiring couplers and Immobilizer Control Module wiring coupler by measuring voltage. Described here is only inspection of Immobilizer Control Module. For inspection of ECM, refer to “ENGINE & EMISSION CONTROL INPUT/OUTPUT TABLE” in Section 6E1.

### CAUTION:

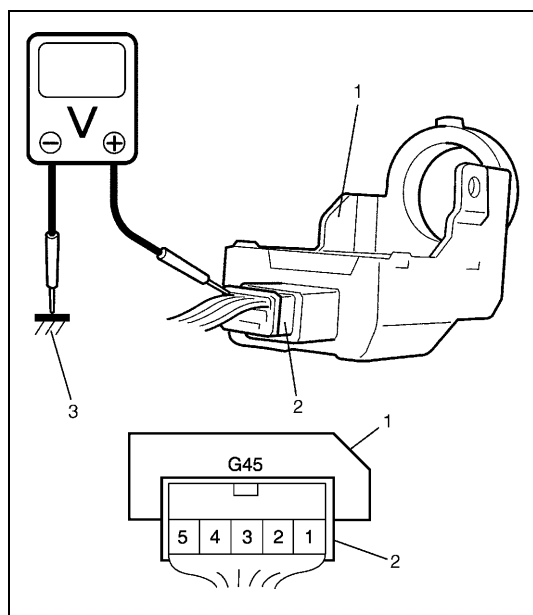
**Immobilizer Control Module cannot be checked by itself. It is strictly prohibited to connect voltmeter or ohmmeter to Immobilizer Control Module with coupler disconnected from it.**

### Voltage check

- 1) Remove Immobilizer Control Module from steering lock assembly with ignition switch OFF, referring to “REMOVAL” of “IMMOBILIZER CONTROL MODULE” in this section.
- 2) Connect Immobilizer Control Module coupler to Immobilizer Control Module.
- 3) Check voltage at each terminal of coupler connected.

### NOTE:

**As each terminal voltage is affected by the battery voltage, confirm that it is 11V or more when ignition switch is ON.**

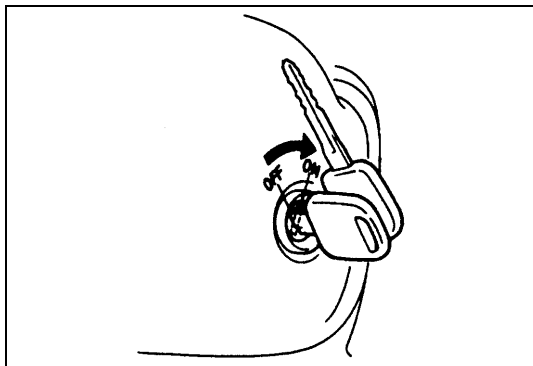


1. Immobilizer Control Module
2. Immobilizer Control Module coupler
3. Body ground

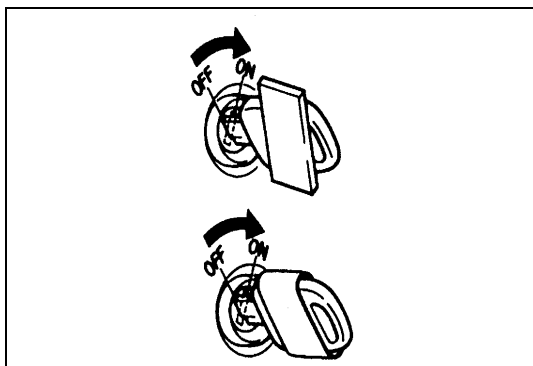
TERMINAL	CIRCUIT	NOMAL VOLTAGE	CONDITION
G45-1	Data link connector (Serial data terminal)	4 – 5V	Ignition switch ON
G45-2	Ignition signal	10 – 14V	Ignition switch ON
		0 – 0.8V	Ignition switch OFF
G45-3	Power source	10 – 14V	Ignition switch ON
G45-4	—	—	—
G45-5	Ground	—	—

## On-vehicle Service

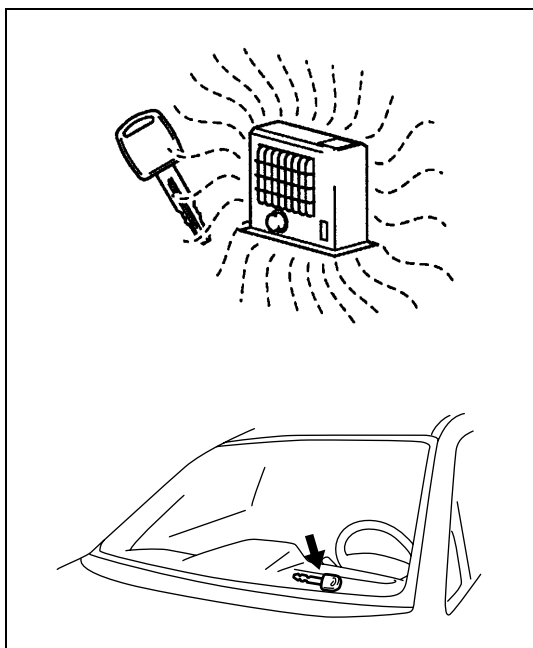
### Precautions in Handling Immobilizer Control System



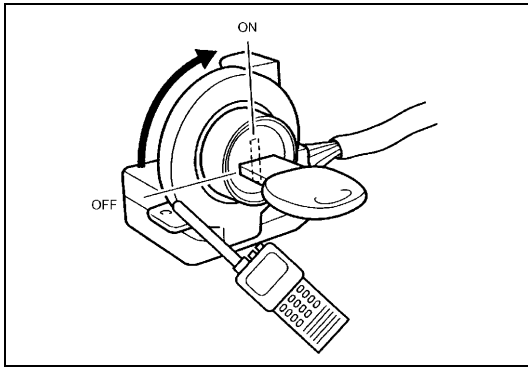
- Don't turn ON ignition switch with ignition key for immobilizer control system put together with another one or placed quite close to another one. Or the system may detect abnormal condition and prevent engine from starting.



- Do not turn ON ignition switch by using ignition key with any type of metal wound around its grip or in contact with it. Or the system may detect abnormal condition and prevent engine from starting.



- Do not leave ignition key where high temperature is anticipated. High temperature will cause transponder in ignition key to be abnormal or damaged.

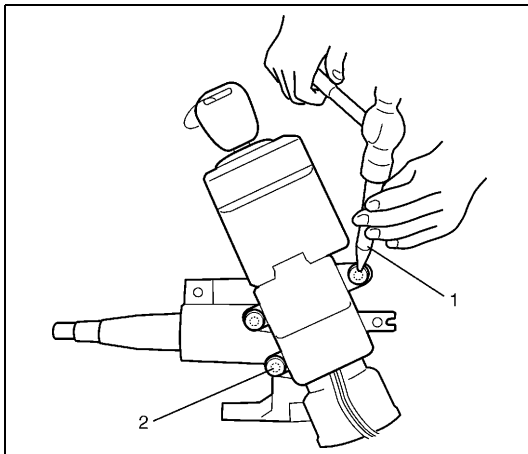


- Do not turn ON ignition switch with a radio antenna placed near Immobilizer Control Module. Or the system may detect abnormal condition and prevent engine from starting.

## Immobilizer Control Module

### REMOVAL

- 1) Disconnect negative (–) cable at battery.
- 2) Remove driver air bag (inflator) module from steering wheel. Refer to “DRIVER AIR BAG (INFLATOR) MODULE” in Section 3.
- 3) Remove steering wheel. Refer to “STEERING WHEEL” in Section 3.
- 4) Remove steering column upper cover, steering column lower cover, contact coil and combination switch assembly. Refer to “CONTACT COIL AND COMBINATION SWITCH ASSEMBLY” in Section 3.



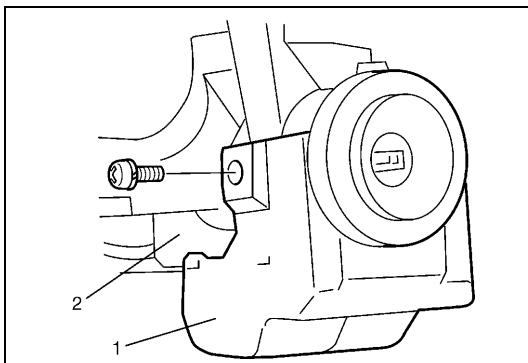
- 5) Remove immobilizer control module as follows.  
[Immobilizer control module with immobilizer control module cover]

- a) Using center punch (1), loosen and remove three mounting bolts (2) for immobilizer control module cover.

#### NOTE:

**Use care not to damage immobilizer control module and other parts with center punch.**

- b) Disconnect coupler at immobilizer control module.



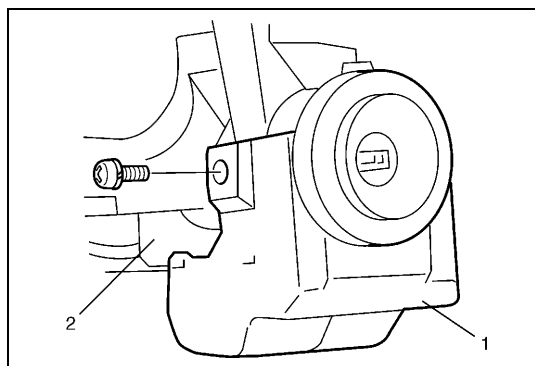
- c) Remove immobilizer control module (1) from steering lock assembly (2).

- [Immobilizer control module without immobilizer control module cover]

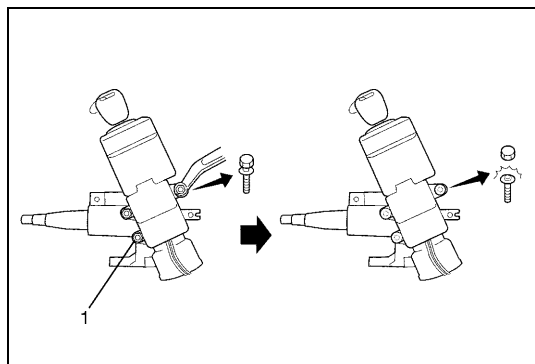
- a) Disconnect coupler at immobilizer control module.
- b) Remove immobilizer control module (1) from steering lock assembly (2).



## INSTALLATION



- 1) Install immobilizer control module (1) on steering lock assembly (2).
- 2) Connect coupler at immobilizer control module.



[Immobilizer control module with immobilizer control module cover]

- 3) To install immobilizer control module cover, tighten three new bolts (1) until head of each bolt is broken off to reinstall immobilizer control module cover on immobilizer control module.
- 4) Install combination switch assembly, contact coil, steering column lower cover, and steering column upper cover. Refer to "CONTACT COIL AND COMBINATION SWITCH ASSEMBLY" in Section 3.
- 5) Install steering wheel. Refer to "STEERING WHEEL" in Section 3.
- 6) Install driver air bag (inflator) module on steering wheel. Refer to "DRIVER AIR BAG (INFLATOR) MODULE" in Section 3.
- 7) Connect negative (–) cable at battery.

### NOTE:

After replacing Immobilizer Control Module, be sure to register Transponder code and ECM/Immobilizer Control Module (ECU) code in Immobilizer Control Module and ECM/Immobilizer Control Module (ECU) code in ECM by performing procedure described in "PROCEDURE AFTER IMMOBILIZER CONTROL MODULE REPLACEMENT" in this section.

## How to Register Ignition Key

Register the ignition key with a built-in transponder in Immobilizer Control Module by using the following procedure.

### CAUTION:

When registering the ignition key including a transponder into the immobilizer control module by using Suzuki scan tool, confirm that the knob color of the ignition key to be registered for the vehicle is black. The ignition key with wrong knob color cannot be registered.

- 1) Prepare SUZUKI scan tool and cartridge or program card for immobilizer control system.
- 2) With ignition switch OFF, connect SUZUKI scan tool to data link connector (DLC) (1) located on underside of instrument panel at driver's seat side.

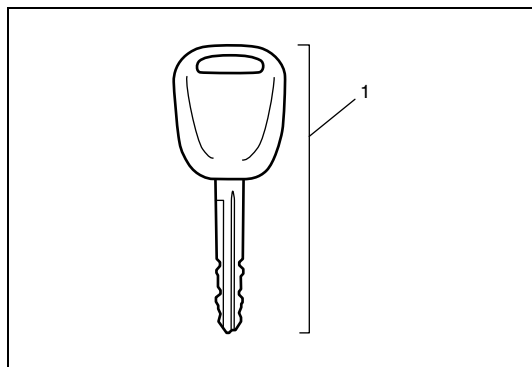
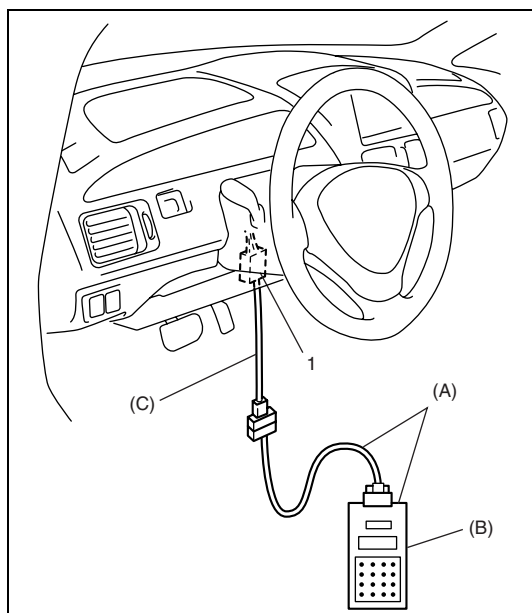
(A) : 09931-76011 (SUZUKI scan tool: Tech 1A)

(B) : Immobilizer cartridge

(C) : 09931-76030 (16/14 pin DLC cable)

### NOTE:

For operation procedure of SUZUKI scan tool, refer to SUZUKI scan tool operator's manual.



- 3) Prepare ignition key with a built-in transponder (1). And then turn ignition switch ON by using it.
- 4) Number of Transponder codes for ignition key with a built-in transponder that can be registered in Immobilizer Control Module is limited to 4. If needed, clear all Transponder codes for ignition key with a built-in transponder that have been registered in Immobilizer Control Module by executing the "CLR. TRANS COD (CLEAR TP CODE)" command in the SELECT MODE menu by using SUZUKI scan tool.

### NOTE:

When "CLR. TRANS COD (CLEAR TP CODE)" command is executed with the immobilizer indicator lamp or malfunction indicator lamp (if not equipped with immobilizer indicator lamp) ON, it remains ON even after execution of that command is over. It will start flashing when the ignition switch is turned OFF once and then turned ON after some seconds.

- 5) Using SUZUKI scan tool, register Transponder code in Immobilizer Control Module by executing “ENT. TRANS COD (ENT. TP CODE)” command in SELECT MODE menu.
- 6) Make sure that immobilizer indicator lamp or malfunction indicator lamp (if not equipped with immobilizer indicator lamp) lights when ignition switch is turned OFF once and then ON.
- 7) If any other Transponder code for ignition key with a built-in transponder needs to be registered, repeat above steps 3), 5) and 6).

**NOTE:**

- Up to 4 Transponder codes for ignition key with a built-in transponder can be registered.
- It is not possible to register the same Transponder code for ignition key with a built-in transponder as the one already registered in Immobilizer Control Module.

## Procedure after Immobilizer Control Module Replacement

When Immobilizer Control Module was replaced, including when replaced because rechecking by using a known-good Immobilizer Control Module was necessary during trouble diagnosis, register Transponder code and ECM/Immobilizer Control Module code in Immobilizer Control Module and ECM/Immobilizer Control Module code in ECM by performing following procedure.

**CAUTION:**

**When registering the ignition key including a transponder into the immobilizer control module by using Suzuki scan tool, confirm that the knob color of the ignition key to be registered for the vehicle is black. The ignition key with wrong knob color cannot be registered.**

- 1) Perform steps 1) and 2) described in “How To Register Ignition Key”.
- 2) Prepare ignition key with a built-in transponder. And then turn ignition switch ON by using it.
- 3) Using SUZUKI scan tool, clear all transponder codes registered in Immobilizer Control Module by executing “CLR. TRANS COD (CLEAR TP CODE)” command in SELECT MODE menu.

**NOTE:**

**When “CLR. TRANS COD (CLEAR TP CODE)” command is executed with the immobilizer indicator lamp or malfunction indicator lamp (if not equipped with immobilizer indicator lamp) ON, it remains ON even after execution of that command is over. It will start flashing when the ignition switch is turned OFF once and then turned ON after some seconds.**

- 4) Using SUZUKI scan tool, register Transponder code in Immobilizer Control Module by executing “ENT. TRANS COD (ENT. TP CODE)” command in SELECT MODE menu.
- 5) Using SUZUKI scan tool, register ECM/Immobilizer Control Module code in both Immobilizer Control Module and ECM by executing “RECORD ECU (RECORD ECM/PCM/ICM)” command in SELECT MODE menu.
- 6) Make sure that immobilizer indicator lamp or malfunction indicator lamp (if not equipped with immobilizer indicator lamp) lights when ignition switch is turned OFF once and then ON.
- 7) If any other Transponder code for ignition key with a built-in transponder needs to be registered, repeat above steps 2), 4) and 6).

**NOTE:**

- Up to 4 Transponder codes for ignition key with a built-in transponder can be registered.
- It is not possible to register the same Transponder code for ignition key with a built-in transponder as the one already registered in Immobilizer Control Module.

## Procedure after ECM Replacement

When ECM was replaced, including when replaced because rechecking by using a known-good ECM was necessary during trouble diagnosis, register ECM/Immobilizer Control Module code in ECM by performing following procedure.

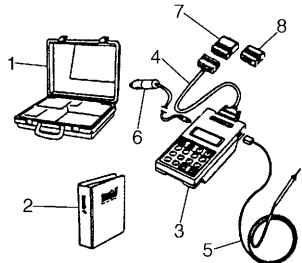
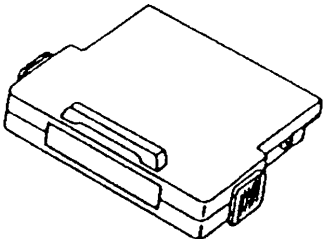
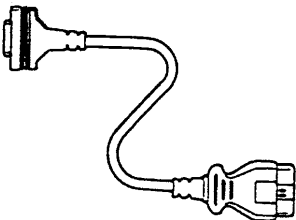
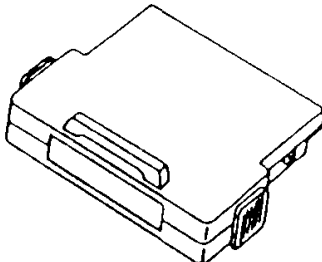
- 1) Perform steps 1) and 2) described in “How To Register Ignition Key”. And then turn ignition switch ON.
- 2) Using SUZUKI scan tool, register ECM/Immobilizer Control Module code in ECM by executing “RECORD ECU (RECORD ECM/ICM)” command in SELECT MODE menu.

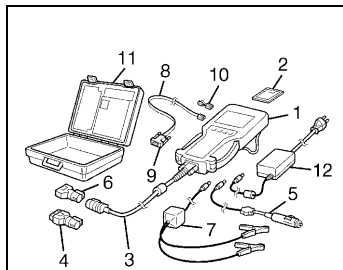
**NOTE:**

For operation procedure of SUZUKI scan tool, refer to SUZUKI scan tool operator’s manual.

- 3) Make sure that immobilizer indicator lamp or malfunction indicator lamp (if not equipped with immobilizer indicator lamp) lights when ignition switch is turned OFF once and then ON.

## Special Tool

 <p>09931-76011 Tech 1A kit (SUZUKI scan tool) See NOTE “A” below.</p>	 <p>Immobilizer cartridge of version 1.1 or more for Tech 1A</p>	 <p>09931-76030 16/14 pin DLC cable</p>	 <p>Mass storage cartridge of version 1.7 or more for Tech 1A</p>
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Tech 2 kit (SUZUKI scan tool)

See NOTE "B" below.

**NOTE:**

- **"A" :** This kit includes the following items and substitutes for the Tech 2 kit.
  1. Storage case, 2. Operator's manual, 3. Tech 1A, 4. DLC cable, 5. Test lead/probe, 6. Power source cable, 7. DLC cable adaptor, 8. Self-test adaptor
- **"B" :** This kit includes the following items and substitutes for the Tech 1 kit.
  1. Tech 2, 2. PCMCIA card, 3. DLC cable, 4. SAE16/19 adapter, 5 Cigarette cable, 6. DLC loopback adapter, 7. Battery power cable, 8. RS232 cable, 9. RS232 adapter, 10. RS232 loopback connector, 11. Storage case, 12. Power supply

## SECTION 9

# BODY SERVICE

**WARNING:**

For vehicles equipped with Supplemental Restraint (Air Bag) System:

- Service on and around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Refer to “Air Bag System Components and Wiring Location View” under “General Description” in air bag system section in order to confirm whether you are performing service on or near the air bag system components or wiring. Please observe all WARNINGS and “Service Precautions” under “On-Vehicle Service” in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.
- Technical service work must be started at least 90 seconds after the ignition switch is turned to the “LOCK” position and the negative cable is disconnected from the battery. Otherwise, the system may be activated by reserve energy in the Sensing and Diagnostic Module (SDM).
- When body servicing, if shock may be applied to air bag system component parts, remove those parts beforehand. (Refer to Section 10B.)

**NOTE:**

- Fasteners are important attaching parts in that they could affect the performance of vital components and systems, and / or could result in major repair expense. They must be replaced with one of the same part number or with an equivalent part if replacement becomes necessary.
- Do not use a replacement part of lesser quality or substitute a design. Torque values must be used as specified during reassembly to assure proper retention of these parts.

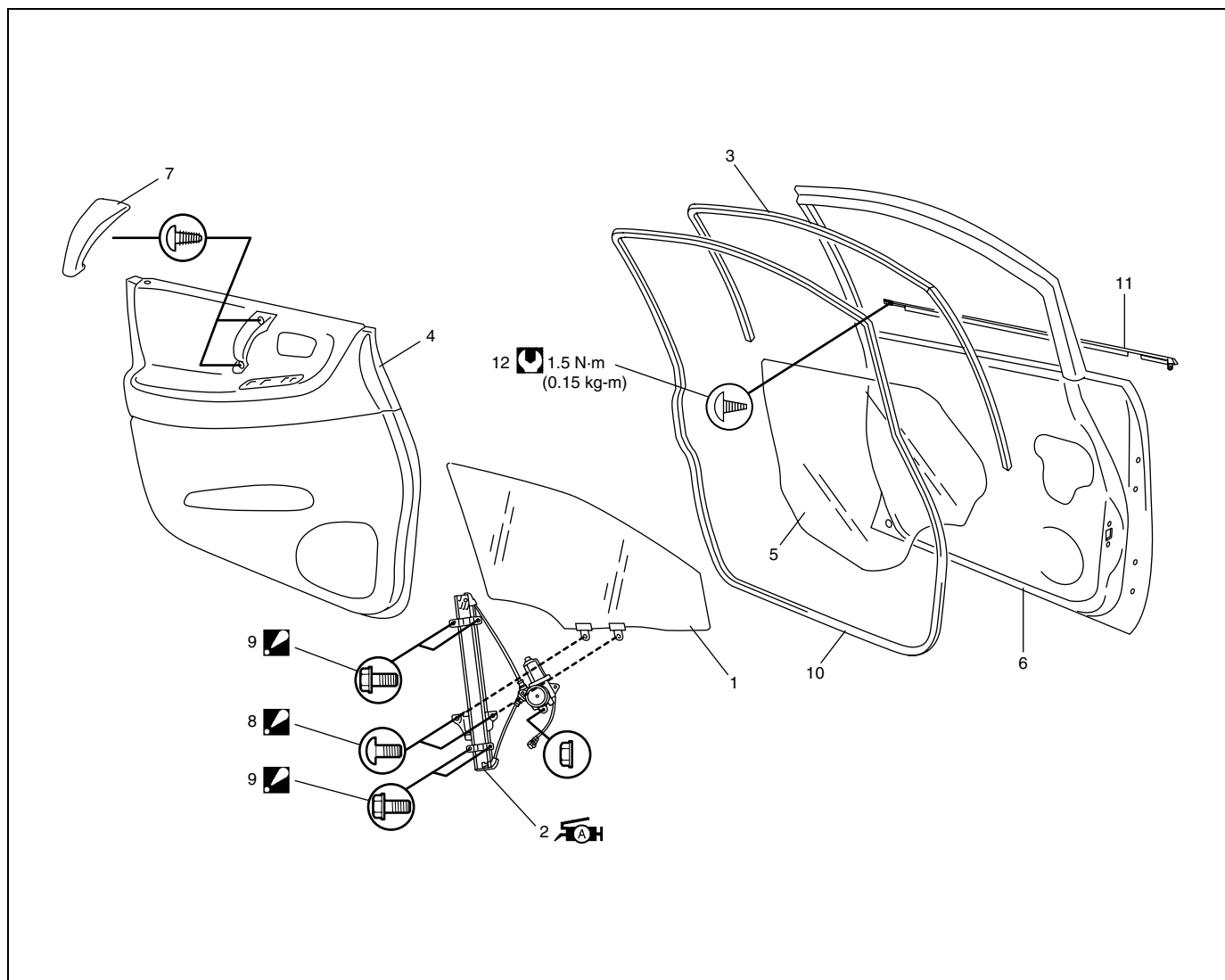
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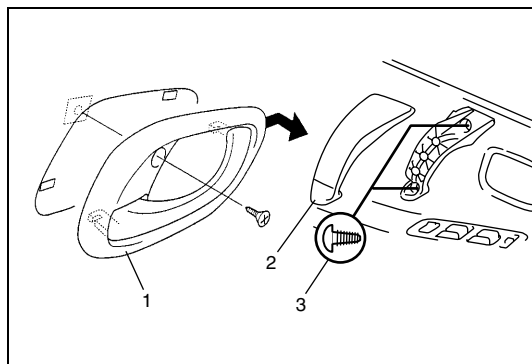
# Glass, Windows and Mirrors

## Front Door Glass



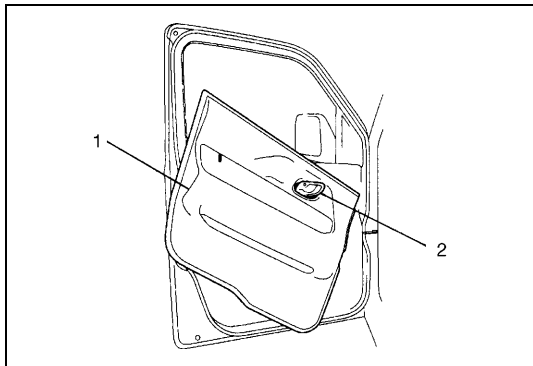
1. Door glass	6. Door panel	11. Front door outer weather-strip
2. Window regulator assembly : Apply lithium grease 99000-25010 to sliding part.	7. Front door grip cover	12. Front door outer weather-strip mounting screw
3. Glass run	8. Door glass mounting screw : Tighten rear screw first, and then tighten front screw.	Tightening torque
4. Door trim	9. Window regulator mounting bolt : Tighten proper procedure referring to "FRONT DOOR WINDOW REGULATOR".	
5. Door sealing cover	10. Door opening weather-strip	

## REMOVAL



- 1) Remove inside handle bezel (1).
- 2) Remove inside door grip cover (2), and then remove door trim mounting bolts (3).

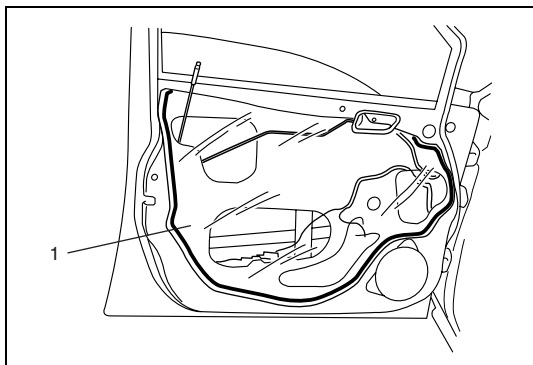




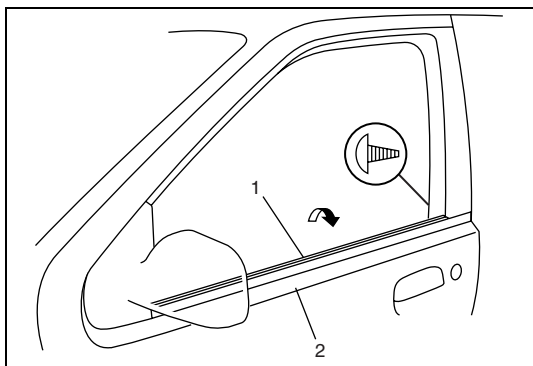
3) Remove door trim (1).

With inside handle bezel (2) tilted as shown in figure, turn door trim (1) 90° clockwise to remove it.

And disconnect power window switch lead wire at coupler.



4) Remove door sealing cover (1).

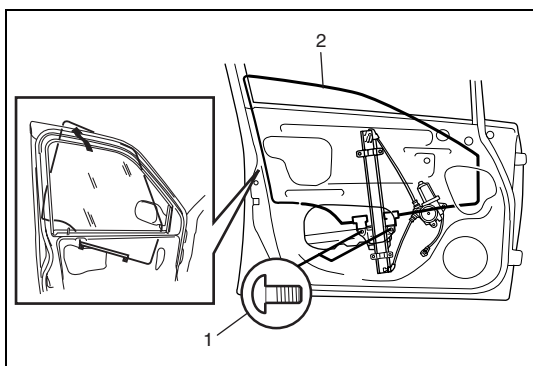


5) Remove outer weather-strip (1).

Lower window all the way down. Then, use a tape-wrapped putty knife to pry off outer weather-strip.

**NOTE:**

**When removed outer weather-strip (1) from door panel (2), be careful not to deformation for outer weather-strip (1).**



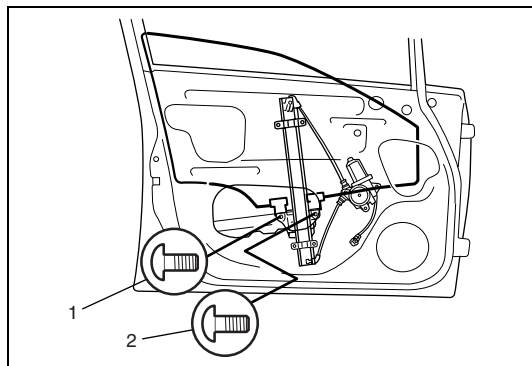
6) Remove door glass mounting screws (1).

7) When removing door glass (2) by turning door glass 90° clockwise to remove it.

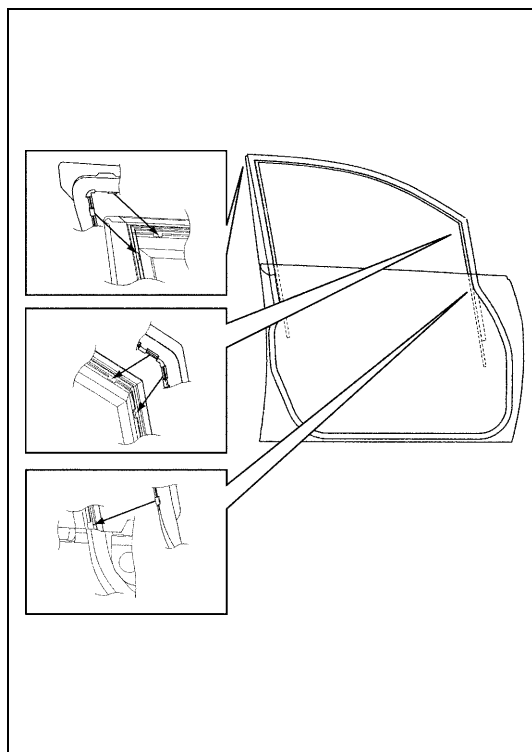
## INSTALLATION

Reverse removal procedure to install door glass noting the following instructions.

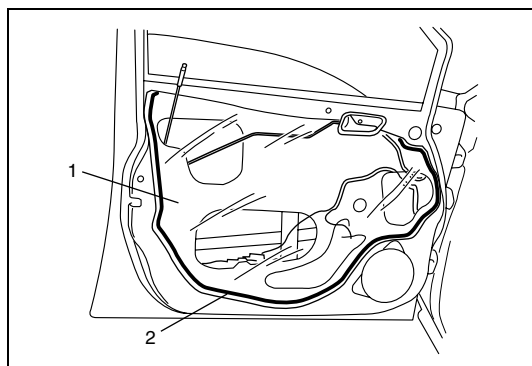
- If there is deformity for glass run, replace new one.



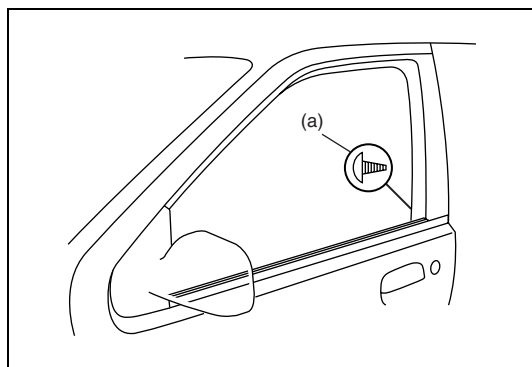
- Tighten door glass rear mounting screw (1) first, and then tighten door glass front mounting screw (2).



- Set weather-strip convex part to door panel notch part securely.



- Secure door sealing cover (1) with adhesive (2).



- Tighten front door outer weather strip mounting screw as specified torque.

#### **Tightening torque**

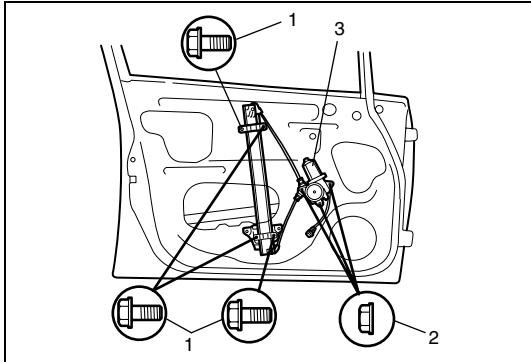
**Front door outer weather-strip mounting screw**

**(a): 1.5 N·m (0.15 kg-m, 1.0 lb-ft)**

## Front Door Window Regulator

### REMOVAL

- 1) Remove door glass referring to "FRONT DOOR GLASS" in this section.
- 2) Disconnect power window motor lead wire at coupler and loosen clamp.
- 3) Loosen regulator mounting bolts (1) and nuts (2), and then remove front door window regulator (3).



### INSPECTION

Check the following parts :

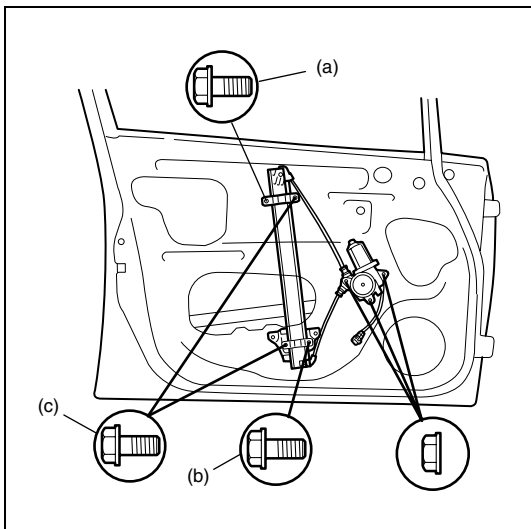
- Check regulator sliding and rotating parts for greasing.
- Check rollers for wear and damage.
- Check wire for damage.

### INSTALLATION

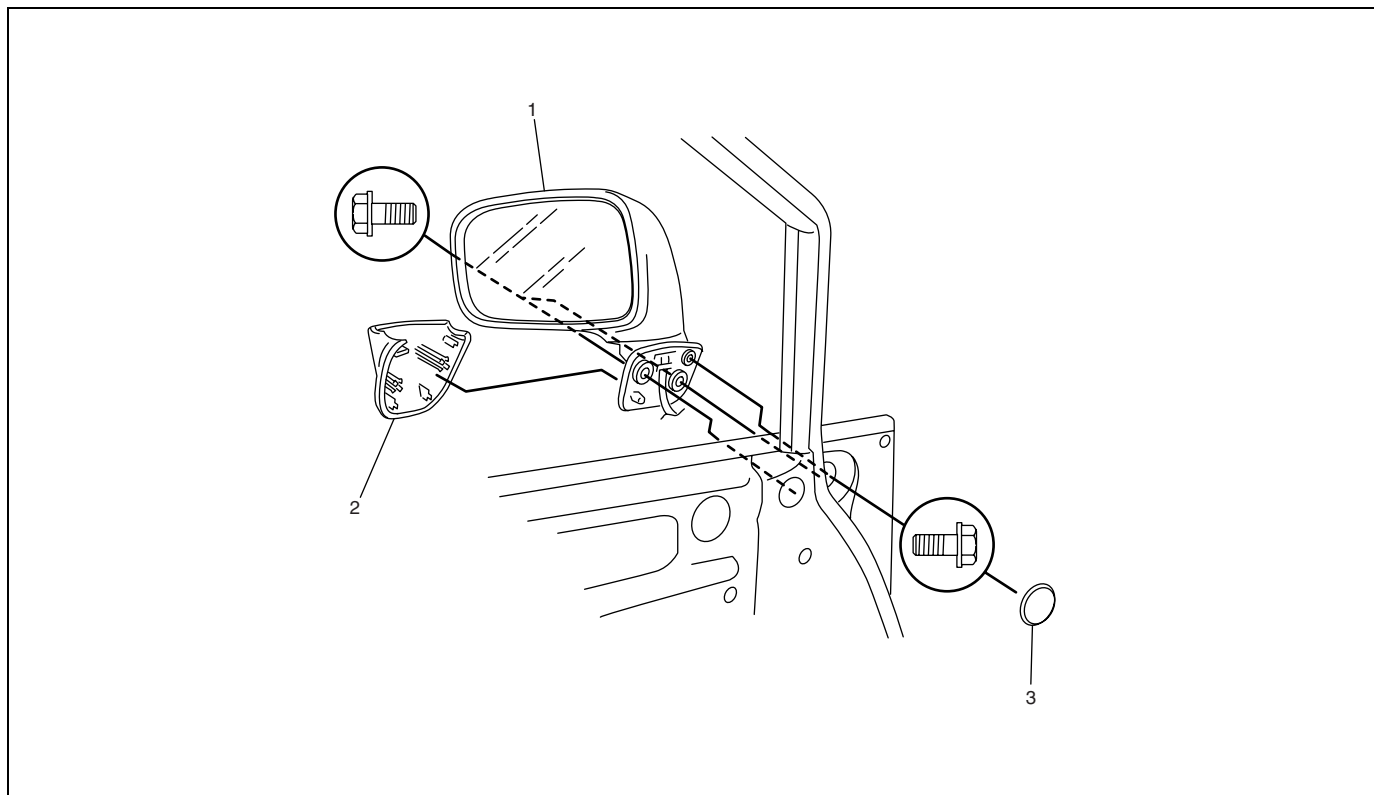
Reverse removal procedure to install window regulator noting the following instruction.

- Tighten front door window regulator attaching bolts to proper tightening order.

**Front door window regulator bolts tightening order: (a) → (b) → (c).**



## Door Mirror

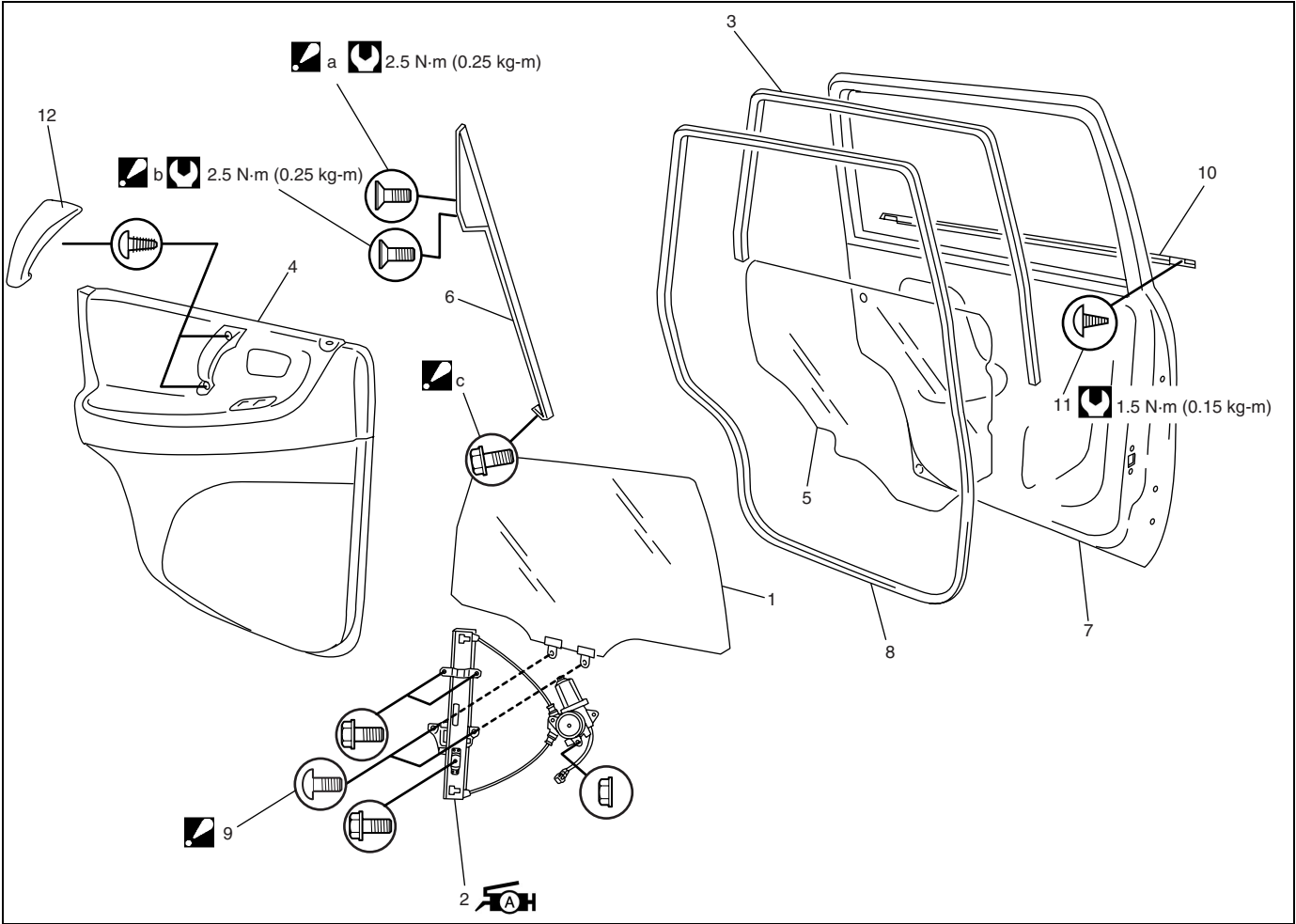







1. Door mirror assembly
2. Door mirror cover
3. Cover

### REMOVAL AND INSTALLATION

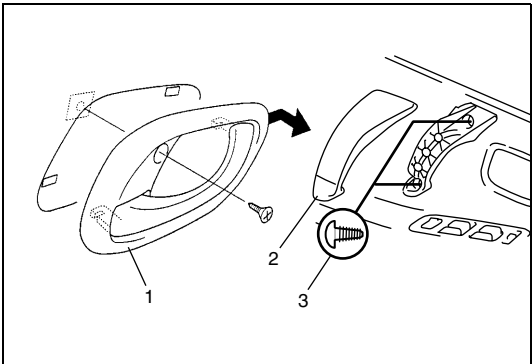
When removing or installing door mirror, refer to above figure.

Rear Door Glass



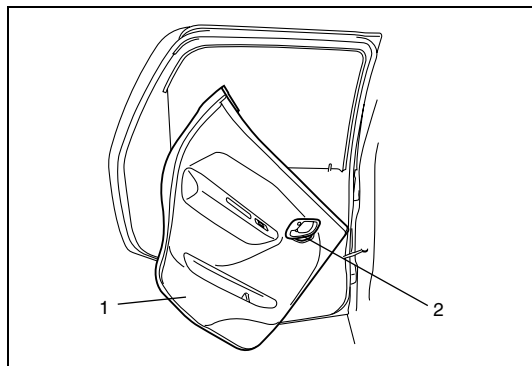
1. Door glass	6. Door sash	11. Rear door outer weather-strip mounting screw.
 2. Window regulator assembly : Apply lithium grease 99000-25010 to sliding part.	7. Door panel	12. Door grip cover
3. Glass run	8. Rear door opening weather-strip	 a, b: Sash upper mounting screw : Tightening order: c Æ b Æ a
4. Door trim	 9. Door glass mounting screw : Tighten rear screw first, and then tighten front screw.	 c: Sash lower mounting bolt : Tightening order: c Æ b Æ a
5. Door sealing cover	10. Rear door outer weather-strip	 Tightening torque

REMOVAL

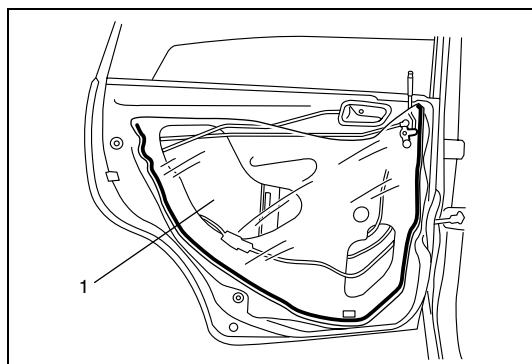


- 1) Remove inside handle bezel (1).
- 2) Remove inside door grip cover (2), and then remove door trim mounting bolts (3).

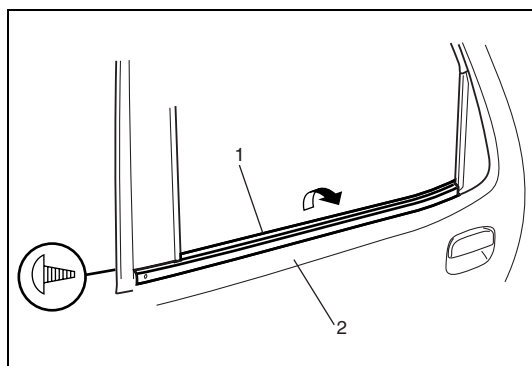
- 3) Remove door trim mounting clip.



- 4) Remove door trim (1).  
 With inside handle bezel (2) tilted as shown in figure by turning door trim 90° clockwise to remove it.  
 And disconnect power window switch lead wire at coupler.



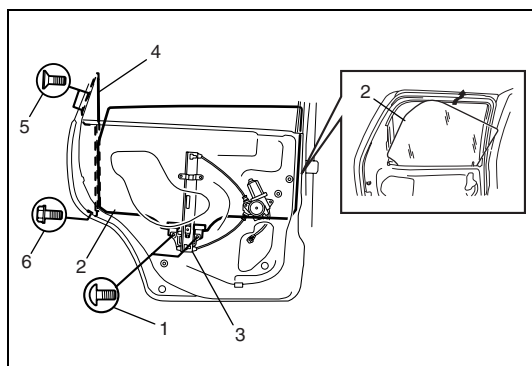
- 5) Remove door sealing cover (1).



- 6) Remove outer weather-strip (1).

**NOTE:**

**When removed outer weather-strip (1) from door panel (2), be careful not to deformation for outer weather-strip (1).**

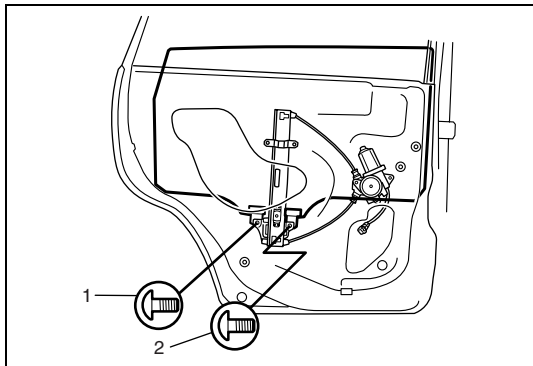


- 7) Loosen door glass mounting screws (1), and then drop door glass (2) from window regulator (3).  
 8) Detach rear part of glass run from sash (4), and remove sash by removing 2 screws (5) and bolt (6).  
 9) Removing door glass (2) by turning door glass 90° clockwise to remove it.

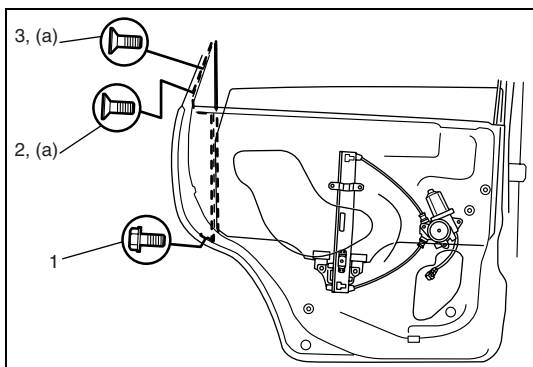
**INSTALLATION**

Reverse removal procedure to install door glass noting the following instructions.

- If there is deformity for glass run, replace new one.



- Tighten door glass rear mounting screw (1) first, and then tighten door glass front mounting screw (2).



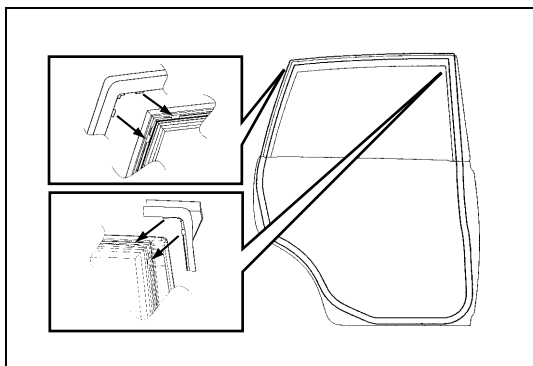
- Tighten rear door rear sash lower mounting bolts (1), and tighten rear door rear sash upper mounting screws (2,3) as specified torque.

Tightening order: (1) → (2) → (3)

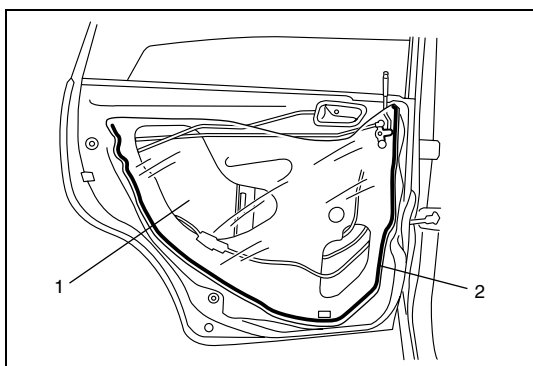
#### Tightening torque

**Rear door rear sash upper mounting screw**

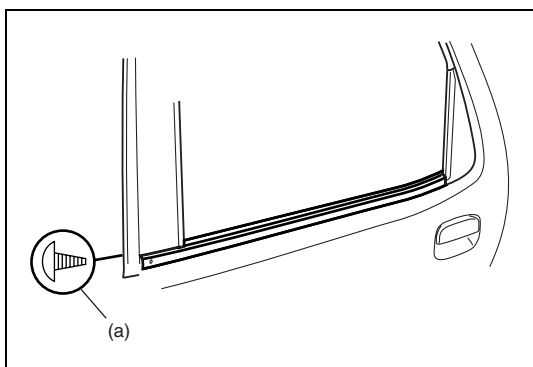
**(a): 2.5 N·m (0.25 kg·m, 1.8 lb·ft)**



- Set weather-strip convex part to door panel notch part securely.



- Secure door sealing cover (1) with adhesive (2).



- Tighten rear door outer weather-strip mounting screw to specified torque.

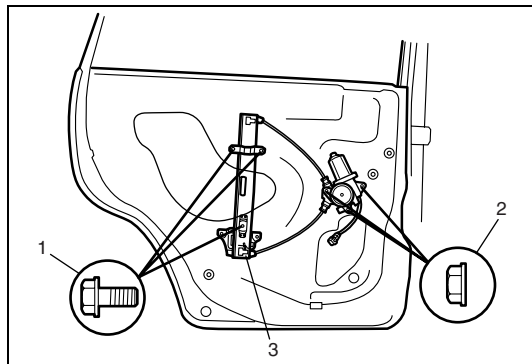
#### Tightening torque

**Rear door outer weather-strip mounting screw**

**(a): 1.5 N·m (0.15 kg·m, 1.0 lb·ft)**

## Rear Door Window Regulator

### REMOVAL



- 1) Remove door glass (3) referring to “REAR DOOR GLASS” in this section.
- 2) Loosen regulator mounting bolts (1) and nuts (2), and then remove rear window regulator (3).

### INSPECTION

Check the following point :

- Check regulator sliding and rotating parts for greasing.
- Check rollers for wear and damage.
- Check wire for damage.

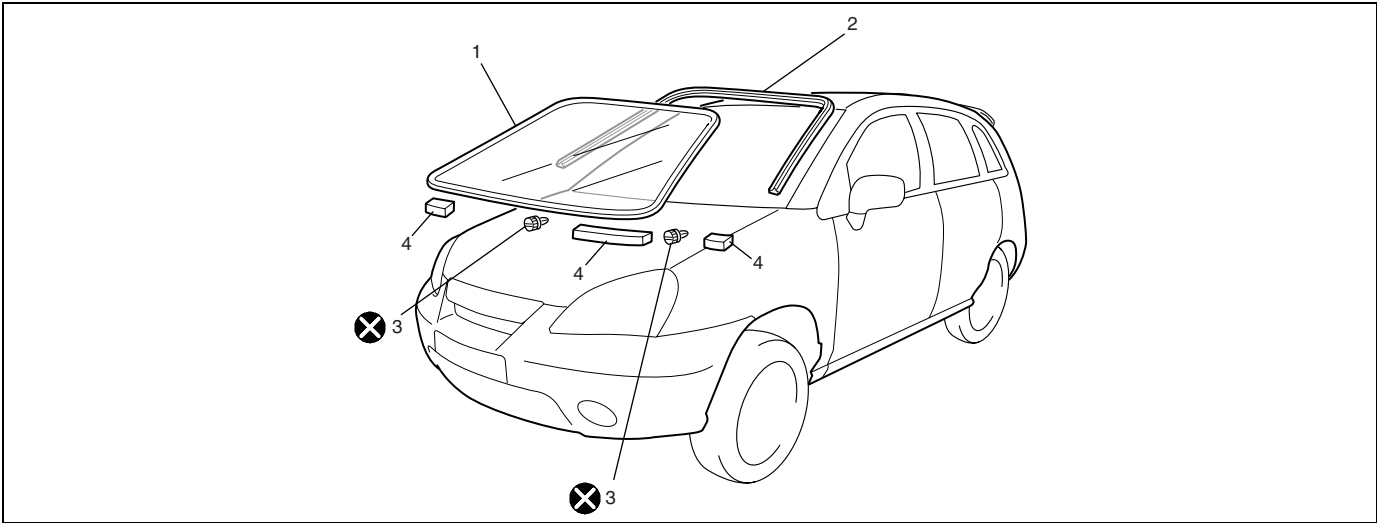
### INSTALLATION


Reverse removal procedure to install window regulator.



# Windshield

The front windshield is installed by using a special type of adhesive (that is, one component urethane adhesive used with primer). For the Windshield replacement, it is important to use an adhesive which provides sufficient adhesion strength and follow the proper procedure.



1. Windshield glass	3. Windshield glass stopper	 Do not reuse.
2. Windshield molding	4. Spacer	

## CAUTION:

- Described in this section is the glass replacement by using 3 types of primers and 1 type of adhesive made by YOKOHAMA (one component urethane adhesive to be used with primer in combination). When using primer and adhesive made by other manufacturers, be sure to refer to handling instructions supplied with them. Negligence in following such procedure or misuse of the adhesive in any way hinders its inherent adhesive property. Therefore, before the work, make sure to read carefully the instruction and description given by the maker of the adhesive to be used and be sure to follow the procedure and observe each precaution throughout the work.
- Should coated surface be scratched or otherwise damaged, be sure to repair damaged part, or corrosion may start from there.

Use an adhesive of above mentioned type which has the following property.

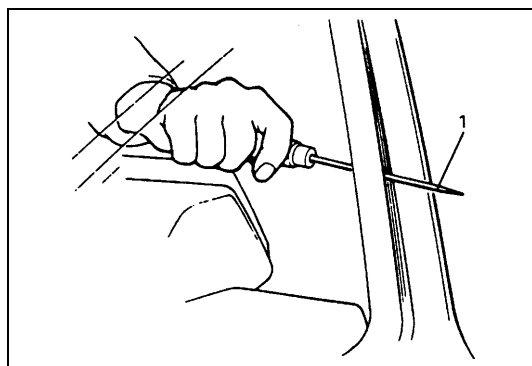
**Glass adhesive shearing strength**  
**: 40 kg / cm<sup>2</sup> (569 lb / in<sup>2</sup>) or more**

Adhesive materials and tools required for removal and installation.

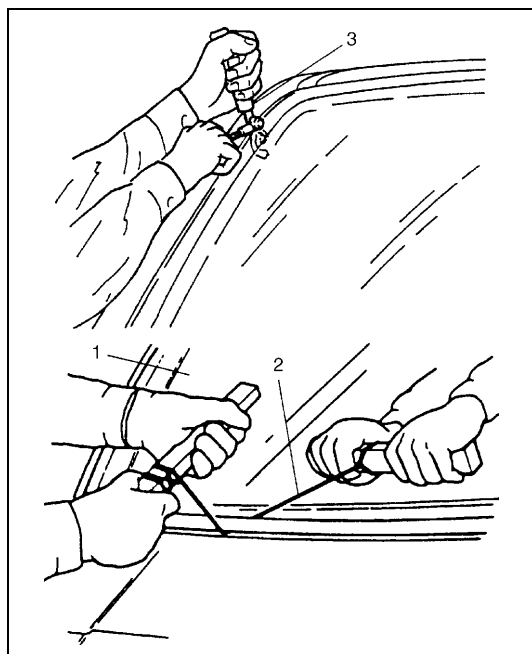
- One component urethane adhesive and primers used in combination (For one sheet of windshield).
  - Adhesive (470 g (15.7 oz.))
  - Primer for glass (30 g (1.0 oz.))
  - Primer for body (30 g (1.0 oz.))
  - Primer for molding (30 g (1.0 oz.))
- Eyeleteer
- Piano string
- Windshield knife
- Brush for primer application (2 pcs)
- Knife
- Rubber sucker grip
- Sealant gun (for filling adhesive)
- Putty spatula (for correcting adhered parts)

## REMOVAL

- 1) Clean both inside and outside of glass and around it.
- 2) Remove wiper arms and garnish.
- 3) Using tape, cover body surface around glass to prevent any damage.
- 4) Remove rear view mirror, sun visor and front pillar trims (right & left).
- 5) If necessary, remove instrument panel. Refer to "INSTRUMENT PANEL" in this section.
- 6) If necessary, remove head lining. Refer to "HEAD LINING" in this section.
- 7) Remove (or cut) windshield molding.



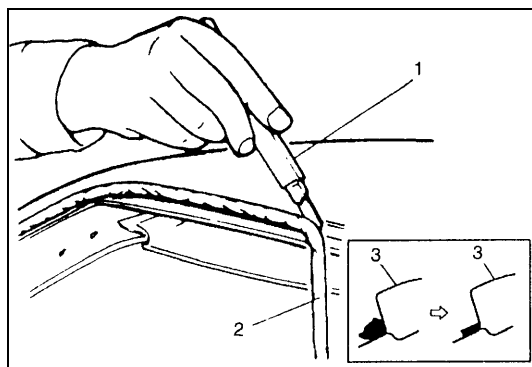
- 8) Drill hole with eyeleteer (1) through adhesive and let piano string through it.



- 9) Cut adhesive all around windshield (1) with piano string (2). When using tool, windshield knife (3), to cut adhesive, be careful not to cause damage to windshield. Use wire to cut adhesive along lower part of windshield.

### NOTE:

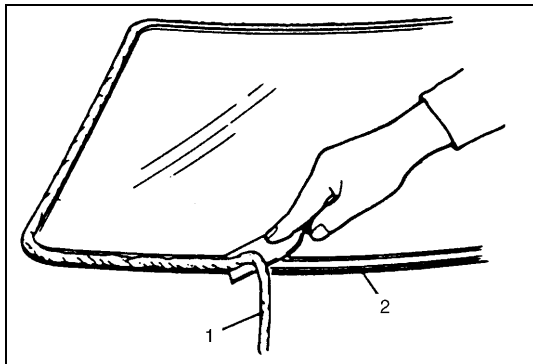
Use piano string (2) as close to glass as possible so as to prevent damage to body and instrument panel.



- 10) Using knife (1), smoothen adhesive (2) remaining on body side (3) so that it is 1 – 2 mm (0.039 – 0.078 in.) thick all around.

### NOTE:

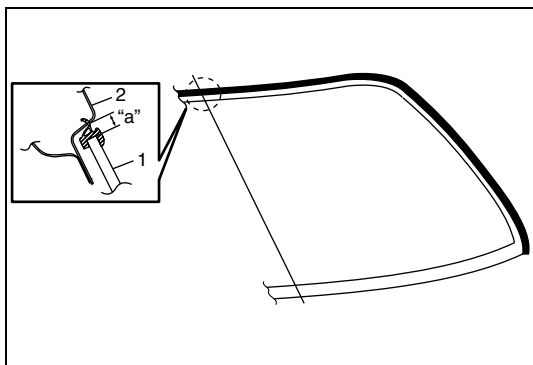
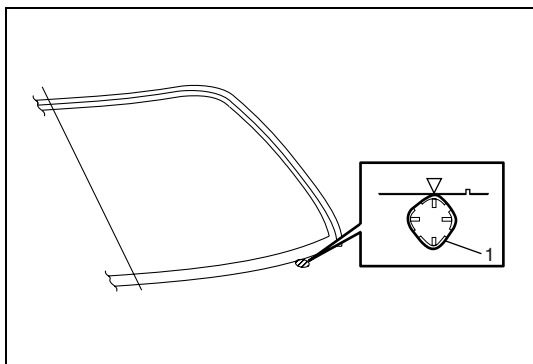
Before using knife (1), clean it with alcohol or the like to remove oil from it.



- 11) When reusing windshield, remove the adhesive (1) from it, using care not to damage primer coated surface (2).

## INSTALLATION

- 1) Using cleaning solvent, clean windshield edge where windshield glass is to be adhered. (Let it dry for more than 10 minutes.)
- 2) Install new glass stoppers (1) (2 pieces) to lower side of windshield.



- 3) To determine installing position of glass (1) to body (2), position glass against body so that clearance between upper end of glass (1) and body (2) is approximately 5 mm (0.197 in.) and clearances between each side end (right & left) of glass (1) and body (2) are even. Then mark mating marks on glass (1) and body (2) as shown. Upper clearance can be adjusted by moving glass stoppers position.

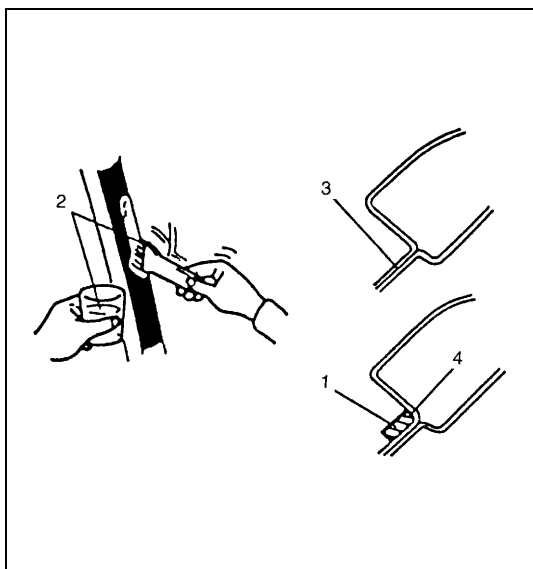
### Windshield clearance

“a” : approx. 5 mm (0.197 in.)

- 4) Clean contact surfaces of old adhesive (4), paint or bare metal thoroughly.  
If surfaces of paint or bare metal come out, apply primer (2) for body with caution not to apply primer (2) to surface of adhesive remaining on body.

### NOTE:

- Be sure to refer to primer maker's instruction for proper handling and drying time.
- Do not touch body and old adhesive surfaces where glass is to be adhered.

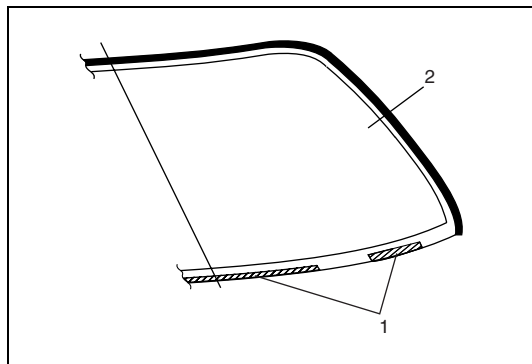


- |                        |
|------------------------|
| 1. Do not apply primer |
| 3. Apply primer        |

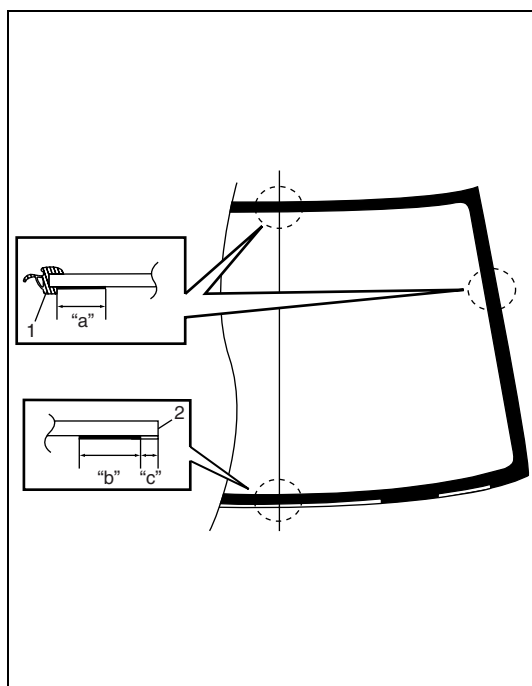
- 5) Install new molding to glass.
- 6) Clean glass surface to be adhered to body with clean cloth. If cleaning solvent is used, let it dry for more than 10 minutes.

**Cleaning Area for windshield (distance from the edge of glass or molding)**

**: 30 – 50 mm (1.18 – 1.97 in.)**



- 7) Install new spacers (1) to windshield (2).



- 8) Using new brush, apply sufficient amount of primer for glass along glass surface to be adhered to body.

**NOTE:**

- Be sure to refer to maker's instruction for proper handling and drying time.
- Do not apply primer on outside of ceramic coated surface.
- Do not touch primer coated surface.

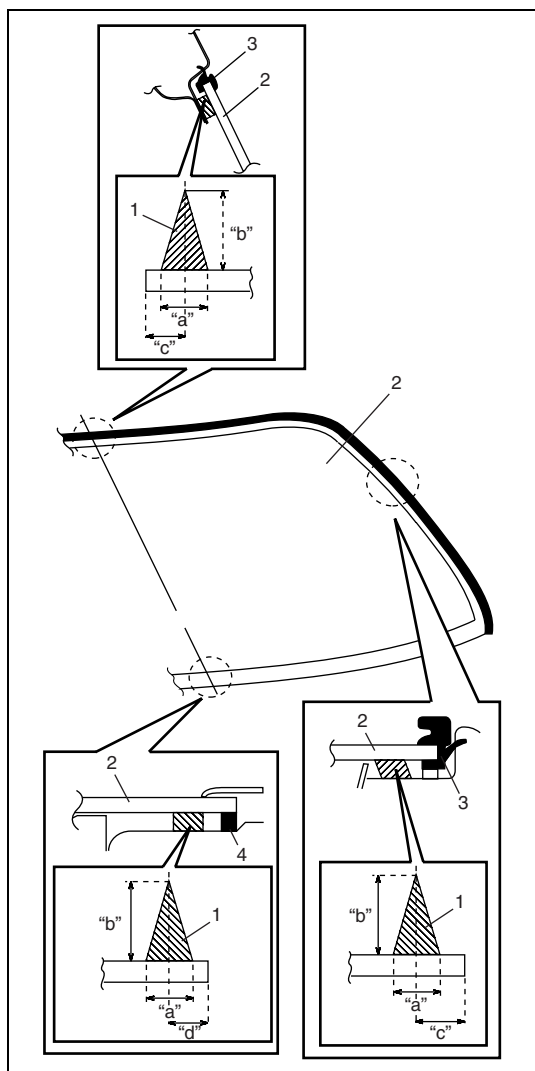
**Width applied primer for windshield**

**"a" : 15 mm (0.59 in.)**

**"b" : 22 mm (0.87 in.)**

**"c" : 6 mm (0.24 in.)**

1. Molding
2. Spacer



- 9) Apply primer for molding along molding surface all around.
- 10) Apply adhesive (1) referring to figure.

**NOTE:**

- Press glass (2) against fittings surface of body panel quickly after adhesive (1) is applied.
- Use of rubber sucker grip is helpful to hold and carry glass after adhesive (1) is applied.
- Perform steps 8) to 9) within 10 min. to ensure sufficient adhesion.
- Be sure to refer to adhesive maker's instruction for proper handling and drying time.
- Start from bottom side of glass (2).
- Be careful not to damage primer.

**Adhesive amount specifications and position for windshield**

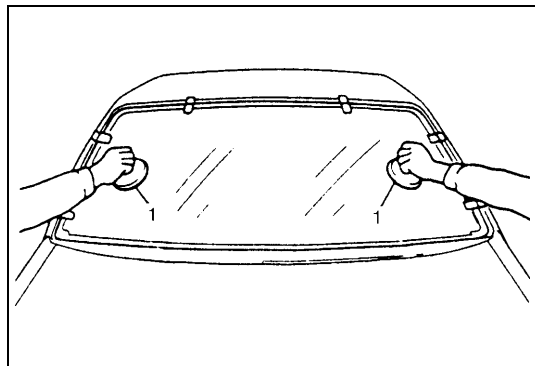
Width "a" : Approx. 7 mm (0.27 in.)

Height "b" : Approx. 15 mm (0.59 in.)

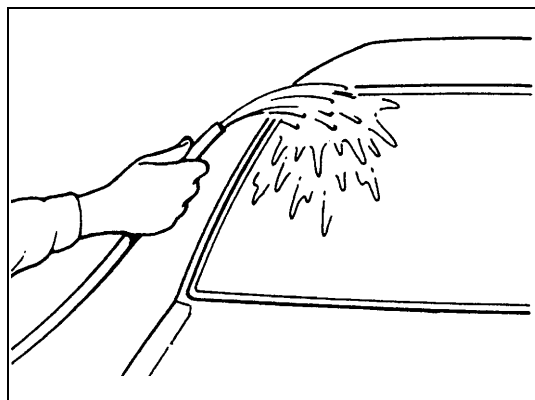
Position "c" : Approx. 10 mm (0.39 in.) for front, rear and upper sections

Position "d" : Approx. 17 mm (0.67 in.) for bottom section.

3. Molding
4. Windshield glass spacer



- 11) Holding rubber sucker grips (1), place glass onto body by aligning mating marks marked in step 3) and press it.



- 12) Check for water leakage by pouring water over windshield through hose. If leakage is found, dry windshield and fill leaky point with adhesive. If water still leaks even after that, remove glass and start installation procedure all over again.

**NOTE:**

- Do not use high pressure water.
- Do not blow compressed air directly at adhesive applied part when drying.
- Do not use infrared lamp or like for drying.

**CAUTION:**

Upon completion of installation, note the following.

- Sudden closing of door before adhesive is completely set may cause glass to become loose or to come off. Therefore, if door is opened or closed before adhesive is completely set, make sure to open all door glasses and use proper care.
- If molding is not securely in place, hold it down with a tape until adhesive is completely set.
- Each adhesive has its own setting time.
- Be sure to refer to its maker's instruction, check setting time of adhesive to be used and observe precautions to be taken before adhesive is set.
- Refrain from driving till adhesive is completely set so as to ensure proper and sufficient adhesion.

## Front Pillar Window

### REMOVAL AND INSTALLATION

Refer to "WINDSHIELD" in this section as removal and installation procedures are basically the same. However, note the following.

- Observe the following precautions when applying adhesive (1) along glass (2) edge.
- Adhesive (1) should be applied evenly especially in height.
- Be careful not to damage primer (3).
- Press glass against body quickly after adhesive (1) is applied.

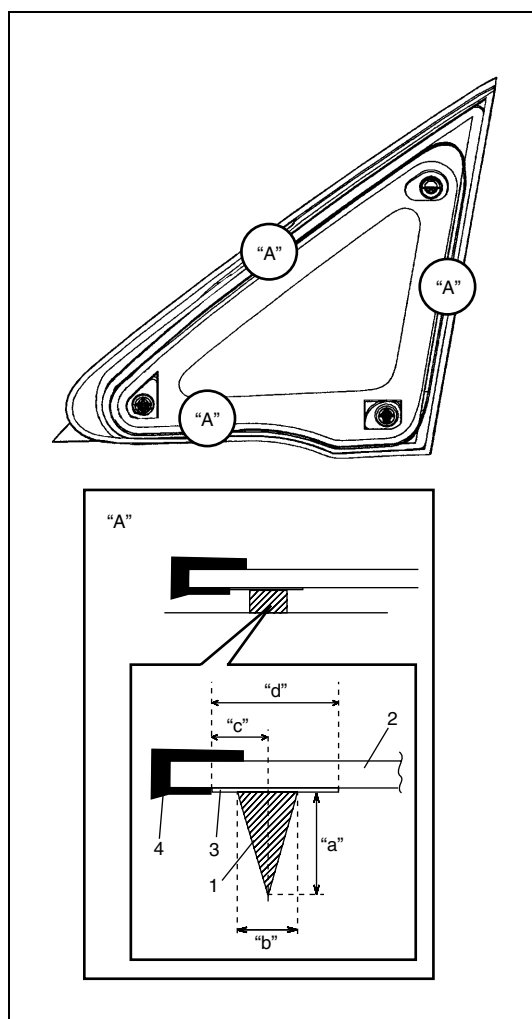
**Adhesive amount specification and position for front pillar window**

**Height "a" : 10 mm (0.39 in.)**

**Width "b" : 6 mm (0.24 in.)**

**Position "c" : 4.5 mm (0.18 in.)**

**Width "d" : 12 mm (0.47 in.)**



4. Molding

## Quarter Window

### REMOVAL AND INSTALLATION

Refer to "WINDSHIELD" in this section as removal and installation procedures are basically the same. However, note the following.

- Observe the following precautions when applying adhesive (1) along glass (2) edge.
- Adhesive (1) should be applied evenly especially in height.
- Be careful not to damage primer (3).
- Press glass against body quickly after adhesive (1) is applied.

#### Adhesive amount specification and position for quarter window

Height "a" : 16 mm (0.63 in.)

Width "b" : 9 mm (0.35 in.)

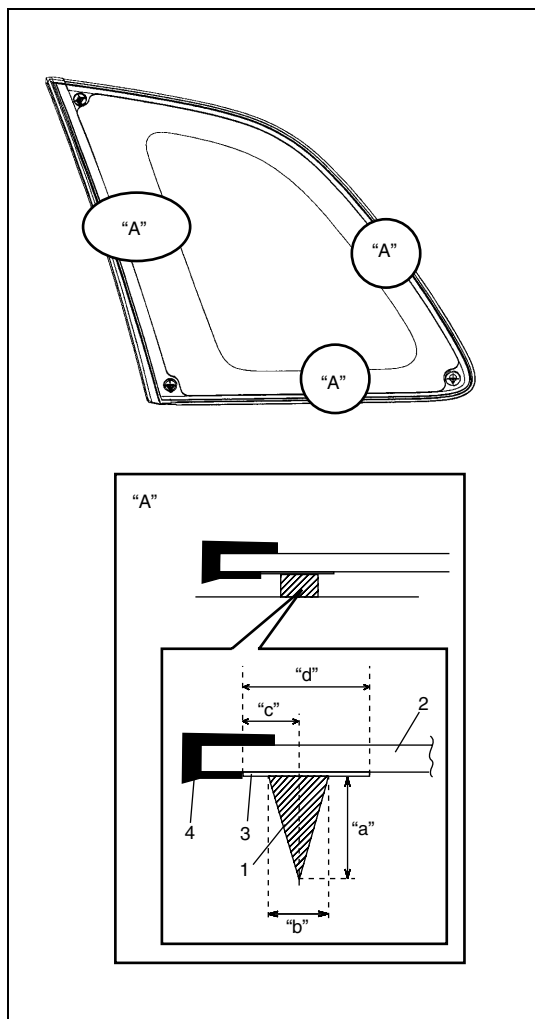
Position "c" : 8 mm (0.31 in.) for glass front section.

Position "c" : 10 mm (0.39 in.) for glass rear sections

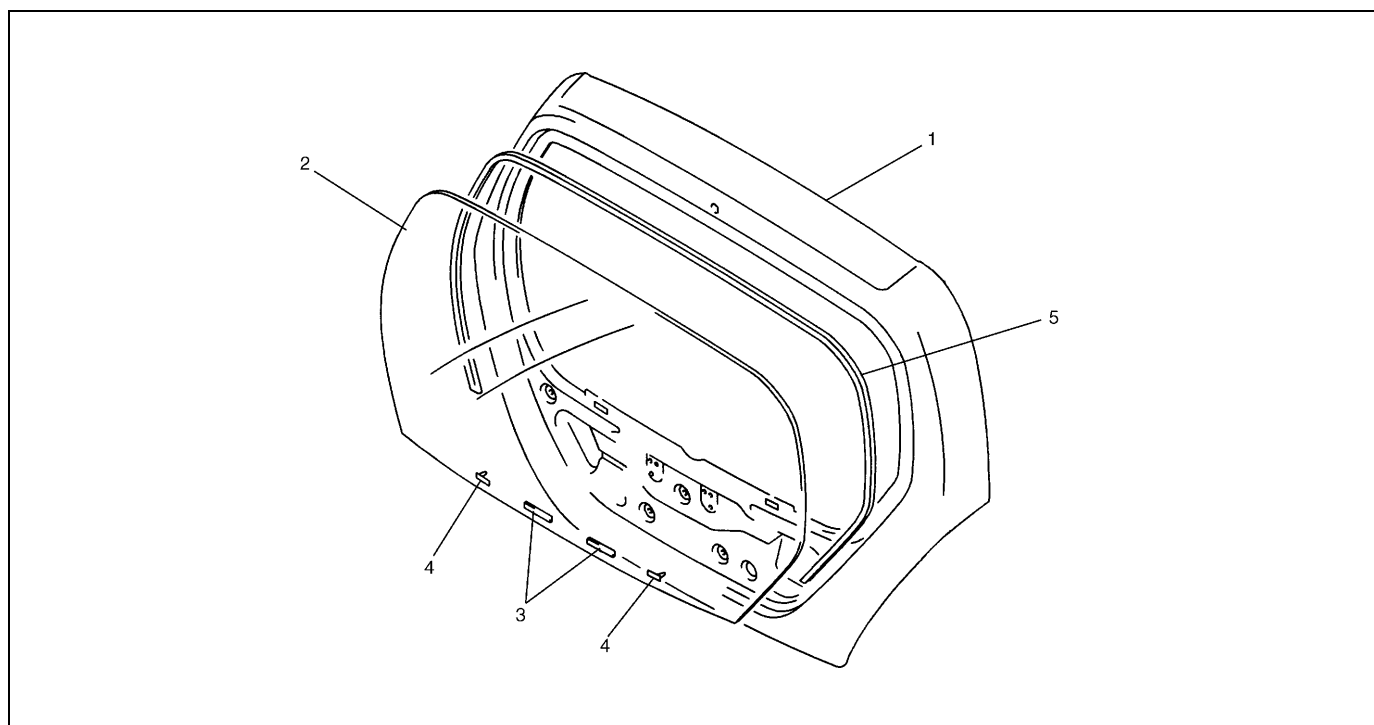
Position "c" : 12 mm (0.47 in.) for glass bottom section

Width "d" : 15 mm (0.59 in.)

4. Molding



## Back Door Glass



1. Back door panel

2. Back door glass

3. Spacer

4. Male

5. Back door glass trim

### REMOVAL AND INSTALLATION

Refer to "WINDSHIELD" in this section as removal and installation procedures are basically the same. However, note the following.

- Observe the following precautions when applying adhesive (1) along glass (2) edge.
- Adhesive (1) should be applied evenly especially in height.
- Be careful not to damage primer (3).
- Press glass against body quickly after adhesive (1) is applied.

#### Adhesive amount specifications and position for back door glass

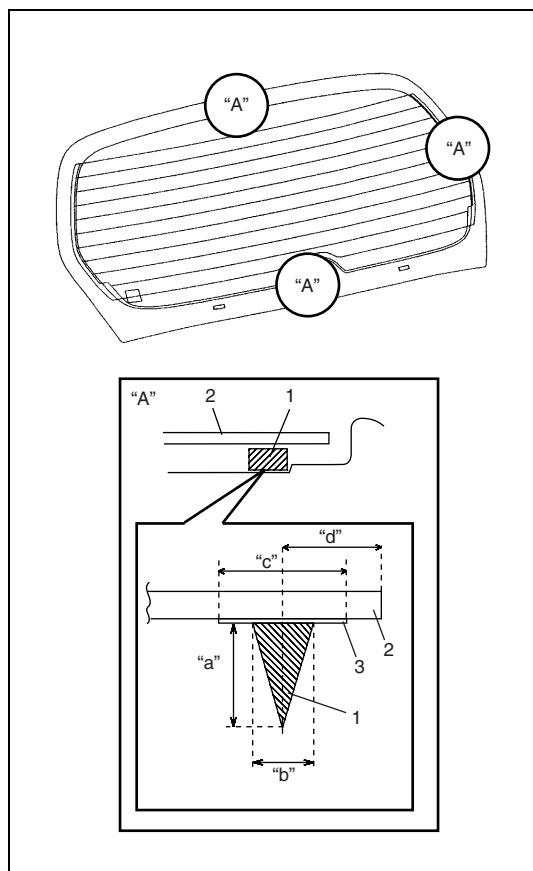
Height "a" : 14 mm (0.55 in.)

Width "b" : 7 mm (0.28 in.)

Width "c" : 16 mm (0.63 in.)

Position "d" : 14 mm (0.55 in.) for glass upper and side sections

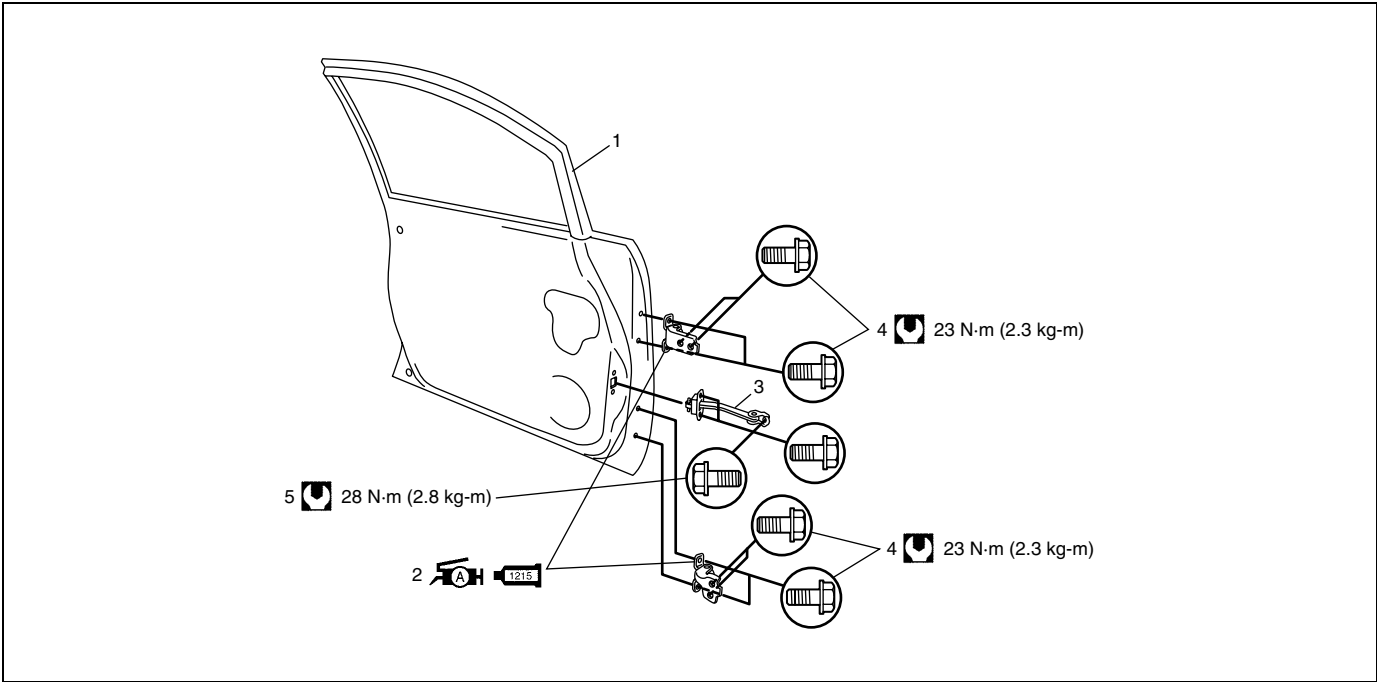
Position "d" : 15 mm (0.59 in.) for glass bottom section





# Body Structure

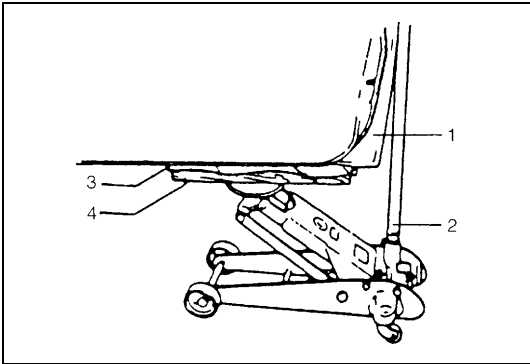
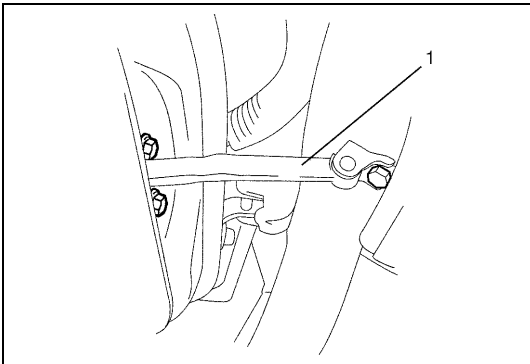
## Front Door Assembly



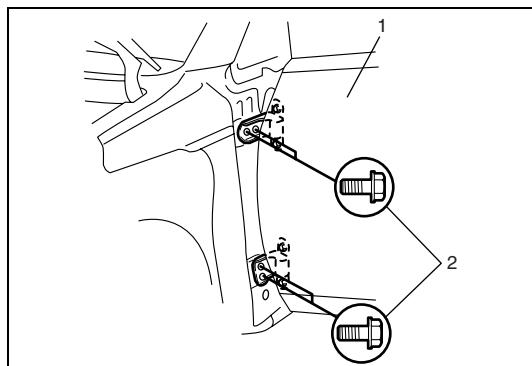
1. Door panel	4. Front door hinge bolt
2. Door hinge : Apply lithium grease 99000-25010 to rotating part. : Apply sealant 99000-31110 to contact face.	5. Door open stopper bolt
3. Door open stopper	Tightening torque

### REMOVAL

- 1) Remove front fender.
- 2) Disconnect door harness lead wires at each coupler.
- 3) Remove door open stopper (1).



- 4) Support door panel (1) using a jack (2) with rags (3) and a piece of wood (4) placed between jack (2) and panel (1) as shown.



- 5) Remove door assembly (1) by loosening hinge mounting bolts (2).

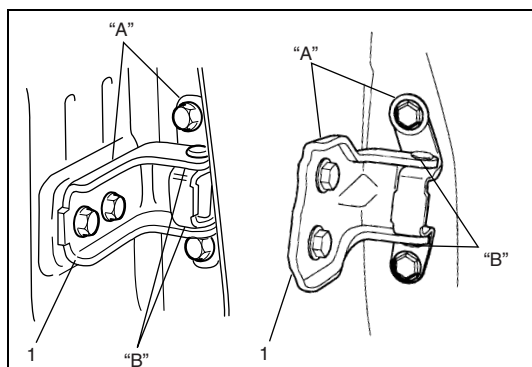
## INSTALLATION

Reverse removal procedure to install door assembly noting the following instructions.

- When replacing door, coat replacement door inside with wax for proper anti-corrosion treatment.  
Refer to "SEALANT APPLICATION AREAS" in this section.
- Apply sealant to contact face "A" of hinge (1) and apply grease to rotating part "B" of hinge (1).

**"A" : Sealant 99000-31110**

**"B" : Lithium grease 99000-25010**

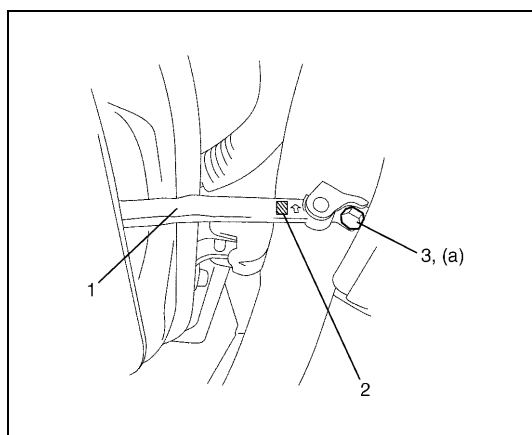


- When door open stopper (1) is installed, be careful to face side of door open stopper.

**Door open stopper installing direction**

**Left side door: L punch mark is upward**

**Right side door: R punch mark is upward**



2. Punch mark

- Tighten door open stopper bolt (1) as specified torque.

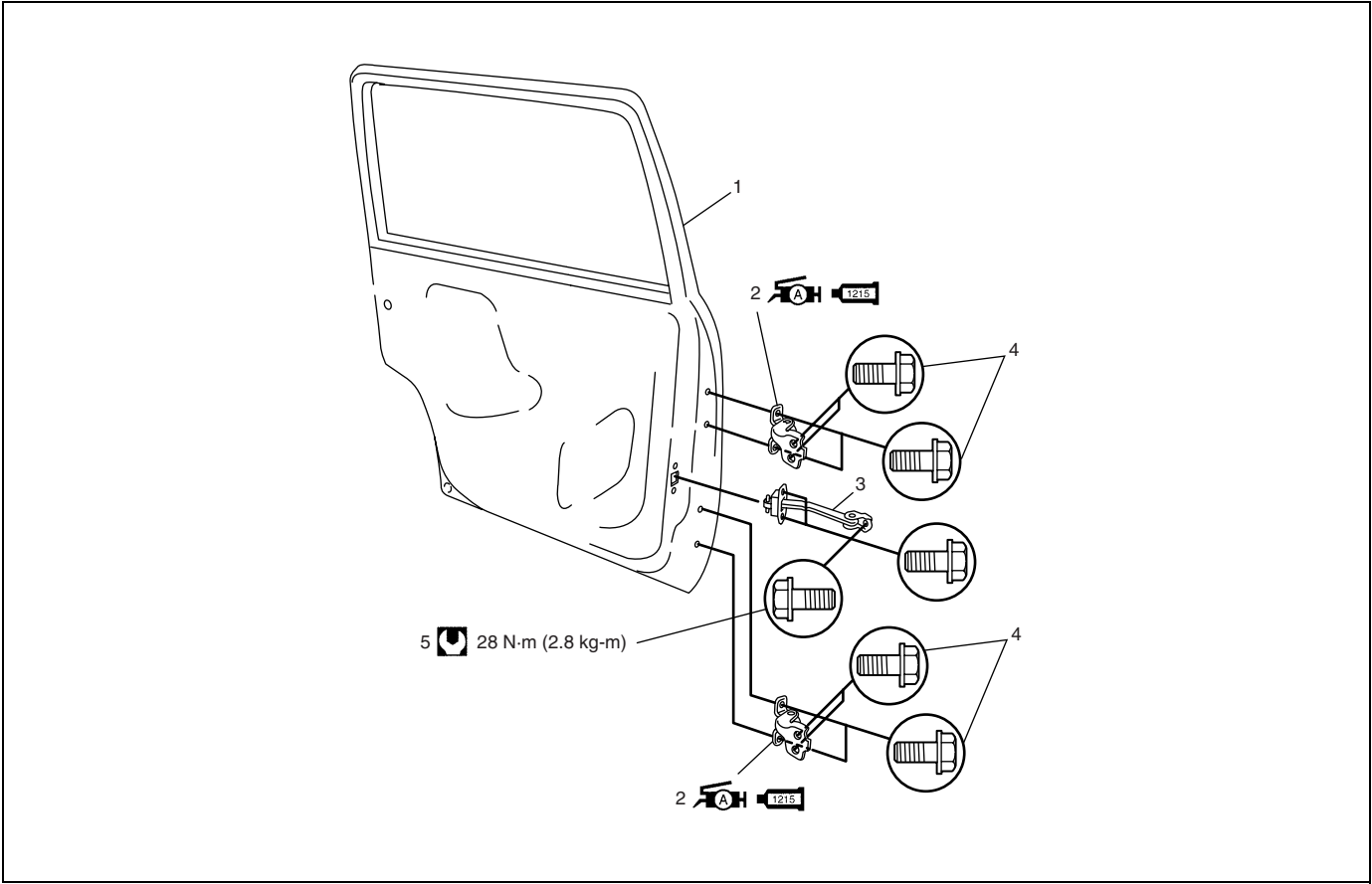
**Tightening torque**

**Door open stopper bolt**

**(a) : 28 N·m (2.8 kg-m, 20.5 lb-ft)**

- Adjust door latch striker position referring to "FRONT DOOR LOCK ASSEMBLY" in this section.
- Adjust front door cushion so that door becomes flush with side body.
- After installation, open and close the door to check looseness.

# Rear Door Assembly



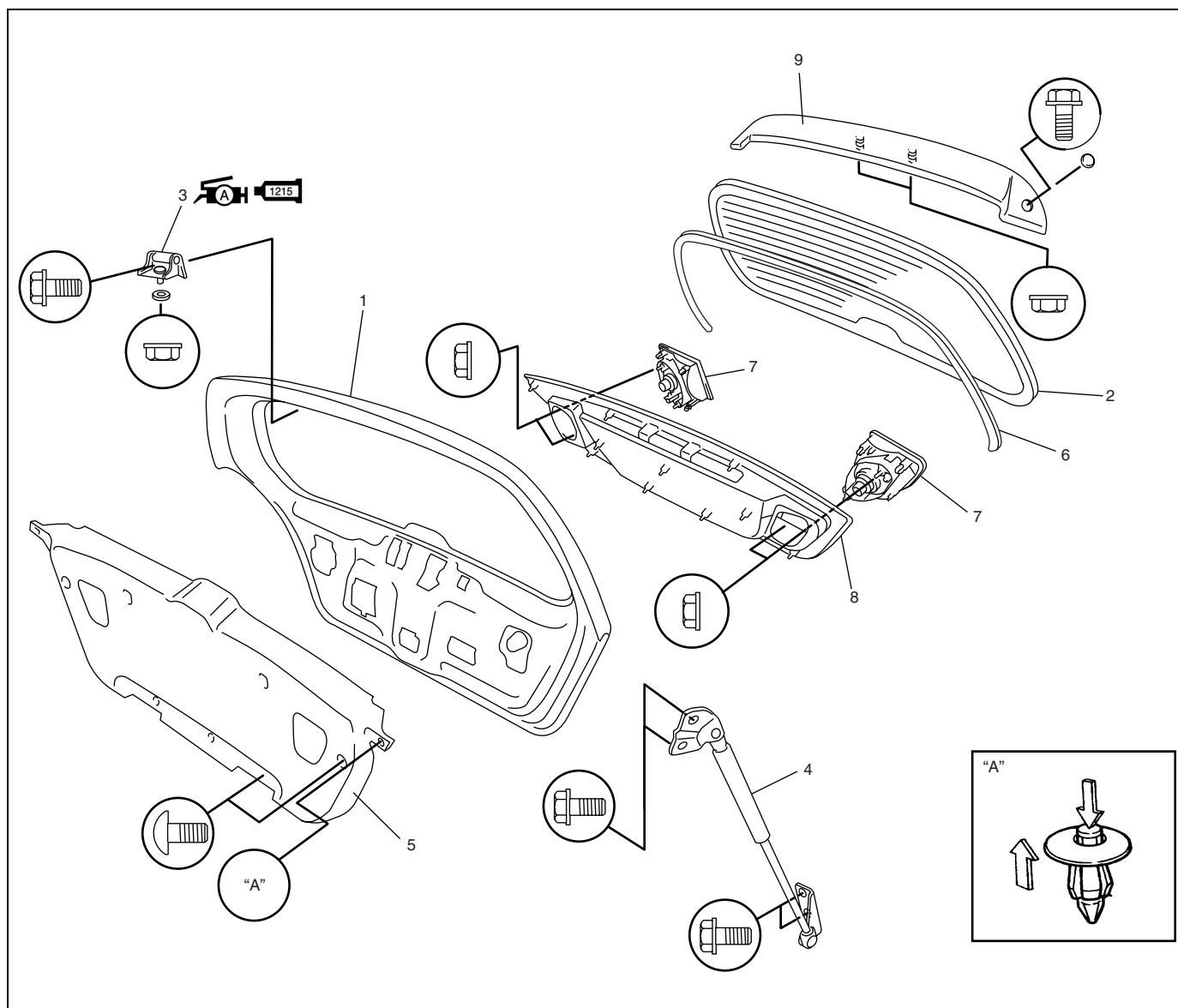
1. Door panel	3. Door stopper
2. Door hinge : Apply lithium grease 99000-25010 to rotating part. : Apply sealant 99000-31110 to contact face.	4. Rear door hinge bolt

## REMOVAL AND INSTALLATION

Refer to “FRONT DOOR ASSEMBLY” in this section noting the following instruction.

- Refer to above figure for grease and sealant.

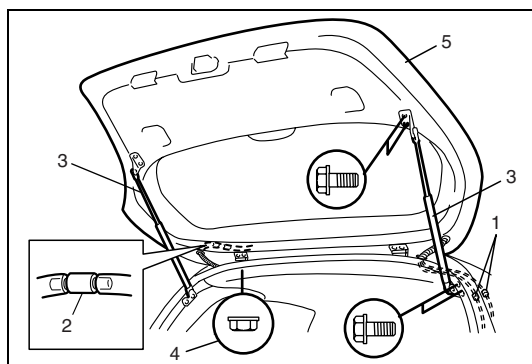
## Back Door Assembly

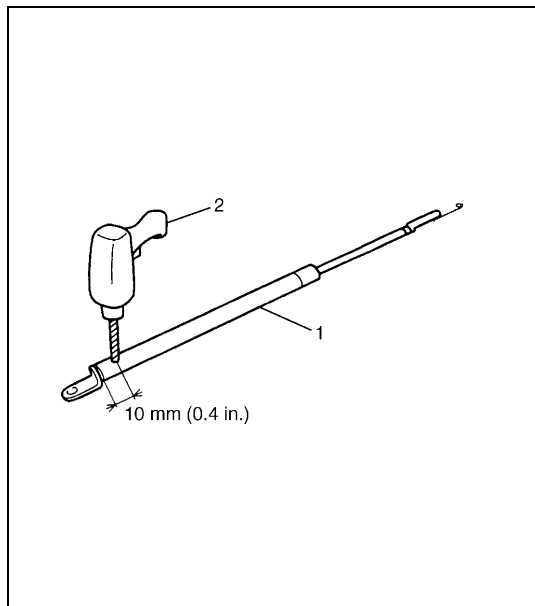


1. Back door panel assembly	4. Back door balancer unit	7. Back up lamp
2. Back door window glass	5. Back door trim	8. Back door license garnish
3. Back door hinge : Apply lithium grease 99000-25010 to door hinge moving section. : Apply sealant 99000-31110 to contact face.	6. Back door window glass trim	9. Back door spoiler (if equipped)

### REMOVAL

- 1) Remove back door trim.
- 2) Remove related section of head lining and quarter trim.
- 3) Disconnect back door harness couplers (1) and washer hose (2).
- 4) Remove back door balancer (3).
- 5) Remove door hinge nuts (4) and remove back door assembly (5).

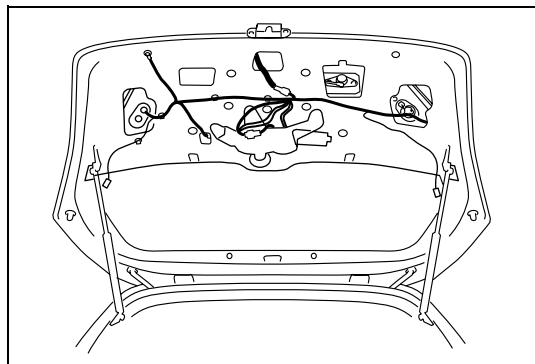


**WARNING:****Handling of Back Door Balancer (Damper)**

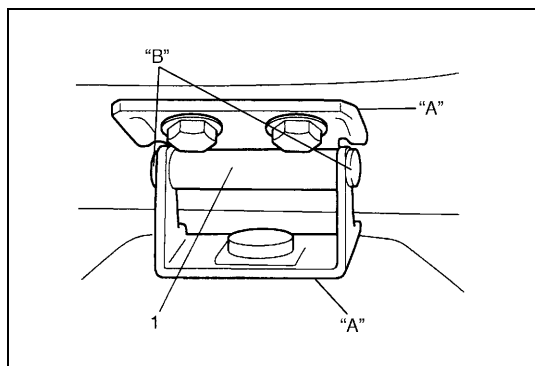
- Do not disassemble balancer (1) because its cylinder is filled with gas.
- Handle balancer carefully. Do not scar or scratch exposed surface of its piston rod, and never allow any paint or oil to stick to its surface.
- Do not turn piston rod with balancer fully extended.
- When discarding removed back door balancer (damper), use a 2 – 3 mm (0.08 – 0.12 in.) drill (2) to make a hole as shown.
- The gas itself is harmless but it may issue out of the hole together with chips generated by the drill (2). Therefore, be sure to wear goggle.

**INSTALLATION**

Reverse removal procedure to install back door noting the following instructions.



- Secure wiring harness.



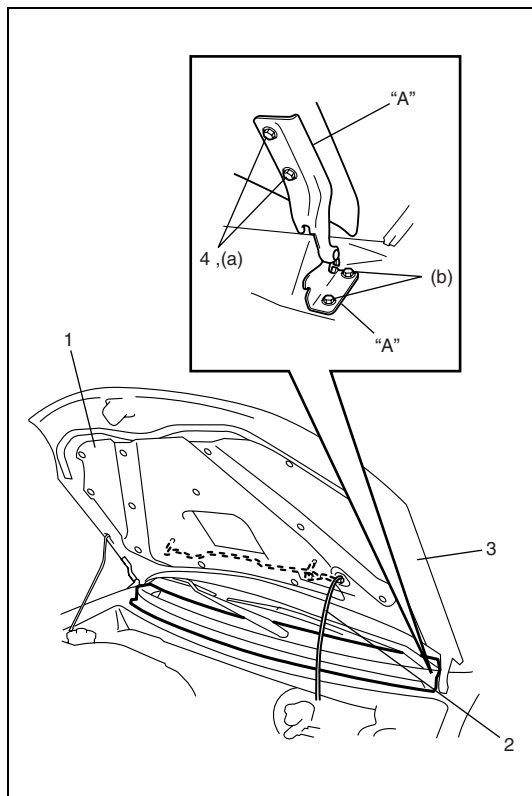
- Adjust door latch striker position by referring "BACK DOOR LOCK ASSEMBLY" in this section.
- Adjust door cushion so that door contacts body when closed.
- Apply sealant to contact face "A" of door hinge (1) and apply grease to rotating part "B" of hinge (1).

**"A" : Sealant 99000-31110**

**"B" : Lithium grease 99000-25010**

## Hood

### REMOVAL



#### CAUTION:

**Place cloth to prevent body from any damage.**

- 1) Remove hood silencer (1).
- 2) Remove window washer hose (2) from hood (3).
- 3) Remove 2 mounting bolts (4) to detach hood (3).

### INSTALLATION

Reverse removal procedure to install hood noting the following instruction.

- Apply sealant to contact face "B" of hood hinge (4).

**"A" : Sealant 99000-3110**

- Tighten hood hinge mounting bolt as specified torque.

#### Tightening torque

##### Hinge mounting bolt

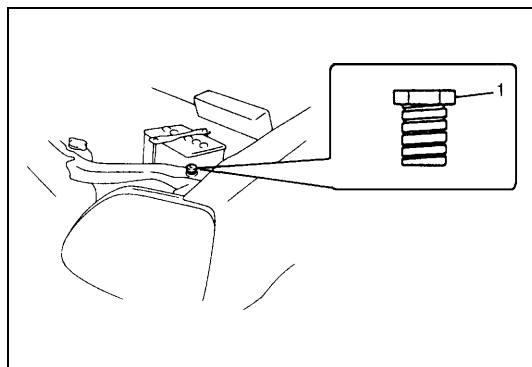
**(a) : 16 N·m (1.6 kg-m, 11.5 lb-ft)**

**(b) : 9 N·m (0.9 kg-m, 6.5 lb-ft)**

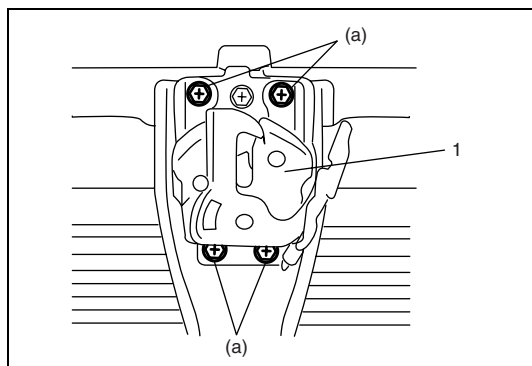
### ADJUSTMENT

Adjust the following point :

- Hood position adjustment.  
Fore-and-aft and right-and-left adjustment.  
Adjust hood clearance by loosening hood mounting bolts.



- Vertical adjustment  
If only one side (right or left) of hood is not level with front fender, make it level by tightening or loosening hood cushion (1).



- Hood lock position adjustment  
When installing hood lock (1), bring bolt at highest position and move it in vertical direction for adjustment free from loose to hood striker.

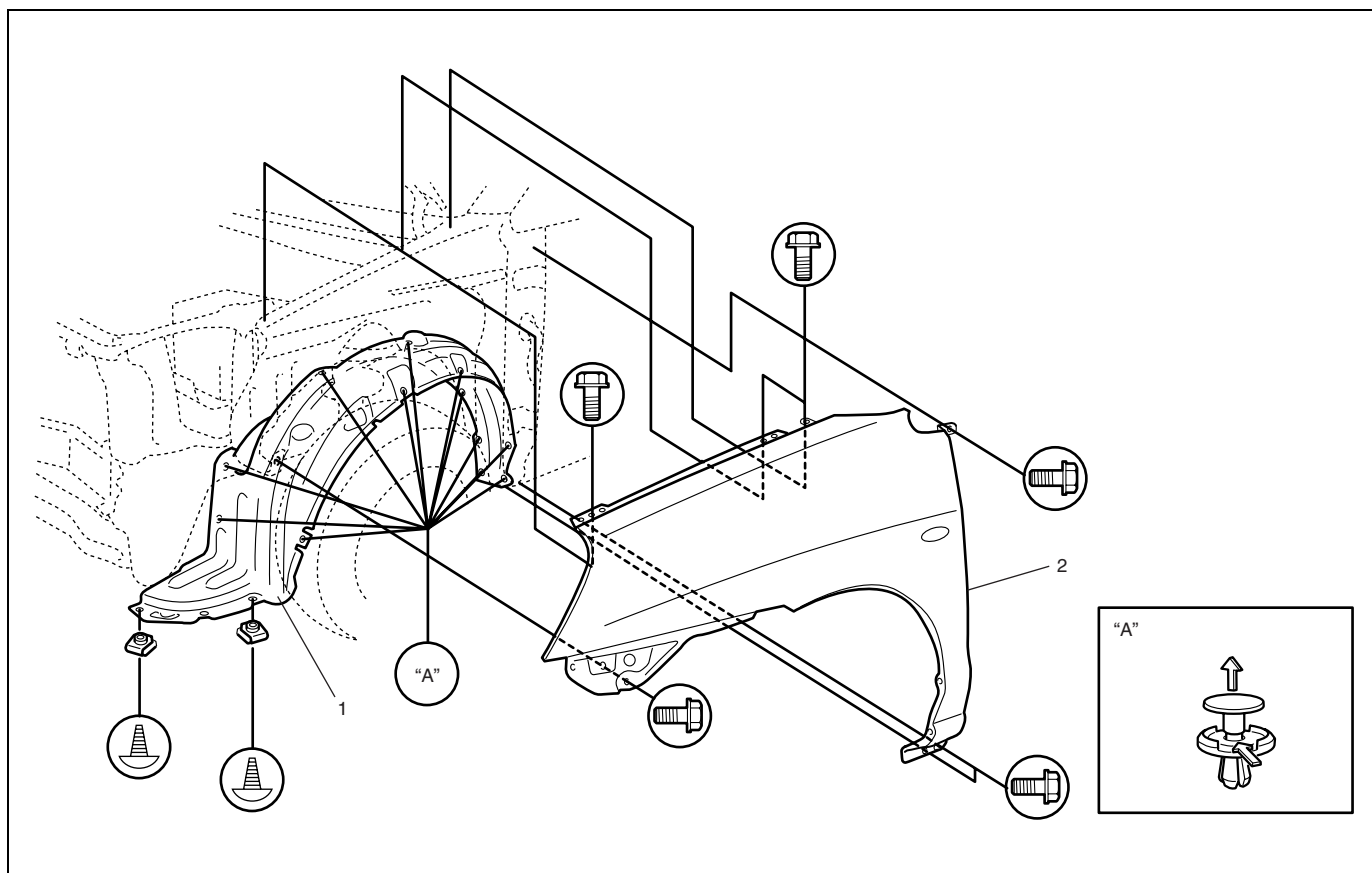
#### Tightening torque

**Hood latch bolts (a) : 10 N·m (1.0 kg-m, 7.0 lb-ft)**

## INSPECTION

Check that hood opens and closes smoothly and properly. Lubricate if necessary. Also check that secondary latch operates properly (check that secondary latch keeps hood from opening all the way) and hood locks securely when closed. Adjust hood locks position, if necessary.

## Front Fender



1. Front fender lining

2. Front fender

## REMOVAL

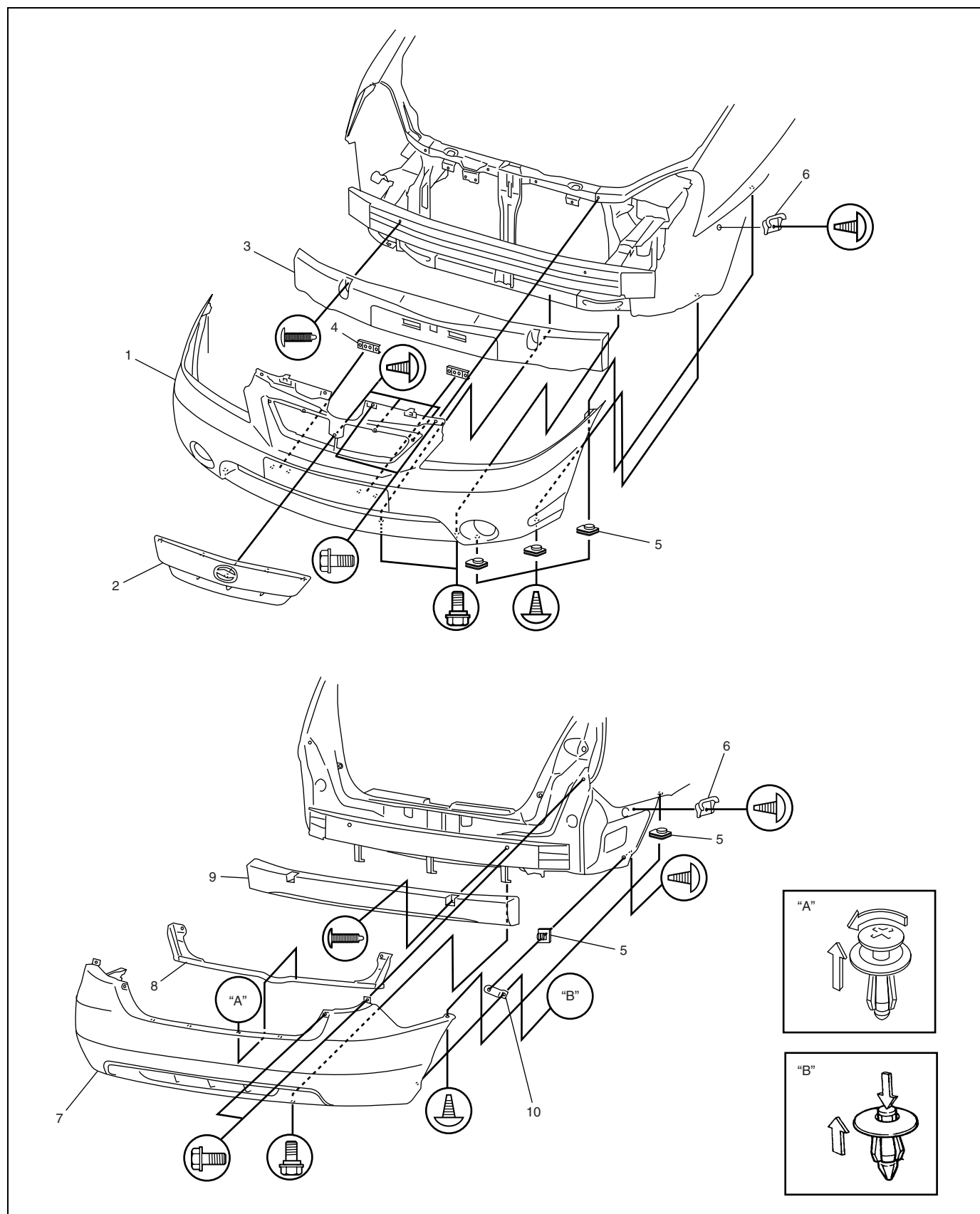
- 1) Remove front fender lining.
- 2) Remove front bumper referring to "FRONT BUMPER AND REAR BUMPER" in this section.
- 3) Disconnect connector of side turn signal (or side marker) lamp.
- 4) Remove front fender.

## INSTALLATION

Reverse removal procedure to install front fender noting the following instruction.

- If paint on fender bolt is peeled off, be sure to apply paint again.

# Front Bumper and Rear Bumper

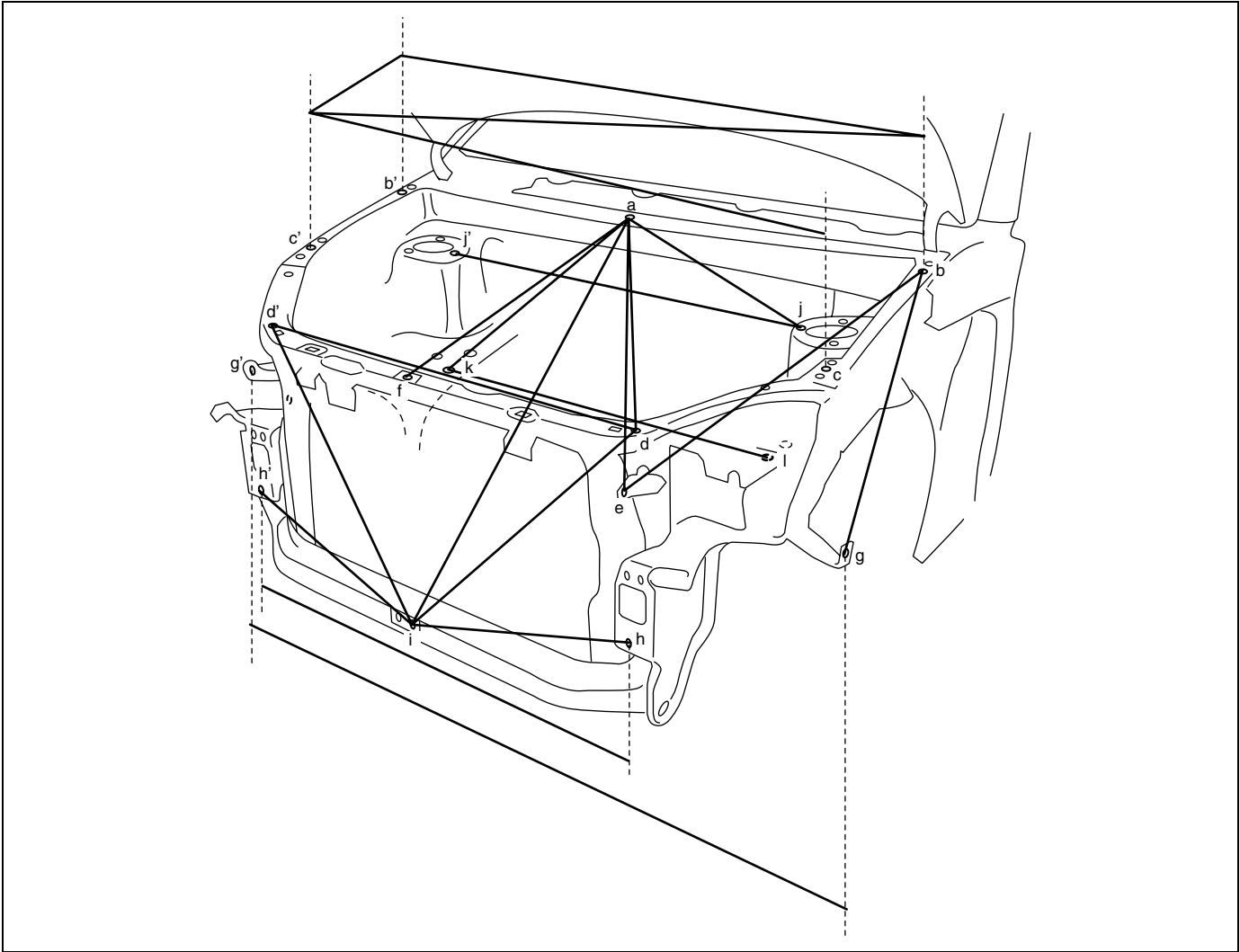


1. Front bumper	5. Plastic nut	9. Rear bumper absorber (if equipped)
2. Radiator grill	6. Bumper holder	10. Rear bumper side bracket
3. Front bumper absorber (if equipped)	7. Rear bumper	
4. License plate retainer	8. Rear bumper reinforcement	



Body Dimensions

Engine room

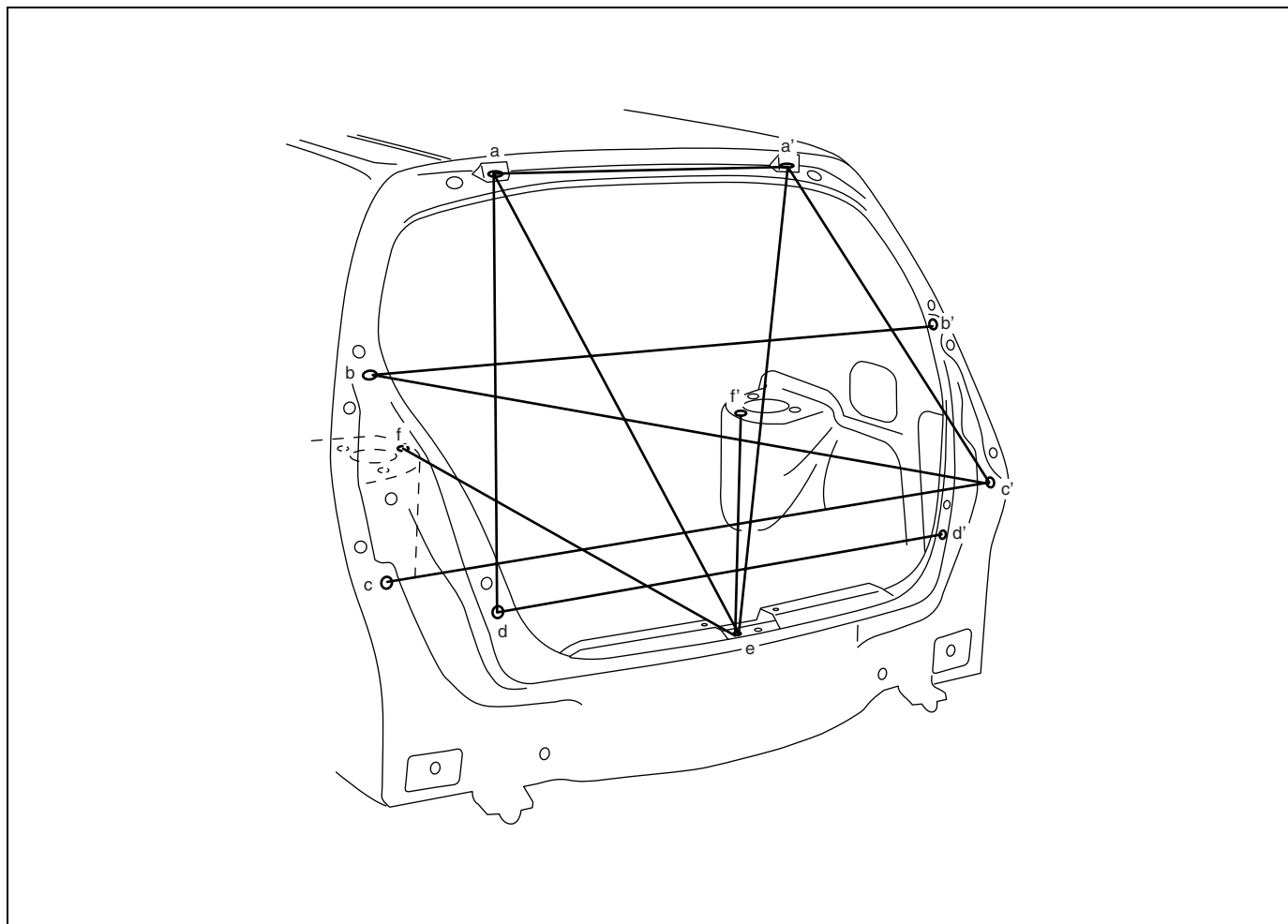


a. Datum point	e (e'). Jig hole	i. Hood lock brace installation lower left side hole
b (b'). Front fender installation hole	f. Hood cushion installation hole	j (j'). Front strut installation inside hole
c (c'). Front fender installation hole	g (g'). Front fender installation hole	k. Right side engine mounting installation front hole
d (d'). Head light installation hole	h (h'). Front bumper member installation lower hole	l. Left side engine mounting installation front hole

Hole to hole distance

a-d : 759.5 mm (29.90 in.)	b-c' : 1385.6 mm (54.55 in.)	d'-i : 677.1 mm (26.26 in.)
a-e : 759.8 mm (29.91 in.)	b-e : 723.4 mm (28.48 in.)	g-g' : 1532.0 mm (60.31 in.)
a-f : 655.5 mm (25.81 in.)	b-g : 603.2 mm (23.75 in.)	h-h' : 960.4 mm (37.81 in.)
a-i : 958.1 mm (37.72 in.)	b'-c' : 396.1 mm (15.59 in.)	h-i : 477.6 mm (18.80 in.)
a-j : 504.9 mm (19.88 in.)	c-c' : 1302.0 mm (51.26 in.)	h'-i : 515.3 mm (20.29 in.)
a-k : 700.3 mm (27.57 in.)	d-d' : 894.0 mm (35.20 in.)	j-j' : 950.2 mm (37.41 in.)
b-b' : 1354.0 mm (53.30 in.)	d-i : 650.9 mm (25.63 in.)	k-l : 950.7 mm (37.43 in.)

## Back door

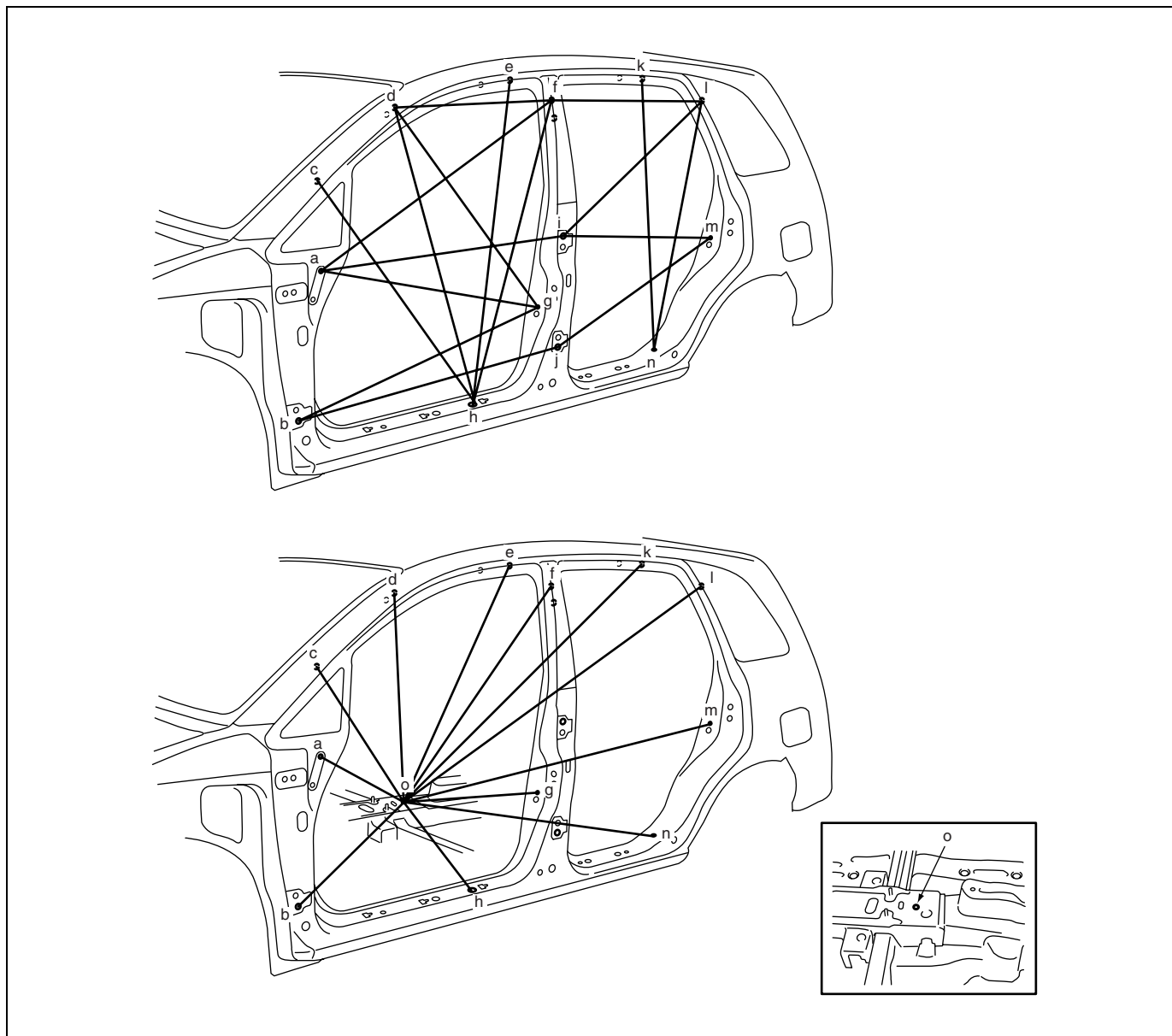


a (a'). Back door hinge installation hole	d (d'). Rear bumper installation hole
b (b'). Rear combination lamp installation bolt hole	e. Back door striker installation left side hole
c (c'). Rear bumper installation hole	f (f'). Rear strut installation inside hole

### Hole to hole distance

<b>a-a' : 670 mm (26.38 in.)</b>	<b>a'-e : 979 mm (38.54 in.)</b>	<b>d-d' : 1006 mm (39.61 in.)</b>
<b>a-d : 816 mm (32.13 in.)</b>	<b>b-b' : 1290 mm (50.79 in.)</b>	<b>e-f : 853 mm (33.58 in.)</b>
<b>a-e : 965 mm (37.99 in.)</b>	<b>b-c' : 1375 mm (54.13 in.)</b>	<b>e-f' : 876 mm (34.49 in.)</b>
<b>a'-c' : 787 mm (30.98 in.)</b>	<b>c-c' : 1370 mm (53.94 in.)</b>	

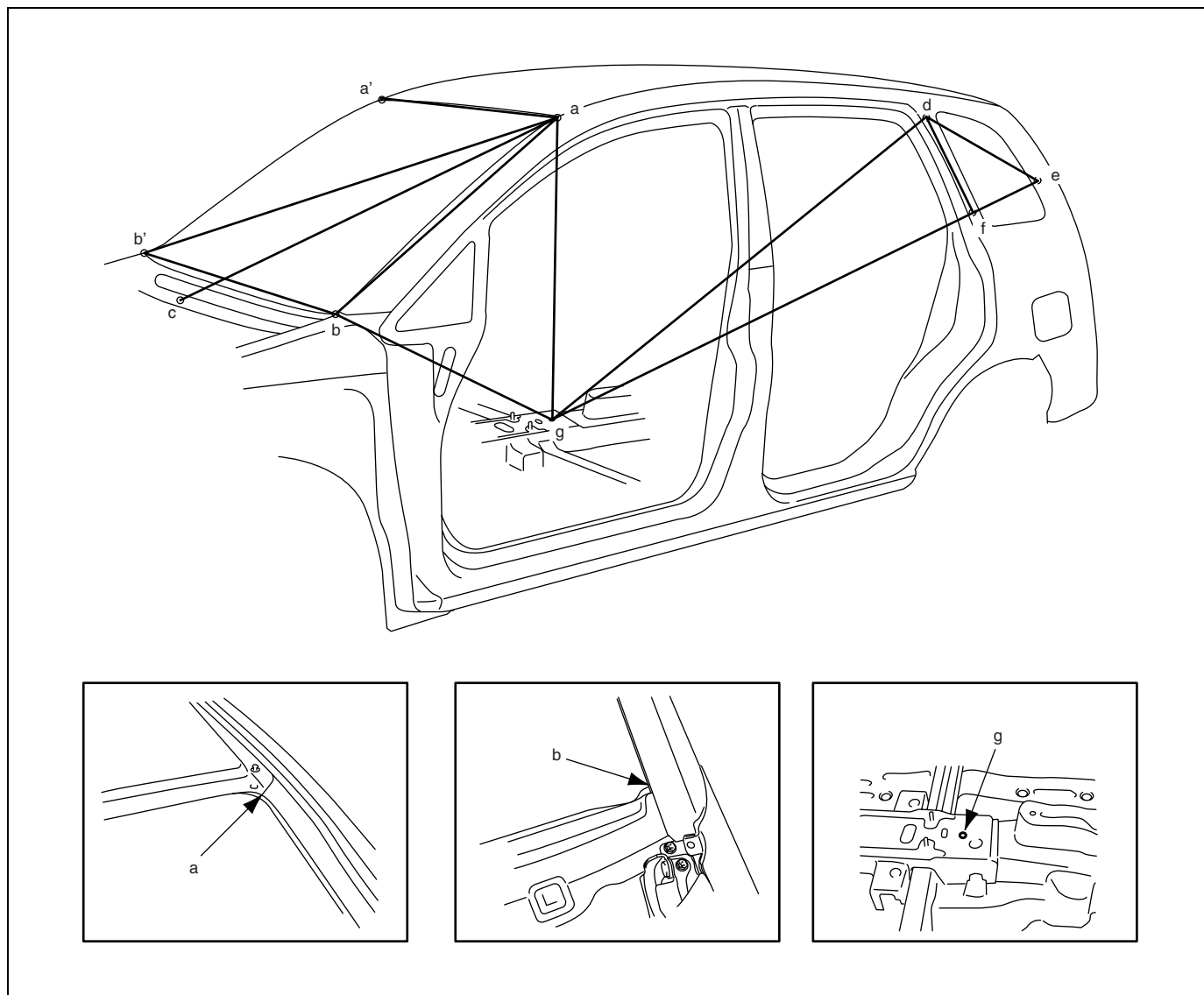
## Side body



a. Instrumental panel upper mounting bolt hole	f. Front shoulder adjuster bracket installation upper hole	k. Rear assistant grip installation rear hole
b. Front door lower hinge installation hole	g. Front door switch mounting bolt hole	l. Rear shoulder adjuster installation hole
c. Front pillar inner trim installation lower hole	h. Bleeding hole (f15 mm (0.59 in.))	m. Rear door switch mounting bolt hole
d. Front pillar inner trim installation upper hole	i. Rear door upper hinge installation upper hole	n. Side sill scuff installation rear hole
e. Front assistant grip installation rear hole	j. Rear door lower hinge installation lower hole	o. Jig hole (f10 mm (0.39 in.))

## Hole to hole distance

a-f : 1112 mm (43.78 in.)	f-h : 1088 mm (42.83 in.)	d-o : 1121 mm (44.13 in.)
a-g : 918 mm (36.14 in.)	f-l : 812 mm (32.13 in.)	e-o : 1208 mm (47.56 in.)
a-i : 935 mm (36.81 in.)	i-l : 964 mm (37.95 in.)	f-o : 1199 mm (47.20 in.)
b-g : 1004 mm (39.53 in.)	i-m : 873 mm (34.37 in.)	g-o : 807 mm (31.77 in.)
b-j : 1027 mm (40.43 in.)	j-m : 912 mm (35.90 in.)	h-o : 727 mm (28.62 in.)
c-h : 988 mm (38.90 in.)	k-n : 1076 mm (42.36 in.)	k-o : 1520 mm (59.84 in.)
d-f : 645 mm (25.39 in.)	l-n : 944 mm (37.17 in.)	l-o : 1645 mm (64.76 in.)
d-g : 877 mm (34.53 in.)	a-o : 1053 mm (41.46 in.)	m-o : 1464 mm (57.64 in.)
d-h : 1026 mm (40.39 in.)	b-o : 1012 mm (39.84 in.)	n-o : 1156 mm (45.51 in.)
e-h : 1147 mm (45.16 in.)	c-o : 1137 mm (44.76 in.)	

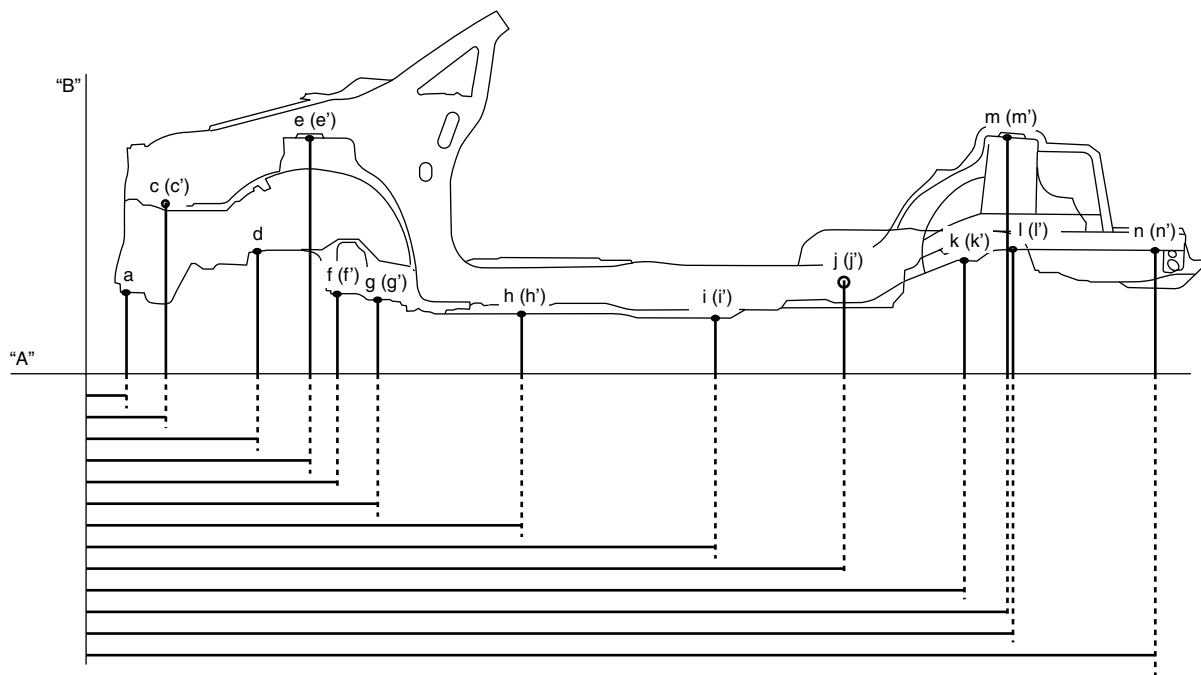
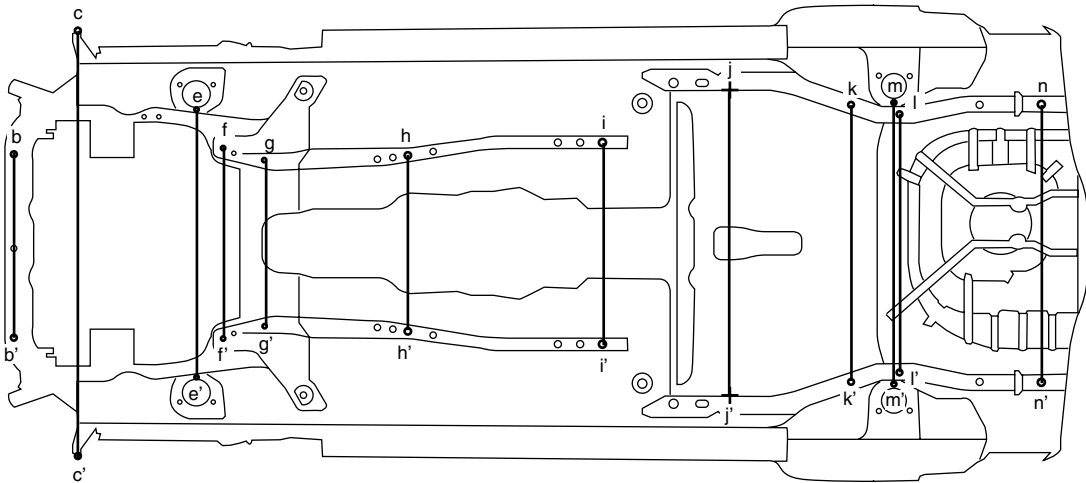
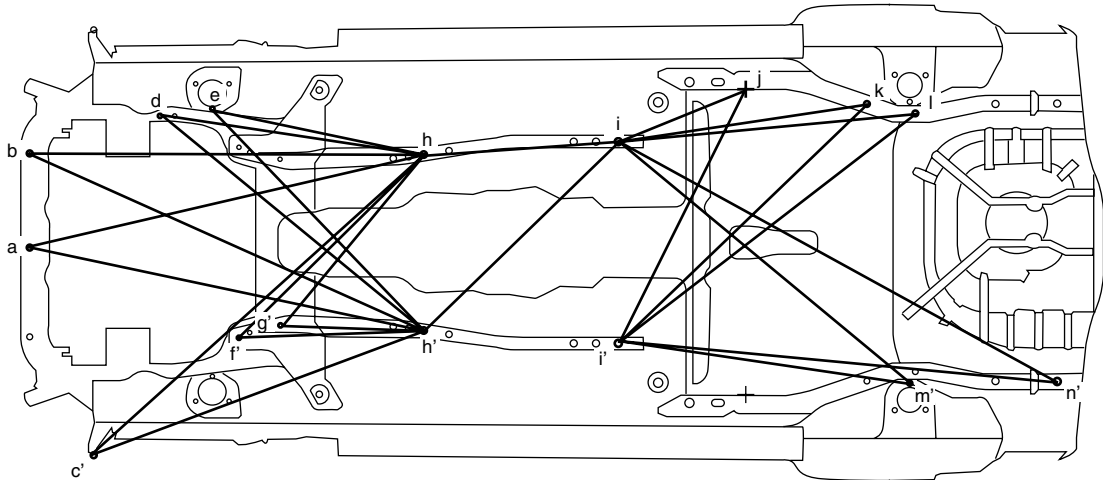


a (a'). Front end of windshield upper installation section	e. Quarter window trim mounting clip installation hole
b (b'). Front end of windshield lower installation section	f. Quarter window trim mounting clip installation hole
c. Datum point	g. Jig hole (f10 mm (0.39 in.))
d. Quarter window trim mounting clip installation hole	

### Hole to hole distance

<b>a-a' : 1078 mm (42.44 in.)</b>	<b>a-g : 1165 mm (45.87 in.)</b>	<b>d-f : 322 mm (12.68 in.)</b>
<b>a-b : 740 mm (29.13 in.)</b>	<b>b-b' : 1332 mm (52.44 in.)</b>	<b>d-g : 1642 mm (64.48 in.)</b>
<b>a-b' : 1408 mm (55.43 in.)</b>	<b>b-g : 1211 mm (47.68 in.)</b>	<b>e-f : 384 mm (15.10 in.)</b>
<b>a-c : 1149 mm (45.24 in.)</b>	<b>d-e : 558 mm (21.97 in.)</b>	<b>f-g : 1625 mm (63.97 in.)</b>

Under body



a. Jig hole (f20 mm (0.78 in.))	h (h'). Drain hole (f30 mm (1.18 in.))
b (b'). Jig hole (f20 mm (0.78 in.))	i (i'). Drain hole (f30 mm (1.18 in.))
c (c'). Front fender panel installation hole	j (j'). Trailing rod inside installation hole
d. Engine mounting installation front hole	k (k'). Rear suspension flame installation hole
e (e'). Front strut inside installation hole	l (l'). Rear suspension flame installation hole
f (f'). Front suspension flame installation hole	m (m'). Rear strut inside installation hole
g (g'). Front suspension flame installation hole	n (n'). Drain hole (f25 mm (0.98 in.))

### Hole to hole distance

<b>a-h :</b> 1460 mm (57.48 in.)	<b>e-h' :</b> 1260 mm (49.61 in.)	<b>i-k :</b> 924 mm (36.37 in.)
<b>a-h' :</b> 1463 mm (57.60 in.)	<b>f'-h :</b> 941 mm (37.05 in.)	<b>i'-k :</b> 1248 mm (49.13 in.)
<b>b-h :</b> 1422 mm (55.98 in.)	<b>f'-h' :</b> 670 mm (26.38 in.)	<b>i-l :</b> 1097 mm (43.17 in.)
<b>b-h' :</b> 1562 mm (61.50 in.)	<b>g'-h :</b> 808 mm (31.81 in.)	<b>i'-l :</b> 1362 mm (53.61 in.)
<b>c-h :</b> 1661 mm (65.39 in.)	<b>g'-h' :</b> 523 mm (20.59 in.)	<b>i-m' :</b> 1494 mm (58.83 in.)
<b>c-h' :</b> 1338 mm (52.68 in.)	<b>h-i :</b> 702 mm (27.62 in.)	<b>i'-m' :</b> 1233 mm (48.56 in.)
<b>d-h :</b> 1243 mm (48.94 in.)	<b>h'-i' :</b> 973 mm (38.31 in.)	<b>i-n :</b> 1799 mm (70.83 in.)
<b>d-h' :</b> 978 mm (38.50 in.)	<b>i-j :</b> 547 mm (21.52 in.)	<b>i'-n' :</b> 1593 mm (62.72 in.)
<b>e-h :</b> 994 mm (39.13 in.)	<b>i'-j :</b> 1039 mm (40.91 in.)	

### Hole to hole distance

<b>b-b' :</b> 660 mm (25.98 in.)	<b>g-g' :</b> 660 mm (23.62 in.)	<b>k-k' :</b> 978 mm (38.50 in.)
<b>c-c' :</b> 1532 mm (60.31 in.)	<b>h-h' :</b> 632 mm (24.87 in.)	<b>l-l' :</b> 906 mm (35.65 in.)
<b>e-e' :</b> 950 mm (37.41 in.)	<b>i-i' :</b> 720 mm (28.35 in.)	<b>m-m' :</b> 988 mm (38.89 in.)
<b>f-f' :</b> 690 mm (27.17 in.)	<b>j-j' :</b> 1085 mm (42.72 in.)	<b>n-n' :</b> 970 mm (38.19 in.)

### Projection Dimension from Standard Line "A"

<b>a :</b> 113 mm (4.45 in.)	<b>g (g') :</b> 86 mm (3.40 in.)	<b>l (l') :</b> 258 mm (10.18 in.)
<b>c (c') :</b> 446 mm (17.56 in.)	<b>h (h') :</b> 32 mm (1.25 in.)	<b>m (m') :</b> 660 mm (25.99 in.)
<b>d :</b> 292 mm (11.48 in.)	<b>i (i') :</b> 19 mm (0.74 in.)	<b>n (n') :</b> 258.8 mm (10.19 in.)
<b>e (e') :</b> 655 mm (25.80 in.)	<b>j (j') :</b> 92 mm (3.62 in.)	
<b>f (f') :</b> 108 mm (4.26 in.)	<b>k (k') :</b> 221 mm (8.70 in.)	

### Projection Dimension from Standard Line "B"

<b>a :</b> 65 mm (2.56 in.)	<b>g (g') :</b> 970 mm (38.19 in.)	<b>l (l') :</b> 3256 mm (128.19 in.)
<b>c (c') :</b> 300 mm (11.81 in.)	<b>h (h') :</b> 1490 mm (58.66 in.)	<b>m (m') :</b> 3235 mm (127.36 in.)
<b>d :</b> 559 mm (22.01 in.)	<b>i (i') :</b> 2190 mm (86.22 in.)	<b>n (n') :</b> 3760 mm (148.08 in.)
<b>e (e') :</b> 732 mm (28.83 in.)	<b>j (j') :</b> 2700 mm (106.30 in.)	
<b>f (f') :</b> 825 mm (32.48 in.)	<b>k (k') :</b> 3082 mm (123.34 in.)	

# Instrumentation and Driver Information

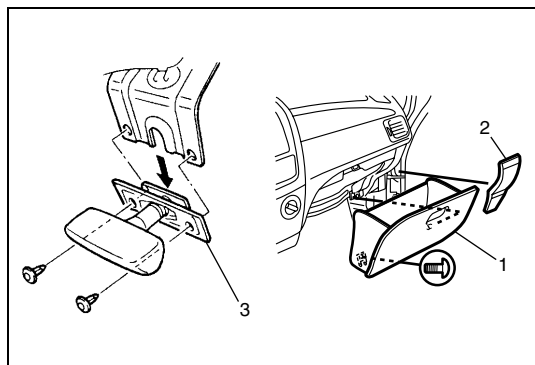
## Instrument Panel

**WARNING:**

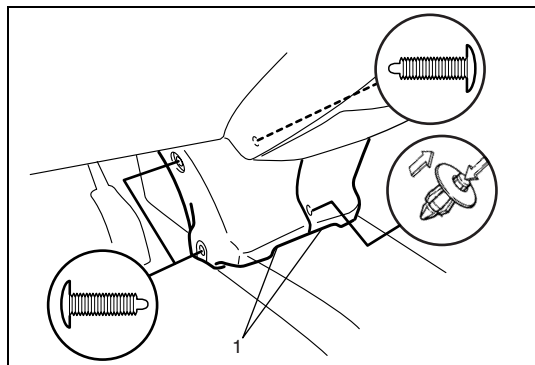
See **WARNING** at the beginning of this section.

**REMOVAL**

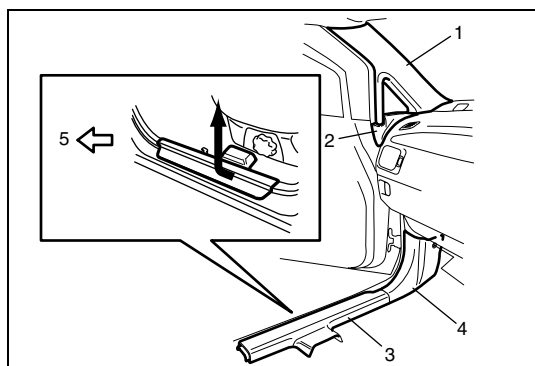
- 1) Disconnect negative cable at battery.
- 2) Disable air bag system (if equipped) referring to “DISABLING AIR BAG SYSTEM” in Section 10B.
- 3) Remove steering column assembly referring to “STEERING COLUMN ASSEMBLY” in Section 3.
- 4) Remove glove box (1), glove box side cover (2), and hood latch release lever (3).



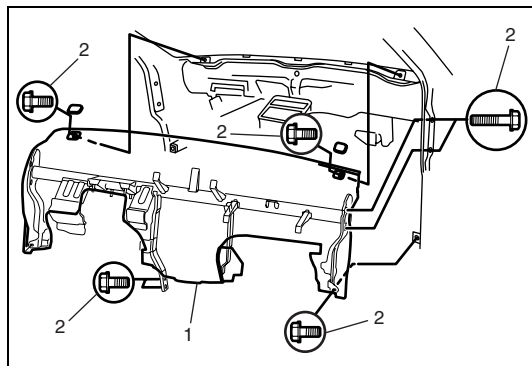
- 5) Remove console box.
- 6) Remove instrument panel center under covers (1).



- 7) Disconnect instrument panel harness connectors, antenna and heater control cables which need to be disconnected for removal for instrument panel.
- 8) Remove instrument panel ground wire.
- 9) Remove front pillar trims (1), front pillar lower garnishes (2), front side sill scuffs (3) and dash side trims (4).



5. Forward



- 10) Remove instrument panel mounting bolts (2).
- 11) Remove instrument panel (1) with steering support member and instrument panel harness.

## INSTALLATION

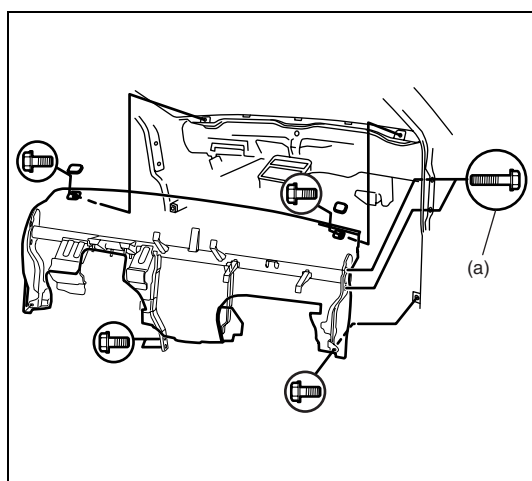
Reverse removal procedure to install instrument panel noting the following instructions.

- When installing each part, be careful not to catch any cable or wiring harness.
- Tighten steering support member support bolts to specified torque

### Tightening torque

**Steering support member support bolts (a) :**  
**23 N·m (2.3 kg-m, 17.0 lb-ft)**

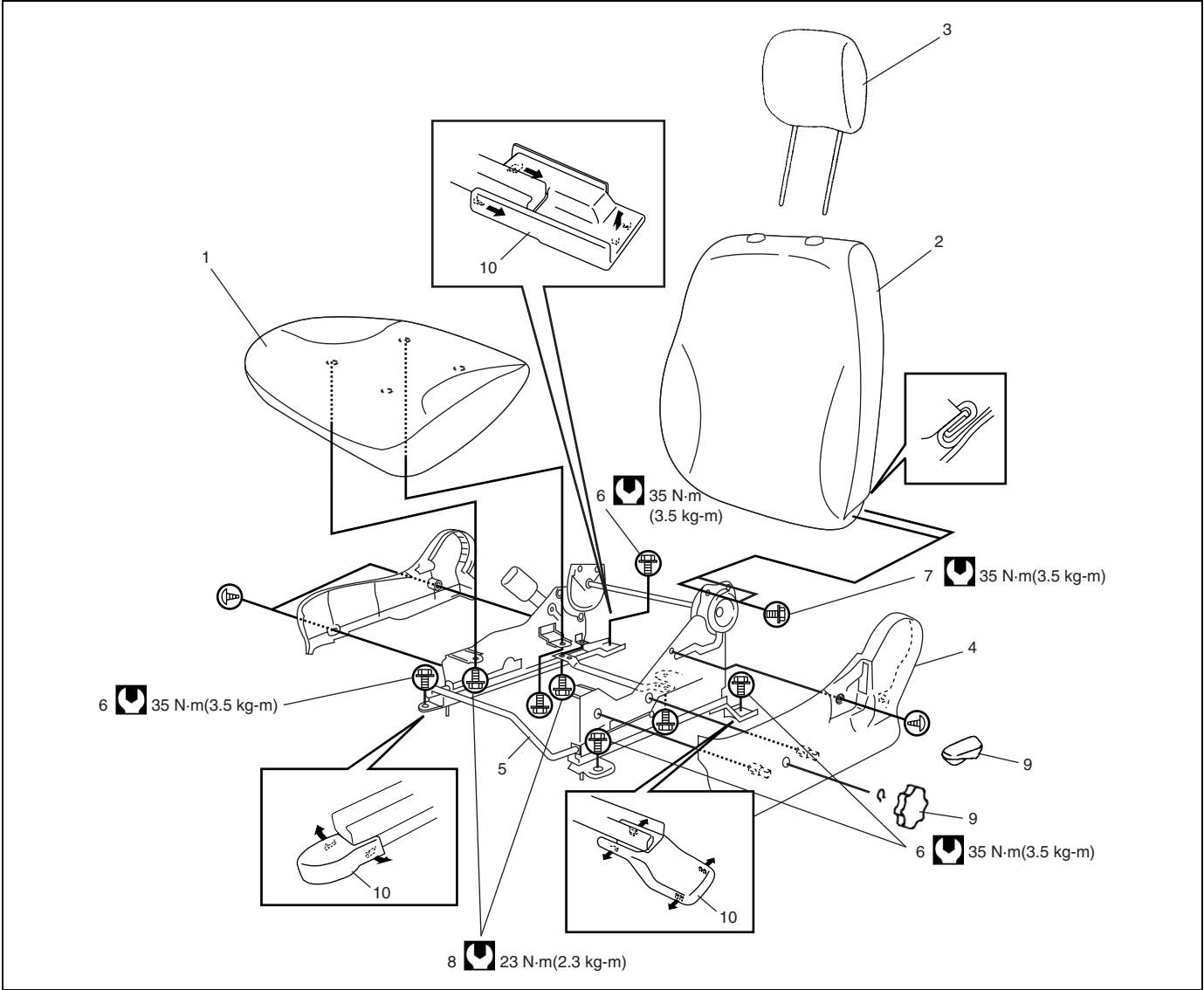
- Install steering column assembly referring to “STEERING COLUMN ASSEMBLY” in Section 3.
- Adjust control cables. Refer to “HEATER CONTROLLER” in Section 1A.
- Enable air bag system (if equipped) referring to “ENABLING AIR BAG SYSTEM” in Section 10B.





Seats

Front Seat



1. Seat cushion	4. Cover	7. Reclining bolt	10. Cover
2. Seat back	5. Seat adjuster	8. Seat cushion bolt	Tightening torque
3. Headrest	6. Seat adjuster bolt	9. Knob	

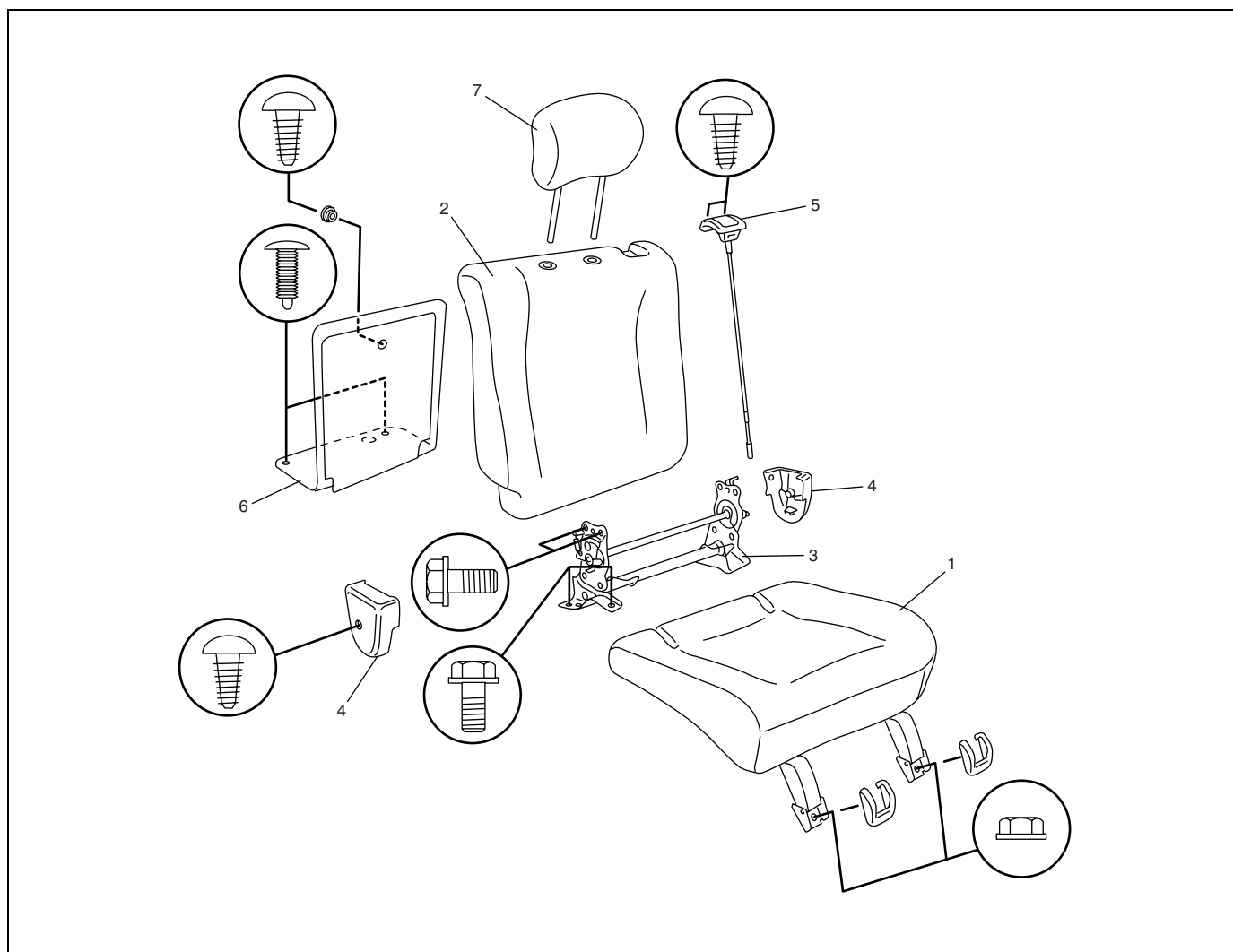
REMOVAL


- 1) Remove console box.
- 2) Disable air bag system referring to “DISABLING AIR BAG SYSTEM” in Section 10B.
- 3) Disconnect heat seater coupler and side air bag coupler, if equipped.
- 4) Remove 4 mounting bolts to remove seat assembly.
- 5) Disassemble and repair seat as necessary.

INSTALLATION

Reverse removal procedure to install front seat.  
Torque to specifications as shown.

## Rear Seat



1. Seat cushion	4. Reclining assembly cover	7. Headrest (if equipped)
2. Seat back	5. Rear back knob	 Tightening torque
3. Reclining assembly	6. Seat back board	

### REMOVAL

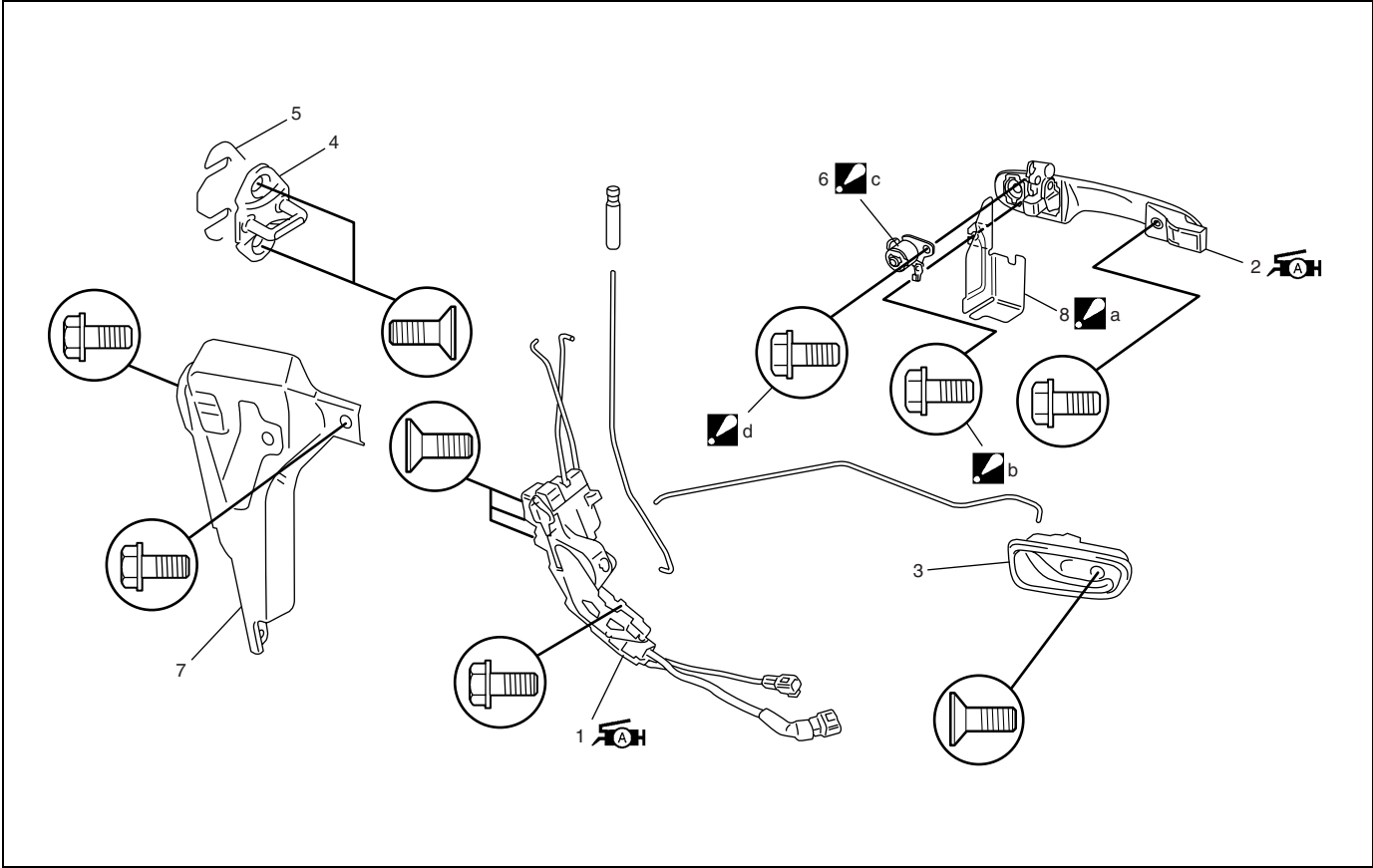
- 1) Remove 2 seat cushion nuts to remove seat cushion.
- 2) Remove 4 seat back bolts to remove seat back.
- 3) Disassemble and repair seat as necessary.




### INSTALLATION

Reverse removal procedure to install rear seat.  
Torque to specifications as shown.

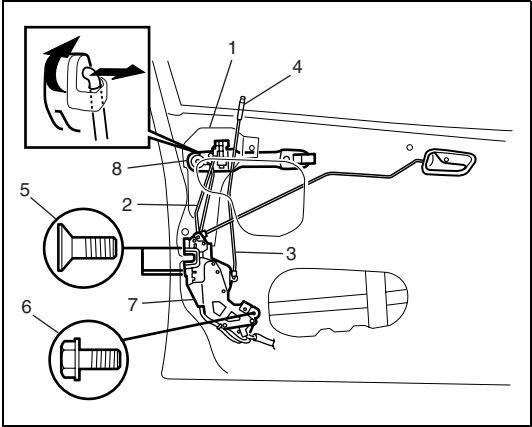
# Security and Locks

## Front Door Lock Assembly



	1. Front door latch assembly : Apply lithium grease 99000-25010 to sliding part.	4. Latch striker	7. Key cylinder
	2. Outside handle : Apply lithium grease 99000-25010 to sliding part and spring.	5. Shim	8. Key cylinder plate
	3. Inside handle bezel	6. Key cylinder	 Follow proper installing order: a Æ b Æ c Æ d

### REMOVAL

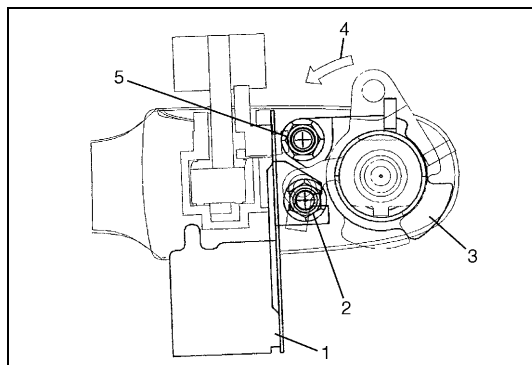


- 1) Remove front door glass referring to “FRONT DOOR GLASS” in this section.
- 2) Remove cylinder protector (1).
- 3) Disconnect door opening control rod (2) from outside handle.
- 4) Disconnect door latch control rod (3).
- 5) Disconnect door lock motor lead wire (if equipped).
- 6) Remove door lock knob (4).
- 7) Loosen door latch screw (5), door latch actuator bolt (6) and remove door lock assembly (7).
- 8) Remove key cylinder mounting bolt.
- 9) Remove key cylinder (8).

- 10) Remove key cylinder plate.

## INSTALLATION

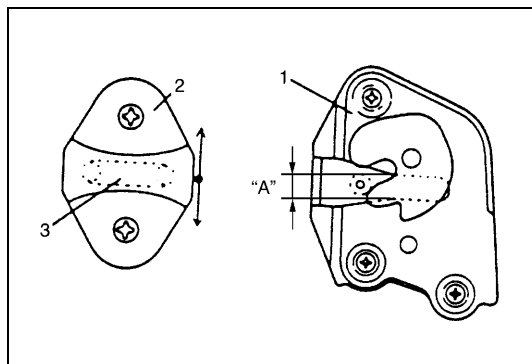
Reverse removal procedure to install front door lock assembly noting the following instructions.



- Install key cylinder as follows:
  - a) Install key cylinder plate (1).
  - b) Tighten lower outside handle screw (2).
  - c) Install key cylinder (3), and then rotate it to arrow mark (4) direction as shown.
  - d) Tighten upper outside handle screw (5).

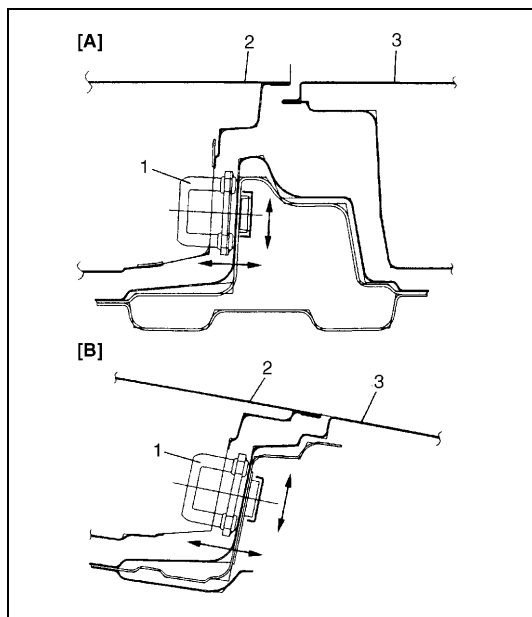
- Apply grease to sliding parts of door latch assembly.

### Grease 99000-25010



- Move door latch striker (2) up or down so its center aligns with the center of groove "A" on the door lock assembly (1) as shown.  
Striker should be moved vertically and placed level. Do not adjust door lock.

3. Shaft
----------



- Move door latch striker (1) sideways to adjust door outer panel surface (2) flush with another door outer panel or body outer panel surface (3) as shown.  
In order to correctly obtain door lock operates, increase or decrease number of shims inserted between body and striker (1) to adjust it.

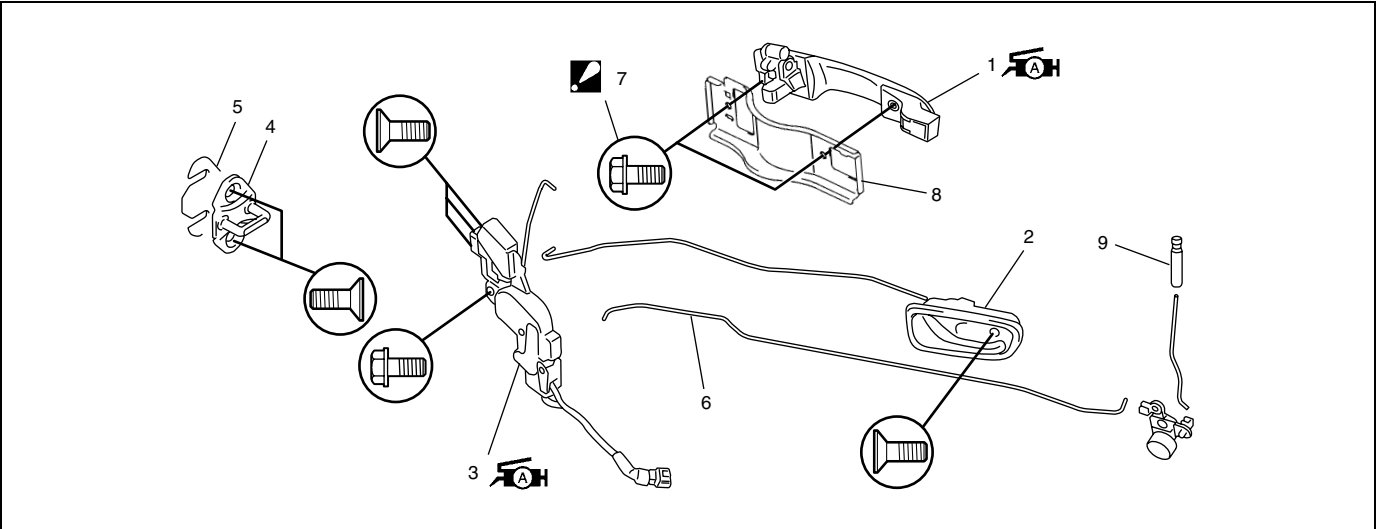
[A] : Front door
------------------




[B] : Rear door
-----------------

## INSPECTION

Check that door open and closes smoothly and properly.  
Also check that door latch half lock operates properly (check that door latch half lock keeps door from opening all the way) and door latch full locks securely when closed.  
Adjust door latch striker position, if necessary.

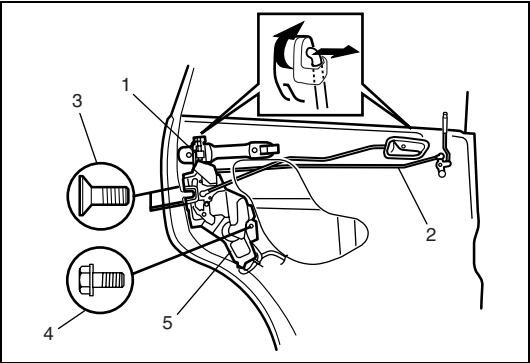
Rear Door Lock Assembly



 1. Outside handle : Apply lithium grease 99000-25010 to sliding part and spring.	4. Latch striker	 7. Out side handle mounting bolt : Tighten rear bolt first, and then tighten front bolt.
2. Inside handle bezel	5. Shim	8. Outside handle reinforcement
 3. Rear door latch assembly : Apply lithium grease 99000-25010 to sliding part.	6. Door lock control rod	9. Knob

REMOVAL

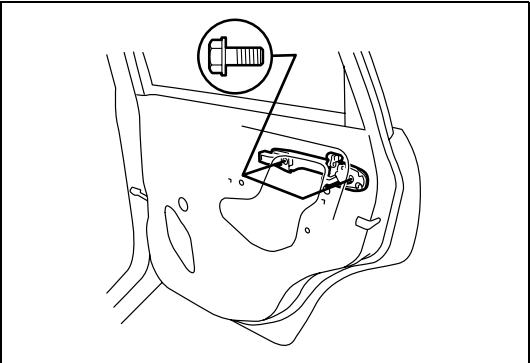
- 1) Remove rear door glass referring to “REAR DOOR GLASS” in this section.
- 2) Disconnect door opening control rod (1) and door latch control rod (2).
- 3) Loosen door latch mounting screw (3), door latch actuator bolt (4) and remove door lock assembly (5).



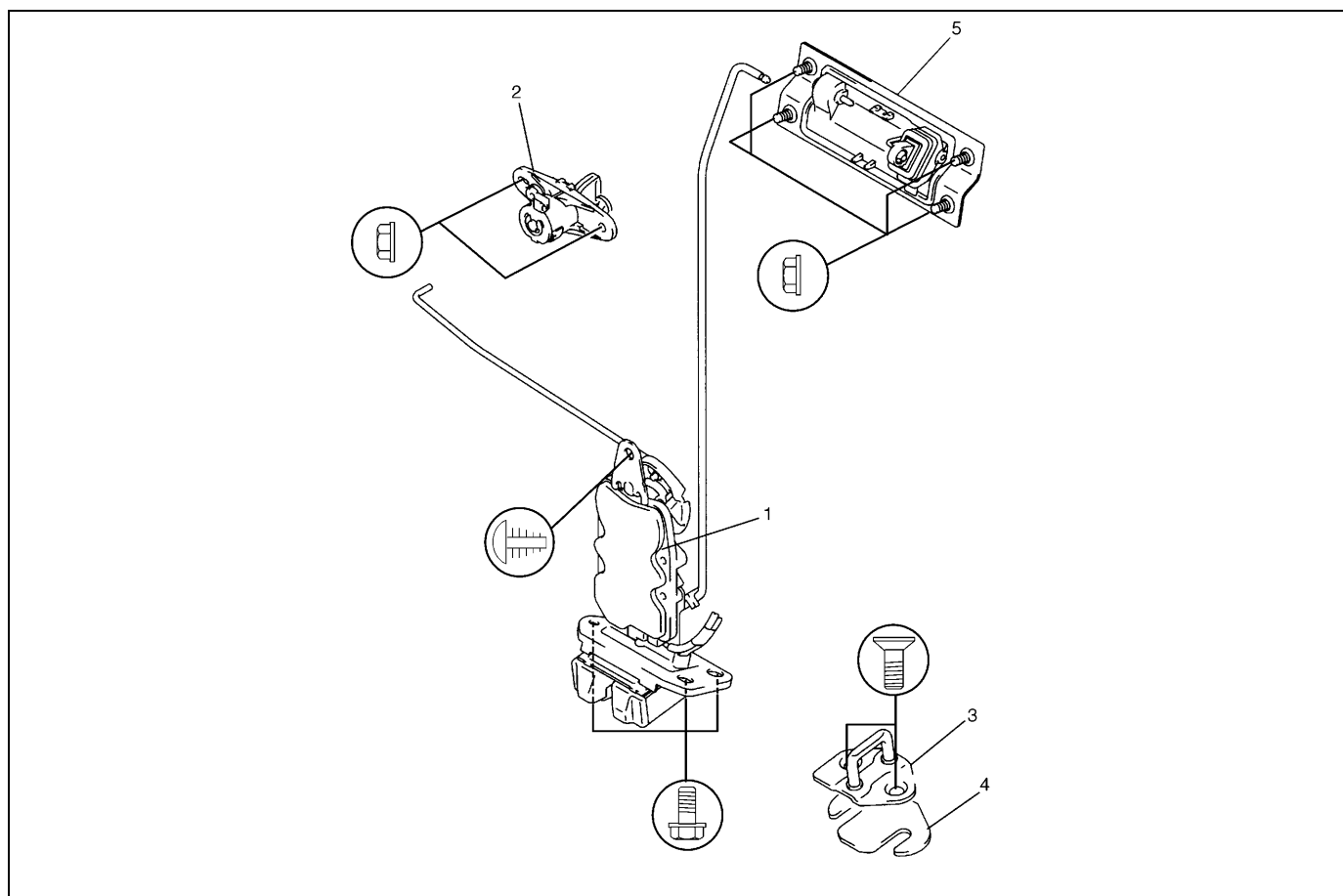
INSTALLATION

Reverse removal procedure to install rear door lock assembly referring to the following instruction and “FRONT DOOR LOCK ASSEMBLY” in this section.

- Tighten out side rear handle mounting bolt first, and then tighten out side handle front mounting bolt.

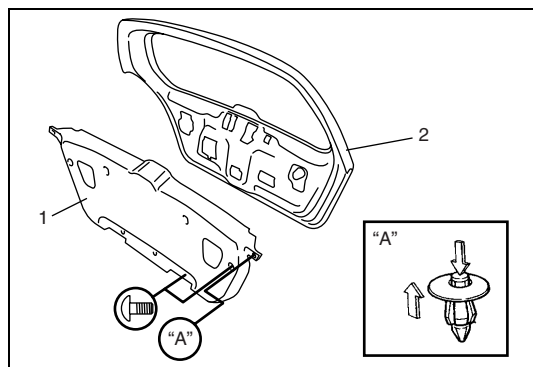


## Back Door Lock Assembly

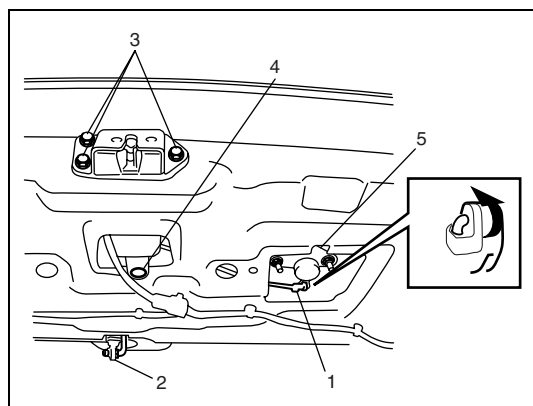


1. Back door latch assembly	3. Latch striker	5. Door handle
2. Back door lock cylinder	4. Shim	

### REMOVAL



1) Remove door trim (1) from back door panel (2).

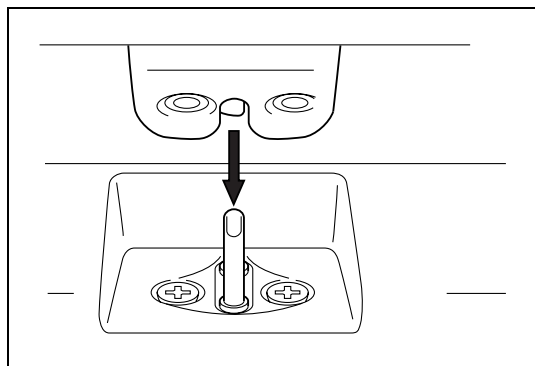


- 2) Disconnect door lock control rod (1) and door handle rod (2).
- 3) Disconnect door lock motor lead wire.
- 4) Loosen door latch bolts (3) and clip (4), and remove door latch assembly (4).
- 5) Remove back door lock cylinder (5).

## INSTALLATION

Reverse removal procedure to install back door lock assembly noting the following instruction.

- Adjust door latch striker so that its center aligns with the center of groove in door latch base.



## INSPECTION

Check that door open and closes smoothly and properly.

Also check that door latch half lock operates properly (Check that door latch half lock keeps door from opening all the way) and door latch full locks securely closed.

Adjust door latch striker position, if necessary.

## Key Coding

### Key usage and identification

Key is used for ignition and door lock cylinder. Keys are cut on both edges to make them reversible.

Key identification is obtained from five character key code stamped on key code tag. Using this key code, key code cutting combination can be determined from a code list (available to owners of key cutting equipment from suppliers).

If key codes are not available from records or tags, key code can be obtained from the right hand door lock cylinder (if lock has not been replaced). Lock cylinders supplied by the factory as service parts are unmarked.

If original key is available, key code cutting combination can be determined by laying key.

**Ignition switch lock cylinder****REMOVAL AND INSTALLATION**

Refer to “STEERING LOCK ASSEMBLY (IGNITION SWITCH)” in Section 3.

**ELECTRICAL DIAGNOSIS**

For ignition switch electrical troubleshooting, refer to “IGNITION SWITCH” in Section 8.

## **Exterior and Interior Trim**

### **Floor Carpet**

**REMOVAL**

- 1) Remove front seats and rear seat cushion.
- 2) Remove seat belt lower anchor bolt.
- 3) Remove related trims and scuffs.
- 4) Remove console box.
- 5) Remove floor carpet.

**INSTALLATION**

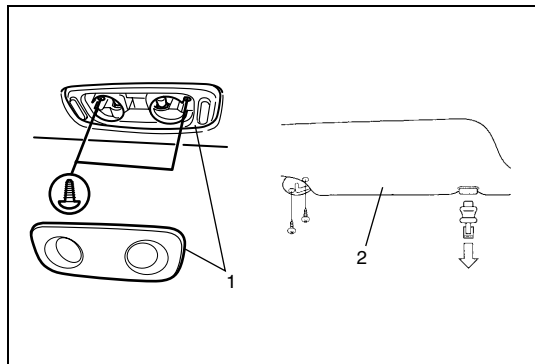
Reverse removal sequence to install front floor carpet, noting the following instruction.

- For tightening torque of seat belt anchor bolt, refer to “FRONT SEAT BELT” in Section 10.

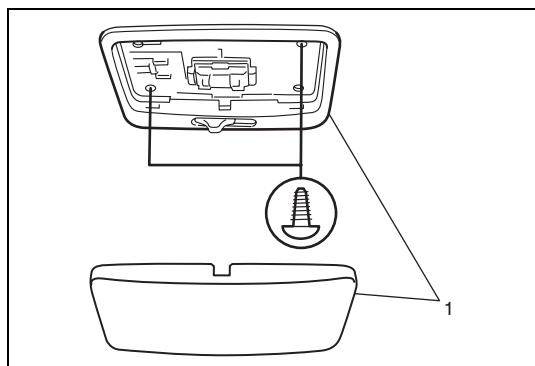


## Head Lining

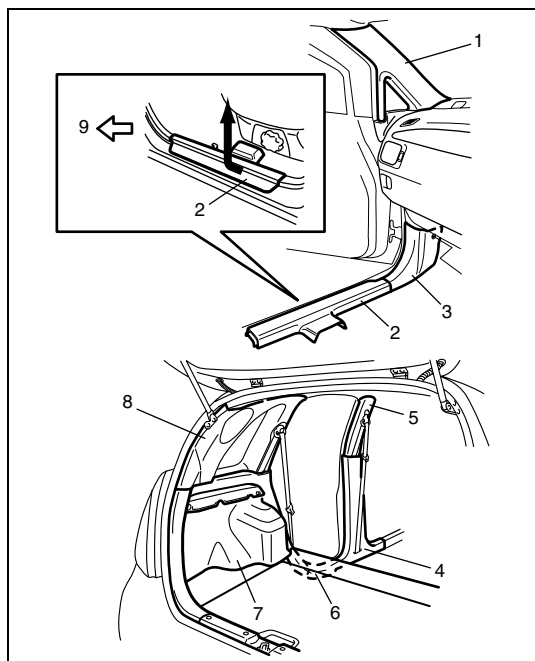
### REMOVAL



- 1) Remove spot light assembly (1), if equipped.
- 2) Remove sun visor (2).

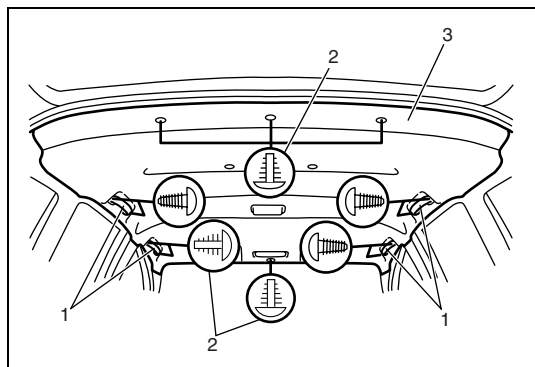


- 3) Remove doom light assembly (1).



- 4) Remove front pillar trim (1), front side sill scuff (2), front pillar lower garnish (3), center pillar inner trim (4), center pillar inner upper trim (5), rear side sill scuff (6), quarter inner trim (7) and quarter window trim (8).

9. Forward



- 5) Remove assistant grip (1).
- 6) Remove head lining clips (2) and remove head lining (3).

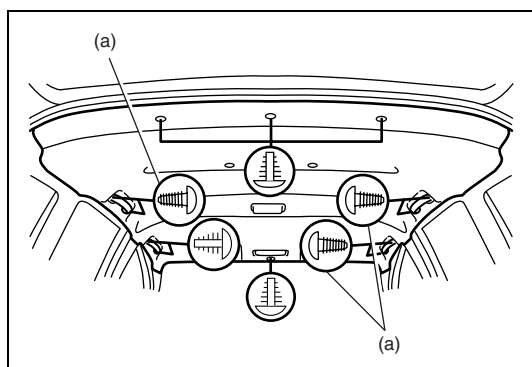
## INSTALLATION

Reverse removal procedure to install head lining noting the following instructions.

- Tighten assistant grip screw to specified torque.

### Tightening torque

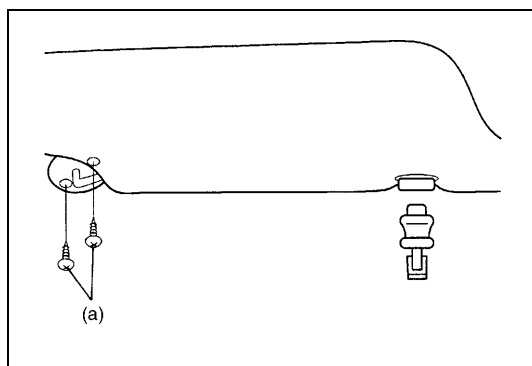
**Assistant grip screw (a) : 4 N·m (0.4 kg·m, 2.8 lb·ft)**



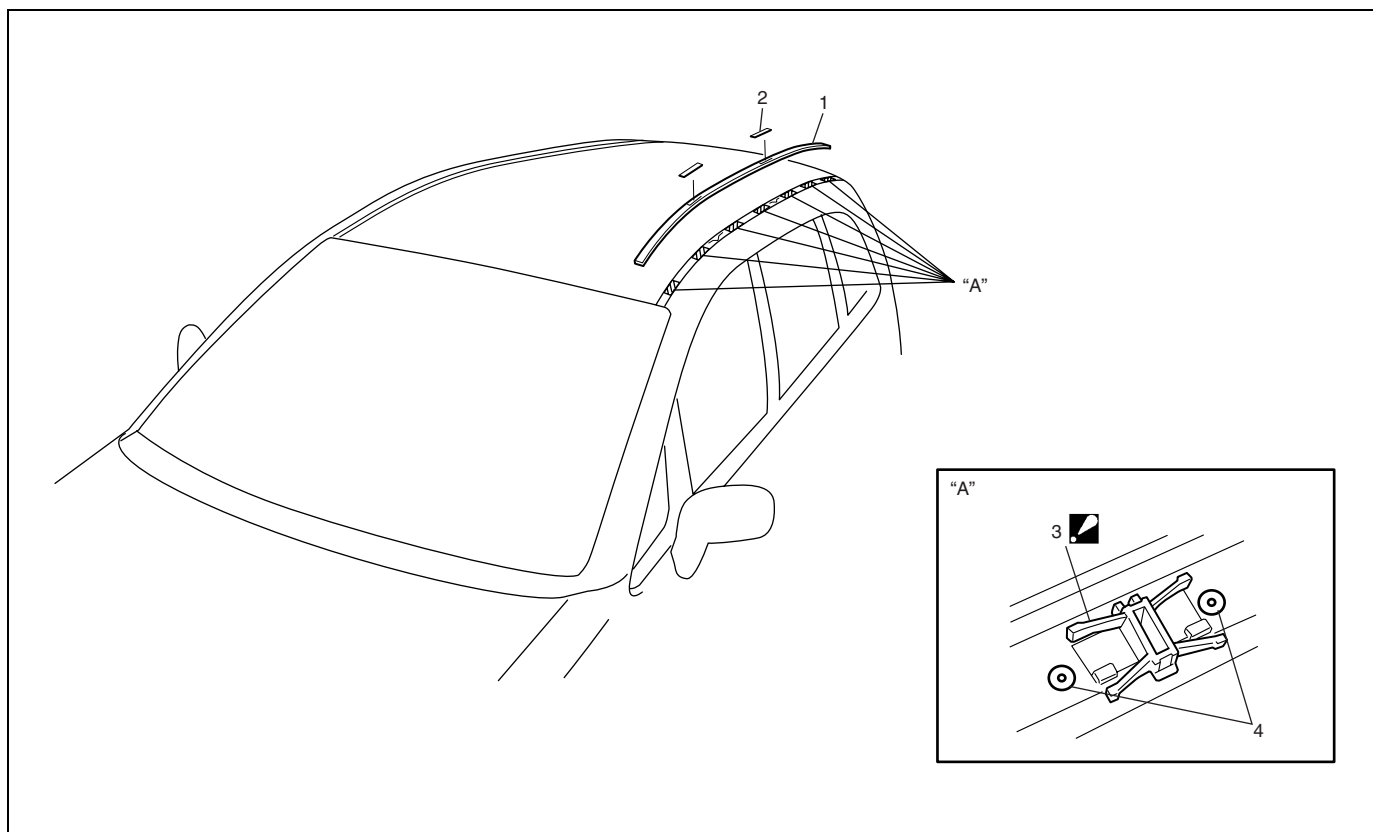
- Tighten sun visor screw to specified torque.

### Tightening torque

**Sun visor screw (a) : 4 N·m (0.4 kg·m, 2.8 lb·ft)**



## Roof Molding



1. Roof molding

2. Roof molding cap



3. Roof molding clip  
: Locate between punch marks as shown  
Come into contact with flange.

4. Punch mark

## Paint and Coatings

### Anti-Corrosion Treatment

**WARNING:**

**Standard shop practices, particularly eye protection, should be followed during the performance of the below-itemized operations to avoid personal injury.**

As rust proof treatment, steel sheets are given corrosion resistance on the interior and/or exterior. These corrosion resistance steel sheet materials are called one of two-side galvanized steel sheets. It is for the sake of rust protection that these materials are selected and given a variety of treatments as described below.

- Steel sheets are treated with cathodic electroprimer which is excellent in corrosion resistance.
- Rust proof wax coatings are applied to door and side sill insides where moisture is liable to stay.
- Vinyl coating is applied to body underside and wheel housing inside.
- Sealer is applied to door hem, engine compartment steel sheet-to-steel sheet joint, and the like portions to prevent water penetration and resulting in rust occurrence.

In panel replacement or collision damage repair, leaving the relevant area untreated as it is in any operation which does disturb the above-mentioned rust proof treatment will cause corrosion to that area. Therefore, it is the essential function of any repair operation to correctly recoat the related surfaces of the relevant area.

All the metal panels are coated with metal conditioners and primer coating during vehicle production. Following the repair and/or replacement parts installation, every accessible bare metal surface should be cleaned and coated with rust proof primer. Perform this operation prior to the application of sealer and rust proof wax coating. Sealer is applied to the specific joints of a vehicle during production. The sealer is intended to prevent dust from entering the vehicle and serves also as an anticorrosion barrier. The sealer is applied to the door and hood hem areas and between panels. Correct and reseal the originally sealed joints if damaged. Reseal the attaching joints of a new replacement panel and reseal the hem area of a replacement door or hood.

Use a quality sealer to seal the flanged joints, overlap joints and seams. The sealer must have flexible characteristics and paint ability after it's applied to repair areas.

For the sealer to fill open joints, use caulking material. Select a sealer in conformance with the place and purpose of a specific use. Observe the manufacturer's label-stand instructions when using the sealer.

In many cases, repaired places require color painting. When this is required, follow the ordinary techniques specified for the finish preparation, color painting and undercoating build-up.

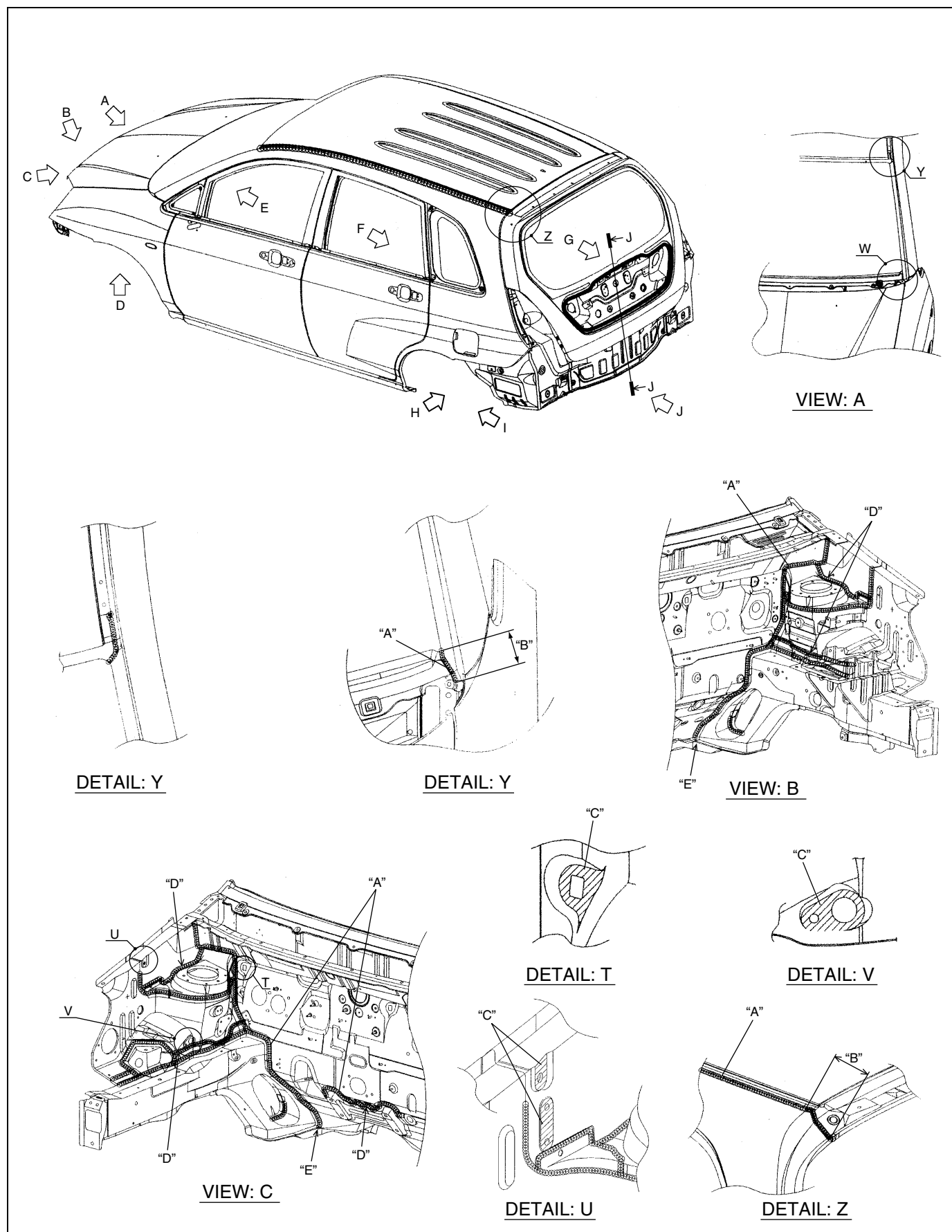
Rust proof wax, a penetrative compound, is applied to the metal-to-metal surfaces (door and side sill insides) where it is difficult to use ordinary undercoating material for coating. Therefore, when selecting the rust proof wax, it may be the penetrative type.

During the undercoating (vinyl coating) application, care should be taken that sealer is not applied to the engine-related parts and shock absorber mounting or rotating parts. Following the under coating, make sure that body drain holes are kept open.

The sequence of the application steps of the anti-corrosion materials are as follows:

- 1) Clean and prepare the metal surface.
- 2) Apply primer.
- 3) Apply sealer (all joints sealed originally).
- 4) Apply color in areas where color is required such as hem flanges, exposed joints and under body components.
- 5) Apply anticorrosion compound (penetrative wax).
- 6) Apply undercoating (rust proof material).

# Sealant Application Areas



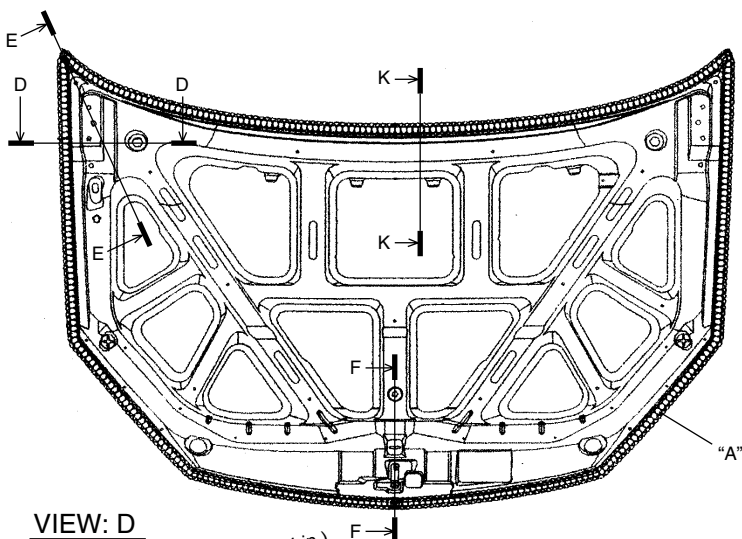
"A" : Apply sealant.

"C" : Do not apply sealant.

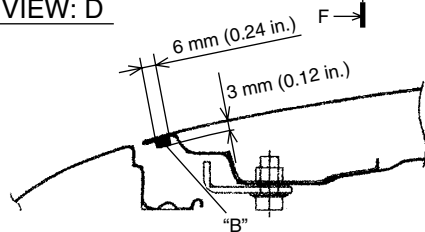
"E" : Apply sealant on hole.

"B" : Wipe off excess sealant after application.

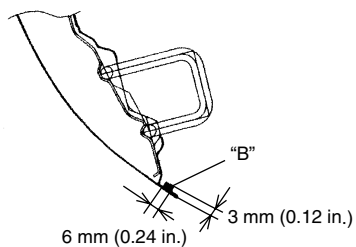
"D" : Smooth out sealant with a brush.



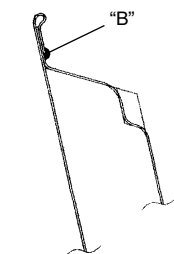
VIEW: D



SECT: D-D



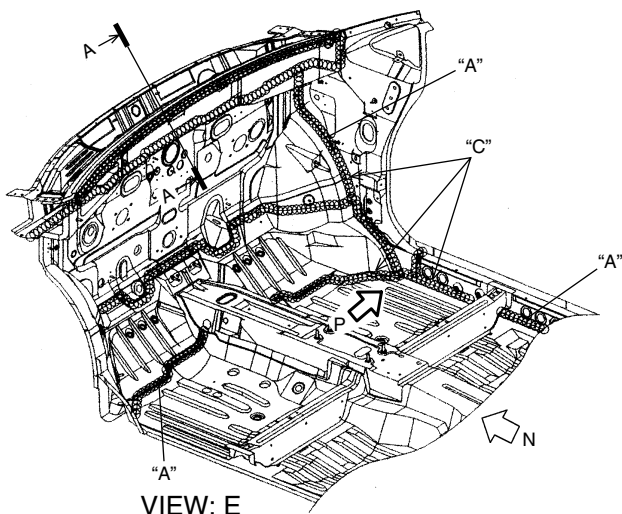
SECT: F-F



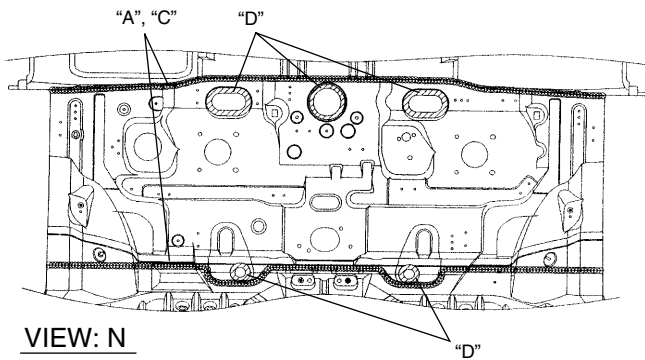
SECT: K-K



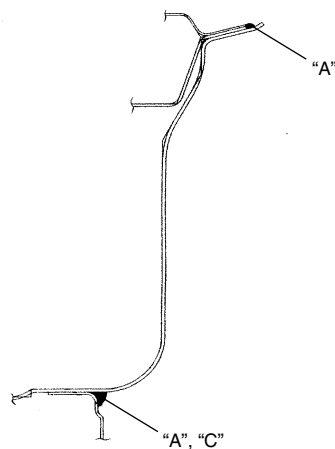
SECT: E-E



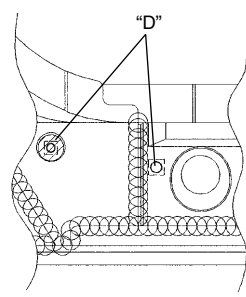
VIEW: E



VIEW: N

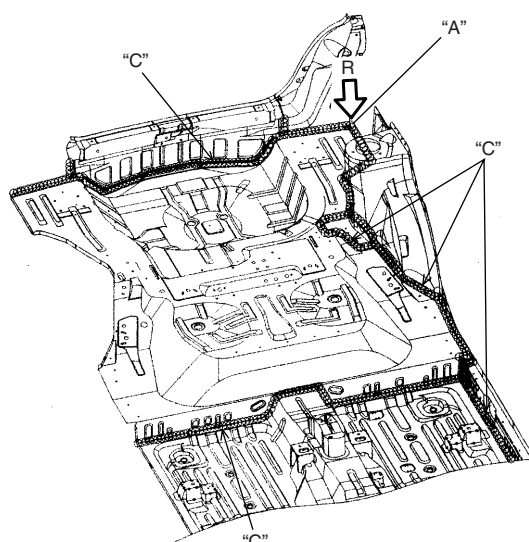


SECT: A-A

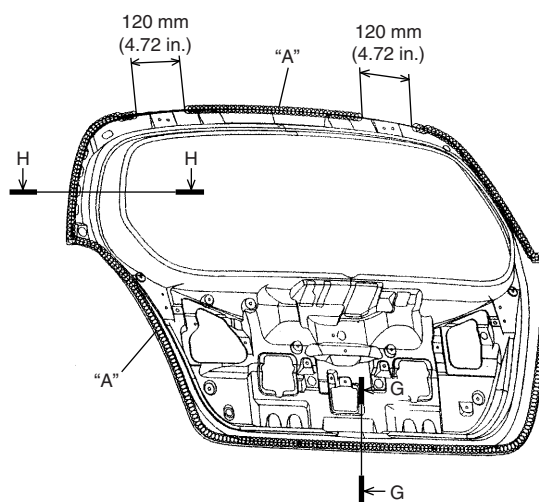


VIEW: P

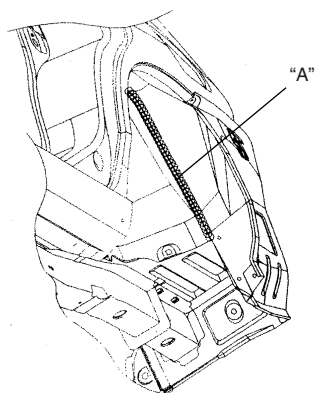
"A" : Apply sealant.	"C" : Smooth out sealant with a brush.
"B" : Apply sealant covering flange end.	"D" : Do not apply sealant.



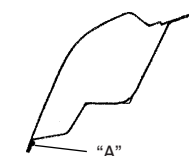
VIEW: F



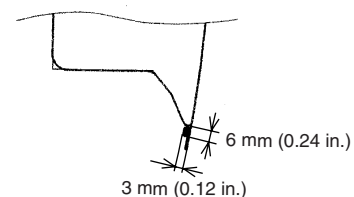
VIEW: G



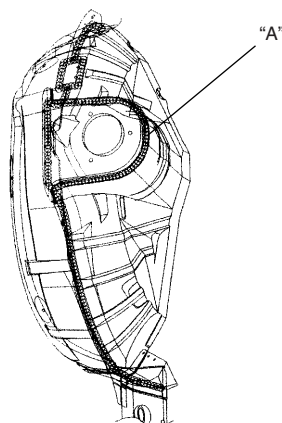
VIEW: H



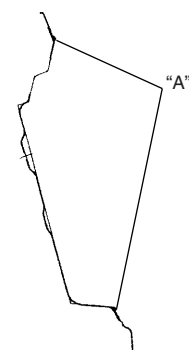
SECT: H-H



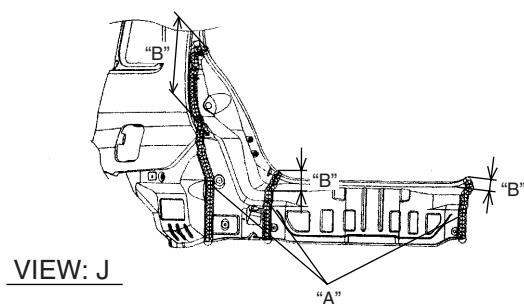
SECT: G-G



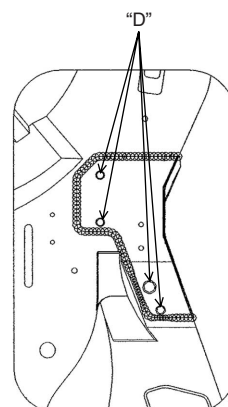
VIEW: I



SECT: J-J

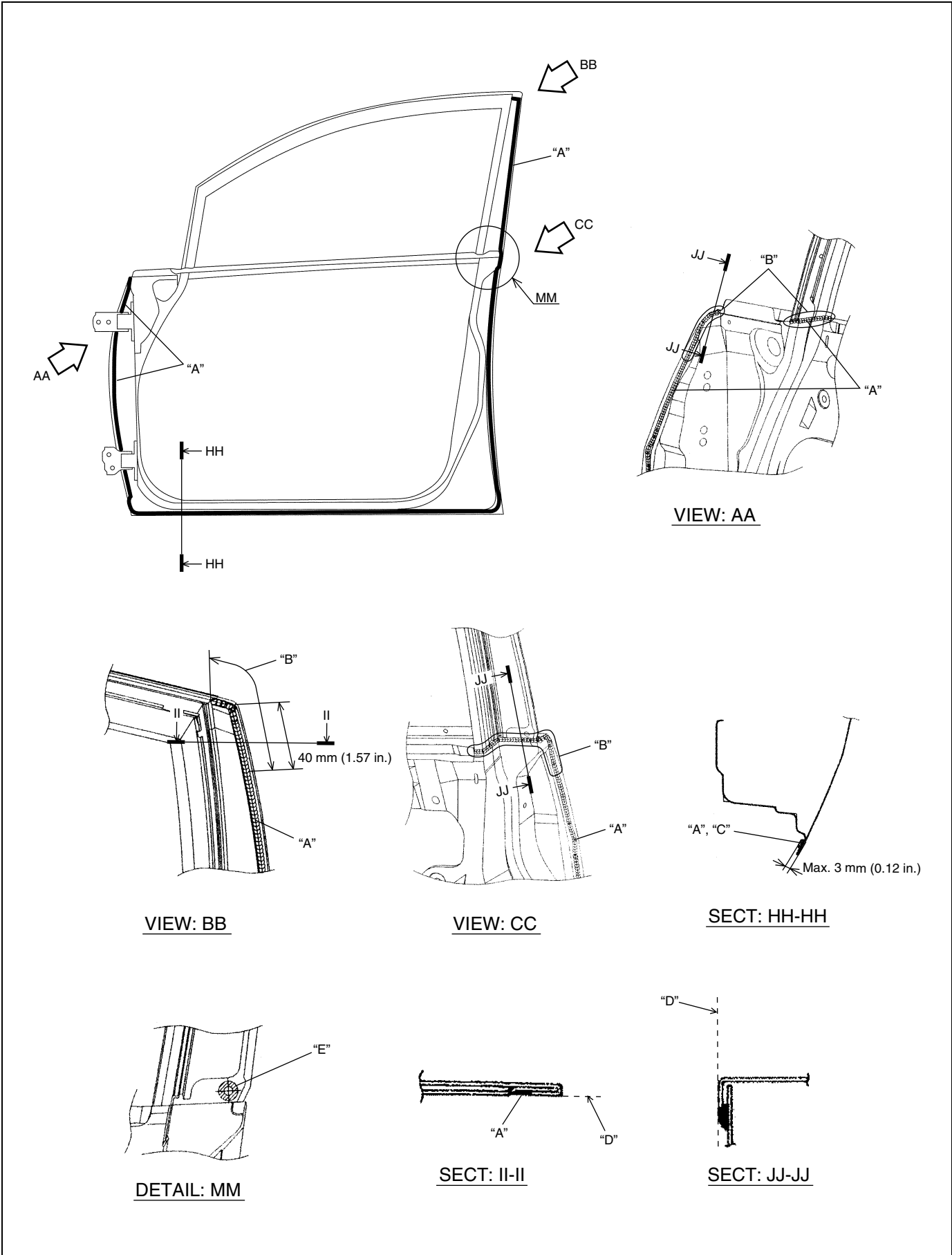


VIEW: J

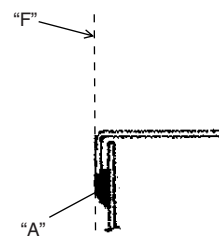
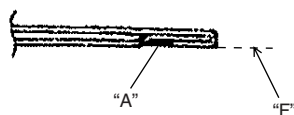
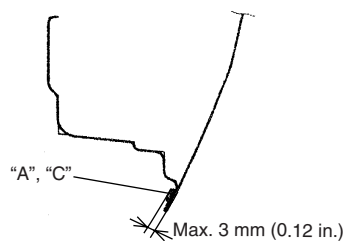
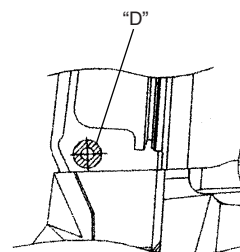
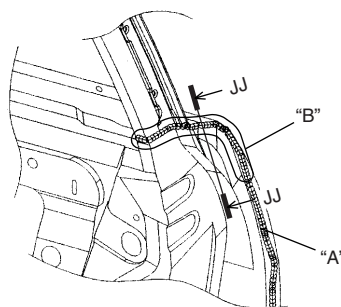
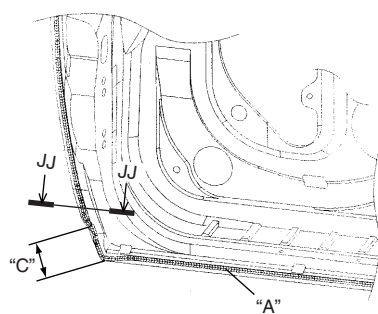
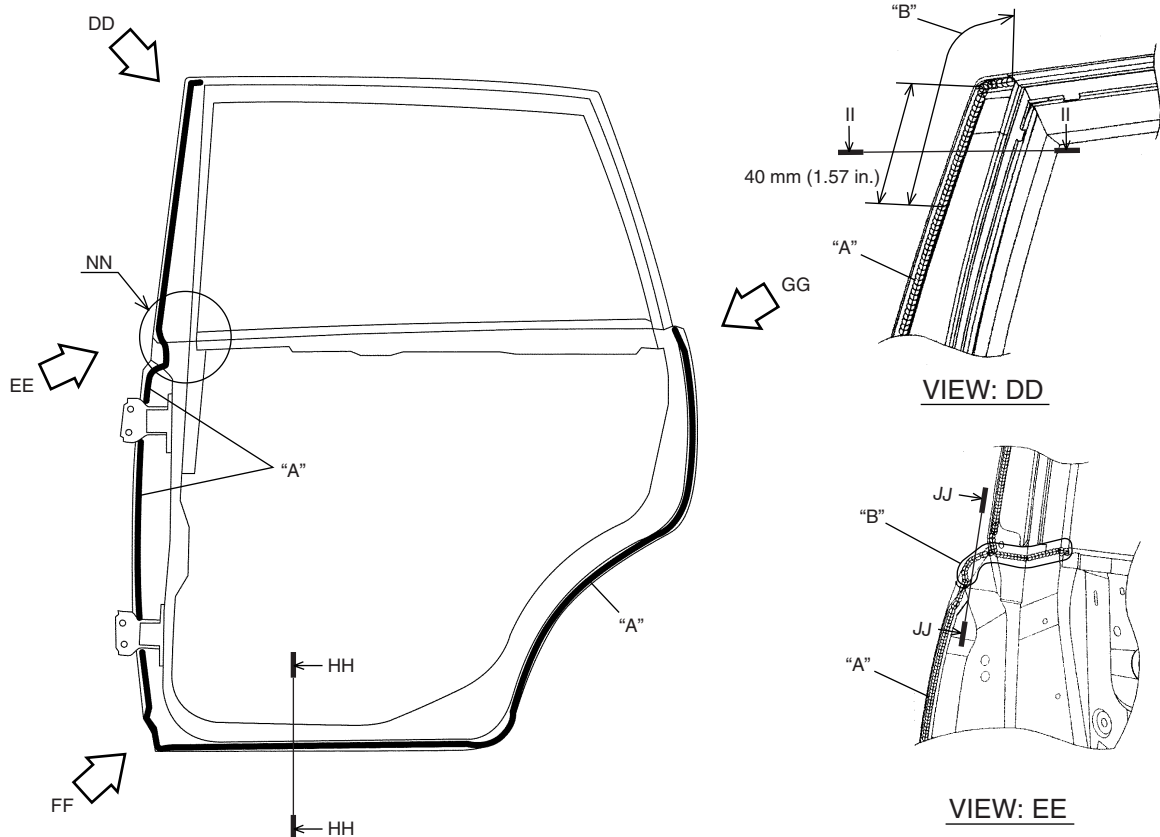


VIEW: R

"A" : Apply sealant.	"C" : Smooth out sealant with a brush.
"B" : Wipe off excess sealant after application.	"D" : Must be free from sealant.

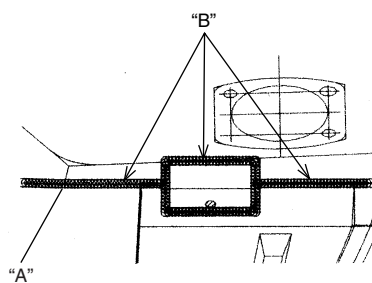
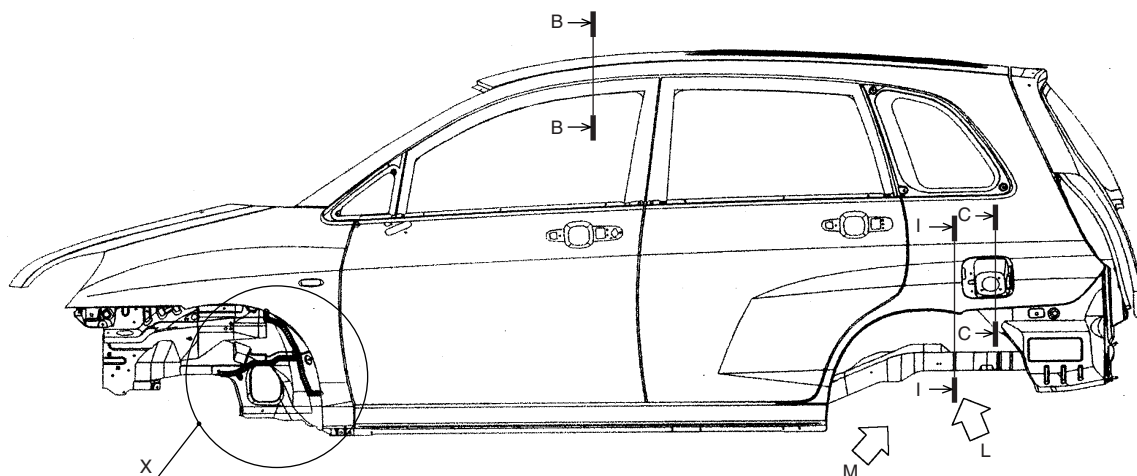


"A" : Apply sealant.	"D" : Wipe off sealant so as not to over-flow from this surface.
"B" : Wipe off swell sealant.	"E" : Do not apply sealant.
"C" : Never fill up drain holes.	

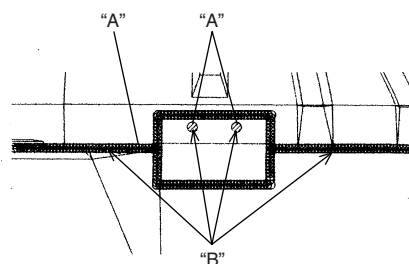


"A" : Apply sealant.	"D" : Do not apply sealant.
"B" : Wipe off swell sealant.	"E" : Wipe off sealant so as not to over-flow from this surface.
"C" : Smooth out sealant with brush.	

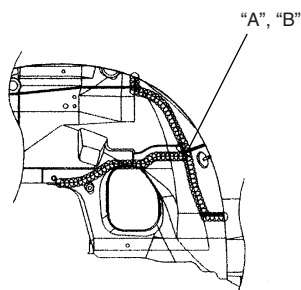




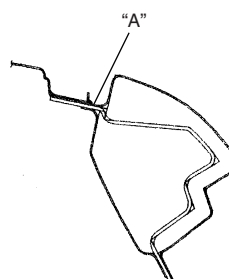
VIEW: L (LH ONLY)



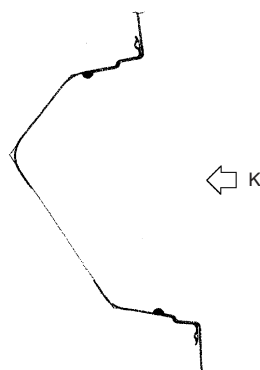
VIEW: M (RH ONLY)



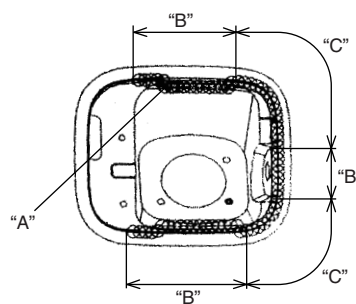
DETAIL: X



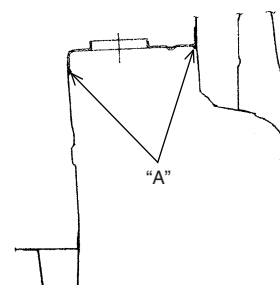
SECTION: B-B



SECTION: C-C



VIEW: K



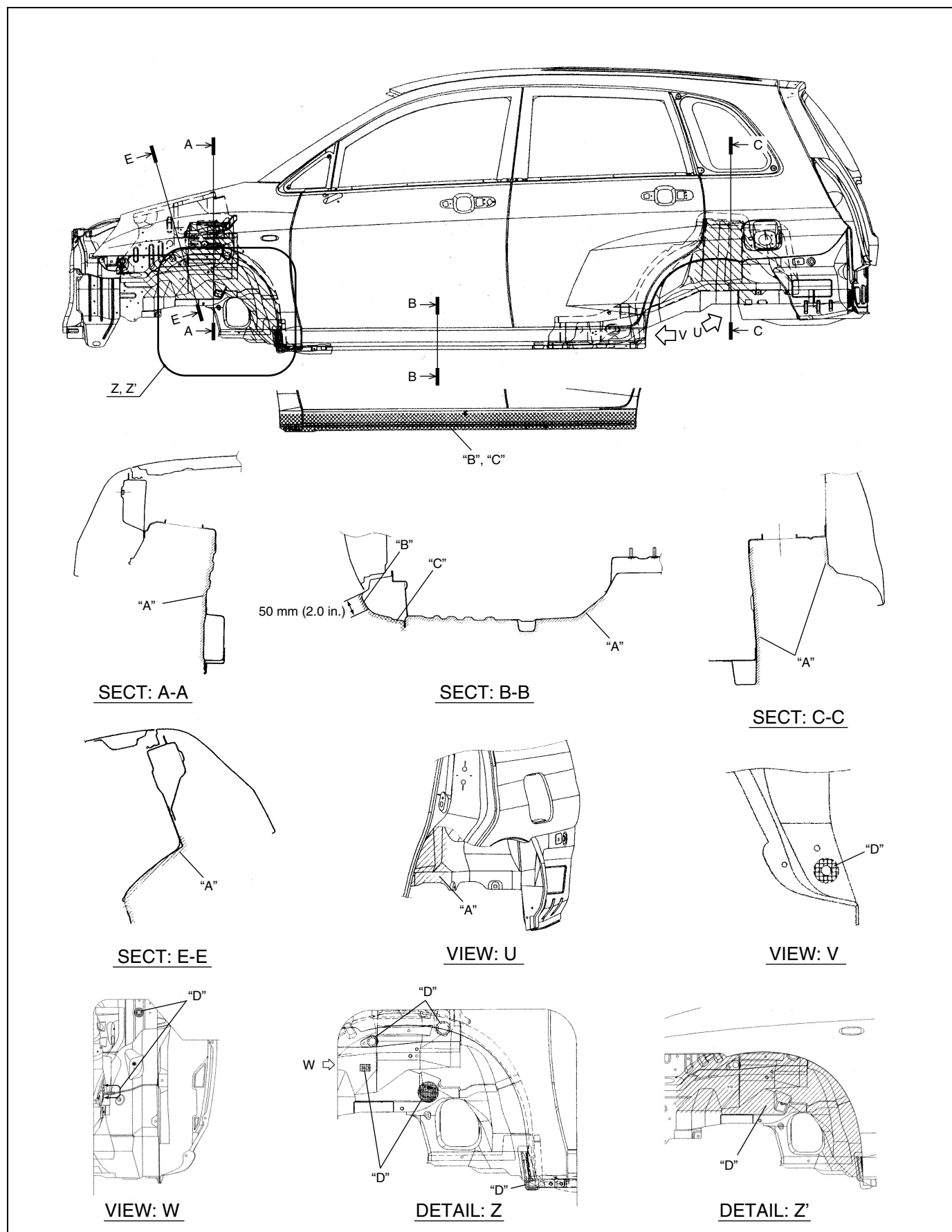
SECTION: I-I

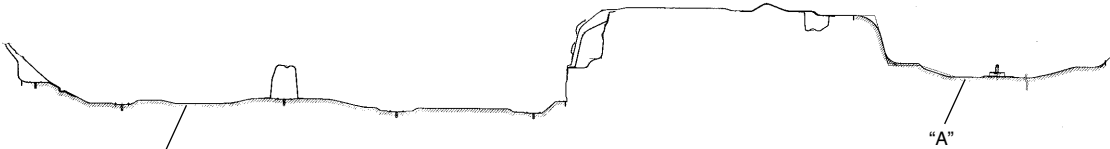
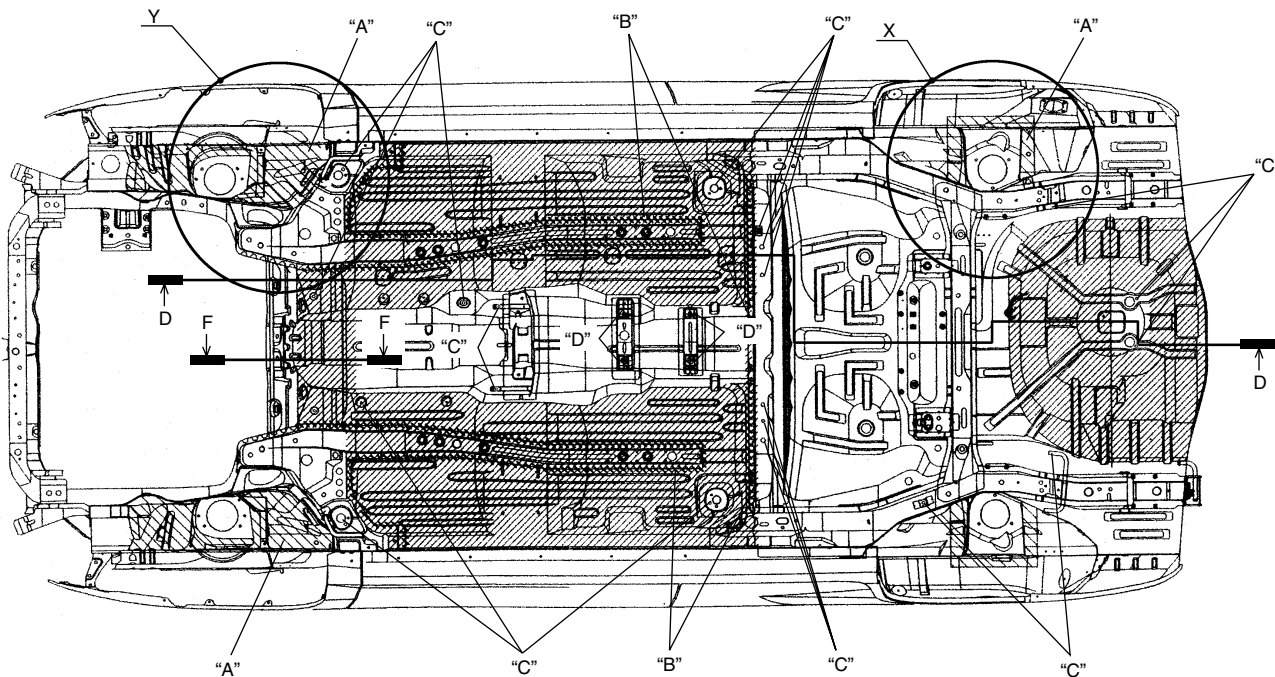
"A" : Apply sealant.

"B" : Smooth out sealant with a brush.

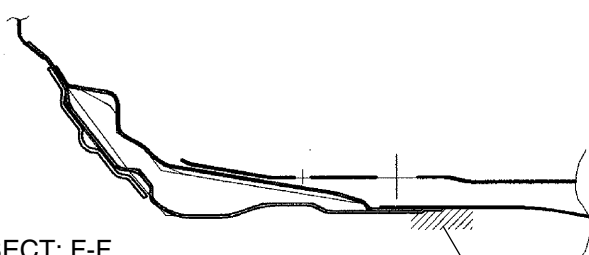
"C" : Wipe off excess sealant after application.

# Under Coating Application Areas

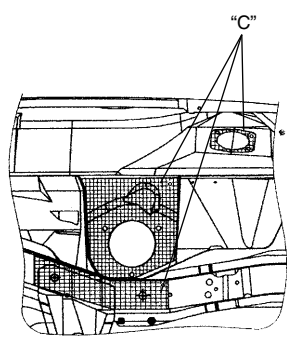




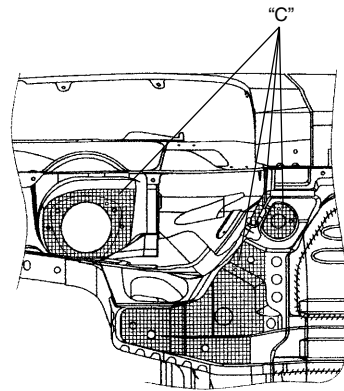
SECT: D-D



SECT: F-F



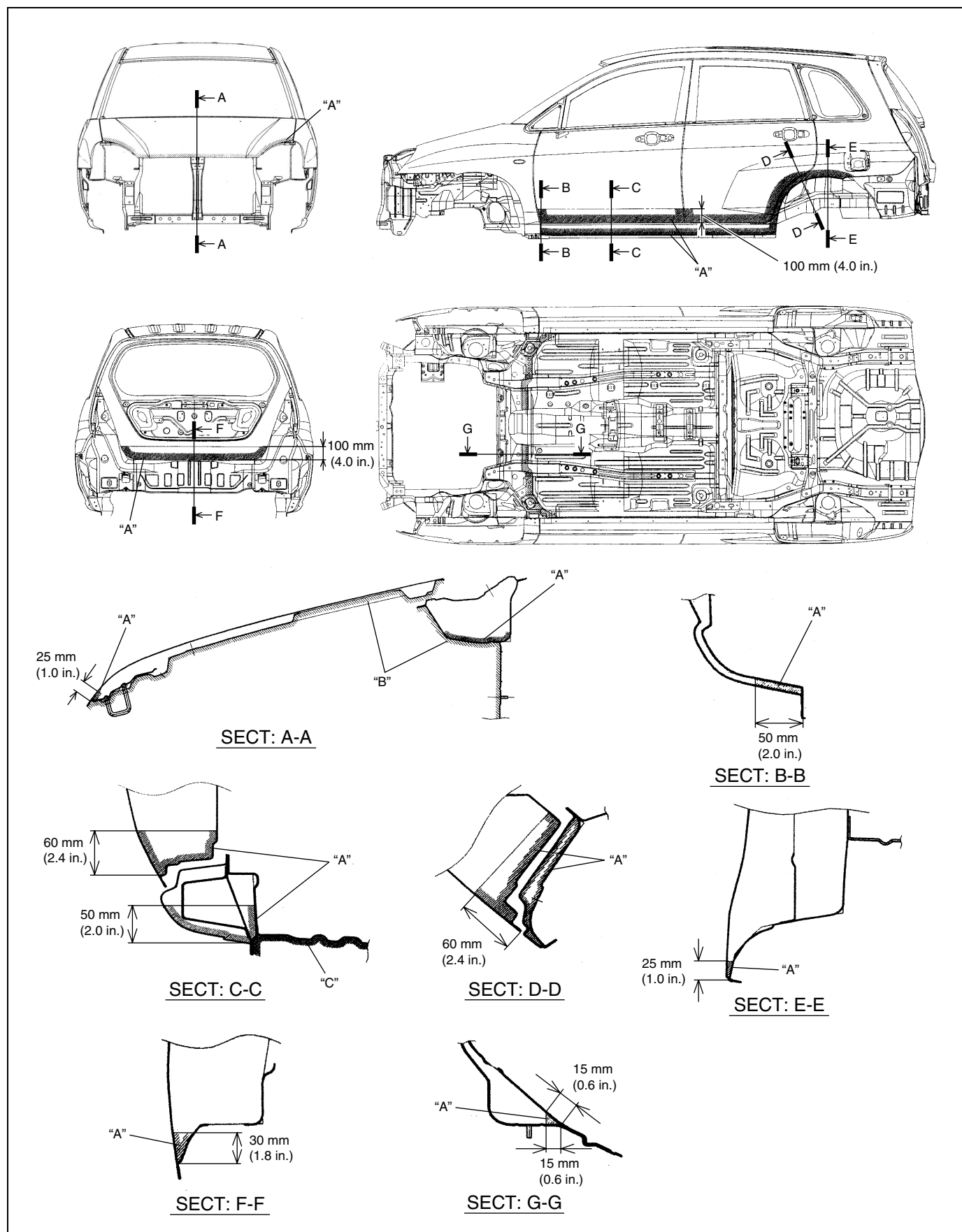
DETAIL: X



DETAIL: Y

"A" : Apply undercoating (PCV, 400 µm or more).	"C" : Do not apply undercoating.
"B" : Apply undercoating (PCV, 600 µm or more).	"D" : Do not apply undercoating (4WD model only).

# Anti-Corrosion Compound Application Area



"A" : Apply rust proof wax (hot wax 50 µm or more).
"B" : Apply rust proof wax (low viscosity wax 10 µm or more).
"C" : Apply rust proof wax (high viscosity wax 50 µm or more).

## PLASTIC PARTS FINISHING

Paintable plastic parts are ABS plastic parts.

### Painting

Rigid or hard ABS plastic needs no primer coating.

General acrylic lacquers can be painted properly over hard ABS plastic in terms of adherence.

- 1) Use cleaning solvent for paint finish to wash each part.
- 2) Apply conventional acrylic color lacquer to part surface.
- 3) Follow lacquer directions for required drying time. (Proper drying temperature range is 60 – 70 °C (140 – 158 °F)).

### Reference

Plastic parts employ not only ABS (Acrylonitrile Butadiene Styrene) plastic but also polypropylene, vinyl, or the like plastic. Burning test method to identify ABS plastic is described below.

- 1) Use a sharp blade to cut off a plastic sliver from the part at its hidden backside.
- 2) Hold sliver with pincers and set it on fire.
- 3) Carefully observe condition of the burning plastic.
- 4) ABS plastic must raise readily distinguishable black smoke while burning with its residue suspended in air temporarily.
- 5) Polypropylene must raise no readily distinguishable smoke while burning.

## Required Service Material

Material	Recommended SUZUKI product	Use
Lithium grease	SUZUKI SUPER GREASE A (99000-25010)	<ul style="list-style-type: none"> <li>• Window regulator</li> <li>• Door hinge</li> </ul>
Sealant	SUZUKI BOND No. 1215 (99000-31110)	<ul style="list-style-type: none"> <li>• Hood hinge</li> <li>• Door hinge</li> </ul>

## SECTION 10

# RESTRAINT SYSTEM

**WARNING:**

For vehicles equipped with Supplemental Restraint (Air Bag) System with seat belt pretensioner:

- Service on or around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Please observe all WARNINGS and “Service Precautions” under “On-Vehicle Service” in air bag system section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintentional activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.
- The procedures in this section must be followed in the order listed to disable the air bag system temporarily and prevent false diagnostic trouble codes from setting. Failure to follow procedures could result in possible activation of the air bag system, personal injury or otherwise unneeded air bag system repairs.

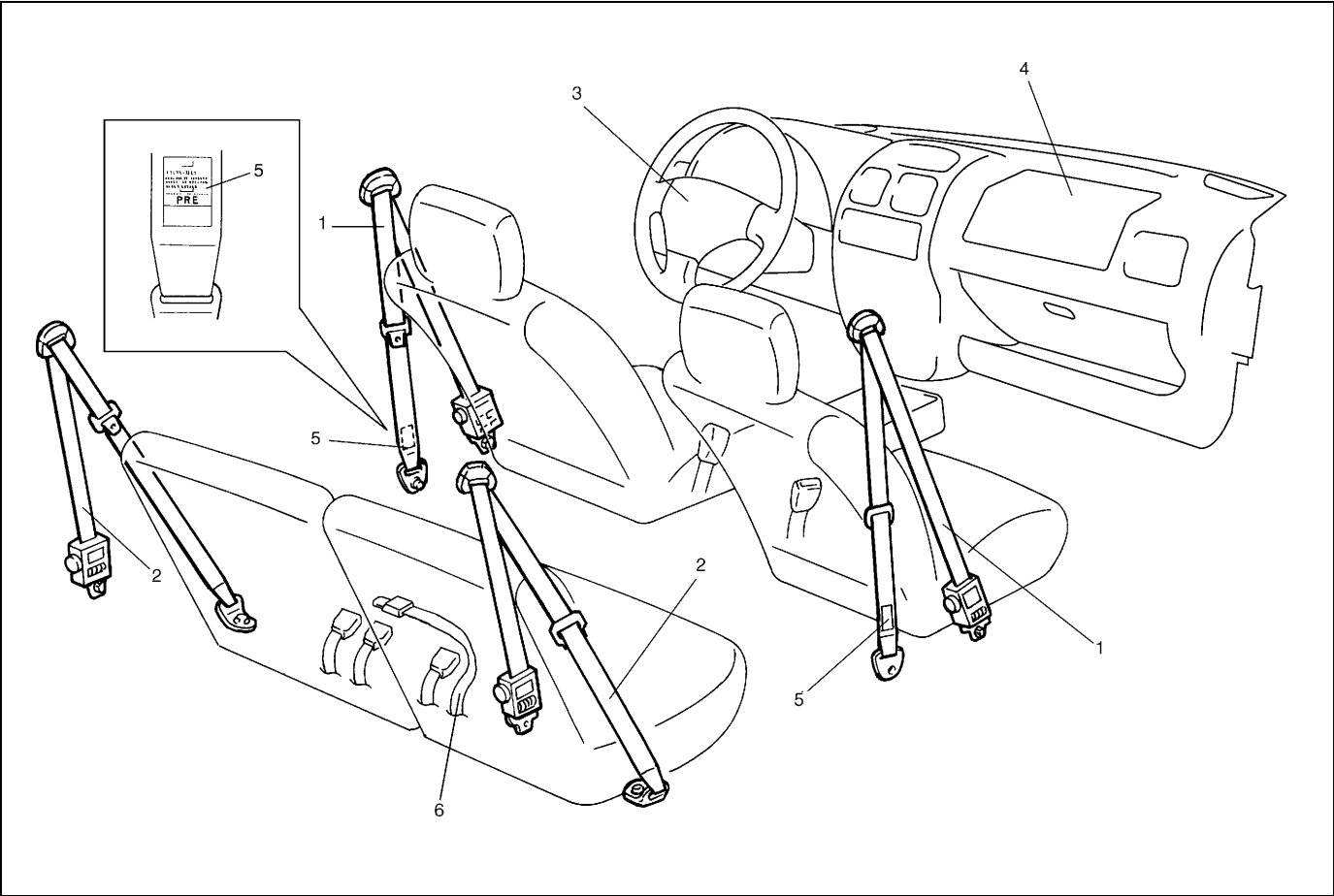
**10****CAUTION:**

When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread-locking compound, will be called out. The correct torque value must be used when installing fasteners that require it. If the above procedures are not followed, parts or system damage could result.

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# General Description



1. Front seat belt	4. Passenger air bag (if equipped)
2. Rear seat belt	5. Label (for seat belt with pretensioner)
3. Driver air bag (if equipped)	6. Rear center seat belt

## Seat belt with ELR

The seat belt with emergency locking retractor (ELR) is designed so that it locks immediately (to prevent the webbing from being pulled out of the retractor any further) when any of the following items is detected as exceeding each set value;

- speed at which the webbing is pulled out of the retractor,
- acceleration or deceleration of the vehicle speed, and
- inclination.

## Seat belt with A-ELR

The automatic and emergency locking retractor (A-ELR) works as an Emergency Locking Retractor (ELR) till its webbing is pulled all the way out and then on as an Automatic Locking Retractor (ALR) till it is retracted fully.  
ALR: Automatically locks when the webbing is pulled out from the retractor and allowed to retract even a little. Then the webbing can not be pulled out any further, unless it is wound all the way back into the retractor, which releases the lock and allows the webbing to be pulled out.

## Seat belt with ELR and pretensioner

The seat belt with ELR and a pretensioner has a pretensioner mechanism which operates in linkage with the air bag in addition to the above described ELR. The pretensioner takes up the sag of the seat belt in occurrence of a front collision with an impact larger than a certain set value, thereby enhancing restraint performance.

## System Specification

	Type 1	Type 2
<b>Front seat</b>	<ul style="list-style-type: none"> <li>• Seat belt with ELR</li> </ul>	<ul style="list-style-type: none"> <li>• Driver and passenger air bags</li> <li>• Side air bag (if equipped)</li> <li>• Seat belt with ELR and pretensioner</li> </ul>
<b>Rear seat</b>	<ul style="list-style-type: none"> <li>• Seat belt with A-ELR (right and left)</li> <li>• Seat belt (center)</li> </ul>	<ul style="list-style-type: none"> <li>• Seat belt with A-ELR (right and left)</li> <li>• Seat belt (center)</li> </ul>

## Seat Belt Pretensioner (If Equipped)

Some seat belts of the driver and front passenger seats are provided with a pretensioner as an optional function unit. The pretensioner is incorporated in retractor assembly and controlled by SDM as one of air bag system components. It will be activated at the same time as the air bag when an impact at the front of vehicle exceeds the specified value.

When servicing seat belt (retractor assembly) with pretensioner, be sure to observe all WARNINGS and CAUTIONS in this section and “SERVICE PRECAUTIONS” of “ON-VEHICLE SERVICE” in Section 10B

### CAUTION:

**Do not reuse the seat belt pretensioner (retractor assembly) that has operated but replace it with a new one as an assembly. For checking procedure of its operation, refer to “SERVICE PRECAUTIONS” of “ON-VEHICLE SERVICE” in Section 10B.**

## Diagnosis

For diagnosis of air bag system (including in seat belt pretensioner), refer to Section 10B.

## Inspection and Repair Required after Accident

After an accident, whether the seat belt pretensioner has been activated or not, be sure to perform checks and repairs described on “REPAIRS AND INSPECTIONS REQUIRED AFTER AN ACCIDENT” under “DIAGNOSIS” in Section 10B.



## On-Vehicle Service

### Service Precautions

#### Service and diagnosis

**WARNING:**

If replacing seat belt is necessary, replace buckle and ELR (or webbing) together as a set. This is for the reason of ensuring locking of tongue plate with buckle.

If these parts are replaced individually, such a locking condition may become unreliable. For this reason, SUZUKI will supply only the spare buckle and ELR (or webbing) in a set part.

Before servicing or replacing seat belts, refer to the following precautionary items.

- Seat belts should be normal relative to strap retractor and buckle portions.
- Keep sharp edges and damaging objects away from belts.
- Avoid bending or damaging any portion of belt buckle or latch plate.
- Do not bleach or dye belt webbing. (Use only mild soap and lukewarm water to clean it.)
- When installing a seat belt anchor bolt, it should be tightened by hand at first to prevent cross-threading and then to specified torque.
- Do not attempt any repairs on retractor mechanisms or retractor covers. Replace defective assemblies with new replacement parts.
- Keep belts dry and clean at all times.
- If there exist any parts in question, replace such parts.
- Replace belts whose webbing is cut or otherwise damaged.
- Do not put anything into trim panel opening which seat belt webbing passes through.

#### For seat belt with pretensioner

Refer to “SERVICE AND DIAGNOSIS” of “SERVICE PRECAUTIONS” under “ON-VEHICLE SERVICE” in Section 10B.

**WARNING:**

When performing service on or around air bag system components or air bag system wiring, disable the air bag system. Refer to “DISABLING AIR BAG SYSTEM” of “SERVICE PRECAUTIONS” under “ON-VEHICLE SERVICE” in Section 10B.

Failure to follow procedures could result in possible air bag activation, personal injury or unneeded air bag system repairs.

#### Disabling air bag system

Refer to “DISABLING AIR BAG SYSTEM” of “SERVICE PRECAUTIONS” under “ON-VEHICLE SERVICE” in Section 10B.

#### Enabling air bag system

Refer to “ENABLING AIR BAG SYSTEM” of “SERVICE PRECAUTIONS” under “ON-VEHICLE SERVICE” in Section 10B.

#### Handling and storage

Refer to “HANDLING AND STORAGE” of “SERVICE PRECAUTIONS” under “ON-VEHICLE SERVICE” in Section 10B.

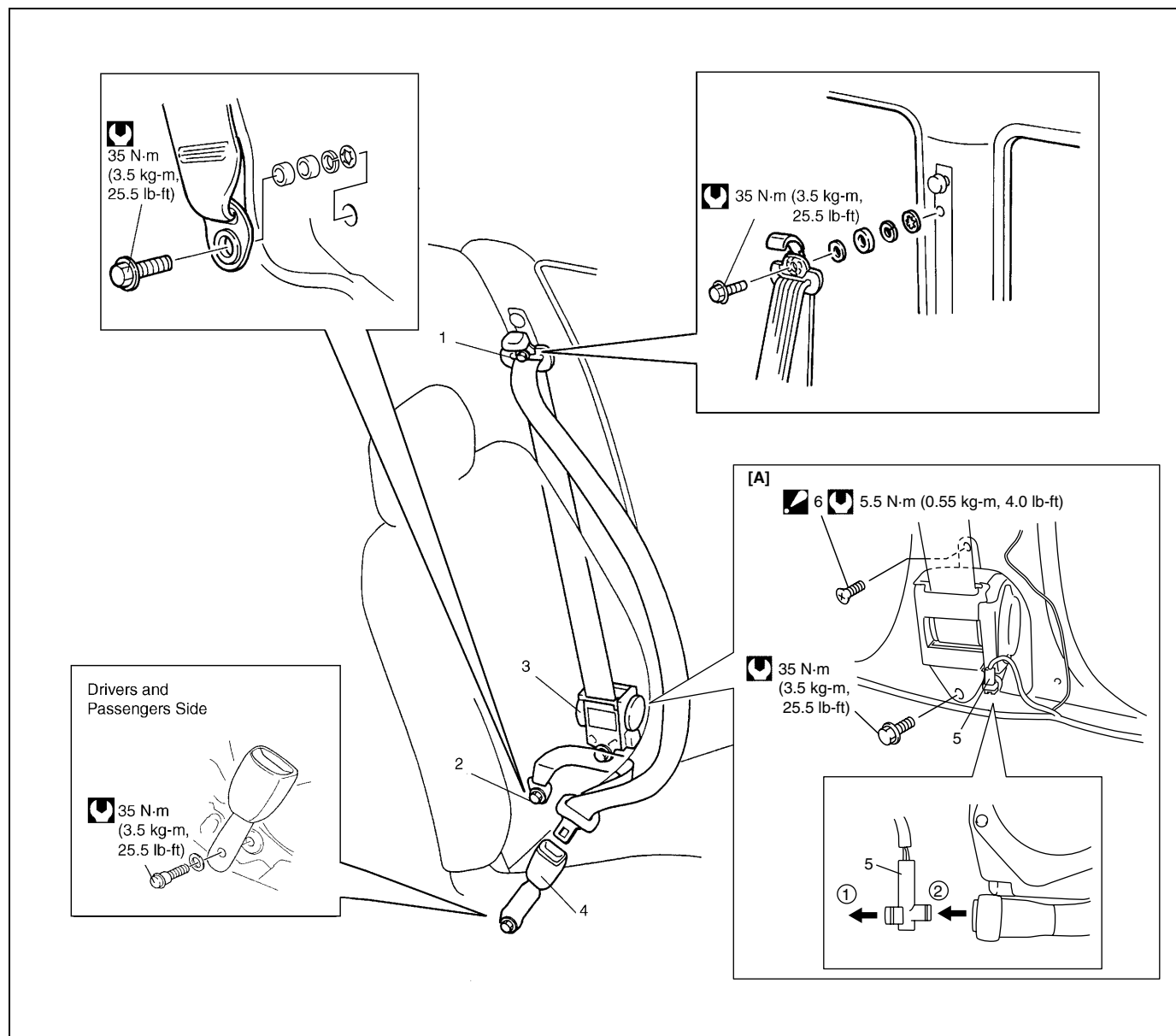
#### Disposal

Refer to “DISPOSAL” of “SERVICE PRECAUTIONS” under “ON-VEHICLE SERVICE” in Section 10B.

## Front Seat Belt

### WARNING:

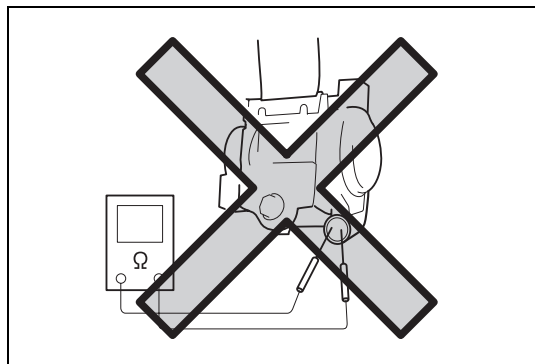
- Never attempt to disassemble or repair the seat belt pretensioner (retractor assembly). If any abnormality is found, be sure to replace it with new one as an assembly.
- Be sure to read “SERVICE PRECAUTIONS”, before starting to work and observe every precaution during work. Neglecting them may result in personal injury or unactivation of the seat belt pretensioner when necessary.



1. Upper anchor	4. Buckle	Tightening torque
2. Lower anchor	5. Yellow connector (for seat belt pretensioner) (if equipped)	[A] : With pretensioner
3. Retractor assembly	6. Retractor assembly upper mounting bolt : After tightening lower bolt, tighten upper bolt.	

## REMOVAL

- 1) Disconnect negative battery cable at battery. (if seat belt pretensioner is equipped)
- 2) Disable air bag system. Refer to "DISABLING AIR BAG SYSTEM" of "SERVICE PRECAUTIONS" under "ON-VEHICLE SERVICE" in Section 10B. (if seat belt pretensioner is equipped)
- 3) Remove center pillar lower trim.
- 4) Disconnect Yellow connector from seat belt pretensioner. (if seat belt pretensioner is equipped)
  - a) Release locking of lock slider.
  - b) After unlocked, disconnect to connector.
- 5) Remove front seat belts from the vehicle.



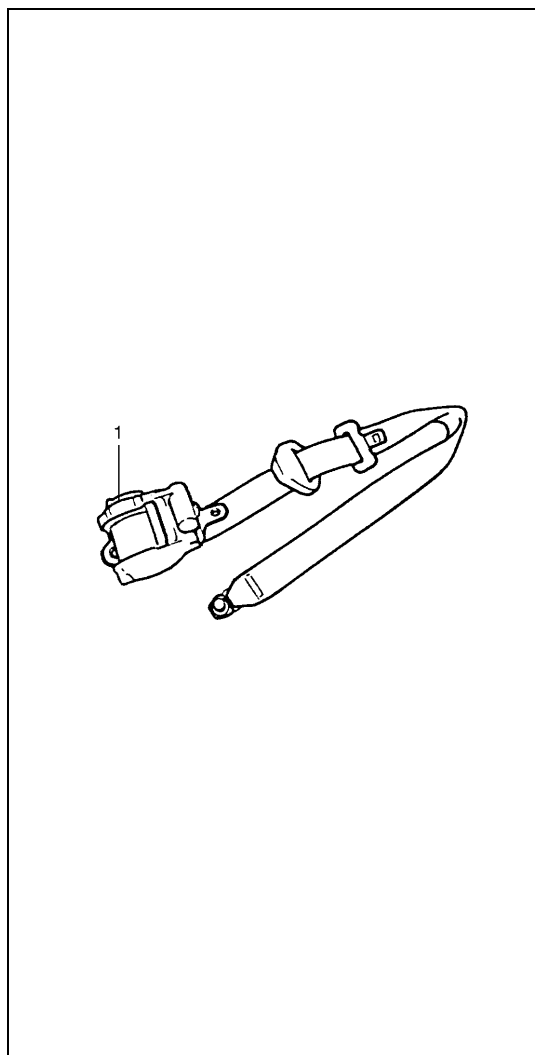
## INSPECTION

### WARNING:

**Never measure resistance of pretensioner or disassemble it. Otherwise, personal injury may result.**

### CAUTION:

**If seat belt pretensioner (retractor assembly) (if equipped) was dropped from a height of 30 cm (1 ft) or more, it should be replaced.**



Seat belts and attaching parts can affect the vital components and systems of a vehicle.

Therefore, they should be inspected carefully and replaced with genuine parts only.

### Seat belt

- The seat belt webbing or strap should be free from damage.

### Retractor assembly

- 1) Let the seat belt retract fully to confirm its easy retraction.
  - The retractor assembly should lock webbing when pulled quickly.
  - The front seat belt retractor assembly (1) should pass the above inspection and should lock webbing even when tilted (approx. 15°) toward the fore and aft or right and left directions.
- 2) Check retractor assembly (1) with seat belt pretensioner appearance visually for following symptoms and if any one of them is applicable, replace it with a new one as an assembly. (if seat belt pretensioner is equipped)
  - Pretensioner has activated.
  - There is a crack in seat belt pretensioner (retractor assembly).
  - Wire harness or connector is damaged.
  - Seat belt pretensioner (retractor assembly) is damaged or a strong impact (e.g., dropping) was applied to it.

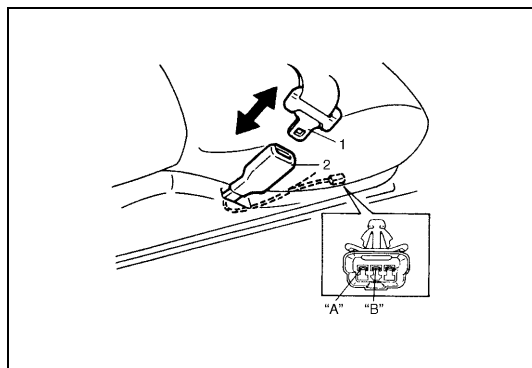
### Anchor bolt

- Anchor bolts should be torqued to specification.

### Belt latch

- It should be secure when latched.

## Seat belt switch



Check driver side seat belt strap switch for continuity by using ohmmeter.

### Seat belt strap switch specification

**Without inserted buckle tongue to buckle catch:**

**Terminal “A” and “B” : Continuity**

**With inserted buckle tongue to buckle catch:**

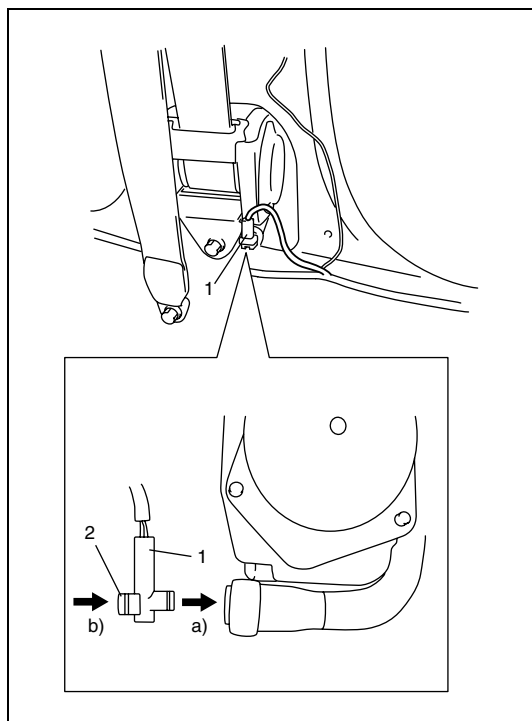
**Terminal “A” and “B” : No continuity**

1.	Buckle tongue
2.	Buckle catch

## INSTALLATION

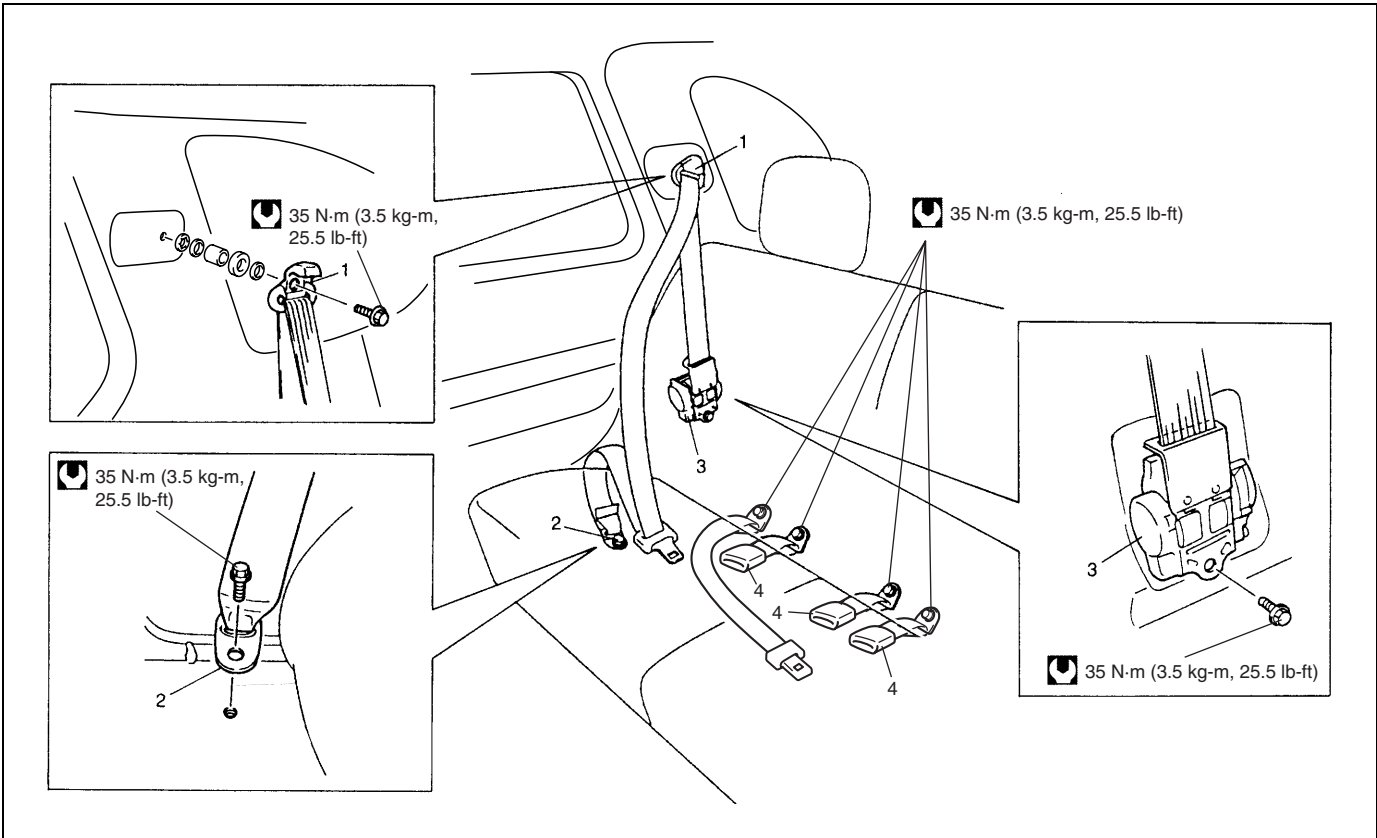
Install in reverse order of removal, noting the following.

- Seat belt anchor bolts should have an unified fine thread (7/16-20 UNF). Under no circumstances should any different sized or metric screw threads be used.
- Connect Yellow connector (1) to seat belt pretensioner securely. (if seat belt pretensioner is equipped)
  - a) Connect connector
  - b) Lock connector with lock slider (2)
- Enable air bag system. Refer to “ENABLING AIR BAG SYSTEM” under “SERVICE PRECAUTIONS” in Section 10B. (if seat belt pretensioner is equipped)



# Rear Seat Belt

**WARNING:**  
Be sure to read “SERVICE PRECAUTIONS” before starting to work and observe every precaution during work.



1. Upper anchor	4. Buckle
2. Lower anchor	Tightening torque
3. Retractor assembly	

## REMOVAL

Remove rear seat belts as shown in figure.

## INSPECTION

- Check the rear seat belt in the same way as “INSPECTION” of “FRONT SEAT BELT”.
- As to seat belts with A-ELR (other than driver side seat belt), check them as follows in addition to above check.
  - With vehicle at stop, pull seat belt all the way out, let it retract a little and try to pull it. It should not be pulled out, that is, it should be locked where retracted.
  - Let seat belt retract to its original state. Next, pull it half way out, let it retract a little and try to pull it again. It should be pulled out smoothly, that is it should not be locked at this time.

## INSTALLATION

Install the rear seat belt observing the same precautions as “INSTALLATION” of “FRONT SEAT BELT”.

## Tightening Torque Specification

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
Upper and lower anchor bolt	35	3.5	25.5
Retractor assembly bolt	35	3.5	25.5
Retractor assembly screw	5.5	0.55	4.0
Buckle bolt	35	3.5	25.5



## SECTION 10B

# AIR BAG SYSTEM

### WARNING:

- Service on or around the air bag system components or wiring must be performed only by an authorized SUZUKI dealer. Please observe all WARNINGS and “Service Precautions” under “On-Vehicle Service” in this section before performing service on or around the air bag system components or wiring. Failure to follow WARNINGS could result in unintended activation of the system or could render the system inoperative. Either of these two conditions may result in severe injury.
- The procedures in this section must be followed in the order listed to disable the air bag system temporarily and prevent false diagnostic trouble codes from setting. Failure to follow procedures could result in possible activation of the air bag system, personal injury or otherwise unneeded air bag system repairs.

### CAUTION:

When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread-locking compound, will be called out. The correct torque value must be used when installing fasteners that require it. If the above conditions are not followed, parts or system damage could result.

10B

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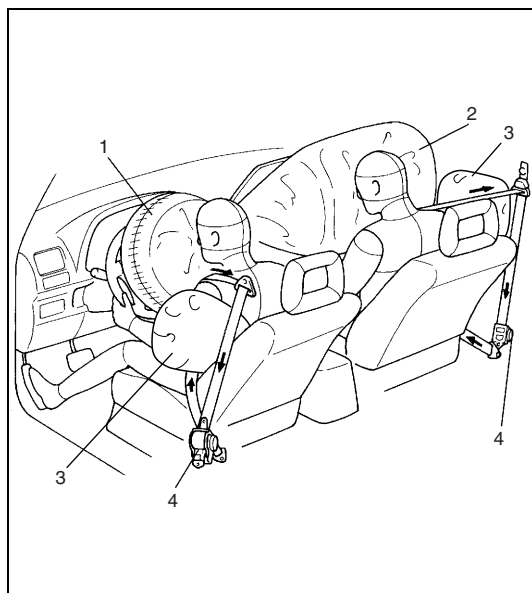
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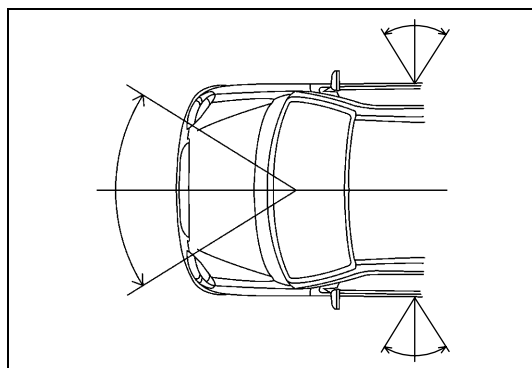
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## General Description



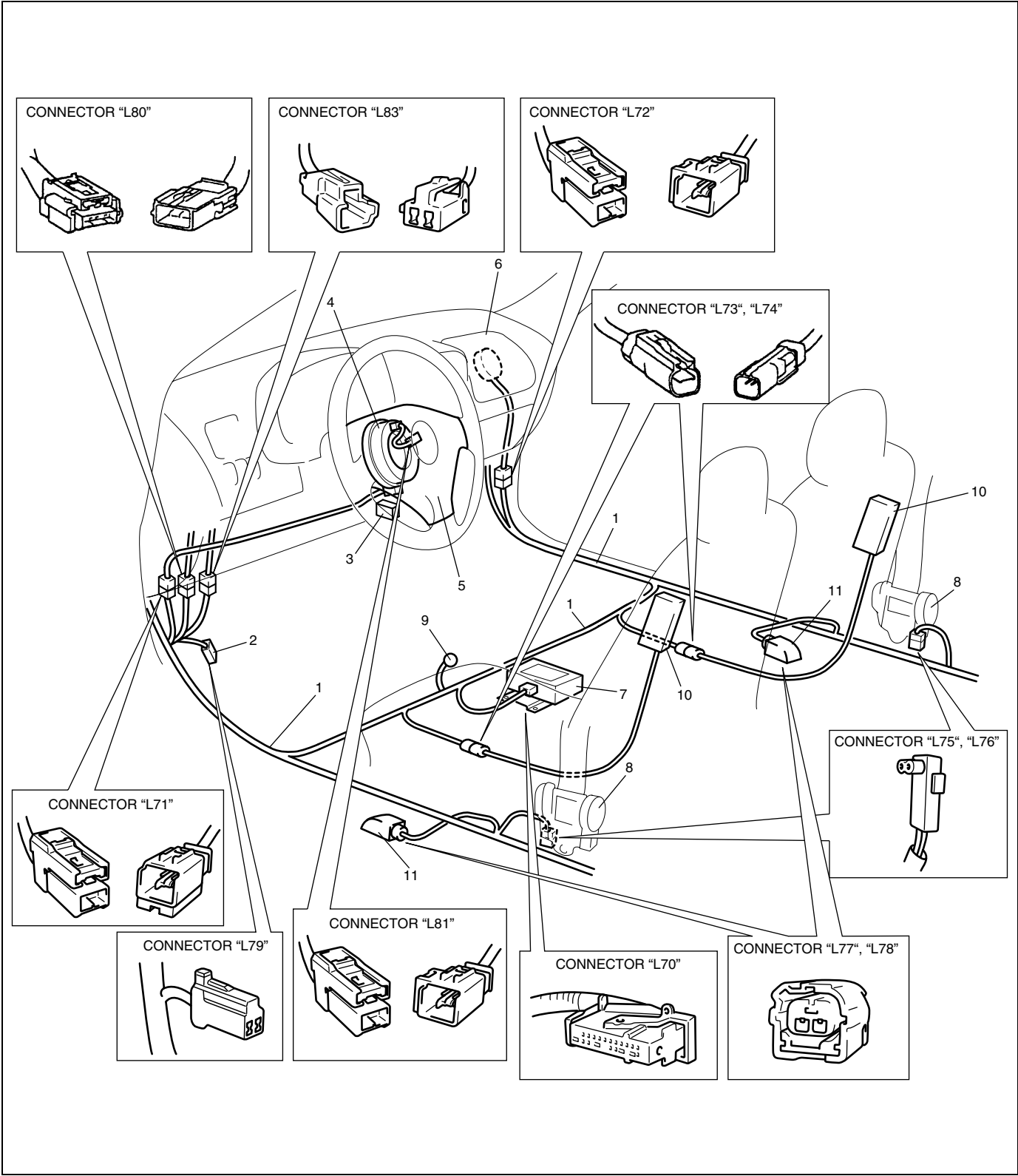
With the air bag system which includes front air bags and side air bags for both the driver's and passenger's sides as well as the seat belt pretensioners, the sag of the seat belt is taken up (for seat belt with pretensioner), the driver air bag (inflator) module is deployed from the center of the steering column and the passenger air bag (inflator) module from the top of the instrument panel in front of the front passenger seat in occurrence of a front collision with an impact larger than a certain set value to supplement protection offered by the driver and front passenger seat belts. Side air bag (inflator) module is deployed from the side of the seat back in occurrence of a sideward collision with an impact larger than a certain set value.

1.	Driver side air bag
2.	Passenger side air bag
3.	Side air bag
4.	Seat belt pretensioner



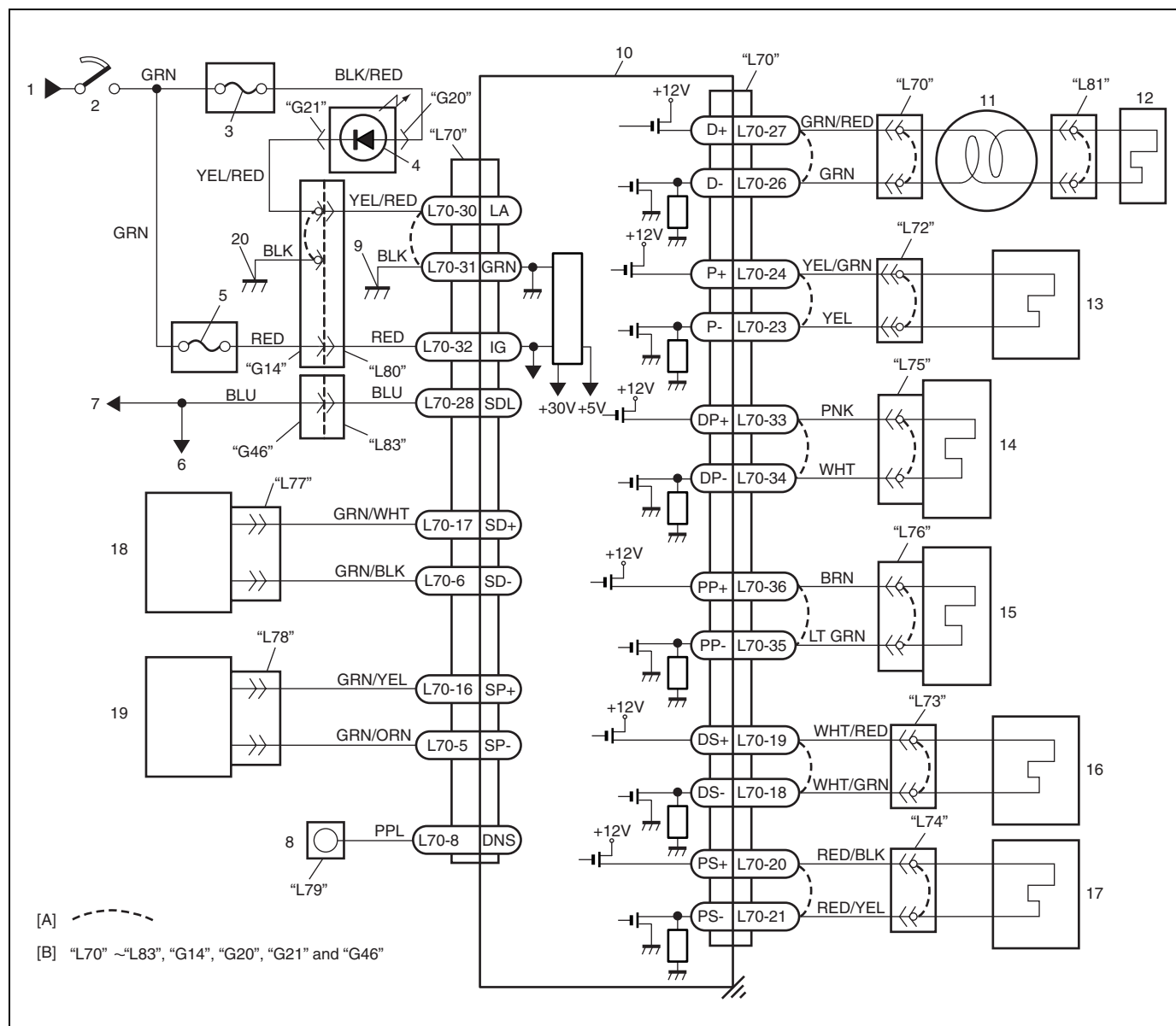
The air bag system is designed to activate only in severe frontal and sideward collisions. It is not designed to activate in rear impacts, rollovers, or minor frontal and sideward collisions, since it would offer no protection in those types of accidents.

System Components and Wiring Location View and Connectors



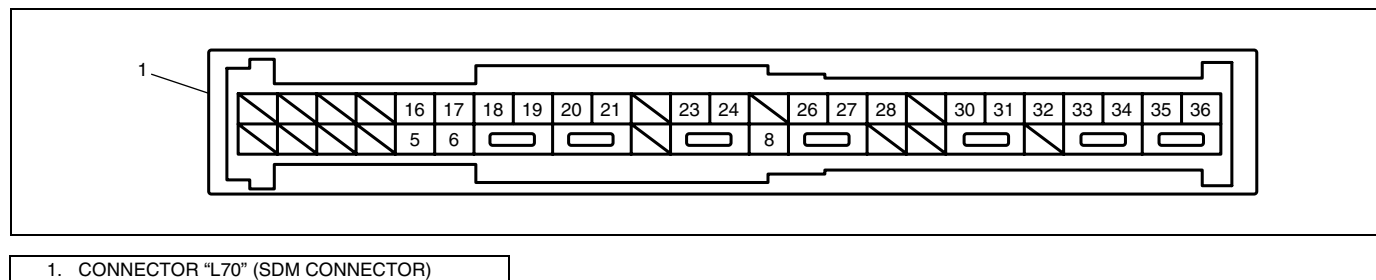
1. Air bag harness (in floor harness)	5. Driver air bag (inflator) module	9. Ground for air bag system
2. "Air bag" monitor coupler	6. Passenger air bag (inflator) module	10. Side air bag (inflator) module (if equipped)
3. DLC	7. SDM	11. Side Sensor (if equipped)
4. Contact coil assembly	8. Seat belt pretensioner (retractor assembly)	

## System Wiring Diagram



[A]: Shorting bar	7. To data link connector (DLC)	15. Passenger seat belt pretensioner
[B]: Connector	8. "AIR BAG" monitor coupler	16. Side air bag (inflator) module at driver side (if equipped)
1. From main fuse	9. Ground for air bag system	17. Side air bag (inflator) module at passenger side (if equipped)
2. Ignition switch	10. SDM	18. Side sensor at driver side (if equipped)
3. "METER" fuse	11. Contact coil assembly	19. Side sensor at passenger side (if equipped)
4. "AIR BAG" warning lamp in combination meter	12. Driver air bag (inflator) module	20. Ground on body
5. "AIR BAG" fuse	13. Passenger air bag (inflator) module	
6. To ECM and ABS control module (if equipped)	14. Driver seat belt pretensioner	

### TERMINAL ARRANGEMENT OF SDM CONNECTOR (VIEWED FROM HARNESS SIDE)



## CONNECTOR “L70” (SDM connector)

TERMINAL	CIRCUIT	TERMINAL	CIRCUIT
L70-1	—	L70-20	Side air bag (inflator) High
L70-2	—	L70-21	module (passenger side) Low (if equipped)
L70-3	—	L70-22	—
L70-4	—	L70-23	Passenger air bag Low
L70-5	Side sensor (passenger side) Low	L70-24	(inflator) module High
L70-6	Side sensor (driver side) Low	L70-25	—
L70-7	—	L70-26	Driver air bag (inflator) Low
L70-8	Diagnosis switch	L70-27	module High
L70-9	—	L70-28	Data link connector (DLC)
L70-10	—	L70-29	—
L70-11	—	L70-30	“AIR BAG” warning lamp
L70-12	—	L70-31	Ground
L70-13	—	L70-32	Ignition switch (power source)
L70-14	—	L70-33	Driver pretensioner High
L70-15	—	L70-34	Low
L70-16	Side sensor (passenger side) High (if equipped)	L70-35	Low
L70-17	Side sensor (driver side) High (if equipped)	L70-36	Passenger pretensioner High
L70-18	Side air bag (inflator) Low		
L70-19	module (driver side) High (if equipped)		

## Diagnosis

**WARNING:**

To avoid deployment when troubleshooting the air bag system, do not use electrical test equipment such as a battery powered or AC powered voltmeter, ohmmeter, etc., or any type of electrical equipment other than that specified in this manual. Do not use a non-powered probe type tester. Instructions in this manual must be followed carefully, otherwise personal injury may result.

## Diagnostic Trouble Code (DTC)

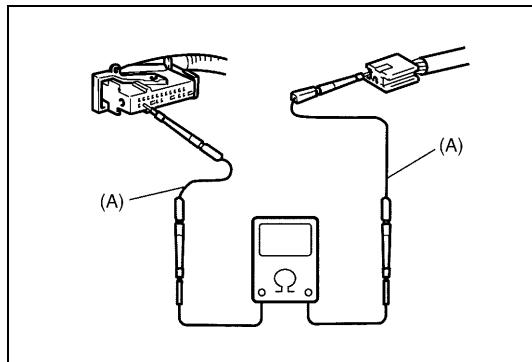
The AIR BAG DIAGNOSTIC SYSTEM CHECK must always be the starting point of any air bag system diagnosis. The AIR BAG DIAGNOSTIC SYSTEM CHECK checks for proper “AIR BAG” warning lamp operation and checks for air bag diagnostic trouble codes (DTCs) using on-board diagnosis function or SUZUKI scan tool.

## Use of Special Tool

### WARNING:

To avoid deployment when troubleshooting the air bag system, do not use electrical test equipment such as a battery powered or AC powered voltmeter, ohmmeter, etc., or any type of electrical equipment other than that specified in this manual. Do not use a non-powered probe type tester. Instructions in this manual must be followed carefully, otherwise personal injury may result.

You should be familiar with the tools listed in this section under the heading SPECIAL TOOLS. You should be able to measure voltage and resistance. You should be familiar with proper use of a scan tool such as Air Bag Driver/Passenger Load Tool, Connector Test Adapter Kit and the Digital Multimeter.

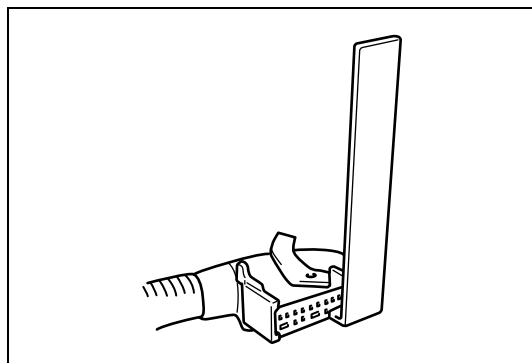


### Special tool

#### (A) : 09932-76010 (Connector Test Adapter Kit)

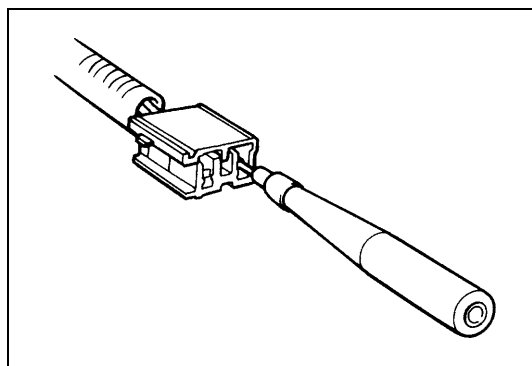
This must be used whenever a diagnostic procedure requests checking or probing a terminal.

Using the appropriate adapter in the special tool will ensure that no damage to the terminal will occur from the multimeter probe, such as spreading or bending.

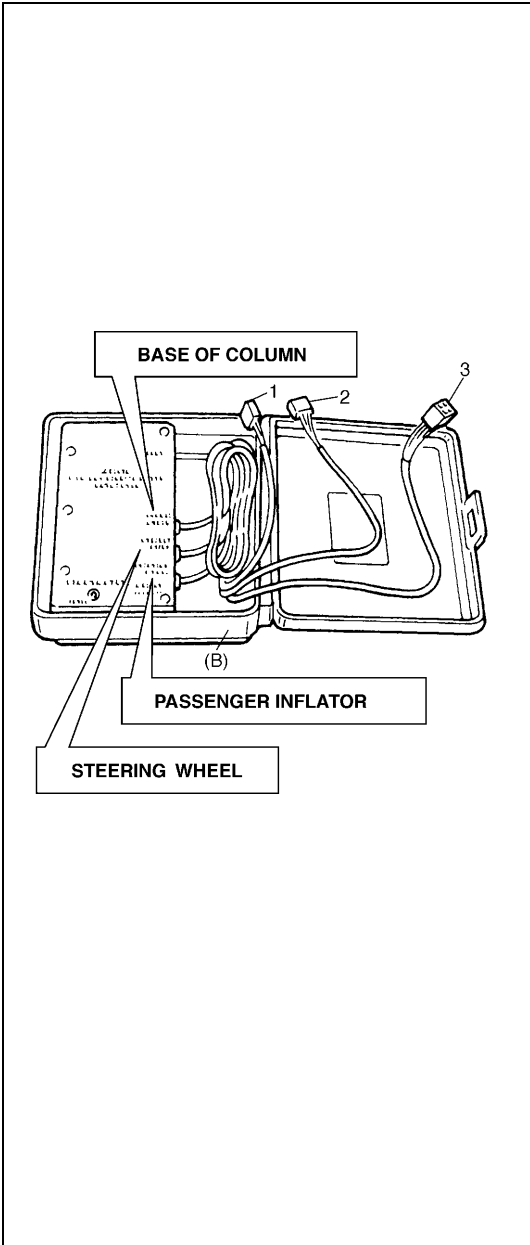


An SDM short bar release tool is included in the connector test adapter kit.

Inserting it into the SDM connector will release the shorting bar.



The adapter will also give an idea of whether contact tension is sufficient, helping to find an open or intermittent open due to poor terminal contact.



**Special tool**  
**(B) : 09932-75010 (Air Bag Driver/Passenger Load Tool)**

This tool is used only when called for in this section. It is used as a diagnostic aid and safety device to prevent inadvertent air bag (inflator) module deployment.

The load tool has three connectors attached to its case which are electrically functional and serve as resistive load substitutions. No more than two connectors are used at any time.

One of connectors (“STEERING WHEEL”) is used to substitute the load of followings.

- Driver air bag (inflator) module when it is connected at the top of the column to the contact coil assembly.
- Passenger air bag (inflator) module when it is connected to the air bag harness connector in floor harness for passenger air bag (inflator) module.
- Side air bag (inflator) module (driver and passenger side) when it is connected to the floor harness connector for side air bag (inflator) module.
- Each of driver and passenger seat belt pretensioners when it is connected to floor harness connector for driver and passenger seat belt pretensioners.

Another connector (“BASE OF COLUMN”) is used to substitute the load of the driver air bag (inflator) module and the contact coil assembly when it is connected at the base of the column to the air bag wire harness in floor harness?

The third connector (“PASSENGER INFLATOR”) is not used.

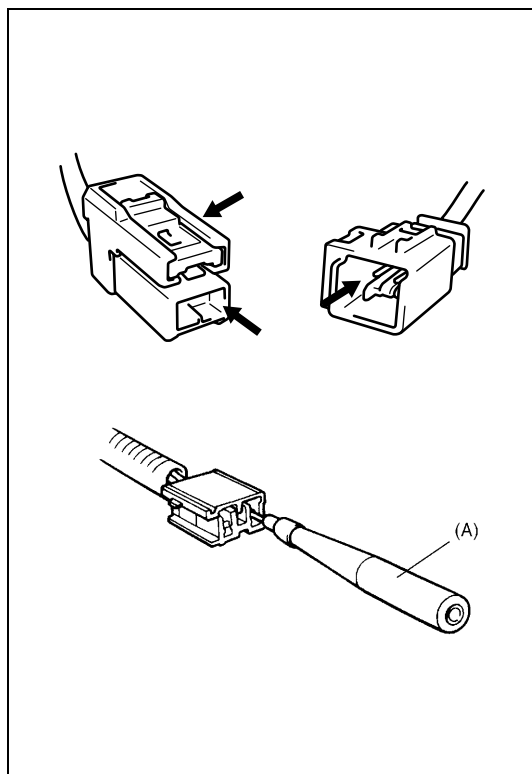
By substituting the resistance of the load tool when called for, a determination can be made as to whether an inflator circuit component is causing system malfunction and which component is causing the malfunction.

The load tool should be used only when specifically called for in the diagnostic procedures.

1. Connector for contact coil and driver air bag (inflator) module (Located near the base of the steering column)
2. Connector for driver and passenger air bag (inflator) module, side air bag (inflator) module (driver and passenger side) and driver and passenger seat belt pretensioners
3. Not used

## Intermittents and Poor Connections

Most intermittents are caused by faulty electrical connections or wiring. When a check for proper connection is requested in a diagnostic flow table, perform careful check of suspect circuits for:



- Check connector for loose connection.
- Poor mating of connector halves, or terminals not fully seated in the connector body (backed out).
- Dirt or corrosion on the terminals. The terminals must be clean and free of any foreign material which could impede proper terminal contact.

However, cleaning the terminal with a sand paper or the like is prohibited.

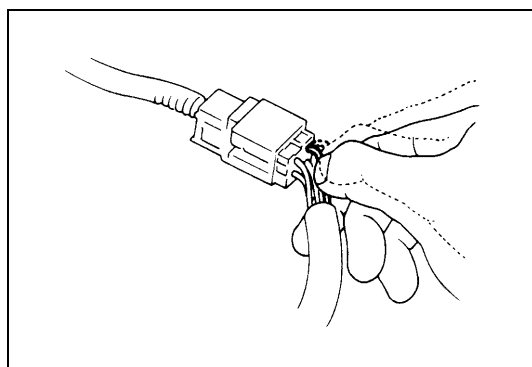
- Damaged connector body, exposing the terminals to moisture and dirt, as well as not maintaining proper terminal orientation with the component or mating connector.
- Improperly formed or damaged terminals.

Check each connector terminal in problem circuits carefully to ensure good contact tension by using the corresponding mating terminal included in the connector test adapter kit (special tool).

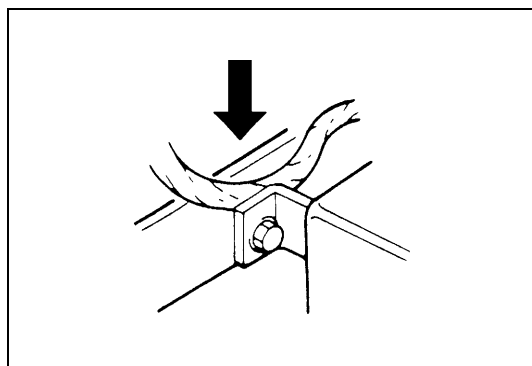
If contact tension is not enough, reform it to increase contact tension or replace.

### Special tool

**(A) : 09932-76010 (Connector Test Adapter Kit)**



- Poor terminal-to-wire connection.  
Check each wire harness in problem circuits for poor connection by shaking it by hand lightly. If any abnormal condition is found, change the wire harness assembly or component parts with new ones.



- Wire insulation which is rubbed through, causing an intermittent short as the bare area touches other wiring or parts of the vehicle.
- Wire broken inside the insulation. This condition could cause a continuity check to show a good circuit, but if only 1 or 2 strands of a multi-strand-type wire are intact, resistance could be far too high.

If any abnormality is found, repair or replace as a wire harness assembly.



## Air Bag Diagnostic System Check

**WARNING:**

To avoid deployment when troubleshooting the air bag system, do not use electrical test equipment such as a battery powered or AC powered voltmeter, ohmmeter, etc., or any type of electrical equipment other than that specified in this manual. Do not use a non-powered probe type tester. Instructions in this manual must be followed carefully, otherwise personal injury may result.

**CAUTION:**

The order in which diagnostic trouble codes are diagnosed is very important. Failure to diagnose the diagnostic trouble codes in the order specified may result in extended diagnostic time, incorrect diagnosis and incorrect parts replacement.

The diagnostic procedures used in this section are designed to find and repair air bag system malfunctions. To get the best results, it is important to use the diagnostic flow tables and follow the sequence listed below.

- 1) Perform the AIR BAG DIAGNOSTIC SYSTEM CHECK FLOW TABLE.  
(The AIR BAG DIAGNOSTIC SYSTEM CHECK FLOW TABLE must be the starting point of any air bag system diagnosis.  
The AIR BAG DIAGNOSTIC SYSTEM CHECK FLOW TABLE checks for proper "AIR BAG" warning lamp operation through "AIR BAG" warning lamp and whether air bag diagnostic trouble codes exist.)
- 2) Refer to the proper diagnostic table as directed by the AIR BAG DIAGNOSTIC SYSTEM CHECK FLOW TABLE.  
(The AIR BAG DIAGNOSTIC SYSTEM CHECK FLOW TABLE will lead you to the correct table to diagnose any air bag system malfunctions. Bypassing these procedures may result in extended diagnostic time, incorrect diagnosis and incorrect parts replacement.)
- 3) Repeat the AIR BAG DIAGNOSTIC SYSTEM CHECK FLOW TABLE after any repair or diagnostic procedures have been performed.  
(Performing the AIR BAG DIAGNOSTIC SYSTEM CHECK FLOW TABLE after all repair or diagnostic procedures will ensure that the repair has been made correctly and that no other malfunctions exist.)

### FLOW TABLE TEST DESCRIPTION

STEP 1 : Check that "AIR BAG" warning lamp lights.

STEP 2 : Check that "AIR BAG" warning lamp lights.

STEP 3 : Check diagnosis switch circuit.

STEP 4 : Check that "AIR BAG" warning lamp flashes 6 times after ignition switch is turned ON.

STEP 6 : Check that history codes are in SDM memory. (using SUZUKI scan tool)

STEP 7 : Check that history codes are in SDM memory. (using monitor coupler)

STEP 9 : Check that current code is in SDM memory. (using SUZUKI scan tool)

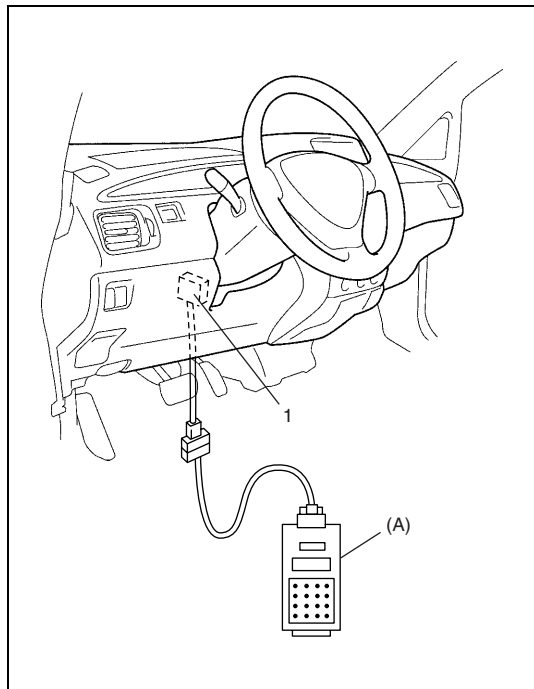
STEP 10 : Check that current code is in SDM memory. (using monitor coupler)

## Air Bag Diagnostic System Check Flow Table

Step	Action	Yes	No
1	1) Make sure that battery voltage is about 11V or higher. 2) Note "AIR BAG" warning lamp as ignition switch is turned ON. Does "AIR BAG" warning lamp come ON when ignition switch is turned ON?	Go to step 2.	Proceed to Diagnostic Flow Table B ("AIR BAG" warning lamp circuit check).
2	Does "AIR BAG" warning lamp come ON steady?	Proceed to Diagnostic Flow Table A ("AIR BAG" warning lamp circuit check).	Go to step 3.
3	Does "AIR BAG" warning lamp keep flashing (indicating DTC) when ignition switch is ON?	Proceed to Diagnostic Flow Table C ("AIR BAG" warning lamp circuit check).	Go to step 4.
4	Does "AIR BAG" warning lamp turn OFF, after flashing 6 times?	Go to step 5.	Go to step 8.
5	Do you have SUZUKI scan tool?	Go to step 6.	Go to step 7.
6	1) Check DTC using SUZUKI scan tool. Refer to DTC CHECK. Is "NO CODES" displayed on SUZUKI scan tool?	Air bag system is in good condition.	An intermittent trouble has occurred at some place. Check the connector harness, etc. related to the sensed DTC. Refer to INTERMITTENTS AND POOR CONNECTIONS in this section. Then clear DTC (Refer to DTC CLEARANCE.) and repeat this table.
7	1) Check DTC using monitor coupler. Refer to DTC CHECK. Is flashing pattern no. 12 indicated on "AIR BAG" warning lamp?	Air bag system is in good condition.	An intermittent trouble has occurred at some place. Check the connector harness, etc. related to the sensed DTC. Refer to INTERMITTENTS AND POOR CONNECTIONS in this section. Then clear DTC (Refer to DTC CLEARANCE.) and repeat this table.
8	Do you have SUZUKI scan tool?	Go to step 9.	Go to step 10.
9	1) Check DTC using SUZUKI scan tool. Refer to DTC CHECK. Is "NO CODES" displayed on SUZUKI scan tool?	Substitute a known-good SDM and recheck.	Check and repair according to Flow Table corresponding to that DTC.
10	1) Check DTC using monitor coupler. Refer to DTC CHECK. Is flashing pattern no. 12 indicated on "AIR BAG" warning lamp?	Substitute a known-good SDM and recheck.	Check and repair according to Flow Table corresponding to that DTC.

## DTC Check

### Using SUZUKI scan tool



- 1) Turn ignition switch to OFF position.
- 2) After setting cartridge to SUZUKI scan tool, connect it to data link connector (DLC) located on underside of instrument panel at driver's seat side.

#### Special tool

##### (A) : SUZUKI scan tool

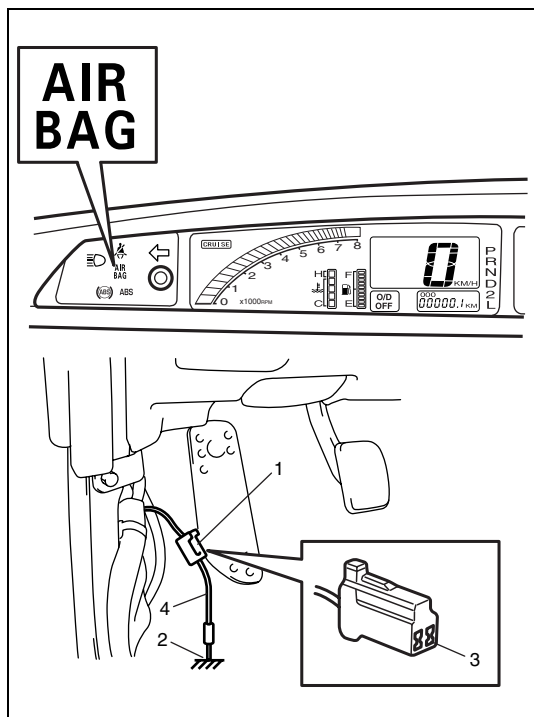
- 3) Turn ignition switch to ON position.
- 4) Read DTC according to instructions displayed on SUZUKI scan tool and print it or write it down. Refer to SUZUKI scan tool operator's manual for further details.

If communication between scan tool and SDM is not possible, proceed to Diagnostic Flow Table E (Serial data check circuit).

- 5) After completing the check, turn ignition switch to OFF position and disconnect SUZUKI scan tool from data link connector (DLC).

1. Data link connector (DLC)

### Not using SUZUKI scan tool



- 1) Check that malfunction indicator lamp ("AIR BAG" warning lamp) comes ON when ignition switch is turned to ON position.

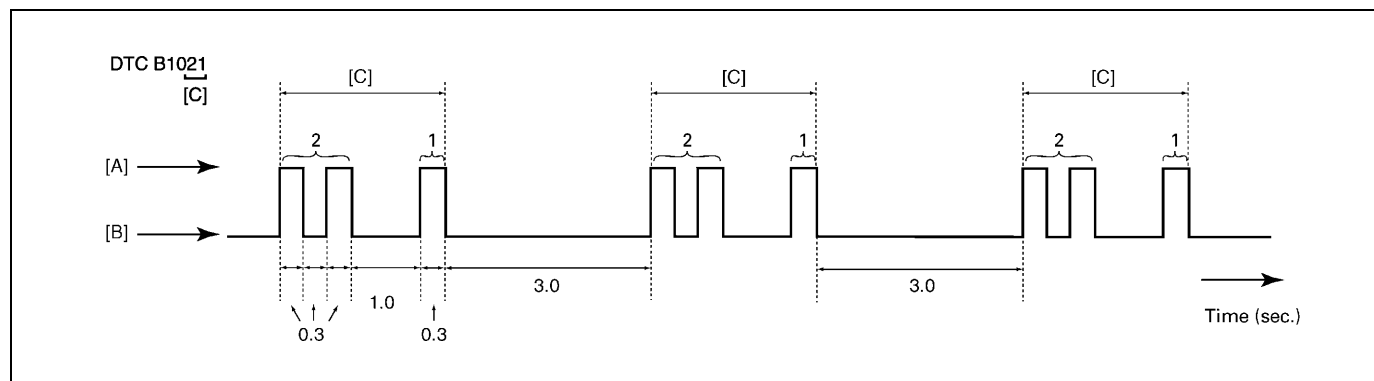
If it does not come "ON", proceed to Diagnostic Flow Table B ("AIR BAG" warning lamp circuit).

- 2) Using service wire, ground diagnosis switch terminal in monitor coupler.
- 3) Read DTC from flashing pattern of malfunction indicator lamp ("AIR BAG" warning lamp). (Refer to DTC TABLE.)

If lamp does not indicate DTC, proceed to Diagnostic Flow Table D (Diagnosis switch terminal circuit check).

- 4) After completing the check, turn ignition switch to OFF position and disconnect service wire from "AIR BAG" monitor coupler.

1. "AIR BAG" monitor coupler
2. Body ground
3. Diagnosis switch terminal
4. Service wire

**EXAMPLE : When driver air bag initiator circuit resistance high (DTC B1021) is set**

[A]: "AIR BAG" warning lamp is turned ON

[B]: "AIR BAG" warning lamp is turned OFF

[C]: Code No.21

**DTC Clearance****Using SUZUKI scan tool**

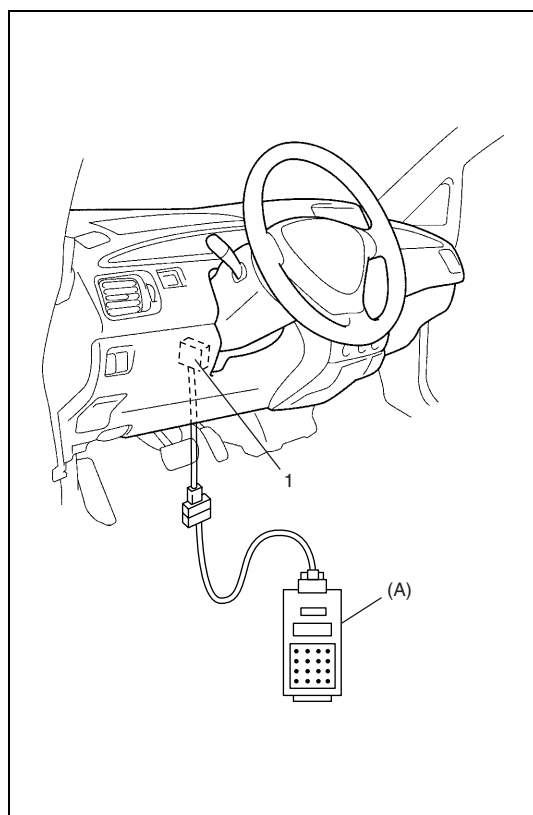
- 1) Turn ignition switch to OFF position.
- 2) Connect SUZUKI scan tool to data link connector (DLC) in the same manner as when making this connection for DTC check.

**Special tool****(A) : SUZUKI scan tool**

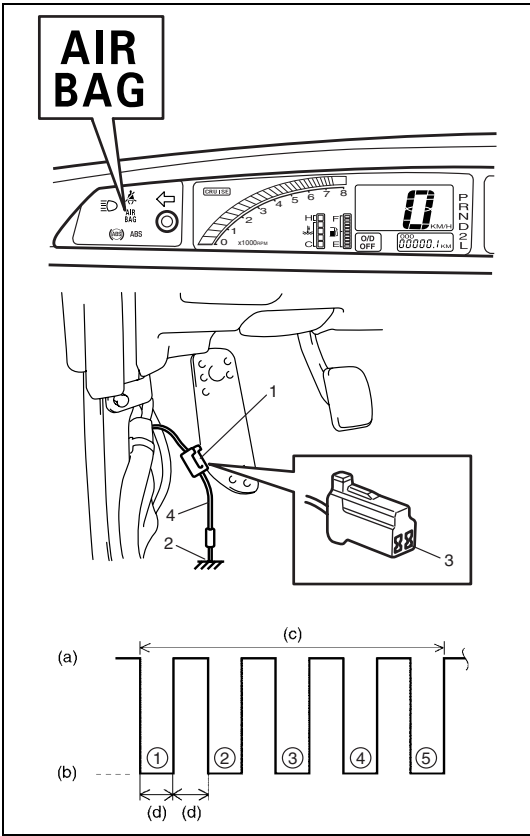
- 3) Turn ignition switch to ON position.
- 4) Erase DTC according to instructions displayed on SUZUKI scan tool.  
Refer to SUZUKI scan tool operator's manual for further details.
- 5) After completing the check, turn ignition switch to OFF position and disconnect SUZUKI scan tool from DLC.
- 6) Perform DTC CHECK and confirm that normal DTC (NO CODES) is displayed and not malfunction DTC.

**NOTE:**

**If DTC B1051, B1058, B1071 is stored in SDM, it is not possible to clear all DTC.**



1. Data link connector (DLC)



**Not using SUZUKI scan tool**

- 1) Turn ignition switch to ON position and wait about 6 seconds or more.
- 2) Using service wire, repeat shorting and opening between diagnosis switch terminal on “AIR BAG” monitor coupler and body ground 5 times at about 1 second intervals within 10 seconds.
- 3) Perform DTC CHECK and confirm that normal DTC (DTC 12) is displayed and not malfunction DTC.

**NOTE:**

**If DTC B1051, B1058, B1071 is stored in SDM, it is not possible to clear all DTC.**









1. “AIR BAG” monitor coupler	(a) Open
2. Body ground	(b) Short
3. Diagnosis switch terminal	(c) Max. 10 seconds
4. Service wire	(d) About 1 sec.

**DTC Table**

DTC	“AIR BAG” warning lamp flashing pattern		Diagnosis	
	NO.	MODE		
–	12		Normal	–
B1015	15		Passenger air bag circuit	Resistance high
B1016	16			Resistance low
B1018	18			Short to ground
B1019	19			Short to power circuit
B1021	21		Driver air bag circuit	Resistance high
B1022	22			Resistance low
B1024	24			Short to ground
B1025	25			Short to power circuit
B1031	31		Power source voltage	Too high
B1032	32			Too low

Diagnose trouble according to diagnostic flow table corresponding to each code No.

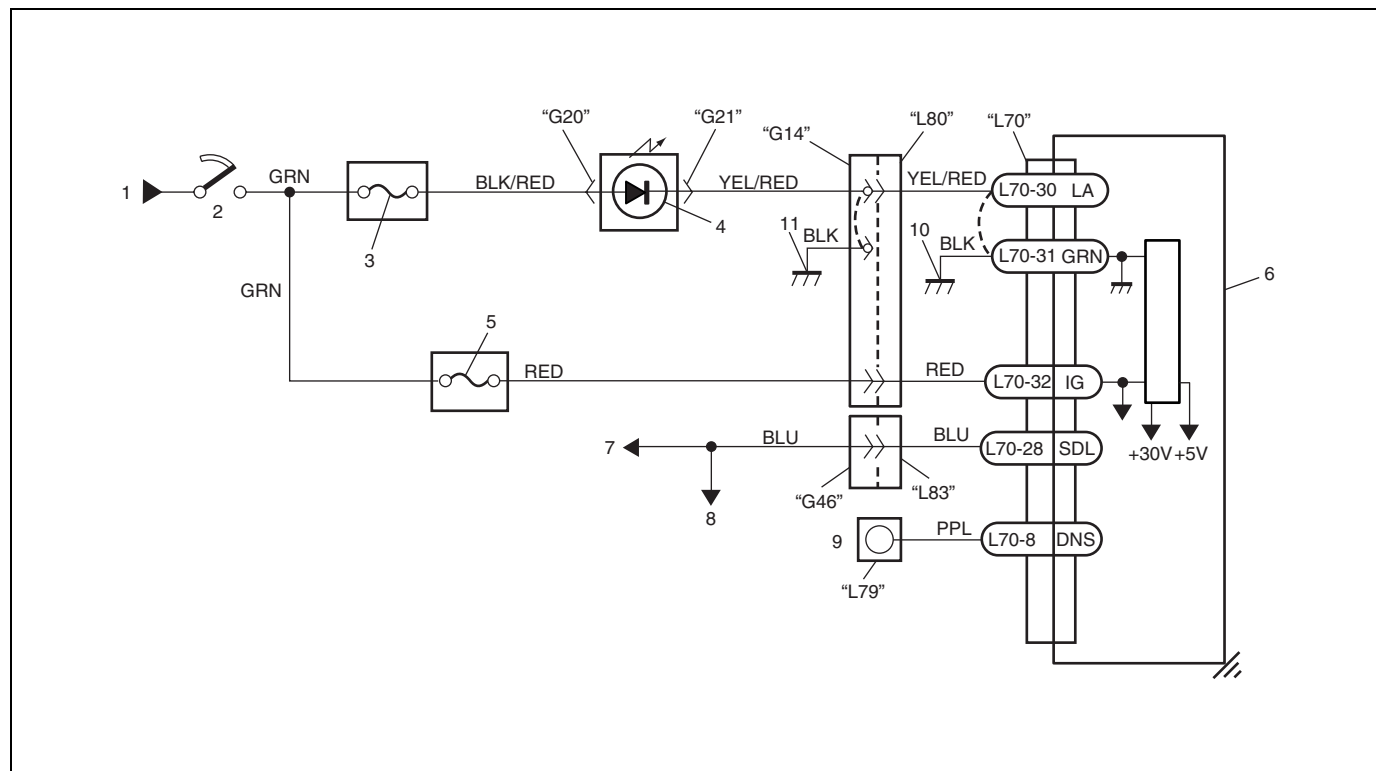
DTC	“AIR BAG” warning lamp flashing pattern		Diagnosis		
	NO.	MODE			
B1041	41		Driver pretensioner circuit	Resistance high	Diagnose trouble according to diagnostic flow table corresponding to each code No.
B1042	42			Resistance low	
B1043	43			Short to ground	
B1044	44			Short to power circuit	
B1045	45		Passenger pretensioner circuit	Resistance high	
B1046	46			Resistance low	
B1047	47			Short to ground	
B1048	48			Short to power circuit	
B1051	51		SDM	Frontal crash detected	
B1056	56			Sideward crash (driver side) detected	
B1057	57			Sideward crash (passenger side) detected	
B1058	58			Frontal crash detected (pretensioner activation command outputted)	
B1061	61		“AIR BAG” warning lamp circuit	Circuit failure	
B1063	63		Side sensor circuit (driver side)	Short to ground	
B1064	64			Short to power circuit or open	
B1065	65		Side sensor circuit (passenger side)	Short to ground	
B1066	66			Short to power circuit or open	
B1071	71		SDM	Internal fault	
B1072	72		Side sensor (driver side)	Internal fault	
B1073	73		Side sensor circuit (driver side)	Correspondence abnormality	
B1074	74		Side sensor (passenger side)	Internal fault	
B1075	75		Side sensor circuit (passenger side)	Correspondence abnormality	

DTC	“AIR BAG” warning lamp flashing pattern		Diagnosis		
	NO.	MODE			
B1081	81		Side air bag circuit (driver side)	Resistance high	Diagnose trouble according to diagnostic flow table corresponding to each code No.
B1082	82			Resistance low	
B1083	83			Short to ground	
B1084	84			Short to power circuit	
B1085	85		Side air bag circuit (passenger side)	Resistance high	
B1086	86			Resistance low	
B1087	87			Short to ground	
B1088	88			Short to power circuit	

**NOTE:**

- When 2 or more codes are indicated, the lowest numbered code will appear first.
- Current DTC and history DTC can be identified by lighting and flashing of “AIR BAG” warning lamp as follows. However, if a multiple number of DTC’s are set an even one of them is a current DTC, “AIR BAG” warning lamp remains on after ignition switch is turned ON. Therefore, it is not possible to identify any of them as to whether it is a current one or a history one. (But use of SUZUKI scan tool will make identification possible.)

	<b>Current DTC is set. (Abnormality exists at present.)</b>	<b>History DTC is set only. (Faulty condition occurred once in the past but normal condition is restored at present.)</b>
<b>“AIR BAG” warning lamp after ignition switch ON</b>	<b>Flashing 6 times and turns on.</b>	<b>Flashing 6 times and turns off.</b>
<b>“AIR BAG” warning lamp when grounding diagnosis switch</b>	<b>Current DTC is displayed.</b>	<b>History DTC is displayed.</b>

**Table A - “AIR BAG” Warning Lamp Comes ON Steady****Table B - “AIR BAG” Warning Lamp Does Not Come ON****Table C - “AIR BAG” Warning Lamp Flashes****Table D - “AIR BAG” Warning Lamp Cannot Indicate Flashing Pattern of DTC****WIRING DIAGRAM**

1. From main fuse	5. “AIR BAG” fuse	9. “AIR BAG” monitor coupler
2. Ignition switch	6. SDM	10. Ground for air bag system
3. “METER” fuse	7. To DLC	11. Ground on body
4. “AIR BAG” warning lamp in combination meter	8. To ECM and ABS control module (if equipped)	

**CAUTION:**

- Be sure to perform AIR BAG DIAGNOSTIC SYSTEM CHECK before starting diagnosis according to flow table.
- When measurement of resistance or voltage is required in this table, use a tester along with a correct terminal adapter from special tool (Connector test adapter kit).
- When a check for proper connection is required, refer to INTERMITTENTS AND POOR CONNECTIONS in this section.
- If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.



**TABLE TEST DESCRIPTION****Table A :**

STEP 1 : Check for "AIR BAG" fuse blown.

STEP 2 : Check for loose connection between floor wire harness and instrument panel wire harness.

STEP 3 : Check for loose connection between SDM connector and SDM.

STEP 4 : Check for power supply circuit.

STEP 5 : Check for short circuit between "AIR BAG" warning lamp circuit and ground.

**Table B :**

STEP 1 : Check for combination meter power supply circuit.

STEP 2 : Check for "AIR BAG" warning lamp blown.

STEP 3 : Check for open circuit in "AIR BAG" warning lamp circuit.

STEP 4 : Check for short circuit between "AIR BAG" warning lamp circuit and power supply circuit.

**Table C:**

STEP 1 : Check for connection between diagnosis switch terminal and ground terminal by service wire.

STEP 2 : Check for short circuit between diagnosis switch circuit and ground.

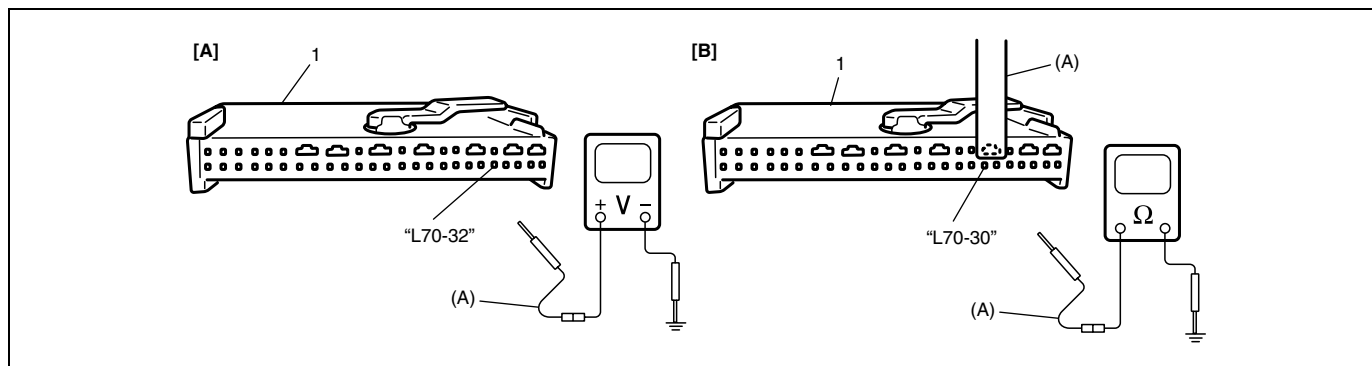
**Table D:**

STEP 1 : Check for loose connection between diagnosis switch terminal and ground terminal by service wire.

STEP 2 : Check for open circuit in diagnosis switch circuit.

**DIAGNOSTIC FLOW TABLE****Table A :**

Step	Action	Yes	No
1	1) Ignition switch turn to OFF position. 2) Remove and inspect "AIR BAG" fuse. Is fuse good?	Go to step 2.	Clear up short circuit between "RED" wire and ground. After clearing up, replace "AIR BAG" fuse.
2	1) Check for loose connection between "G14" and "L80" connectors. Is connection good?	Go to step 3.	Clear up loose connection between "G14" and "L80" connectors.
3	1) Check for loose connection between SDM connector "L70" and SDM. Is connection good?	Go to step 4.	Clear up loose connection between SDM connector "L70" and SDM.
4	1) Disconnect SDM connector "L70". 2) Turn ignition switch to ON position. 3) Measure voltage between "L70-32" terminal and body ground. Is it 10-14V?	Go to step 5.	Check and clear up the following possible cause. • Open circuit in "RED" or "GRN" wire. • Short circuit between "GRN" and ground.
5	1) Disconnect "G21" connector from combination meter referring to COMBINATION METER in Section 8. 2) Release shorting bar of "L70-30" terminal inserting release tool (A). 3) Measure resistance between "L70-30" terminal and body ground. Is resistance infinity?	Substitute a known-good SDM and recheck.	Clear up short circuit between "YEL/RED" wire and ground.



[A]: Fig. for Step 4

[B]: Fig. for Step 5

1. SDM connector "L70"

### Special tool

(A) : 09932-76010

### NOTE:

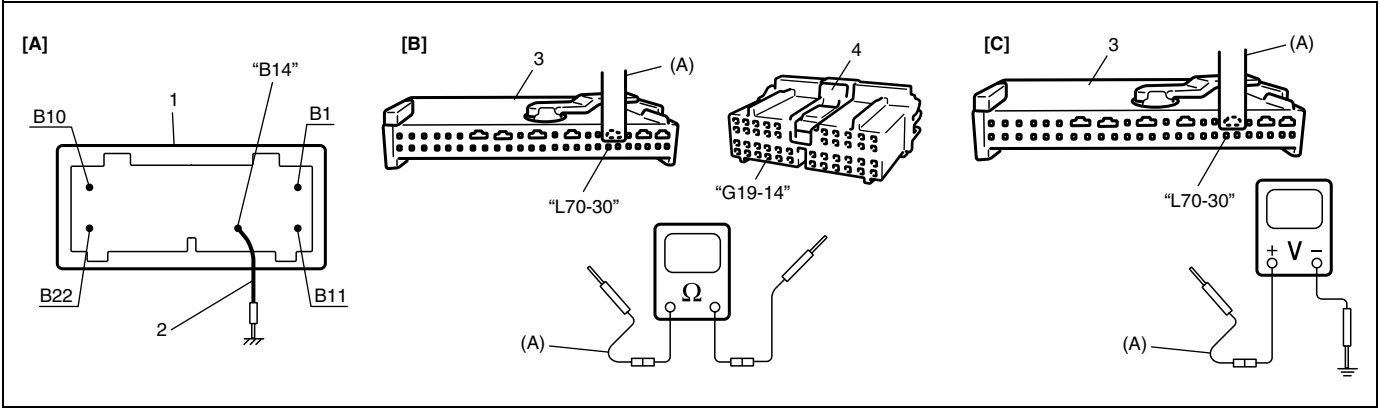
Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

Table B :

Step	Action	Yes	No
1	1) Set parking brake. 2) Turn ignition switch to ON position. Does brake system warning light ("BRAKE") come ON?	Go to step 2.	Check and clear up the following possible cause. • Open circuit in "BLK/RED" or "GRN" wire. • Short circuit between "BLK/RED" or "GRN" and ground. • "METER" fuse blown.
2	1) Turn ignition switch to OFF position. 2) Remove combination meter. Refer to COMBINATION METER in Section 8. 3) With "G21" connector (22-pin) disconnected and "G20" connector (20-pin) connected, connect service wire between "B14" terminal in combination meter and ground. 4) Turn ignition switch to ON position. Does "AIR BAG" warning lamp come on?	Go to step 3.	Replace combination meter.
3	1) Turn ignition switch to OFF position. 2) Disconnect SDM connector "L70". 3) Release shorting bar of "L70-30" terminal inserting release tool (A). 4) Check continuity between "G21-14" and "L70-30" terminals. Is there any continuity?	Go to step 4.	Clear up open circuit in "YEL/RED" wire.

Step	Action	Yes	No
4	1) With “G21” and “L70” connectors disconnected, turn ignition switch to ON position. 2) Measure voltage between “L70-30” terminal and body ground. Is voltage 0 V?	Substitute a known-good SDM and recheck.	Clear up short circuit between “YEL/RED” wire circuit and power supply circuit.



[A]: Fig. for Step 2	1. 22-pin connector in combination meter
[B]: Fig. for Step 3	2. Service wire
[C]: Fig. for Step 4	3. SDM connector “L70”
	4. “G21” connector (22-pin) for combination meter

**Special tool**  
**(A) : 09932-76010**

**NOTE:**

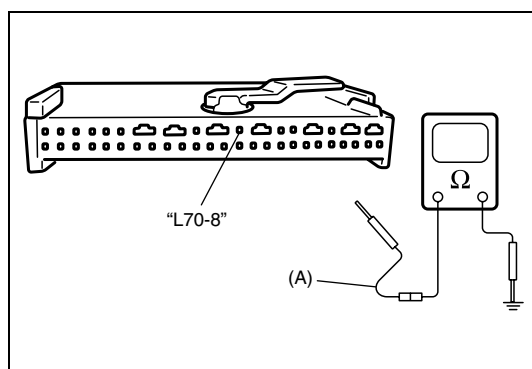
Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

**Table C :**

Step	Action	Yes	No
1	1) Check "AIR BAG" monitor coupler. Is it connected diagnosis switch terminal and ground terminal in "AIR BAG" monitor coupler by service wire?	Remove service wire.	Go to step 2.
2	1) With ignition switch OFF, disconnect SDM connector "L70". 2) Measure resistance between "L70-8" terminal in SDM connector "L70" and body ground. Is resistance infinity.	Substitute a known-good SDM and recheck.	Repair short from "PPL" wire circuit to ground.

Fig. for STEP 2



**Special tool**  
**(A) : 09932-76010**

**NOTE:**

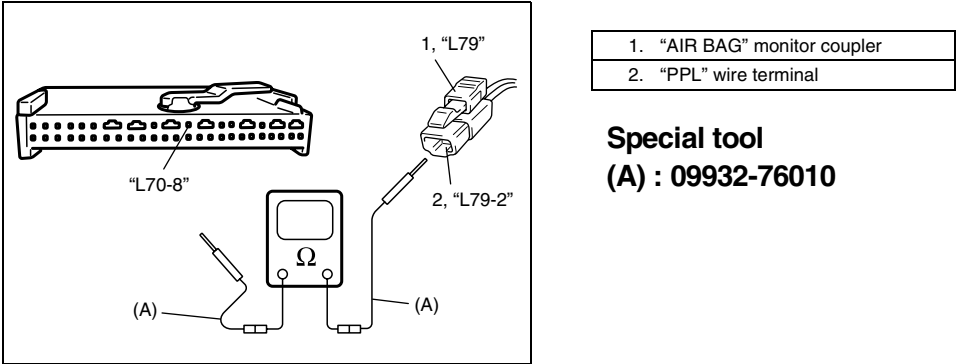
Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

Table D :

Step	Action	Yes	No
1	1) Inspect connection between diagnostic switch terminal in “AIR BAG” monitor coupler and body ground by service wire. Is it securely connected between them by service wire?	Go to step 2.	Properly connection diagnostic switch terminal on “AIR BAG” monitor coupler and body ground by service wire.
2	1) Disconnect SDM connector “L70” from SDM. 2) Check for proper connection at “PPL” wire (“L70-8” terminal in SDM connector and “L79-2” terminal in “AIR BAG” monitor coupler) terminals. 3) If OK, then measure resistance between “L70-8” terminal and “L79-2” terminal. Is resistance 0-1 Ω?	Substitute a known good SDM and recheck	Check “PPL” wire terminals. If OK, repair high resistance or open in “PPL” wire.

Fig. for STEP 2



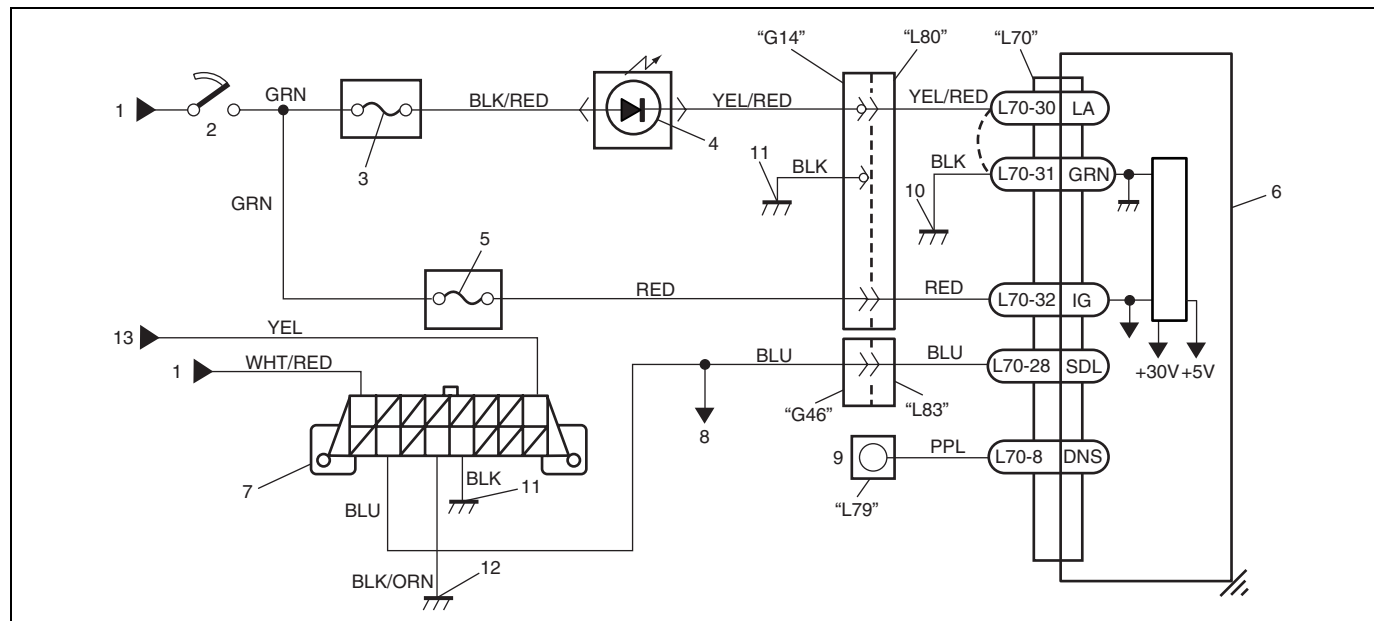
**NOTE:**

Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

## Table E - SDM Cannot Communicate through the Serial Data Circuit

### WIRING DIAGRAM



1. From main fuse	6. SDM	11. Ground on body
2. Ignition switch	7. DLC	12. Ground on Engine block
3. "METER" fuse	8. To ECM, and ABS control module (if equipped)	13. Immobilizer control module (if equipped)
4. "AIR BAG" warning lamp in combination meter	9. "AIR BAG" monitor coupler	
5. "AIR BAG" fuse	10. Ground for air bag system	

### CAUTION:

- Be sure to perform **AIR BAG DIAGNOSTIC SYSTEM CHECK** before starting diagnosis according to flow table.
- When measurement of resistance or voltage is required in this table, use a tester along with a correct terminal adapter from special tool (Connector test adapter kit).
- When a check for proper connection is required, refer to **INTERMITTENTS AND POOR CONNECTIONS** in this section.
- If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.

### TABLE TEST DESCRIPTION

STEP 1 : An improper connection to the data link connector (DLC) will prevent communications from being established.

STEP 2 : This test checks whether it is possible to communicate with other control module.

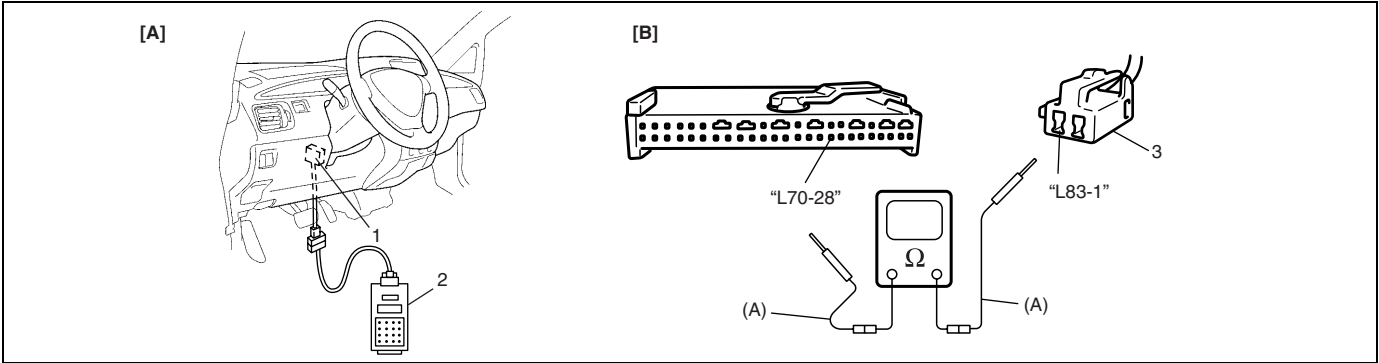
STEP 3 : This test checks for an open in "Serial data" circuit.

### DIAGNOSTIC FLOW TABLE

Step	Action	Yes	No
1	1) Make sure that SUZUKI scan tool is free from malfunction and correct cartridge for air bag system is used. 2) Ignition switch OFF. 3) Check proper connection of SUZUKI scan tool to DLC. Is connection in good condition?	Go to step 2.	Properly connect SUZUKI scan tool to DLC.

Step	Action	Yes	No
2	1) Check if communication is possible by trying communication with other control module (ECM or ABS control module (if equipped)). Is it possible to communicate with other control module?	Go to step 3.	Repair open in common section of serial data circuit ("BLU" wire circuit) used by all controllers or short to ground or power circuit which has occurred somewhere in serial data circuit ("BLU" wire circuit).
3	1) With ignition switch OFF, disconnect SDM connector "L70" and "L83" connector. 2) Check proper connection at "L83-1" ("BLU" wire) terminal for DLC. 3) If OK, then check resistance between "L83-1" ("BLU" wire) terminal and "L70-28" terminal of SDM connector "L70". Is resistance 0-1 Ω?	Substitute a known-good SDM and recheck.	Repair high resistance or open in "BLU" wire circuit (between "L83" connector and SDM).

[A] Fig. for STEP 1/ [B] Fig. for STEP 3

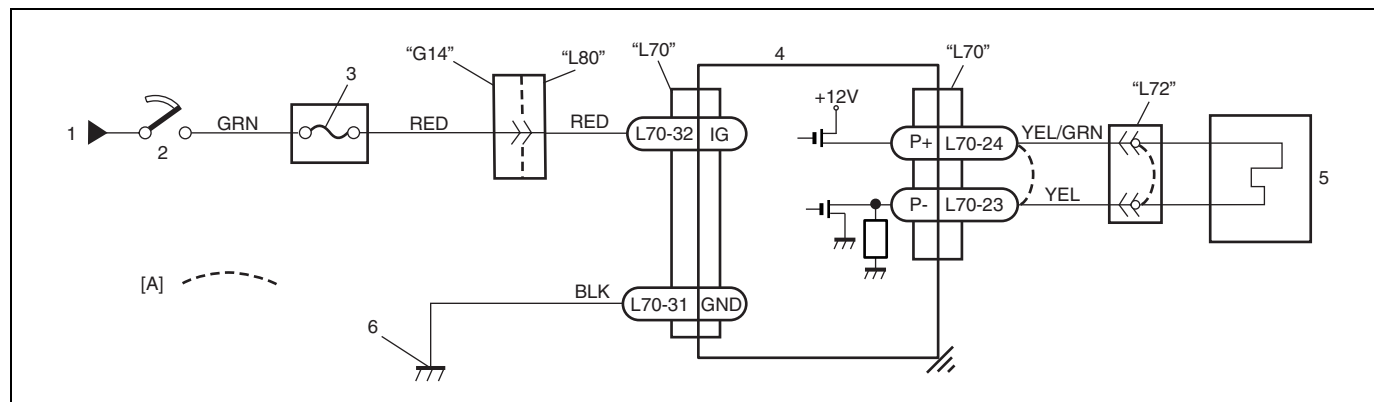


1. DLC
2. Scan tool
3. Floor harness side connector

**Special tool**  
**(A) : 09932-76010**

**NOTE:**  
Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

**DTC B1015 - Passenger Air Bag Initiator Circuit Resistance High****DTC B1016 - Passenger Air Bag Initiator Circuit Resistance Low****DTC B1018 - Passenger Air Bag Initiator Circuit Short to Ground****DTC B1019 - Passenger Air Bag Initiator Circuit Short to Power Circuit****WIRING DIAGRAM**

[A]: Shorting bar	2. Ignition switch	4. SDM	6. Ground for air bag system
1. From main fuse	3. "AIR BAG" fuse	5. Passenger air bag (inflator) module	

**CAUTION:**

- Be sure to perform **AIR BAG DIAGNOSTIC SYSTEM CHECK** before starting diagnosis according to flow table.
- When measurement of resistance or voltage is required in this table, use a tester along with a correct terminal adaptor from special tool (Connector test adapter kit).
- When a check for proper connection is required, refer to **INTERMITTENTS AND POOR CONNECTIONS** in this section.
- If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.

**DTC WILL SET WHEN****DTC B1015 :**

The combined resistance of the passenger air bag (inflator) module, harness wiring and connector terminal contact is above a specified value for specified time.

**DTC B1016 :**

The combined resistance of the passenger air bag (inflator) module, harness wiring and connector terminal contact is below a specified value for specified time.

**DTC B1018 :**

The voltage measured at passenger air bag initiator circuit is below a specified value for specified time.

**DTC B1019 :**

The voltage measured at passenger air bag initiator circuit is above a specified value for specified time.

**TABLE TEST DESCRIPTION****DTC B1015, B1016, B1018 or B1019 :**

STEP 1 : Check whether malfunction is in passenger air bag (inflator) module.

STEP 2 : Check passenger air bag (inflator) module initiator circuit in air bag harness.

STEP 3 : Check passenger air bag (inflator) module initiator circuit in air bag harness. (for DTC B1019 only)

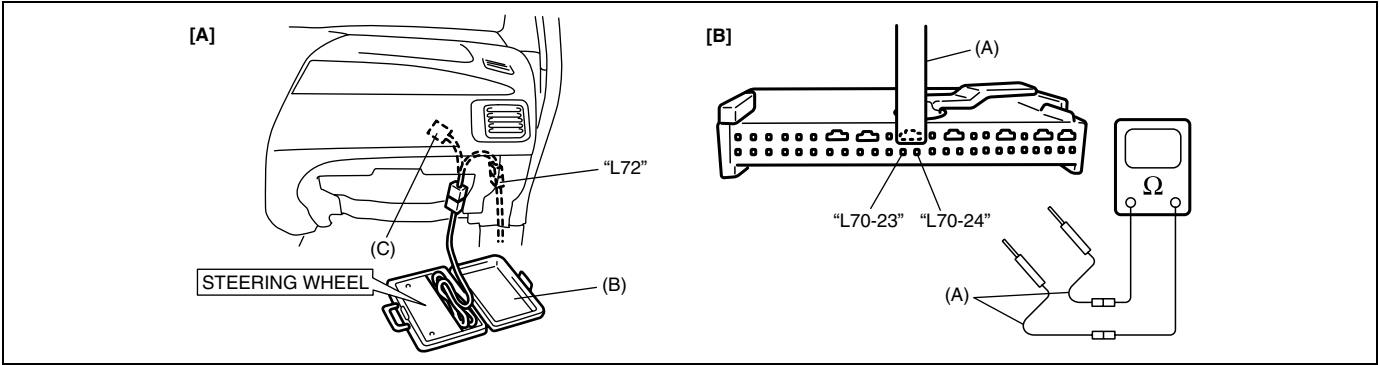


DIAGNOSTIC FLOW TABLE

DTC B1015 :

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect passenger air bag (inflator) module connector “L72” behind the glove box. 2) Check proper connection to passenger air bag (inflator) module at terminals in “L72” connector. 3) If OK, then connect Special Tool (B) and (C) to passenger air bag (inflator) module connector “L72” disconnected at the step 1). With ignition switch ON, is DTC B1015 current?	Go to step 2.	Ignition switch OFF. Replace passenger air bag (inflator) module (Refer to PASSENGER AIR BAG (INFLATOR) MODULE in this section).
2	1) With ignition switch OFF, disconnect SDM connector “L70”. 2) Check proper connection to SDM at terminals “L70-24” and “L70-23”. 3) If OK, then measure resistance between “L70-24” and “L70-23” terminals with connected Special Tool (B). Is resistance 2.8 Ω or less?	Substitute a known-good SDM and recheck.	Repair high resistance or open in “YEL/GRN” or “YEL” wire circuit.

[A] Fig. for STEP 1 and 2 / [B] Fig. for STEP 2



**Special tool**  
(A) : 09932-76010  
(B) : 09932-75010  
(C) : 09932-78340

NOTE:

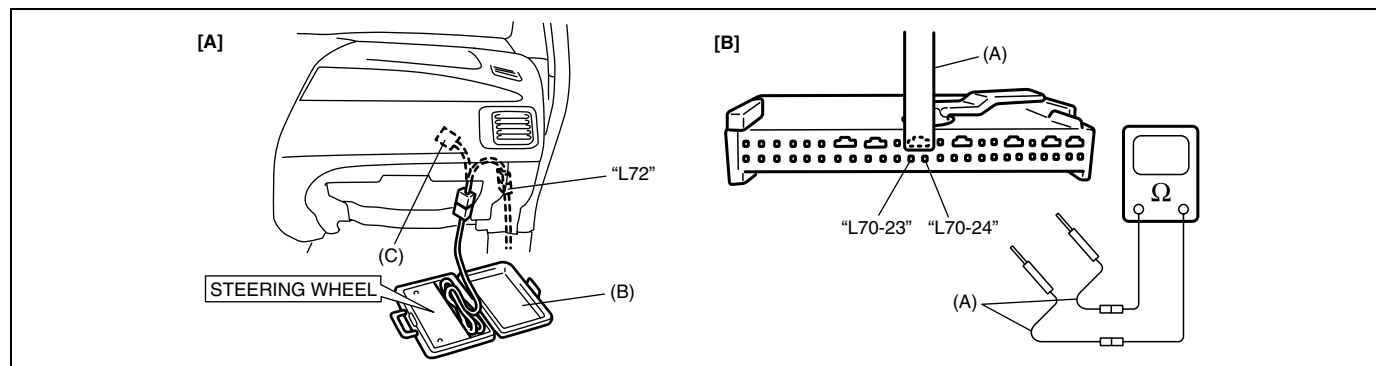
Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Clear diagnostic trouble codes (Refer to DTC CLEARANCE), if any.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

**DTC B1016:**

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect passenger air bag (inflator) module connector "L72" behind the glove box. 2) Check proper connection to passenger air bag (inflator) module at terminals in "L72" connector. 3) If OK, then connect Special Tool (B) and (C) to passenger air bag (inflator) module connector disconnected at the step 1). With ignition switch ON, is DTC B1016 current?	Go to step 2.	Ignition switch OFF. Replace passenger air bag (inflator) module (Refer to PASSENGER AIR BAG (INFLATOR) MODULE in this section).
2	1) With ignition switch OFF, disconnect SDM connector "L70". 2) Check proper connection to SDM at terminals "L70-24" and "L70-23". 3) If OK, then measure resistance between "L70-24" and "L70-23" terminals with connected Special Tool (B). Is resistance 2.2 $\Omega$ or more?	Substitute a known-good SDM and recheck.	Repair short from "YEL/GRN" wire circuit to "YEL" wire circuit or from "YEL/GRN" or "YEL" wire circuit to other wire circuit.

[A] Fig. for STEP 1 and 2 / [B] Fig. for STEP 2

**Special tool**

(A) : 09932-76010

(B) : 09932-75010

(C) : 09932-78340

**NOTE:**

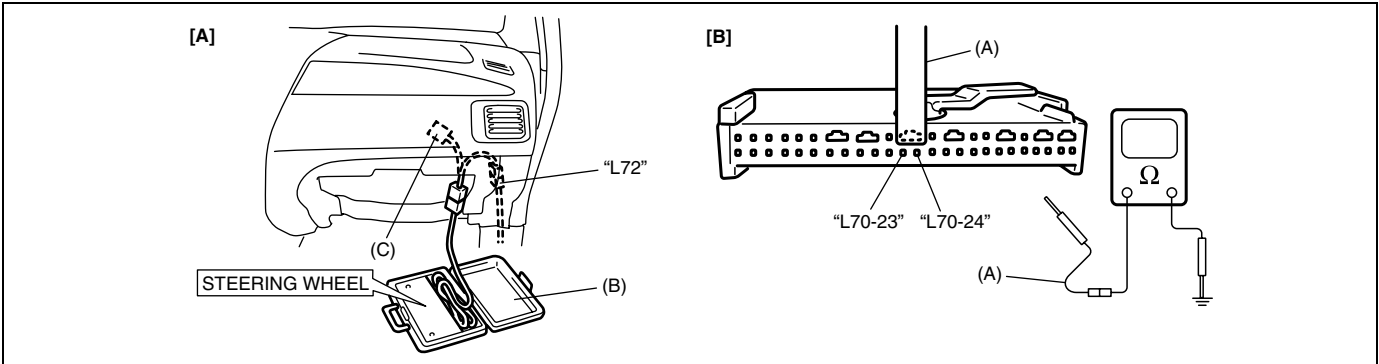
Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Clear diagnostic trouble codes (Refer to DTC CLEARANCE), if any.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

DTC B1018:

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect passenger air bag (inflator) module connector “L72” behind the glove box. 2) Check proper connection to passenger air bag (inflator) module at terminals in “L72” connector. 3) If OK, then connect Special Tool (B) and (C) to passenger air bag (inflator) module connector “L72” disconnected at the step 1). With ignition switch ON, is DTC B1018 current?	Go to step 2.	Ignition switch OFF. Replace passenger air bag (inflator) module (Refer to PASSENGER AIR BAG (INFLATOR) MODULE in this section).
2	1) With ignition switch OFF, disconnect Special Tool (B), (C) and SDM connector “L70”. 2) Measure resistance between “L70-24” terminal and body ground. Is resistance infinity?	Go to step 3.	Repair short from “YEL/GRN” wire circuit to ground.
3	1) Measure resistance between “L70-23” terminal and body ground. Is resistance infinity?	Substitute a known-good SDM and recheck.	Repair short from “YEL” wire circuit to ground.

[A] Fig. for STEP 1, 2 and 3 / [B] Fig. for STEP 2 and 3



- Special tool**  
(A) : 09932-76010  
(B) : 09932-75010  
(C) : 09932-78340

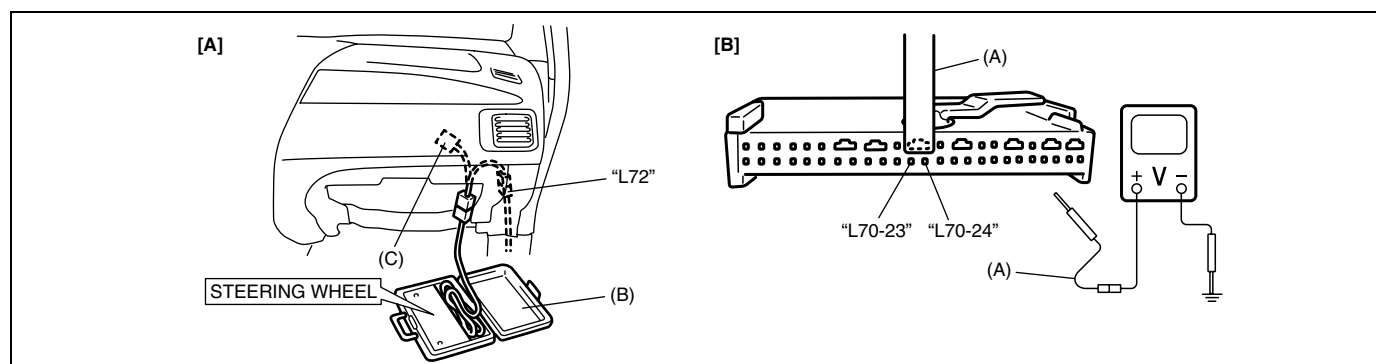
**NOTE:**

- Upon completion of inspection and repair work, perform following items.
- Reconnect all air bag system components, ensure all components are properly mounted.
  - Clear diagnostic trouble codes (Refer to DTC CLEARANCE), if any.
  - Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

**DTC B1019:**

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect passenger air bag (inflator) module connector "L72" behind the glove box. 2) Check proper connection to passenger air bag (inflator) module at terminals in "L72" connector. 3) If OK, then connect Special Tool (B) and (C) to passenger air bag (inflator) module connector "L72" disconnected at the step 1). With ignition switch ON, is DTC B1019 current?	Go to step 2.	Ignition switch OFF. Replace passenger air bag (inflator) module (Refer to PASSENGER AIR BAG (INFLATOR) MODULE in this section).
2	1) With ignition switch OFF, disconnect Special Tool (B), (C) and SDM connector "L70". 2) Measure voltage from "L70-24" terminal to body ground. With ignition switch ON, is voltage 0-1 V?	Go to step 3.	Repair short from "YEL/GRN" wire circuit to power circuit.
3	1) Measure voltage from "L70-23" terminal to body ground. With ignition switch ON, is voltage 0-1 V?	Substitute a known-good SDM and recheck.	Repair short from "YEL" wire circuit to power circuit.

[A] Fig. for STEP 1, 2 and 3 / [B] Fig. for STEP 2 and 3

**Special tool**

(A) : 09932-76010

(B) : 09932-75010

(C) : 09932-78340

**NOTE:**

Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Clear diagnostic trouble codes (Refer to DTC CLEARANCE), if any.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

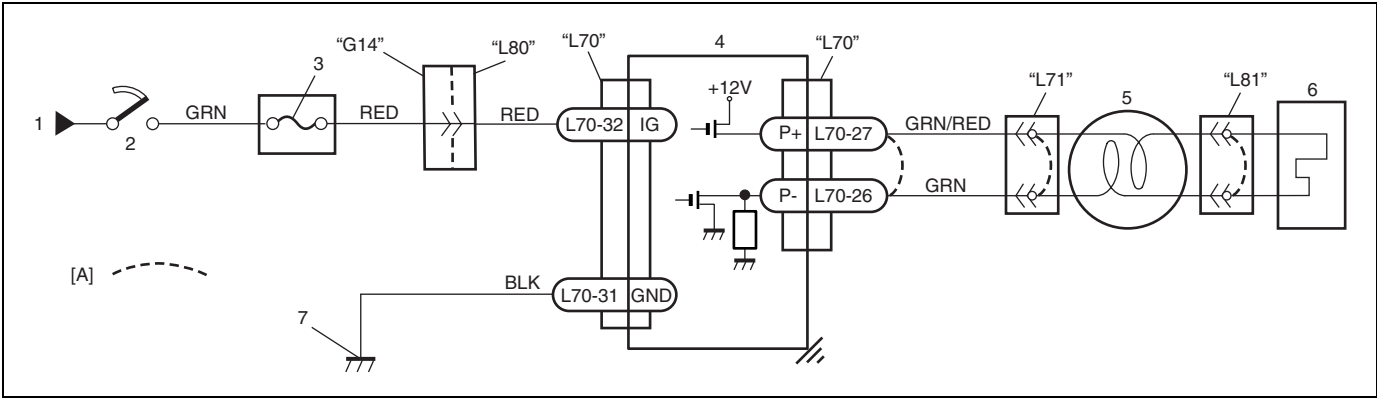
DTC B1021 – Driver Air Bag Initiator Circuit Resistance High

DTC B1022 – Driver Air Bag Initiator Circuit Resistance Low

DTC B1024 – Driver Air Bag Initiator Circuit Short to Ground

DTC B1025 – Driver Air Bag Initiator Circuit Short to Power Circuit

WIRING DIAGRAM



[A] : Shorting bar	3. "AIR BAG" fuse	6. Driver air bag (inflator) module
1. From main fuse	4. SDM	7. Ground for air bag system
2. Ignition switch	5. Contact coil assembly	

CAUTION:

- Be sure to perform AIR BAG DIAGNOSTIC SYSTEM CHECK before starting diagnosis according to flow table.
- When measurement of resistance or voltage is required in this table, use a tester along with a correct terminal adapter from special tool (Connector test adapter kit).
- When a check for proper connection is required, refer to INTERMITTENTS AND POOR CONNECTIONS in this section.
- If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.

DTC WILL SET WHEN

DTC B1021 :

The combined resistance of the driver air bag (inflator) module, contact coil assembly, harness wiring and connector terminal contact is above a specified value for specified time.

DTC B1022 :

The combined resistance of the driver air bag (inflator) module, contact coil assembly, harness wiring and connector terminal contact is below a specified value for specified time.

DTC B1024 :

The voltage measured at driver air bag initiator circuit is below a specified value for specified time.

DTC B1025 :

The voltage measured at driver air bag initiator circuit is above a specified value for specified time.

TABLE TEST DESCRIPTION

DTC B1021, B1022, B1024 or B1025 :

STEP 1 : Check whether malfunction is in contact coil and driver air bag (inflator) module or the others.

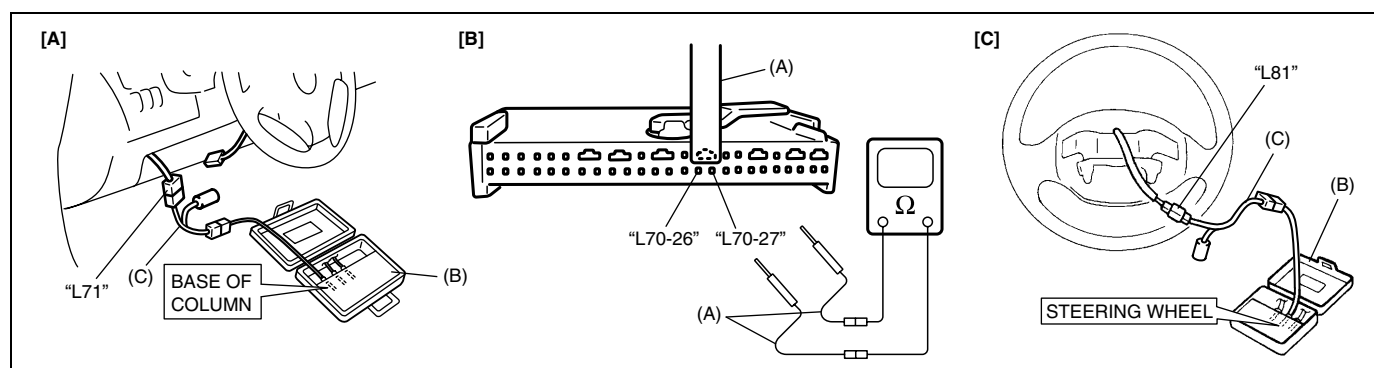
STEP 2 : Check driver air bag (inflator) module initiator circuit in air bag harness.

STEP 3 : Check whether malfunction is in contact coil or driver air bag (inflator) module.

**DIAGNOSTIC FLOW TABLE****DTC B1021 :**

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect contact coil connector "L71" located near the base of the steering column. 2) Check proper connection to contact coil at terminals in "L71" connector. 3) If OK, then connect Special Tool (B) and (C) to contact coil connector "L71" disconnected at step 1). With ignition switch ON, is DTC B1021 current?	Go to step 2.	Go to step 3.
2	1) With ignition switch OFF, disconnect SDM connector "L70". 2) Check proper connection to SDM at terminals "L70-27" and "L70-26". 3) If OK, then measure resistance between "L70-27" and "L70-26" terminals with connected Special Tool (B). Is resistance 3.1 $\Omega$ or less?	Substitute a known-good SDM and recheck.	Repair high resistance or open in "GRN/RED" or "GRN" wire circuit.
3	1) With ignition switch OFF, disconnect Special Tool (B) and (C) then reconnect contact coil connector "L71" located near the base of the steering column. 2) Remove driver air bag (inflator) module from steering wheel (Refer to DRIVER AIR BAG (INFLATOR) MODULE in Section 3C). 3) Check proper connection to driver air bag (inflator) module at terminals in "L81" connector. 4) If OK, then connect Special Tool (B) and (C) to "L81" connector. With ignition switch ON, is DTC B1021 current?	Ignition switch OFF. Replace contact coil assembly (Refer to COMBINATION SWITCH/CONTACT COIL AND COMBINATION SWITCH ASSEMBLY in Section 3).	Ignition switch OFF. Replace driver air bag (inflator) module (Refer to DRIVER AIRBAG (INFLATOR) MODULE in Section 3).

[A] Fig. for STEP 1 and 2 / [B] Fig. for STEP 2 / [C] Fig. for STEP 3

**Special tool**

(A) : 09932-76010

(B) : 09932-75010

(C) : 09932-78340

**NOTE:**

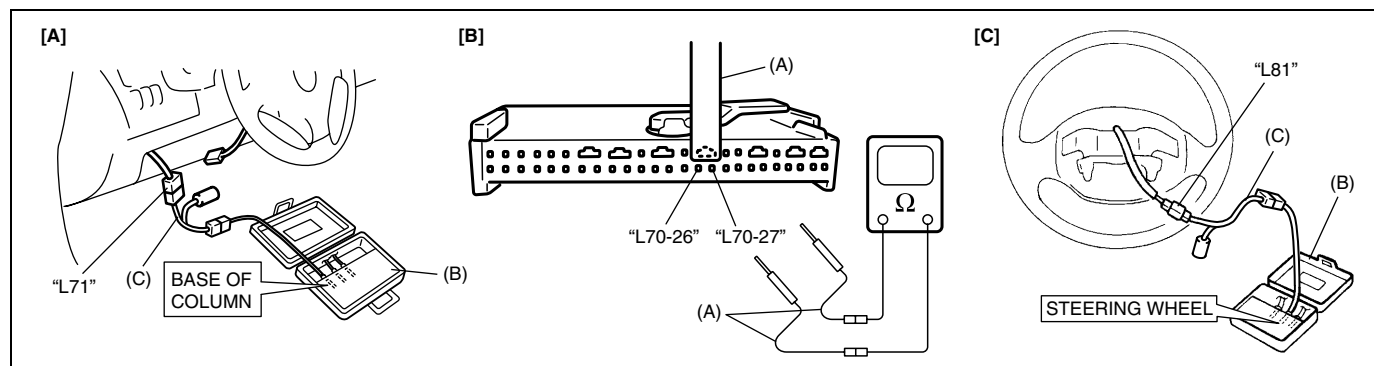
Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Clear diagnostic trouble codes (Refer to DTC CLEARANCE), if any.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

**DTC B1022 :**

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect contact coil connector "L71" located near the base of the steering column. 2) Check proper connection to contact coil at terminals in "L71" connector. 3) If OK, then connect Special Tool (B) and (C) to contact coil connector "L71" disconnected at step 1). With ignition switch ON, is DTC B1022 current?	Go to step 2.	Go to step 3.
2	1) With ignition switch OFF, disconnect SDM connector "L70". 2) Check proper connection to SDM at terminals "L70-27" and "L70-26". 3) If OK, then measure resistance between "L70-27" and "L70-26" terminals with connected Special Tool (B) and (C). Is resistance 2.7 $\Omega$ or more?	Substitute a known-good SDM and recheck.	Repair short from "GRN/RED" wire circuit to "GRN" wire circuit or from "GRN/RED" or "GRN" wire circuit to other wire circuit.
3	1) With ignition switch OFF, disconnect Special Tool (B) and (C), then reconnect contact coil connector "L71" located near the base of the steering column. 2) Remove driver air bag (inflator) module from steering wheel (Refer to DRIVER AIR BAG (INFLATOR) MODULE in Section 3C). 3) Check proper connection to driver air bag (inflator) module at terminals in "L81" connector. 4) If OK, then connect Special Tool (B) and (C) to "L81" connector. With ignition switch ON, is DTC B1022 current?	Ignition switch OFF. Replace contact coil assembly (Refer to COMBINATION SWITCH/CONTACT COIL AND COMBINATION SWITCH ASSEMBLY in Section 3).	Ignition switch OFF. Replace driver air bag (inflator) module (Refer to DRIVER AIR BAG (INFLATOR) MODULE in Section 3).

[A] Fig. for STEP 1 and 2 / [B] Fig. for STEP 2 / [C] Fig. for STEP 3



### Special tool

(A) : 09932-76010

(B) : 09932-75010

(C) : 09932-78340

### NOTE:

Upon completion of inspection and repair work, perform following items.

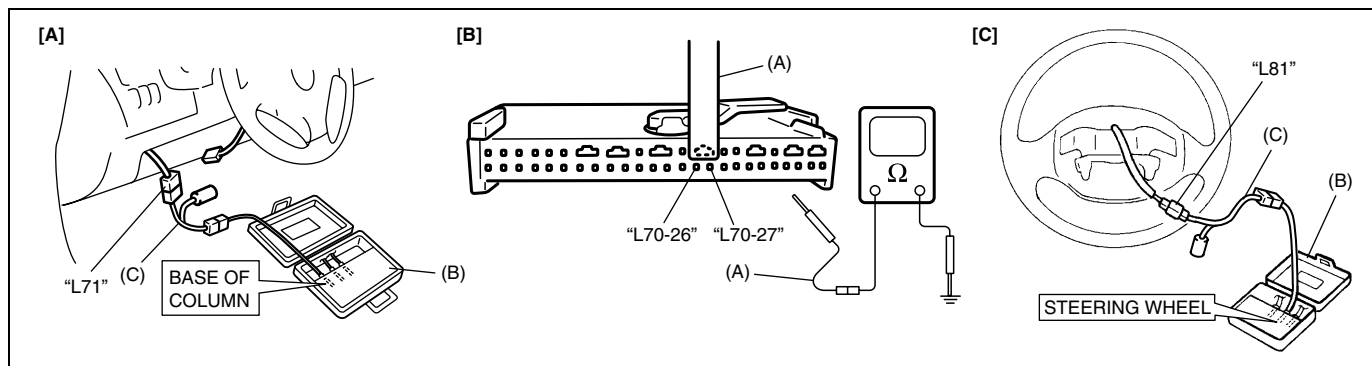
- Reconnect all air bag system components, ensure all components are properly mounted.
- Clear diagnostic trouble codes (Refer to DTC CLEARANCE), if any.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.



**DTC B1024 :**

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect contact coil connector "L71" located near the base of the steering column. 2) Check proper connection to contact coil at terminals in "L71" connector. 3) If OK, then connect Special Tool (B) and (C) to contact coil connector "L71" disconnected at step 1). With ignition switch ON, is DTC B1024 current?	Go to step 2.	Go to step 3.
2	1) With ignition switch OFF, disconnect Special Tool (B), (C) and SDM connector "L70". 2) Measure resistance between "L70-27" terminal and body ground and between "L70-26" terminal and body ground. Are they infinity?	Substitute a known-good SDM and recheck.	Repair short from "GRN/RED" or "GRN" wire circuit to ground.
3	1) With ignition switch OFF, disconnect Special Tool (B) and (C), then reconnect contact coil connector "L71" located near the base of the steering column. 2) Remove driver air bag (inflator) module from steering wheel (Refer to DRIVER AIR BAG (INFLATOR) MODULE in Section 3C). 3) Check proper connection to driver air bag (inflator) module at terminals in "L81" connector. 4) If OK, then connect Special Tool (B) and (C) to "L81" connector. With ignition switch ON, is DTC B1024 current?	Ignition switch OFF. Replace contact coil assembly (Refer to COMBINATION SWITCH/CONTACT COIL AND COMBINATION SWITCH ASSEMBLY in Section 3).	Ignition switch OFF. Replace driver air bag (inflator) module (Refer to DRIVER AIR BAG (INFLATOR) MODULE in Section 3).

[A] Fig. for STEP 1 and 2 / [B] Fig. for STEP 2 / [C] Fig. for STEP 3

**Special tool**

(A) : 09932-76010

(B) : 09932-75010

(C) : 09932-78340

**NOTE:**

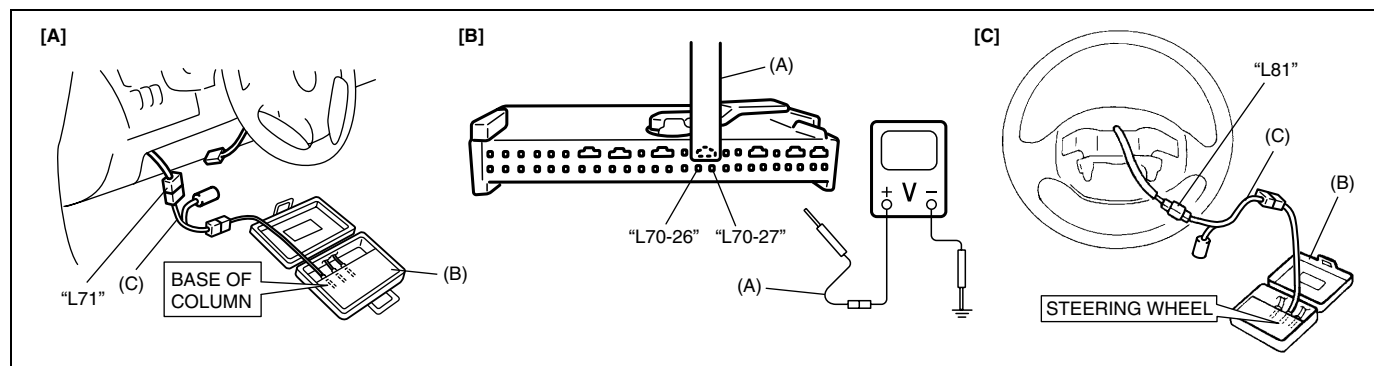
Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Clear diagnostic trouble codes (Refer to DTC CLEARANCE), if any.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

**DTC B1025 :**

<b>Step</b>	<b>Action</b>	<b>Yes</b>	<b>No</b>
1	1) With ignition switch OFF, disconnect contact coil connector "L71" located near the base of the steering column. 2) Check proper connection to contact coil at terminals in "L71" connector. 3) If OK, then connect Special Tool (B) and (C) to contact coil connector "L71" disconnected at step 1). With ignition switch ON, is DTC B1025 current?	Go to step 2.	Go to step 3.
2	1) With ignition switch OFF, disconnect Special Tool (B), (C) and SDM connector "L70". 2) Measure voltage from "L70-27" terminal to body ground and from "L70-26" terminal to body ground. With ignition switch ON, are they 0-1V?	Substitute a known-good SDM and recheck.	Repair short from "GRN/RED" or "GRN" wire circuit to power circuit.
3	1) With ignition switch OFF, disconnect Special Tool (B) and (C), then reconnect contact coil connector "L71" located near the base of the steering column. 2) Remove driver air bag (inflator) module from steering wheel (Refer to DRIVER AIR BAG (INFLATOR) MODULE in Section 3C). 3) Check proper connection to driver air bag (inflator) module at terminals in "L81" connector. 4) If OK, then connect Special Tool (B) and (C) to "L81" connector. With ignition switch ON, is DTC B1025 current?	Ignition switch OFF. Replace contact coil assembly (Refer to COMBINATION SWITCH/CONTACT COIL AND COMBINATION SWITCH ASSEMBLY in Section 3).	Ignition switch OFF. Replace driver air bag (inflator) module (Refer to DRIVER AIR BAG (INFLATOR) MODULE in Section 3).

[A] Fig. for STEP 1 and 2 / [B] Fig. for STEP 2 / [C] Fig. for STEP 3



### Special tool

(A) : 09932-76010

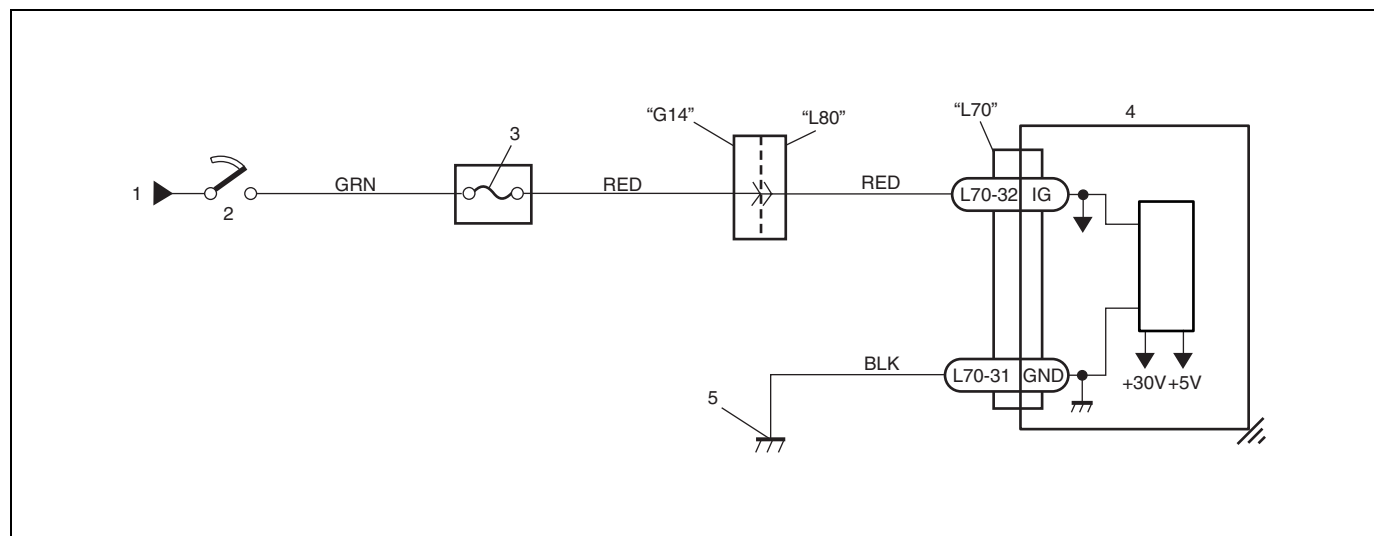
(B) : 09932-75010

(C) : 09932-78340

### NOTE:

Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Clear diagnostic trouble codes (Refer to DTC CLEARANCE), if any.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

**DTC B1031 – Power Source Voltage High****DTC B1032 – Power Source Voltage Low****WIRING DIAGRAM**

1. From main fuse	3. "AIR BAG" fuse	5. Ground for air bag system
2. Ignition switch	4. SDM	

**CAUTION:**

- Be sure to perform **AIR BAG DIAGNOSTIC SYSTEM CHECK** before starting diagnosis according to flow table.
- When measurement of resistance or voltage is required in this table, use a tester along with a correct terminal adapter from special tool (Connector test adapter kit).
- When a check for proper connection is required, refer to **INTERMITTENTS AND POOR CONNECTIONS** in this section.
- If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.

**DTC WILL SET WHEN****DTC B1031 :**

The power source voltage to SDM is above specified value for specified time.

**DTC B1032 :**

The power source voltage is below an approx. 8V for specified time.

**TABLE TEST DESCRIPTION****DTC B1031 :**

STEP 1 : Check if voltage applied to SDM is within normal range.

STEP 2 : Check if DTC B1031 still exists.

**DTC B1032 :**

STEP 1 : Check if voltage on battery is within normal range.

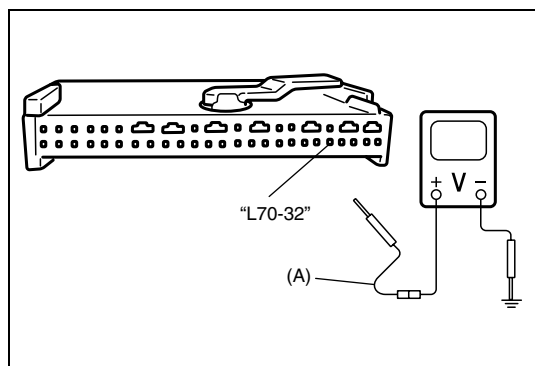
STEP 2 : Check if voltage applied to SDM is within normal range.

STEP 3 : Check if voltage applied to "G14" connector is within normal range.

STEP 4 : Check if DTC B1032 still exists.

**DIAGNOSTIC FLOW TABLE****DTC B1031 :**

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect SDM connector "L70" 2) Check proper connection to SDM at "L70-32" terminal. 3) If OK, then ignition switch ON, and then check voltage from "L70-32" terminal in SDM connector "L70" to body ground. Is voltage 14 V or less?	Go to step 2.	Check Charging System and repair as necessary. (Refer to DIAGNOSIS in Section 6H.)
2	1) With ignition switch OFF, disconnect SDM connector "L70". With ignition switch ON, is DTC B1031 current?	Substitute a known-good SDM and recheck.	Check Charging System and repair as necessary. (Refer to DIAGNOSIS in Section 6H.)



**Special tool**  
**(A) : 09932-76010**

**NOTE:**

Upon completion of inspection and repair work, perform following items.

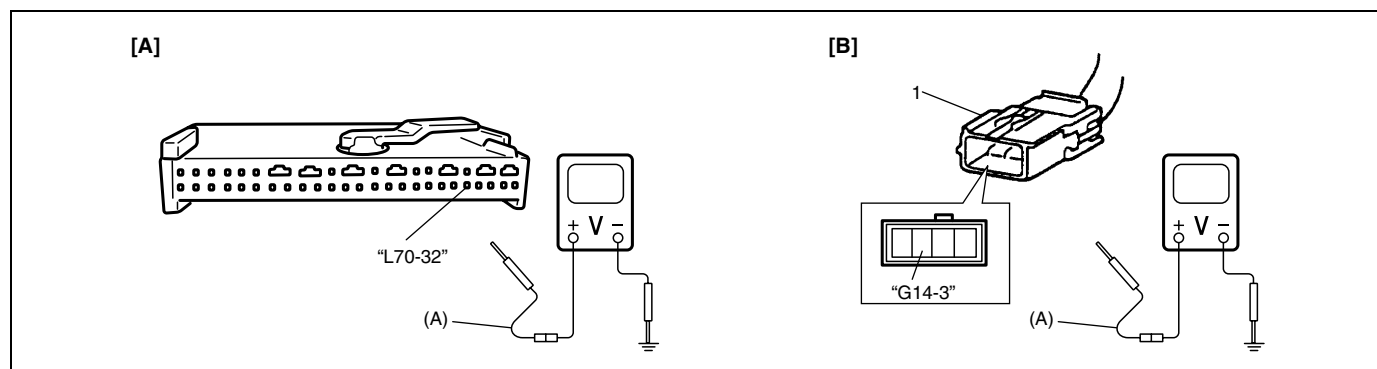
- Reconnect all air bag system components, ensure all components are properly mounted.
- Clear diagnostic trouble codes (Refer to DTC CLEARANCE), if any.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

**DTC B1032 :**

Step	Action	Yes	No
1	1) Measure voltage on battery. Is voltage 11 V or more?	Go to Step 2.	Check Charging System and repair as necessary. (Refer to DIAGNOSIS in Section 6H.)
2	1) With ignition switch OFF, disconnect SDM connector "L70". 2) Check proper connection to SDM at "L70-32" terminal. 3) If OK, then ignition switch ON, and then check voltage from "L70-32" terminal in SDM connector to body ground. Is voltage 8 V or more?	Go to Step 4.	Go to Step 3.

Step	Action	Yes	No
3	1) With ignition switch OFF, disconnect "G14" connector in instrument panel harness. 2) Check proper connection at "G14-3" ("RED" wire) terminal. 3) If OK, then ignition switch ON, and then check voltage from "G14-3" ("RED" wire) terminal to body ground. Is voltage 8 V or more?	Check for proper connection at "L80-3" terminal. If OK, repair high resistance or open in "RED" wire (between "L80" connector and SDM).	Possibly faulty points are as follows. Check each of them and repair as necessary. <ul style="list-style-type: none"> <li>• Circuit from battery to "G14" connector</li> <li>• Charging System (Refer to DIAGNOSIS in Section 6H.)</li> </ul>
4	1) With ignition switch OFF, reconnect SDM connector "L70". With ignition switch ON, is DTC B1032 current?	Substitute a known-good SDM and recheck.	Check Charging System and repair as necessary. (Refer to DIAGNOSIS in Section 6H.)

[A] Fig. for STEP 2 / [B] Fig. for STEP 3



1. Instrument panel harness side connector

### Special tool

(A) : 09932-76010

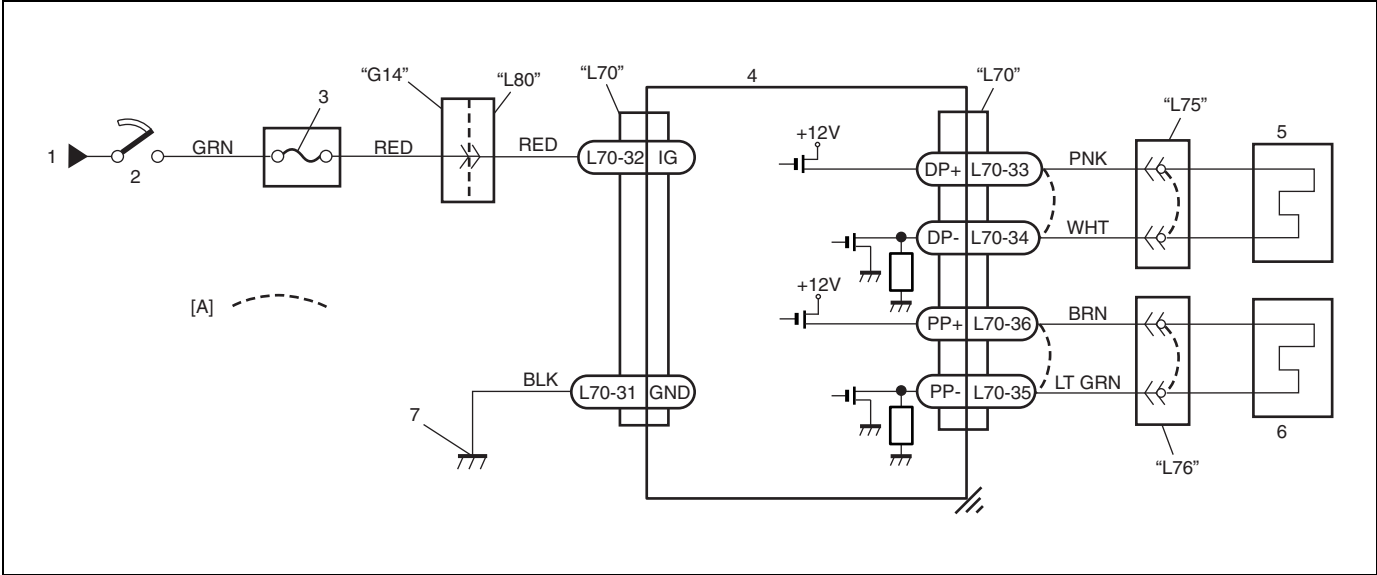
### NOTE:

Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Clear diagnostic trouble codes (Refer to DTC CLEARANCE), if any.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

- DTC B1041 – Driver Pretensioner Initiator Circuit Resistance High
- DTC B1042 – Driver Pretensioner Initiator Circuit Resistance Low
- DTC B1043 – Driver Pretensioner Initiator Circuit Short to Ground
- DTC B1044 – Driver Pretensioner Initiator Circuit Short to Power Circuit
- DTC B1045 – Passenger Pretensioner Initiator Circuit Resistance High
- DTC B1046 – Passenger Pretensioner Initiator Circuit Resistance Low
- DTC B1047 – Passenger Pretensioner Initiator Circuit Short to Ground
- DTC B1048 – Passenger Pretensioner Initiator Circuit Short to Power Circuit

WIRING DIAGRAM



[A] : Shorting bar	3. "AIR BAG" fuse	6. Passenger seat belt pretensioner
1. From main fuse	4. SDM	7. Ground for air bag system
2. Ignition switch	5. Driver seat belt pretensioner	

CAUTION:

- Be sure to perform AIR BAG DIAGNOSTIC SYSTEM CHECK before starting diagnosis according to flow table.
- When measurement of resistance or voltage is required in this table, use a tester along with a correct terminal adapter from special tool (Connector test adapter kit).
- When a check for proper connection is required, refer to INTERMITTENTS AND POOR CONNECTIONS in this section.
- If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.

**DTC WILL SET WHEN****DTC B1041 or B1045 :**

The resistance of driver or passenger seat belt pretensioner initiator circuit is above a specified value for specified time.

**DTC B1042 or B1046 :**

The resistance of driver or passenger seat belt pretensioner initiator circuit is below a specified value for specified time.

**DTC B1043 or B1047 :**

The voltage measured at driver or passenger seat belt pretensioner initiator circuit is below a specified value for specified time.

**DTC B1044 or B1048 :**

The voltage measured at driver or passenger seat belt pretensioner initiator circuit is above a specified value for specified time.

**TABLE TEST DESCRIPTION****DTC B1041, B1042, B1043, B1044, B1045, B1046, B1047 or B1048 :**

STEP 1 : Check whether malfunction is in seat belt pretensioner.

STEP 2 : Check seat belt pretensioner initiator circuit in air bag harness.

**DIAGNOSTIC FLOW TABLE****DTC B1041 or B1045 :**

Step	Action	Yes	No
1	1) With ignition switch OFF, remove center pillar inner garnish of applicable side then disconnect seat belt pretensioner connector. 2) Check proper connection to applicable seat belt pretensioner at terminals in "L75" or "L76" connector. 3) If OK, then connect Special Tool (A), (B) and (C) to seat belt pretensioner connector disconnected at the step 1. With ignition switch ON, is DTC B1041 or B1045 still current?	Go to step 2.	Ignition switch OFF. Replace seat belt pretensioner (Refer to Section 10).
2	1) With ignition switch OFF, disconnect SDM connector "L70". 2) Check proper connection to SDM at terminals "L70-33" and "L70-34" or "L70-36" and "L70-35". 3) If OK, then measure resistance with connected Special Tool (A), (B) and (C). <ul style="list-style-type: none"> <li>• DTC B1041 : between "L70-33" and "L70-34" terminals.</li> <li>• DTC B1045 : between "L70-36" and "L70-35" terminals.</li> </ul> Is resistance 2.8 $\Omega$ or less?	Substitute a known-good SDM and recheck.	DTC B1041 : Repair high resistance or open in "PNK" or "WHT" wire circuit. DTC B1045 : Repair high resistance or open in "BRN" or "LT GRN" wire circuit.



Fig. for STEP 1 and 2

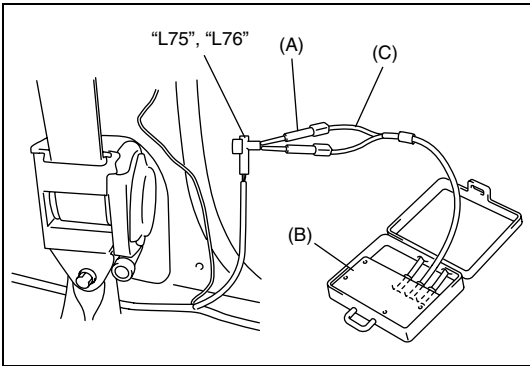
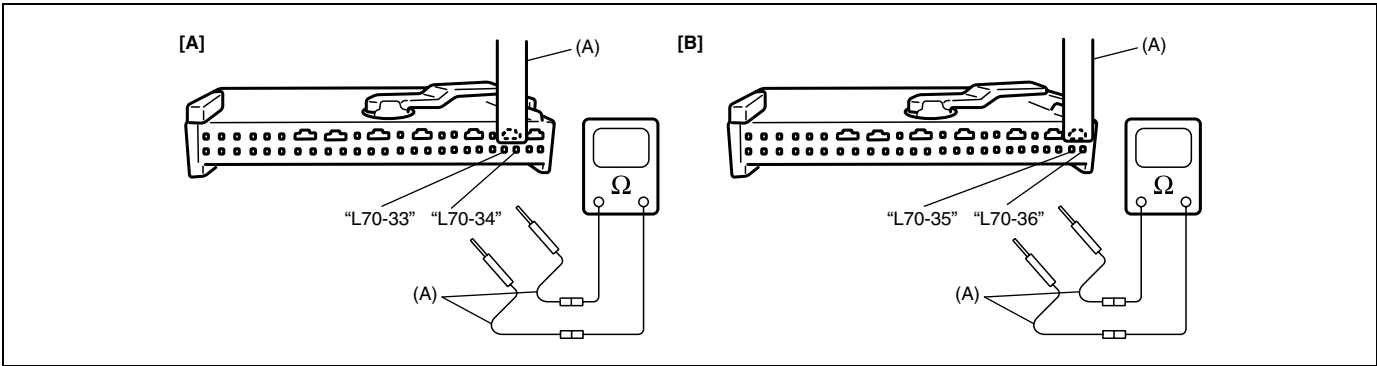


Fig. for STEP 2



[A] : For DTC B1041
[B] : For DTC B1045

- Special tool**
- (A) : 09932-76010
  - (B) : 09932-75010
  - (C) : 09932-78310

**NOTE:**

- Upon completion of inspection and repair work, perform following items.
- Reconnect all air bag system components, ensure all components are properly mounted.
  - Clear diagnostic trouble codes (Refer to DTC CLEARANCE), if any.
  - Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

**DTC B1042 or B1046 :**

Step	Action	Yes	No
1	<p>1) With ignition switch OFF, remove center pillar inner garnish of applicable side then disconnect seat belt pretensioner connector.</p> <p>2) Check proper connection to applicable seat belt pretensioner at terminals in "L75" or "L76" connector.</p> <p>3) If OK, then connect Special Tool (A), (B) and (C) to seat belt pretensioner connector disconnected at the step 1.</p> <p>With ignition switch ON, is DTC B1042 or B1046 still current?</p>	Go to step 2.	Ignition switch OFF. Replace seat belt pretensioner (Refer to Section 10).

Step	Action	Yes	No
2	1) With ignition switch OFF, disconnect SDM connector "L70". 2) Check proper connection to SDM at terminals "L70-33" and "L70-34" or "L70-36" and "L70-35". 3) If OK, then measure resistance with connected Special Tool (B). <ul style="list-style-type: none"> <li>• DTC B1042 : between "L70-33" and "L70-34" terminals.</li> <li>• DTC B1046 : between "L70-36" and "L70-35" terminals.</li> </ul> Is resistance 2.2 $\Omega$ or more?	Substitute a known-good SDM and recheck.	DTC B1042 : Repair short from "PNK" wire circuit to "WHT" wire circuit, or from "PNK" or "WHT" wire circuit to other wire circuit. DTC B1046 : Repair short from "BRN" wire circuit to "LT GRN" wire circuit, or from "BRN" or "LT GRN" wire circuit to other wire circuit.

Fig. for STEP 1 and 2

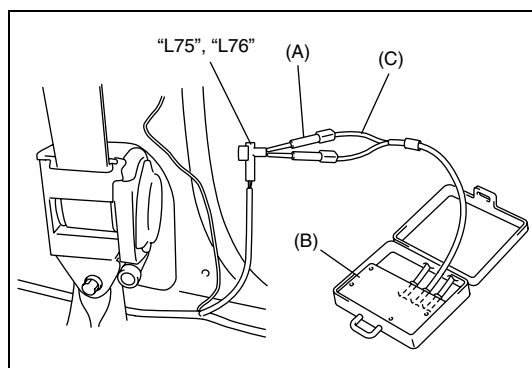
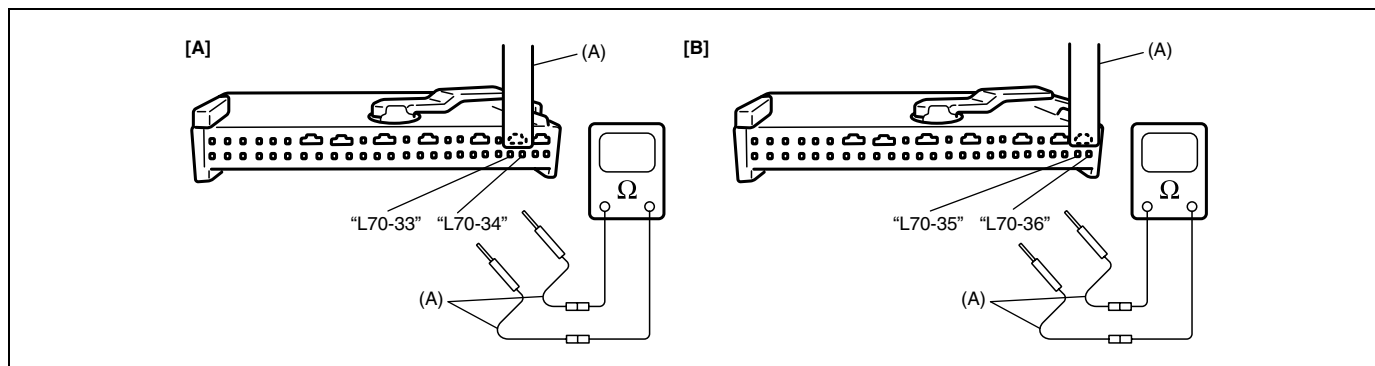


Fig. for STEP 2



[A] : For DTC B1042

[B] : For DTC B1046

**Special tool**

(A) : 09932-76010

(B) : 09932-75010

(C) : 09932-78310

**NOTE:**

Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Clear diagnostic trouble codes (Refer to DTC CLEARANCE), if any.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

DTC B1043 or B1047 :

Step	Action	Yes	No
1	<p>1) With ignition switch OFF, remove center pillar inner garnish of applicable side then disconnect seat belt pretensioner connector.</p> <p>2) Check proper connection to applicable seat belt pretensioner at terminals in “L75” or “L76” connector.</p> <p>3) If OK, then connect Special Tool (A), (B) and (C) to seat belt pretensioner connector disconnected at the step 1.</p> <p>With ignition switch ON, is DTC B1043 or B1047 still current?</p>	Go to step 2.	Ignition switch OFF. Replace seat belt pretensioner (Refer to Section 10).
2	<p>1) With ignition switch OFF, disconnect Special Tool (A), (B) and (C) and SDM connector “L70”.</p> <p>2) Measure resistance.</p> <ul style="list-style-type: none"><li>• DTC B1043 : between “L70-33” terminal and body ground, and between “L70-34” terminal and body ground.</li><li>• DTC B1047 : between “L70-36” terminal and body ground, and between “L70-35” terminal and body ground.</li></ul> <p>Is resistance infinity?</p>	Substitute a known-good SDM and recheck.	DTC B1043 : Repair short “PNK” or “WHT” wire circuit to ground. DTC B1047 : Repair short from “BRN” or “LT GRN” wire circuit to ground.

Fig. for STEP 1 and 2

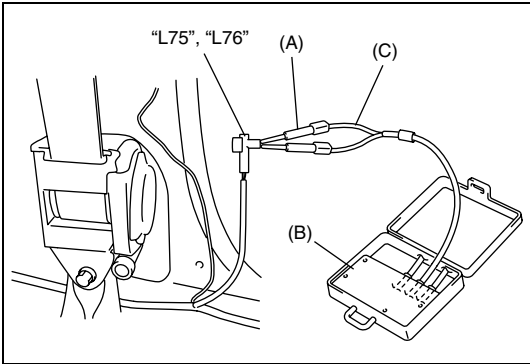
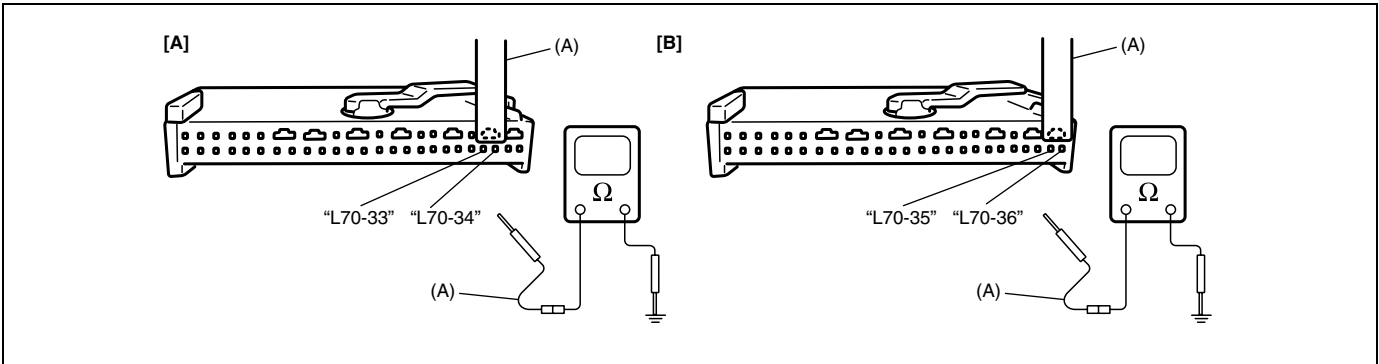


Fig. for STEP 2



[A] : For DTC B1043
[B] : For DTC B1047

**Special tool****(A) : 09932-76010****(B) : 09932-75010****(C) : 09932-78310****NOTE:**

Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Clear diagnostic trouble codes (Refer to DTC CLEARANCE), if any.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

**DTC B1044 or B1048 :**

Step	Action	Yes	No
1	1) With ignition switch OFF, remove center pillar inner garnish of applicable side then disconnect seat belt pretensioner connector. 2) Check proper connection to applicable seat belt pretensioner at terminals in "L75" or "L76" connector. 3) If OK, then connect Special Tool (A), (B) and (C) to seat belt pretensioner connector disconnected at the step 1. With ignition switch ON, is DTC B1044 or B1048 still current?	Go to step 2.	Ignition switch OFF. Replace seat belt pretensioner (Refer to Section 10).
2	1) With ignition switch OFF, disconnect Special Tool (A), (B) and (C) and SDM connector "L70". 2) Measure voltage. <ul style="list-style-type: none"> <li>• DTC B1044 : between "L70-33" terminal and body ground, and between "L70-34" terminal and body ground.</li> <li>• DTC B1048 : between "L70-36" terminal and body ground, and between "L70-35" terminal and body ground.</li> </ul> With ignition switch ON, is voltage 0-1 V?	Substitute a known-good SDM and recheck.	DTC B1044 : Repair short "PNK" or "WHT" wire circuit to power circuit. DTC B1048 : Repair short from "BRN" or "LT GRN" wire circuit to power circuit.

Fig. for STEP 1 and 2

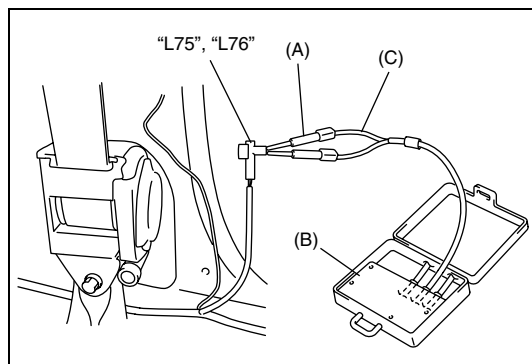
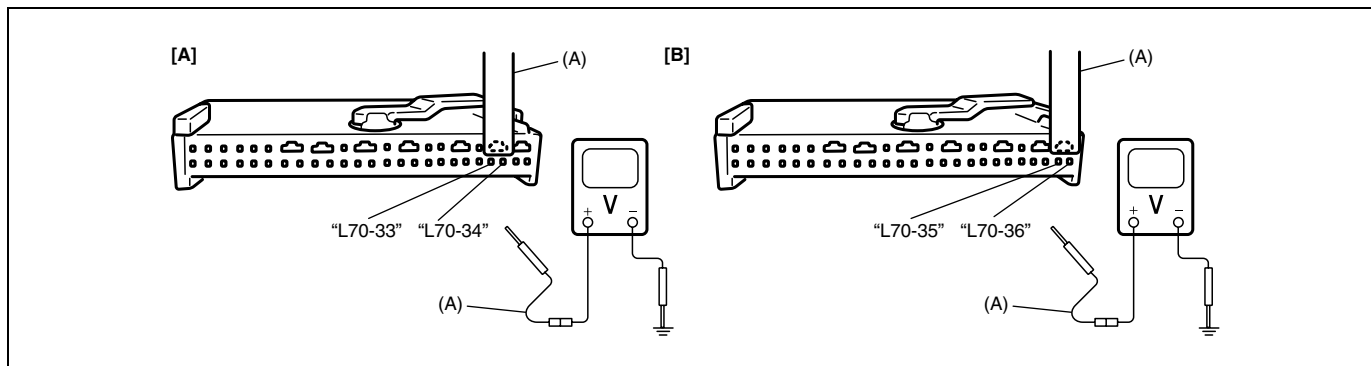


Fig. for STEP 2



[A] : For DTC B1044

[B] : For DTC B1048

### Special tool

(A) : 09932-76010

(B) : 09932-75010

(C) : 09932-78310

### NOTE:

Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Clear diagnostic trouble codes (Refer to DTC CLEARANCE), if any.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

## DTC B1051 – Frontal Crash Detected (System Activation Command Outputted)

### DTC WILL SET WHEN

The SDM detects a frontal crash of sufficient force to warrant activation of the air bag system. (SDM outputs a deployment command.)

### TABLE TEST DESCRIPTION

STEP 1 : Check that DTC B1051 has been set although air bag has not been deployed.

STEP 2 : Check that DTC has been set due to failure of SDM.

### NOTE:

**Before executing items in this table, be sure to perform AIR BAG DIAGNOSTIC SYSTEM CHECK.**

### DIAGNOSTIC FLOW TABLE

Step	Action	Yes	No
1	1) Ignition switch OFF. Has air bag system deployed?	Replace components and perform inspections as directed in "REPAIRS AND INSPECTIONS REQUIRED AFTER AN ACCIDENT".	Go to step 2.
2	1) Inspect front of vehicle and undercarriage for signs of impact. Are there signs of impact?	Replace components and perform inspections as directed in "REPAIRS AND INSPECTIONS REQUIRED AFTER AN ACCIDENT".	Substitute a known-good SDM and recheck.

### NOTE:

- DTC B1051 can never be cleared once it has been set.
- Upon completion of inspection and repair work, perform following items.
  - Reconnect all air bag system components, ensure all components are properly mounted.
  - Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

## **DTC B1056 – Sideward Crash (Driver Side) Detected (Side Air Bag System Activation Command Outputted)**

## **DTC B1057 – Sideward Crash (Passenger Side) Detected (Side Air Bag System Activation Command Outputted)**

### **DTC WILL SET WHEN**

#### **DTC B1056 or B1057 :**

The SDM detects a sideward crash (driver or passenger side) of sufficient force to warrant activation of the side air bag system (driver or passenger side). (SDM outputs a deployment command.)

### **TABLE TEST DESCRIPTION**

#### **DTC B1056 or B1057 :**

STEP 1 : Check that DTC B1056 or B1057 has been set although side air bag (driver or passenger side) has not been deployed.

STEP 2 : Check that DTC has been set due to failure of SDM.

#### **NOTE:**

**Before executing items in this table, be sure to perform AIR BAG DIAGNOSTIC SYSTEM CHECK.**

### **DIAGNOSTIC FLOW TABLE**

#### **DTC B1056 or B1057 :**

<b>Step</b>	<b>Action</b>	<b>Yes</b>	<b>No</b>
1	1) Ignition switch OFF. Has side air bag deployed?	Replace components and perform inspections as directed in "REPAIRS AND INSPECTIONS REQUIRED AFTER AN ACCIDENT".	Go to step 2.
2	1) Inspect sideward of vehicle and undercarriage for signs of impact. Are there signs of impact?	Replace components and perform inspections as directed in "REPAIRS AND INSPECTIONS REQUIRED AFTER AN ACCIDENT".	Substitute a known-good SDM and recheck.

#### **NOTE:**

**Upon completion of inspection and repair work, perform following items.**

- **Reconnect all air bag system components, ensure all components are properly mounted.**
- **Clear diagnostic trouble codes (Refer to DTC CLEARANCE.), if any.**
- **Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.**

## DTC B1058 – Frontal Crash Detected (Pretensioner Activation Command Outputted)

### DTC WILL SET WHEN

The SDM detects a frontal crash of sufficient force to warrant activation of pretensioner. (SDM outputs a activation command.)

### TABLE TEST DESCRIPTION

STEP 1 : Check that DTC B1058 has been set although pretensioner has not been activated.

STEP 2 : Check that DTC has been set due to failure of SDM.

### NOTE:

**Before executing items in this table, be sure to perform AIR BAG DIAGNOSTIC SYSTEM CHECK.**

### DIAGNOSTIC FLOW TABLE

Step	Action	Yes	No
1	1) Ignition switch OFF. Has pretensioner activated?	Replace components and perform inspections as directed in "REPAIRS AND INSPECTIONS REQUIRED AFTER AN ACCIDENT".	Go to step 2.
2	1) Inspect front of vehicle and undercarriage for signs of impact. Are there signs of impact?	Replace components and perform inspections as directed in "REPAIRS AND INSPECTIONS REQUIRED AFTER AN ACCIDENT".	Substitute a known-good SDM and recheck.

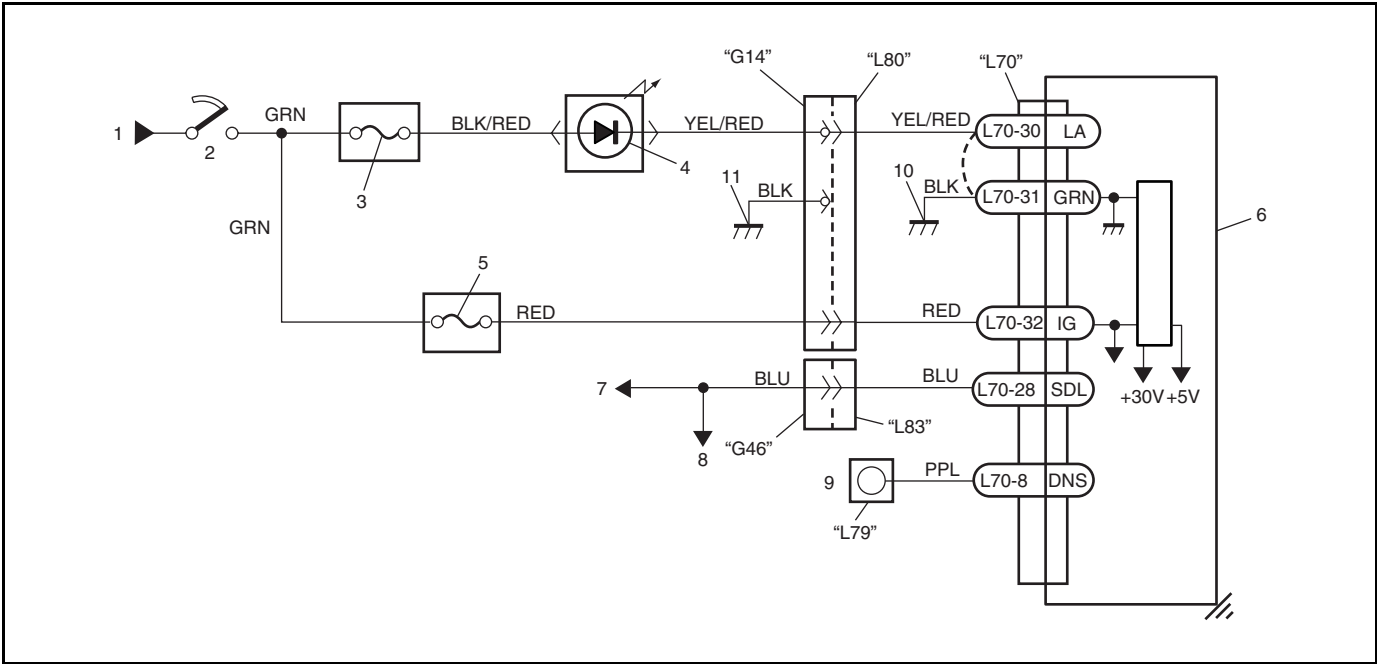
### NOTE:

- DTC B1058 can never be cleared once it has been set.
- Upon completion of inspection and repair work, perform following items.
  - Reconnect all air bag system components, ensure all components are properly mounted.
  - Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.



DTC B1061 - “AIR BAG” Warning Lamp Circuit Failure

WIRING DIAGRAM



1. From main fuse	5. “AIR BAG” fuse	9. “AIR BAG” monitor coupler
2. Ignition switch	6. SDM	10. Ground for air bag system
3. “METER” fuse	7. To DLC	11. Ground on body
4. “AIR BAG” warning lamp in combination meter	8. To ECM and ABS control module (if equipped)	

CAUTION:

- Be sure to perform AIR BAG DIAGNOSTIC SYSTEM CHECK before starting diagnosis according to flow table.
- When measurement of resistance or voltage is required in this table, use a tester along with a correct terminal adapter from special tool (Connector test adapter kit).
- When a check for proper connection is required, refer to INTERMITTENTS AND POOR CONNECTIONS in this section.
- If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.

DTC WILL SET WHEN

The voltage at the “AIR BAG” warning lamp circuit terminal “L70-30” does not match the commanded state of the warning lamp driver for specified time.

TABLE TEST DESCRIPTION

- STEP 1 : This test rechecks “AIR BAG” warning lamp operation.
- STEP 2 : This test rechecks whether an abnormality is in SDM.

**DIAGNOSTIC FLOW TABLE**

<b>Step</b>	<b>Action</b>	<b>Yes</b>	<b>No</b>
1	1) This DTC is set when there is a trouble in "AIR BAG" warning lamp circuit. Failure to properly perform AIR BAG DIAGNOSTIC SYSTEM CHECK may also result in misdiagnosis. Therefore, check "AIR BAG" warning lamp circuit again according to AIR BAG DIAGNOSTIC SYSTEM CHECK. Is "AIR BAG" warning lamp circuit in good condition?	Go to step 2.	Repair "AIR BAG" warning lamp circuit.
2	1) Clear DTC (Refer to DTC CLEARANCE). 2) Check DTC (Refer to DTC CHECK). Is DTC B1061 set?	Substitute a known-good SDM and recheck.	Recheck air bag system. Refer to AIR BAG DIAGNOSTIC SYSTEM CHECK.

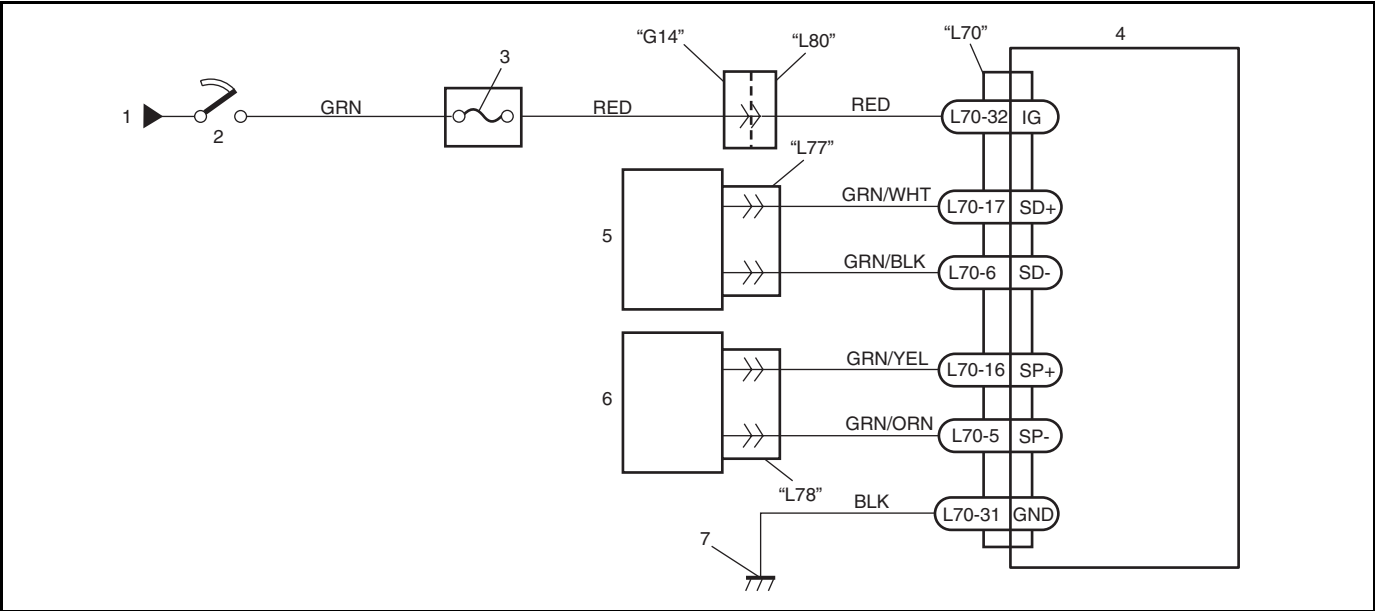
**NOTE:**

Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Clear diagnostic trouble codes (Refer to DTC CLEARANCE), if any.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

- DTC B1063 – Side Sensor (Driver Side) Circuit Short to Ground
- DTC B1064 – Side Sensor (Driver Side) Circuit Short to Power Circuit Or Open
- DTC B1065 – Side Sensor (Passenger Side) Circuit Short to Ground
- DTC B1066 – Side Sensor (Passenger Side) Circuit Short to Power Circuit or Open

WIRING DIAGRAM



1. From main fuse	4. SDM	7. Ground for air bag system
2. Ignition switch	5. Side sensor (driver side)	
3. "AIR BAG" fuse	6. Side sensor (passenger side)	

CAUTION:

- Be sure to perform AIR BAG DIAGNOSTIC SYSTEM CHECK before starting diagnosis according to flow table.
- When measurement of resistance or voltage is required in this table, use a tester along with a correct terminal adapter from special tool (Connector test adapter kit).
- When a check for proper connection is required, refer to INTERMITTENTS AND POOR CONNECTIONS in this section.
- If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.

DTC WILL SET WHEN

DTC B1063 or B1065 :

The voltage measured at side sensor (driver or passenger side) circuit is below a specified value for specified time.

DTC B1064 or B1066 :

The voltage measured at side sensor (driver or passenger side) circuit is above a specified value for specified time.

**TABLE TEST DESCRIPTION****DTC B1063, B1064, B1065 or B1066 :**

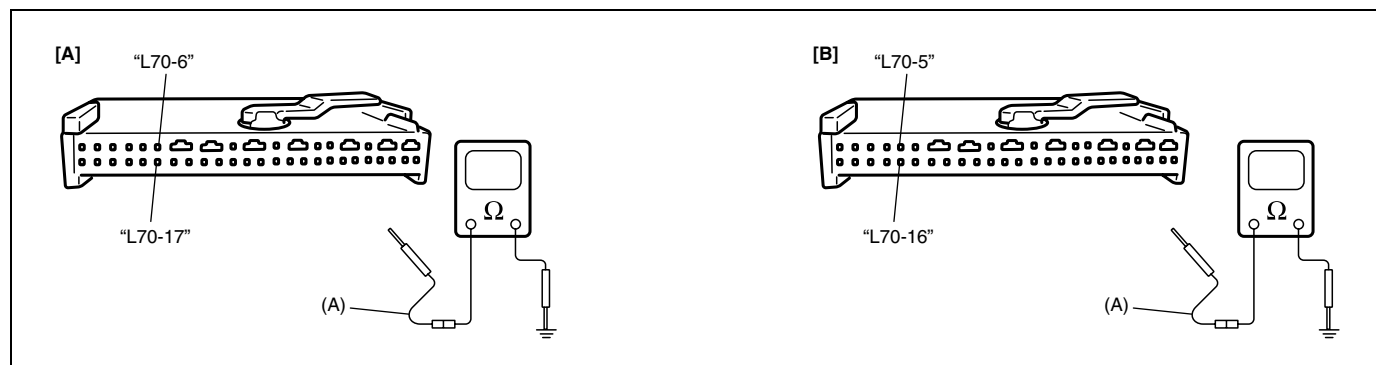
STEP 1 : Check side sensor (driver or passenger side) circuit in floor harness.

STEP 2 : Check side sensor (driver or passenger side) circuit in floor harness. (for DTC B1064 and B1066 only)

**DIAGNOSTIC FLOW TABLE****DTC B1063 or B1065 :**

Step	Action	Yes	No
1	1) With ignition switch OFF, remove center pillar lower trim and side sill scuff, then disconnect side sensor connector. 2) Disconnect SDM connector "L70". 3) Check proper connection to applicable side sensor at terminals in "L77" or "L78" connector. 4) If OK, measure resistance. <ul style="list-style-type: none"> <li>• DTC B1063: between "L70-17" terminal and body ground, and between "L70-6" terminal and body ground.</li> <li>• DTC B1065: between "L70-16" terminal and body ground, and between "L70-5" terminal and body ground.</li> </ul> Is resistance infinity?	Substitute a known-good side sensor and/or SDM and recheck.	DTC B1063 : Repair short "GRN/WHT" or "GRN/BLK" wire circuit to ground. DTC B1065 : Repair short "GRN/YEL" or "GRN/ORN" wire circuit to ground.

Fig. for STEP 1



[A]: For DTC B1063

[B]: For DTC B1065

**Special tool****(A) : 09932-76010****NOTE:**

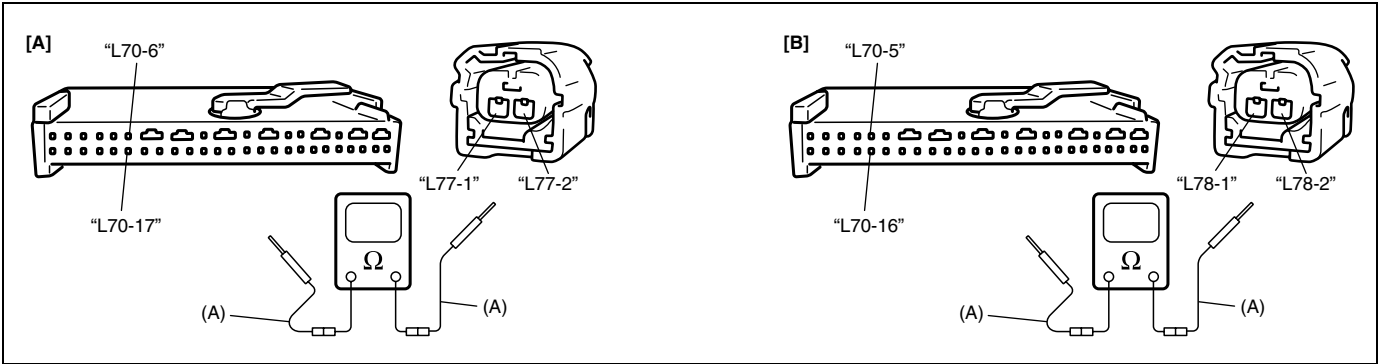
Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Clear diagnostic trouble code (Refer to DTC CLEARANCE), if any.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

DTC B1064 or B1066 :

Step	Action	Yes	No
1	<p>1) With ignition switch OFF, remove center pillar lower trim and side sill scuff, then disconnect side sensor connector.</p> <p>2) Disconnect SDM connector "L70".</p> <p>3) Check proper connection to applicable side sensor at terminals in "L77" or "L78" connector.</p> <p>4) If OK, measure resistance.</p> <ul style="list-style-type: none"><li>• DTC B1064: between "L77-1" and "L70-17" terminals, and between "L77-2" and "L70-6" terminals.</li><li>• DTC B1066: between "L78-1" and "L70-16" terminals, and between "L78-2" and "L70-5" terminals.</li></ul> <p>Is resistance 0 – 1 Ω?</p>	Got to Step 2.	<p>DTC B1064 Repair open in "GRN/WHT" or "GRN/BLK" wire circuit.</p> <p>DTC B1066 Repair open in "GRN/YEL" or "GRN/ORN" wire circuit.</p>
2	<p>1) Measure voltage.</p> <ul style="list-style-type: none"><li>• DTC B1064: between "L70-17" terminal and body ground, and between "L70-6" terminal and body ground.</li><li>• DTC B1066: between "L70-16" terminal and body ground, and between "L70-5" terminal and body ground.</li></ul> <p>With ignition switch ON, is voltage 0 – 1 V?</p>	Substitute a known-good side sensor and/or SDM and recheck.	<p>DTC B1064 : Repair short "GRN/WHT" or "GRN/BLK" wire circuit to power circuit.</p> <p>DTC B1066 : Repair short "GRN/YEL" or "GRN/ORN" wire circuit to power circuit.</p>

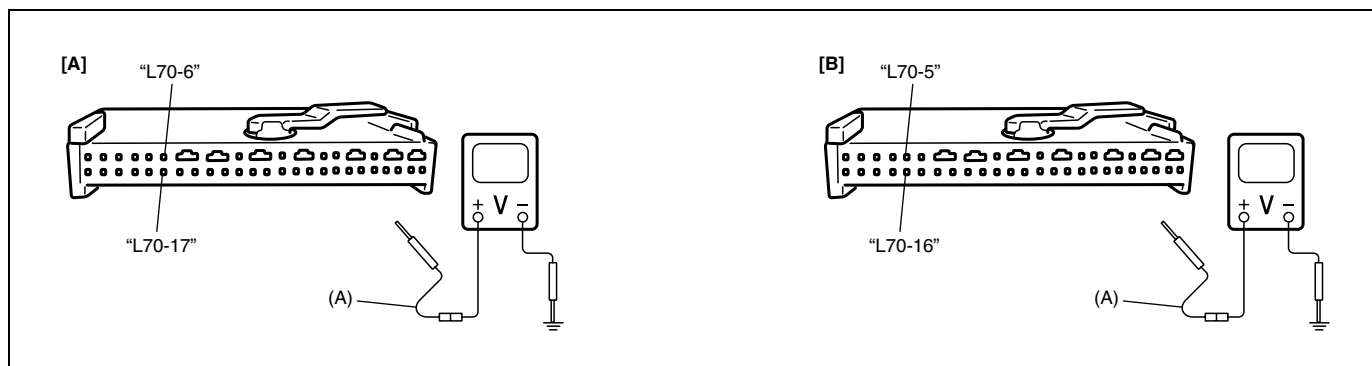
Fig. for STEP 1



[A]: For DTC B1064	[B]: For DTC B1066
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**Special tool**  
**(A) : 09932-76010**

Fig. for STEP 2



[A]: For DTC B1064

[B]: For DTC B1066

**Special tool****(A) : 09932-76010****NOTE:**

Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Clear diagnostic trouble code (Refer to DTC CLEARANCE), if any.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

## **DTC B1071 - Internal SDM Fault**

### **DTC WILL SET WHEN**

An internal SDM fault is detected by SDM.

#### **NOTE:**

**Before executing items below, be sure to perform AIR BAG DIAGNOSTIC SYSTEM CHECK.**

#### **NOTE:**

**DTC B1071 can never be cleared once it has been set.**

- |  |
|--|
| <ol style="list-style-type: none"><li>1) Ignition switch OFF.</li><li>2) Replace SDM.</li><li>3) Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK.</li></ol> |
|--|

## **DTC B1072 – Internal Side Sensor (Driver Side) Fault**

## **DTC B1074 – Internal Side Sensor (Passenger Side) Fault**

### **DTC WILL SET WHEN**

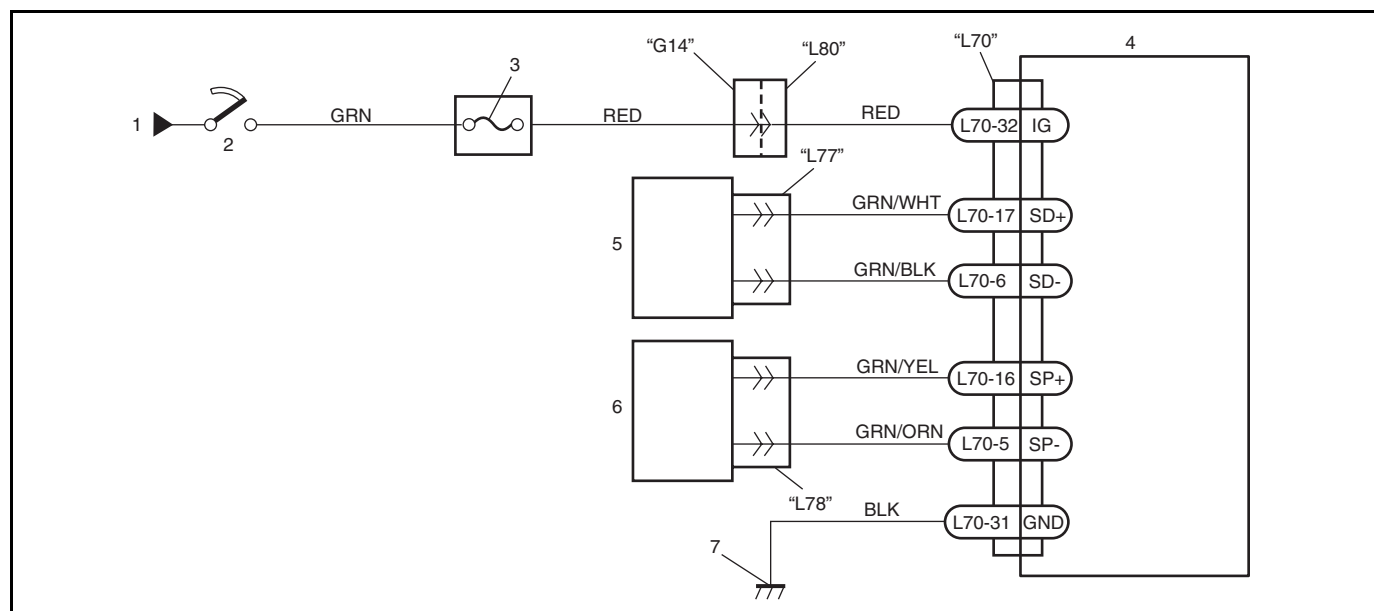
#### **DTC B1072 or B1074 :**

SDM receive internal fault signal from side sensor.

#### **NOTE:**

**Before executing items below, be sure to perform AIR BAG DIAGNOSTIC SYSTEM CHECK.**

- |  |
|--|
| <ol style="list-style-type: none"><li>1) Ignition switch OFF.</li><li>2) Replace side sensor.</li><li>3) Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK.</li></ol> |
|--|

**DTC B1073 – Side Sensor (Driver Side) Correspondence Abnormality****DTC B1075 – Side Sensor (Passenger Side) Correspondence Abnormality****WIRING DIAGRAM**

1. From main fuse	4. SDM	7. Ground for air bag system
2. Ignition switch	5. Side sensor (driver side)	
3. "AIR BAG" fuse	6. Side sensor (passenger side)	

**CAUTION:**

- Be sure to perform AIR BAG DIAGNOSTIC SYSTEM CHECK before starting diagnosis according to flow table.
- When measurement of resistance or voltage is required in this table, use a tester along with a correct terminal adapter from special tool (Connector test adapter kit).
- When a check for proper connection is required, refer to INTERMITTENTS AND POOR CONNECTIONS in this section.
- If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.

**DTC WILL SET WHEN****DTC B1073 or B1075 :**

Side sensor abnormal signal is detected by SDM.

**TABLE TEST DESCRIPTION****DTC B1073 or B1075 :**

STEP 1 to 4 : Check side sensor circuit in floor harness.



**DIAGNOSTIC FLOW TABLE****DTC B1073 or B1075 :**

<b>Step</b>	<b>Action</b>	<b>Yes</b>	<b>No</b>
1	<p>1) With ignition switch OFF, disconnect SDM connector "L70" and side sensor connector.</p> <p>2) DTC B1073 : Check proper connection to side sensor at terminals in "L77" connector and to SDM at "L70-17" and "L70-6" terminals in SDM connector "L70". DTC B1075 : Check proper connection to side sensor at terminals in "L78" connector and to SDM at "L70-16" and "L70-5" terminals in SDM connector "L70".</p> <p>3) DTC B1073 : If OK, then measure resistance between "L77-1" and "L70-17" terminals, and between "L77-2" and "L70-6" terminals. Is resistance 0 - 1Ω? DTC B1075 : If OK, then measure resistance between "L78-1" and "L70-16" terminals, and between "L78-2" and "L70-5" terminals. Is resistance 0 - 1Ω?</p>	Go to step 2.	<p>DTC B1073 : Repair high resistance or open in "GRN/WHT" or "GRN/BLK" wire.</p> <p>DTC B1075 : Repair high resistance or open in "GRN/YEL" or "GRN/ORN" wire.</p>
2	<p>1) DTC B1073 : Measure resistance between "L70-17" and "L70-6" terminals. Is resistance infinity?</p> <p>DTC 1075 : Measure resistance between "L70-16" and "L70-5" terminals. Is resistance infinity?</p>	Go to step 3.	<p>DTC B1073 : Repair short from "GRN/WHT" wire to "GRN/BLK" wire.</p> <p>DTC B1075 : Repair short from "GRN/YEL" wire to "GRN/ORN" wire.</p>
3	<p>1) DTC B1073 : Measure resistance between "L70-17" terminal and body ground, and between "L70-6" terminal and body ground. Is resistance infinity?</p> <p>DTC 1075 : Measure resistance between "L70-16" terminal and body ground, and between "L70-5" terminal and body ground. Is resistance infinity?</p>	Go to step 4.	<p>DTC B1073 : Repair short from "GRN/WHT" or "GRN/BLK" wire to body ground.</p> <p>DTC B1075 : Repair short from "GRN/YEL" or "GRN/ORN" wire to body ground.</p>

Step	Action	Yes	No
4	<p>1) DTC B1073 : Measure voltage from "L70-17" and "L70-6" terminals to body ground. With ignition switch ON, is voltage 0 - 1V? DTC B1075 : Measure voltage from "L70-16" and "L70-5" terminals to body ground. With ignition switch ON, is voltage 0 - 1V?</p>	Substitute a known-good side sensor and/or SDM and recheck.	<p>DTC B1073 : Repair short from "GRN/ WHT" or "GRN/BLK" wire to power circuit. DTC B1075 : Repair short from "GRN/ YEL" or "GRN/ORN" to power circuit.</p>

Fig. for STEP 1

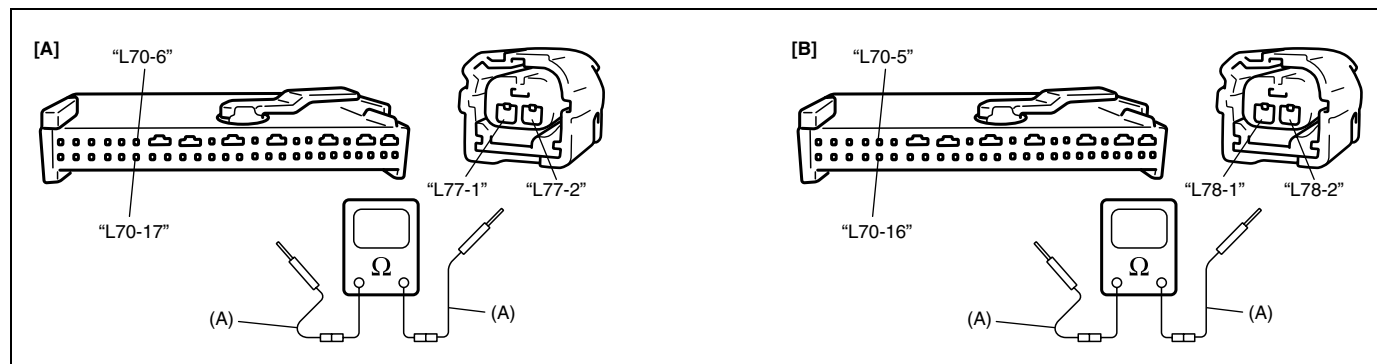


Fig. for STEP 2

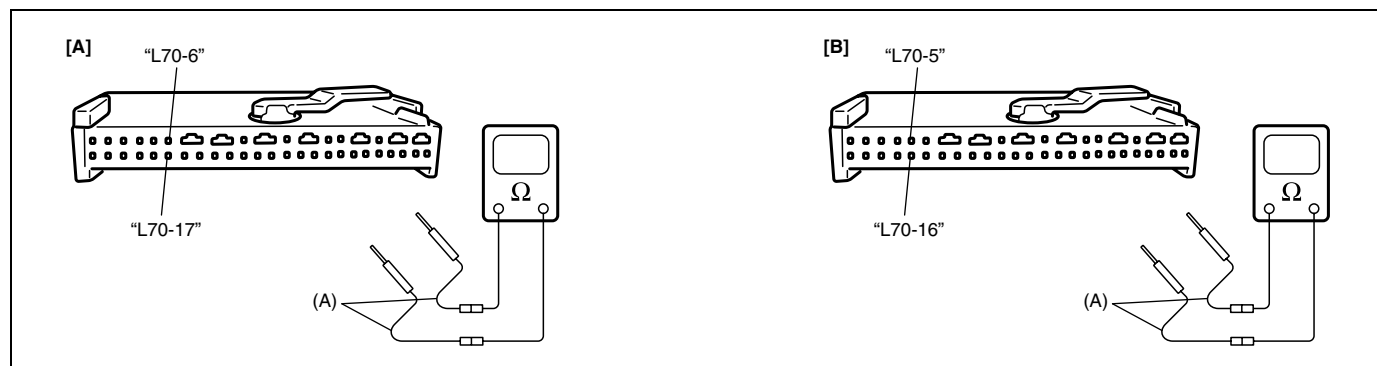


Fig. for STEP 3

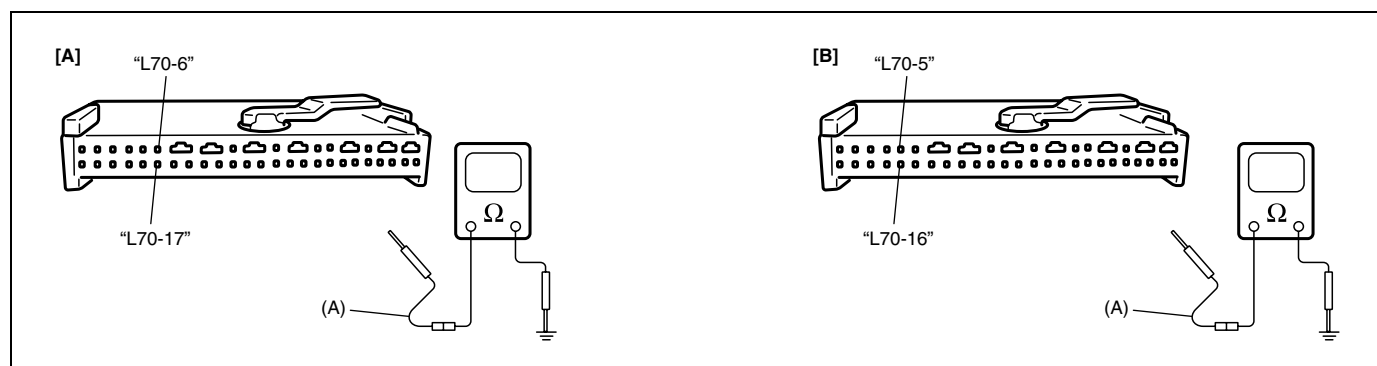
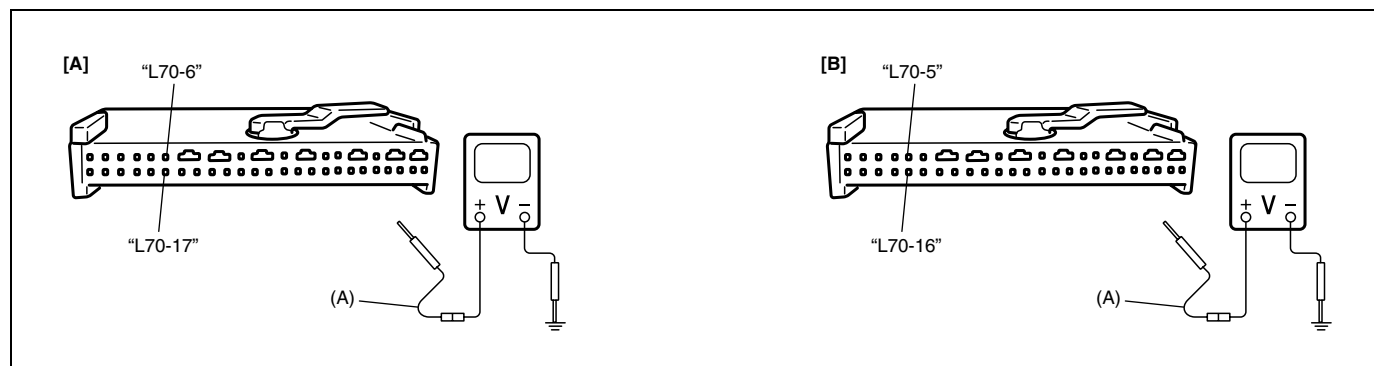


Fig. for STEP 4



[A]: For DTC B1073

[B]: For DTC B1075

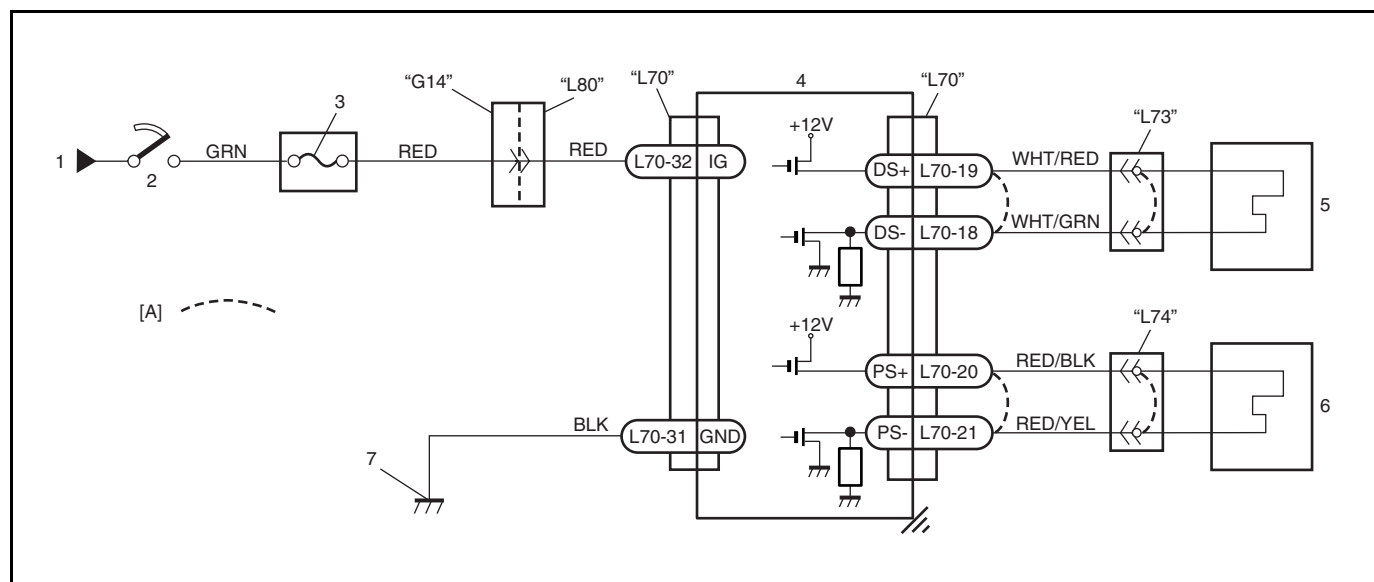
**Special tool****(A) : 09932-76010****NOTE:**

Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Clear diagnostic trouble code (Refer to DTC CLEARANCE), if any.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

**DTC B1081 – Side Air Bag (Driver Side) Initiator Circuit Resistance High**  
**DTC B1082 – Side Air Bag (Driver Side) Initiator Circuit Resistance Low**  
**DTC B1083 – Side Air Bag (Driver Side) Initiator Circuit Short to Ground**  
**DTC B1084 – Side Air Bag (Driver Side) Initiator Circuit Short to Power Circuit**  
**DTC B1085 – Side Air Bag (Passenger Side) Initiator Circuit Resistance High**  
**DTC B1086 – Side Air Bag (Passenger Side) Initiator Circuit Resistance Low**  
**DTC B1087 – Side Air Bag (Passenger Side) Initiator Circuit Short to Ground**  
**DTC B1088 – Side Air Bag (Passenger Side) Initiator Circuit Short to Power Circuit**

#### WIRING DIAGRAM



[A] : Shorting bar	2. Ignition switch	4. SDM	6. Side air bag (passenger side) (inflator) module
1. From main fuse	3. "AIR BAG" fuse	5. Side air bag (driver side) (inflator) module	7. Ground for air bag system

#### CAUTION:

- Be sure to perform AIR BAG DIAGNOSTIC SYSTEM CHECK before starting diagnosis according to flow table.
- When measurement of resistance or voltage is required in this table, use a tester along with a correct terminal adapter from special tool (Connector test adapter kit).
- When a check for proper connection is required, refer to INTERMITTENTS AND POOR CONNECTIONS in this section.
- If there is open circuit in the air bag wire harness, connector or terminal is found damaged, replace the wire harness, connector and terminal as an assembly.

**DTC WILL SET WHEN****DTC B1081 or B1085 :**

The combined resistance of the side air bag (inflator) module (driver or passenger side), harness wiring and connector terminal contact is above a specified value for specified time.

**DTC B1082 or B1086 :**

The combined resistance of the side air bag (inflator) module (driver or passenger side), harness wiring and connector terminal contact is below a specified value for specified time.

**DTC B1083 or B1087 :**

The voltage measured at side air bag (driver or passenger side) initiator circuit is below a specified value for specified time.

**DTC B1084 or B1088 :**

The voltage measured at side air bag (driver or passenger side) initiator circuit is below a specified value for specified time.

**TABLE TEST DESCRIPTION****DTC B1081, B1082, B1083, B1084, B1085, B1086, B1087, or B1088 :**

STEP 1 : Check whether malfunction is in side air bag (inflator) module.

STEP 2 : Check side air bag initiator circuit in floor harness.

**DIAGNOSTIC FLOW TABLE****DTC B1081 or B1085**

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect side air bag (inflator) module connector under front seat cushion. 2) Check proper connection to applicable side air bag (inflator) module at terminals in "L73" or "L74" connector. 3) If OK, then connect Special tool (B) and (C) to side air bag (inflator) module connector disconnected at the step 1. With ignition switch ON, is DTC B1081 or B1085 still current?	Go to step 2.	Ignition switch OFF. Replace side air bag (inflator) module (Refer to SIDE AIR BAG (INFLATOR) MODULE (IF EQUIPPED) in this section.).
2	1) With ignition switch OFF, disconnect SDM connector "L70". 2) Check proper connection to SDM at terminals "L70-19" and "L70-18" or "L70-20" and "L70-21". 3) If OK, then measure resistance with connected Special Tool (B) and (C). <ul style="list-style-type: none"> <li>• DTC B1081 : between "L70-19" and "L70-18" terminals.</li> <li>• DTC B1085 : between "L70-20" and "L70-21" terminals.</li> </ul> Is resistance 2.6 $\Omega$ or less?	Substitute a known-good SDM and recheck.	DTC B1081 : Repair high resistance or open in "WHT/RED" or "WHT/GRN" wire circuit. DTC B1085 : Repair high resistance or open in "RED/BLK" or "RED/YEL" wire circuit.

Fig. for STEP 1 and 2

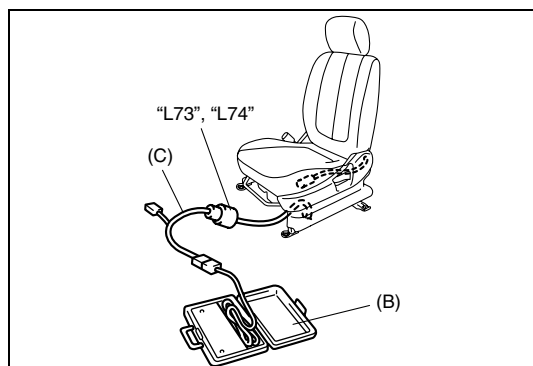
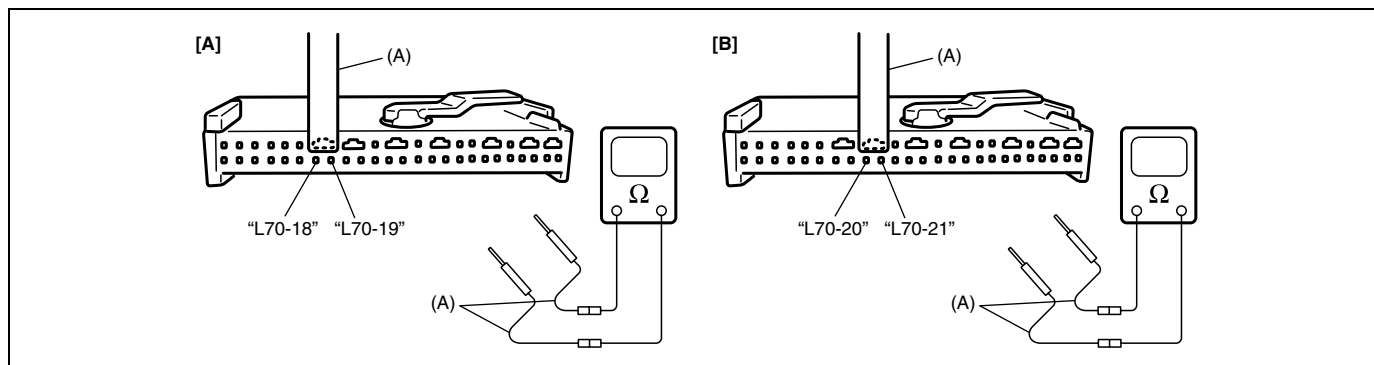


Fig. for STEP 2



[A]: For DTC B1081

[B]: For DTC B1085

**Special tool**

(A) : 09932-76010

(B) : 09932-75010

(C) : 09932-78340

**NOTE:**

Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Clear diagnostic trouble code (Refer to DTC CLEARANCE), if any.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

**DTC B1082 or B1086**

Step	Action	Yes	No
1	1) With ignition switch OFF, disconnect side air bag (inflator) module connector under front seat cushion. 2) Check proper connection to applicable side air bag (inflator) module at terminals in "L73" or "L74" connector. 3) If OK, then connect Special tool (B) and (C) to side air bag (inflator) module connector disconnected at the step 1. With ignition switch ON, is DTC B1082 or B1086 still current?	Go to step 2.	Ignition switch OFF. Replace side air bag (inflator) module (Refer to SIDE AIR BAG (INFLATOR) MODULE (IF EQUIPPED) in this section.).

Step	Action	Yes	No
2	<div>1) With ignition switch OFF, disconnect SDM connector “L70”.</div> <div>2) Check proper connection to SDM at terminals “L70-19” and “L70-18” or “L70-20” and “L70-21”.</div> <div>3) If OK, then measure resistance with connected Special Tool (B) and (C).<ul style="list-style-type: none"><li>• DTC B1082 : between “L70-19” and “L70-18” terminals.</li><li>• DTC B1086 : between “L70-20” and “L70-21” terminals.</li></ul>Is resistance 2.2 Ω or more?</div>	Substitute a known-good SDM and recheck.	<div>DTC B1082 : Repair short from “WHT/RED” wire circuit to “WHT/GRN” wire circuit or from “WHT/RED” or “WHT/GRN” wire circuit to other wire circuit.</div> <div>DTC B1086 : Repair short from “RED/BLK” wire circuit to “RED/YEL” wire circuit or from “RED/BLK” or “RED/YEL” wire circuit to other wire circuit.</div>

Fig. for STEP 1 and 2

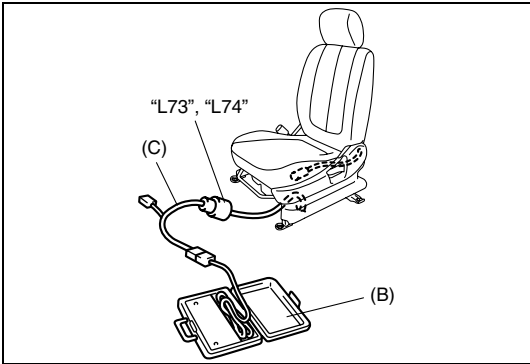
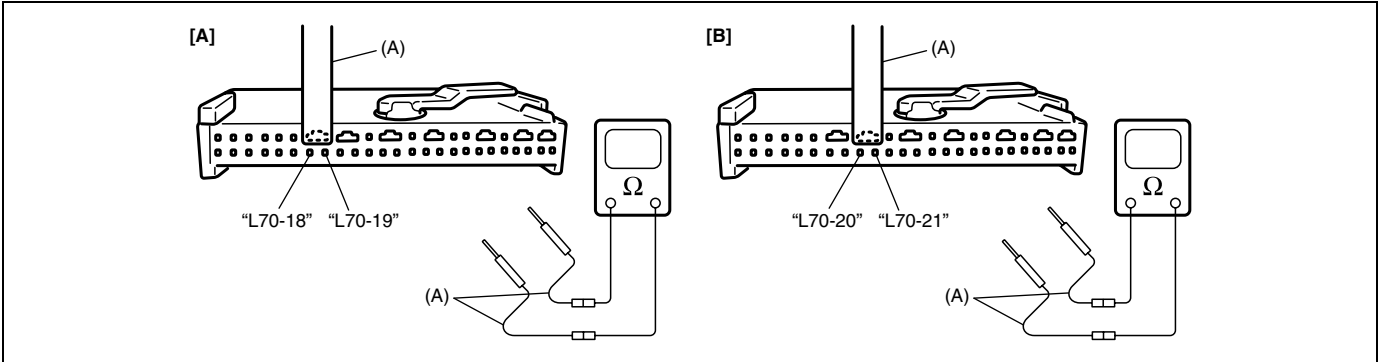


Fig. for STEP 2



[A]: For DTC B1082
[B]: For DTC B1086

- Special tool**
- (A) : 09932-76010
  - (B) : 09932-75010
  - (C) : 09932-78340

**NOTE:**

- Upon completion of inspection and repair work, perform following items.
- Reconnect all air bag system components, ensure all components are properly mounted.
  - Clear diagnostic trouble code (Refer to DTC CLEARANCE), if any.
  - Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

**DTC B1083 or B1087**

Step	Action	Yes	No
1	<p>1) With ignition switch OFF, disconnect side air bag (inflator) module connector under front seat cushion.</p> <p>2) Check proper connection to applicable side air bag (inflator) module at terminals in "L73" or "L74" connector.</p> <p>3) If OK, then connect Special tool (B) and (C) to side air bag (inflator) module connector disconnected at the step 1.</p> <p>With ignition switch ON, is DTC B1083 or B1087 still current?</p>	Go to step 2.	Ignition switch OFF. Replace side air bag (inflator) module (Refer to SIDE AIR BAG (INFLATOR) MODULE (IF EQUIPPED) in this section.).
2	<p>1) With ignition switch OFF, disconnect Special Tool (B) and (C) and SDM connector "L70".</p> <p>2) Measure resistance.</p> <ul style="list-style-type: none"> <li>• DTC B1083 : between "L70-19" terminal and body ground, and between "L70-18" terminal and body ground.</li> <li>• DTC B1087 : between "L70-20" terminal and body ground, and between "L70-21" terminal and body ground.</li> </ul> <p>Is resistance infinity?</p>	Substitute a known-good SDM and recheck.	<p>DTC B1083 : Repair short from "WHT/RED" or "WHT/GRN" wire circuit to ground.</p> <p>DTC B1087 : Repair short from "RED/BLK" or "RED/YEL" wire circuit to ground.</p>

Fig. for STEP 1 and 2

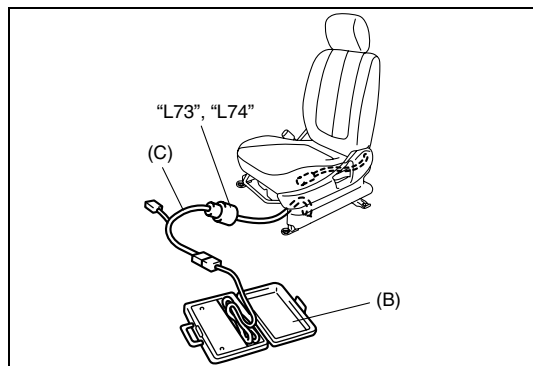
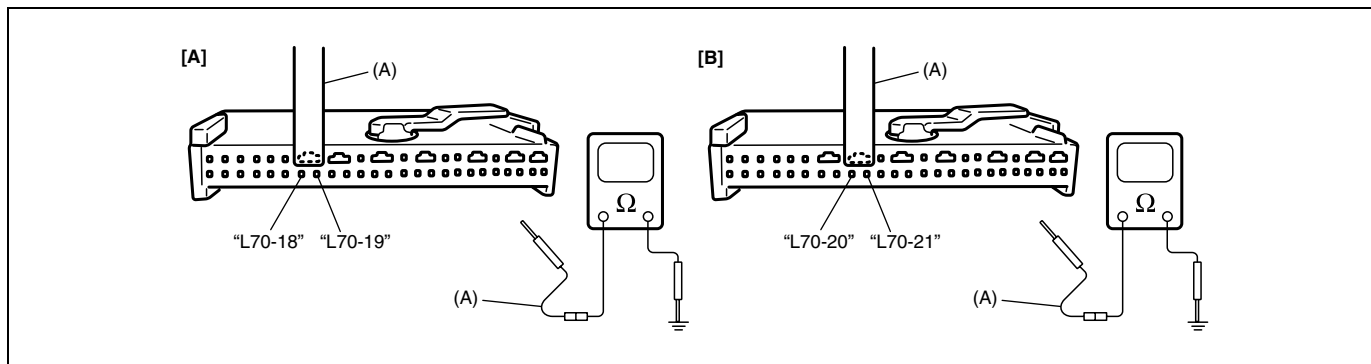




Fig. for STEP 2



[A]: For DTC B1083
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[B]: For DTC B1087
--------------------

**Special tool****(A) : 09932-76010****(B) : 09932-75010****(C) : 09932-78340****NOTE:**

Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Clear diagnostic trouble code (Refer to DTC CLEARANCE), if any.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

**DTC B1084 or B1088**

Step	Action	Yes	No
1	<p>1) With ignition switch OFF, disconnect side air bag (inflator) module connector under front seat cushion.</p> <p>2) Check proper connection to applicable side air bag (inflator) module at terminals in "L73" or "L74" connector.</p> <p>3) If OK, then connect Special tool (B) and (C) to side air bag (inflator) module connector disconnected at the step 1.</p> <p>With ignition switch ON, is DTC B1084 or B1088 still current?</p>	Go to step 2.	Ignition switch OFF. Replace side air bag (inflator) module (Refer to SIDE AIR BAG (INFLATOR) MODULE (IF EQUIPPED) in this section.).
2	<p>1) With ignition switch OFF, disconnect Special Tool (B), (C) and SDM connector "L70".</p> <p>2) Measure voltage.</p> <ul style="list-style-type: none"> <li>• DTC B1084 : between "L70-19" terminal and body ground, and between "L70-18" terminal and body ground.</li> <li>• DTC B1088 : between "L70-20" terminal and body ground, and between "L70-21" terminal and body ground.</li> </ul> <p>With ignition switch ON, is voltage 0-1V?</p>	Substitute a known-good SDM and recheck.	<p>DTC B1084 : Repair short from "WHT/RED" or "WHT/GRN" wire circuit to ground.</p> <p>DTC B1088 : Repair short from "RED/BLK" or "RED/YEL" wire circuit to power circuit.</p>

Fig. for STEP 1 and 2

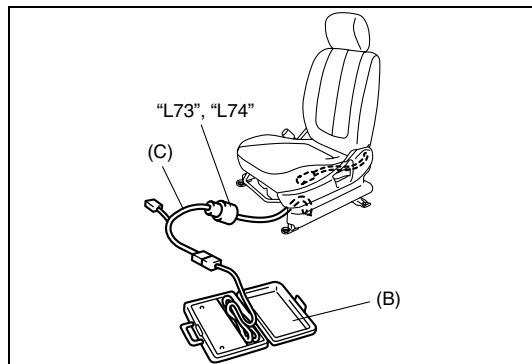
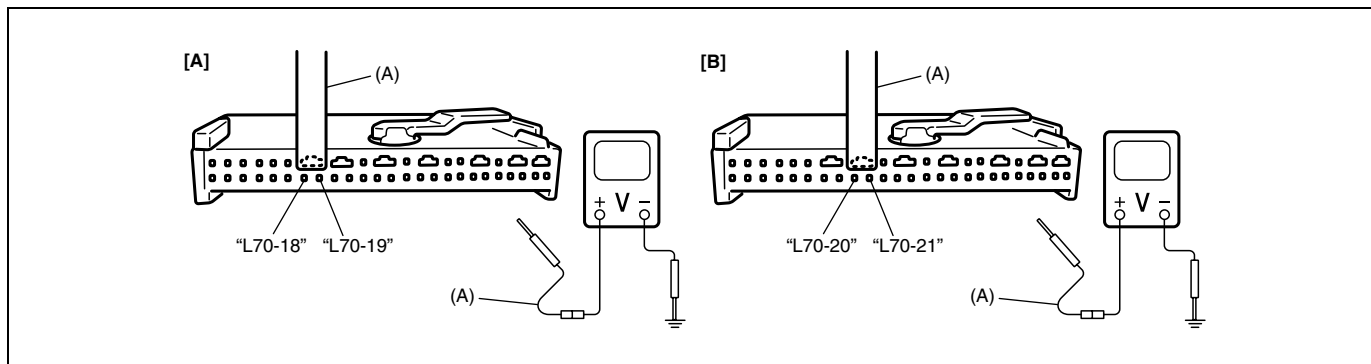


Fig. for STEP 2



[A]: For DTC B1084
[B]: For DTC B1088

**Special tool****(A) : 09932-76010****(B) : 09932-75010****(C) : 09932-78340****NOTE:**

Upon completion of inspection and repair work, perform following items.

- Reconnect all air bag system components, ensure all components are properly mounted.
- Clear diagnostic trouble code (Refer to DTC CLEARANCE), if any.
- Repeat AIR BAG DIAGNOSTIC SYSTEM CHECK to confirm that the trouble has been corrected.

## On-Vehicle Service

### Service Precautions

#### Service and diagnosis

WARNING/CAUTION labels are attached on each part of air bag system components (SDM, air bag (inflator) modules and seat belt pretensioners). Be sure to follow the instructions.

**WARNING:**

- If the air bag system and another vehicle system both need repair, Suzuki recommends that the air bag system be repaired first, to help avoid unintended air bag system activation.
- Do not modify the steering wheel, dashboard or any other on or around air bag system components. Modifications can adversely affect air bag system performance and lead to injury.
- Failure to follow procedures could result in possible air bag system activation, personal injury or unneeded air bag system repairs.

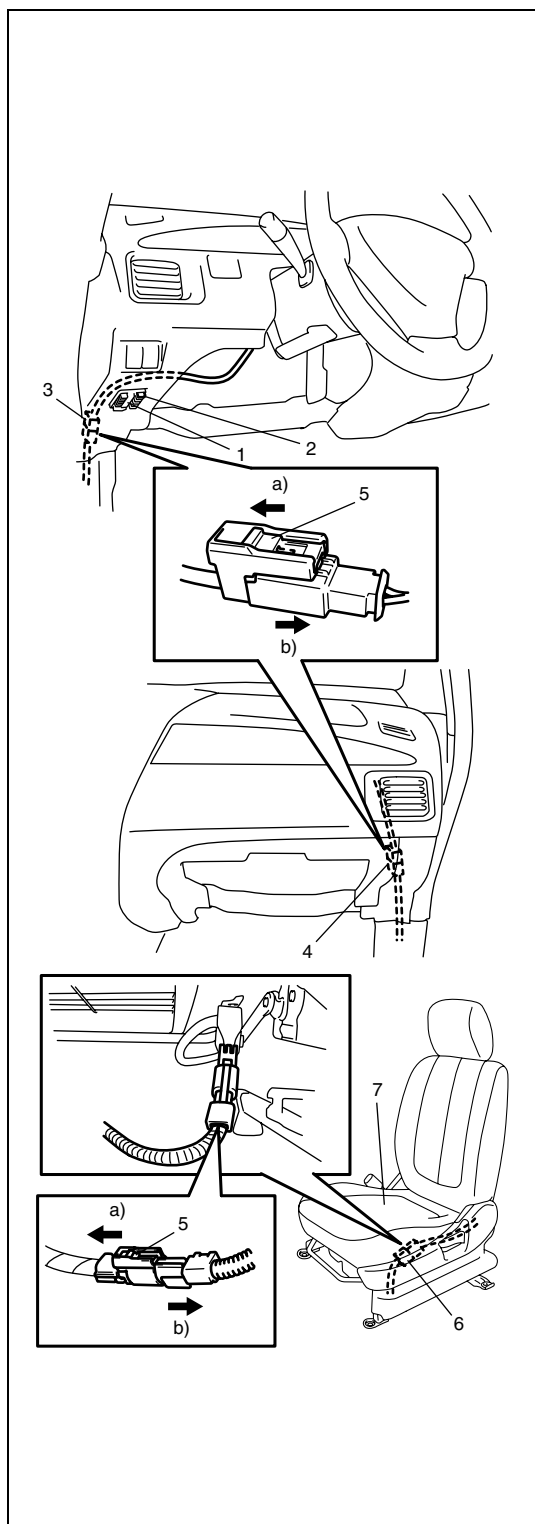
- Many of service procedures require disconnection of "AIR BAG" fuse and air bag (inflator) module(s) (driver, passenger and side of driver and passenger) from initiator circuit to avoid an accidental deployment.
- Do not apply power to the air bag system unless all components are connected or a diagnostic chart requests it, as this will set a diagnostic trouble code (DTC).
- The "AIR BAG DIAGNOSTIC SYSTEM CHECK" must be the starting point of any air bag diagnostics. The "AIR BAG DIAGNOSTIC SYSTEM CHECK" will verify proper "AIR BAG" warning lamp operation and will lead you to the correct table to diagnose any air bag malfunctions. Bypassing these procedures may result in extended diagnostic time, incorrect diagnosis, and incorrect parts replacements.
- Never use air bag component parts from another vehicle.
- If the vehicle will be exposed to temperatures over 93°C (200°F) (for example, during a paint baking process), remove the air bag system components beforehand to avoid component damage or unintended system activation.
- When handling the air bag (inflator) modules (driver, passenger and side of driver and passenger), seat belt pretensioners (driver and passenger), side sensors or SDM, be careful not to drop it or apply an impact to it. If an excessive impact was applied (e.g., side sensors are dropped, SDM is dropped, air bag (inflator) module is dropped from a height of 90 cm (3 ft) or more, seat belt pretensioner (retractor assembly) is dropped from a height of 30 cm (1 ft) or more), never attempt disassembly or repair but replace it with a new one.
- When using electric welding, be sure to disconnect air bag (inflator) module connectors (driver, passenger and side of driver and passenger) and seat belt pretensioner connectors (driver and passenger) respectively.
- When applying paint around the air bag system related parts, use care so that the harness or connector will not be exposed to the paint mist.
- Never expose air bag system component parts directly to hot air (drying or baking the vehicle after painting) or flames.

**WARNING:**

**When performing service on or around air bag system components or air bag wiring, follow the procedures listed in the following pages to temporarily disable the air bag system.**

**Failure to follow procedures could result in possible air bag system activation, personal injury or unneeded air bag system repairs.**

## Disabling air bag system



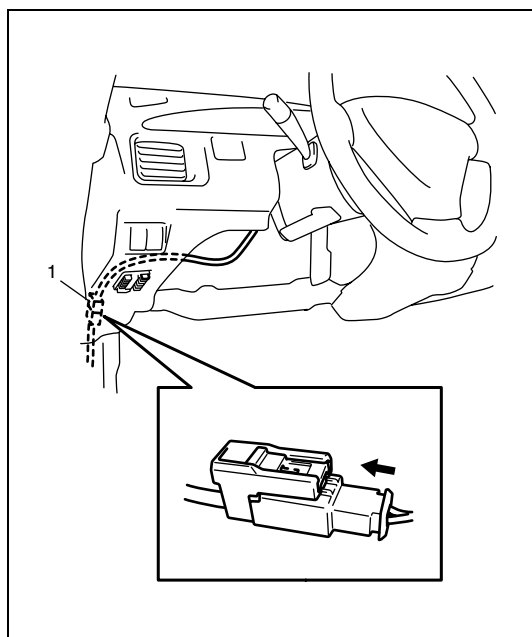
- 1) Turn steering wheel so that vehicle's wheels (front tires) and pointing straight ahead.
- 2) Turn ignition switch to "LOCK" position and remove key.
- 3) Remove "AIR BAG" fuse (2) from fuse box (1).
- 4) Disconnect Yellow connector (3) of contact coil and combination switch assembly as follows.
  - a) Release locking of lock slider (5).
  - b) After unlocked, disconnect connector.
- 5) In case of passenger air bag (inflator) module, pull out glove box while pushing its stopper from both right and left sides and disconnect Yellow connector (4) of passenger air bag (inflator) module.
  - a) Release locking of lock slider (5).
  - b) After unlocked, disconnect connector.
- 6) If equipped with side air bag (inflator) module, disconnect Yellow connector (6) of side air bag (inflator) module under front seat cushion (7).
  - a) Release locking of lock slider (5).
  - b) After unlocked, disconnect connector.

### NOTE:

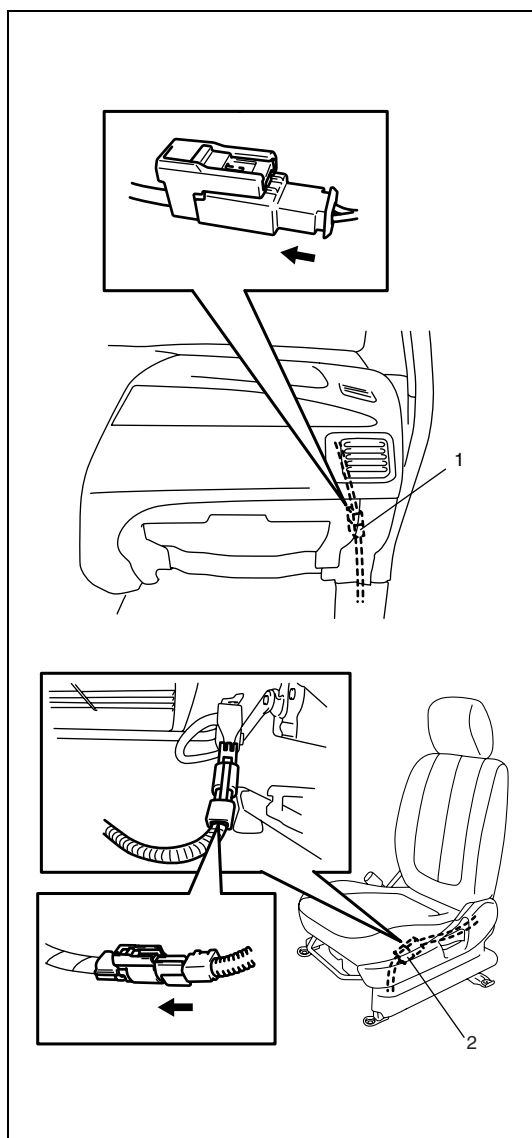
With "AIR BAG" fuse removed and ignition switch ON, "AIR BAG" warning lamp will be ON.

This is normal operation and does not indicate a air bag system malfunction.

## Enabling air bag system



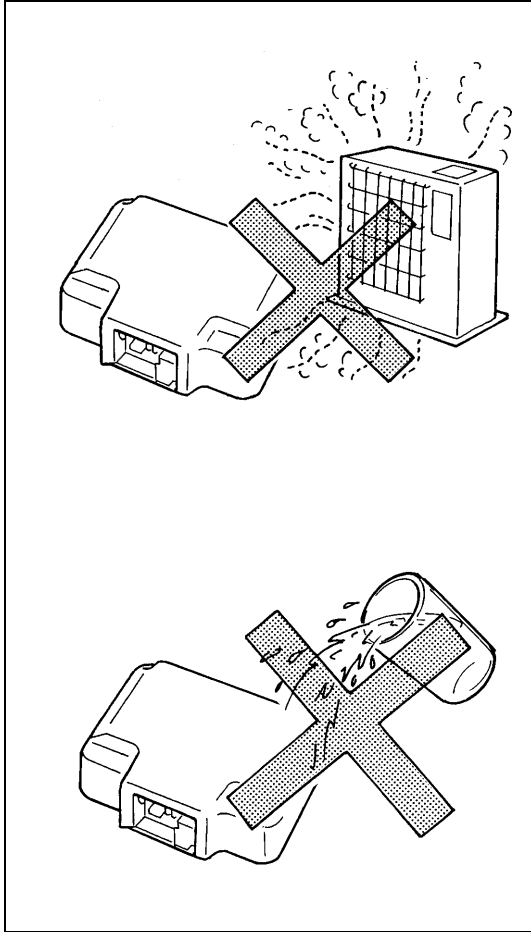
- 1) Turn ignition switch to “LOCK” position and remove key.
- 2) Connect Yellow connector (1) of contact coil and combination switch assembly by pushing connector till clicks heard from it.



- 3) In case of passenger air bag (inflator) module, connect Yellow connector (1) of passenger air bag (inflator) module by pushing connector till click is heard from it.
- 4) Install glove box.
- 5) If equipped with side air bag (inflator) module, connect Yellow connector (2) of side air bag (inflator) module by pushing connector till click is heard from it.
- 6) Install “AIR BAG” fuse to fuse box.
- 7) Turn ignition switch to ON position and verify that “AIR BAG” warning lamp flashes 6 times and then turns OFF.  
If it does not operate as described, perform “AIR BAG DIAGNOSTIC SYSTEM CHECK”.

## Handling and storage

### SDM

**WARNING:**

Never power up air bag system when SDM is not rigidly attached to the vehicle. Otherwise, personal injury may result.

**CAUTION:**

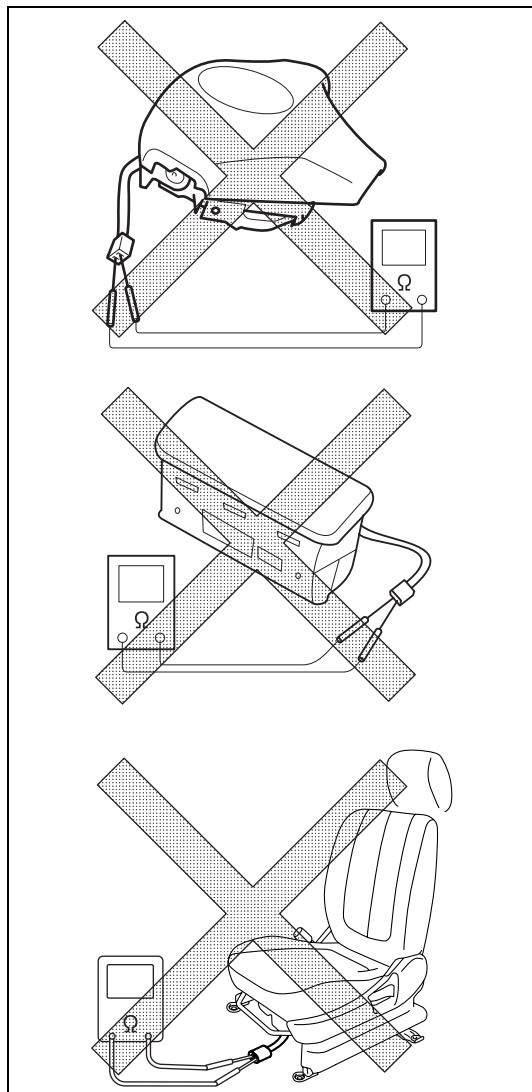
After detecting one time of such collision as to meet deployment conditions, the SDM must not be used. Refer to “AIR BAG DIAGNOSTIC SYSTEM CHECK” when checking the SDM.

- Never attempt disassembly of SDM.
- When storing SDM, select a place where neither high temperature nor high humidity is anticipated and oil, water and dust are kept off.
- If SDM has been dropped, replace it with a new one.
- If installation part of SDM was damaged, repair that part completely before reinstallation.
- All SDM and mounting bracket fasteners must be carefully torqued and the arrow must be pointed toward the front of the vehicle to ensure proper operation of the air bag system.

## LIVE (UNDEPLOYED) AIR BAG (INFLATOR) MODULES

Special care is necessary when handling and storing a live (undeployed) air bag (inflator) modules.

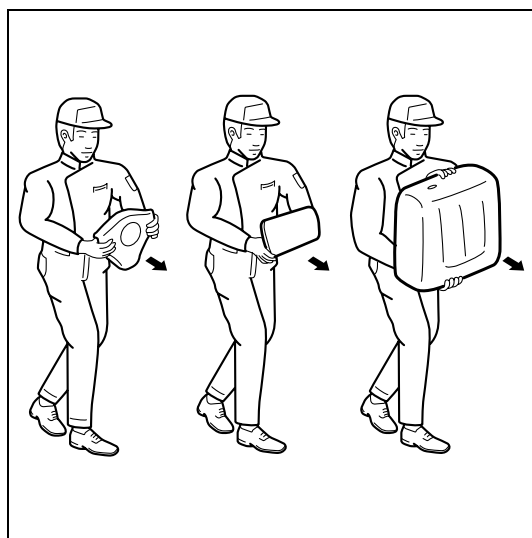
The rapid gas generation produced during deployment of the air bag could cause the air bag (inflator) module, or an object in front of the air bag (inflator) module, to be thrown through the air in the unlikely event of an accidental deployment.



### WARNING:

**Never attempt to measure the resistance of the air bag (inflator) modules (driver, passenger and side). It is very dangerous as the electric current from the tester may deploy the air bag.**

- Never attempt disassembly of the air bag (inflator) modules.
- If any abnormality is found, be sure to replace it with new one as an assembly.
- When an abnormality is noted as existing in the live (undeployed) air bag (inflator) module, be sure to deploy it before discarding it.
- When grease, cleaning agent, oil, water, etc., got on the air bag (inflator) modules (driver, passenger and side of driver and passenger), wipe it off immediately with a dry cloth.
- If air bag (inflator) module was dropped from a height of 90 cm (3 ft) or more, it should be replaced with a new one as an assembly.

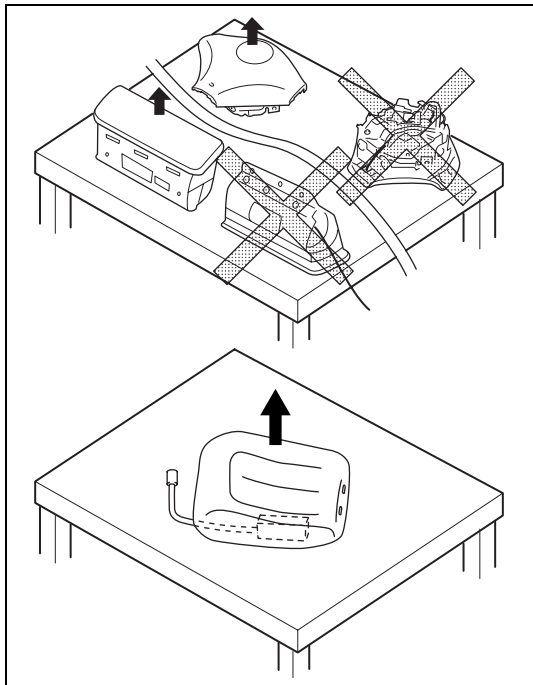


### WARNING:

- For handling and storage of a live air bag (inflator) module, select a place where the ambient temperature below 65°C (150°F), without high humidity and away from electric noise.
- When carrying a live air bag (inflator) module, make sure the bag opening is pointed away from you. In case of an accidental deployment, the bag will then deploy with minimal chance of injury. Never carry the air bag (inflator) module by the wires or connector on the underside of the module.

**Otherwise, personal injury may result.**



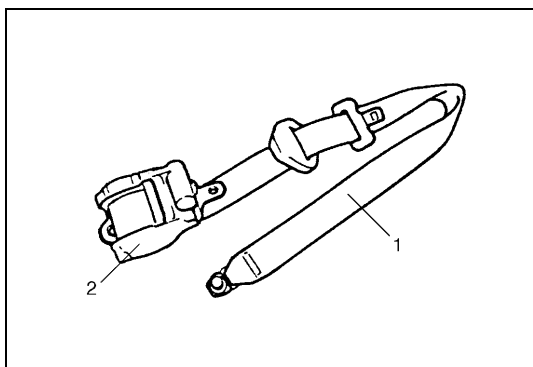
**WARNING:**

When placing a live air bag (inflator) module on bench or other surface, always face the bag up, away from the surface. The front seat back with the live side air bag (inflator) module must be placed with its frontal seat cover facing up.

It is also prohibited to place anything on top of the trim cover and stack air bag (inflator) modules.

This is necessary so that a free space is provided to allow the air bag to expand in the unlikely event of accidental deployment.

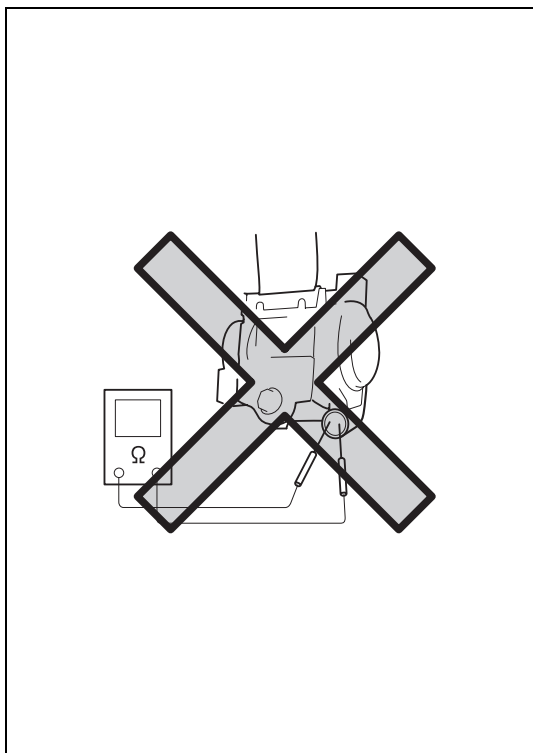
Otherwise, personal injury may result.

**LIVE (INACTIVATED) SEAT BELT PRETENSIONER**

Special care is necessary when handling and storing a live (inactivated) seat belt pretensioners.

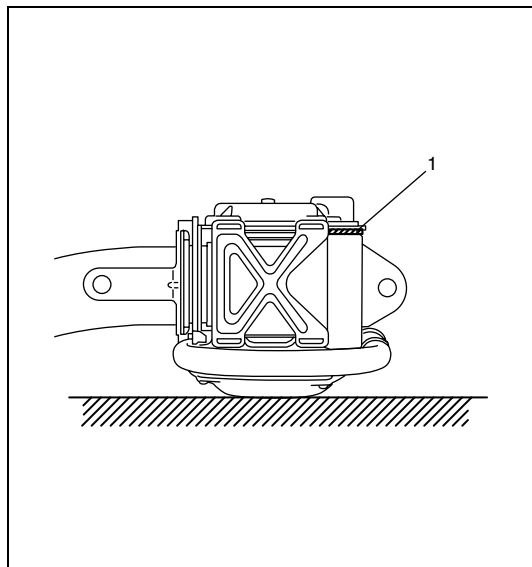
Also, when the seat belt pretensioners activate, gas is generated and the seat belt (1) is retracted into the retractor assembly (2) quickly.

Note, therefore, that if they activate accidentally, the seat belt pretensioners and other object(s) around them may be thrown through the air.

**WARNING:**

**Never attempt to measure the resistance of the seat belt pretensioners. It is very dangerous as the electric current from the tester may activate pretensioner.**

- Never attempt to disassemble the seat belt pretensioners (retractor assembly).
- If any abnormality is found, be sure to replace it with new one as an assembly.
- When an abnormality is noted as existing in the live (inactivated) seat belt pretensioner, be sure to activate it before discarding it.
- When grease, cleaning agent oil, water, etc., got on the seat belt pretensioners (retractor assembly), wipe it off immediately with a dry cloth.
- If seat belt pretensioner was dropped from a height of 30 cm (1 ft) or more, it should be replaced with a new one as an assembly.

**WARNING:**

- For handling and storage of a live seat belt pretensioner, select a place where the ambient temperature below 65°C (150°F), without high humidity and away from electric noise.
- Never carry the seat belt pretensioner by the wire or connector of the pretensioner.
- When placing a live seat belt pretensioner on the workbench or other surface, be sure not to lay it with its exhaust hole (1) provided side facing down. It is also prohibited to put something on its face with an exhaust hole (1) or to put a seat belt pretensioner on top of another.

Otherwise, personal injury may result.

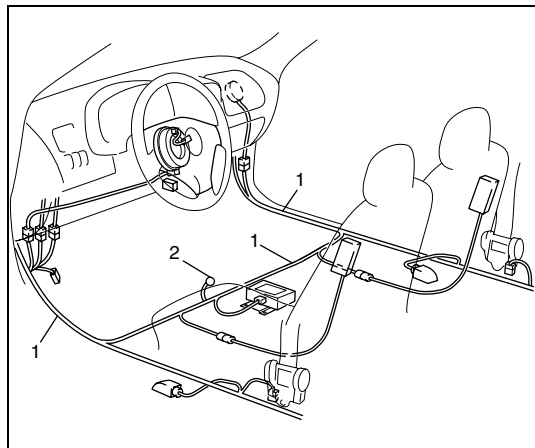
### DEPLOYED AIR BAG (INFLATOR) MODULE AND ACTIVATED SEAT BELT PRETENSIONER

**WARNING:**

- The air bag (inflator) module and seat belt pretensioner immediately after deployment/activation is very hot. Wait for at least 30 minutes to cool it off before proceeding the work.
- Do not apply water, oil, etc. to deployed air bag (inflator) module and to activate seat belt pretensioner.
- After an air bag (inflator) module has been deployed, the surface of the air bag may contain a powdery residue. This powder consists primarily of cornstarch (used to lubricate the bag as it inflates) and by-products of the chemical reaction. As with many service procedures, gloves and safety glasses should be worn.
- Wash your hands with mild soap and water after completing the work.

Refer to the procedure described under “DEPLOYED AIR BAG (INFLATOR) MODULE AND ACTIVATED SEAT BELT PRETENSIONER DISPOSAL”.

## AIR BAG WIRE HARNESS AND CONNECTOR IN FLOOR WIRE HARNESS



Air bag wire harness is included in floor harness. The part of coupler side wire harness can be identified easily as it is covered with a yellow protection tube. Be very careful when handling it.

- When an open in air bag wire harness (in floor harness) (1), damaged wire harness, connector or terminal is found, replace wire harness, connectors and terminals as an assembly.
- When installing it, be careful so that the air bag wire harness (in floor harness) (1) is not caught or does not interfere with other parts.
- Make sure air bag system grounding point (2) are clean and grounds are securely fastened for optimum metal-to-metal contact. Poor grounding can cause intermittent problems that are difficult to diagnose.

## DISPOSAL

Do not dispose of the live (undeployed) air bag (inflator) modules and the live (inactivated) seat belt pretensioners. When disposal is necessary, be sure to deploy/activate the air bag and seat belt pretensioner according to deployment/activation procedure described in “AIR BAG (INFLATOR) MODULE AND SEAT BELT PRETENSIONER DISPOSAL”.

### WARNING:

**Failure to follow proper air bag (inflator) module and seat belt pretensioner disposal procedures can result in air bag deployment and pretensioner activation which could cause personal injury. Undeployed air bag (inflator) module and inactivated seat belt pretensioner must not be disposed of through normal refuse channels.**

**The undeployed air bag (inflator) module and inactivated seat belt pretensioner contain substances that can cause severe illness or personal injury if the sealed container is damaged during disposal.**

## Repairs and Inspections Required after an Accident

### CAUTION:

- All air bag system components, including the electrical harness (component mounting points), must be inspected after an accident. If any components are damaged or bent, they must be replaced even if air bag system activation did not occur.
- Never use air bag system parts from another vehicle.
- Do not attempt to service the parts below. Service of these parts is by replacement only.
  - Driver/Passenger/Side air bag (inflator) module, Driver/Passenger seat belt pretensioner
  - SDM
  - Side sensors
  - Contact coil and combination switch assembly
  - Air bag wire harness (in floor wire harness)
- Proper operation of the air bag system requires that any repairs to the vehicle structure return it to its original production configuration.

### CAUTION:

After detecting one time of such collision as to meet deployment conditions, the SDM must not be used. Refer to “AIR BAG DIAGNOSTIC SYSTEM CHECK” when checking the SDM.

### Accident with deployment/activation - component replacement

When driver and passenger air bag is deployed, the following components must be replaced.

- Driver and passenger air bag (inflator) modules
- Driver and passenger seat belt pretensioners
- SDM

When side air bag is deployed, the following components must be replaced.

- Side air bag (inflator) modules
- Side sensors
- SDM

### Accident with or without deployment/activation - component inspections

Certain air bag system components must be inspected after any crash, whether the air bag system activated or not.

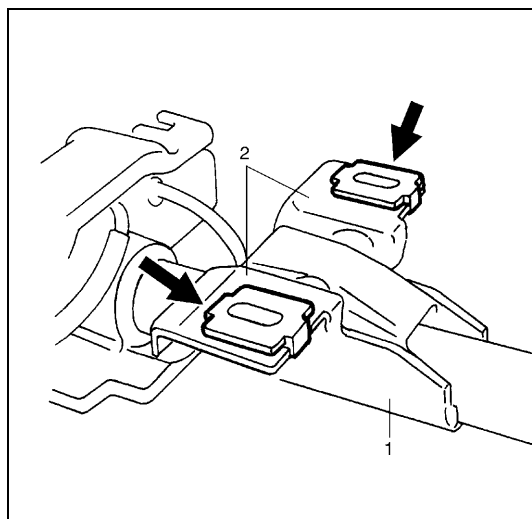
Those components are :

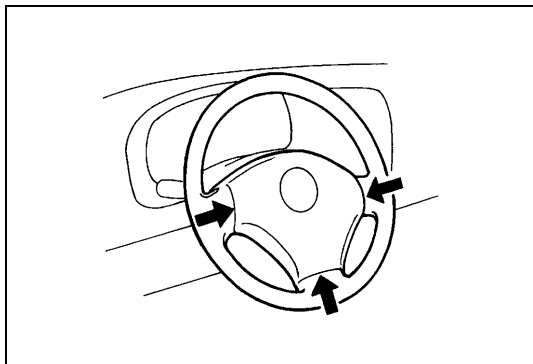
- Steering column (1) and shaft joints
  - Check for length, damage and bend according to “CHECKING STEERING COLUMN FOR ACCIDENT DAMAGE” in SECTION 3.

If any faulty condition is found in above checks, replace faulty part.

- Steering column bracket (2)
  - Check for damage and bent.

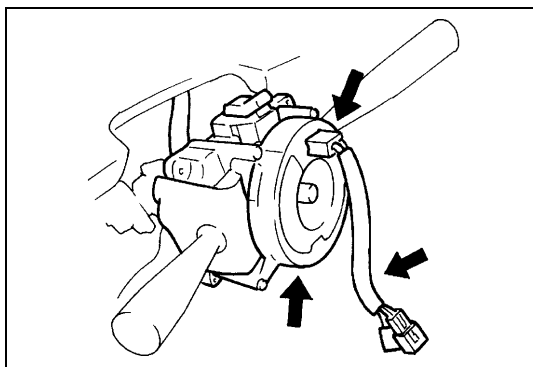
If any faulty condition is found in above checks, replace faulty part.





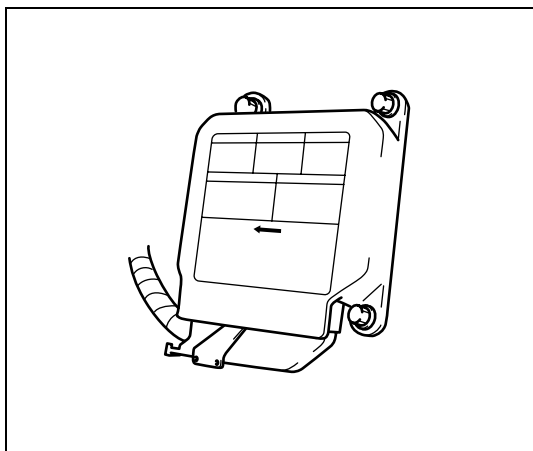
- Steering wheel and driver air bag (inflator) module
  - Check for damage or air bag (inflator) module fitness.
  - Check trim cover (pad surface) for cracks.
  - Check wire harness and connector for damage or tightness.

If any faulty condition is found in above checks, replace faulty part.



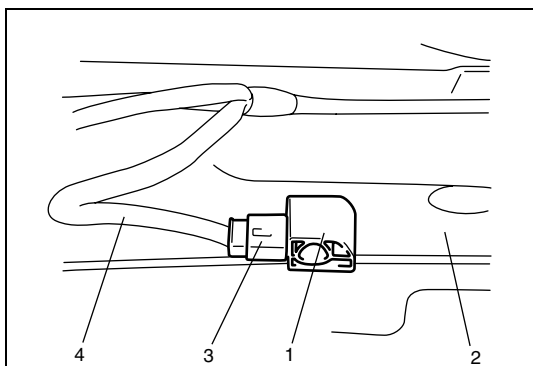
- Contact coil and combination switch assembly
  - Check wire harness and connectors for damage or tightness.
  - Check contact coil case for damage.

If any faulty condition is found in above checks, replace.



- SDM
  - Check for external damage such as deformation, scratch, crack, peeled paint, etc.
  - Check that SDM cannot be installed properly due to a cause in itself.
  - Check that connector or lead wire of SDM has a scorching, melting or damage.
  - Check SDM connector and terminals for tightness.
  - Check SDM sets a diagnostic trouble code (Refer to “DTC CHECK”.) and the diagnostic table leads to a malfunctioning SDM.

If any faulty condition is found in above checks, replace.

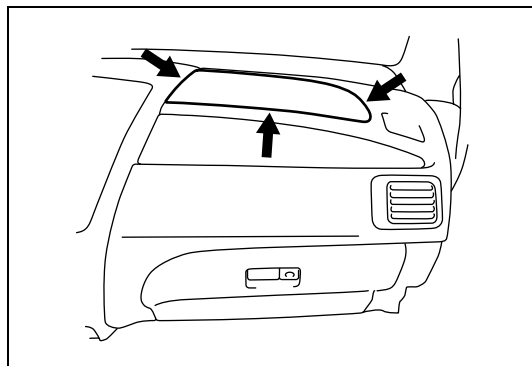


- Side sensors
  - Check sensor (1) and under body (2) for dents, cracks, deformation or rust.
  - Check sensor connector (sensor side and harness side) (3) or sensor lead wire (4) for damage, crack, scorching or melting.

If any faulty condition is found in above checks, replace.

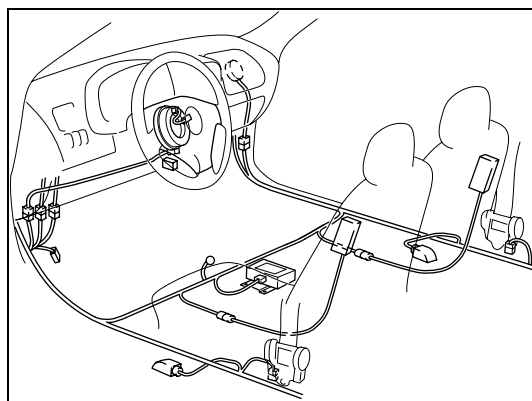
- Instrument panel member and reinforcement
  - Check for any distortion, bending, cracking or other damage.

If any faulty condition is found in above checks, replace.



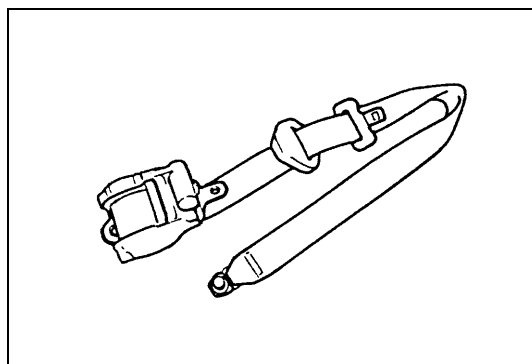
- Passenger air bag (inflator) module
  - Check for dents, cracks, damage or fitness.
  - Check trim cover for cracks or deformities.
  - Check harness and connector for damage or tightness.

If any faulty condition is found in above checks, replace.



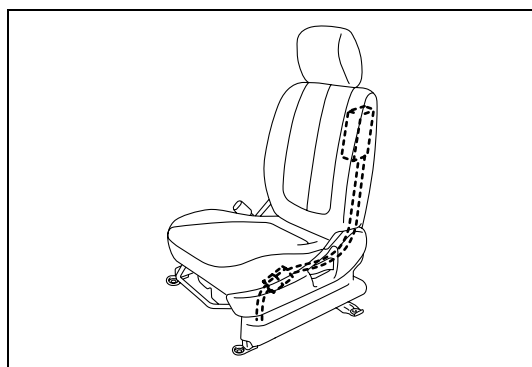
- Air bag wire harness and connections
  - Check for damages, deformities or poor connections.  
(Refer to “INTERMITTENTS AND POOR CONNECTIONS”.)
  - Check wire harness clamps for tightness.

If any faulty condition is found, correct or replace.



- Seat belt pretensioner
  - Check for dents, cracks, damage or fitness
  - Check connector for damage or tightness.

If any faulty condition is found in above checks, replace.



- Seat belts and mounting points
  - Refer to “FRONT SEAT BELT” in Section 10.
- “AIR BAG” warning lamp
  - After vehicle is completely repaired, perform “AIR BAG DIAGNOSTIC SYSTEM CHECK”.

- Side air bag (inflator) module (driver and passenger side)
  - Check front seat back for rent or damage.
  - Check wire harness and connector for damage or tightness

If any faulty condition is found in above checks, replace front seat back.

## SDM

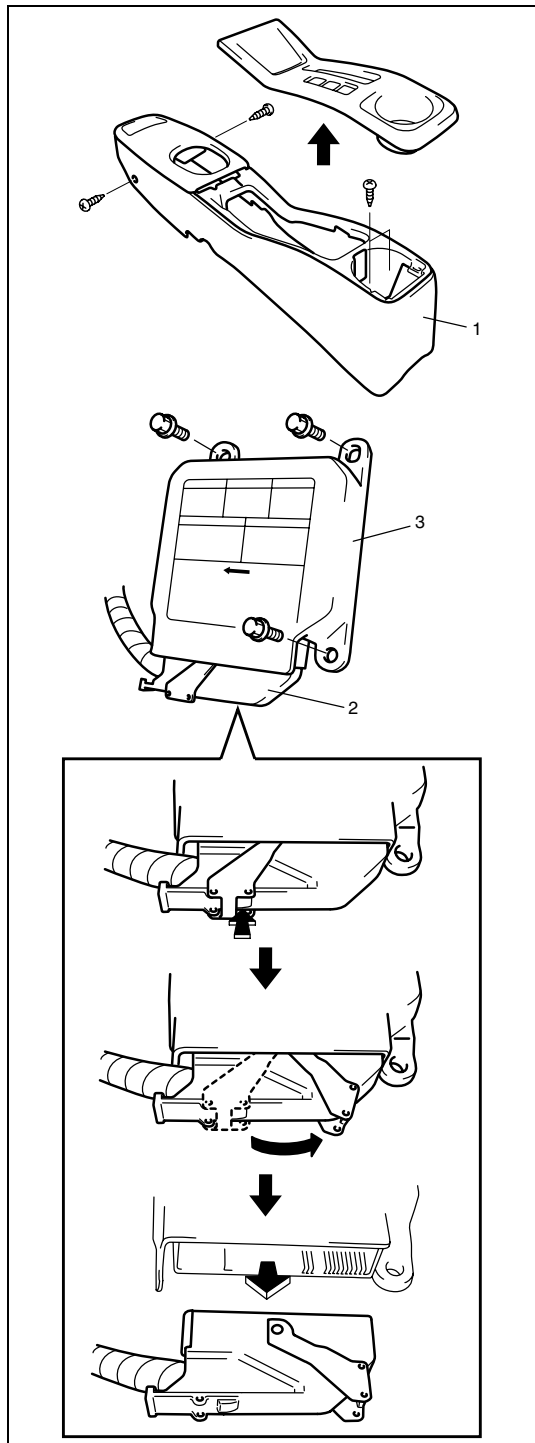
**WARNING:**

During service procedures, be very careful when handling a Sensing and Diagnostic Module (SDM).

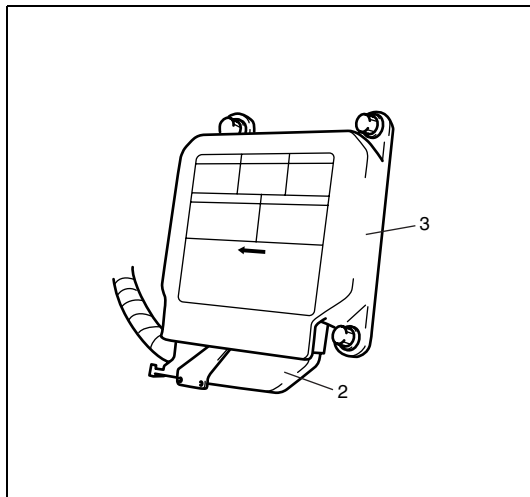
Be sure to read “SERVICE PRECAUTIONS” before starting to work and observe every precaution during work. Neglecting them may result in personal injury or inactivation of the air bag system when necessary.

### REMOVAL

- 1) Disconnect negative cable at battery.
- 2) Disable air bag system. Refer to “DISABLING AIR BAG SYSTEM” of “SERVICE PRECAUTIONS”.
- 3) Remove center console boxes (1) by removing screws and clips.
- 4) Disconnect SDM connector (2) from SDM (3).
- 5) Remove SDM (3) from vehicle.



## INSPECTION



### CAUTION:

- Do not connect a tester whatever type it may be.
- Never repair or disassemble SDM (3).
- If SDM has been dropped, or if there are cracks, dents or other defects in the case or plate, replace it with a new one.

- Check SDM (3) for dents, cracks or deformation.
- Check SDM connector (2) for damage, cracks or lock mechanism.
- Check SDM terminal for bent, corrosion or rust.

If any faulty condition is found in above checks, replace.

## INSTALLATION

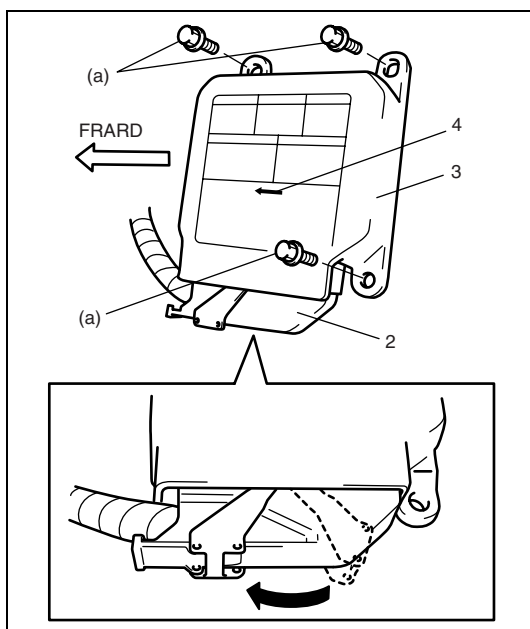
For installation, reverse removal procedure, nothing following points.

- Check none of the following conditions exists.
  - Bend, scratch, deformity in vehicle body mounted on SDM.
  - Foreign matters or rusts on mating surface of vehicle body mounted on SDM.
- Ensure that arrow (4) on the SDM (3) is pointing toward the front of the vehicle.
- Tighten SDM bolts to specified torque.

### Tightening torque

**SDM mounting bolt (a) : 11 N·m (1.1 kg·m, 8.0 lb·ft)**

- Connect SDM connector (2) to SDM (3) securely.
- Enable air bag system. Refer to “ENABLING AIR BAG SYSTEM”.



## Side Sensor

### WARNING:

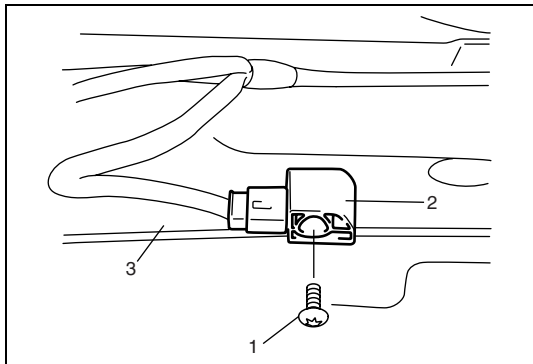
**During service procedures, be very careful when handling a sensor.**

- Never strike or jar a sensor.
- Under some circumstance, it could cause improper operation of the air bag system. A sensor bolt must be carefully torqued to assure proper operation.

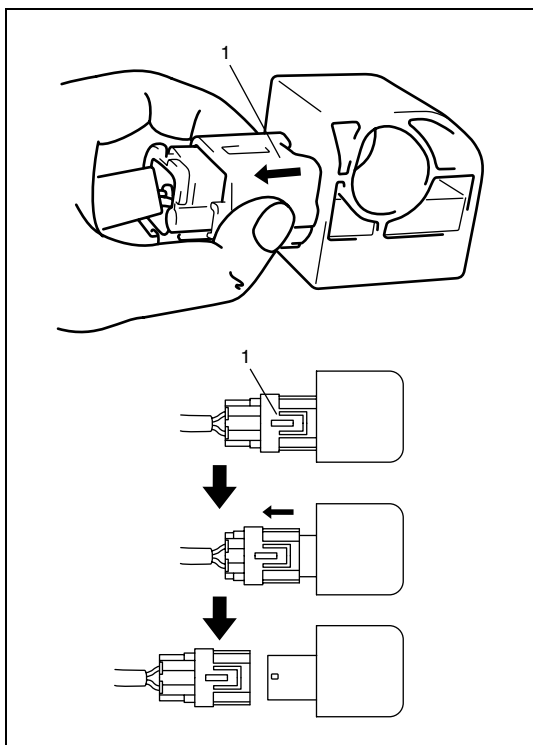
## REMOVAL

- 1) Disconnect negative cable at battery.
- 2) Disable air bag system. Refer to “DISABLING AIR BAG SYSTEM” in this section.
- 3) Remove center pillar lower trim and side sill scuff.
- 4) Turn up floor carpet at front seat side.





- 5) Remove side sensor bolt (1), and side sensor (2) from under body (3).

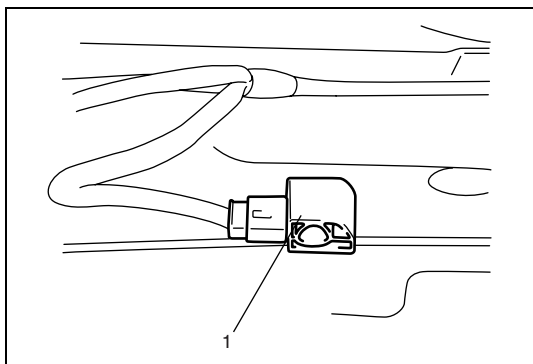


- 6) Disconnect side sensor connector sliding connector outer (1) as shown.

## INSPECTION

### CAUTION:

- **Never disassemble forward sensor.**
- **Sensor should be replaced when it was dropped from a height of 90 cm (3 ft) or more.**

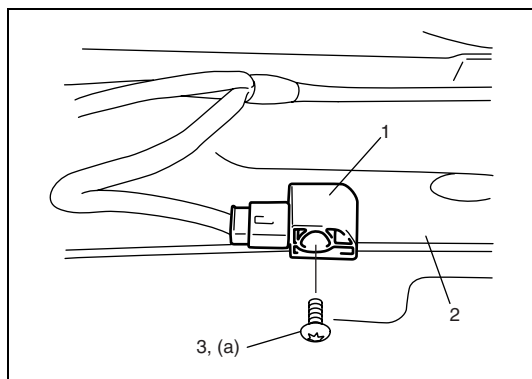


- Check sensor (1) for dents, crack, deformation.
  - Check sensor connector (sensor side and harness side), lock mechanism or sensor lead wire for damage, crack, scorching or melting.
  - Check connector terminals for bent, corrosion or rust.
- If any faulty condition is found in above checks, replace.

## INSTALLATION

### CAUTION:

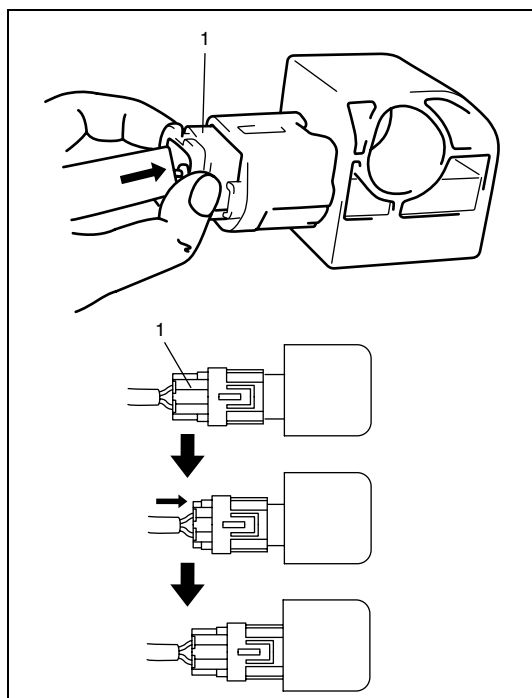
**Proper operation of forward sensor requires sensor be rigidly attached to vehicle structure.**



- 1) Check that none of following faulty conditions exists.
  - Bend, deformity or rust of under body.
  - Foreign matter on mating surface of sensor.
- 2) Install side sensor (1) on under body (2) and tighten side sensor bolt (3) to specified torque.

### Tightening torque

**Side sensor bolt (a) : 9 N·m (0.9 kg-m, 6.5 lb-ft)**



- 3) Connect side sensor connector pushing connector inner (1) as shown.

- 4) Connect negative cable at battery.
- 5) Enable air bag system. Refer to “ENABLING AIR BAG SYSTEM” in this section.

## Seat Belt Pretensioner

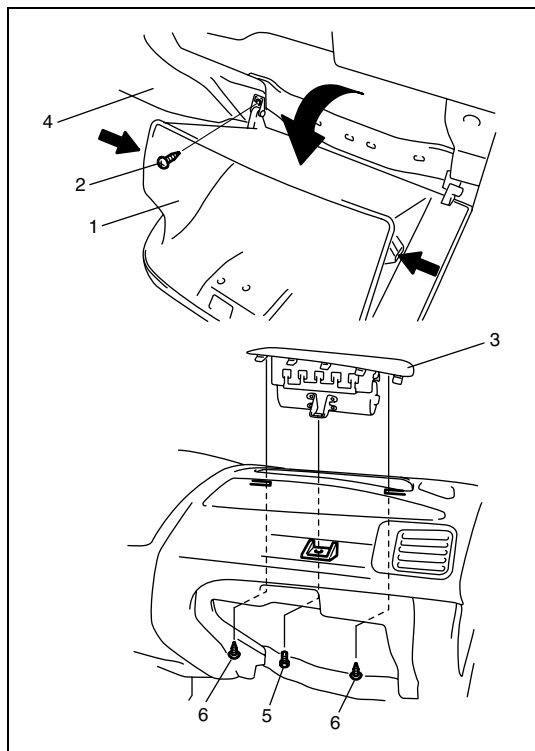
Refer to “FRONT SEAT BELT” in Section 10 for removal, inspection and installation.

## Passenger Air Bag (Inflator) Module

### WARNING:

- Never attempt to disassemble or repair the passenger air bag (inflator) module. If any abnormality is found, be sure to replace it with new one as an assembly.
- Be sure to read “SERVICE PRECAUTIONS” before starting to work and observe every precaution during work. Neglecting them may result in personal injury or undeployment of the air bag when necessary.

### REMOVAL



- 1) Disconnect negative cable at battery.
- 2) Open glove box (1), then while pressing glove box stopper, pull out glove box (1) from instrument panel (4) and then remove glove box screw (2) and glove box (1) from instrument panel (4).
- 3) Disable air bag system. Refer to “DISABLING AIR BAG SYSTEM”.
- 4) Remove passenger air bag (inflator) module (3) attaching bolt (5) and screws (6) and passenger air bag (inflator) module (3) from vehicle.

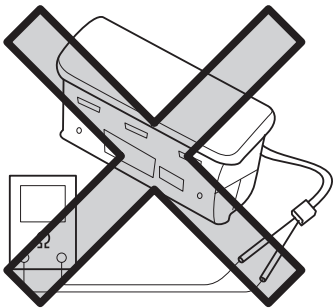
### INSPECTION

#### WARNING:

Never measure resistance of passenger air bag (inflator) module or disassemble it. Otherwise personal injury may result.

#### CAUTION:

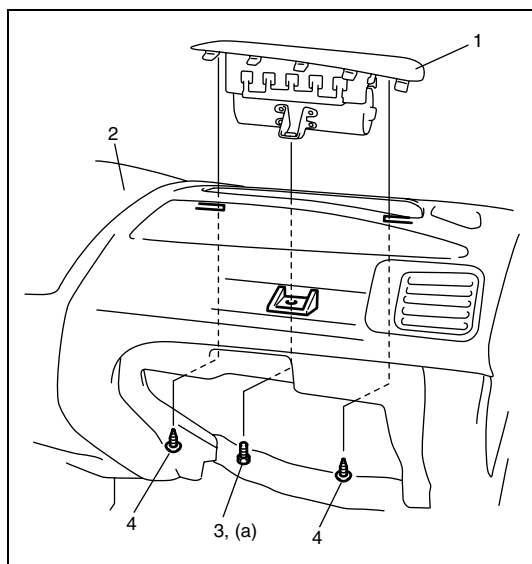
If air bag (Inflator) module was dropped from a height or 90 cm (3 ft) or more, it should be replaced.



Check air bag (inflator) module appearance visually for following symptoms and if any one of them is applicable, replace with a new one.

- Air bag has deployed.
- There is a crack in trim cover (pad surface).
- Wire harness or connector is damaged.
- Air bag (inflator) module is damaged or a strong impact was applied to it.

## INSTALLATION



- 1) Install passenger air bag (inflator) module (1) to instrument panel (2).
- 2) Tighten passenger air bag (inflator) module attaching bolt (3) to specified torque and screws (4).

### Tightening torque

**Passenger air bag (inflator) module mounting bolt  
(a) : 23 N·m (2.3 kg·m, 16.5 lb·ft)**

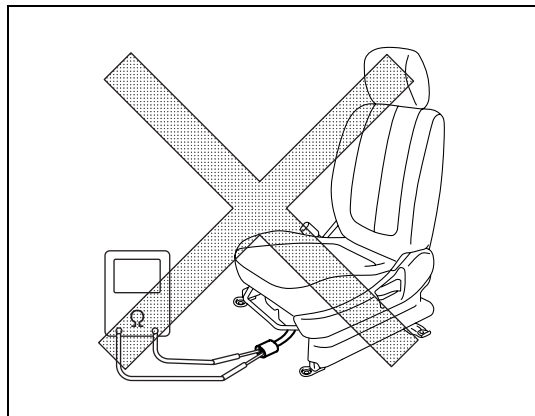
- 3) Connect negative cable to battery.
- 4) Enable air bag system. Refer to "ENABLING AIR BAG SYSTEM".

## Side Air Bag (Inflator) Module (If Equipped)

**WARNING:**

- Never attempt to disassemble front seat back. It is impossible to remove side air bag (inflator) module from front seat back. If any abnormality is found, be sure to replace front seat back with new one as an assembly.
- Be sure to read “SERVICE PRECAUTIONS” before starting to work and observe every precaution during work. Neglecting them may result in personal injury or undeployment of the air bag when necessary.

### INSPECTION

**WARNING:**

Never measure resistance of side air bag (inflator) module or disassemble it. Otherwise personal injury may result.

Check air bag (inflator) module appearance visually for following symptoms and if any one of them is applicable, replace with a new one.

- Air bag has deployed.
- There is a rent or damage in front seat back.
- Wire harness or connector is damaged or tightness.

## Driver Air Bag (Inflator) Module

Refer to “DRIVER AIR BAG (INFLATOR) MODULE” in Section 3 for removal, inspection and installation.

## Contact Coil and Combination Switch Assembly

Refer to “CONTACT COIL AND COMBINATION SWITCH ASSEMBLY” in Section 3 for removal, inspection and installation.

## Seat Belt Pretensioner

Refer to “FRONT SEAT BELT WITH PRETENSIONER” in Section 10 for removal, inspection and installation.

## Air Bag (Inflator) Module and Seat Belt Pretensioner Disposal

**WARNING:**

Failure to follow proper air bag (inflator) module and seat belt pretensioner disposal procedures can result in air bag deployment and pretensioner activation which may cause personal injury.

Do not dispose of live (undeployed) air bag (inflator) modules and seat belt pretensioners. Because undeployed air bag (inflator) module/inactivated seat belt pretensioner must not be disposed of through normal refuse channels.

Undeployed air bag (inflator) module and inactivated seat belt pretensioner contain substances that can cause severe illness or personal injury if sealed container is damaged during disposal.

Air bag (inflator) module/seat belt pretensioner can be deployed/activated inside or outside of vehicle. Deployment/Activation method used depends upon final disposition of vehicle. Review the following instructions in order to determine which will work best in a given situation.

**Deployment/Activation Outside of Vehicle :**

When you intend to return the vehicle to service, deploy the air bag (inflator) module(s) or activate seat belt pretensioner(s) outside of the vehicle.

**Deployment/Activation Inside of Vehicle :**

When the vehicle will be destroyed, or salvaged for component parts, deploy the air bag modules and/or activate seat belt pretensioners installed on vehicle.

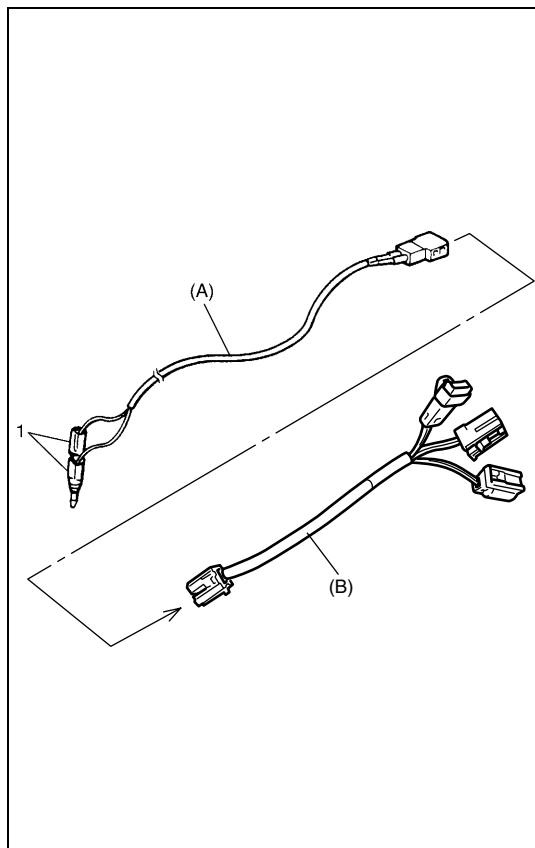
**WARNING:**

The following precautions must be observed for this work. Failure to observe any of them may result in personal injury.

- Procedure should be followed strictly as described here.
- Be sure to read “SERVICE PRECAUTIONS” beforehand.
- To avoid accidental deployment/activation, this work should be performed by no more than one person.
- Since smoke is produced when air bag (inflator) module is deployed and pretensioner is activated, select well-ventilated area.
- Air bag (inflator) module and seat belt pretensioner will immediately deploy/activate when 12 volts vehicle battery is connected to it. Wear safety glasses throughout this entire deployment/activation and disposal procedure.
- Wear suitable ear protection when deploying air bag (inflator) module/activating seat belt pretensioner. Also, advise those who are in area close to deployment/activation site to wear suitable ear protection.
- Do not deploy/activate two or more air bag system components (air bag (inflator) modules and seat belt pretensioners) at the same time.
- Never connect deployment harness to any 12 volts vehicle battery before connecting deployment harness to air bag (inflator) module and seat belt pretensioner. Deployment harness shall remain shorted and not be connected to 12 volts vehicle battery till you are ready to deploy air bag (inflator) module or activate seat belt pretensioner.

## Deployment/Activation Outside of Vehicle

When you intend to return the vehicle to service, deploy the air bag (inflator) module(s) or activate seat belt pretensioner(s) outside of the vehicle.



- 1) Turn ignition switch to "LOCK" position and remove key.
- 2) Wear safety glasses during this deployment/activation procedure.
- 3) Check that there is no open, short or damage in special tools (deployment harness (A) and adapter cable (B)). If any faulty is found, do not use it and be sure to use new deployment harness (A).

### Special tool

(A) : 09932-75030

(B) : 09932-78331

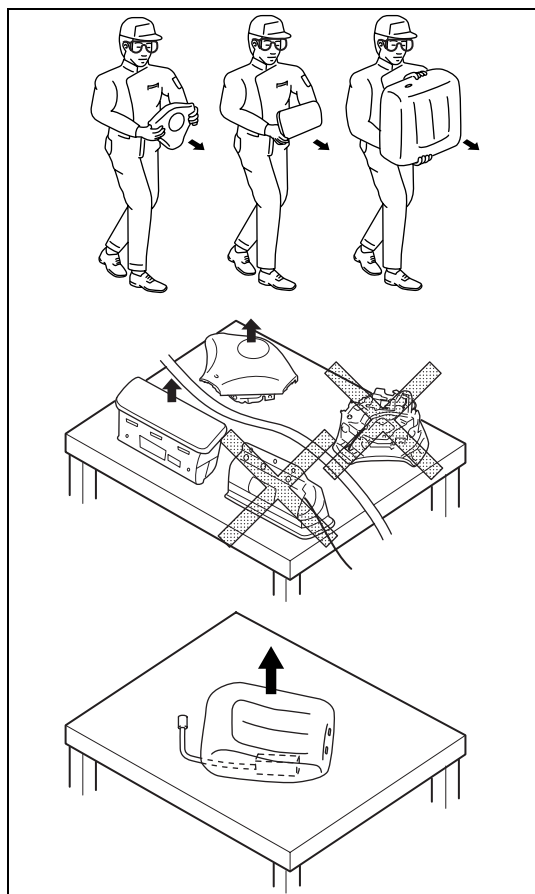
### NOTE:

If faulty of seat belt pretensioner connector of adapter cable (B) is found, replace it to spare connector (special tool).

- 4) Short two deployment harness leads (1) together by fully seating one banana plug into the other.

### WARNING:

**Deployment harness (A) shall remain shorted and not be connected to 12 volts vehicle battery till you are ready to deploy air bag module or activate seat belt pretensioner.**

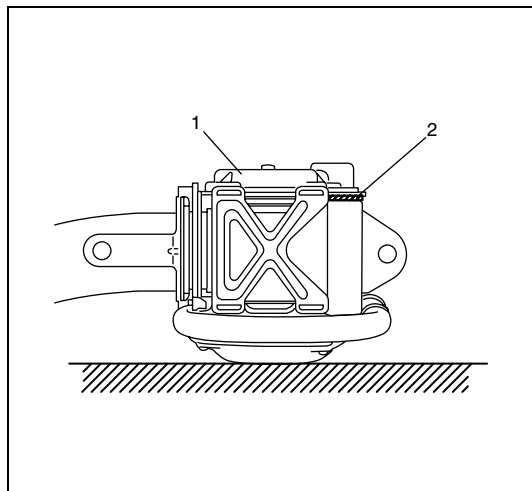


- 5) Remove air bag (inflator) module(s) or seat belt pretensioner(s) from vehicle referring to Section 3, 9, 10 and/or 10B.

### WARNING:

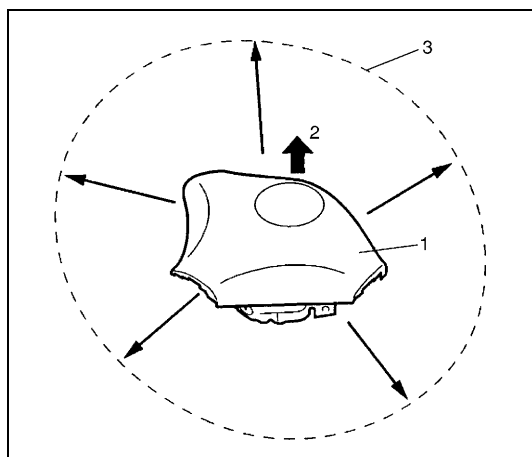
- For handling and storage of live air bag (inflator) module, select place where ambient temperature below 65°C (150°F), without high humidity and away from electric noise.
- Always carry live air bag (inflator) module with trim cover away from you.
- When storing live air bag (inflator) module or when leaving live air bag (inflator) module unattended on bench or other surface, always face trim cover up and away from surface. Front seat back with live air bag (inflator) module must be placed with its frontal seat cover facing up. This is necessary so that free space is provided to allow air bag (inflator) module to expand in the unlikely event of accidental deployment.

**Failure to follow procedures may result in personal injury.**

**WARNING:**

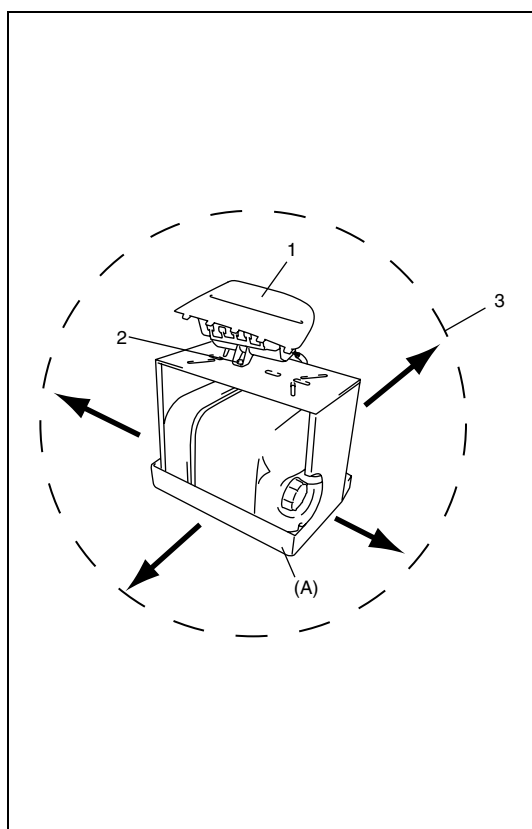
- For handling and storage of seat belt pretensioner (1), select place where ambient temperature below 65°C (150°F), without high humidity and away from electric noise.
- Never carry seat belt pretensioner (1) by wire or connector of seat belt pretensioner (1).
- When placing seat belt pretensioner (1) on workbench or other surface, be sure not to lay it with its exhaust hole (2) side facing up. It is also prohibited to put something on seat belt pretensioner. Otherwise, personal injury may result.

6) Set air bag (inflator) module or seat belt pretensioner as follows.



a) For driver air bag (inflator) module

- Clear space (3) on ground about 185 cm (6 ft) in diameter where driver air bag (inflator) module (1) for deployment. Paved, outdoor location where there is no activity is preferred. If outdoor location is not available, space on shop floor where there is no activity and provide sufficient ventilation. Ensure no loose or flammable objects are within deployment area.
- Place driver air bag (inflator) module (1) with its vinyl trim cover facing up (2) on ground in step i).



b) For passenger air bag (inflator) module

- Clear space (3) on ground about 185 cm (6 ft) in diameter where passenger air bag (inflator) module (1) for deployment. Paved, outdoor location where there is no activity is preferred. If outdoor location is not available, space on shop floor where there is no activity and provide sufficient ventilation. Ensure no loose or flammable objects are within deployment area.
- Place deployment fixture (A) on ground in step i).

**Special tool**

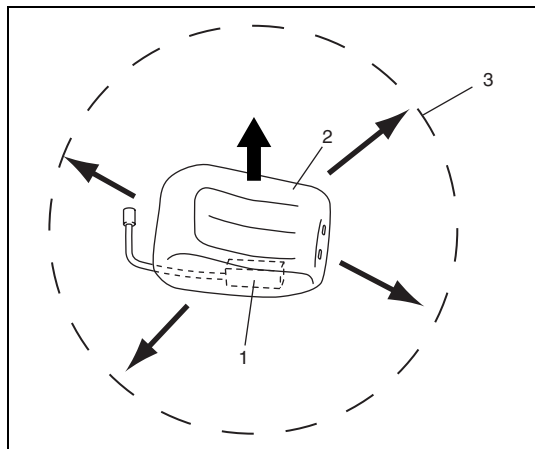
(A) : 09932-75041

- Fill plastic reservoir in deployment fixture (A) with water or sand. This is necessary to provide sufficient stabilization of fixture during deployment.
- Attach passenger air bag (inflator) module (1) in deployment fixture (A) securely using M8 bolt (2).

**CAUTION:**

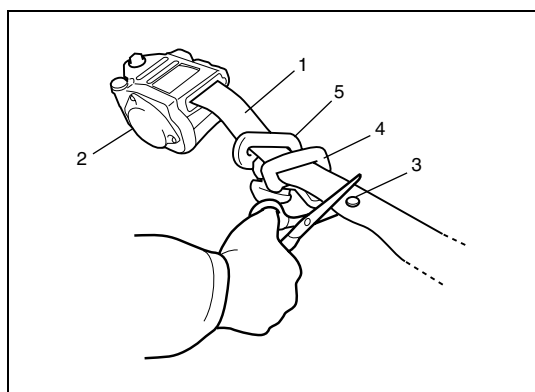
Be sure to use M8 size and 7T strength bolt for fixing passenger air bag (inflator) module (1) to deployment fixture (A).





c) For side air bag (inflator) module

- i) Clear space (3) on ground about 185 cm (6 ft) in diameter where side air bag (inflator) module (1) for deployment. Paved, outdoor location where there is no activity is preferred. If outdoor location is not available, space on shop floor where there is no activity and provide sufficient ventilation. Ensure no loose or flammable objects are within deployment area.
- ii) Place front seat back (2) with side air bag (inflator) module (1) with its frontal seat cover facing up on ground in step i).



d) For seat belt pretensioner

- i) Cut webbing (1) at tongue plate stopper (3) of seat belt pretensioner (2) side as shown.

**NOTE:**

**Hold seat belt pretensioner (2) vertically in the same condition as it is installed. Otherwise, webbing can't be pulled out.**

- ii) Remove tongue plate (4) and shoulder anchor (5) from webbing.
- iii) Tie webbing (1) tightly at 10 cm (3.9 in.) from cutting edge as shown.
- iv) Tie seat belt pretensioner (2) with wire harness (3) to wheel-installed tire (4) as shown.

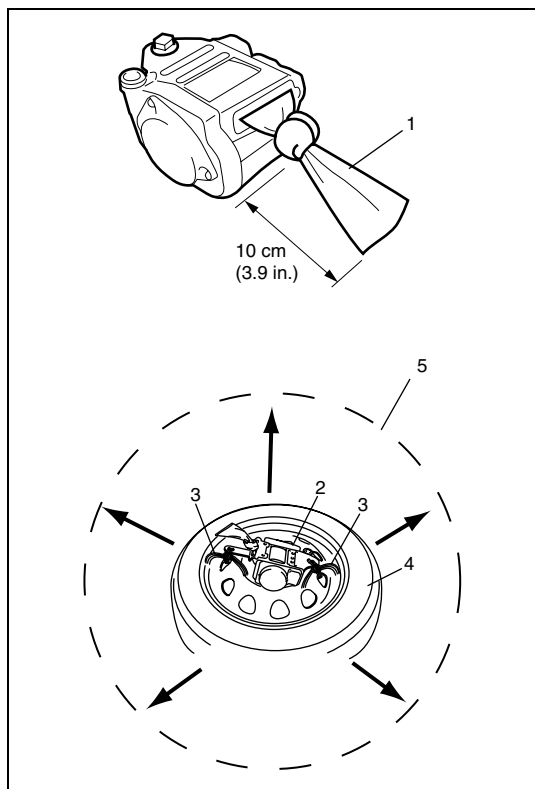
**Wire harness specification:**

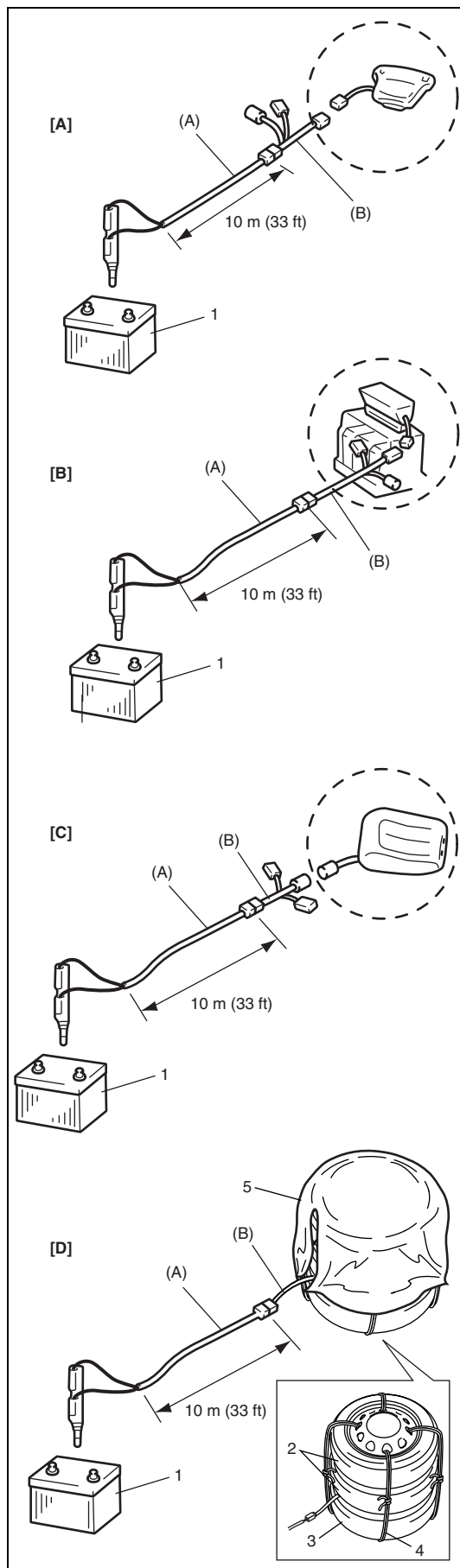
**Stripped wire harness section 1.25 mm<sup>2</sup> (0.0019 in.<sup>2</sup>) or more (Stripped wire harness diameter 1.25 mm (0.05 in.) or more)**

**NOTE:**

**Wind wire harness (3) around at least 3 times.**

- v) Clear space (5) on ground about 185 cm (6 ft) in diameter where seat belt pretensioner (2) is to be activated. Paved, outdoor location where there is no activity is preferred. If outdoor location is not available, space on shop floor where there is no activity and provide sufficient ventilation. Ensure no loose or flammable objects are within activation area.
- vi) Place wheel-installed tire (4) with seat belt pretensioner (2) on ground in step v).





- 7) Stretch deployment harness (A) from air bag (inflator) module or seat belt pretensioner to its full length 10 m (33 ft).

### Special tool

(A): 09932-75030

- 8) Place 12 volts vehicle battery (1) near shorted end of deployment harness (A).
- 9) Verify that area around air bag (inflator) module or seat belt pretensioner is clear of all people and loose or flammable objects.
- 10) Connect adapter cable (B) as follows.

### Special tool

(B): 09932-78331

- a) For driver air bag (inflator) module  
Verify that driver air bag (inflator) module is resting with its vinyl trim cover facing up, and connect adapter cable (B) to driver air bag (inflator) module.
- b) For passenger air bag (inflator) module  
Verify that passenger air bag (inflator) module is firmly and properly secured on deployment fixture (special tool), and connect adapter cable (B) to passenger air bag (inflator) module.
- c) For side air bag (inflator) module  
Verify that front seat back with side air bag (inflator) module resting with its frontal seat cover facing up, and connect adapter cable (B) to side air bag (inflator) module.
- d) For seat belt pretensioner  
Connect adapter cable (B) to seat belt pretensioner.
- 11) Connect adapter cable (B) to deployment harness (A) connector and lock connectors with lock slider.
- 12) For seat belt pretensioner
  - a) Pile 2 wheel-installed tires (2) on top of tire with seat belt pretensioner (3), and tie them with wire harness (4) as shown.

### Wire harness specification:

**Stripped wire harness section 1.25 mm<sup>2</sup> (0.0019 in.<sup>2</sup>) or more (Stripped wire harness diameter 1.25 mm (0.05 in.) or more)**

### NOTE:

**Wind wire harness around at least 2 times.**

- b) Drape blanket (5) over those tires.

[A]:	For driver air bag (inflator) module
[B]:	For passenger air bag (inflator) module
[C]:	For side air bag (inflator) module
[D]:	For seat belt pretensioner

- 13) Notify all people in immediate area that you intend to deploy/activate air bag (inflator) module or seat belt pretensioner.

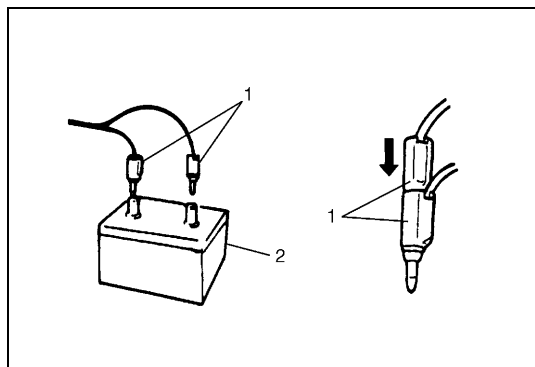
**NOTE:**

- When air bag (inflator) module deploys and seat belt pretensioner activates, rapid gas expansion will create substantial report. Wear suitable ear protection. Notify all people in immediate area that you intend to deploy air bag (inflator) module or activate seat belt pretensioner and suitable ear protection should be worn.
- When driver air bag (inflator) module deploys, driver air bag (inflator) module may jump about 30 cm (1 ft) vertically. This is normal reaction to force of rapid gas expansion inside of drive air bag (inflator) module.
- After air bag (inflator) module has been deployed, surface of air bag (inflator) may contain powdery residue. This powder consists primarily of cornstarch (used to lubricate bag (inflator) as it inflates) and byproducts of chemical reaction.

**WARNING:**

- Do not place deployed air bag (inflator) module and activated seat belt pretensioner near any flammable objects.
- Do not apply water, oil, etc. to deployed air bag (inflator) module and activated seat belt pretensioner.
- Wait for about 30 minutes before touching any metal surface of air bag (inflator) module or seat belt pretensioner module. Disregarding these precautions may cause fire or personal injury.

Failure to follow procedures may result in fire or personal injury.

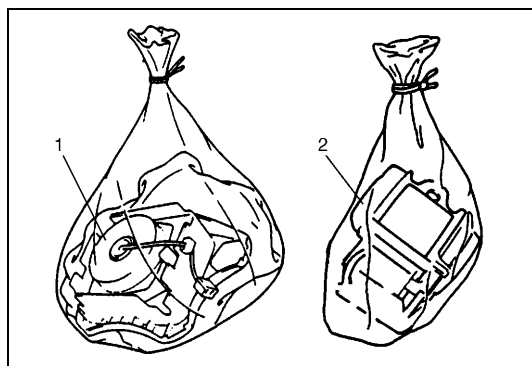


- 14) Separate two banana plugs (1) on deployment harness.
- 15) Connect deployment harness to 12 volts vehicle battery (2). This will immediately deploy or activate air bag (inflator) module or seat belt pretensioner.
- 16) Disconnect deployment harness from 12 volts vehicle battery (2) and short two deployment harness leads together by fully seating one banana plug into the other.

- 17) In the unlikely event that air bag (inflator) module or seat belt pretensioner did not deploy/activate after following these procedures, proceed immediately with Step 23) through 26). If air bag (inflator) module or seat belt pretensioner did deploy or activate, proceed with Steps 18) through 22).
- 18) Put on pair of shop gloves to protect your hands from possible irritation and heat when handling deployed air bag (inflator) module or activated seat belt pretensioner.
- 19) Disconnect adapter cable (special tool) from air bag (inflator) module or seat belt pretensioner as soon as possible. This will prevent adapter cable (special tool) from damage due to possible contact with hot air bag (inflator) module or hot seat belt pretensioner.
- 20) Check adapter cable connector as follows.
  - a) For air bag (inflator) module  
Air bag (inflator) module connector of adapter cable (special tool) are designed to be reused. However they should be inspected for damage after deployment and replaced if necessary.
  - b) For seat belt pretensioner  
Seat belt pretensioner connector of adapter cable (special tool) must be replaced to spare connector (special tool).

**NOTE:**

**Do not reuse seat belt pretensioner connector of adapter cable (special tool) because it will be destroyed by shock when seat belt pretensioner is activated.**



- 21) Dispose of deployed air bag (inflator) module (1) or activated seat belt pretensioner (2) through normal refuse channels after it has cooled for at least 30 minutes and tightly seal air bag (inflator) module (1) or seat belt pretensioner (2) in strong vinyl bag. (Refer to "Deployed Air Bag (Inflator) Module and Activated Seat Belt Pretensioner Disposal" in detail.)
- 22) Wash your hands with mild soap and water afterward.

**NOTE:**

**Remaining steps are to be followed in the unlikely event that air bag (inflator) module did not deploy or seat belt pretensioner did not activate.**

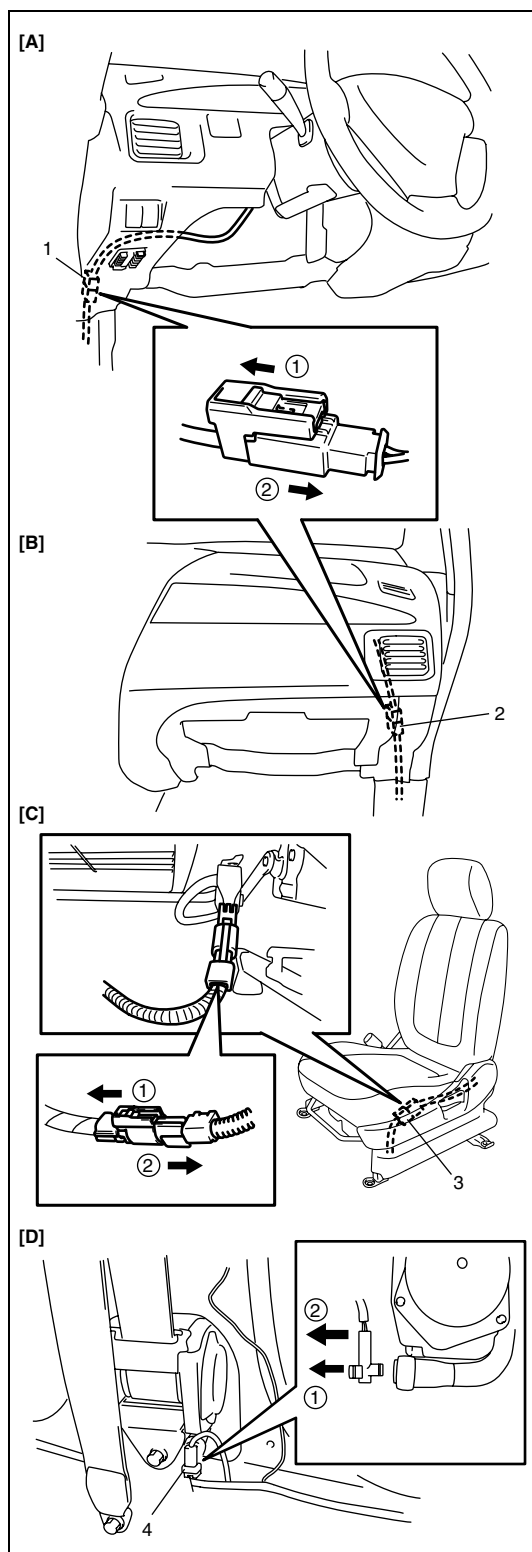
- 23) Ensure that deployment harness has been disconnected from 12 volts vehicle battery and that its two banana plugs have been shorted together by fully seating one banana plug into the other.

- 24) Disconnect deployment harness and adapter cable from air bag (inflator) module or seat belt pretensioner.
- 25) Temporarily store undeployed air bag (inflator) module or unactivated seat belt pretensioner referring to “Service Precautions” for details.
- 26) Contact your local distributor for further assistance.

## Deployment/Activation Inside of Vehicle

When the vehicle will be destroyed, or salvaged for component parts, deploy the air bag modules and/or activate seat belt pretensioners installed on vehicle.

- 1) Turn ignition switch to "LOCK" position, remove key and put on safety glasses.
- 2) Remove all loose objects from front seats and instrument panel.
- 3) Disconnect air bag (inflator) module or seat belt pretensioner connector as follows.
  - a) For driver air bag (inflator) module  
Disconnect contact coil connector (1) located near base of steering column.
  - b) For passenger air bag (inflator) module  
Remove glove box from instrument panel and disconnect passenger air bag (inflator) module connector (2).
  - c) For side air bag (inflator) module  
Disconnect side air bag (inflator) module connectors (3) under front seat cushion.
  - d) For seat belt pretensioner  
Remove both side (driver and passenger side) center pillar lower trims and disconnect seat belt pretensioner connectors (4).
- 4) Confirm that each air bag (inflator) module and/or seat belt pretensioner is securely mounted.

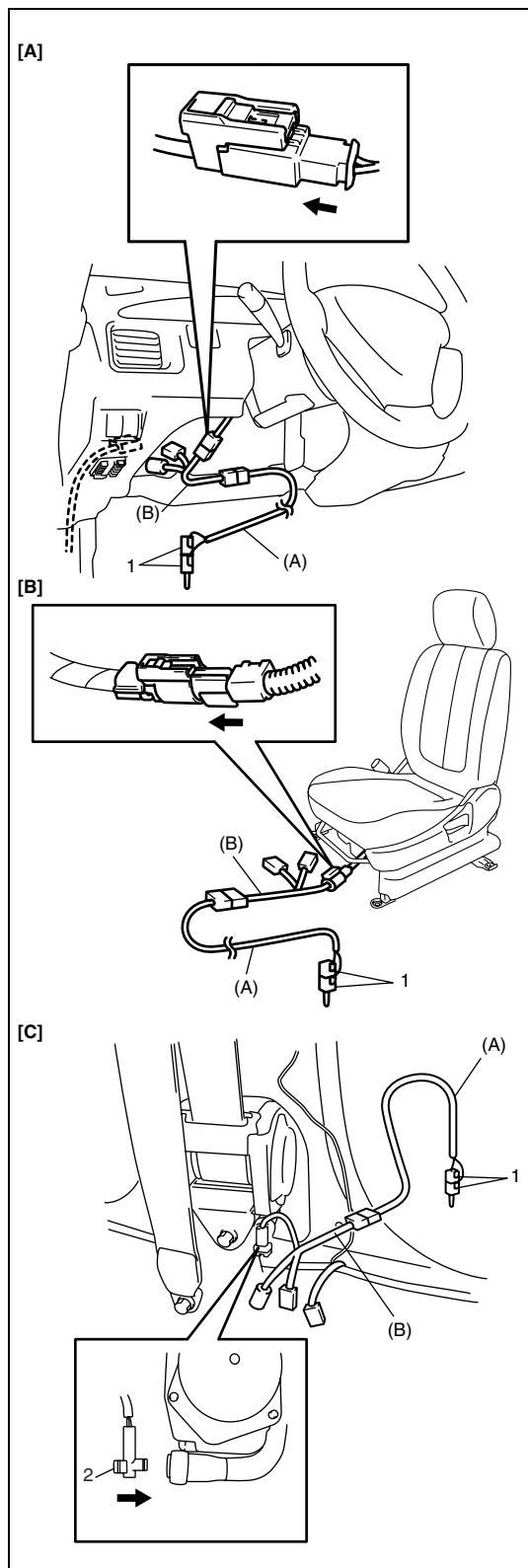


[A]: Driver air bag (inflator) module

[B]: Passenger air bag (inflator) module

[C]: Side air bag (inflator) module

[D]: Seat belt pretensioner



- 5) Check that there is no open, short or damage in special tools (deployment harness (A) and adapter cable (B)). If any faulty condition is found, do not use it and be sure to use new deployment harness (A) and/or adapter cable (B). And connect adapter cable (B) to deployment harness (A) and lock connectors with lock slider (2).

**NOTE:**

If faulty of seat belt pretensioner connector of adapter cable (B) is found, replace it to spare connector (special tool).

**Special tool**

(A) : 09932-75030

(B) : 09932-78331

- 6) Short two deployment harness leads (1) together by fully seating one banana plug into the other.

**WARNING:**

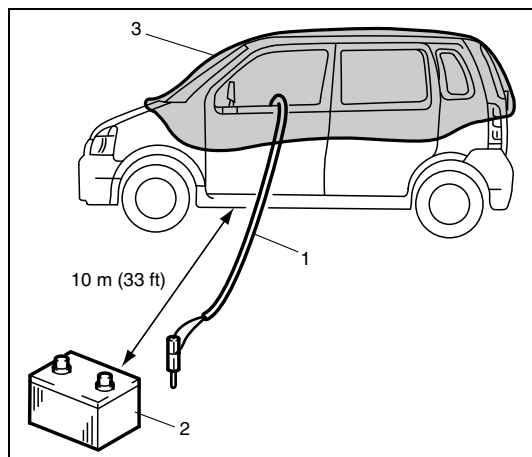
Deployment harness (A) shall remain shorted and not be connected to 12 volts vehicle battery until you are ready to deploy air bag (inflator) module or activate seat belt pretensioner.

- 7) Connect adapter cable (B) in series with deployment harness (A) to air bag (inflator) module or seat belt pretensioner as follows.
- For air bag (inflator) module  
Connect adapter cable (B) in series with deployment harness (A) and push adapter cable (B) connector to air bag (inflator) module connector (driver, passenger or side of driver and passenger) till click can be heard.
  - For seat belt pretensioner  
Connect adapter cable (B) in series with deployment harness (A) to seat belt pretensioner and lock connector with lock part.

[A]: For driver air bag (inflator) module

[B]: For side air bag (inflator) module

[C]: For seat belt pretensioner



- 8) Route deployment harness (1) out of vehicle.
- 9) Verify that inside of vehicle and area surrounding vehicle are clear of all people and loose or flammable objects.
- 10) Stretch deployment harness (1) to its full length 10 m (33 ft).
- 11) Place 12 volts vehicle battery (2) near shorted end of deployment harness (1).
- 12) Completely cover windshield area and front door window openings with drop cloth, a blanket or any similar item (3). This reduces possibility of injury due to possible fragmentation of vehicle's glass or interior.
- 13) Notify all people in immediate area that you intend to deploy air bag (inflator) module or activate seat belt pretensioner.

#### NOTE:

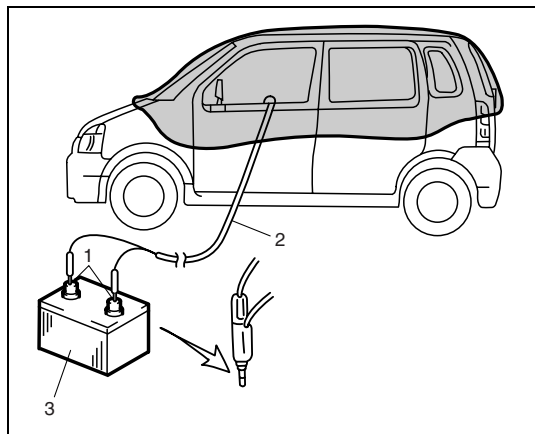
- When air bag (inflator) module deploys or seat belt pretensioner activates, rapid gas expansion will create substantial report. Wear suitable ear protection. Notify all people in immediate area that you intend to deploy air bag (inflator) module or to activate seat belt pretensioner and suitable ear protection should be worn.
- After air bag (inflator) module has been deployed, surface of air bag may contain powdery residue. This powder consists primarily of cornstarch (used to lubricate air bag (inflator) module as it inflates) and by-products of chemical reaction.

#### WARNING:

- Do not place deployed air bag (inflator) module and activated seat belt pretensioner near any flammable objects.
- Do not apply water, oil, etc. to deployed air bag (inflator) module and activated seat belt pretensioner.
- Wait for about 30 minutes before touching any metal surface of air bag (inflator) module or seat belt pretensioner module. Disregarding these precautions may cause fire or personal injury.

Failure to follow procedures may result in fire or personal injury.





- 14) Separate two banana plugs (1) on deployment harness (2).
- 15) Connect deployment harness (2) to 12 volts vehicle battery (3). This will immediately deploy or activate air bag (inflator) module or seat belt pretensioner.
- 16) Disconnect deployment harness (2) from 12 volts vehicle battery (3) and short two deployment harness leads together by fully seating one banana plug into the other.

- 17) Repeat Steps 2) through 16) to deploy/activate air bag (inflator) modules and seat belt pretensioners which has not been deployed/activated, if any.
- 18) In the unlikely event that air bag (inflator) module and seat belt pretensioner after following these procedures, proceed immediately with Step 24) through 26). If air bag (inflator) module and seat belt pretensioner did deploy/activate, proceed with Steps 19) through 23).
- 19) Carefully remove drop cloth from vehicle and clean off any fragments or discard it entirely.
- 20) Put on pair of shop gloves to protect your hands from possible irritation and heat when handling deployed air bag (inflator) module and activated seat belt pretensioner.
- 21) Disconnect adapter cable (special tool) from air bag (inflator) module or seat belt pretensioner as soon as possible. This will prevent adapter cable (special tool) from damage due to possible contact with hot air bag (inflator) module or hot seat belt pretensioner.
- 22) Check adapter cable connector as follows.
  - a) For air bag (inflator) module  
Air bag (inflator) module connector of adapter cable (special tool) are designed to be reused. However they should be inspected for damage after deployment and replaced if necessary.
  - b) For seat belt pretensioner  
Seat belt pretensioner connector of adapter cable (special tool) must be replaced to spare connector (special tool).

**NOTE:**

**Do not reuse seat belt pretensioner connector of adapter cable (special tool) because it will be destroyed by shock when seat belt pretensioner is activated.**

- 23) With air bag (inflator) modules deployed and seat belt pretensioners activated, vehicle may be scrapped in the same manner as non-air bag system/seat belt pretensioner equipped vehicle.

**NOTE:**

**Remaining steps are to be followed in the unlikely event that air bag (inflator) module did not deploy or seat belt pretensioner did not activate.**

- 24) Remove undeployed air bag (inflator) module(s) and/or inactivated seat belt pretensioner(s) from vehicle. For driver air bag (inflator) module, refer to Section 3. For passenger air bag (inflator) module, refer to "ON-VEHICLE SERVICE" in this section. For seat belt pretensioner, refer to Section 10.
- 25) Temporarily store undeployed air bag (inflator) module and/or unactivated seat belt pretensioner referring to "SERVICE PRECAUTIONS" for details.
- 26) Contact your local distributor for further assistance.

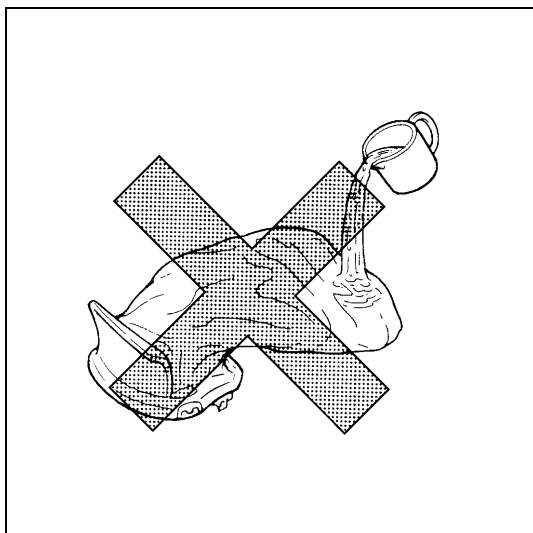
## Deployed Air Bag (Inflator) Module and Activated Seat Belt Pretensioner Disposal

**WARNING:**

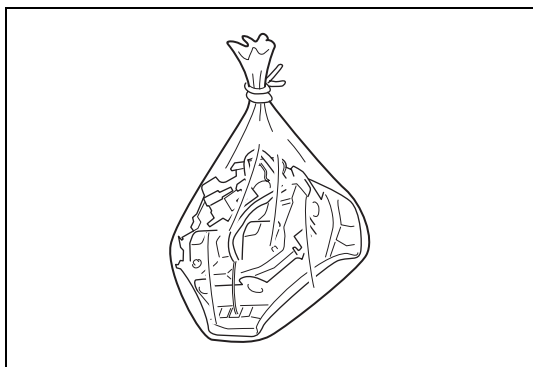
Failure to follow proper air bag (inflator) module and seat belt pretensioner disposal procedures can result in air bag deployment and pretensioner activation which may cause personal injury. Undeployed air bag (inflator) module and inactivated seat belt pretensioner must not be disposed of through normal refuse channels.

Undeployed air bag (inflator) module and inactivated seat belt pretensioner contains substances that can cause severe illness or personal injury if sealed container is damaged during disposal.

Deployed air bag (inflator) module and activated seat belt pretensioner can be disposed of through normal refuse channels just like any other parts. For their disposal, however, following points should be noted.



- Air bag (inflator) module and seat belt pretensioner immediately after deployment/activation is very hot. Wait for 30 minutes to cool it off before handling it.
- Never apply water, oil, etc. to deployed air bag (inflator) module and activated seat belt pretensioner to cool it off and be careful so that water, oil etc. does not get on deployed air bag (inflator) module and activated seat belt pretensioner.
- After air bag (inflator) module has been deployed, surface of air bag may contain a powdery residue. This powder consists primarily of cornstarch (used to lubricate air bag (inflator) module as it inflates) and by-products of chemical reaction. As with many service procedures, you should wear gloves and safety glasses.

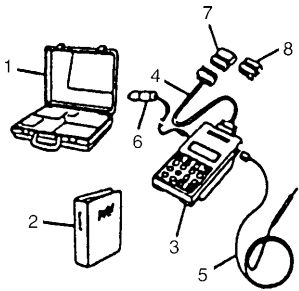
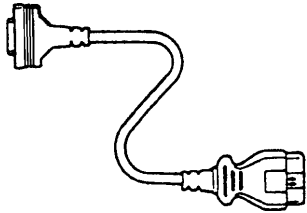
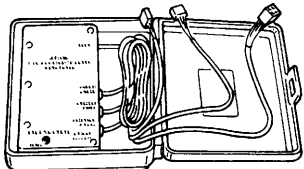
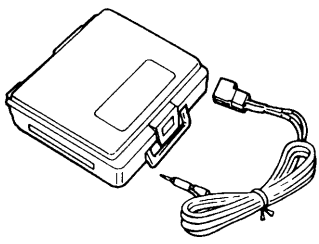
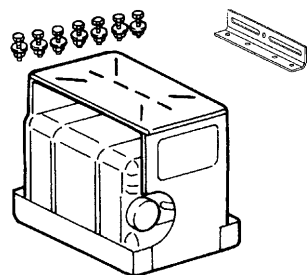
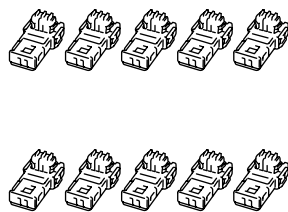
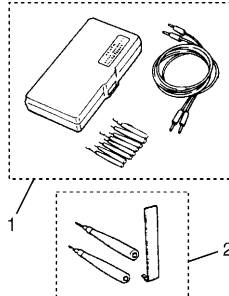
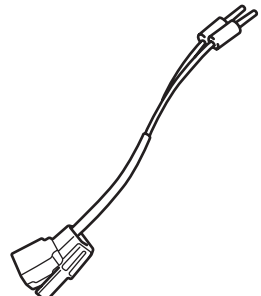


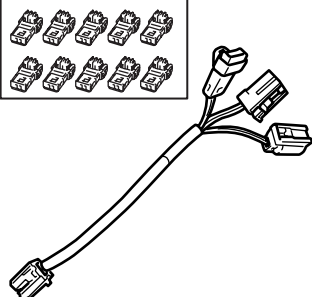
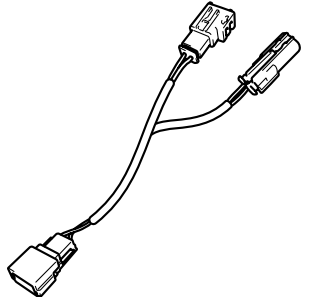
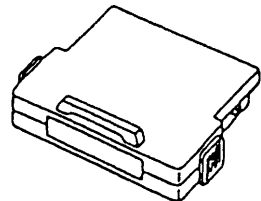
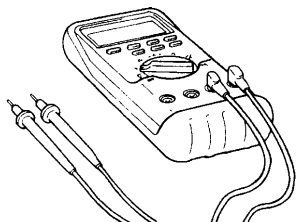
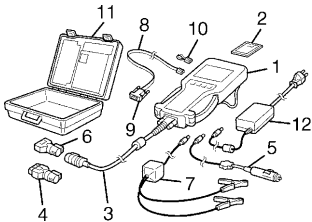
- When disposing of deployed air bag (inflator) module and activated seat belt pretensioner, be sure to seal it in a vinyl bag.
- When air bag (inflator) module and seat belt pretensioner have been deployed/activated inside of vehicle which is going to be scrapped, leave them as installed to vehicle.
- Be sure to wash your hands with mild soap and water after handling it.

## Tightening Torque Specification

Fastening part	Tightening torque		
	N•m	kg-m	lb-ft
SDM mounting bolt	11	1.1	8.0
Passenger air bag (inflator) module bolt	23	2.3	16.5
Side sensor bolt	9	0.9	6.5

## Special Tool

 <p>09931-76011 Tech 1A kit (SUZUKI scan tool) (See NOTE "A".)</p>	 <p>09931-76030 16/14 pin DLC cable for Tech 1A</p>	 <p>09932-75010 Air bag driver/passenger load tool</p>	 <p>09932-75030 Air bag deployment harness</p>
 <p>09932-75041 Passenger air bag (inflator) module deployment fixture</p>	 <p>09932-75410 Spare connector (See NOTE "D".)</p>	 <p>09932-76010 Connector test adapter set (See NOTE "E".)</p>	 <p>09932-78310 Adapter cable</p>

 <p>09932-78331</p> <p>Adapter cable</p>	 <p>09932-78340</p> <p>Adapter cable</p>	 <p>Mass storage cartridge for Tech 1A</p>	 <p>Digital multimeter (See NOTE "B" and WARNING.)</p>
 <p>Tech 2 kit (SUZUKI scan tool) (See NOTE "C".)</p>			

**WARNING:**

Be sure to use the specified digital multimeter. Otherwise, air bag (inflator) module deployment or personal injury may result.

**NOTE:**

- "A" : This kit includes the following items and substitutes for the Tech 2 kit.  
1. Storage case, 2. Operator's manual, 3. Tech 1A, 4. DLC cable, 5. Test lead/probe, 6. Power source cable, 7. DLC cable adapter, 8. Self-test adapter
- "B" : Digital multimeter specification : Maximum test current is 10 mA or less at minimum range of resistance measurement.
- "C" : This kit includes the following items and substitutes for the Tech 1A kit.  
1. Tech 2, 2. PCMCIA card, 3. DLC cable, 4. SAE 16/19 adapter, 5. Cigarette cable, 6. DLC loopback adapter, 7. Battery power cable, 8. RS232 cable, 9. RS232 adapter, 10. RS232 loopback connector, 11. Storage case, 12. Power supply
- "D" : These connectors are spares for adapter cable (09932-78331).
- "E" : This set includes the following items.  
1. Connector test adapter kit (09932-75020), 2. Connector test adapter & shorting bar release tool (09932-76020)

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