

## GENERAL SPECIFICATIONS

Items		Specifications
Model		W5A51-1-E1DD
Type		Electronically controlled 5-speed full-automatic
Torque converter	Type	3-element with torque converter clutch
	Engine stall speed	2100 – 2600 r/min.
Gear ratio	1st	3.789
	2nd	2.057
	3rd	1.421
	4th	1.000
	5th	0.731
	Reverse	3.865
Final gear ratio		3.684
Transfer		0.301
Centre differential		3.684

## SERVICE SPECIFICATIONS

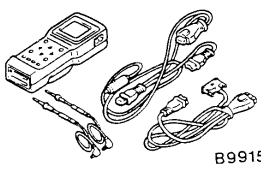
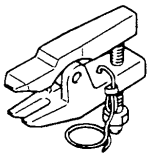
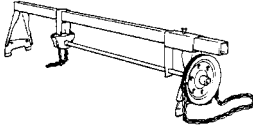
Items		Standard value
Oil temperature sensor kΩ	at 0°C	16.7 – 20.5
	at 100°C	0.57 – 0.69
Input shaft speed sensor resistance [at 20°C] Ω		330-390
Output shaft speed sensor resistance [at 20°C] Ω		330-390
Resistance of damper clutch control solenoid coil [at 20°C] Ω		2.7 – 3.4
Resistance of Low-Reverse solenoid valve coil [at 20°C] Ω		2.7 – 3.4
Resistance of second solenoid valve coil [at 20°C] Ω		2.7 – 3.4
Resistance of underdrive solenoid valve coil [at 20°C] Ω		2.7 – 3.4
Resistance of overdrive solenoid valve coil [at 20°C] Ω		2.7 – 3.4
Resistance of reduction solenoid valve coil [at 20°C] Ω		2.7 – 3.4
Stall speed r/min.		2,100 – 2,600

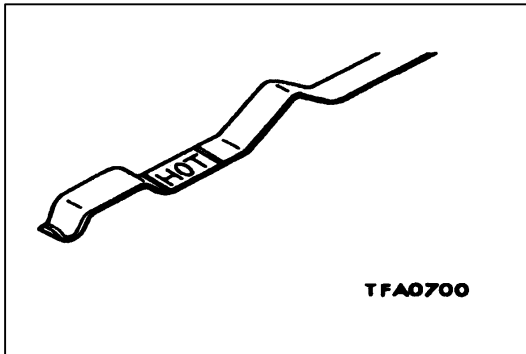
## LUBRICANT

Items	Specified lubricant	Quantity (litres)
Transmission fluid	Mitsubishi ELC4–SP III.	8.8
Transfer case	Hypoid gear oil API classification GL–5 SAE 90	0.62

## SPECIAL TOOLS

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Tool	Tool number and name	Supersession	Application
 B991502	MB991502 MUT-II	–	Checking for diagnosis trouble codes
 B991113	MB991113 Steering linkage puller	13-006	Removal of the tie rod end and the lower arm
 Z203827	E309-A Engine lifter	–	Supporting the engine assembly during removal and installation of the transmission



## ON-VEHICLE SERVICE

### AUTOMATIC TRANSMISSION FLUID CHECK

1. Drive until the fluid temperature reaches the operating temperature 70–80°C.
2. Place vehicle on level floor.
3. Move selector lever sequentially to every position to fill torque converter and hydraulic circuit with fluid, then place lever in “N” Neutral position. This operation is necessary to be sure that fluid level check is accurate.
4. Before removing the oil level gauge, wipe all dirt from area around the oil level gauge. Then take out the oil level gauge and check the condition of the fluid. Further investigation of the transmission is necessary if,
  - the fluid smells burnt.
  - the fluid colour is brown or black.
  - metal particles can be seen or felt on the dipstick.
5. Check to see if fluid level is in “HOT” range on oil level gauge. If fluid level is low, add ATF until level reaches “HOT” range.

#### NOTE

Low fluid level can cause a variety of conditions because it allows the pump to take in air along with fluid. Air trapped in the hydraulic circuit forms bubbles which make the fluid spongy.

Therefore, pressures will be erratic.

Improper filling can also raise fluid level too high. When the transmission has too much fluid, gears churn up foam and cause the same conditions which occur with low fluid level, resulting in accelerated deterioration of ATF. In either case, air bubbles can cause overheating, fluid oxidation, which can interfere with normal valve, clutch, and servo operation. Foaming can also result in fluid escaping from the transmission vent where it may be mistaken for a leak.

6. Be sure to examine the fluid on the oil level gauge closely.

## AUTOMATIC TRANSMISSION FLUID REPLACEMENT

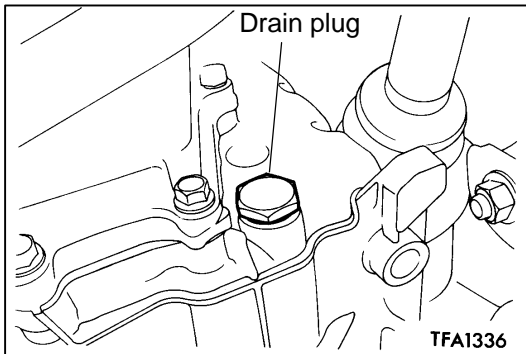
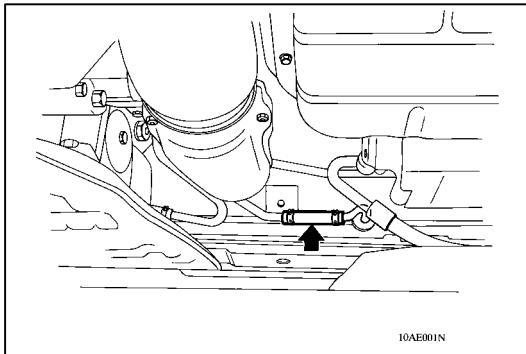
With the ATF at normal operating temperature, replace the ATF using the following procedure.

1. Remove the right hand hose connecting the transmission oil cooler pipe to the oil cooler (built in to the bottom of the radiator).
2. Connect a suitable length of hose from the radiator cooler pipe to an oil drain receptacle, large enough to hold the quantity of discharged fluid.
3. Start the engine and discharge the ATF.  
Operating conditions: "N" Neutral gear and idling.

### Caution

**Start the engine and then stop it within one minute. If the ATF is discharged before the one minute elapses, stop the engine at that time.**

**Amount of ATF discharged: Approximately 4.5 (litres)**



4. Remove the drain plug at the bottom of the transmission case and discharge the ATF.

**Amount of ATF discharged: Approximately 1.0 (litre)**

5. Install the drain plug and gasket, and tighten to the specified torque.

**Tightening torque: 32 Nm**

6. Fill with new ATF through the oil filler tube.

**Amount of ATF added: Approximately 5.5 (litres)**

### NOTE

Stop pouring if the entire amount of new ATF cannot be added. (Do not exceed "COLD" level)

7. Repeat the procedure in step (3) and discharge approximately 3.0 litres of ATF.

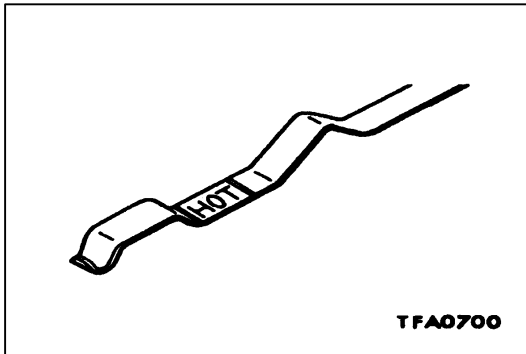
### NOTE

Check the ATF discharged in step (8) for contamination. If it is contaminated, repeat steps (7) and (8).

8. Add the new ATF through the oil filler tube.

**Amount of ATF added: Approximately 3.0 (litres)**

9. Attach and secure the hose that was disconnected in step (1) and securely insert the oil level gauge.
10. Start the engine and let it idle for one or two minutes.
11. Move the selector lever through all gear positions, ending in Neutral position.



12. Make sure the ATF reaches the “COLD” mark on the oil level gauge. If there is not enough ATF, add more.
13. Drive the car until the ATF temperature reaches normal 70–80°C and recheck the ATF level. The ATF must be within the “HOT” range.

#### NOTE

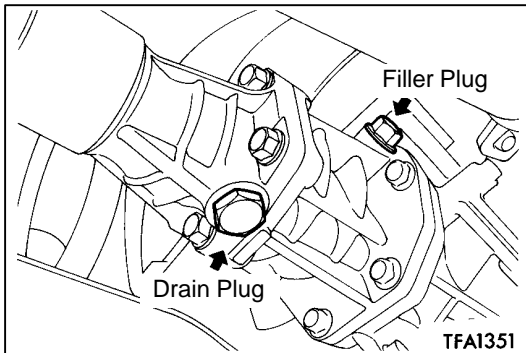
The “COLD” level is for reference only and the “HOT” level serves as the standard.

14. Securely insert the oil level gauge into the filler tube.

### TRANSFER CASE OIL CHECK

1. Remove the oil filler plug
2. Check whether oil is up to the lowest edge of the filler plug hole.
3. Check oil is not extremely dirty and has suitable viscosity.
4. Fit the oil filler plug and tighten to the specified torque.

**Tightening torque: 32 Nm**

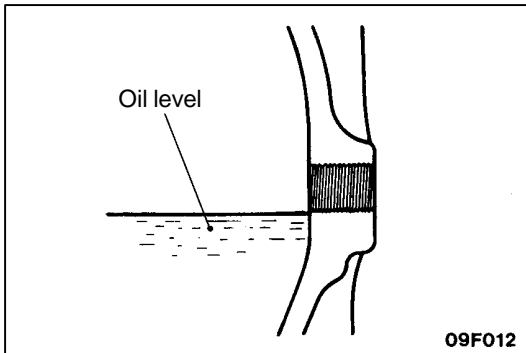


### TRANSFER CASE OIL REPLACEMENT

1. Remove the oil drain plug and drain the oil.
2. Fit the oil drain plug and tighten to the specified torque.

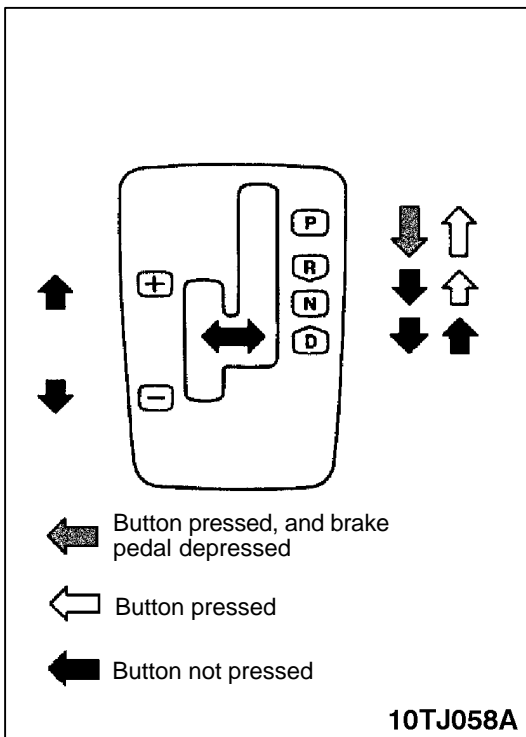
**Tightening torque: 32 Nm**

3. Remove the oil filler plug and fill the transfer case up to the lower edge of the filler plug.



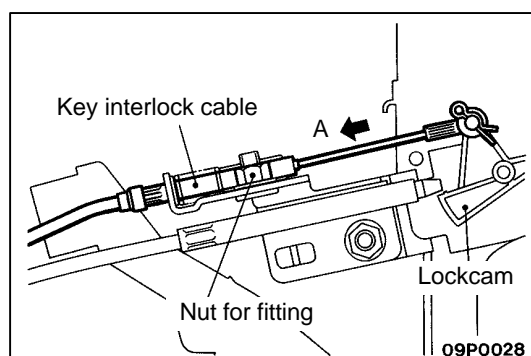
### SELECTOR LEVER OPERATION CHECK

1. Shift the selector lever to each range and check that the lever moves smoothly and clicks into position. Check that the position indicator is correct.
2. Check to be sure the selector lever can be shifted to each position (by button operation as shown in the illustration).
3. Start the engine and check if the vehicle moves forward when the selector lever is shifted from N to D, and moves backward when shifted to R.
4. When the shift lever malfunctions, adjust control cable and selector lever sleeve. Check for worn shift lever assembly sliding parts.



## KEY INTERLOCK STRUCTURE CHECK

Order of check	Check conditions		Checking details (normal conditions)
1	Full brake pedal stroke	Ignition key position: "LOCK"	The push button of the selector lever cannot be pushed. The lever cannot be operated from "P" position to another position.
2		Ignition key position: "ACC"	After pushing the push button of the selector lever, the lever can be operated from "P" position to another position.
3	No brake pedal stroke	Selector lever: Other than "P"	The ignition key does not turn to "LOCK" position.
4		Selector lever: "P"	The ignition key turns to "LOCK" position smoothly.

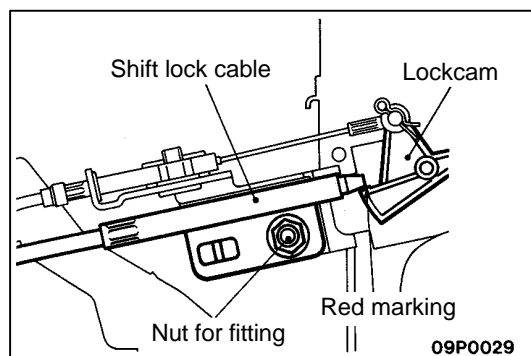


Adjust the key interlock cable as follows when the operations mentioned above do not work.

1. Remove the floor console. (Refer to Group 52A)
2. Position the selector lever at "P".
3. Position the ignition key at "LOCK".
4. Loosen the nut at the key interlock cable.
5. Tighten the nut while pushing the cable connection part of the lockcam towards the arrow A direction lightly.
6. Install the floor console.

## SHIFT LOCK STRUCTURE CHECK

Order of check	Check conditions		Checking details (normal conditions)
1	No brake pedal stroke	Ignition key position: "ACC"	The push button of the selector lever cannot be pushed. The lever cannot be operated from "P" position to another position.
2	Full brake pedal stroke		After pushing the push button of the selector lever, the lever can be operated from "P" position to another position smoothly.
3	No brake pedal stroke		After pushing the button of the selector lever, the lever can be operated from "R" position to "P" position smoothly.



Adjust the key interlock cable as follows when the operations mentioned above do not work.

1. Remove the floor console. (Refer to Group 52A)
2. Position the selector lever at "P".
3. Loosen the nut at the shift lock cable.
4. Tighten the nut at the position where the tip of the shift lock cable is above the red marking part of the lockcam.
5. Install the floor console.

# TRANSMISSION CONTROL

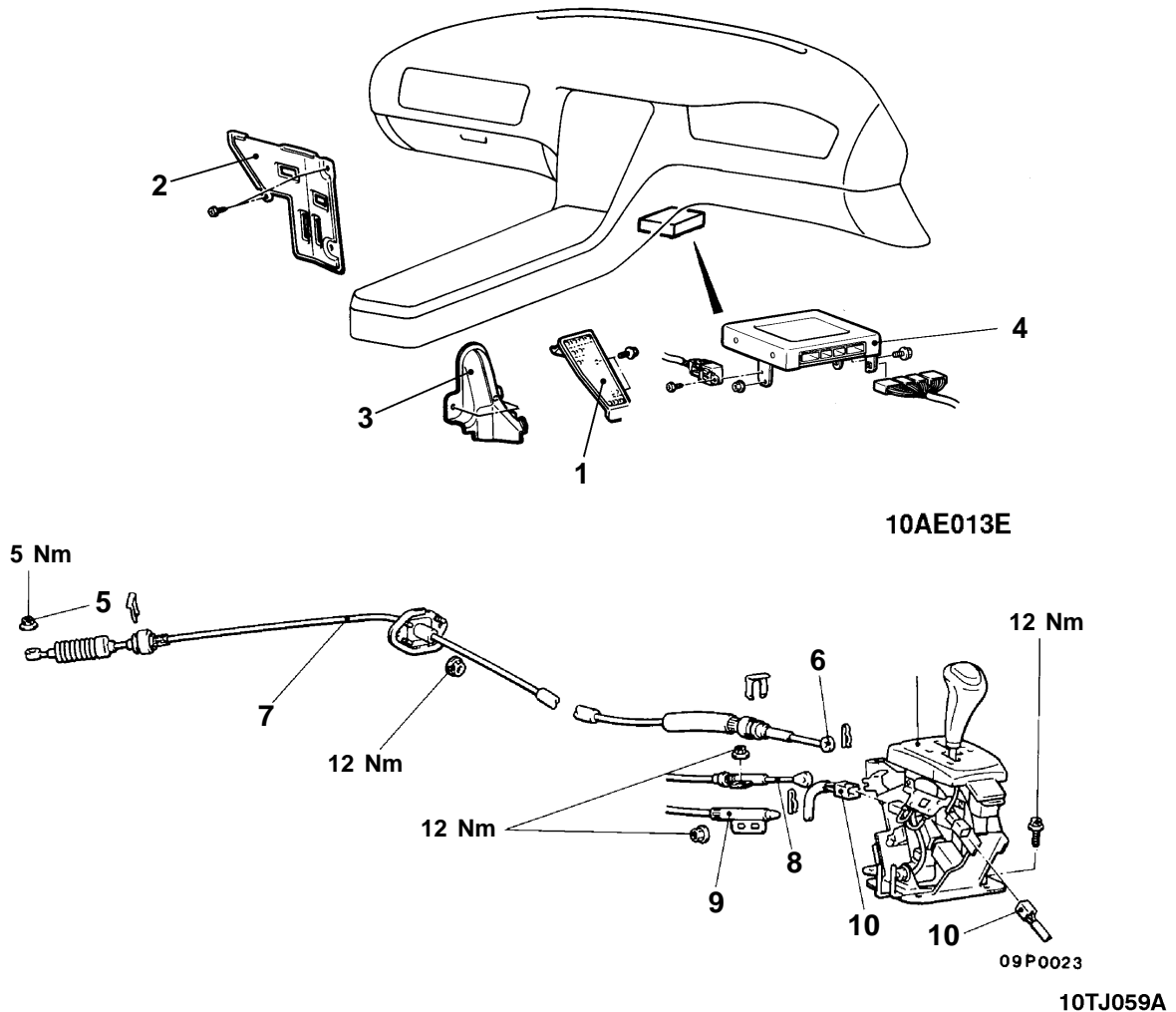
## REMOVAL AND INSTALLATION

### Pre-removal and Post-installation Operation

- (1) Air Cleaner Assembly Removal and Installation
- (2) Front Floor Console Removal and Installation  
(Refer [GROUP 52A](#))

### Caution: SRS

Be careful not to subject the SRS-ECU to any shocks during removal and installation of the transmission control cable, key interlock cable, shift interlock cable and selector lever assembly.



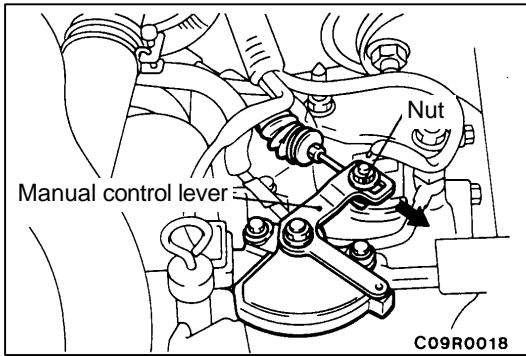
### Transmission control cable assembly removal steps

1. Foot rest
2. Floor carpet front reinforcements (LH and RH)
3. Harness protector
4. Engine-A/T-ECU and A/T control relay
5. Nut
6. Connection of the transmission control cable

7. Transmission control cable assembly

### Selector lever assembly removal steps

6. Connection of transmission control cable assembly
8. Connection of key interlock cable
9. Connection of shift lock cable
10. Harness connector
11. Selector lever assembly



## INSTALLATION SERVICE POINT

### ▶A◀ NUT INSTALLATION

1. Put the selector lever in the “N” position.
2. Loosen the adjusting nut, gently pull the transmission control cable in the direction of the arrow and tighten the nut.

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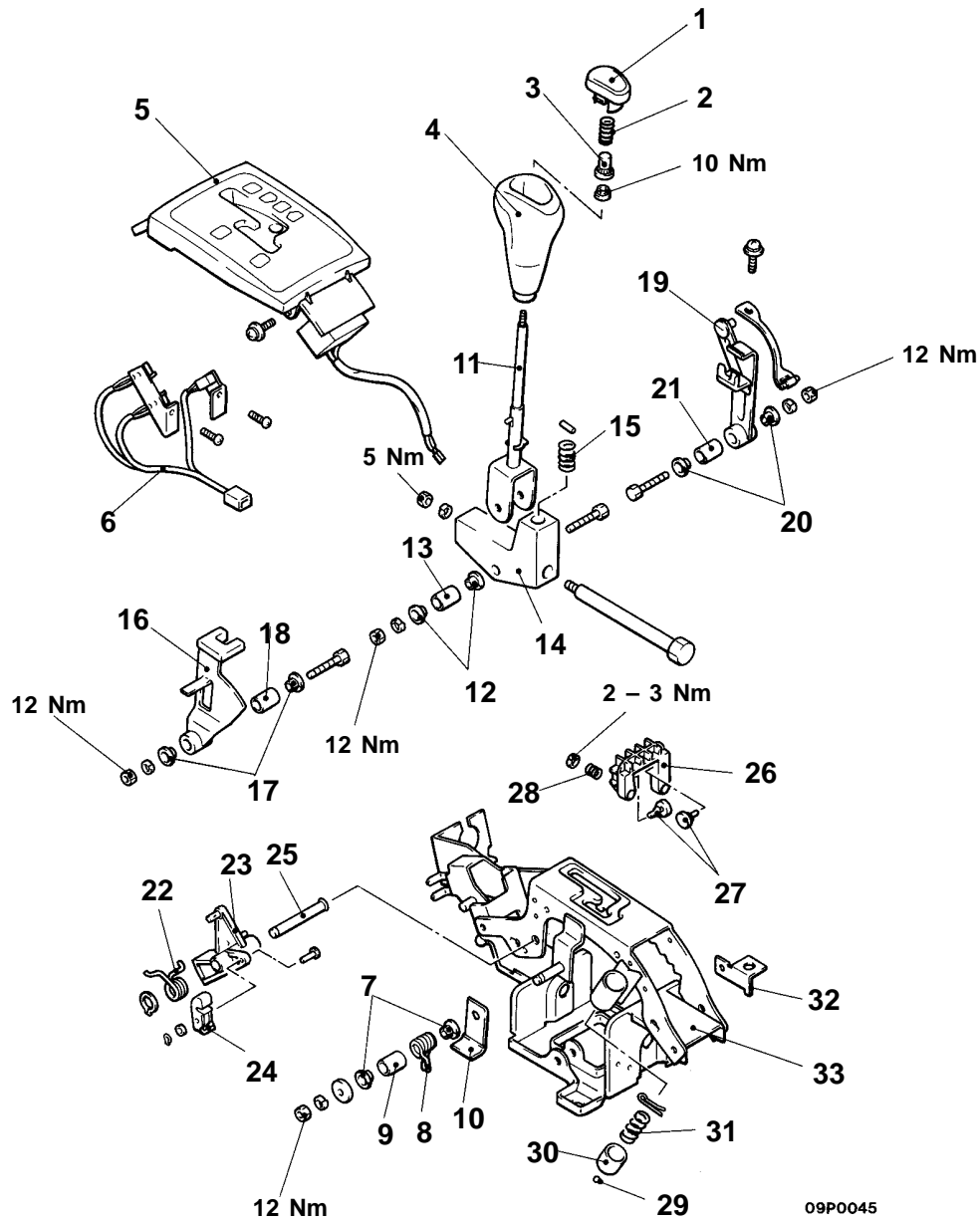


# SELECTOR LEVER ASSEMBLY

## DISASSEMBLY AND REASSEMBLY

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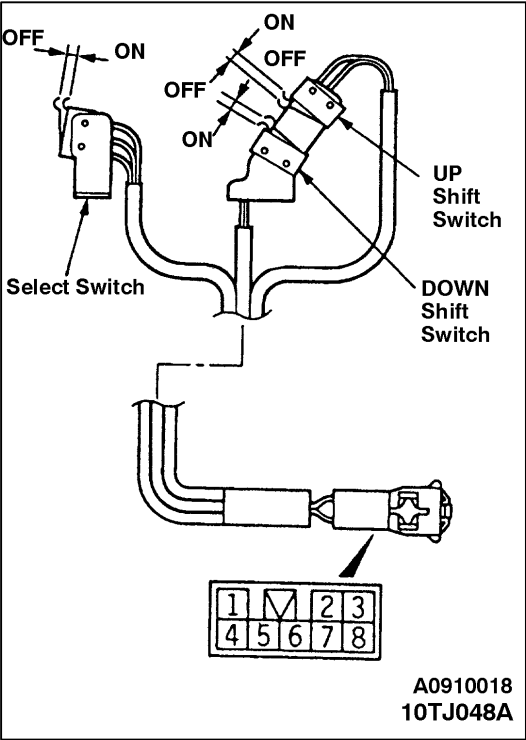
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### Disassembly steps

1. Push button
2. Spring
3. Cap
4. Shift Knob
5. Indicator panel assembly
6. Manual control switch assembly
7. Bush
8. Return spring
9. Pipe
10. Bracket
11. Lever
12. Shift bush
13. Pipe
14. Select lever
15. Spring
16. Manual lever
17. Shift bush
18. Pipe
19. Cable lever
20. Shift bush
21. Pipe
22. Detent spring assembly
23. Lockcam A
24. Lockcam B
25. Clevis pin
26. Guard block
27. Stopper
28. Compression spring
29. Ball
30. Ball stopper
31. Spring
32. Cable bracket
33. Bracket assembly



CHECKING MANUAL CONTROL SWITCH  
ASSEMBLY CIRCUIT.

Switch Position		Terminal No.					
		1	3	4	5	7	8
(UP) Shift Switch	ON		○			○	
	OFF						
(DOWN) Shift Switch	ON		○				○
	OFF						
Select Switch	AUTO	○			○		
	SPORT	○		○			

# TRANSMISSION SHIFT LOCK

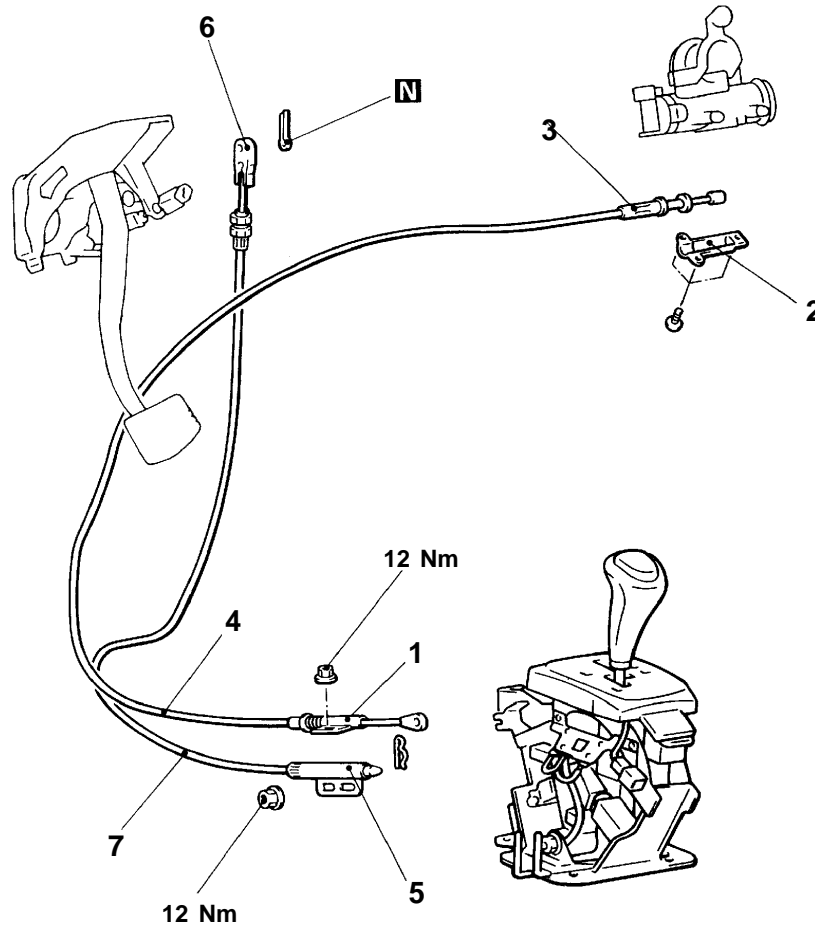
## REMOVAL AND INSTALLATION

### Pre-removal and Post-installation Operation

- (1) Front Floor Console Removal and Installation (Refer [GROUP 52A](#))
- (2) Instrument Panel Lower Cover Assembly Removal and Installation (Refer [GROUP 52A](#))

### Caution: SRS

Be careful not to subject the SRS-ECU to any shocks during removal and installation of the transmission control cable, key interlock cable, shift interlock cable and selector lever assembly.



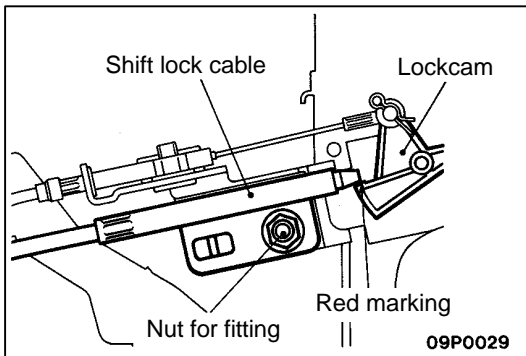
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### Key interlock cable removal steps

- ▶C◀ 1. Connection of key interlock cable (selector lever side)
- 2. Cover
- ▶B◀ 3. Connection of key interlock cable (steering lock cylinder side)

### Shift lock cable removal steps

- ▶A◀ 5. Shiftlock cable (selector lever side)
- 6. Shiftlock cable (brake pedal side)
- 7. Shiftlock cable



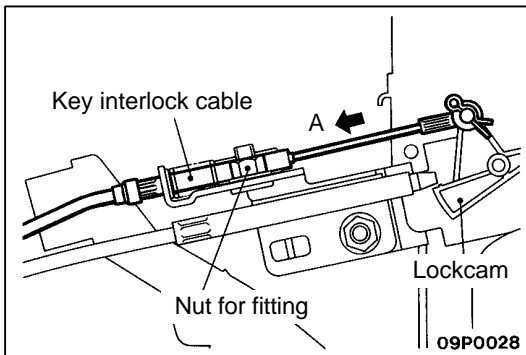
## TRANSMISSION SHIFT LOCK

### ◀A▶ INSTALLATION OF SHIFT LOCK CABLE (SELECTOR LEVER SIDE)

1. Position selector lever at "P".
2. Fix shift lock cable at the position where the tip of the shift lock cable is above the red marking part of the lockcam.

### ◀B▶ INSTALLATION OF KEY INTERLOCK CABLE (STEERING LOCK CYLINDER SIDE)

Position the ignition key at "LOCK", and install the key interlock cable.



### ◀C▶ INSTALLATION OF KEY INTERLOCK CABLE

1. Install the key interlock cable to the lockcam.
2. Install the spring and washer of the key interlock cable.
3. Fix the key interlock cable by tightening the nut while pushing the lockcam cable connection part to A direction.

## TRANSMISSION ASSEMBLY

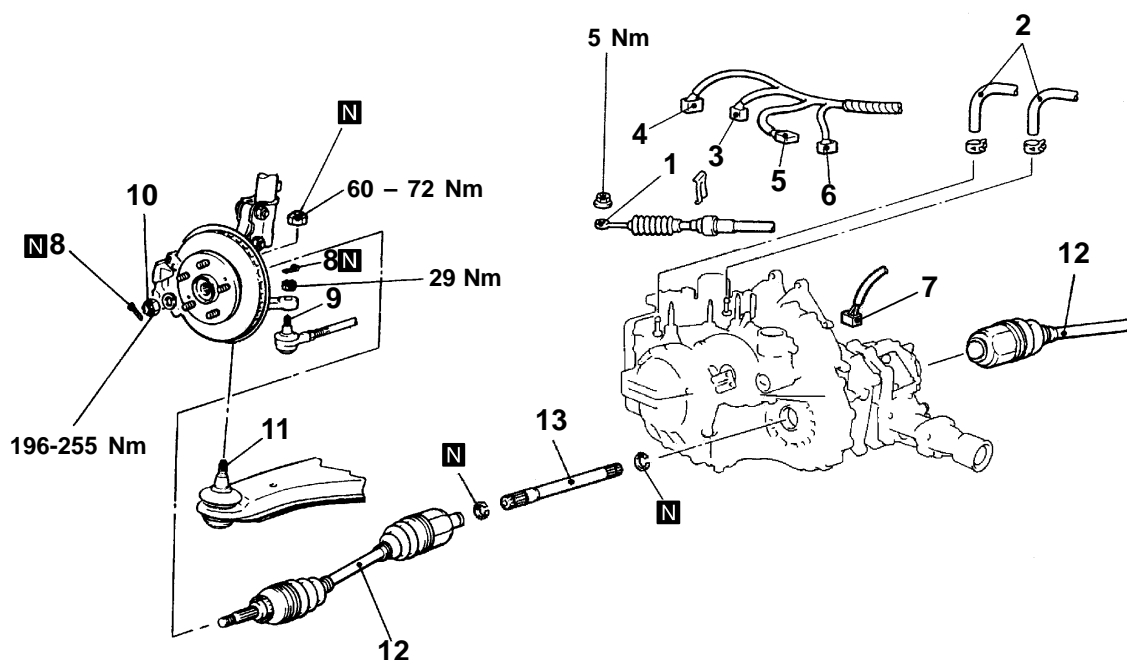
## REMOVAL AND INSTALLATION

**Pre-removal Operation**

- (1) Transmission Fluid Draining  
(Refer [Fluid Replacement.](#))
- (2) Under Cover Removal
- (3) Battery and Battery Tray Removal
- (4) Air Cleaner Assembly Removal

**Post-installation Operation**

- (1) Air Cleaner Assembly Installation
- (2) Battery and Battery Tray Installation
- (3) Under Cover Installation
- (4) Transmission Fluid Supplying  
(Refer [Fluid Replacement.](#))
- (5) Selector Lever Operation Check
- (6) Speedometer Operation Check



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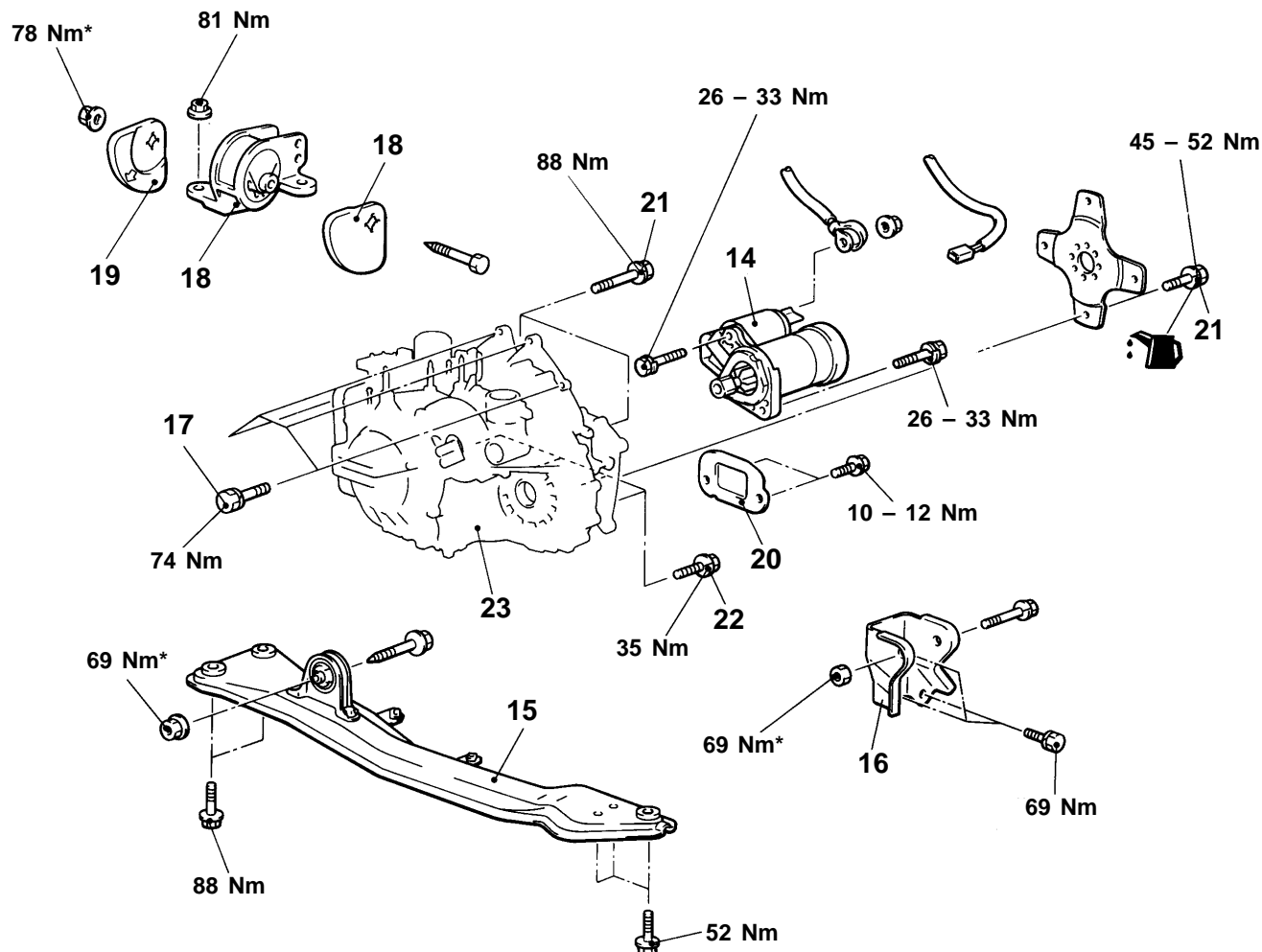
**Removal steps**

1. Transmission control cable connection
2. Transmission oil cooler hoses connection
3. Inhibitor switch connector
4. A/T control solenoid valve connector
5. Input shaft speed sensor connector
6. Output shaft speed sensor connector



7. Vehicle speed sensor connector
8. Split pin
9. Connection of the tie rod end
10. Drive shaft nut
11. Connection for the lower arm ball joint
12. Drive shaft and inner shaft assembly (RH) and the drive shaft (LH)
13. Output shaft

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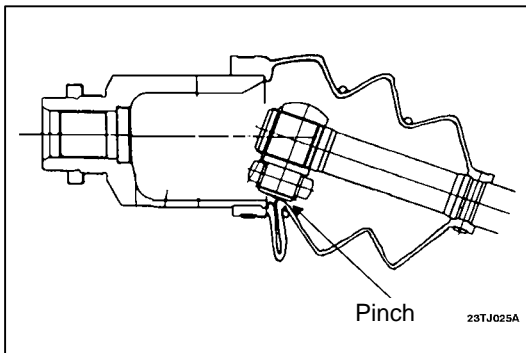
### Lifting up of the vehicle

- 14. Starter motor
- 15. Centre member assembly
- 16. Rear roll stopper bracket
- 17. Transmission upper portion fixing bolt
- 18. Transmission mounting bracket
- 19. Transmission mount stopper
  - Support the engine and transmission assembly
- 20. Bell housing cover

- 21. Drive plate attaching bolt
- 22. Transmission lower portion fixing bolt
- 23. Transmission assembly

### Caution

Mounting locations marked by \* should be provisionally tightened, and then fully tightened when the body is supporting the full weight of the engine.



## REMOVAL SERVICE POINTS

### ◀A▶ DRIVE SHAFT DISCONNECTION

1. The RH inner drive shaft joint boot is made of silicone rubber for improved heat resistance due to the close proximity to the exhaust pipe. This material is more susceptible to damage than the conventional rubber boot material. Therefore, care should be taken not to over extend or bend the joint when handling as internal components of the joint can pinch/split the inside of the boot.

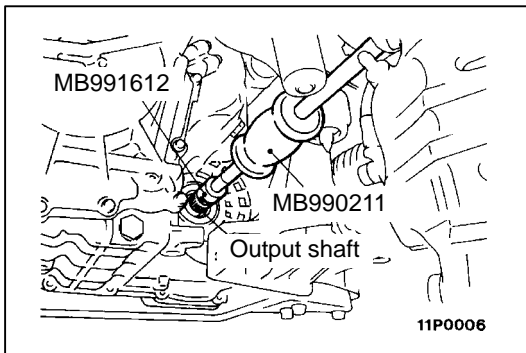
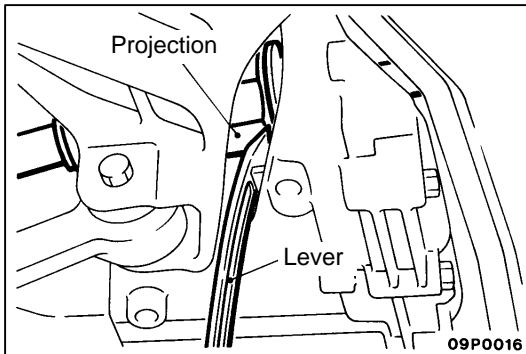
2. Insert a pry bar between the transmission case and the drive shaft as shown to remove the drive shaft.

#### NOTE

Do not remove the hub and knuckle from the drive shaft.

#### Caution

Always use a pry bar, or the ball joint will be damaged.

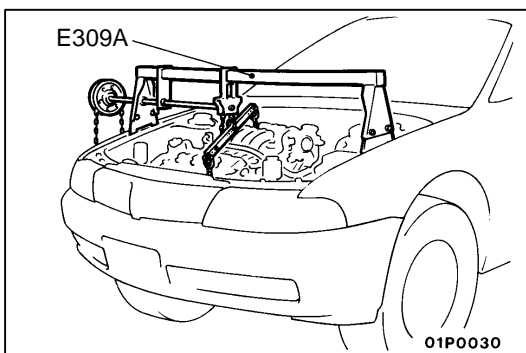


### ◀B▶ OUTPUT SHAFT REMOVAL

1. Remove the out put shaft using the special tools, MB991612, MB990211.
2. Cover the transmission case using the special tool to prevent foreign material entering the transmission.
3. Suspend the removed drive shaft with a wire so that there are no sharp bends in any of the joints.

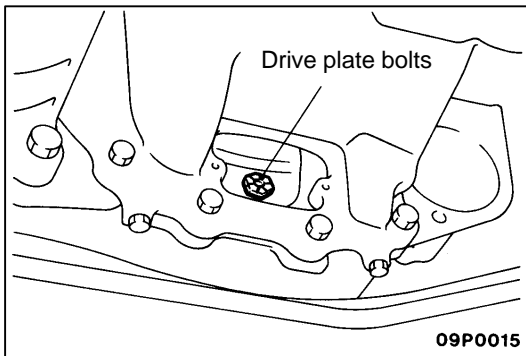
### ◀C▶ TRANSMISSION MOUNT BRACKET REMOVAL

Jack up the transmission assembly gently with a garage jack, and then remove the transmission mounting.



### ◀D▶ ENGINE ASSEMBLY SUPPORTING

Set the special tool to the vehicle to support the engine assembly.



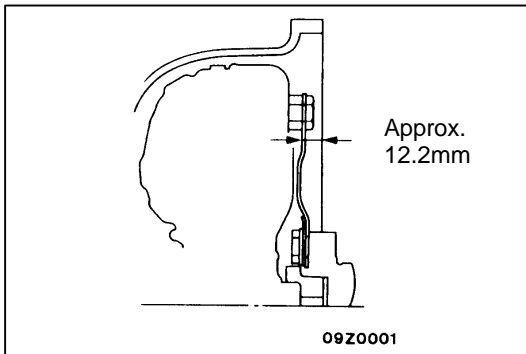
## ◀E▶ DRIVE PLATE BOLTS/TRANSMISSION ASSEMBLY LOWER PART COUPLING BOLTS/TRANSMISSION ASSEMBLY REMOVAL

1. Support the transmission assembly by using a transmission jack.
2. Remove the drive plate bolts while turning the crank shaft.
3. Press in the torque converter to the transmission side so that the torque converter does not remain on the engine side.
4. Remove the transmission assembly lower bolts and lower the transmission assembly.

## INSTALLATION SERVICE POINTS

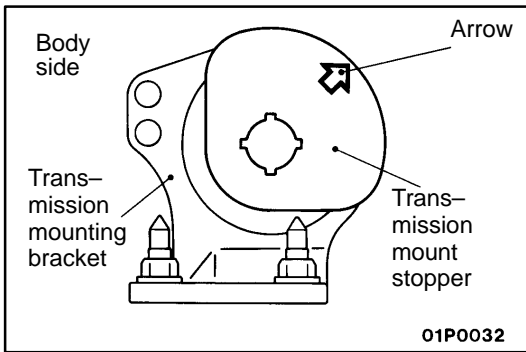
### ▶A◀ TRANSMISSION ASSEMBLY INSTALLATION

After securely inserting the torque converter into the transmission side so that the shown dimension is approx. 12.2 mm, install the transmission assembly to the engine.



### ▶B◀ TRANSMISSION MOUNT STOPPER INSTALLATION

Install the transmission mount stopper so that the arrow mark points as shown in the illustration.



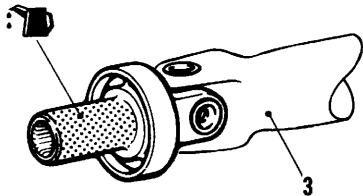


## TRANSFER ASSEMBLY

## REMOVAL AND INSTALLATION

**Pre-removal and Post installation Operations**

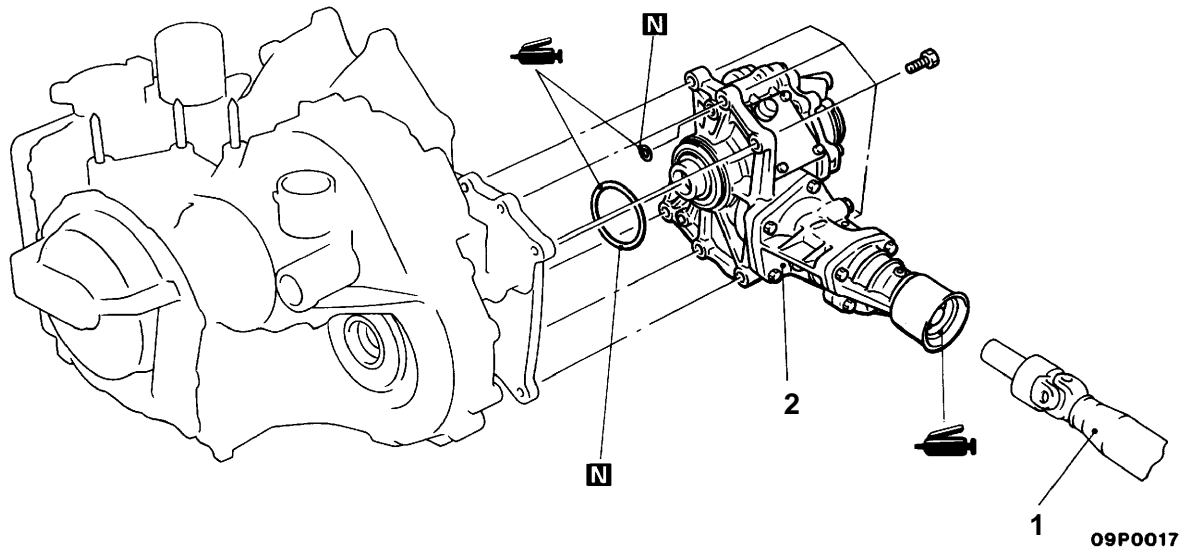
- (1) Transmission Fluid Sampling and Supplying (Refer [Fluid Replacement](#).)
- (2) Transfer Oil Sampling and Supplying
- (3) Front Exhaust Pipe Removal and Installation (Refer to GROUP 15)



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**Gear oil:**

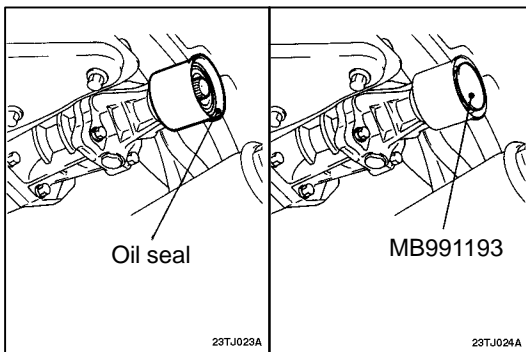
Mitsubishi pure dia-queen super hypoid gear oil (GL – 5).

**Removal steps**

- Drive shaft (Refer GROUP 23)
- 1. Front propeller shaft (Refer to GROUP 25)



2. Transfer assembly

**REMOVAL SERVICE POINTS****◀A▶ REMOVAL OF TRANSFER ASSEMBLY****Caution**

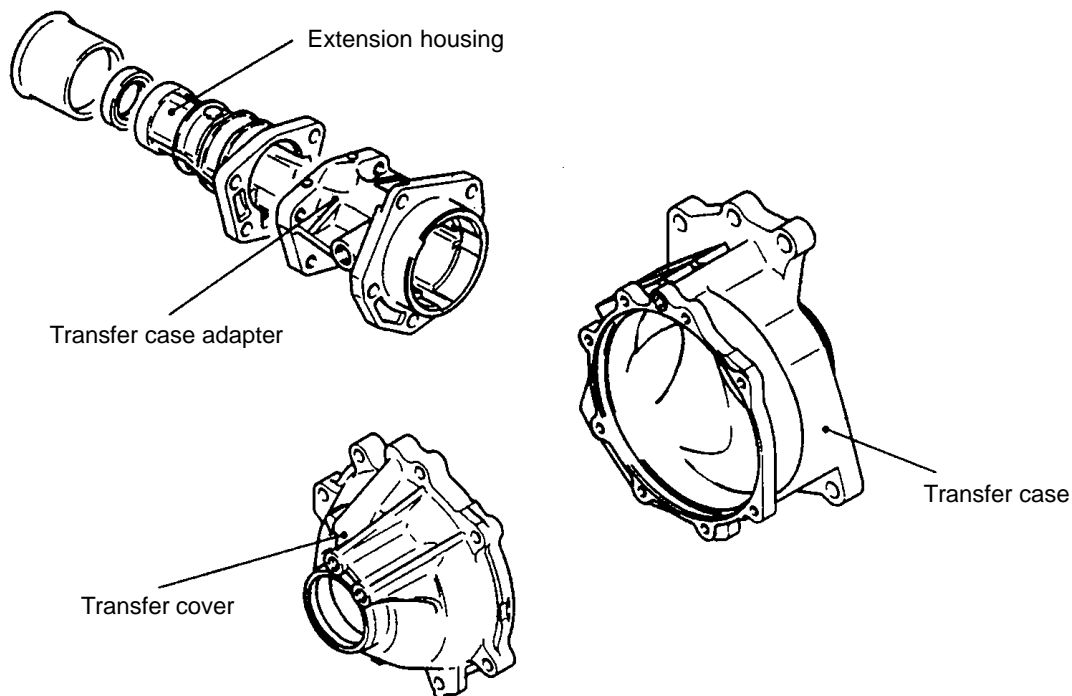
1. Take care not to damage the oil seal lip part of the transfer.
2. Cover transfer with special tool to prevent oil flowing out and the entry of foreign material.

## GENERAL INFORMATION

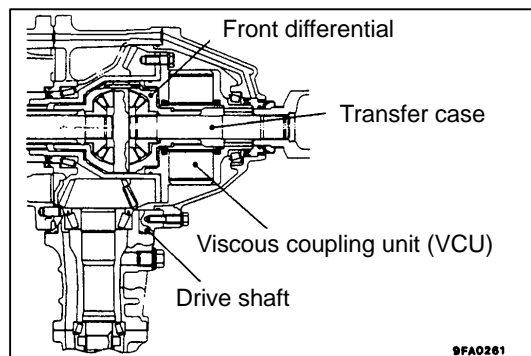
Because the viscous coupling unit (VCU) of the centre differential and the front differential are placed in the transfer case, a larger case has been employed. The case is made of aluminium die cast

to lower its weight and has a minimum number of ribs placed in optimum places to reduce weight and increase rigidity.

## CONSTRUCTION DIAGRAM



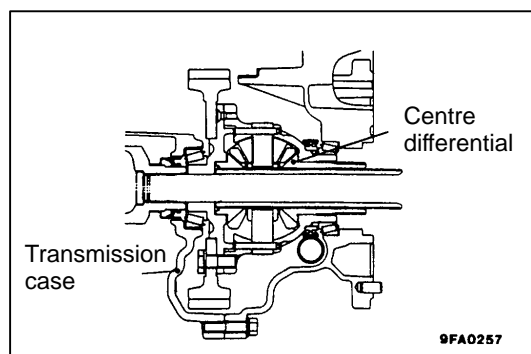
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## POWER TRAIN

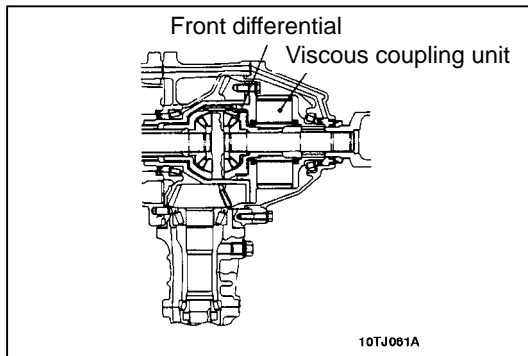
### FRONT DIFFERENTIAL

A bevel type differential is used in the W5A51 transmission.



### CENTRE DIFFERENTIAL

The location of the centre differential for AWD vehicles is the same as that of the front differential for 2WD vehicles.



### VISCOUS COUPLING UNIT (VCU)

A viscous coupling unit (VCU) is installed at the rear of the front differential in order to limit the slip of the centre differential.

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