HOW TO USE THIS MANUAL

RANGE OF TOPICS

AME201000001A01

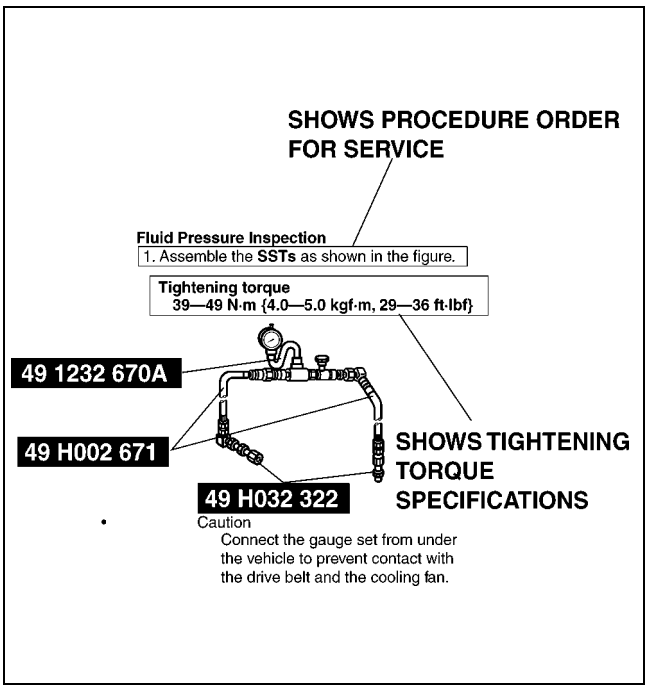
- This manual contains procedures for performing all required service operations. The procedures are divided into the following five basic operations:
  — Removal/Installation
  — Disassembly/Assembly
  — Replacement
  — Inspection
  — Adjustment
- Simple operations which can be performed easily just by looking at the vehicle (i.e., removal/installation of parts, jacking, vehicle lifting, cleaning of parts and visual inspection) have been omitted.

SERVICING PROCEDURE

AME201000001A02

Inspection, Adjustment

- Inspection and adjustment procedures are divided into steps. Important points regarding the location and contents of the procedures are explained in detail and shown in the illustrations.



XME2010001

Repair Procedure

1. Most repair operations begin with an overview illustration. It identifies the components, shows how the parts fit together, and describes visual part inspection. However, only removal/installation procedures that need to be performed methodically have written instructions.
2. Expendable parts, tightening torques, and symbols for oil, grease, and sealant are shown in the overview illustration. In addition, symbols indicating parts requiring the use of special service tools or equivalent are also shown.

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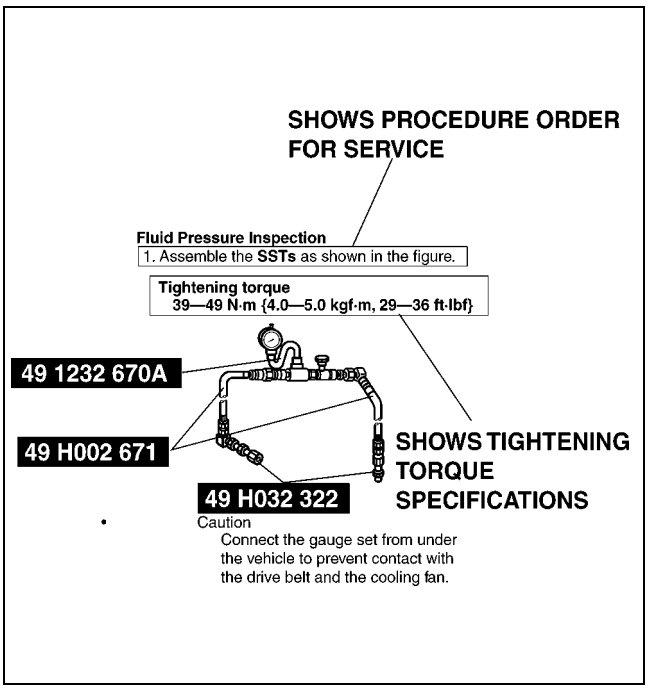

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New Standard		Previous Standard		Remark
Abbreviation	Name	Abbreviation	Name	
—	Output Speed Sensor	—	Vehicle Speed Sensor 1	
OC	Oxidation Catalytic Converter	—	Catalytic Converter	
O2S	Oxygen Sensor	—	Oxygen Sensor	
PNP	Park/Neutral Position	—	Park/Neutral Range	
—	PCM Control Relay	—	Main Relay	#6
PSP	Power Steering Pressure	—	Power Steering Pressure	
PCM	Powertrain Control Module	ECU	Engine Control Unit	#4
—	Pressure Control Solenoid	—	Line Pressure Solenoid Valve	
PAIR	Pulsed Secondary Air Injection	—	Secondary Air Injection System	Pulsed injection
—	Pump Speed Sensor	—	NE Sensor	#6
AIR	Secondary Air Injection	—	Secondary Air Injection System	Injection with air pump
SAPV	Secondary Air Pulse Valve	—	Reed Valve	
SFI	Sequential Multipoint Fuel Injection	—	Sequential Fuel Injection	
—	Shift Solenoid A	—	1-2 Shift Solenoid Valve	
		—	Shift A Solenoid Valve	
—	Shift Solenoid B	—	2-3 Shift Solenoid Valve	
		—	Shift B Solenoid Valve	
—	Shift Solenoid C	—	3-4 Shift Solenoid Valve	
3GR	Third Gear	—	3rd Gear	
TWC	Three Way Catalytic Converter	—	Catalytic Converter	
TB	Throttle Body	—	Throttle Body	
TP sensor	Throttle Position Sensor	—	Throttle Sensor	
TCV	Timer Control Valve	TCV	Timing Control Valve	#6
TCC	Torque Converter Clutch	—	Lockup Position	
TCM	Transmission (Transaxle) Control Module	—	ECAT Control Unit	
—	Transmission (Transaxle) Fluid Temperature Sensor	—	ATF Thermosensor	
TR	Transmission (Transaxle) Range	—	Inhibitor Position	
TC	Turbocharger	—	Turbocharger	
VSS	Vehicle Speed Sensor	—	Vehicle Speed Sensor	
VR	Voltage Regulator	—	IC Regulator	
VAF sensor	Volume Air Flow Sensor	—	Air flow Sensor	
WUTWC	Warm Up Three Way Catalytic Converter	—	Catalytic Converter	#5
WOT	Wide Open Throttle	—	Fully Open	

#1 : Diagnostic trouble codes depend on the diagnostic test mode
#2 : Controlled by the PCM
#3 : In some models, there is a fuel pump relay that controls pump speed. That relay is now called the fuel pump relay (speed).
#4 : Device that controls engine and powertrain
#5 : Directly connected to exhaust manifold
#6 : Part name of diesel engine

AUTOMATIC TRANSAXLE DESCRIPTION

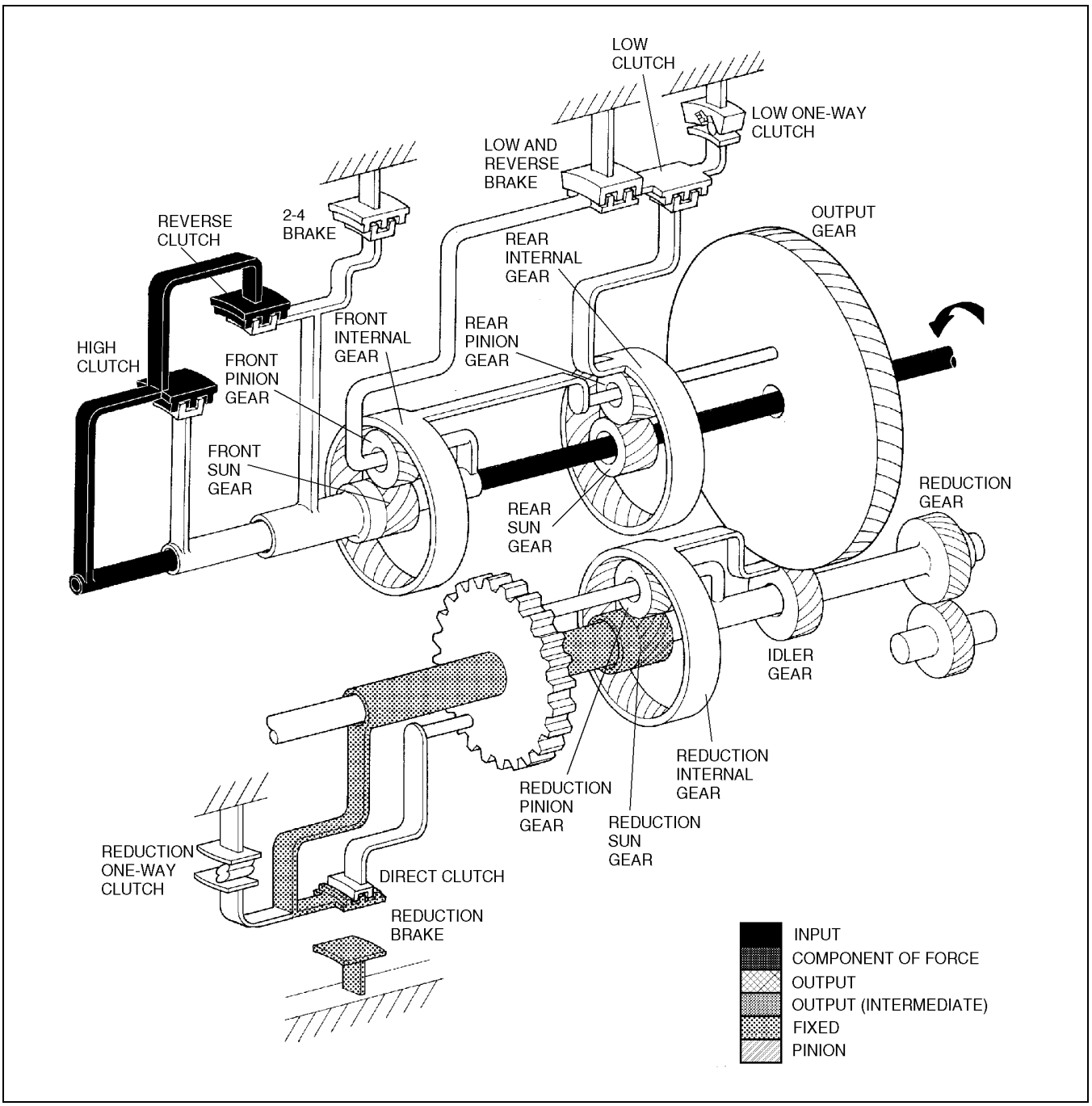
AME561401030A04

Gear Position and Operation of Featured Parts

Position/Renge	Mode	Gear position	Engine braking effect	Low clutch	2-4 brake	High clutch	Reveres clutch	Low and reverse brake	Reduction brake	Direct clutch	Low one-way clutch	Reduction one-way clutch	Solenoid valve				
													Shift solenoid A	Shift solenoid B	Shift solenoid C	Reduction timing solenoid	Neutral shift solenoid
P	—	—	—						○				○	○	○		
R	—	—	Yes				○	○	○				○	○	○		
	R INH	—	No				○		○				○	○	○		○
N	—	—	—						○				○	○	○		
D	HOLD switch OFF	1GR	No	○							●	●	○	○	○	○	
		2GR	No	○	○							●	○	○		○	
		3GR	No	○		○						●		○		○	
		4GR	No		○	○						●			○	○	
		5GR	Yes		○	○				○			○		○	○	
	HOLD switch ON	2GR	No	○	○							●	○	○		○	
		3GR	No	○		○						●		○		○	
		4GR	Yes		○	○			○						○		
		5GR	Yes		○	○				○			○		○	○	
S	HOLD switch OFF	1GR	No	○							●	●	○	○	○	○	
		2GR	No	○	○							●	○	○		○	
		3GR	No	○		○						●		○		○	
		4GR	Yes		○	○			○						○		
		5GR	Yes		○	○				○			○		○	○	
	HOLD switch ON	2GR	No	○	○							●	○	○		○	
		3GR	Yes	○		○			○					○			
		4GR	Yes		○	○			○						○		
		5GR	Yes		○	○				○			○		○	○	
L	HOLD switch OFF	1GR	No	○							●	●	○	○	○	○	
		2GR	No	○	○							●	○	○		○	
		3GR	Yes	○		○			○					○			
		4GR	Yes		○	○			○						○		
		5GR	Yes		○	○				○			○		○	○	
	HOLD switch ON	2GR	Yes	○	○				○				○	○			
		3GR	Yes	○		○			○					○			
		4GR	Yes		○	○			○						○		
		5GR	Yes		○	○				○			○		○	○	

○: Operating
●: Transmits the torque only when driving

AME5714W019



AMU0517A504

Reduction one-way clutch
Structure

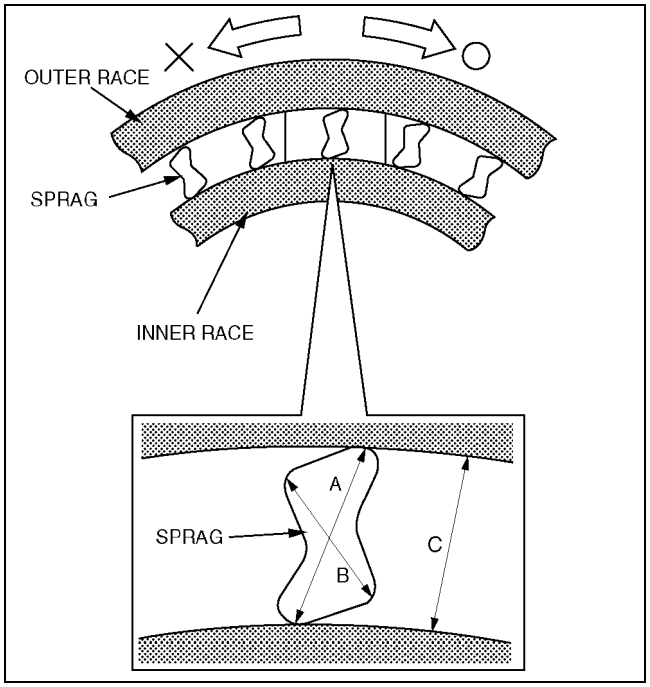
- The reduction one-way clutch counterclockwise rotation (seen from the side cover side) of the reduction sun gear.
- The reduction one-way clutch outer race is integrated on contact with direct clutch drum, and the reduction one-way clutch inner race is fixed to the transaxle case.

Operation

- The reduction one-way clutch outer race (reduction sun gear) rotates clockwise (seen from the side cover) freely, but the sprags rise to lock the rotation when the outer race tries to rotate counterclockwise.
- The reduction one-way clutch locks the counterclockwise rotation of the reduction sun gear

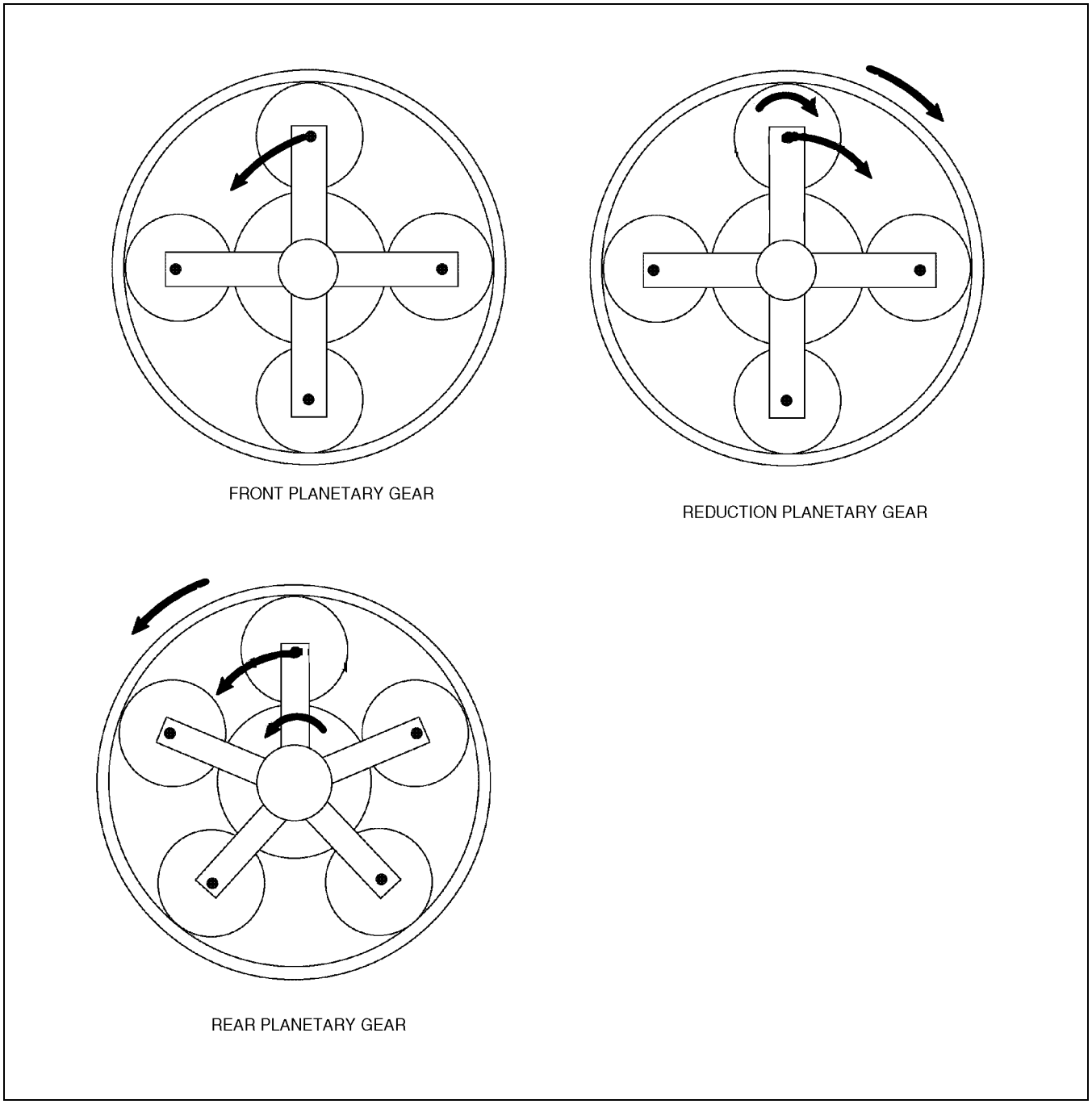
Note

- All direction of rotation are viewed from the side cover.



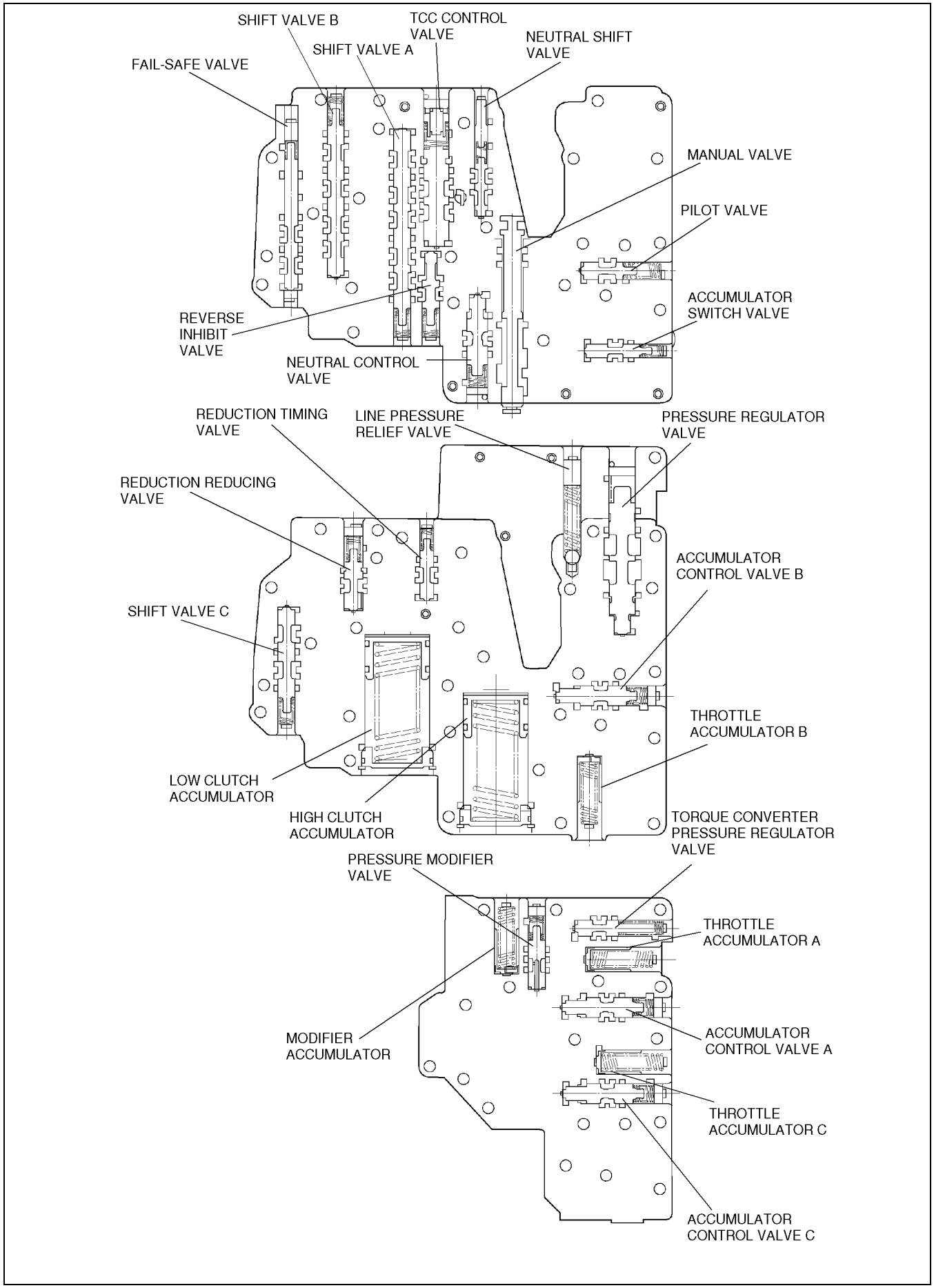
AMU0517A508

Third gear



AMU0517A514

Control Valve Component Location



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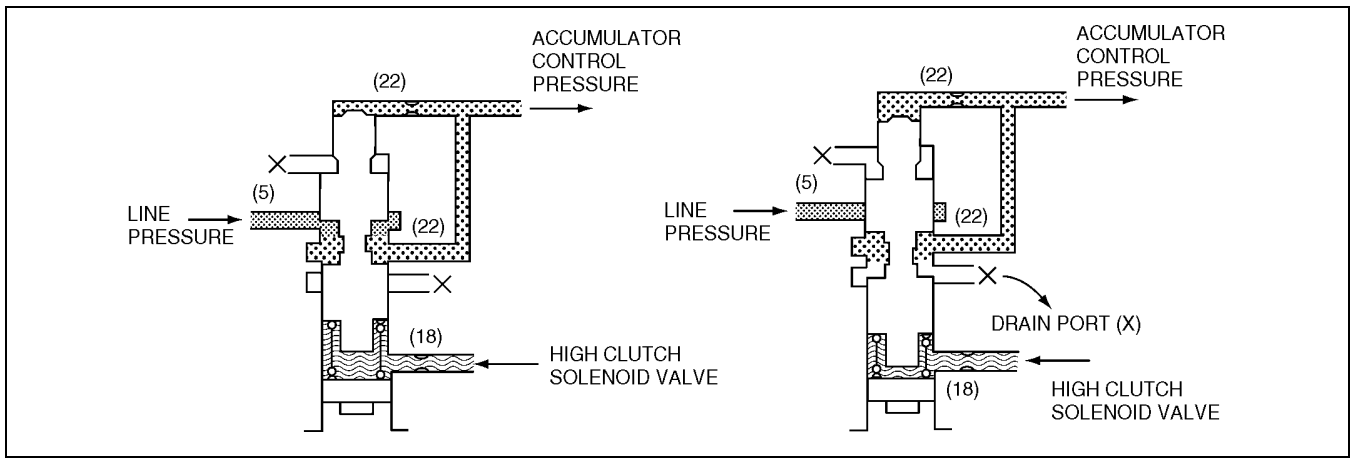


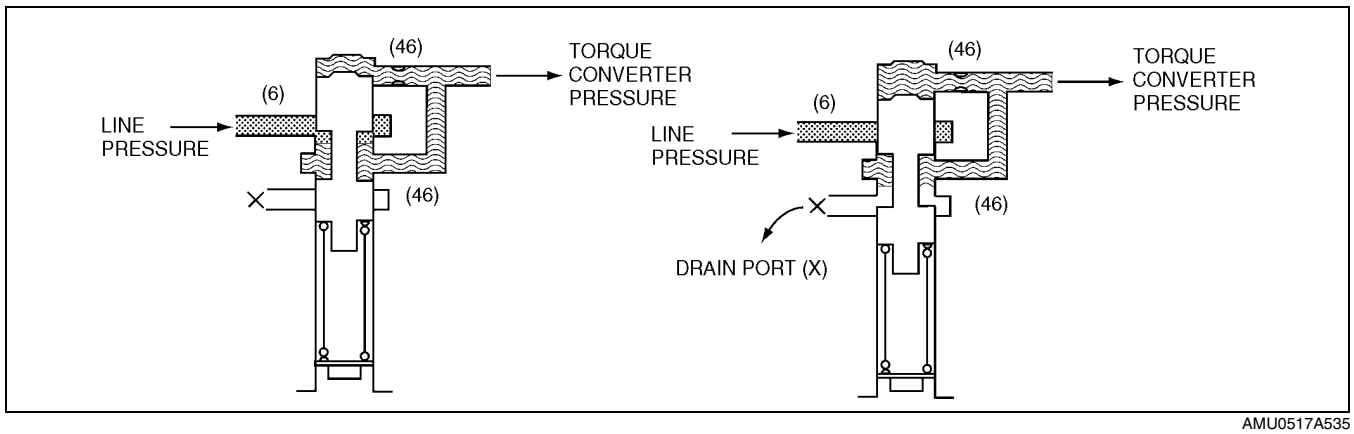
AMU0517A533

Torque Converter Pressure Regulator Valve
Outline

- The torque converter pressure regulator valve reduces the line pressure and adjusts to the torque converter pressure. Torque converter pressure is applied to the torque converter and it is also used as lubricating oil pressure for the component parts of the transaxle.

Operation

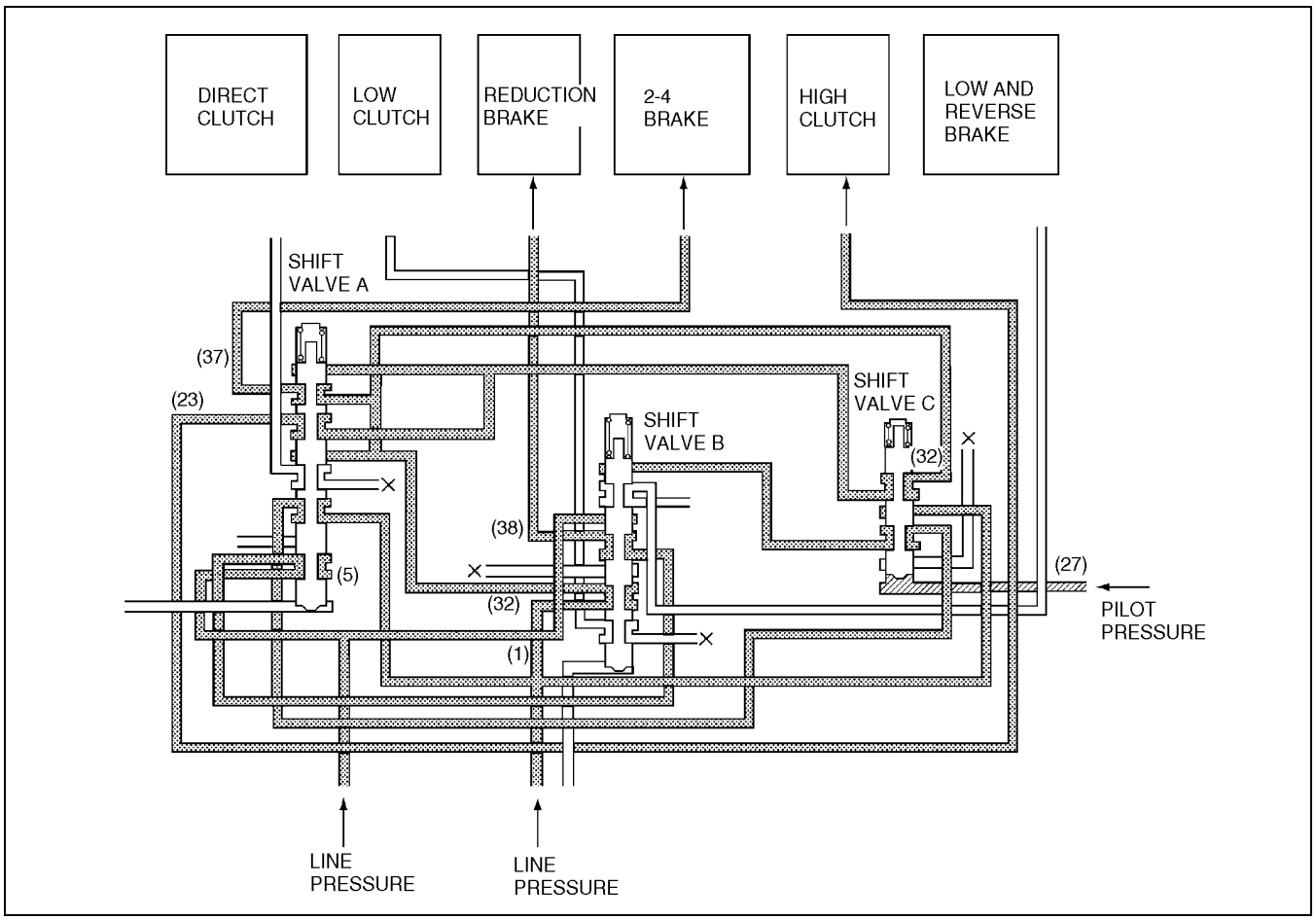
- Spring force is applied to the bottom end of the valve and pushes the valve upward. Conversely, torque converter pressure (46) is applied to the top end of the valve and pushes the valve downward. Torque converter pressure (46) and the spring force maintain the balance. By this balance, line pressure (6) is depressurized and adjusted to torque converter pressure (46).
- When torque converter pressure (46) is lower than spring force, the valve moves upward and opens line pressure oil passage (6). This causes the line pressure to flow through oil passage (6) to oil passage (46) and pressurizes torque converter pressure (46). Pressurized torque converter (46) moves the valve downward and closes line pressure (6) oil passage. This causes torque converter pressure (46) to pressurize.
- When torque converter pressure (46) is greater than spring force, the valve moves downward and closes drain port (X). This causes torque converter pressure (46) to depressurize. When torque converter (46) is depressurized, the force to push the valve decreases and the valve moves upward and closes drain port (X). This causes torque converter pressure (46) to not depressurize. Thus, torque converter pressure (46) is adjusted according to the balance of the spring force.



AMU0517A535

Forth gear

- Each shift solenoid is set to forth gear mode. Pilot pressure is applied to the bottom end of shift valve C and positioned on the upper side. Conversely, shift valve A and B is positioned on the down side by spring force. Line pressure (1) flows through shift valve B and acts through the shift valve A and is applied the 2-4 brake (oil passage (37)). Conversely, line pressure (32) flows through shift valve C and acts through the shift valve A and is applied to the high clutch (oil passage (23)). Line pressure (5) flows through shift valve A and acts through shift valve B and is not applied to the reduction brake (oil passage (38)).



AMU0517A544

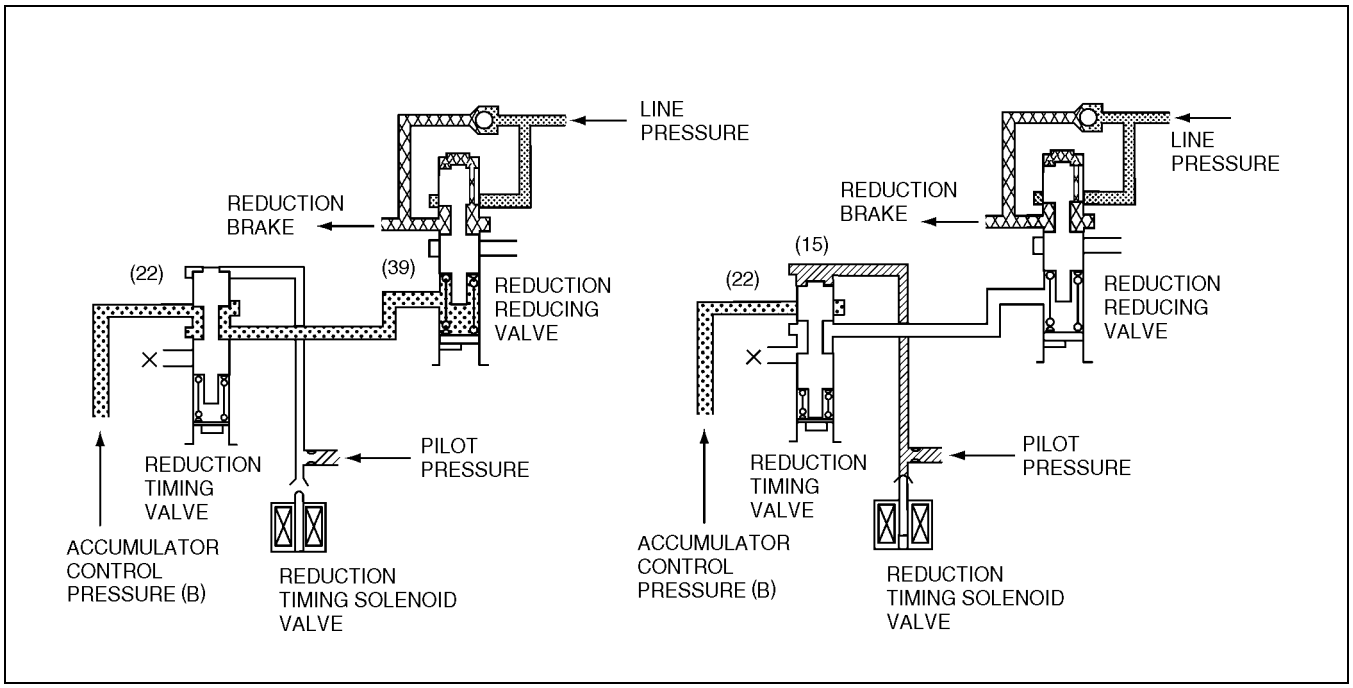
Reduction Timing Valve

Outline

- The reduction timing valve switches the oil passage according to the operation of the reduction timing solenoid. By this valve, the reduction reducing valve pressure adjustment point changes.

Operation

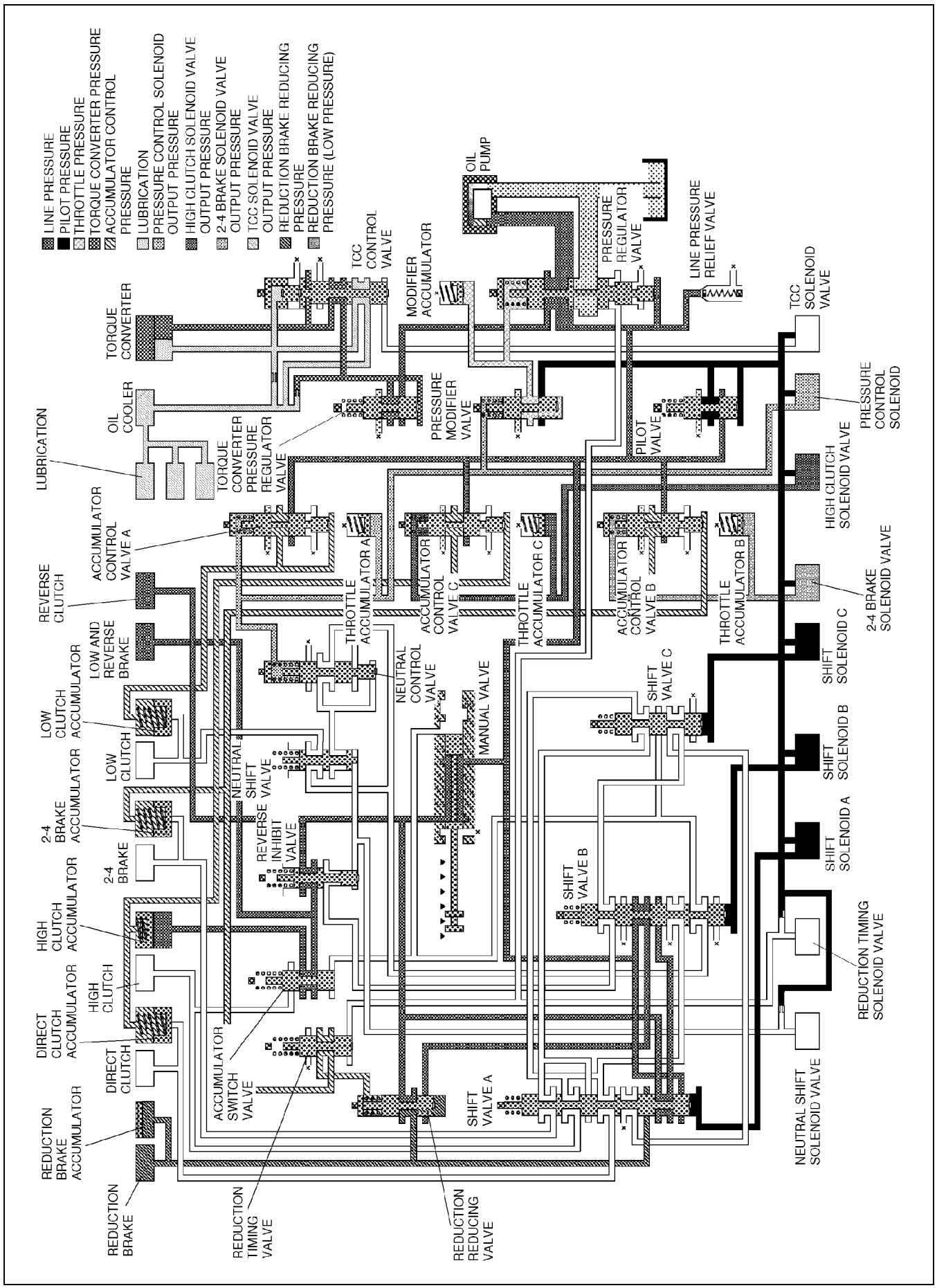
- Spring force is applied to the bottom end of the valve and pushes the valve upward. Conversely, reduction timing solenoid pressure (15) is applied to the top end of the valve and pushes the valve downward.
- When the reduction timing solenoid is in the OFF condition, the reduction timing valve is positioned on the upper side by spring force, and back pressure of accumulator control pressure B (22) is applied to oil passage (39) of the reduction reducing valve.
- When the reduction timing solenoid is in the ON condition, the reduction timing valve is positioned on the lower side below and oil pressure is not applied to the reduction reducing valve.



AME5714A007

Operation

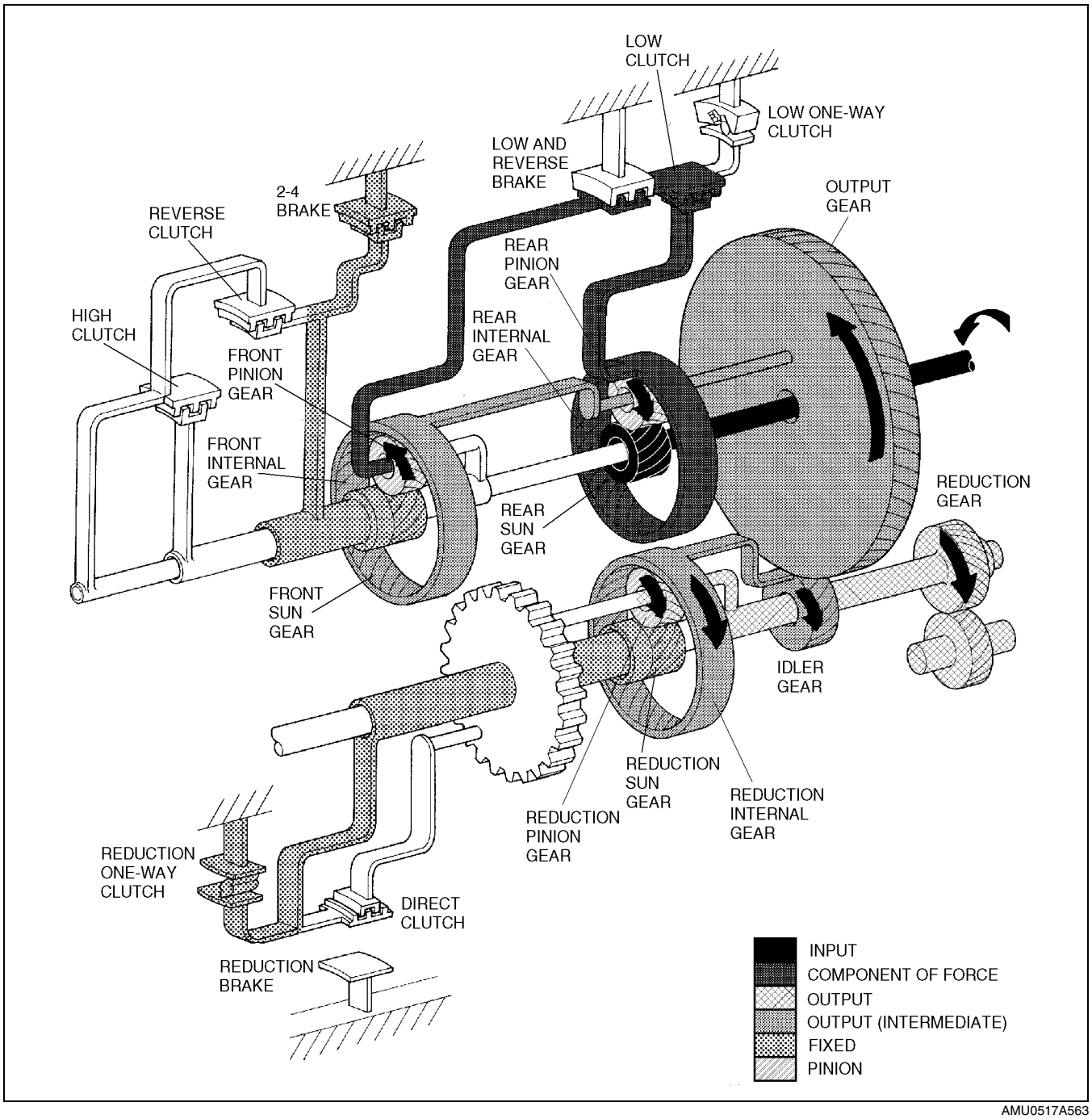
- The driving force of the input shaft is transmitted to the reverse and high clutch drum, and rear sun gear.
- Neither the reverse clutch nor high clutch is engaged, so the driving force of the reverse and high clutch drum is not transmitted.
- The driving force of the rear sun gear is transmitted to the rear pinion and rear internal gear. However, the rear internal gear only rotates freely, and the driving force is not transmitted because the low clutch is not engaged. (These descriptions are applicable to both P and N positions.)
- When P position is selected, the parking rod operates due to the linkage structure with the selector lever, and the parking gear is mechanically locked by the parking pawl, resulting in the final gear being fixed.



AMU0517A558

Second Gear (D, S, L range)
Outline

- Since only shift solenoid C turns OFF when shifting from first gear, the hydraulic circuit for the 2-4 brake opens to engage the low clutch and 2-4 brake.
- In second gear, as in first, the rear sun gear is the input of driving force transmission and the rear carrier is the output.
- The difference between first and second gear is that the rear internal gear, fixed in first gear, starts to rotate counterclockwise as the front sun gear rotating freely and clockwise in first gear is fixed by engagement of the 2-4 brake.

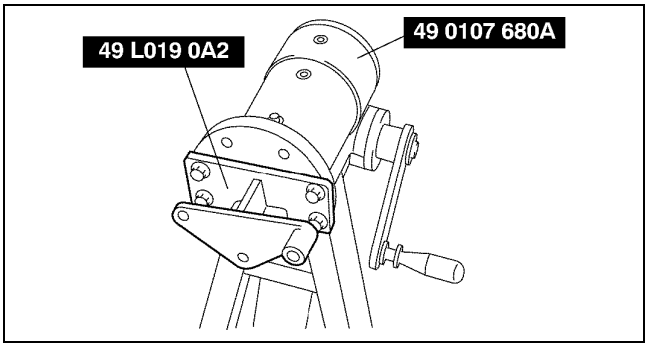


AMU0517A563

Disassembly procedure

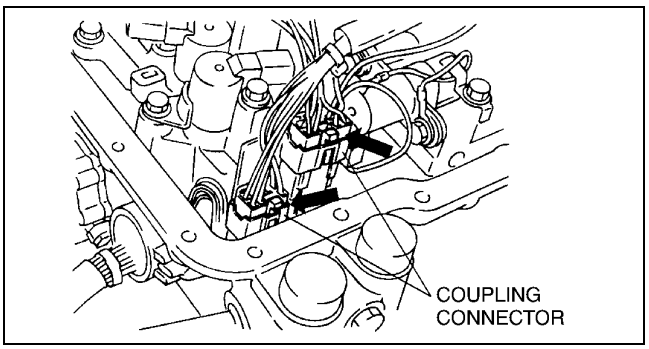
1. Remove the torque converter, and immediately turn it so that the hole faces upward. This will help to keep any remaining fluid from spilling.
2. Remove the transaxle range switch.
3. Set the transaxle to a transmission stand using the **SST**.

Caution
- **Be careful not to scratch the mating surfaces of the control valve body cover and the transaxle case.**
- **After removing the control valve body cover, remove the liquid gasket remaining on the mating surfaces.**



AMU0517A164

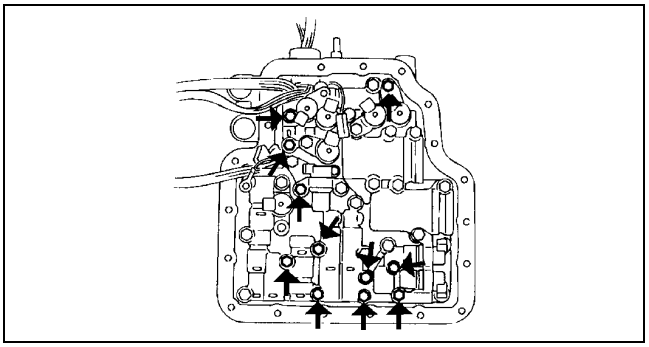
4. Remove the control valve body cover.
5. Disconnect coupling connector between the solenoid valves and the terminal component.



AMU0517A005

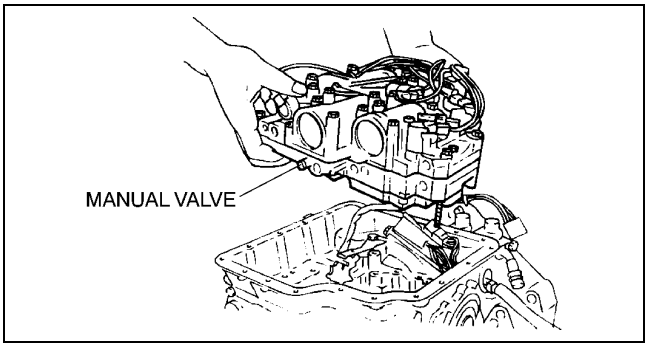
6. Remove the bolts which secure the control valve body to the transaxle case as shown in the figure.

Note
- When removing control valve body, be careful not to drop the manual valve.


AMU0517A006

7. Remove the control valve body from the transaxle case.

Caution
- **If the seal ring has dropped or is scratched, do not reuse it.**



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