Specifications

Item		Specifications
Transmission type		A6MF2
Engine model		Gasoline 1.6 T-GDI
Torque converter type		3-element, 1-stage, 2-phase type
Torque converter size		Ø236 mm (9.2913 in.)
Oil pump system		Parachoid
Friction elements		Clutch: 2EA
		Brake: 3EA
		OWC : 1EA
Planetary gear		3EA
Gear ration	1st	4.639
	2nd	2.826
	3rd	1.841
	4th	1.386
	5th	1.000
	6th	0.772
	Reverse	3.385
Final gear ratio		3.648
Fluid pressure balance piston		2EA
Accumulator		4EA
Solenoid valve		8EA (VFS:6EA, ON/OFF:2EA)
Shift lever position		4 Range (P,R,N,D)
Oil filter		1EA

VFS: Variable Force Solenoid

Sensors

Input Speed Sensor

▹ Type: Hall effect sensor

▹ Specifications

Operation condition (°C)°F		((-)40 ~ 150)) -40 ~ 302
Air gap(mm)in.		(0.95~1.55) 0.950 ~ 1.55
Output voltage(V)	High	1.18 ~ 1.68
	Low	0.59 ~ 0.84

Output Speed Sensor

▹ Type: Hall effect sensor

▹ Specifications

Operation condition (°C)°F		((-)40 ~ 150)) -40 ~ 302
Air gap(mm)in.		(0.55~1) 0.0217 ~ 0.0394
Output voltage	High	1.18 ~ 1.68
	Low	0.59 ~ 0.84

Oil Temperature Sensor

▹ Type: Negative thermal coefficient type

▹ Specifications

Temp.[(°C)°F]	Resistance (kΩ)
(-40)-40	48.1
(-20)-4.0	15.6
(0)32.0	5.88
(20)68.0	2.51
(40)104.0	1.11
(60)140.0	0.61
(80)176.0	0.32
(100)212.0	0.18
(120)248.0	0.10
(140)284.0	0.06
(165)329.0	0.16

Inhibitor Switch

▹ Type: Combination of output signals from 4 terminals

▹ Specifications

Power supply (V)	12
Output type	Pin to Pin

Solenoid Valves

Direct control VFS[26/B, T/CON]

▹ Control type : Normal low type

Control Pressure kpa (kgf/cm², psi)	9.81 ~ 500.14 (0.1 ~ 5.1, 1.42 ~ 72.54)
Current value(mA)	50 ~ 850
Internal resistance(Ω)	5.1

Direct control VFS[UD/B, OD/C, 35R/C]

▹ Control Type : Normal high type

Control Pressure kpa (kgf/cm², psi)	500.14 ~ 9.81 (5.1 ~ 0.1, 72.54 ~ 1.42)
Current value(mA)	50 ~ 850
Internal resistance(Ω)	5.1

Line Pressure Control VFS

▹ Control type : Normal high type

Control Pressure kpa (kgf/cm², psi)	500.14 ~ 9.81 (5.1 ~ 0.1, 72.54 ~ 1.42)
Current value(mA)	50 ~ 850
Internal resistance(Ω)	5.1

ON/OFF Solenoid Valve(SS-A, SS-B)

▹ Control type : Normal low type

Control pressure kpa (kgf/cm², psi)	490.33(5.0, 71.12)
Internal resistance(Ω)	10 ~ 11

Solenoid Valve Operation Table

	SS-A	SS-B	UD/B-VFS	OD/C-VFS	35R/C-VFS	26/B-VFS
			N/H	N/H	N/H	N/L
N, P	●		●		●	
1	Δ			Δ	●	
2				●	●	●
3		●		●		
4					●	
5		●	●			
6			●		●	●
L	●				●	
R		●	●	●		

● : Connected status

Δ : Connected at vehicle speed above 8km/h

Tightening Torques

Item	N.m	Kgf.m	lb-ft
TCM installation mounting bolt/nut	9.8 ~ 11.8	1.0 ~ 1.2	7.2 ~ 8.7
Shift cable bracket mounting bolt	14.7 ~ 21.6	1.5 ~ 2.2	10.8 ~ 15.9
Input shaft speed sensor mounting bolt	9.8 ~ 11.8	1.0 ~ 1.2	7.2 ~ 8.7
Output shaft speed sensor mounting bolt	9.8 ~ 11.8	1.0 ~ 1.2	7.2 ~ 8.7
Shift lever assembly bolt	9.8 ~ 14.7	1.0 ~ 1.5	7.2 ~ 10.8

Inhibitor switch mounting bolt	9.8 ~ 11.8	1.0 ~ 1.2	7.2 ~ 8.7
Valve body cover mounting bolt	13,7 ~ 15.7	1.4 ~ 1.6	10.1 ~ 11.6
ATF Warmer mounting bolt	7.8 ~ 11.8	0.8 ~ 1.2	5.8 ~ 8.7
Injection hole (eyebolt)	2.9 ~ 4.9	0.3 ~ 0.5	2.2 ~ 3.6
Oil drain plug	38.2 ~ 48.1	3.9 ~ 4.9	28.2 ~ 35.4
Torque converter mounting bolt	45.1 ~ 52.0	4.6 ~ 5.3	33.3 ~ 38.3
Starter motor mounting bolts	42.2 ~ 53.9	4.3 ~ 5.5	31.1 ~ 39.8
Automatic transaxle upper mounting bolt (TM=>Eng)	42.2 ~ 53.9	4.3 ~ 5.5	31.1 ~ 39.8
Automatic transaxle lower mounting bolt (Eng=>TM)	42.2 ~ 48.1	4.3 ~ 4.9	31.1 ~ 35.4
	42.2 ~ 53.9	4.3 ~ 5.5	31.1 ~ 39..8
Automatic transaxle mounting support bracket bolt	58.8 ~ 78.5	6.0 ~ 8.0	43.4 ~ 57.9
Automatic transaxle mounting bracket bolt	88.3 ~ 107.9	9.0 ~ 11.0	65.1 ~ 79.6

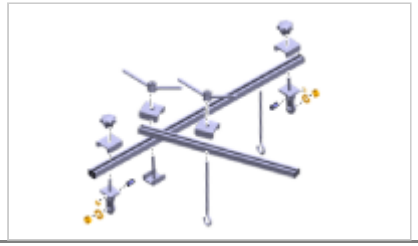
Lubricants

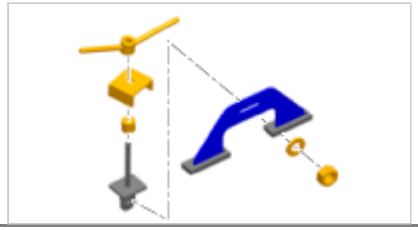
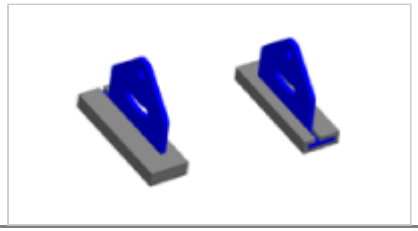
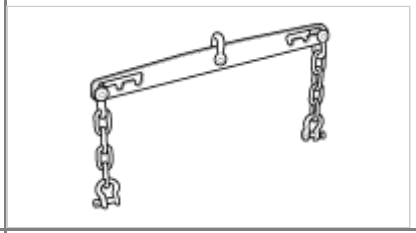
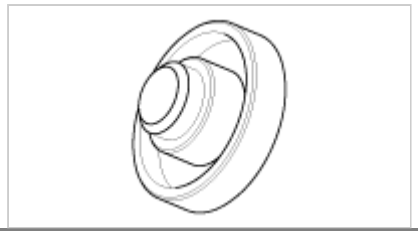
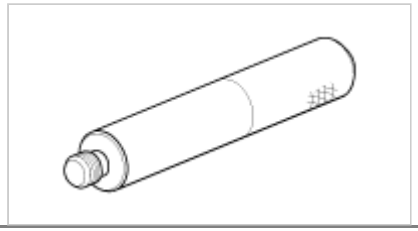
Item	Specified lubricant	Quantity
Transaxle fluid	SK ATF SP-IV, MICHANG ATF SP-IV, NOCA ATF SP-IV , Kia Genuine ATF SP-IV	7.1L (1.88 U.S gal., 7.50 U.S.qt., 6.24 Imp.qt.)

Sealant

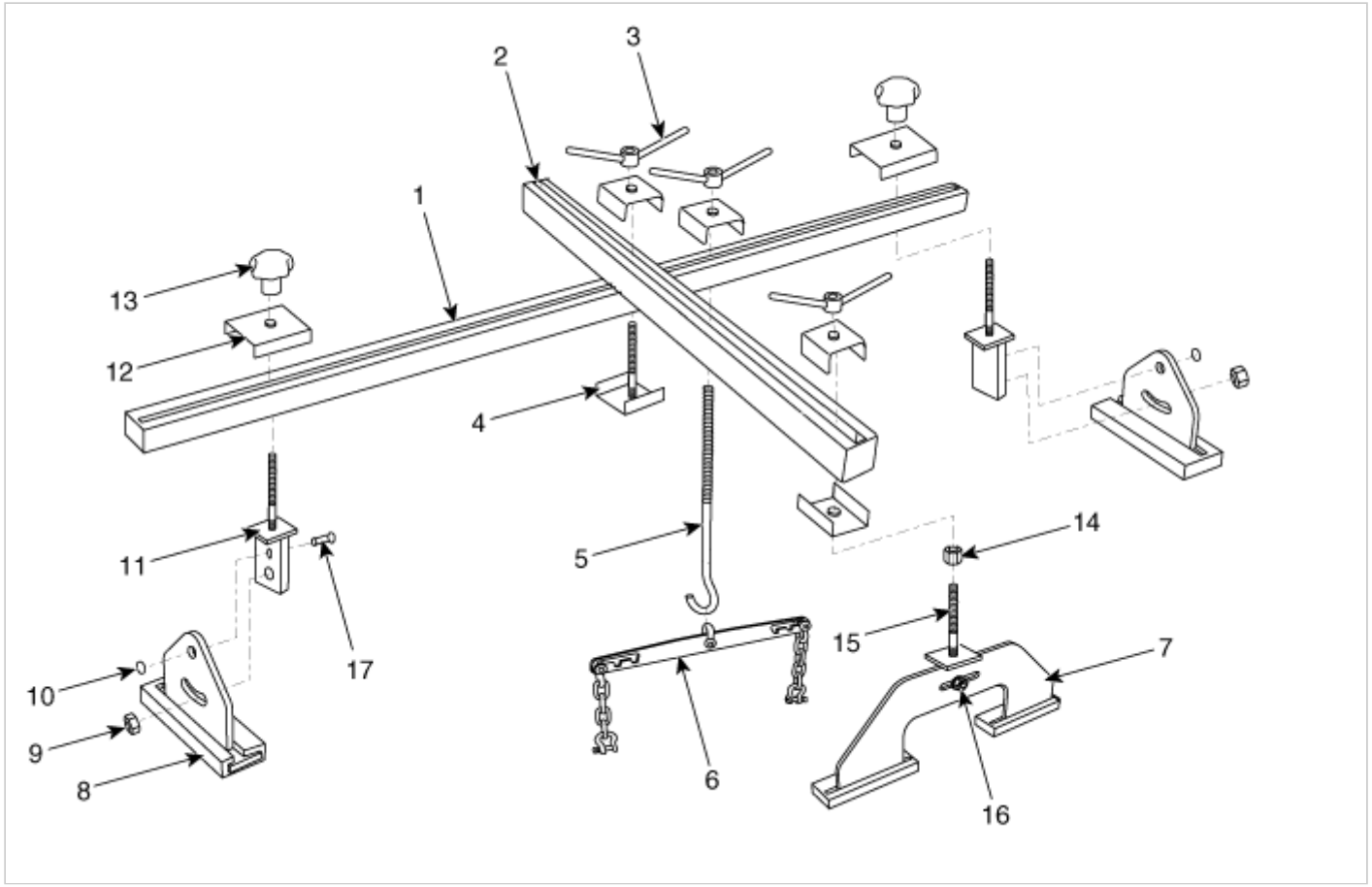
Item	Specified sealant
Rear cover	LOCTITE FMD-546 or THREE-BOND TB1281B
Torque converter housing	

Special Service Tools

Tools (Number and name)	Illustration	Use
09200-3N000 Engine support fixture (Beam)		Removal and installation of the transaxle. Use this adapter (SST No. : 09200-4X000) with the supporter (SST No. : 09200-2S100, 09200-2S200). ※Permit operating with 09200-38001. ※Refer to engine support fixture special tool assembly drawing below.
09200-2S100 Supporter		Removal and installation of the transaxle. Use this bar (SST No. : 09200-38001/3N000) with the supporter (SST No. : 09200-2S200) and adapter (SST No. : 09200-4X000).

		※Refer to engine support fixture special tool assembly drawing below.
09200-2S200 Supporter		Removal and installation of the transaxle. Use this bar (SST No. : 09200-38001/3N000) with the adapter (SST No. : 09200-4X000) and supporter (SST No. : 09200-2S100). ※Refer to engine support fixture special tool assembly drawing below.
09200-4X000 Adapter		Removal and installation of the transaxle. Use this bar (SST No. : 09200-38001/3N000) with the supporter (SST No. : 09200-2S100, 09200-2S200). ※Refer to engine support fixture special tool assembly drawing below.
09453-3L240 Oil seal installer (2WD)		Installation of transaxle case oil seal. [Using with bar (SST No.:09231-H1100)]
09231-H1100 Bar		Installation of transaxle case oil seal. [Using with oil seal installer (SST No.:09453-3L240)]
09480-A3800 Inhibitor neutral fixed pin		Inhibitor neutral fixed.

※ Engine support fixture special tool assembly drawing



1. 09200-3N000(Main bar)
2. 09200-3N000(Sub bar)
3. 09200-3N000(Handle)
4. 09200-3N000(Stopper)
5. 09200-3N000(Bolt-1)
6. 09200-4X000 (Adapter)
7. 09200-2S100(Supporter)
8. 09200-2S200(Supporter)
9. 09200-3N000(Nut)
10. 09200-3N000(Snap ring)
11. 09200-3N000(Sub fixture)
12. 09200-3N000(Stopper)
13. 09200-3N000(Nut)
14. 09200-2S100(Spacer)
15. 09200-2S100(Sub fixture)
16. 09200-2S100(Nut)
17. 09200-3N000(Pin)

Troubleshooting

Fault Diagnosis

Features a fail-safe mechanism that provides "limp-home" 4th gear hold to enable the vehicle to be driven to the owner"s home or dealer shop.

Fail-Safe: The TCM provides 4th gear hold and Reverse gear in the event of a malfunction.

Limp Home: Maintains minimal functionality (Drive(4th gear hold), Reverse) in the event of a malfunction, making it possible for the vehicle to reach the dealer shop.

Self-diagnosis

Transaxle Control Module (TCM) is in constant communication with the control system"s components (sensors and solenoids). If an abnormal signal is received for longer than the predefined duration, TCM recognizes a fault, stores the fault code in memory, and then sends out a fault signal through the self-diagnosis terminal. Such fault codes are independently backed up and will not be cleared even if the ignition switch is turned off, the battery is disconnected, or the TCM connector is disconnected.

⚠ CAUTION

Disconnecting a sensor or an actuator connector while the ignition switch is in the "On" position generates a Diagnostic Trouble Code (DTC) and commits the code to memory. In such event, disconnecting the battery will not clear the fault diagnosis memory. The diagnosis tool must be used to clear the fault diagnosis memory.

⚠ CAUTION

- Before removing or installing any part, read the diagnostic trouble codes and then disconnect the battery negative (-) terminal.
- Before disconnecting the cable from battery terminal, turn the ignition switch to OFF. Removal or connection of the battery cable during engine operation or while the ignition switch is ON could cause damage to the Transaxle Control Module (TCM).
- When checking the generator for the charging state, do not disconnect the battery "+" terminal to prevent the Engine Control Module (ECM) from damage due to the voltage.
- When charging the battery with the external charger, disconnect the vehicle side battery terminals to prevent damage to the TCM.

Checking Procedure (Self-diagnosis)

⚠ CAUTION

- When battery voltage is excessively low, diagnostic trouble codes can not be read. Be sure to check the battery for voltage and the charging system before starting the test.

Inspection Procedure (Using the GDS)

1) Turn OFF the ignition switch.
2) Connect the GDS to the data link connector on the lower crash pad.
3) Turn ON the ignition switch.
4) Use the GDS to check the diagnostic trouble code.
5) Repair the faulty part from the diagnosis chart.
6) Erase the diagnostic trouble code.
7) Disconnect the GDS.

⚠ CAUTION

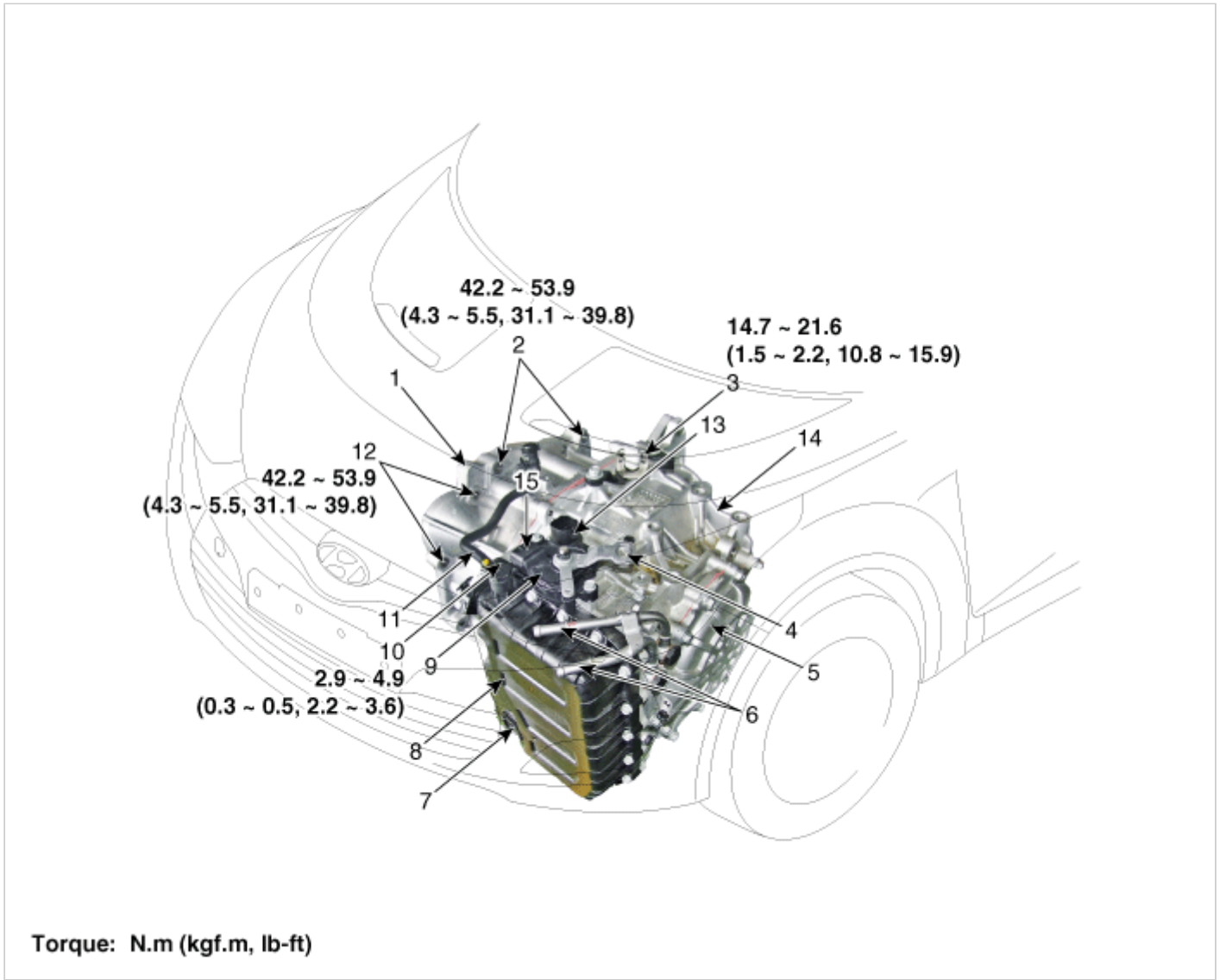
- After replacing the automatic transaxle, use the GDS to reset (erase the TCM learning values). Then perform Transaxle Control Module (TCM) learning to provide optimum shift quality.
  (Refer to Automatic Transaxle Control System - "Repair procedures")
- Adding automatic transaxle fluid.

(Refer to Hydraulic System - "Fluid")

- After servicing the automatic transaxle or TCM, clear the Diagnostic Trouble Code (DTC) using the GDS tool. Diagnostic Trouble Codes (DTC) cannot be cleared by disconnecting the battery.

Automatic Transaxle System

Components Location



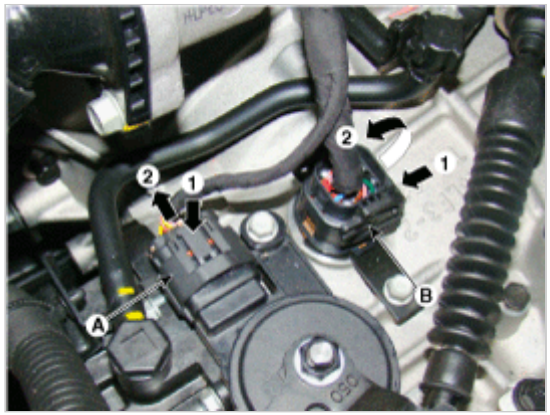
1. Converter housing
2. Automatic transaxle upper mounting bolt
9. Inhibitor switch
10. Injection hole(eyebolt)

3. Shift cable bracket
4. Manual control lever
5. Rear cover
6. Oil cooler tube
7. Oil level plug
8. Valve body cover
11. Air breather hose
12. Starter motor mounting bolt
13. Solenoid valve connector
14. Automatic transaxle case
15. Inhibitor switch connector

Automatic Transaxle System

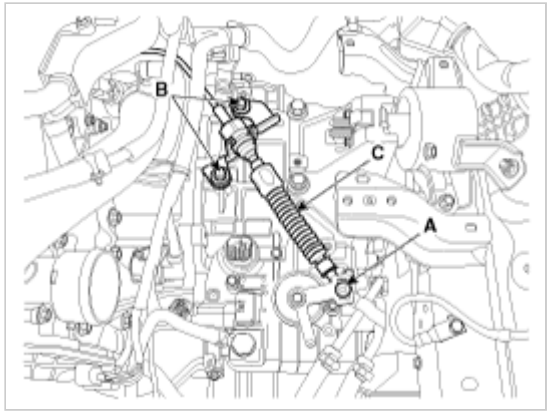
Removal

1. Remove the engine cover.
   (Refer to Engine Mechanical System - "Engine cover")
2. Remove the air cleaner assembly and air duct.
   (Refer to Engine Mechanical System - "Air cleaner")
3. Remove the battery and battery tray.
   (Refer to Engine Electrical System - "Battery")
4. Disconnect the inhibitor switch connect (A) and solenoid valve connector (B).



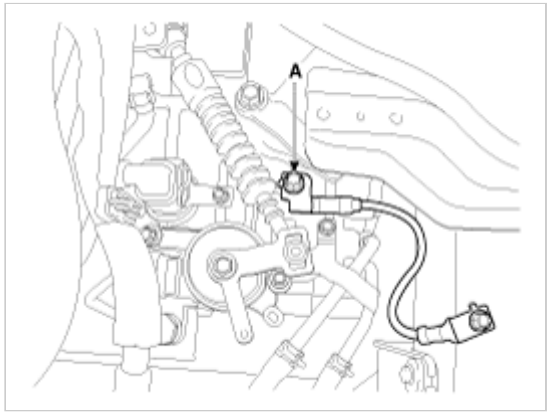
5. Remove the shift cable (C) after removing the nut (A) and the bolt B).

Tightening torque:
(A) 9.8 ~ 13.7 N.m (1.0 ~ 1.4 kgf.m, 7.2 ~ 10.1 lb-ft)
(B) 14.7 ~ 21.6 N.m (1.5 ~ 2.2 kgf.m, 10.9 ~ 15.9 lb-ft)

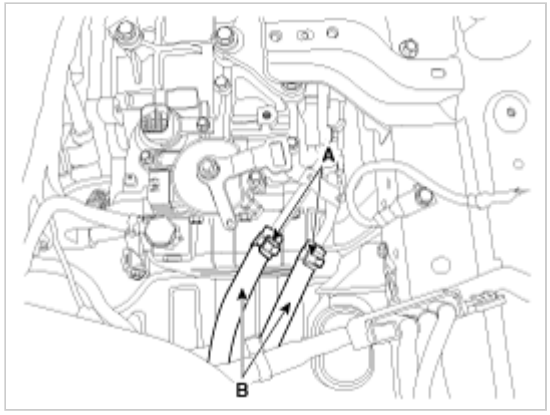


6. Remove the ground line after removing the bolt (A).

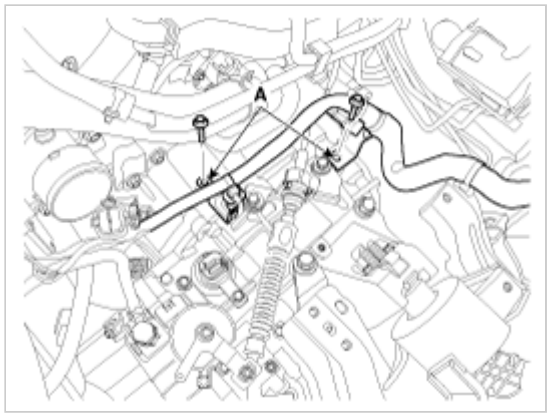
Tightening torque:
(A) 10.8 ~ 13.7 N.m (1.1 ~ 1.4 kgf.m, 8.1 ~ 10.1 lb-ft)



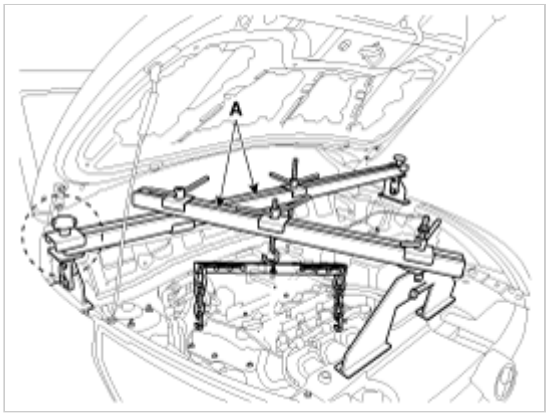
7. Disconnect the hose (B) after removing the automatic transaxle fluid cooler hose clamp (A).



8. Remove the solenoid valve connector and inhibitor switch connector wiring mounting bracket (A).

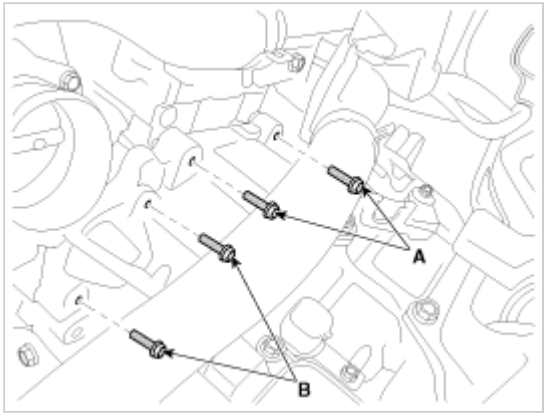


9. Remove the cowl top cover or wiper motor.
   (Refer to Body - "Cowl Top Cover")
10. Assemble the engine support fixture.
    (Refer to Special Service Tools - "Engine support fixture assembly drawing")
11. Using the engine support fixture(A) , hold the engine and transaxle assembly safely.



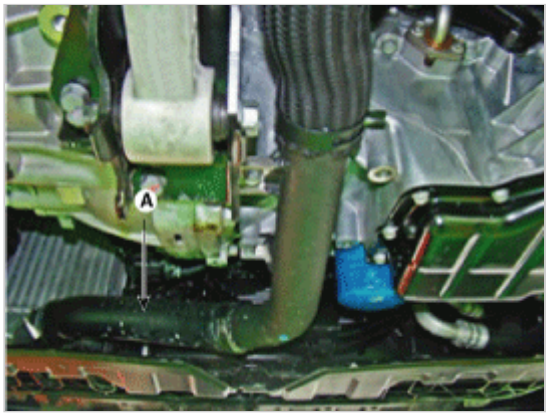
12. Remove the automatic transaxle upper mounting bolt (A-2ea) and the starter motor mounting bolt (B-2ea).

Tightening torque:
(A,B) 42.2 ~ 54.0 N.m (4.3 ~ 5.5 kgf.m, 31.1 ~ 39.8 lb-ft)



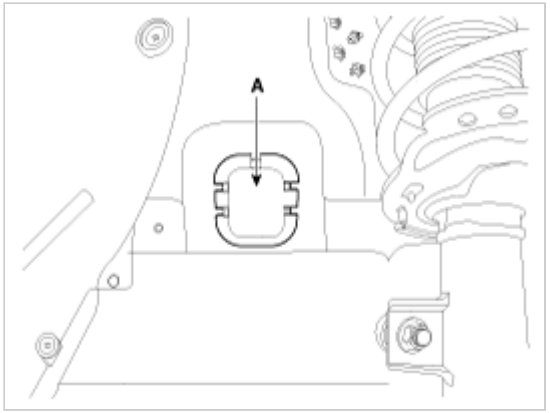
13. Remove the inlet hose&pipe (A).

Tightening torque:
19.6 ~ 26.5 N.m (2.0 ~ 2.7 kgf.m, 14.5 ~ 19.5 lb-ft)



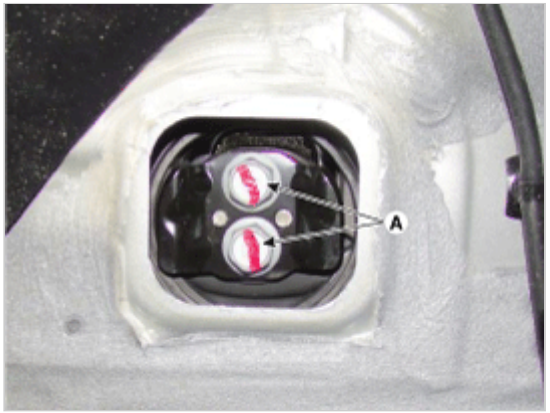
14. Remove the brake vacuum pump.
(Refer to Brake System - "Brake Booster")

15. Remove the automatic transaxle mounting bracket cover (A).



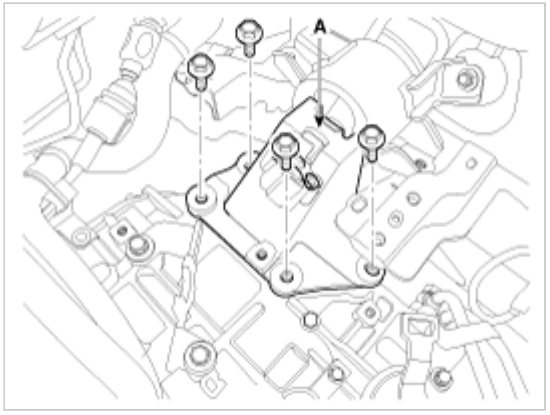
16. Remove the automatic transaxle mounting bracket bolt (A).

Tightening torque:
63.7 ~ 83.4 N.m (6.5 ~ 8.5 kgf.m, 47.0 ~ 61.5 lb-ft)



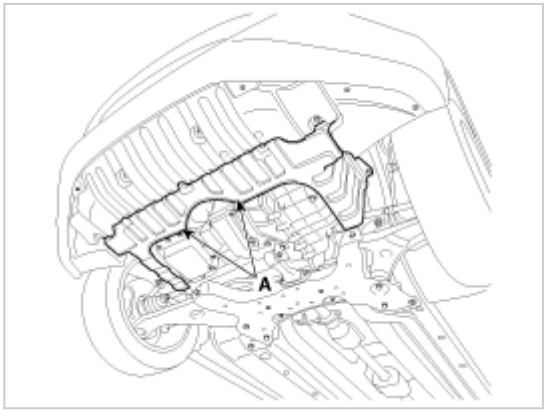
17. Remove the automatic transaxle mounting support bracket (A).

Tightening torque:
58.8 ~ 78.5 N.m (6.0 ~ 8.0 kgf.m, 43.4 ~ 57.9 lb-ft)



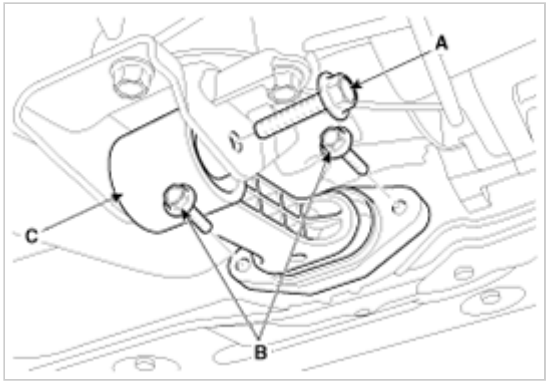
18. Remove the under cover (A).

Tightening torque:
6.9 ~ 10.8 N.m (0.7 ~ 1.1 kgf.m, 5.1 ~ 8.0 lb-ft)

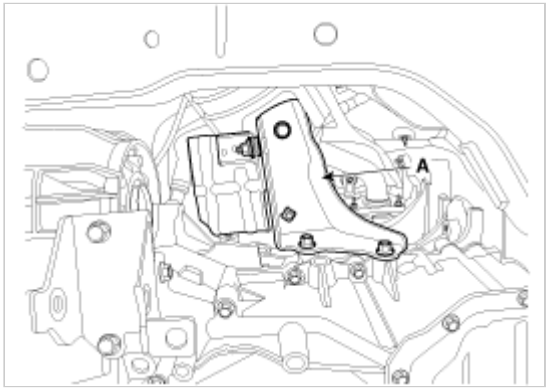


19. Remove the roll rod bracket (C) after removing bolt (A,B).

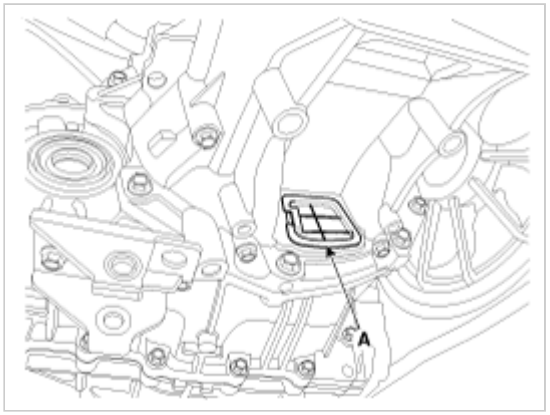
Tightening torque:
(A) 49.0 ~ 63.7 N.m (5.0 ~ 6.5 kgf.m, 36.2 ~ 47.0 lb-ft)
(B) 107.9 ~ 127.5 N.m (11.0 ~ 13.0 kgf.m, 79.6 ~ 94.1 lb-ft)



20. Remove the drive shaft cover (A).

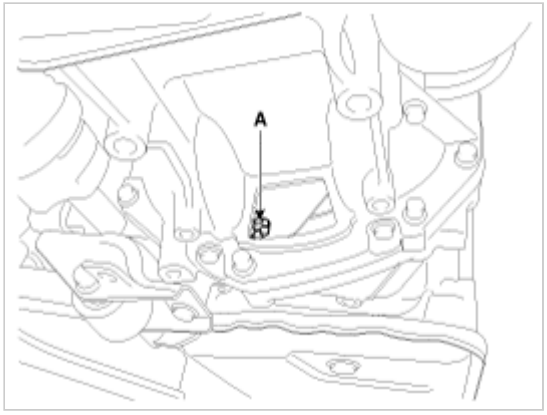


21. Remove the dust cover (A).



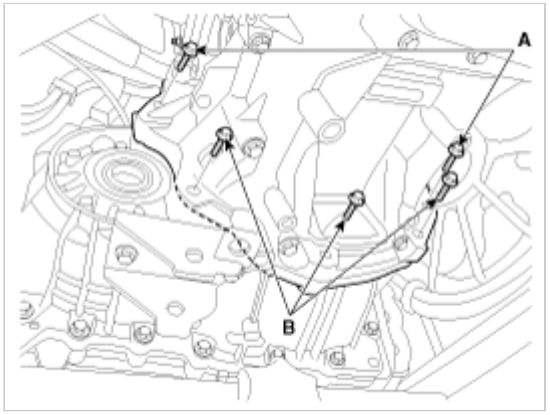
22. Remove the torque converter mounting bolt (A-4ea) with rotating the crankshaft.

Tightening torque:
45.1 ~ 52.0 N.m (4.6 ~ 5.3 kgf.m, 33.3 ~ 38.3 lb-ft)



23. Remove the automatic transaxle with a jack after removing the mounting bolt (A-4ea, B-2ea).

Tightening torque:
(A) 42.2 ~ 48.1 N.m (4.3 ~ 4.9 kgf.m, 31.1 ~ 35.4 lb-ft)
(B) 42.2 ~ 54.0 N.m (4.3 ~5.5 kgf.m, 31.1 ~ 39.8 lb-ft)



Installation

1. Install in the reverse order of removal.

> **NOTICE**
> Follow the separted each procedure as below according to reinstallation or replacing with a new automatic transaxle.

2. In case of the reinstallation.
   (1) Replace the oil seal with a new one when ATF leak occurred because of differential oil seal damage.

> **Information**
> When installing the new oil seal, use the special service tool(SST No.:09453-3L340, 09231-H1100).

(2) Check the ATF level after refilling the automatic transaxle with fluid. (Refer to Hydraulic System - "Fluid")

(3) Clear the diagnostic trouble codes (DTC) using the GDS.

> **Information**
> Even though disconnecting the battery negative terminal, the DTCs will not be cleared. So, be sure to clear the DTCs using the GDS.

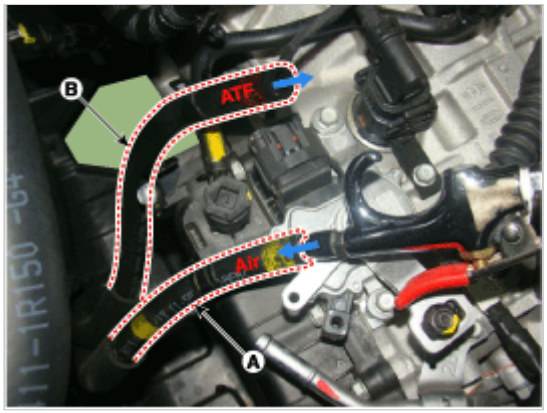
3. In case of the replacing with a new automatic transaxle.

> **NOTICE**
> New automatic transaxle is already filled with specified quantity ATF.
> For that reason, it does not necessary to refill and check the ATF but the remaining ATF inside of ATF cooler have to be removed.

(1) Set the air blow gun in front of the ATF cooler hose (A).

(2) Remove the remaining ATF by blowing air into ATF cooler hose (A).

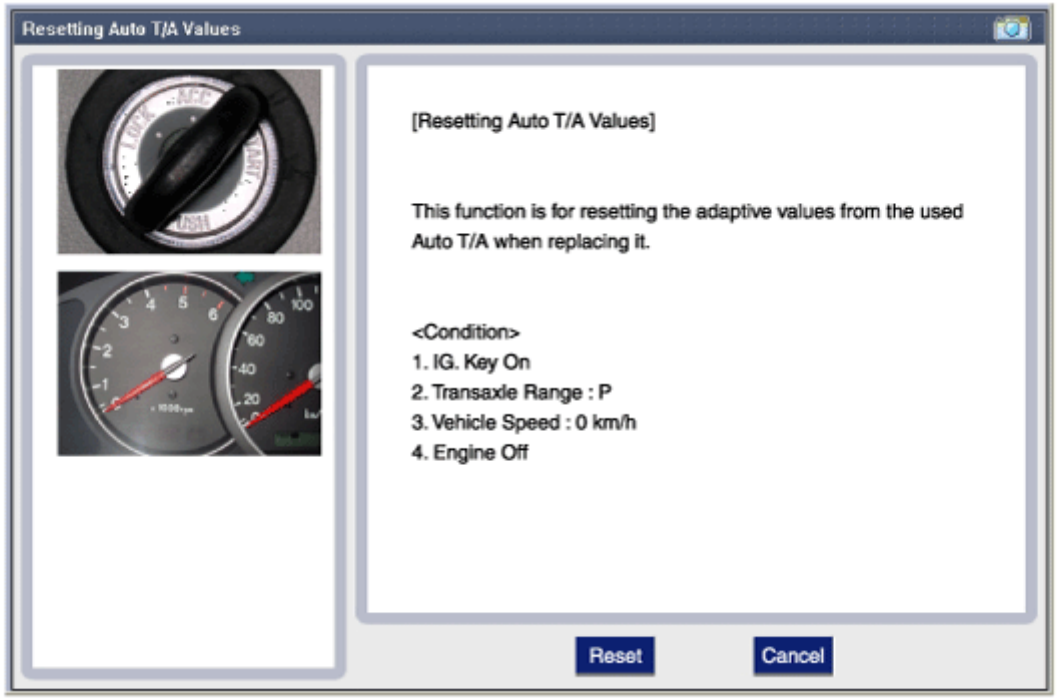
(3) Install the ATF cooler hose (A) and (B).



(4) Clear the diagnostic trouble codes (DTC) using the GDS.

> **Information**
> Even though disconnecting the battery negative terminal, the DTCs will not be cleared. So, be sure to clear the DTCs using the GDS.

(5) Reset the automatic transaxle adaptive values using the GDS.



(6) Perform the TCM adaptive values learning procedure.
(Refer to Automatic Transaxle Control System - "Repair procedures")

4. In case of the replacing with a remanufactured automatic transaxle.

NOTICE

Remanufactured automatic transaxle is not filled with specified quantity ATF.
For that reason, it is necessary to refill and check the ATF.

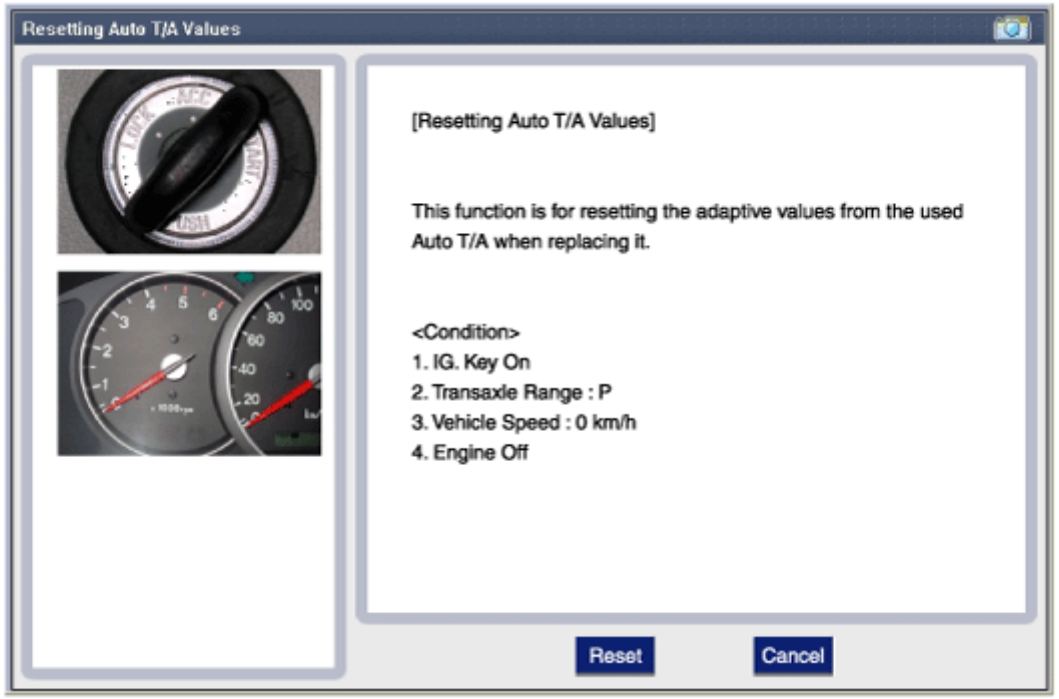
(1) Check the ATF level after refilling the automatic transaxle with fluid. (Refer to Hydraulic System - "Fluid")

(2) Clear the diagnostic trouble codes (DTC) using the GDS.

Information

Even though disconnecting the battery negative terminal, the DTCs will not be cleared. So, be sure to clear the DTCs using the GDS.

(3) Reset the automatic transaxle adaptive values using the GDS.



(4) Perform the TCM adaptive values learning procedure.
(Refer to Automatic Transaxle Control System - "Repair procedures")

Automatic Transaxle System

Description

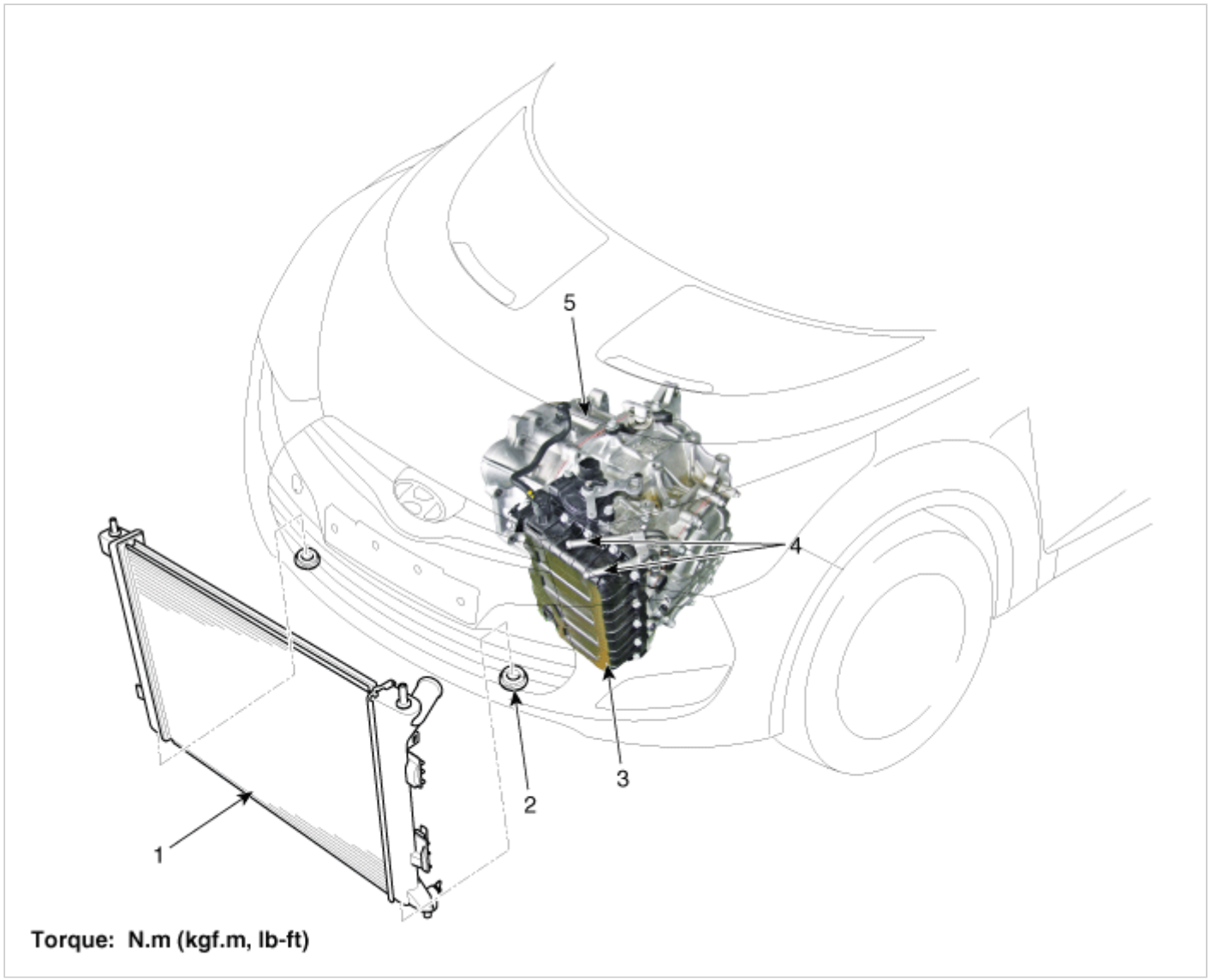
The hydraulic system consists of oil, an oil filter, an oil pump, and a valve body (valves and solenoid valves).

The oil pump is powered by the engine. ATF passes through the oil filter and gets distributed along the oil channels.

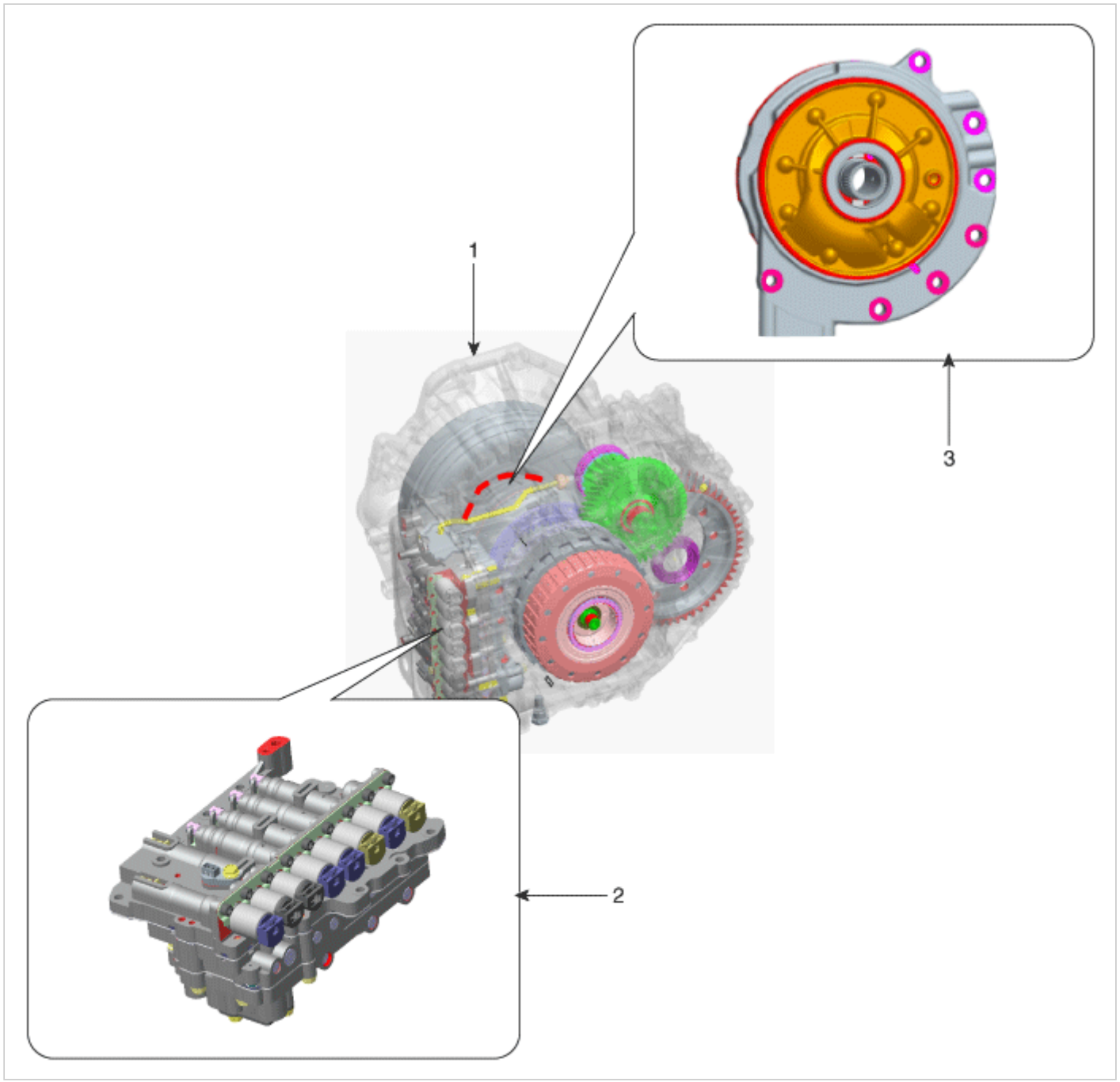
The oil becomes highly pressurized as it exits the oil pump and passes through the line pressure valve before being fed to the clutch & brake control valve, clutch, and brakes. TCM controls the hydraulic pressure using solenoid valves and controls clutch and brake operations.

Automatic Transaxle System

Components Location

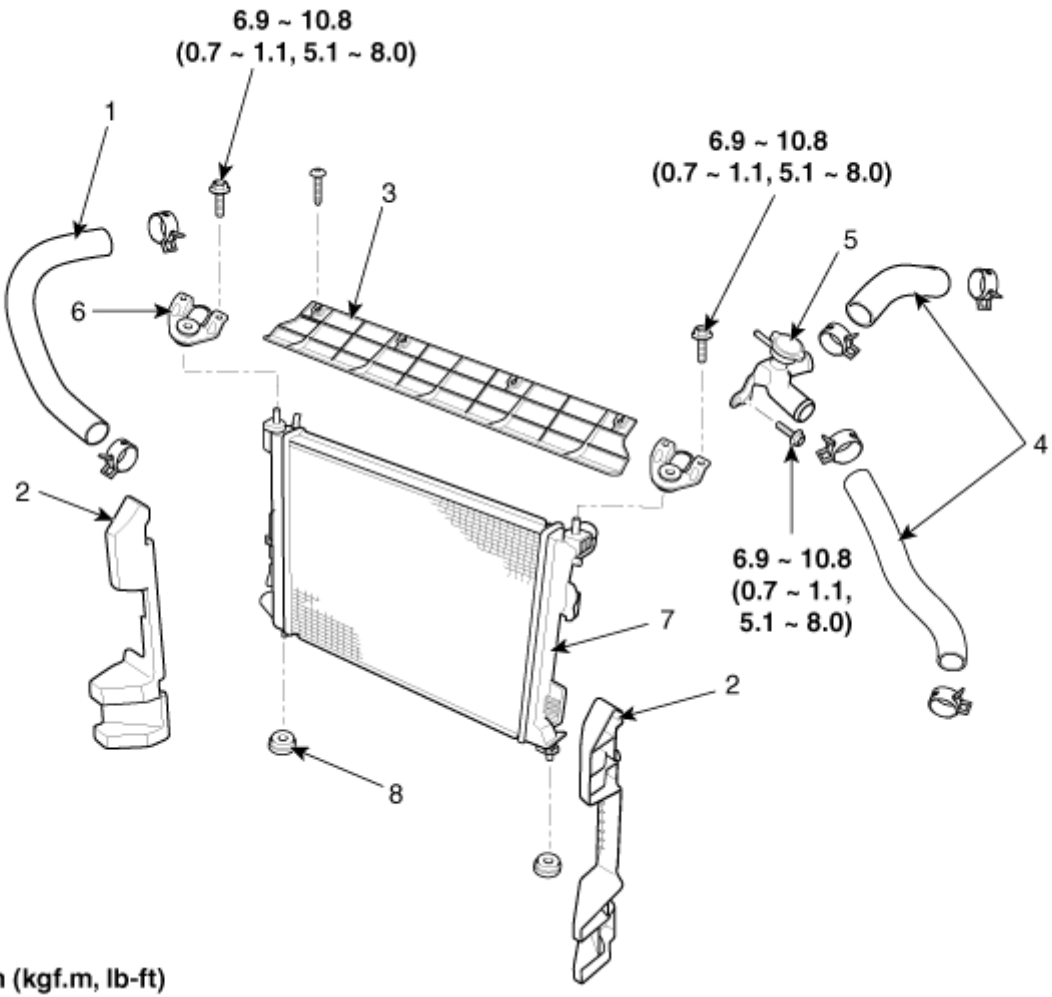


1. Radiator
2. Mounting insulator
3. Valve body cover
4. Oil cooler tube
5. Automatic transaxle
6. Radiator upper mounting bracket



1. Automatic transaxle
2. Valve body assembly
3. Oil pump assembly

Components



1. Radiator lower hose
2. Air guard
3. Radiator upper cover
4. Radiator upper hose
5. Filler neck
6. Upper mounting bracket
7. Radiator
8. Mounting insulator

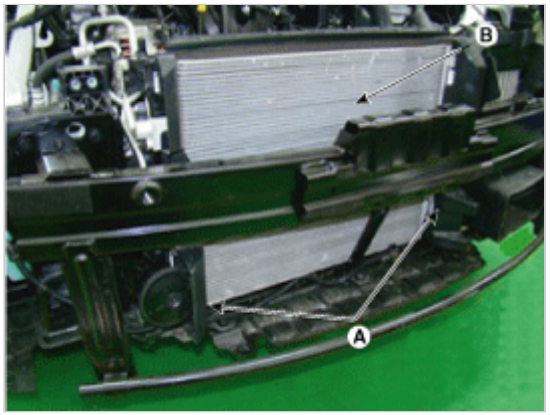
Removal and Installation

1. Disconnect the battery negative terminal.
2. Remove the air cleaner assembly.
   (Refer to Intake and exhaust system - "Air Cleaner")
3. Loosen the drain plug, and drain the engine coolant.
   Remove the radiator cap to drain with speed.
4. Disconnect the over flow hose (A) from the radiator.

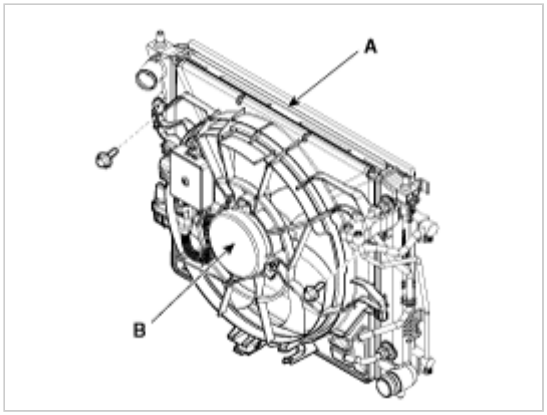
5. Disconnect the radiator upper hose (A) and lower hose (B).
6. Disconnect the ATF cooler hoses.
   (Refer to Auto Transaxle System - "Auto Transaxle")
7. Remove the front bumper.
   (Refer to Body - "Front Bumper")
8. Remove the head lamp.
   (Refer to Body Electrical System - "Head Lamp")
9. Remove the upper mounting bracket (A).

10. Disconnect the cooling fan controller connector (A).

11. Remove the air guard (A) and then disconnect the A/C condenser (B) from radiator.



12. Disconnect the radiator assembly from vehicle.
13. Remove the cooling fan & reservior tank (A) from the radiator (B).



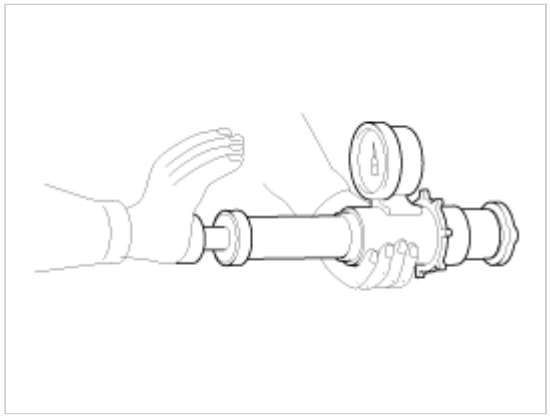
14. Installation is reverse order of removal.

15. Fill the radiator with coolant and check for leaks.
16. Put the radiator cap on tightly, then run engine again and check for leaks.

Inspection

Radiator Cap Testing

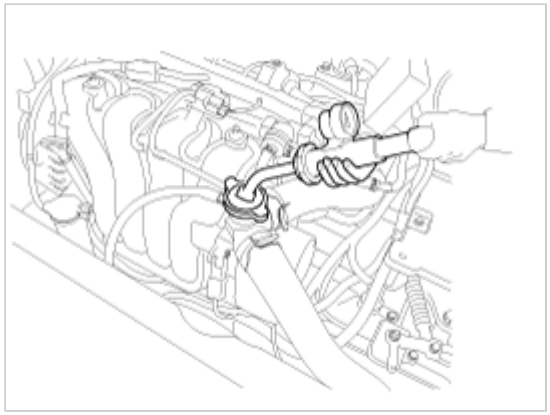
1. Remove the radiator cap, wet its seal with engine coolant, and then install it on a pressure tester.



2. Apply a pressure of 93.16 ~ 122.58kpa (0.95 ~ 1.25kg/cm², 13.51 ~ 17.78psi).
3. Check for a drop in pressure.
4. If the pressure drops, replace the cap.

Radiator Leakage Test

1. Wait until engine is cool, then carefully remove the radiator cap and fill the radiator with engine coolant, then install a pressure tester on it.



2. Apply a pressure of 93 ~ 123kPa (0.95 ~ 1.25kgf/cm², 14 ~ 19psi).

3. Inspect for engine coolant leaks and a drop in pressure.
4. If the pressure drops, check hoses, the radiator and the water pump for leakage. If there is no leakage, inspect the heater core, the cylinder block and the cylinder head.
5. Remove the tester and reinstall the radiator cap.

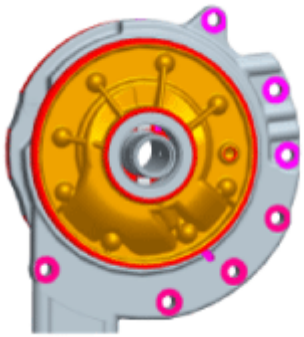
NOTICE

Check for engine oil in coolant and/or coolant in engine oil.

Automatic Transaxle System

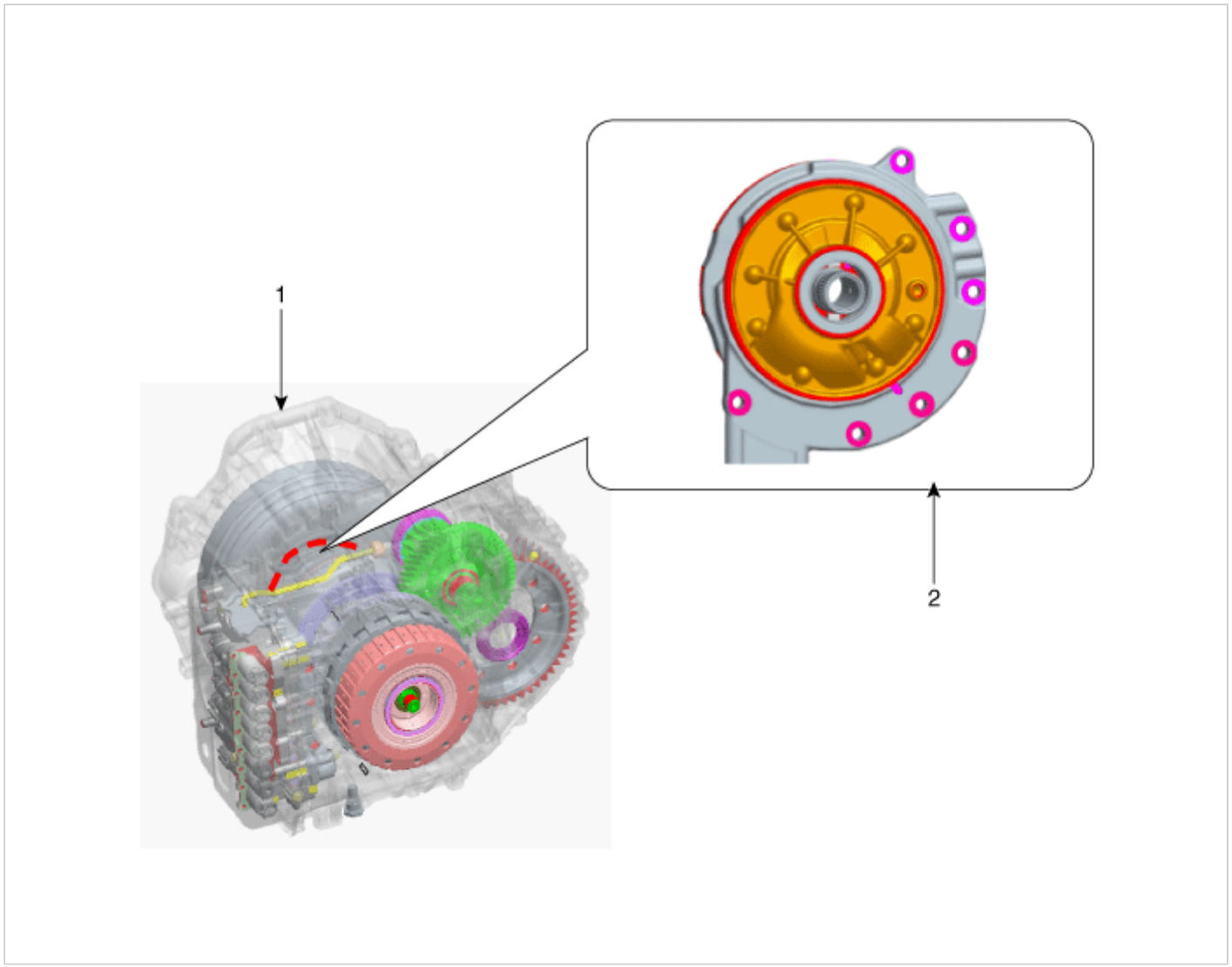
Description

The oil pump is built-in as a single unit with the 26Brake chamber. Rotation of the pump builds the hydraulic pressure needed for the lubrication of the various parts of the transaxle and operation of the clutch and brakes. The oil also circulates through the torque converter and the cooler.



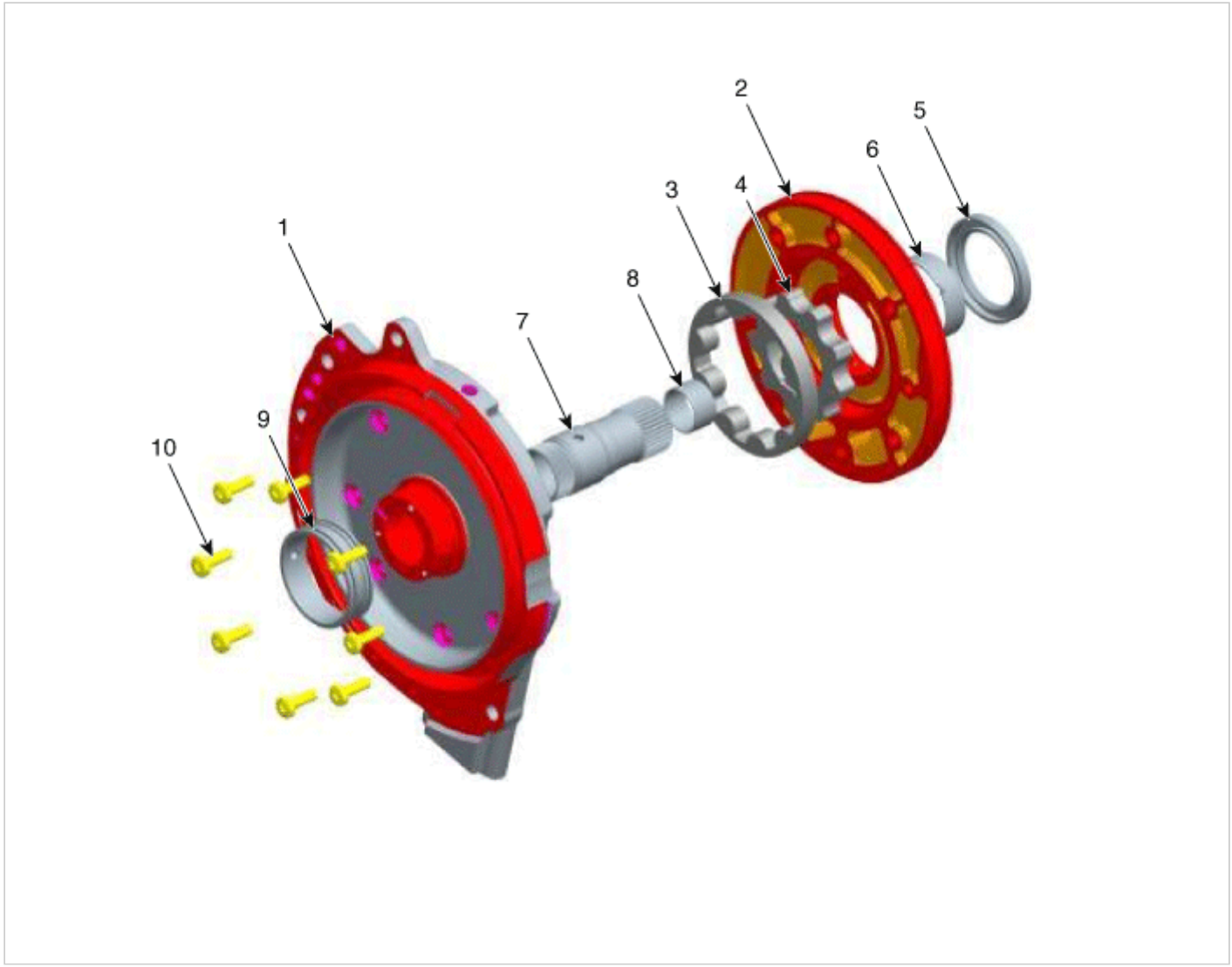
Automatic Transaxle System

Component Location



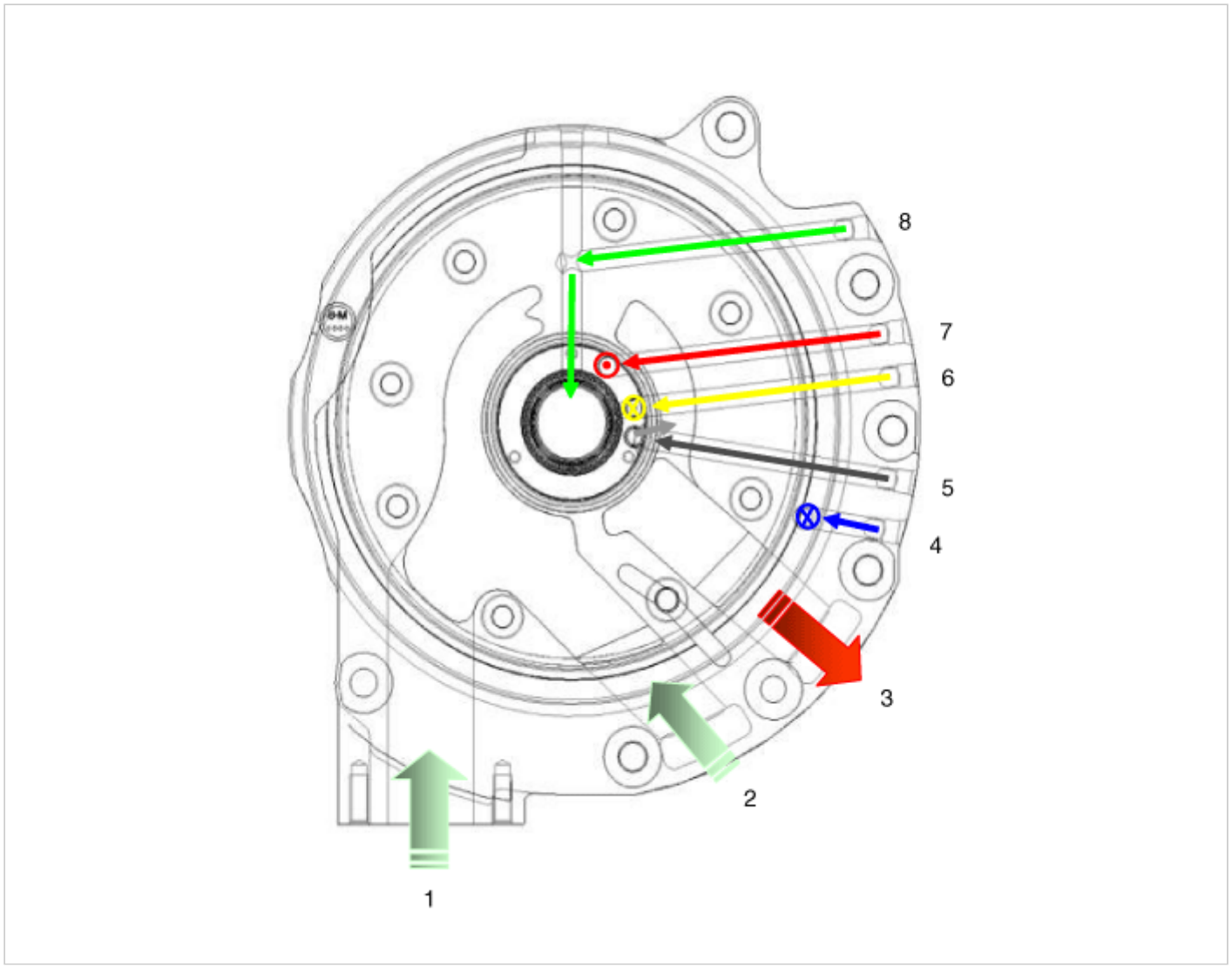
1. Automatic transaxle
2. Oil pump assembly

Component



1. Reaction shaft support assembly
2. Oil pump husing
3. Driven gear
4. Drive gear
5. Oil seal
6. Bush-Housing
7. Reaction shaft
8. Bush- Reaction shaft
9. Sleeve
10. Flange bolt

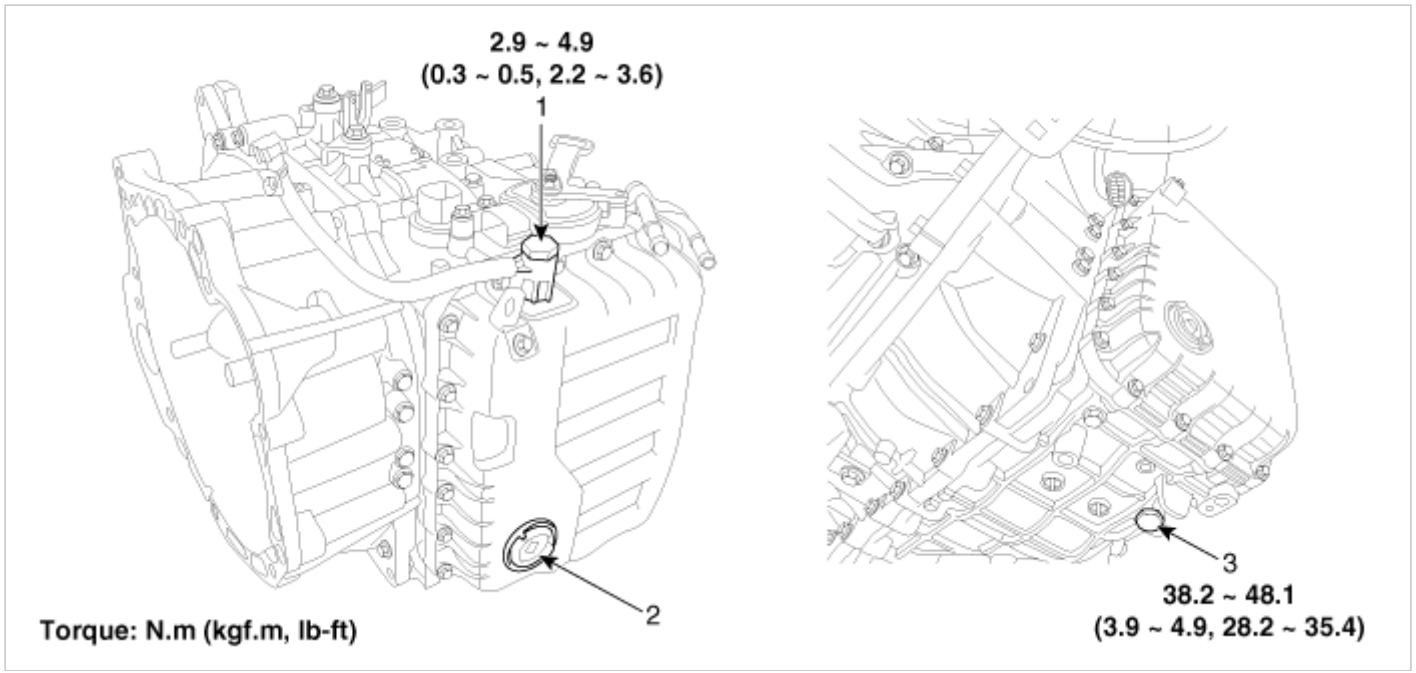
Oil Pump Operation Flow



1. Inhale(Oil filter)
2. Inhale(Valve body)
3. Outlet
4. 26/B operation pressure
5. 35R/C operation pressure
6. Lubrication
7. Line up clutch operation pressure
8. Line up clutch cancellation

Automatic Transaxle System

Components Location



1. ATF Injection hole(eyebolt)
2. Oil level plug
3. Oil drain plug

Automatic Transaxle System

Service Adjustment Procedure

Oil level Check

NOTICE

A check of ATF level is not normally required during scheduled services. If an oil leak is found, perform the oil level check procedure after replairs are completed.

⚠ CAUTION

When checking the oil level, be careful not to enter dust, foreign matters, etc. from fill hole.

1. Remove the ATF Injection hole(eyebolt) (A).

Eyebolt tightening torque:
2.9 ~ 4.9 N.m (0.3 ~ 0.5 kgf.m, 2.2 ~ 3.6 lb-ft)

CAUTION

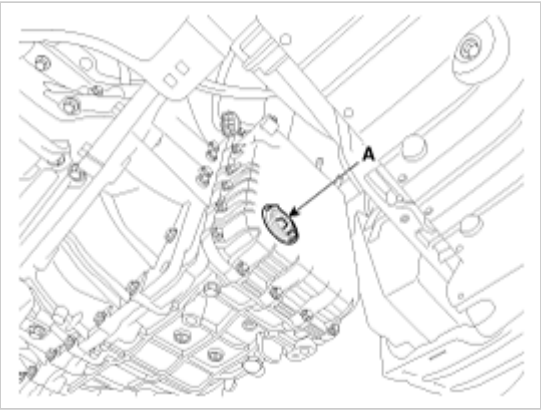
Always replace the O-Ring (A) of the eyebolt use new one whenever loosening eyebolt.

2. Add ATF SP-IV 700cc to the ATF injection hole.
3. Start the engine. (Don’t step on brake and accelerator simultaneously.)
4. Confirm that the temperature of the A/T oil temperature sensor is 50 ~ 60°C(122 ~ 140°F) with the GDS.
5. Shift the select lever slowly from “P” to “D”, then “D” to “P” and repeat one more at idle.

CAUTION

Stop in each gear position for 3 seconds.

6. Lift the vehicle, then remove the oil level plug (A) from the valve body cover.



⚠ CAUTION

At this time, the vehicle must be at a level state.

7. If the oil flows out of the overflow plug in thin steady stream, the oil level is correct.
   Then finish the procedure and tighten the oil plug.

NOTICE

Oil level check (excess or shortage) method

- Excess: Drain quantity exceed 900cc for two minutes.((50~60°C)122~140°F)
- Shortage: No oil flows out of the overflow plug.

⚠ CAUTION

If there is no damage at the automatic transaxle and the oil cooler, the oil cooler hose, transaxle case, valve body tightening state are normal, ATF must drop out after performing above 1 to 7 procedures. After performing above 1 to 7 procedures, if the oil doesn't drop out, inspect the automatic transaxle assembly.

⚠ CAUTION

The gasket of the oil level plug use new one.

Oil level plug tightening torque:

Tightening up stopper

8. Put down the vehicle with the lift and then tighten the eyebolt.

Replacement

NOTICE

ATF of 6 speed automatic transaxle doesn't be replaced. But, if the vehicle is severe use or business use, replace ATF every 60,000 miles for severe usage.
Severe usage is defined as

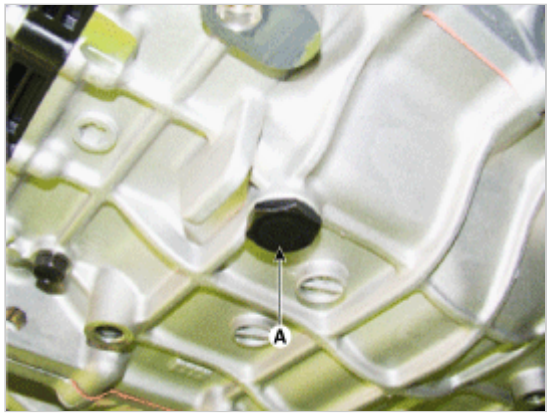
-

Driving in rough road (Bumpy, Gravel, Snowy, Unpaved road, etc)

- Driving in mountain road, ascent/descent
- Repetition of short distance driving
- More than 50% operation in heavy city traffic during hot weather above 32°C(89.6°F) .
- Police, Taxi, Commercial type operation or trailer towing, etc

1. Remove the drain plug (A) and reinstall the drain plug after draining ATF totally.

Drain plug tightening torque:
38.2 ~ 48.1 N.m (3.9 ~ 4.9 kgf.m, 28.2 ~ 35.4 lb-ft)



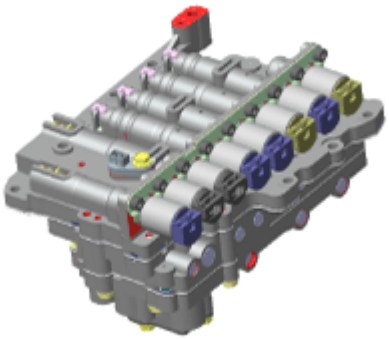
⚠ CAUTION
The gasket of the drain plug use new one.

2. Fill the oil about 5 liters.
3. Check the oil level.
(Refer to Hydraulic System - "Fluid")

Automatic Transaxle System

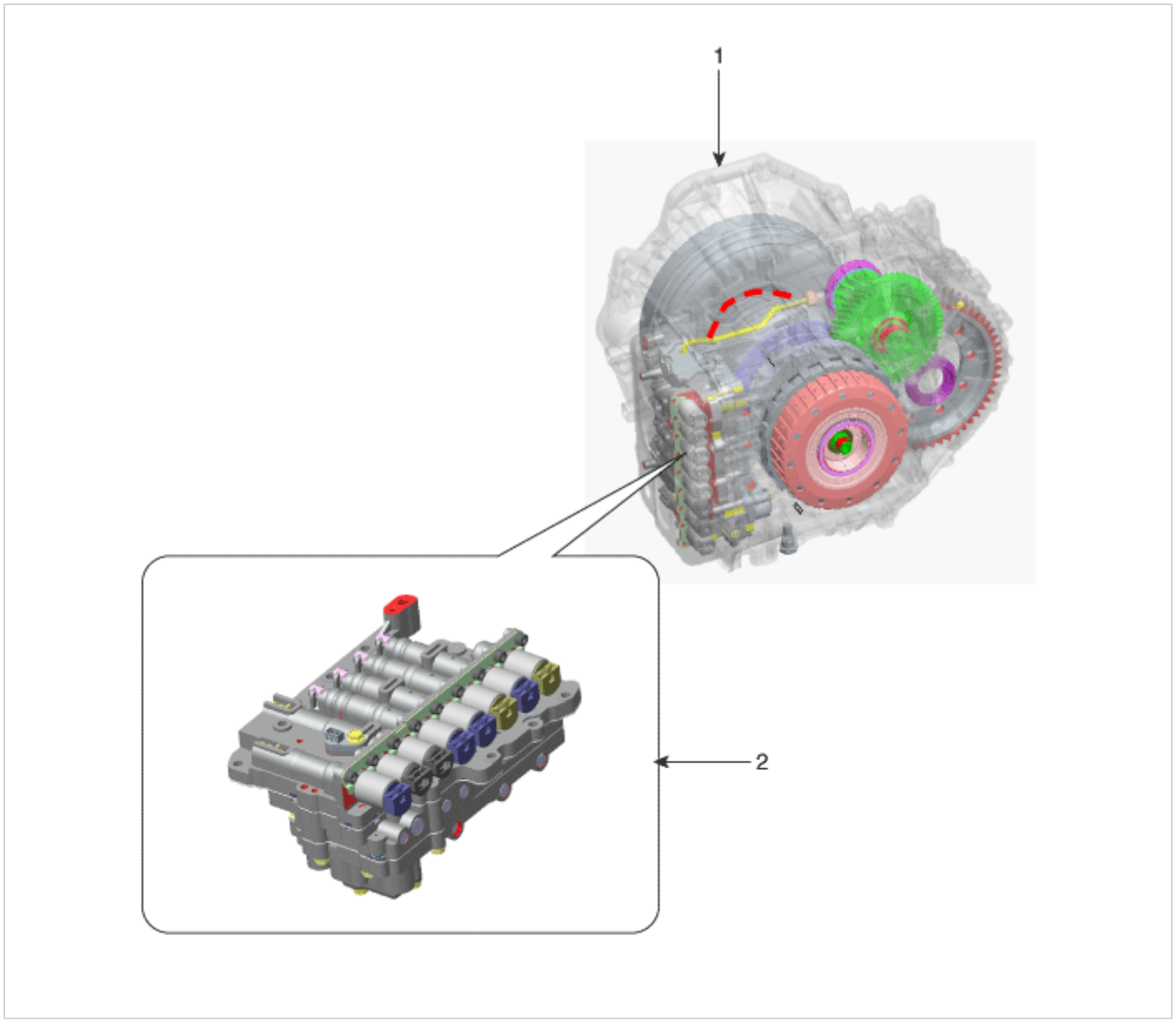
Description

The valve body is essential to automatic transaxle control and consists of various valves used to control the oil feed from the oil pump. Specifically, these valves consist of pressure regulator valves, oil redirection valves, shift valves, and manual valves. The body also features electronic solenoid valves that ensure smooth gear changes.

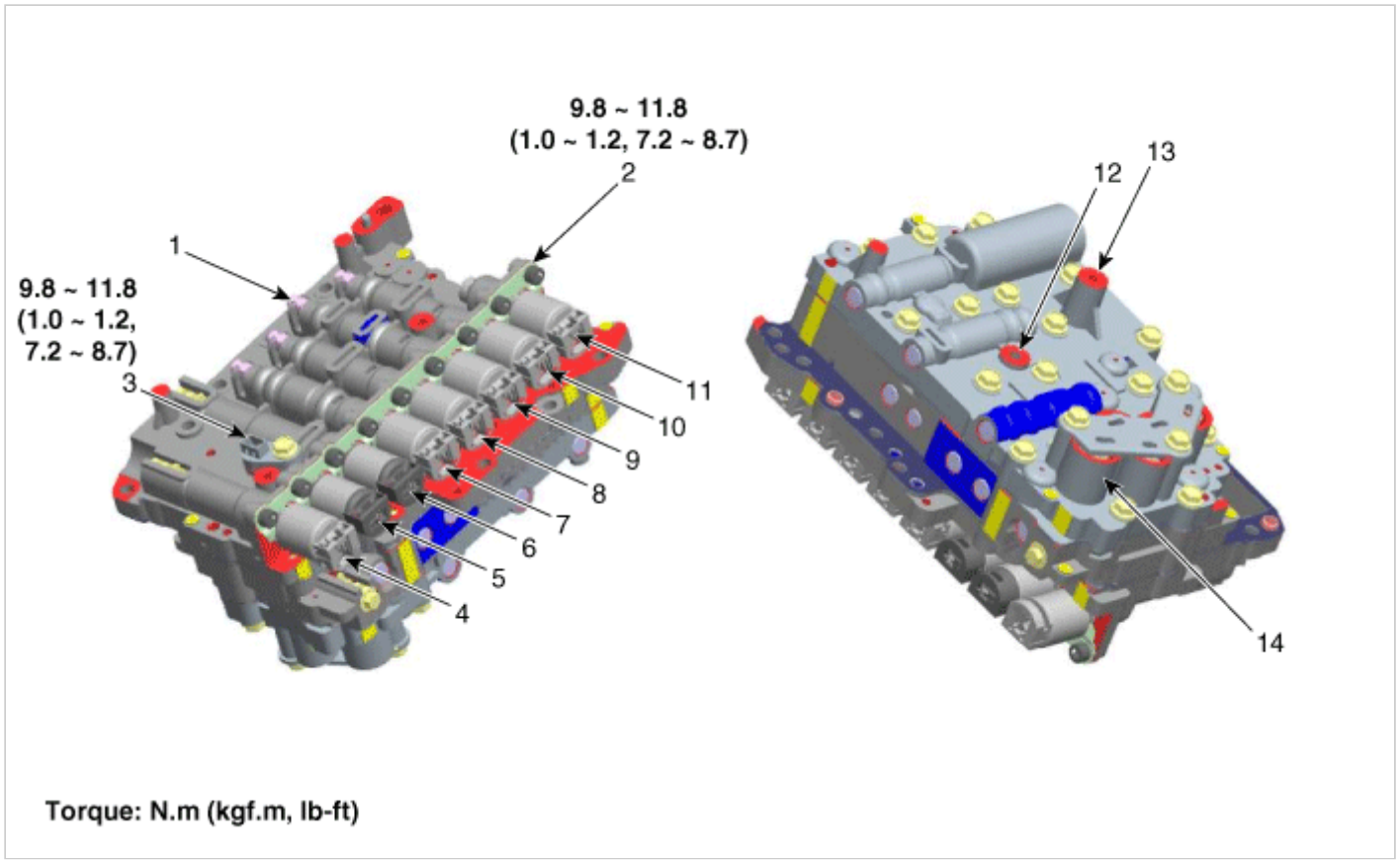


Automatic Transaxle System

Components Location

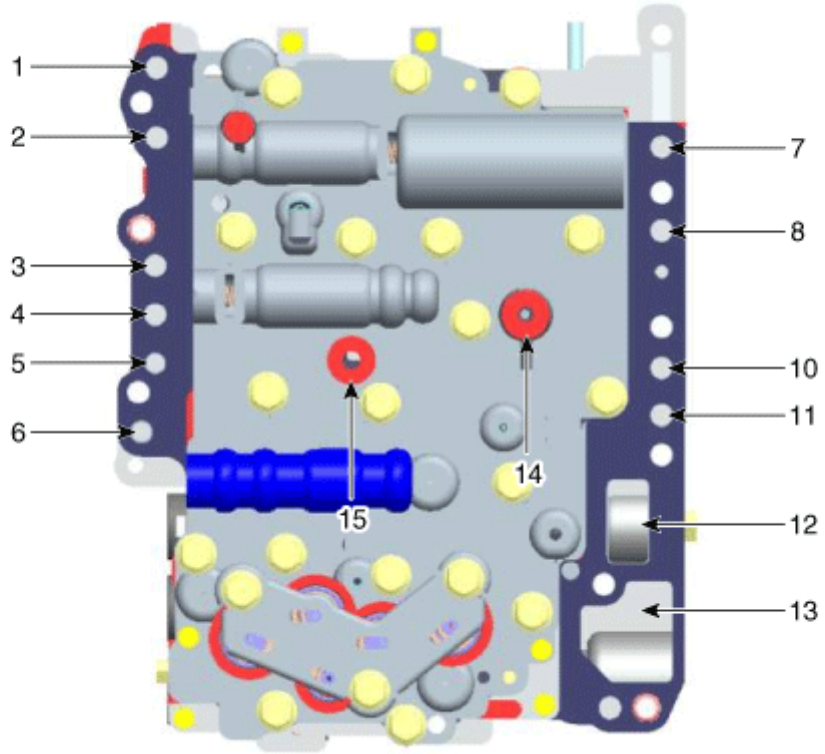


1. Automatic transaxle
2. Valve body assembly



1. Pressure Control Valve(PCV) adjust screw
2. Solenoid valve bracket
3. Oil temperature sensor
4. Line Pressure Control Solenoid Valve
5. SS-A Solenoid Valve(ON/OFF)
6. SS-B Solenoid Valve(ON/OFF)
7. Overdrive Clutch Control Solenoid Valve(OD/C)
8. Underdrive Brake Control Solenoid Valve(UD/B)
9. 26 Brake Control Solenoid Valve(26/B)
10. 35R Clutch Control Solenoid Valve(35R/C)
11. Torque Converter Control Solenoid Valve (T/CON)
12. Accumulator
13. Low & reverse brake(LR/B)pressure flow hole
14. Under drive brake(UD/B)pressure flow hole

Valve Body Flow



1. To cooler
2. From cooler
3. Lubrication(rear)
4. OD Clutch pressure
5. Reducing pressure (red2)
6. Reducing pressure (red1)
7. From damper pressure
8. To damper pressure
9. Lubrication(front)
10. 35R Clutch pressure
11. 26 Brake pressure
12. From oil pump
13. To oil pump
14. Underdrive(UD) Brake pressure
15. Low & reverse pressure

Automatic Transaxle System

Removal

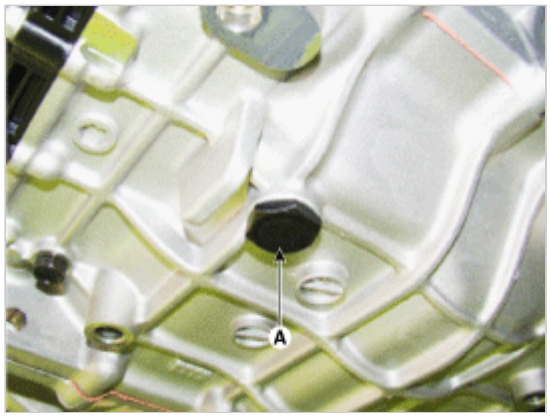
1. Remove the air duct.
   (Refer to Engine Mechanical System - "Air cleaner")
2. Remove the battery and the battery tray.
   (Refer to Engine Electrical System - "Battery")

3. Remove the under cover.

4. Drain the coolant.
   (Refer to Engine Mechanical System - "Coolant")

5. Remove the drain plug (A) and reinstall the drain plug after draining ATF totally.

   Drain plug tightening torque:
   38.2 ~ 48.1 N.m (3.9 ~ 4.9 kgf.m, 28.2 ~ 35.4 lb-ft)



> **⚠ CAUTION**
> The gasket of the drain plug use new one.

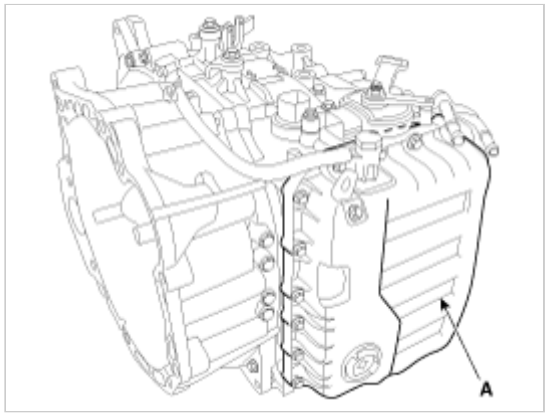
6. Remove the ATF Injection hole(eyebolt) (A).

   Eyebolt tightening torque:
   2.9 ~ 4.9 N.m (0.3 ~ 0.5 kgf.m, 2.2 ~ 3.6 lb-ft)

> **⚠ CAUTION**
> The O-Ring (A) of the eyebolt use new one.

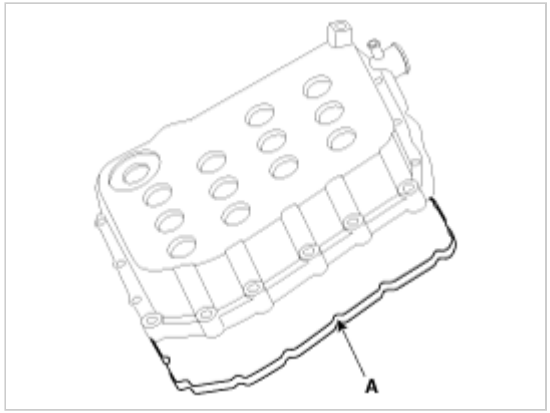
7. Remove the valve body cover (A).

Tightening torque:
(A) 13.7 ~ 15.7 N.m (1.4 ~ 1.6 kgf.m, 10.1 ~ 11.6 lb-ft)



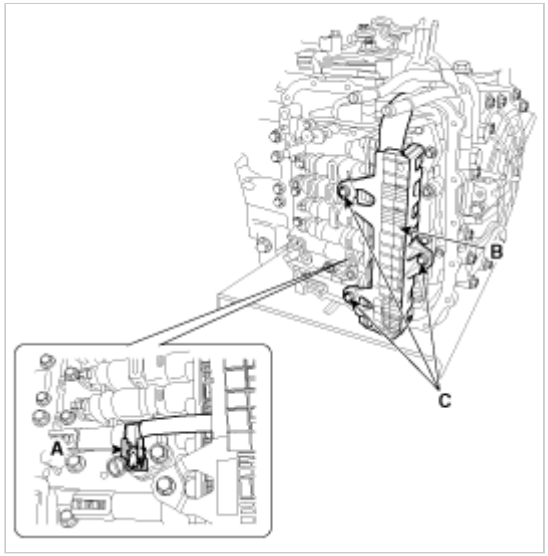
⚠ CAUTION

- Use new valve body gasket (A).



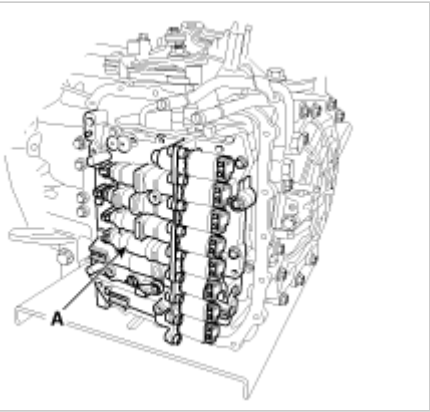
8. Remove the bolts (C) after disconnecting the solenoid valve connector (B) and the oil temperature sensor connector (A).

Tightening torque:
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



9. Remove the valve body assembly (A).

Tightening torque:
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



Installation

1. Install in the reverse order of removal.

NOTICE

- Adding Automatic Transaxle Fluid(ATF).
  (Refer to Hydraulic System - "Fluid")
- Perform Transaxle Control Module(TCM) learning after replacing the valve body to prevent slow transaxle response, jerky acceleration and jerky startup.
  (Refer to Automatic Transaxle Control System - "Repair procedures")

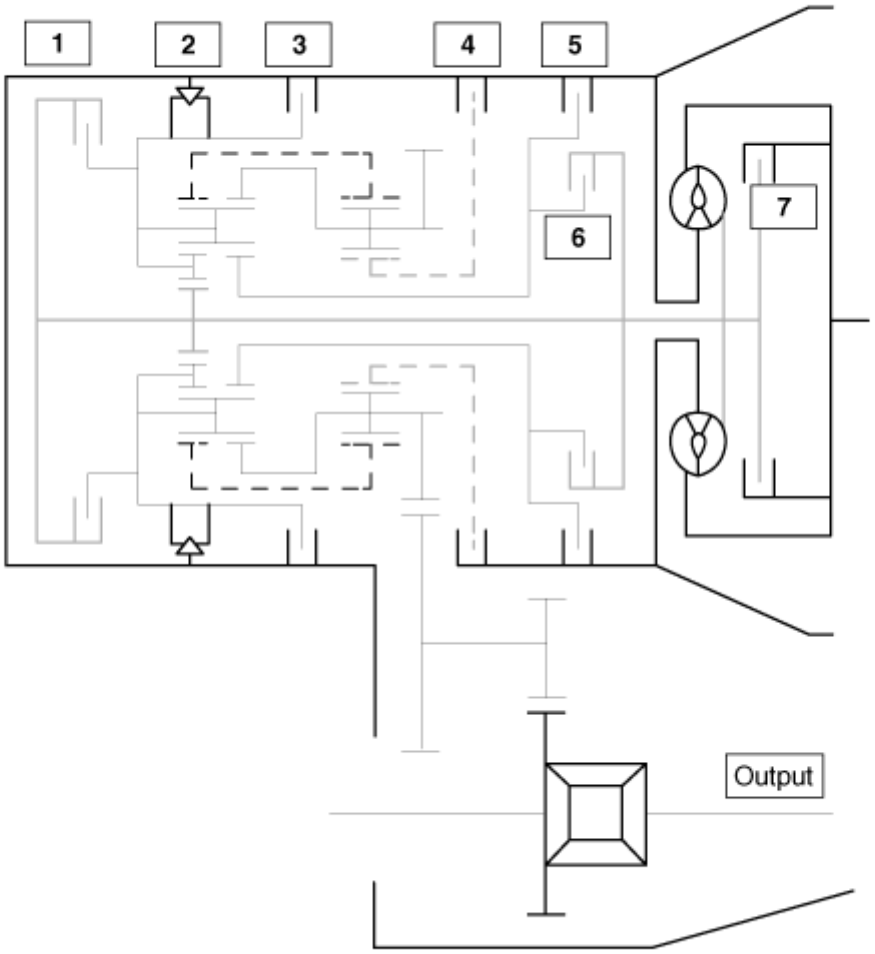
Automatic Transaxle System

Description

The 6-speed automatic transaxle consists of an overdrive clutch (OD/C), a one-way clutch (OWC), a lower and reverse brake (LR/B), an underdrive brake (UD/B), a 26 brake (26/B), and a 35R clutch (35R/C). These clutches and brakes are operated by controlling the hydraulic pressure.

Automatic Transaxle System

Components Location



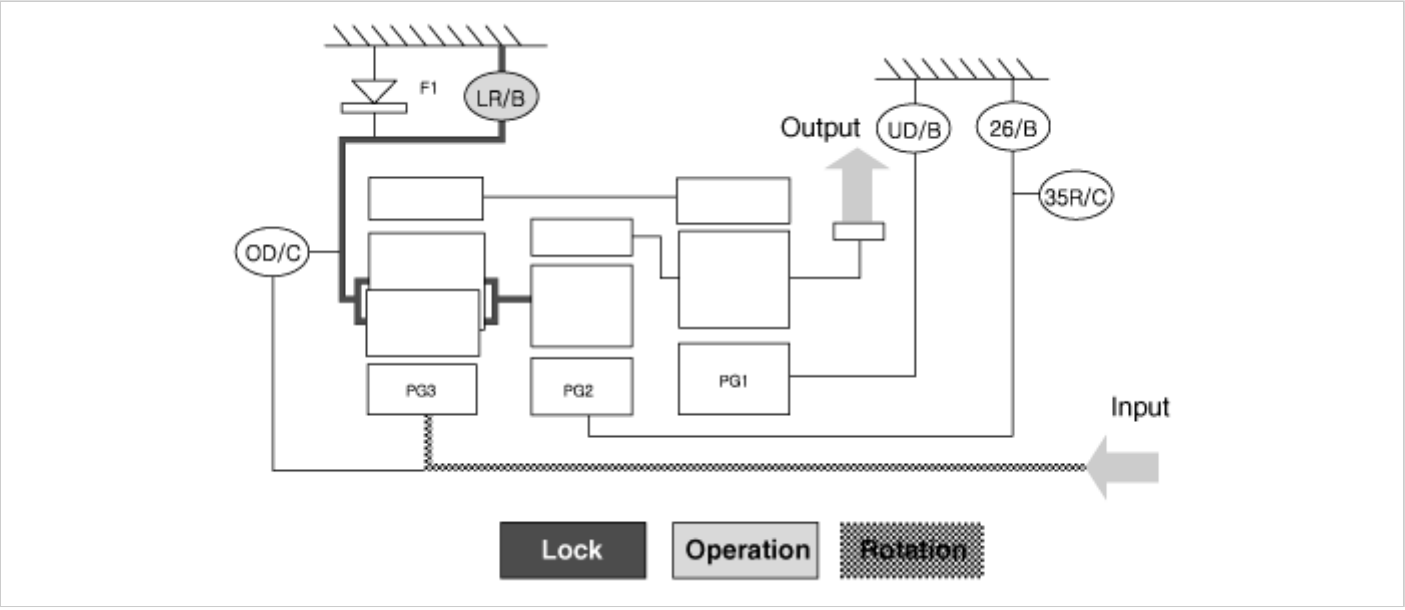
1. Overdrive clutch (OD/C)
2. One way clutch (OWC)
3. Low & Reverse brake (LR/B)
4. Underdrive brake (UD/B)
5. 26 brake(26/B)
6. 35R clutch (35R/C)
7. Damper clutch (D/C)

Automatic Transaxle System

Power Flow Chart

P,N	UD/B	LR/B	26/B	35R/C	OD/C	OWC

		●				



▣ Direction of Rotation

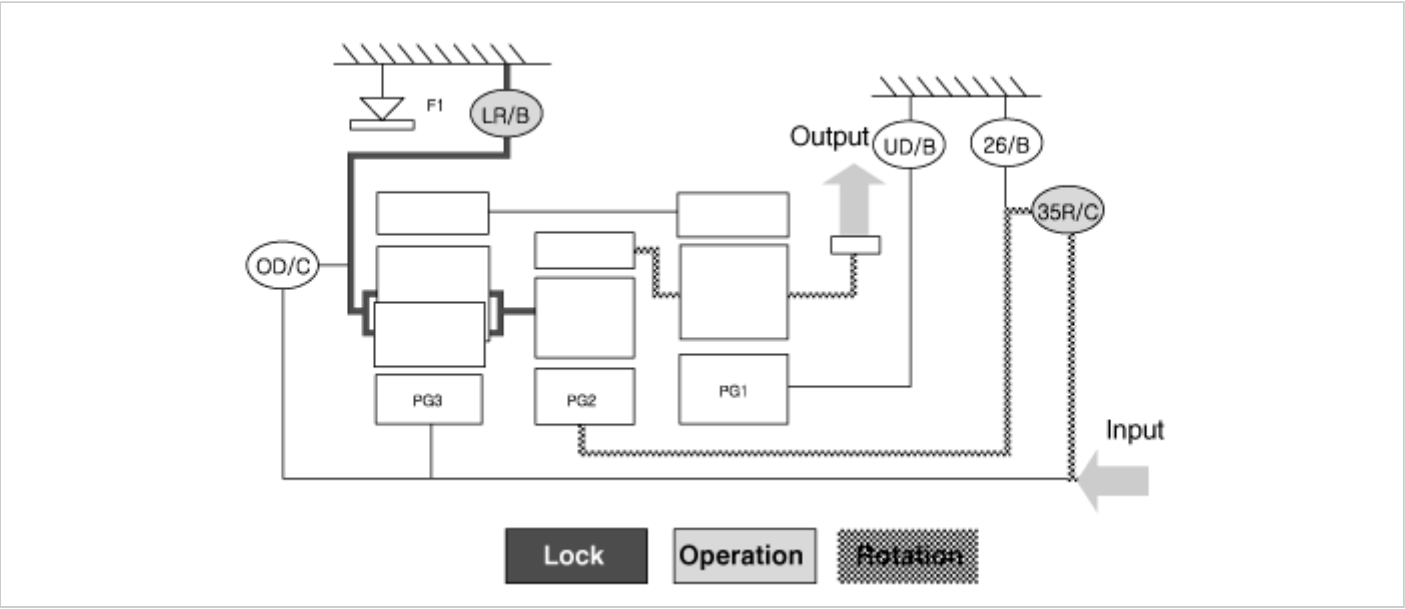
▸Lower & Reverse Brake (LR/B) Activation → Overdrive (O/D) Hub Lock → Mid & Rear P/C Lock

▸Input Shaft Rotation → Rear Sun Gear Rotation → Rear Inner Pinion Rotation (Reverse) → Rear Outer Pinion Rotation → Rear Annulus Gear Rotation → Front Annulus Gear Rotation → Front Pinion Rotation → Front Sun Gear Rotation (Reverse) → Underdrive (U/D) Hub Rotation (Reverse)

▸Input shaft rotation → Overdrive Clutch (OD/C) Retainer Rotation

▸Input shaft rotation → 35R Clutch Rotation

	UD/B	LR/B	26/B	35R/C	OD/C	OWC
R		●		●		



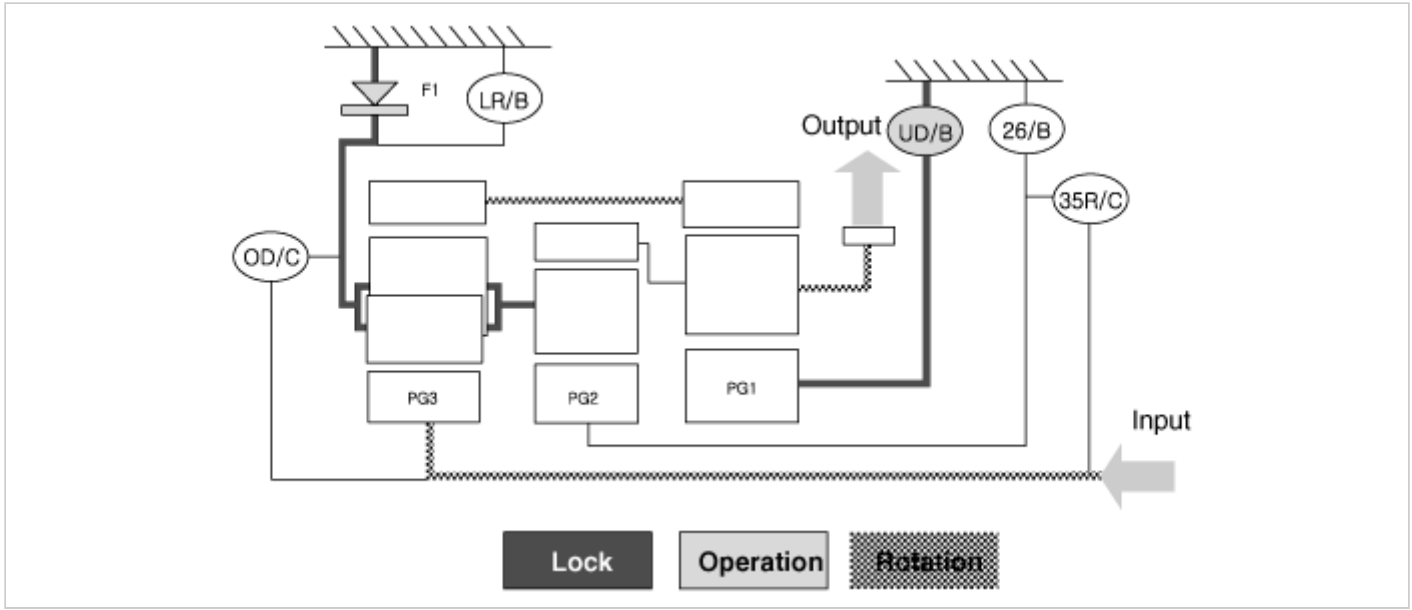
▣ Power Delivery Route

▸ Middle carrier locked and middle sun gear in rotation

▸ Rotating the middle planetary gear"s sun gear while its carrier is locked in place slows down and reverse rotates the annulus gear (front carrier), resulting in power transfer to the front carrier.

▸ The rear planetary gear"s rear and front annulus gears rotate at a reduced rate, resulting in reverse, zero load rotation of the front planetary gear"s front sun gear.

	UD/B	LR/B	26/B	35R/C	OD/C	OWC
D1	●	(○)				●



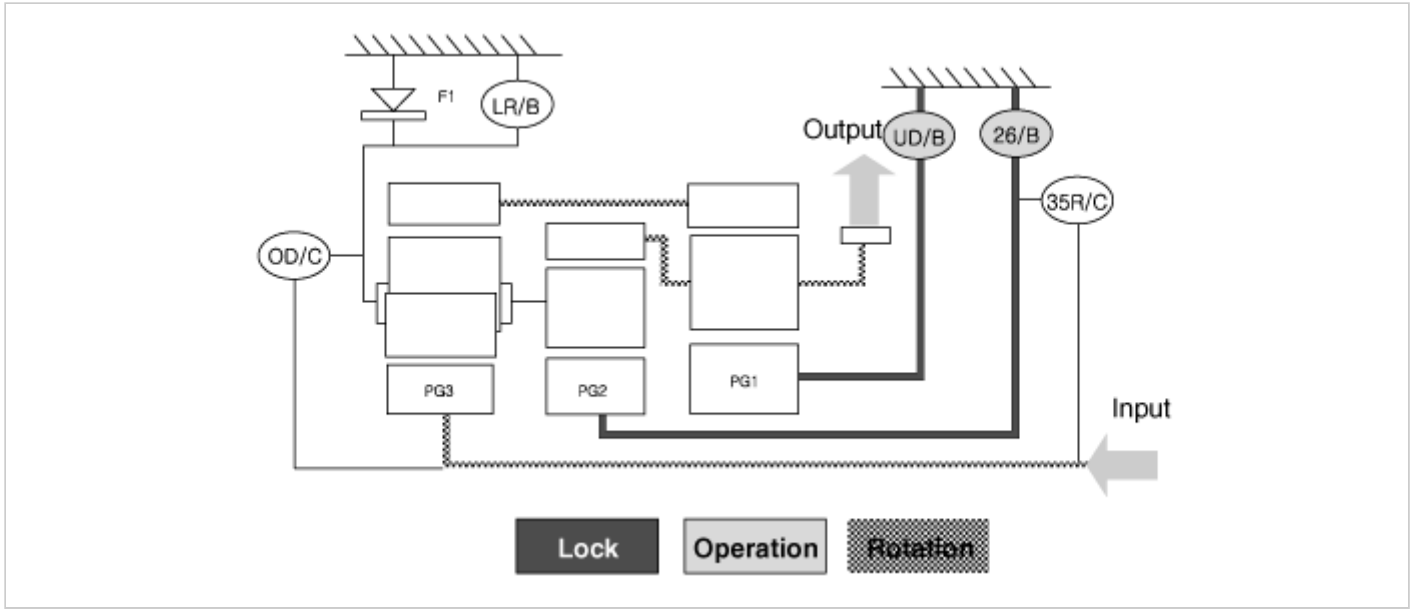
▣ Power Delivery Route

▸ Front sun gear and middle & rear carrier locked and rear sun gear in constant rotation

▸ When the rear sun gear is rotated, power is reduced at the rear planetary gear and then delivered to the rear and front annulus gears. The power is then reduced again at the front planetary gear, whose sun gear is locked in place, and then delivered to the front carrier.

▸ Here, the middle annulus gear, which comprises of a single unit with the front carrier, rotates and results in reverse, zero load rotation of the middle sun gear.

D2	UD/B	LR/B	26/B	35R/C	OD/C	OWC
	●		●			

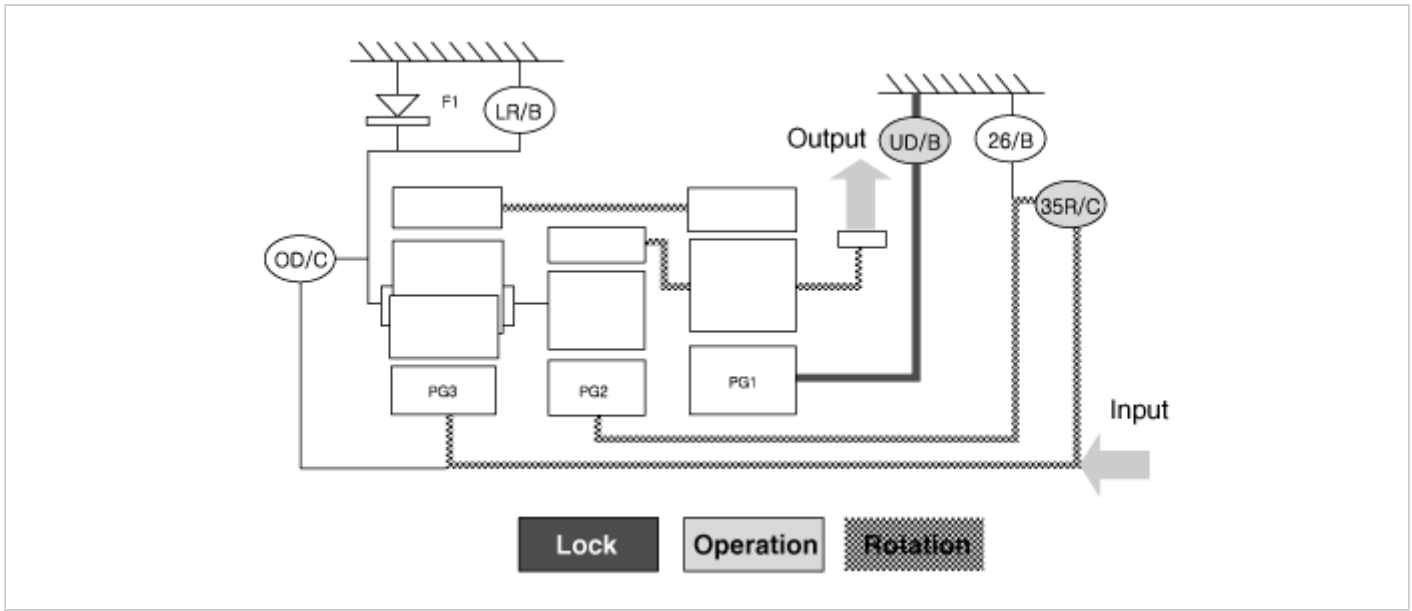


▣ Power Delivery Route

▸ Front sun gear and middle sun gear locked and rear sun gear in constant rotation

▸ Rotating the rear sun gear delivers power to the rear & front annulus gears, and reaction from the front carrier and the middle annulus gear, to which the sun gear is attached, transfers to the middle and rear carriers, resulting in power equilibrium and power transfer to the front carrier.

D3	UD/B	LR/B	26/B	35R/C	OD/C	OWC
	•			•		

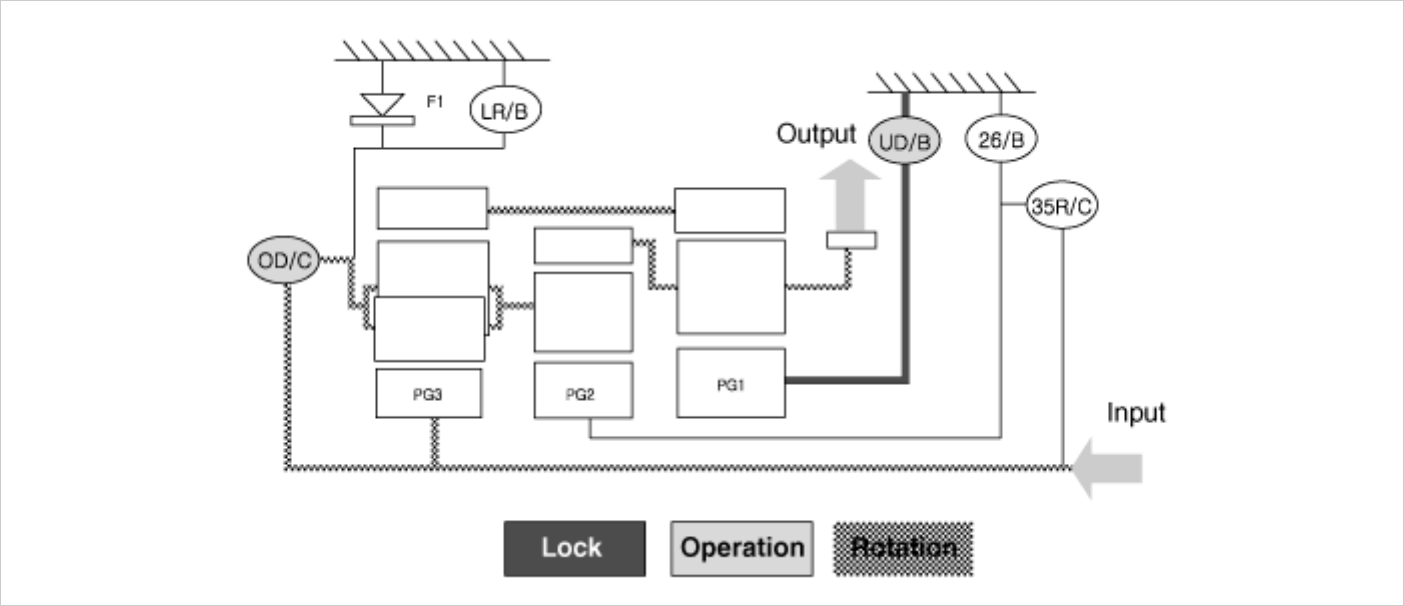


▣ Power Delivery Route

▸ Front sun gear locked and middle and rear sun gears in rotation

▸ Rotating the middle sun gear and the rear sun gear transfers power to the rear and front annulus gears, and reaction from the front carrier and the middle annulus gear, to which the sun gear is attached, transfers to the middle and rear carriers, resulting in power equilibrium and power transfer to the front carrier.

D4	UD/B	LR/B	26/B	35R/C	OD/C	OWC
	●				●	



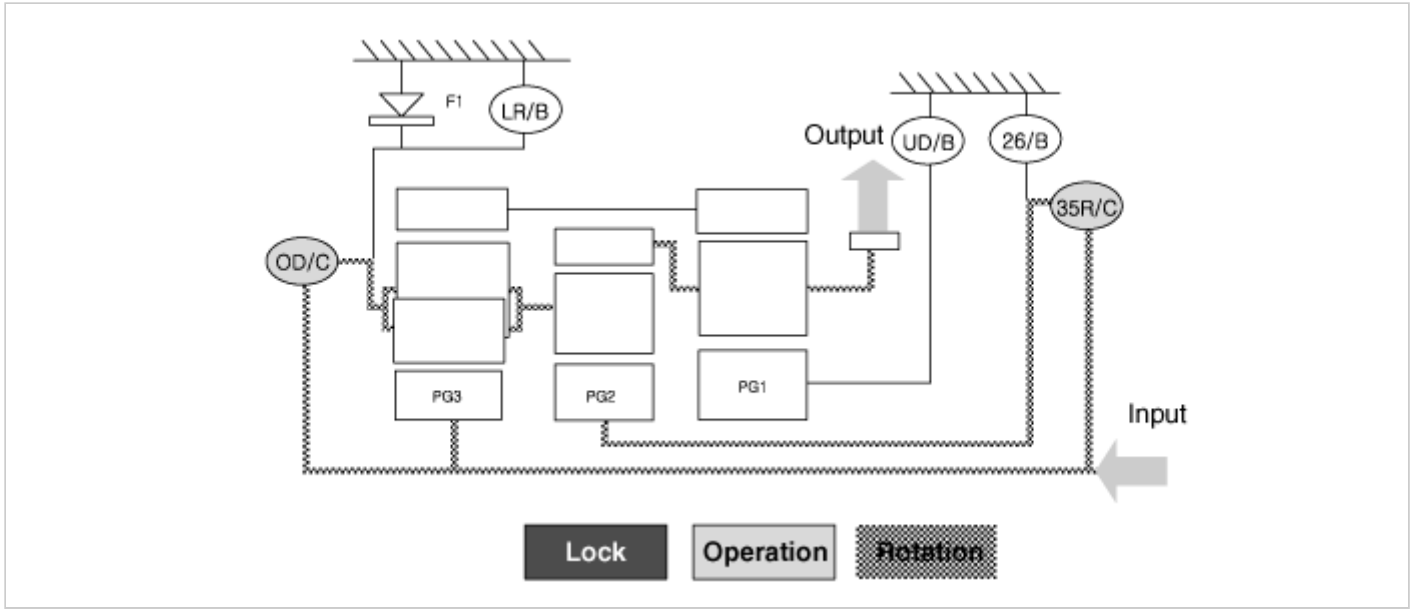
▣ Power Delivery Route

▸ Front sun gear locked and rear carrier and rear sun gears in rotation

▸ Activation of the overdrive clutch (OD/C) synchronizes the rear planetary gear"s carrier and sun gears. The 1:1 rotation ratio passes through the rear and front annulus gears and reaches the front planetary gear"s front carrier, to which the sun gear is attached.

▸ Here, the middle planetary gear"s middle sun gear rotates at a faster rate in the normal direction and at zero load due to the actions of the reduced annulus gear and the carrier having a 1:1 rotation ratio.

D5	UD/B	LR/B	26/B	35R/C	OD/C	OWC
				●	●	



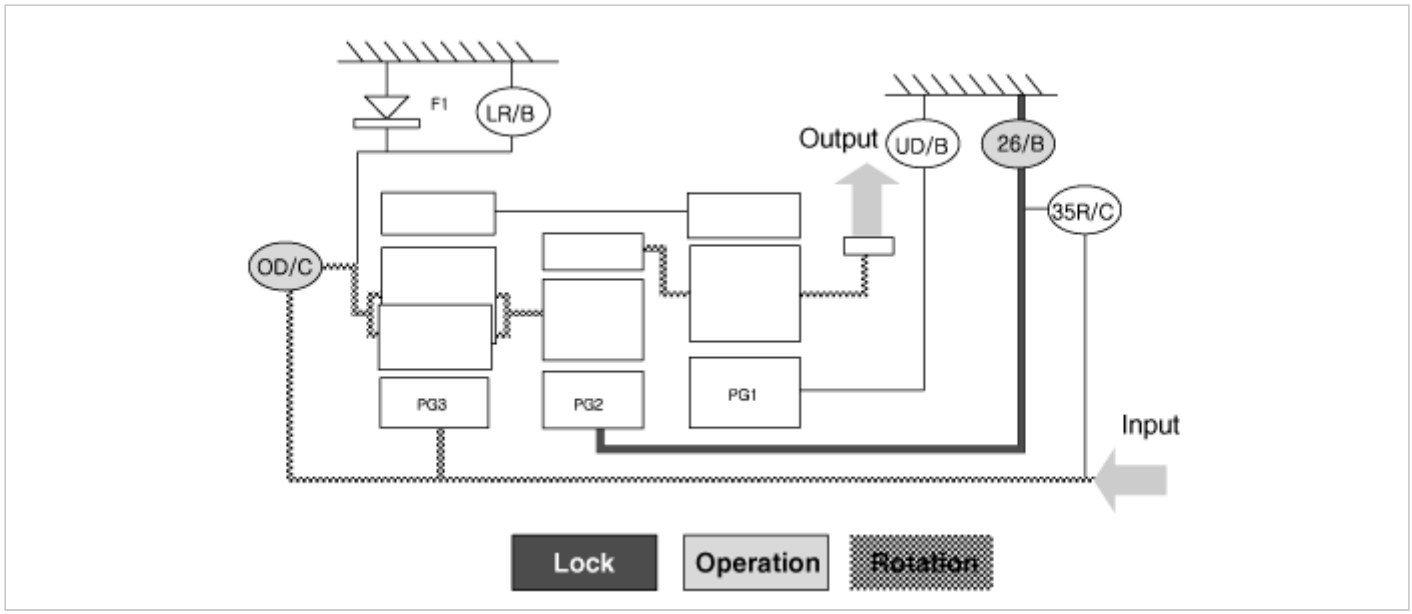
▣ Power Delivery Route

▸ Middle and rear carriers, middle sun gear, and rear sun gear in rotation

▸ The middle planetary gear"s middle carrier and sun gear rotate simultaneously, resulting in the 1:1 rotation ratio being transferred to the middle annulus gear (front carrier).

▸ Here, the rear planetary gear rotates in a 1:1 rotation ratio, as it would when the 4th gear is engaged; however, the front planetary gear remains unrestrained and the front sun gear rotates in the normal direction, at a zero load, and at a rotation ratio of 1:1.

	UD/B	LR/B	26/B	35R/C	OD/C	OWC
D6			●		●	



▣ Power Delivery Route

▸ Middle carrier in rotation and middle sun gear locked

▸ When the middle planetary gear"s sun gear is locked in place and the train"s carrier"s allowed to rotate, the middle annulus gear increases its rate of rotation and transfers power to the front carrier.

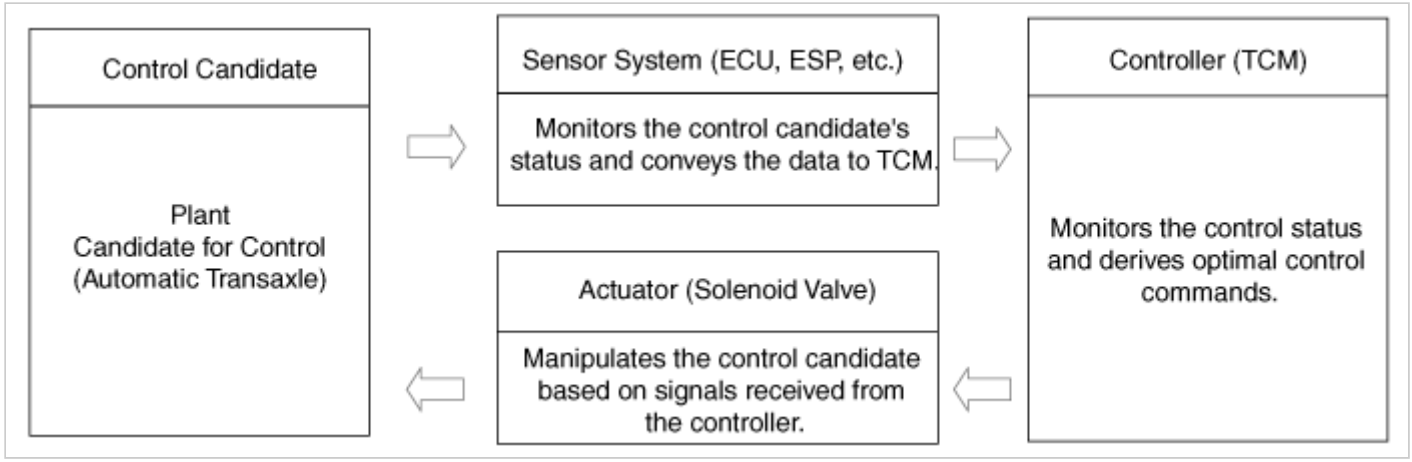
▸ Here, the rear planetary gear maintains a 1:1 rotation ratio as it would when 4th or 5th gear is engaged; however, the front planetary gear remains unrestrained and the front sun gear rotates at a faster rate in the normal direction and at zero load.

Automatic Transaxle System

Description

Automatic transaxle system relies on various measurement data to determine the current control status and extrapolate the necessary compensation values. These values are used to control the actuators and achieve the desired control output. If a problem with the drivetrain, including the transaxle, has been identified, perform self-diagnosis and basic transaxle inspection (oil and fluid inspection) and then check the control system"s components using the diagnosis tool.

Control System Composition



Automatic Transaxle System

Adjustment

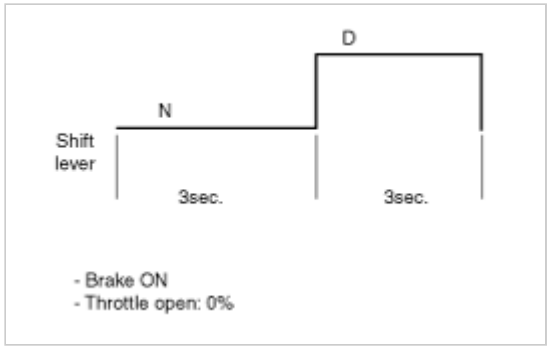
Transaxle Control Module(TCM) Learning

When shift shock is occurred or parts related with the transaxle are replaced, TCM learning should be performed.
In the following case, TCM learning is required.

- Transaxle assembly replacement
- TCM replacement
- TCM upgrading

TCM learning procedure

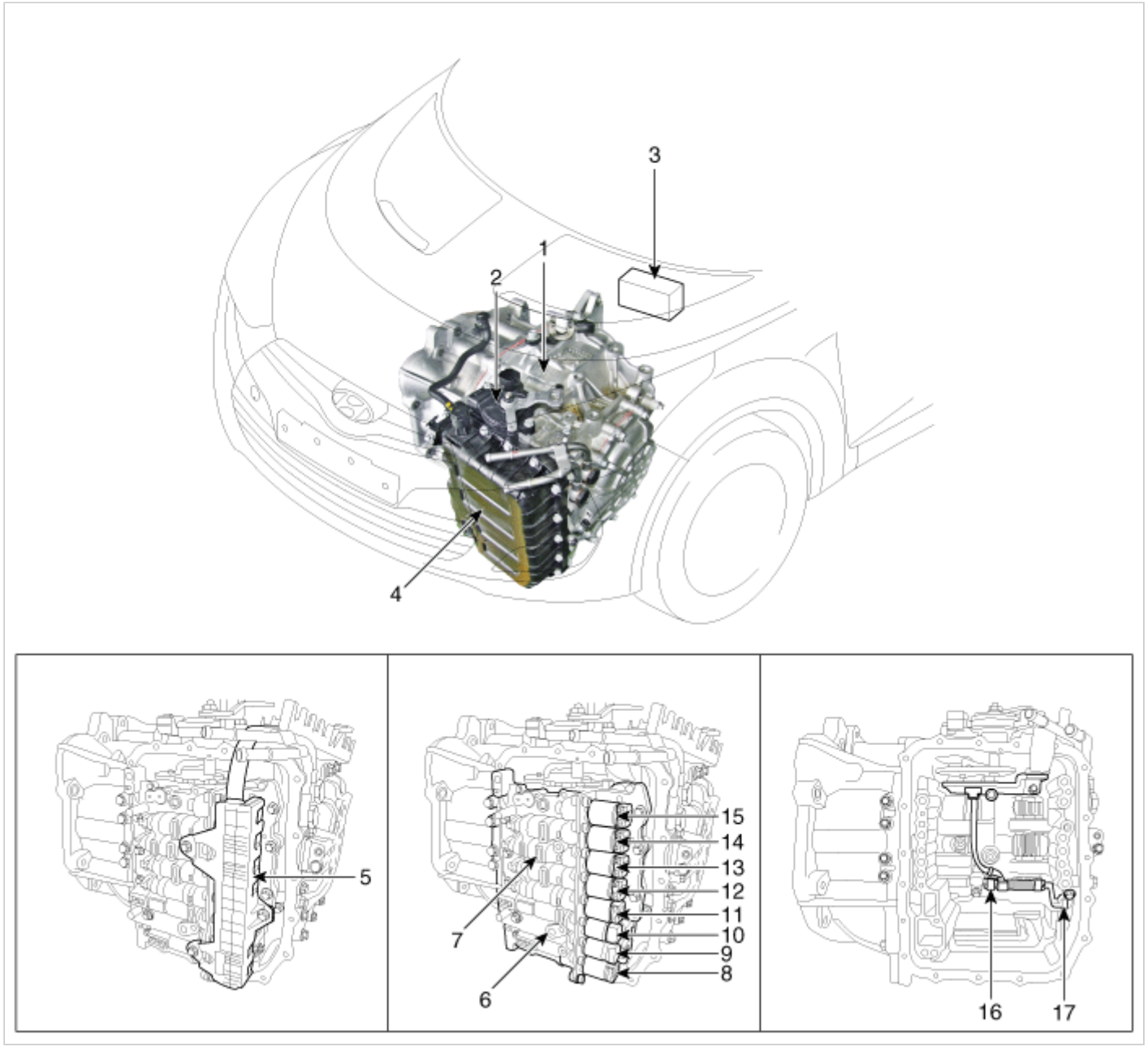
1. Automatic Transaxle Fluid (ATF) temperature: 40 ~ 100°C (104 ~ 212°F)
2. Static learning
   Repeat the below shift pattern four times or more with stepping on the brake.



3. Driving learning
   Drive the vehicle from a stop in D through all gears 1st, 2nd, 3rd, 4th, 5th and 6th gear while holding the throttle steady at the specified Throttle Position Sensor (TPS) value (15~25%).

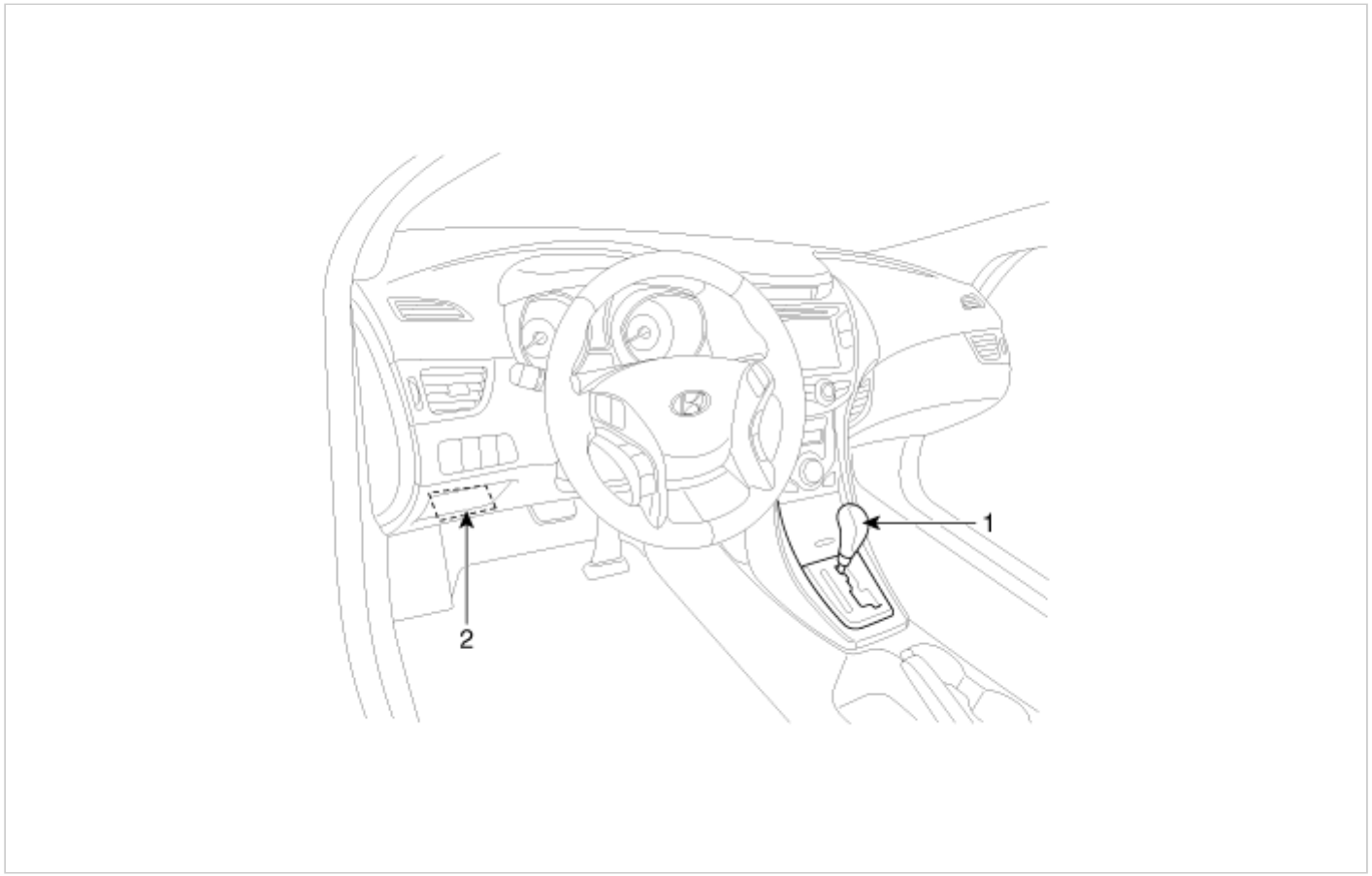
Automatic Transaxle System

Components Location



1. Automatic transaxle
2. Inhibitor switch
10. SS-B Solenoid Valve(ON/OFF)
11. Overdrive Clutch Control Solenoid Valve(OD/C)

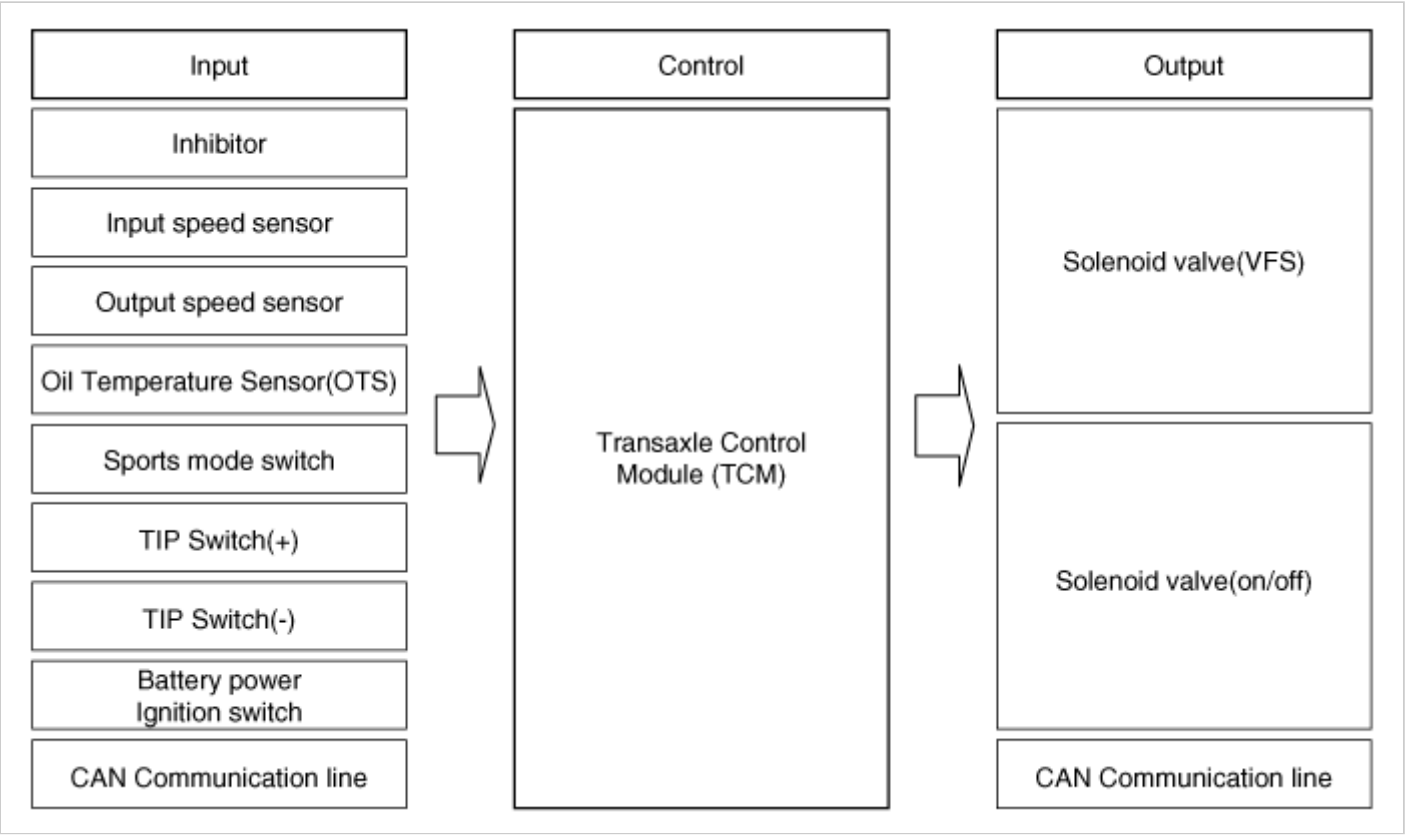
3. Engine Control Module(ECM)
4. Valve body cover
5. Solenoid valve connect
6. Oil temperature sensor
7. Valve body assembly
8. Line Pressure Control Solenoid Valve
9. SS-A Solenoid Valve(ON/OFF)
12. Underdrive Brake Control Solenoid Valve(UD/B)
13. 26 Brake Control Solenoid Valve(26/B)
14. 35R Clutch Control Solenoid Valve(35R/C)
15. Torque Converter Control Solenoid Valve (T/CON)
16. Output speed sensor
17. Input speed sensor



1. Shift lever
2. Data Link Connector (DLC)

Automatic Transaxle System

Circuit Diagram



Automatic Transaxle System

Description

Transaxle Control Module (TCM) is the automatic transaxle"s brain. The module receives and processes signals from various sensors and implements a wide range of transaxle controls to ensure optimal driving conditions for the driver. TCM is programmed for optimal response to any on-road situation. In the event of a transaxle failure or malfunction, TCM stores the fault information in memory so that the technician may reference the code and quickly repair the transaxle.

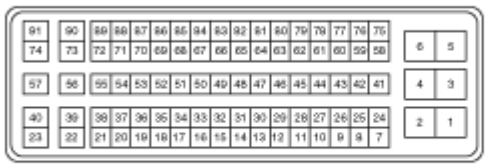
Functions

- Monitors the vehicle"s operating conditions to determine the optimal gear setting.
- Performs a gear change if the current gear setting differs from the identified optimal gear setting.
- Determines the need for damper clutch (D/C) activation and engages the clutch accordingly.
- Calculates the optimal line pressure level by constantly monitoring the torque level and adjusts the pressure accordingly.
- Diagnoses the automatic transaxle for faults and failures.

Automatic Transaxle System

1. TCM connector and terminal function

TCM Connector [A]



TCM Connector [B]

2. TCM terminal function

Connector [A]

Pin	Description	Pin	Description
22	Overdrive clutch control solenoid valve	73	Inhibitor switch signal "S4"
23	Pressure control solenoid valve	74	Inhibitor switch signal "S2"
26	SS-B solenoid valve (ON/OFF)	75	Inhibitor switch signal "S3"
37	Sports mode up switch	87	Solenoid power 1
38	Sports mode select switch	88	Solenoid power 2
39	Oil temperature sensor (+)	89	SS-A solenoid valve A (ON/OFF)
43	Underdrive brake control solenoid valve	94	Inhibitor switch signal "S1"
44	35R clutch control solenoid valve	95	Output speed sensor power
45	Torque converter control solenoid valve	96	Input speed sensor power
46	26 brake control solenoid valve	99	Input speed sensor signal
58	Sports mode down switch	100	Output speed sensor signal
59	Oil temperature sensor (-)		

Connector [B]

Pin	Description	Pin	Description
1	GND (Power)	5	VB
2	GND (Power)	60	CAN High
3	VB (Battery voltage)	68	IG.1 (Ignition key)
4	Ground (Power)	77	CAN Low

3. TCM Terminal input/ output signal

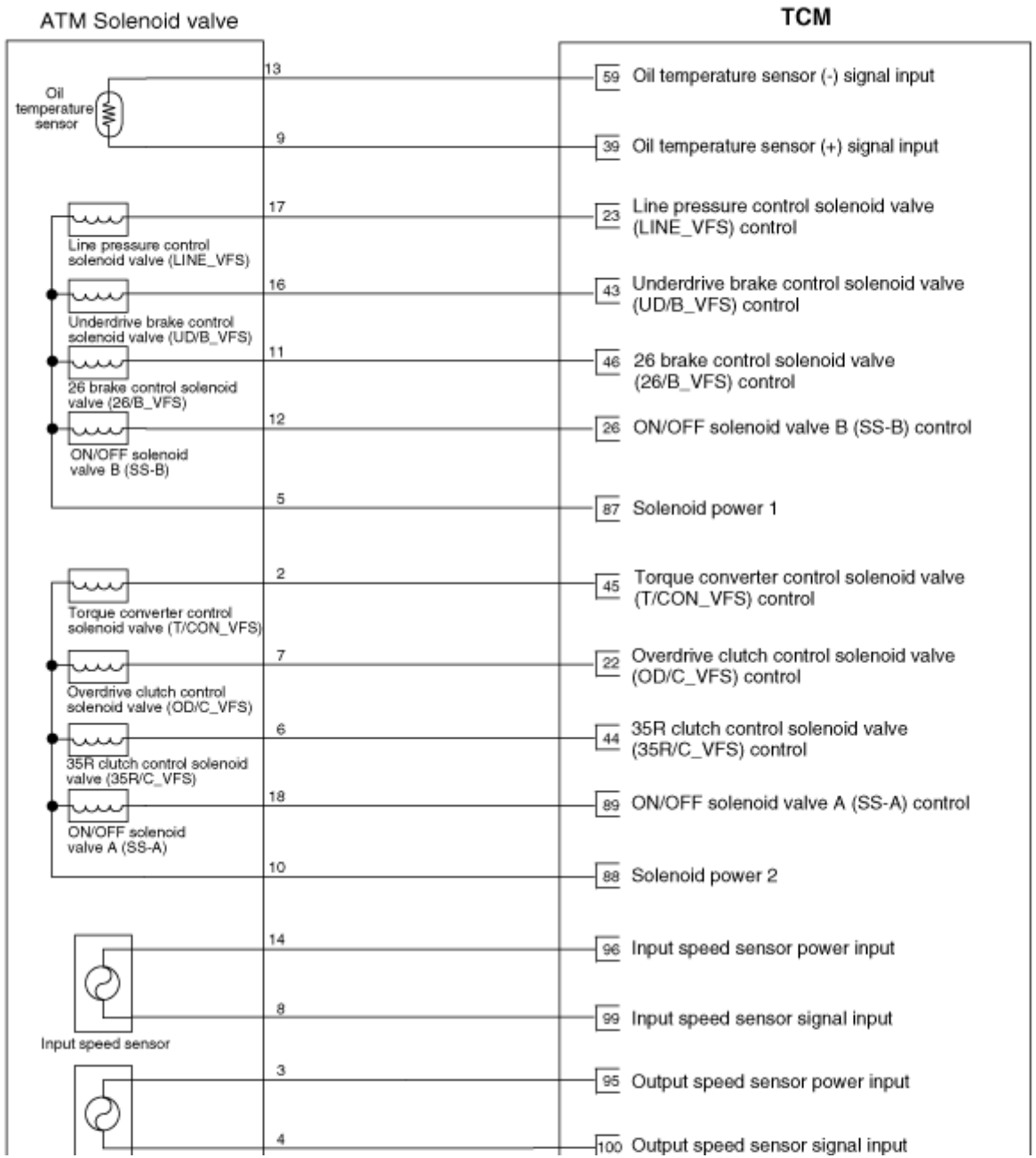
Connector [A]

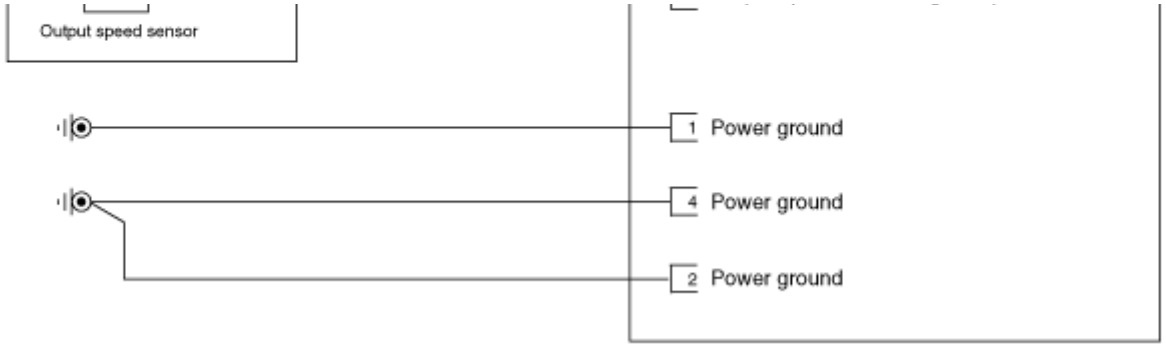
Pin	Description	Condition	Input/output value	
			Type	Level
	Overdrive clutch control solenoid valve			0V/Battery voltage level

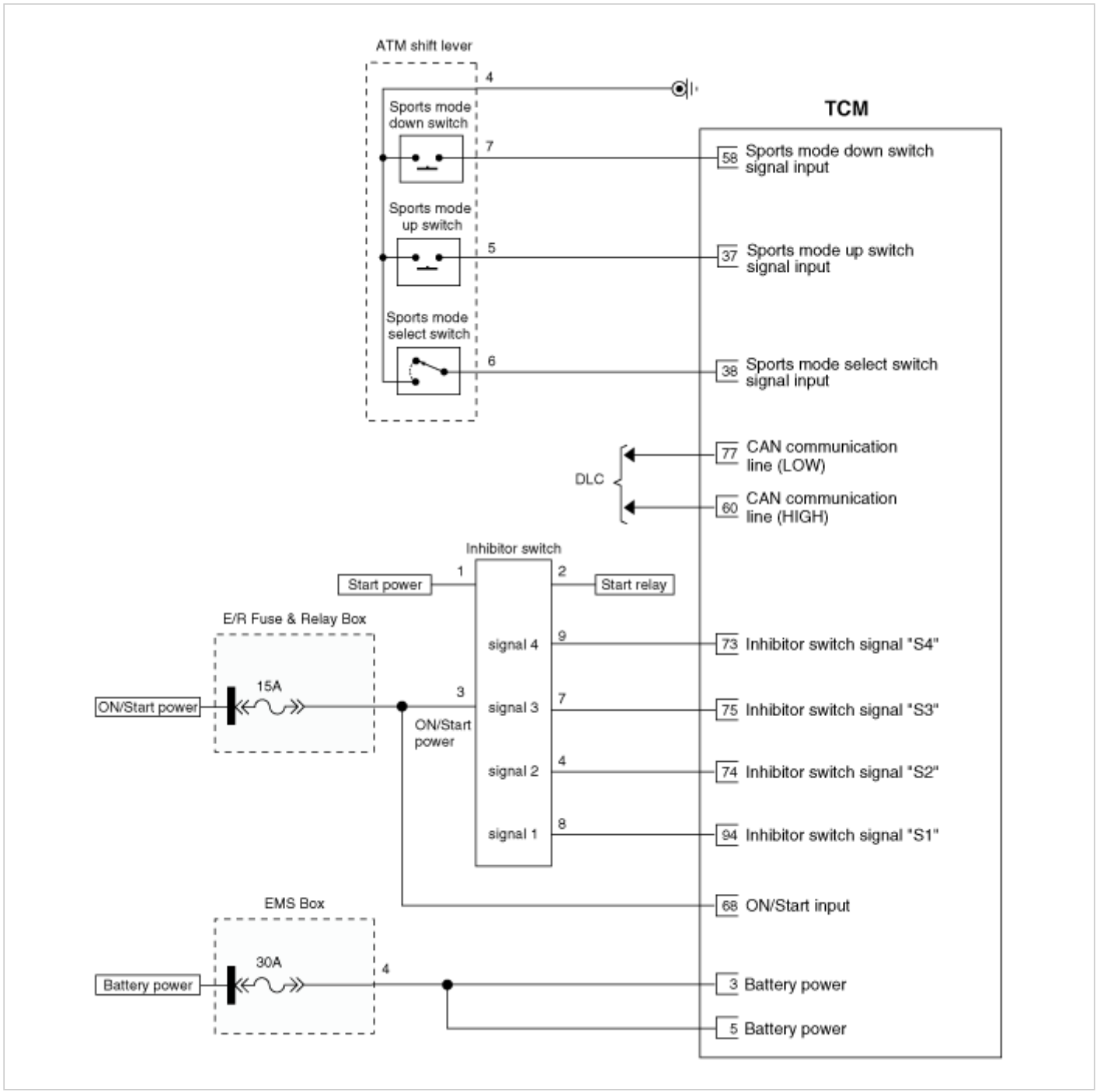
22		-	Output	
				9V < Battery voltage level < 16V
23	Line pressure control solenoid valve	-	Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
26	SS-B solenoid valve (ON/OFF)	High	Output	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
37	Sports mode up switch	Up ON	Input	0V/Battery voltage level
		Other		9V < Battery voltage level < 16V
38	Sports mode select switch	Sport mode	Input	0V/Battery voltage level
		Other		9V < Battery voltage level < 16V
39	Oil temperature sensor (+)	ON	Input	0V/3.3V
		OFF		
43	Underdrive brake control solenoid valve	-	Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
				Power supply : V_SOL2
44	35R clutch control solenoid valve	-	Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
45	Torque converter control solenoid valve	-	Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
46	26 brake control solenoid valve	-	Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
				Power supply : V_SOL2
58	Sports mode down switch	Down ON	Input	0V/Battery voltage level
		Other		9V < Battery voltage level < 16V
59	Oil temperature sensor (-)	-	Ground	0V
73	Inhibitor switch signal "S4"	High	Input	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
74	Inhibitor switch signal "S2"	High	Input	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
75	Inhibitor switch signal "S3"	High	Input	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
89	SS-A solenoid valve A (ON/OFF)	High	Output	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
94	Inhibitor switch signal "S1"	High	Input	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
95	Output speed sensor power	ON	Power	0V/7.5V
		OFF		
96	Input speed sensor power	ON	Power	0V/7.5V
		OFF		
99	Input speed sensor signal	High	Input	0.7V/1.4V
		Low		

100	Output speed sensor signal	High Low	Input	0.7V/1.4V

Circuit Diagram




Output speed sensor
1 Power ground
4 Power ground
2 Power ground



Automatic Transaxle System

Inspection

TCM Problem Inspection Procedure

1. TEST TCM GROUND CIRCUIT: Measure resistance between TCM and chassis ground using the backside of TCM harness connector as TCM side check point. If the problem is found, repair it.

   Specification: Below 1Ω

2. TEST TCM CONNECTOR: Disconnect the TCM connector and visually check the ground terminals on TCM side and harness side for bent pins or poor contact pressure. If the problem is found, repair it.
3. If problem is not found in Step 1 and 2, the TCM could be faulty. If so, make sure there were no DTC"s before swapping the TCM with a new one, and then check the vehicle again. If DTC"s were found, examine this first before swapping TCM.
4. RE-TEST THE ORIGINAL TCM: Install the original TCM (may be broken) into a known-good vehicle and check the vehicle. If the problem occurs again, replace the original TCM with a new one. If problem does not occur, this is intermittent problem (Refer to “Intermittent Problem Inspection Procedure” in Basic Inspection Procedure).

Replacement

NOTICE

When replacing the Transaxle Control Module (TCM), the vehicle equipped with immobilizer must be performed the procedure as below.

[In the case of installing used TCM]

1) Perform "TCM neutralization mode" procedure with GDS.

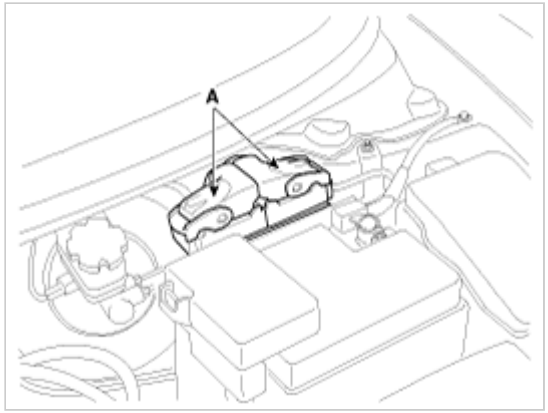
2) Insert the key and turn it to the IGN ON and OFF position.

Then the TCM key register process is completed automatically.

[In the case of installing new TCM]– Insert the key and turn it to the IGN ON and OFF position.

Then the TCM key register process is completed automatically.

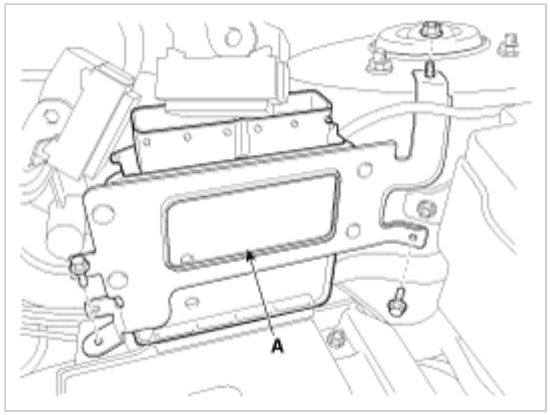
1. Turn ignition switch OFF.
2. Disconnect the negative (-) battery cable.
3. Disconnect the TCM connector (A).



4. Remove the TCM (A) after removing the mounting bolts and nut.

TCM installation bolt/nut :

9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



Installation

NOTICE

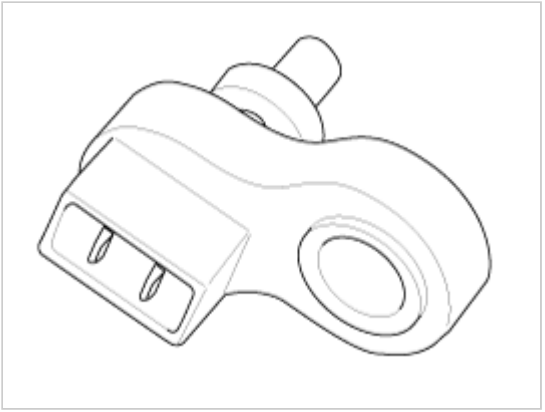
In the case of the vehicle equipped with immobilizer or button engine start system, perform "Key Teaching" procedure together.
(Refer to Body Electrical System - "Immobilizer")

1. Install in the reverse order of removal.

Automatic Transaxle System

Description

Transaxle Oil Temperature Sensor(OTS) monitors the automatic transaxle fluid"s temperature and conveys the readings to TCM. It is an Negativen Thermal Coefficient(NTC) sensor whose resistance has an inversely proportional relationship with the temperature level. Data produced by this sensor is used to identify damper clutch activation and deactivation zones within the low temperature and high temperature range and to compensate hydraulic pressure levels during gear changes.

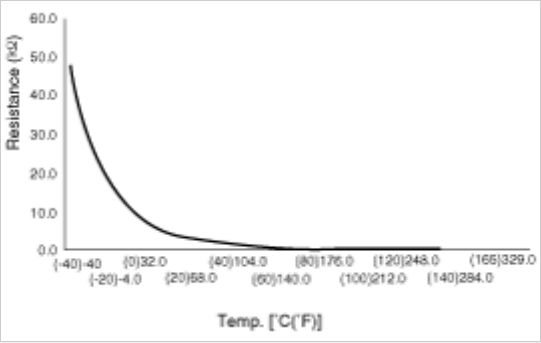


Automatic Transaxle System

Specifications

Type: Negative Thermal Coefficient Type (NTC)

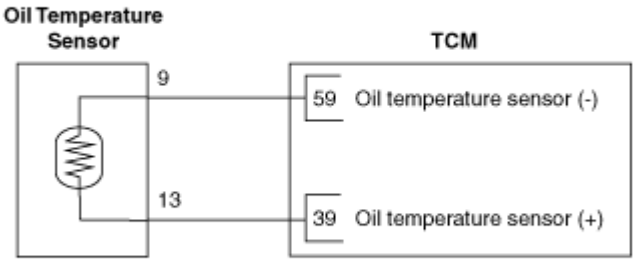
Temp.[(°C)°F]	Resistance (kΩ)
(-40)-40	48.1
(-20)-4.0	15.6
(0)32.0	5.88
(20)68.0	2.51
(40)104.0	1.11
(60)140.0	0.61
(80)176.0	0.32
(100)212.0	0.18
(120)248.0	0.10
(140)284.0	0.06
(165)329.0	0.16



Automatic Transaxle System

Circuit Diagram

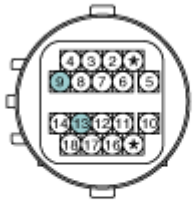
[Circuit Diagram]



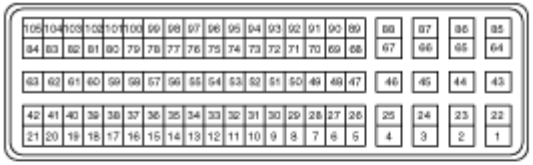
[Connection Information]

Terminal	Connected to	Function
9	TCM(59)	Oil temperature sensor (-)
13	TCM(39)	Oil temperature sensor (+)

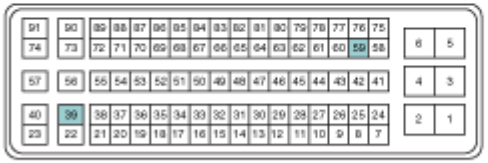
[Harness Connector]



Solenoid Valve Connector



TCM Connector [A]

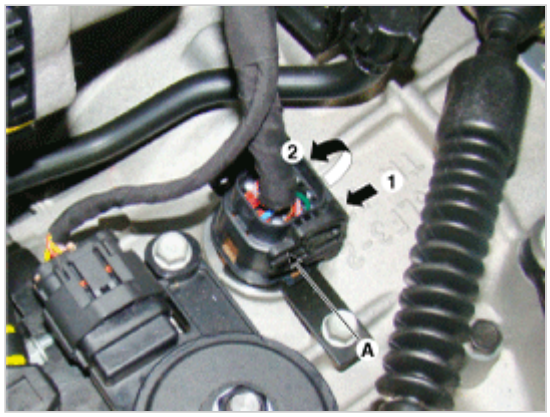


TCM Connector [B]

Automatic Transaxle System

Inspection

1. Turn ignition switch OFF.
2. Remove the air duct.
3. Disconnect the solenoid valve connector (A).

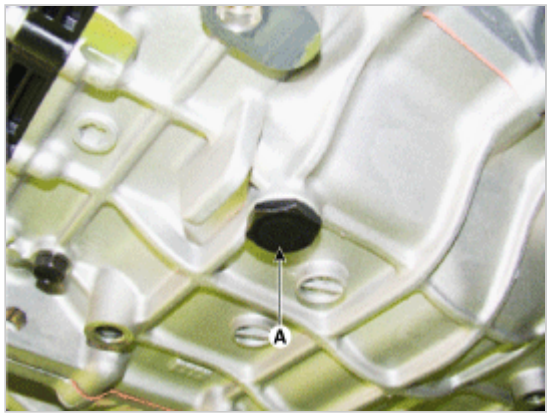


4. Measure resistance between sensor signal terminal and sensor ground terminal.
5. Check that the resistance is within the specification.

Removal

1. Remove the battery and the battery tray.
   (Refer to Engine Electrical System - "Battery")
2. Remove the under cover.
3. Drain the coolant.
   (Refer to Engine Mechanical System - "Coolant")
4. Remove the drain plug (A) and reinstall the drain plug after draining ATF totally.

Tightening torque:
38.2 ~ 48.1 N.m (3.9 ~ 4.9 kgf.m, 28.2 ~ 35.4 lb-ft)



⚠ CAUTION
The gasket of the drain plug use new one.

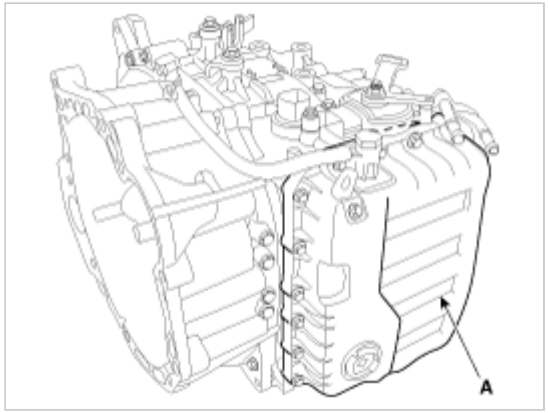
5. Remove the ATF Injection hole(eyebolt) (A).

Tightening torque:
2.9 ~ 4.9 N.m (0.3 ~ 0.5 kgf.m, 2.2 ~ 3.6 lb-ft)

CAUTION
The O-Ring (A) of the eyebolt use new one.

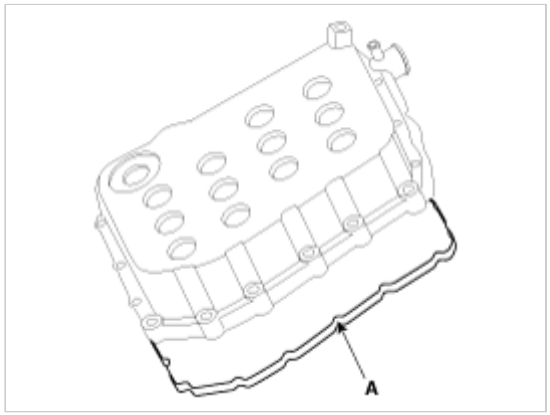
6. Remove the valve body cover (A).

Tightening torque:
(A) 13.7~ 15.7 N.m (1.4 ~ 1.6 kgf.m, 10.1 ~ 11.6 lb-ft)

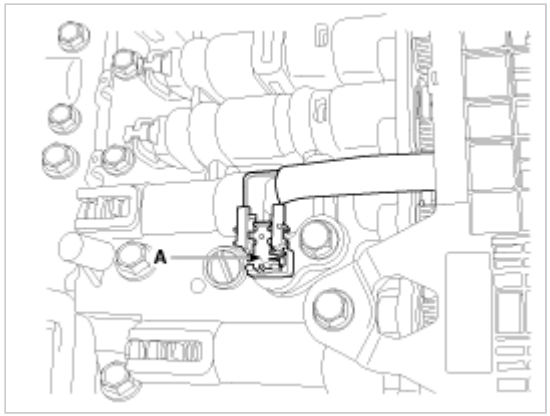


CAUTION

- Use new valve body gasket (A).



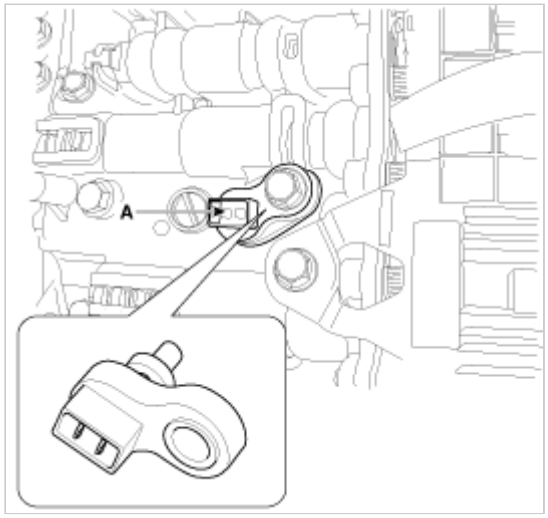
7. Disconnect the oil temperature sensor connector (A).



8. Remove the oil temperature sensor (A) after removing a bolt.

Tightening torque:
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)

⚠ CAUTION
Be careful not to damage the harness lock connector.



Installation

1. Install in the reverse order of removal.

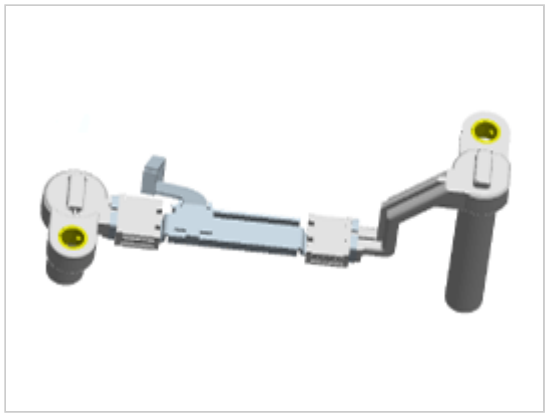
NOTICE

- Adding Automatic Transaxle Fluid(ATF).
  (Refer to Hydraulic System - "Fluid")
- Perform Transaxle Control Module(TCM) learning after replacing the valve body to prevent slow transaxle response, jerky acceleration and jerky startup.
  (Refer to Automatic Transaxle Control System - "Repair procedures")

Automatic Transaxle System

Description

Input speed sensor (A) is a vital unit that measures the rate of rotation of the input shaft inside the transaxle and delivers the readings to the Transaxle Control Module(TCM). The sensor provides critical input data that"s used in feedback control, damper clutch control, gear setting control, line pressure control, clutch activation pressure control, and sensor fault analysis.



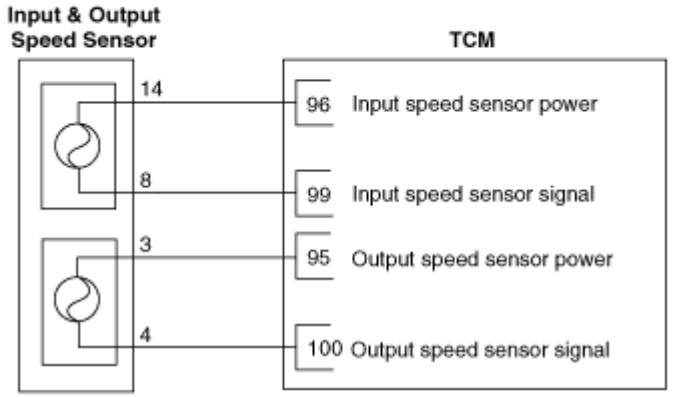
Specifications

▹ Type: Hall effect sensor

Operation condition [°C(°F)]		((-)40 ~ 150)) -40 ~ 302
Air gap(mm)in.		(0.95 ~ 1.55) 0.950 ~ 1.55
Output voltage(V)	High	1.18 ~ 1.68
	Low	0.59 ~ 0.84

Circuit Diagram

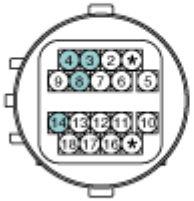
[Circuit Diagram]



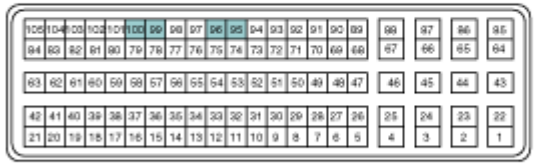
[Connection Information]

Terminal	Connected to	Function
14	TCM(96)	Output speed sensor signal
8	TCM(99)	Input speed sensor power
3	TCM(95)	Input speed sensor signal
4	TCM(100)	Output speed sensor power

[Harness Connector]



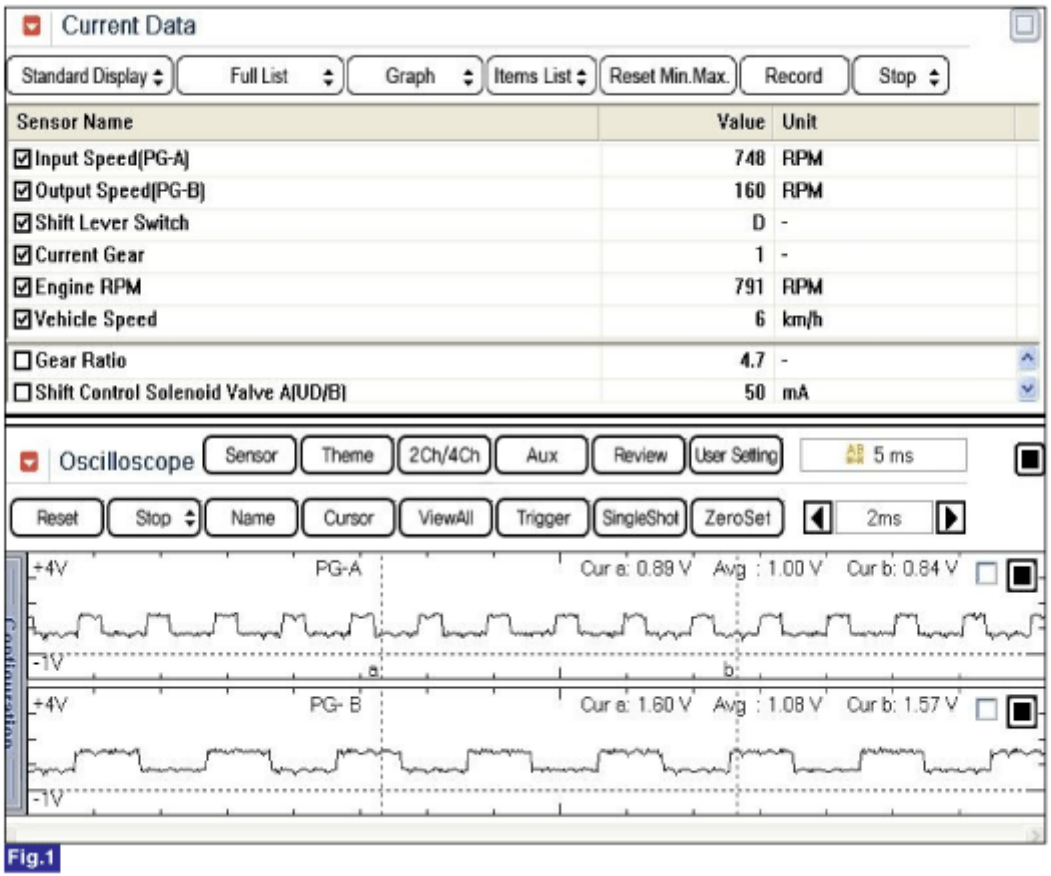
Solenoid Valve Connector

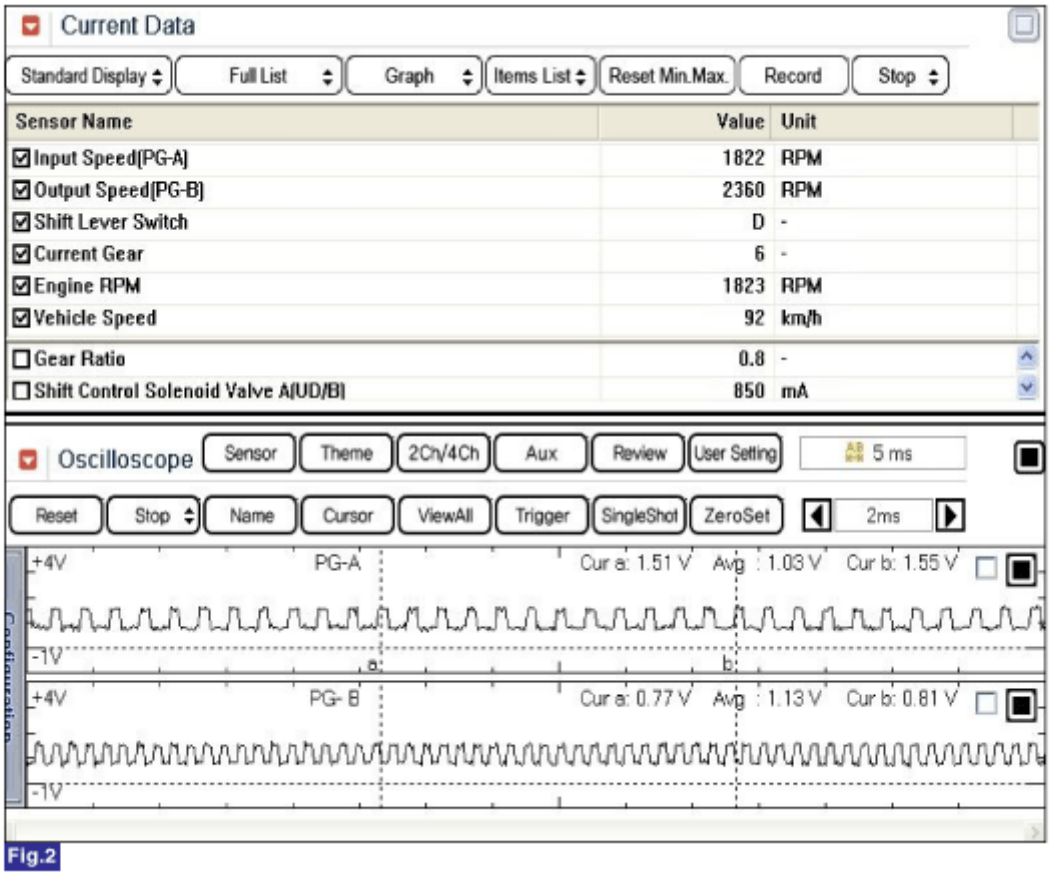


TCM Connector

Automatic Transaxle System

Signal Waveform


Current Data
Standard Display
Full List
Graph
Items List
Reset Min.Max.
Record
Stop
Sensor Name
Value
Unit
Input Speed[PG-A]
748
RPM
Output Speed[PG-B]
160
RPM
Shift Lever Switch
D
-
Current Gear
1
-
Engine RPM
791
RPM
Vehicle Speed
6
km/h
Gear Ratio
4.7
-
Shift Control Solenoid Valve A[UD/B]
50
mA
Oscilloscope
Sensor
Theme
2Ch/4Ch
Aux
Review
User Setting
5 ms
Reset
Stop
Name
Cursor
ViewAll
Trigger
SingleShot
ZeroSet
2ms
+4V
PG-A
Cur a: 0.89 V
Avg : 1.00 V
Cur b: 0.84 V
-1V
a
b
+4V
PG- B
Cur a: 1.60 V
Avg : 1.08 V
Cur b: 1.57 V
-1V
Fig.1



Inspection

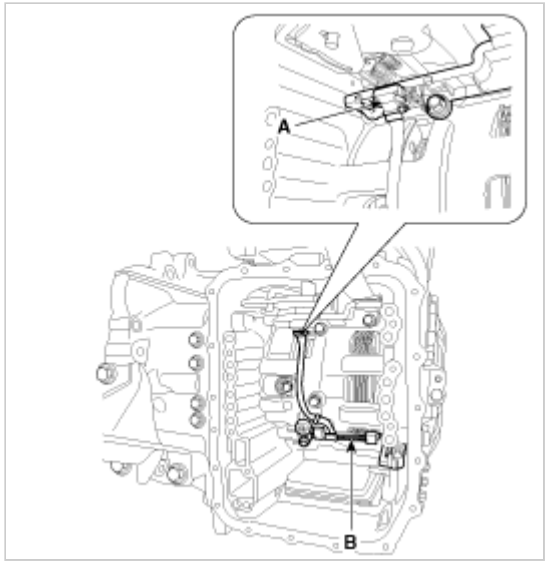
1. Check signal waveform of Input & output speed sensor using the GDS.

Specification: Refer to "Signal Wave Form" section.

Removal

1. Remove the valve body assembly.
   (Refer to Hydraulic System - "Valve Body")
2. Disconnect the input & output speed sensor connector (A).
3. Remove the input & output speed sensor (B) after removing the bolts(2ea).

Tightening torque:
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



Installation

1. Install in the reverse order of removal.

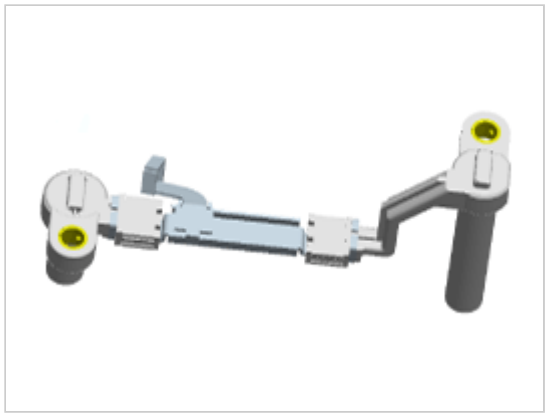
NOTICE

- Adding Automatic Transaxle Fluid(ATF).
  (Refer to Hydraulic System - "Fluid")
- Perform Transaxle Control Module(TCM) learning after replacing the valve body to prevent slow transaxle response, jerky acceleration and jerky startup.
  (Refer to Automatic Transaxle Control System - "Repair procedures")

Automatic Transaxle System

Description

The output speed sensor (A) is a vital unit that measures the rate of rotation of the transaxle"s turbine shaft and output shaft, and delivers the readings to the Transaxle Control Module(TCM). The sensor provides critical input data that"s used in feedback control, damper clutch control, gear setting control, line pressure control, clutch activation pressure control, and sensor fault analysis.



Automatic Transaxle System

Specifications

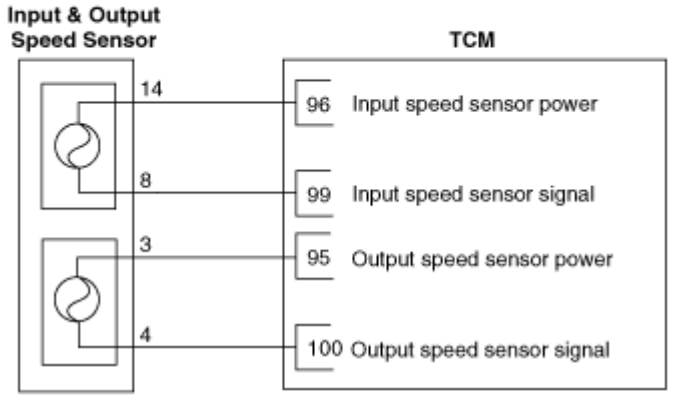
▹ Type: Hall effect sensor

Operation condition [°C(°F)]		((-)40 ~ 150)) -40 ~ 302
Air gap(mm)in.		(0.55 ~ 1) 0.0217 ~ 0.0394
Output voltage	High	1.18 ~ 1.68
	Low	0.59 ~ 0.84

Automatic Transaxle System

Circuit Diagram

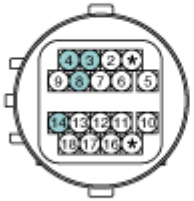
[Circuit Diagram]



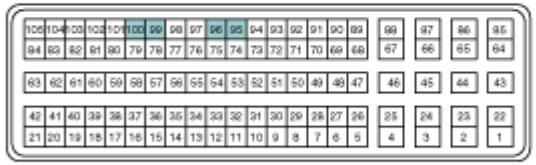
[Connection Information]

Terminal	Connected to	Function
14	TCM(96)	Output speed sensor signal
8	TCM(99)	Input speed sensor power
3	TCM(95)	Input speed sensor signal
4	TCM(100)	Output speed sensor power

[Harness Connector]



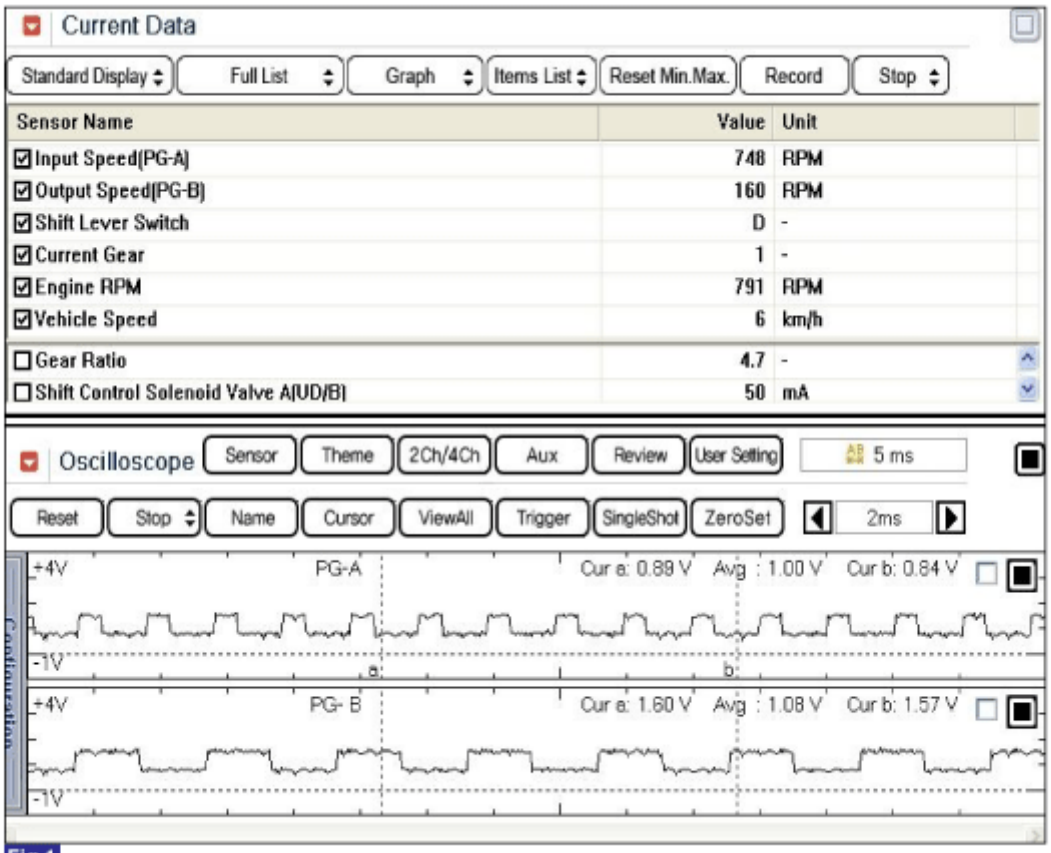
Solenoid Valve Connector

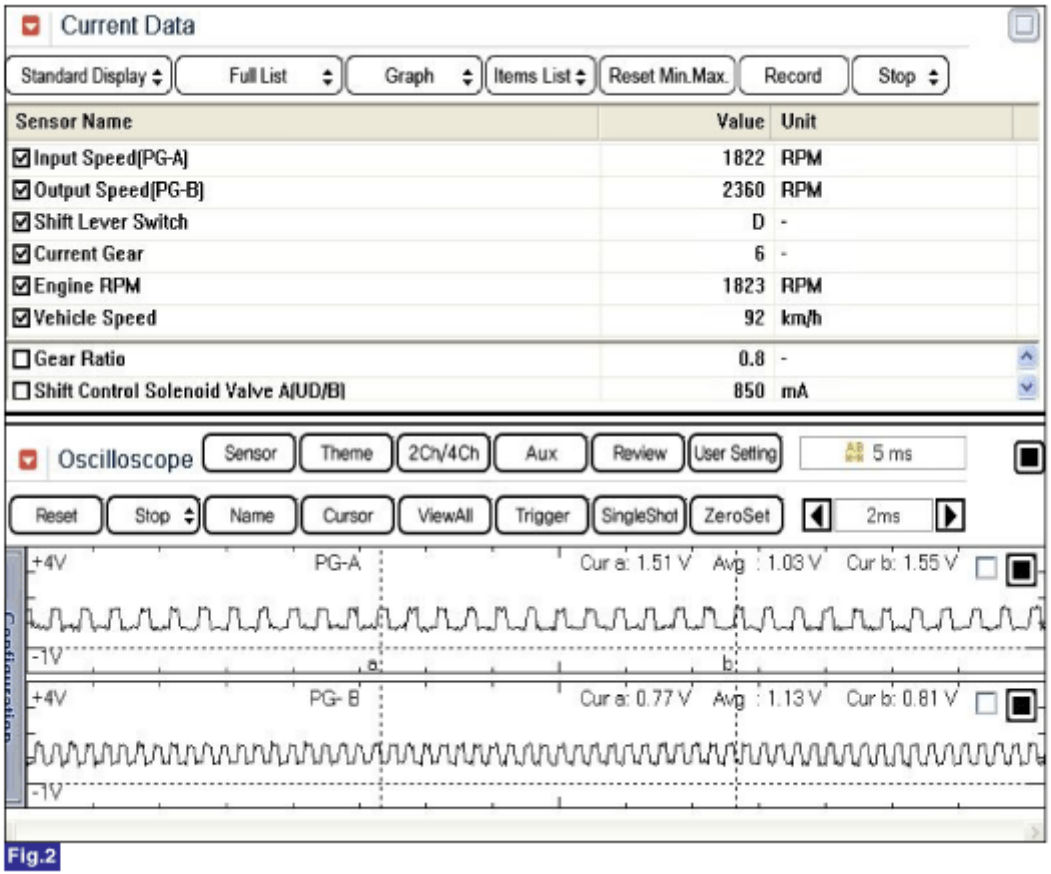


TCM Connector

Automatic Transaxle System

Signal Waveform


Current Data
Standard Display
Full List
Graph
Items List
Reset Min.Max.
Record
Stop
Sensor Name
Value
Unit
Input Speed[PG-A]
748
RPM
Output Speed[PG-B]
160
RPM
Shift Lever Switch
D
-
Current Gear
1
-
Engine RPM
791
RPM
Vehicle Speed
6
km/h
Gear Ratio
4.7
-
Shift Control Solenoid Valve A[UD/B]
50
mA
Oscilloscope
Sensor
Theme
2Ch/4Ch
Aux
Review
User Setting
5 ms
Reset
Stop
Name
Cursor
ViewAll
Trigger
SingleShot
ZeroSet
2ms
+4V
PG-A
Cur a: 0.89 V
Avg : 1.00 V
Cur b: 0.84 V
-1V
a
b
+4V
PG- B
Cur a: 1.60 V
Avg : 1.08 V
Cur b: 1.57 V
-1V
Fig.1



Automatic Transaxle System

Inspection

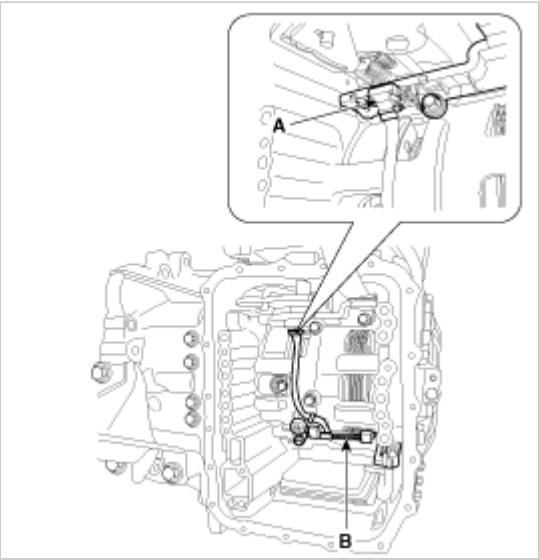
1. Check signal waveform of Input & output speed sensor using the GDS.

Specification: Refer to "Signal Wave Form" section.

Removal

1. Remove the valve body assembly.
   (Refer to Hydraulic System - "Valve Body")
2. Disconnect the input & output speed sensor connector (A).
3. Remove the input & output speed sensor (B) after removing the bolts (2ea).

Tightening torque:
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



Installation

1. Install in the reverse order of removal.

NOTICE

- Adding Automatic Transaxle Fluid(ATF).
  (Refer to Hydraulic System - "Fluid")
- Perform Transaxle Control Module(TCM) learning after replacing the valve body to prevent slow transaxle response, jerky acceleration and jerky startup.
  (Refer to Automatic Transaxle Control System - "Repair procedures")

Automatic Transaxle System

Description

Torque converter control solenoid valve (T/CON) is attached to the valve body. This variable force solenoid valve directly controls the hydraulic pressure inside the torque converter.

Automatic Transaxle System

Specifications

Direct control VFS[T/CON]

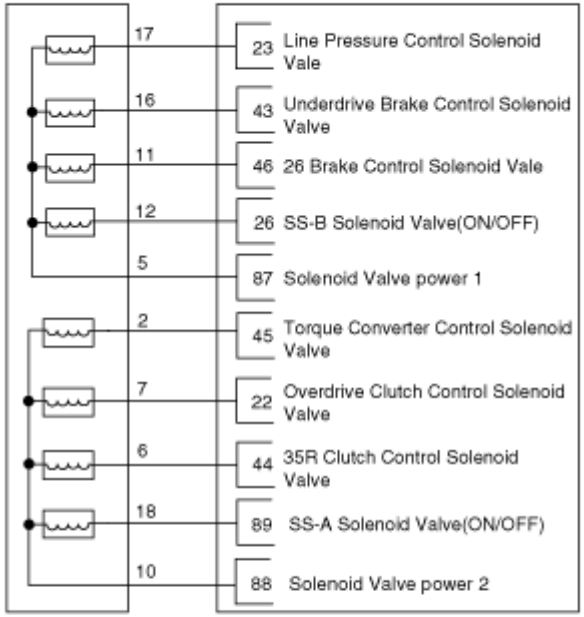
▹ Control type : Normal low type

Control Pressure kpa (kgf/cm², psi)	9.81 ~ 500.14 (0.1 ~ 5.1,1.42 ~ 72.54)
Current value(mA)	50 ~ 850
Internal resistance(Ω)	5.1

Automatic Transaxle System

Circuit Diagram

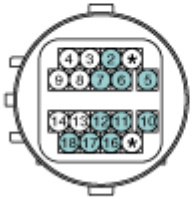
[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
17	TCM(23)	Line Pressure Control Solenoid Vale
16	TCM(43)	Underdrive Brake Control Solenoid Valve
11	TCM(46)	26 Brake Control Solenoid Vale
12	TCM(26)	SS-B Solenoid Valve (ON/OFF)
5	TCM(87)	Solenoid Valve power 1
2	TCM(45)	Torque Converter Control Solenoid Valve
7	TCM(22)	Overdrive Clutch Control Solenoid Valve
6	TCM(44)	35R Clutch Control Solenoid Valve
18	TCM(89)	SS-A Solenoid Valve (ON/OFF)
10	TCM(88)	Solenoid Valve power 2

[Harness Connector]



Solenoid Valve Connector

TCM Connector

Automatic Transaxle System

Inspection

1. Turn ignition switch OFF.
2. Remove the air duct.
   (Refer to Engine Mechanical System - "Air cleaner")
3. Disconnect the solenoid valve connector (A).

Click to see large image...

4. Measure resistance between sensor signal terminal and sensor ground terminal.
5. Check that the resistance is within the specification.

Removal

CAUTION

- When the solenoid valve failure code (DTC) is on, perform the following procedure to replace it.
- Automatic transaxle is composed of delicate components. Be careful not to cause any damage on the component in the course of assembly and disassembly.
- Maintain clean condition so that foreign substance does not get into the automatic transaxle.
- Use a coated apron, latex gloves, and stainless tray to prevent foreign substance from getting into the transaxle.
- Automatic transaxle fluid (ATF) can be reused. Collect it using a clean 10-liter beaker.

1. Remove the air duct.
   (Refer to Engine Mechanical System - "Air cleaner")
2. Remove the battery and the battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
4. Remove the ATF warmer.
   (Refer to Automatic Transaxle System - "ATF Warmer") (if equipped ATF warmer)
5. Remove the drain plug (A) and reinstall the drain plug after draining ATF totally.

   Tightening torque :
   38.2 ~ 48.1 N.m (3.9 ~ 4.9 kgf.m, 28.2 ~ 35.4 lb-ft)

   Click to see large image...

   CAUTION

   - Replace the gasket before reinstalling the drain plug.

6. Remove the air bleeder hose (B) after removing the clamp (A).

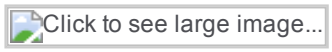
   Click to see large image...
7. Disconnect the clip for fixing wiring from the valve body cover.
8. Remove the valve body cover (A).

   Tightening torque:
   (A) : 13.7 ~ 15.7 N.m (1.4 ~ 1.6 kgf.m, 10.1 ~ 11.6 lb-ft)

   Click to see large image...

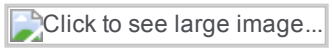
   CAUTION

- When re-mounting the valve body cover, replace the gasket (A) with a new one.
- After mounting the valve body cover, check for oil leakage on the connecting part while the engine is on.



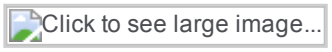
9. Disconnect the solenoid valve connector (B) and the oil temperature sensor (A) after removing the bolts.

Tightening torque :
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



10. Remove the solenoid valve support bracket (A).

Tightening torque :
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



11. Remove the valve body mounting bolt (A-1ea).

12. Remove the torque converter control solenoid valve (A).

Installation

1. To install, reverse the removal procedure.
2. Check the ATF level after refilling the automatic transaxle with fluid.
   (Refer to Automatic Transaxle System - "Fluid")
3. Clear the diagnostic trouble codes (DTC) using the GDS.

⚠ CAUTION
Even though disconnecting the battery negative terminal, the DTCs will not be cleared. So, be sure to clear the DTCs using the GDS.

4. Reset the automatic transaxle adaptive values using the GDS.
5. Perform Transaxle Control Module (TCM) learning after replacing the solenoid valve, TCM, automatic transaxle to prevent slow transaxle response, jerky acceleration and jerky startup.

NOTICE

TCM Learning

1) Learning Overview and Purpose
- It aims to correct the deviation between transaxle products to reduce learning time and secure initial driving safety.
- When gear shift shock has occurred at the 1-2-3-4-5-6 positions, delete the previous learning values using GDS device and perform TCM learning again.

2) Conditions that Require Learning
- After replacing automatic transaxle
- After replacing TCM
- After performing TCM reprogramming

3) TCM Learning Method

(1) Condition
- ATF temperature : 40 - 100°C

(2) Learning Method

a. Learning with the vehicle stopped
- While pressing and holding the brake (vehicle is stationery), set the throttle opening to 0% and repeat the following procedure four times.

Click to see large image...

b. Learning with the vehicle running
- Maintain a consistent throttle opening at the D position and gradually shift from 1st gear position to 6th gear position one by one. Then, gradually shift from 6th gear position to 1st gear position one by one (brake : on, throttle opening : 0%).
- Throttle opening (for shifting to upper gear) : 10 - 50% (less than 5% of throttle opening (APS) change)
- Repeat the above procedure four times.

Description

26Brake control solenoid valve(26/B) is attached to the valve body. This variable force solenoid valve directly controls the hydraulic pressure inside the 26Brake.

Specifications

Direct control VFS[26/B]

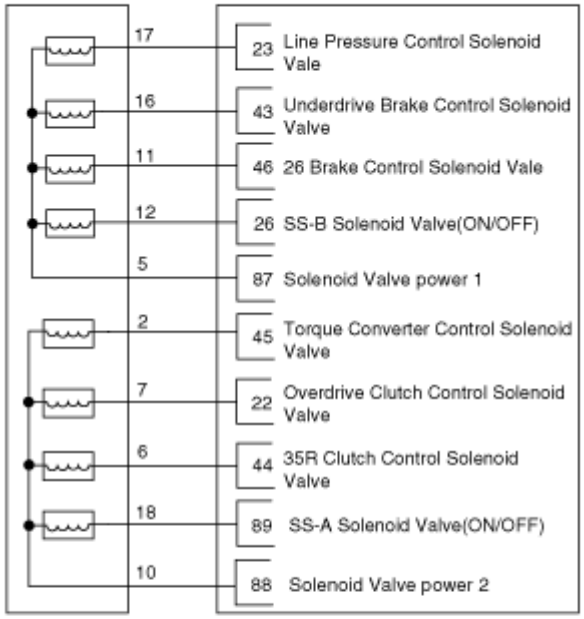
▹ Control type : Normal low type

Control Pressure kpa (kgf/cm², psi)	9.81 ~ 500.14 (0.1 ~ 5.1, 1.42 ~ 72.54)

Current value(mA)	50 ~ 850
Internal resistance(Ω)	5.1

Circuit Diagram

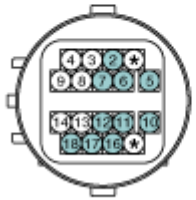
[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
17	TCM(23)	Line Pressure Control Solenoid Vale
16	TCM(43)	Underdrive Brake Control Solenoid Valve
11	TCM(46)	26 Brake Control Solenoid Vale
12	TCM(26)	SS-B Solenoid Valve (ON/OFF)
5	TCM(87)	Solenoid Valve power 1
2	TCM(45)	Torque Converter Control Solenoid Valve
7	TCM(22)	Overdrive Clutch Control Solenoid Valve
6	TCM(44)	35R Clutch Control Solenoid Valve
18	TCM(89)	SS-A Solenoid Valve (ON/OFF)
10	TCM(88)	Solenoid Valve power 2

[Harness Connector]

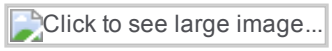


Solenoid Valve Connector

TCM Connector

Inspection

1. Turn ignition switch OFF.
2. Remove the air duct.
   (Refer to Engine Mechanical System - "Air cleaner")
3. Disconnect the solenoid valve connector (A).



4. Measure resistance between sensor signal terminal and sensor ground terminal.
5. Check that the resistance is within the specification.

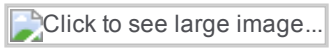
Removal

⚠ CAUTION

- When the solenoid valve failure code (DTC) is on, perform the following procedure to replace it.
- Automatic transaxle is composed of delicate components. Be careful not to cause any damage on the component in the course of assembly and disassembly.
- Maintain clean condition so that foreign substance does not get into the automatic transaxle.
- Use a coated apron, latex gloves, and stainless tray to prevent foreign substance from getting into the transaxle.
- Automatic transaxle fluid (ATF) can be reused. Collect it using a clean 10-liter beaker.

1. Remove the air duct.
   (Refer to Engine Mechanical System - "Air cleaner")
2. Remove the battery and the battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
4. Remove the ATF warmer.
   (Refer to Automatic Transaxle System - "ATF Warmer") (if equipped ATF warmer)
5. Remove the drain plug (A) and reinstall the drain plug after draining ATF totally.

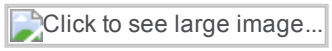
Tightening torque :
38.2 ~ 48.1 N.m (3.9 ~ 4.9 kgf.m, 28.2 ~ 35.4 lb-ft)



⚠ CAUTION

- Replace the gasket before reinstalling the drain plug.

6. Remove the air bleeder hose (B) after removing the clamp (A).



7. Disconnect the clip for fixing wiring from the valve body cover.

8. Remove the valve body cover (A).

Tightening torque :
(A) : 13.7 ~ 15.7 N.m (1.4 ~ 1.6 kgf.m, 10.1 ~ 11.6 lb-ft)

Click to see large image...

CAUTION

- When re-mounting the valve body cover, replace the gasket (A) with a new one.
- After mounting the valve body cover, check for oil leakage on the connecting part while the engine is on.

Click to see large image...

9. Disconnect the solenoid valve connector (B) and the oil temperature sensor (A) after removing the bolts.

Tightening torque :
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)

Click to see large image...

10. Remove the solenoid valve support bracket (A).

Tightening torque :
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)

Click to see large image...

11. Remove the valve body mounting bolt (A-1ea).

Click to see large image...

12. Remove the 26 Brake control solenoid valve (A).

Click to see large image...

Installation

1. To install, reverse the removal procedure.
2. Check the ATF level after refilling the automatic transaxle with fluid.
   (Refer to Automatic Transaxle System - "Fluid")
3. Clear the diagnostic trouble codes (DTC) using the GDS.

CAUTION

Even though disconnecting the battery negative terminal, the DTCs will not be cleared. So, be sure to clear the DTCs using the GDS.

4. Reset the automatic transaxle adaptive values using the GDS.
5. Perform Transaxle Control Module (TCM) learning after replacing the solenoid valve, TCM, automatic transaxle to prevent slow transaxle response, jerky acceleration and jerky startup.

NOTICE

TCM Learning

1) Learning Overview and Purpose
- It aims to correct the deviation between transaxle products to reduce learning time and secure initial driving safety.
- When gear shift shock has occurred at the 1-2-3-4-5-6 positions, delete the previous learning values using GDS device and perform TCM learning again.

2) Conditions that Require Learning
- After replacing automatic transaxle
- After replacing TCM
- After performing TCM reprogramming

3) TCM Learning Method

(1) Condition
- ATF temperature : 40 - 100°C

(2) Learning Method

a. Learning with the vehicle stopped
- While pressing and holding the brake (vehicle is stationery), set the throttle opening to 0% and repeat the following procedure four times.

Click to see large image...

b. Learning with the vehicle running
- Maintain a consistent throttle opening at the D position and gradually shift from 1st gear position to 6th gear position one by one. Then, gradually shift from 6th gear position to 1st gear position one by one (brake : on, throttle opening : 0%).
- Throttle opening (for shifting to upper gear) : 10 - 50% (less than 5% of throttle opening (APS) change)
- Repeat the above procedure four times.

Automatic Transaxle System

Description

Line pressure control solenoid valve is attached to the valve body. This variable force solenoid valve directly controls the hydraulic pressure inside the line pressure.

Automatic Transaxle System

Specifications

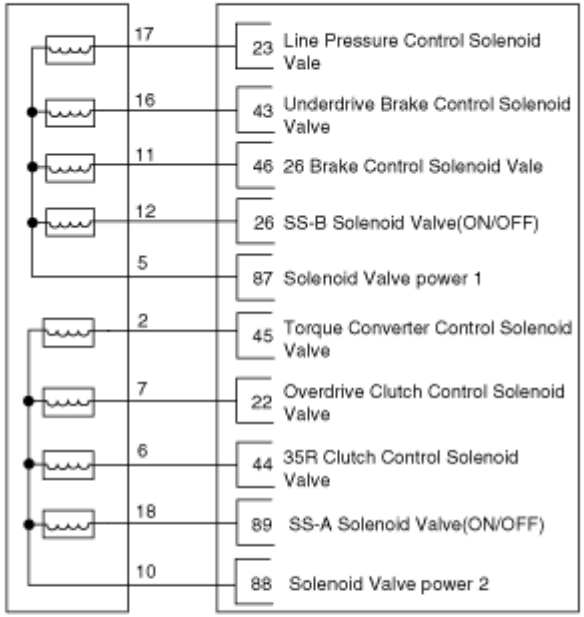
Direct control VFS[LINE Pressure]

▹ Control type : Normal high type

Control Pressure kpa (kgf/cm², psi)	500.14 ~ 9.81 (5.1 ~ 0.1, 72.54 ~ 1.42)
Current value(mA)	50 ~ 850
Internal resistance(Ω)	5.1

Circuit Diagram

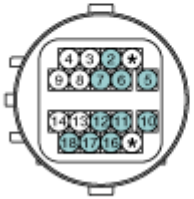
[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
17	TCM(23)	Line Pressure Control Solenoid Vale
16	TCM(43)	Underdrive Brake Control Solenoid Valve
11	TCM(46)	26 Brake Control Solenoid Vale
12	TCM(26)	SS-B Solenoid Valve (ON/OFF)
5	TCM(87)	Solenoid Valve power 1
2	TCM(45)	Torque Converter Control Solenoid Valve
7	TCM(22)	Overdrive Clutch Control Solenoid Valve
6	TCM(44)	35R Clutch Control Solenoid Valve
18	TCM(89)	SS-A Solenoid Valve (ON/OFF)
10	TCM(88)	Solenoid Valve power 2

[Harness Connector]



Solenoid Valve Connector

TCM Connector

Automatic Transaxle System

Inspection

1. Turn ignition switch OFF.
2. Remove the air duct.
   (Refer to Engine Mechanical System - "Air cleaner")
3. Disconnect the solenoid valve connector (A).

Click to see large image...

4. Measure resistance between sensor signal terminal and sensor ground terminal.
5. Check that the resistance is within the specification.

Removal

CAUTION

- When the solenoid valve failure code (DTC) is on, perform the following procedure to replace it.
- Automatic transaxle is composed of delicate components. Be careful not to cause any damage on the component in the course of assembly and disassembly.
- Maintain clean condition so that foreign substance does not get into the automatic transaxle.
- Use a coated apron, latex gloves, and stainless tray to prevent foreign substance from getting into the transaxle.
- Automatic transaxle fluid (ATF) can be reused. Collect it using a clean 10-liter beaker.

1. Remove the air duct.
   (Refer to Engine Mechanical System - "Air cleaner")
2. Remove the battery and the battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
4. Remove the ATF warmer.
   (Refer to Automatic Transaxle System - "ATF Warmer") (if equipped ATF warmer)
5. Remove the drain plug (A) and reinstall the drain plug after draining ATF totally.

   Tightening torque :
   38.2 ~ 48.1 N.m (3.9 ~ 4.9 kgf.m, 28.2 ~ 35.4 lb-ft)

   Click to see large image...

   CAUTION

   - Replace the gasket before reinstalling the drain plug.

6. Remove the air bleeder hose (B) after removing the clamp (A).

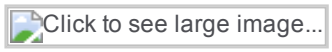
   Click to see large image...
7. Disconnect the clip for fixing wiring from the valve body cover.
8. Remove the valve body cover (A).

   Tightening torque :
   (A) : 13.7 ~ 15.7 N.m (1.4 ~ 1.6 kgf.m, 10.1 ~ 11.6 lb-ft)

   Click to see large image...

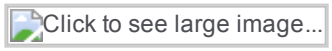
   CAUTION

- When re-mounting the valve body cover, replace the gasket (A) with a new one.
- After mounting the valve body cover, check for oil leakage on the connecting part while the engine is on.



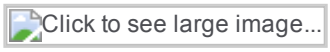
9. Disconnect the solenoid valve connector (B) and the oil temperature sensor (A) after removing the bolts.

Tightening torque :
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



10. Remove the solenoid valve support bracket (A).

Tightening torque :
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



11. Remove the Line pressure control solenoid valve (A).

Installation

1. To install, reverse the removal procedure.
2. Check the ATF level after refilling the automatic transaxle with fluid.
   (Refer to Automatic Transaxle System-"Fluid")
3. Clear the diagnostic trouble codes (DTC) using the GDS.

⚠ CAUTION
Even though disconnecting the battery negative terminal, the DTCs will not be cleared. So, be sure to clear the DTCs using the GDS.

4. Reset the automatic transaxle adaptive values using the GDS.
5. Perform Transaxle Control Module (TCM) learning after replacing the solenoid valve, TCM, automatic transaxle to prevent slow transaxle response, jerky acceleration and jerky startup.

NOTICE

TCM Learning

1) Learning Overview and Purpose
- It aims to correct the deviation between transaxle products to reduce learning time and secure initial driving safety.
- When gear shift shock has occurred at the 1-2-3-4-5-6 positions, delete the previous learning values using GDS device and perform TCM learning again.

2) Conditions that Require Learning
- After replacing automatic transaxle
- After replacing TCM

– After performing TCM reprogramming

3) TCM Learning Method

(1) Condition

– ATF temperature : 40 - 100°C

(2) Learning Method

a. Learning with the vehicle stopped

– While pressing and holding the brake (vehicle is stationery), set the throttle opening to 0% and repeat the following procedure four times.

Click to see large image...

b. Learning with the vehicle running

– Maintain a consistent throttle opening at the D position and gradually shift from 1st gear position to 6th gear position one by one. Then, gradually shift from 6th gear position to 1st gear position one by one (brake : on, throttle opening : 0%).

– Throttle opening (for shifting to upper gear) : 10 - 50% (less than 5% of throttle opening (APS) change)

– Repeat the above procedure four times.

Description

35R Clutch control solenoid valve(35R/C) is attached to the valve body. This variable force solenoid valve directly controls the hydraulic pressure inside the 35R Clutch.

Specifications

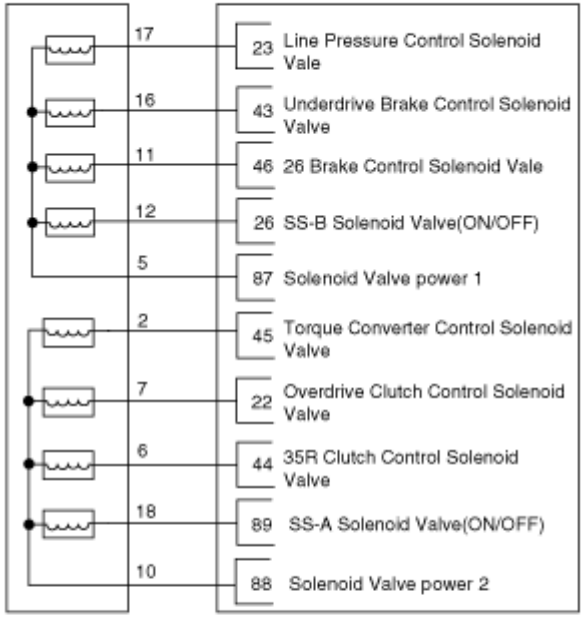
Direct control VFS[35R/C]

▹ Control type : Normal high type

Control Pressure kpa (kgf/cm², psi)	500.14 ~ 9.81 (5.1 ~ 0.1, 72.54 ~ 1.42)
Current value(mA)	50 ~ 850
Internal resistance(Ω)	5.1

Circuit Diagram

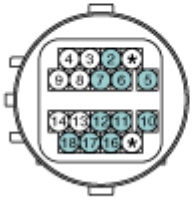
[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
17	TCM(23)	Line Pressure Control Solenoid Vale
16	TCM(43)	Underdrive Brake Control Solenoid Valve
11	TCM(46)	26 Brake Control Solenoid Vale
12	TCM(26)	SS-B Solenoid Valve (ON/OFF)
5	TCM(87)	Solenoid Valve power 1
2	TCM(45)	Torque Converter Control Solenoid Valve
7	TCM(22)	Overdrive Clutch Control Solenoid Valve
6	TCM(44)	35R Clutch Control Solenoid Valve
18	TCM(89)	SS-A Solenoid Valve (ON/OFF)
10	TCM(88)	Solenoid Valve power 2

[Harness Connector]



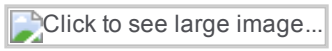
Solenoid Valve Connector

TCM Connector

Inspection

1. Turn ignition switch OFF.
2. Remove the air duct.
   (Refer to Engine Mechanical System - "Air cleaner")

3. Disconnect the solenoid valve connector (A).



4. Measure resistance between sensor signal terminal and sensor ground terminal.
5. Check that the resistance is within the specification.

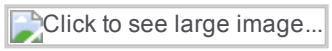
Removal

⚠ CAUTION

- When the solenoid valve failure code (DTC) is on, perform the following procedure to replace it.
- Automatic transaxle is composed of delicate components. Be careful not to cause any damage on the component in the course of assembly and disassembly.
- Maintain clean condition so that foreign substance does not get into the automatic transaxle.
- Use a coated apron, latex gloves, and stainless tray to prevent foreign substance from getting into the transaxle.
- Automatic transaxle fluid (ATF) can be reused. Collect it using a clean 10-liter beaker.

1. Remove the air duct.
   (Refer to Engine Mechanical System - "Air cleaner")
2. Remove the battery and the battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
4. Remove the ATF warmer.
   (Refer to Automatic Transaxle System - "ATF Warmer") (if equipped ATF warmer)
5. Remove the drain plug (A) and reinstall the drain plug after draining ATF totally.

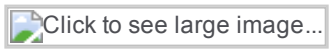
Tightening torque :
38.2 ~ 48.1 N.m (3.9 ~ 4.9 kgf.m, 28.2 ~ 35.4 lb-ft)



⚠ CAUTION

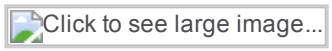
- Replace the gasket before reinstalling the drain plug.

6. Remove the air bleeder hose (B) after removing the clamp (A).



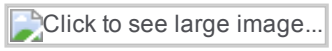
7. Disconnect the clip for fixing wiring from the valve body cover.
8. Remove the valve body cover (A).

Tightening torque :
(A) : 13.7 ~ 15.7 N.m (1.4 ~ 1.6 kgf.m, 10.1 ~ 11.6 lb-ft)



⚠ CAUTION

- When re-mounting the valve body cover, replace the gasket (A) with a new one.
- After mounting the valve body cover, check for oil leakage on the connecting part while the engine is on.



9. Disconnect the solenoid valve connector (B) and the oil temperature sensor (A) after removing the bolts.

Tightening torque :
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)

10. Remove the solenoid valve support bracket (A).

Tightening torque :
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)

11. Remove the valve body mounting bolt (A-1ea).

12. Remove the 35R Clutch control solenoid valve (A).

Installation

1. To install, reverse the removal procedure.
2. Check the ATF level after refilling the automatic transaxle with fluid.
   (Refer to Automatic Transaxle System-"Fluid")
3. Clear the diagnostic trouble codes (DTC) using the GDS.

⚠ CAUTION

Even though disconnecting the battery negative terminal, the DTCs will not be cleared. So, be sure to clear the DTCs using the GDS.

4. Reset the automatic transaxle adaptive values using the GDS.
5. Perform Transaxle Control Module (TCM) learning after replacing the solenoid valve, TCM, automatic transaxle to prevent slow transaxle response, jerky acceleration and jerky startup.

NOTICE

TCM Learning

1) Learning Overview and Purpose
- It aims to correct the deviation between transaxle products to reduce learning time and secure initial driving safety.
- When gear shift shock has occurred at the 1-2-3-4-5-6 positions, delete the previous learning values using GDS device and perform TCM learning again.

2) Conditions that Require Learning
- After replacing automatic transaxle
- After replacing TCM
- After performing TCM reprogramming

3) TCM Learning Method

(1) Condition
- ATF temperature : 40 - 100°C

(2) Learning Method

a. Learning with the vehicle stopped
- While pressing and holding the brake (vehicle is stationery), set the throttle opening to 0% and repeat the following procedure four times.

Click to see large image...

b. Learning with the vehicle running
- Maintain a consistent throttle opening at the D position and gradually shift from 1st gear position to 6th gear position one by one. Then, gradually shift from 6th gear position to 1st gear position one by one (brake : on, throttle opening : 0%).
- Throttle opening (for shifting to upper gear) : 10 - 50% (less than 5% of throttle opening (APS) change)
- Repeat the above procedure four times.

Description

Underdrive brake control solenoid valve(UD/B) is attached to the valve body. This variable force solenoid valve directly controls the hydraulic pressure inside the underdrive brake.

Specifications

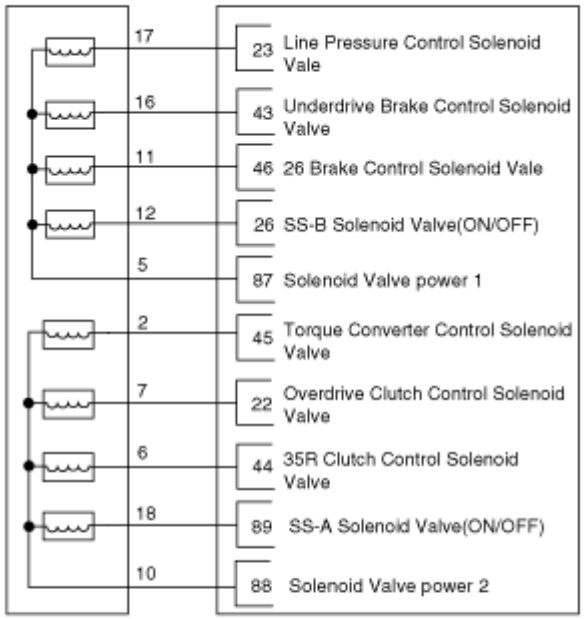
Direct control VFS[UD/B]

▹ Control type : Normal high type

Control Pressure kpa (kgf/cm², psi)	500.14 ~ 9.81 (5.1 ~ 0.1, 72.54 ~ 1.42)
Current value(mA)	50 ~ 850
Internal resistance(Ω)	5.1

Circuit Diagram

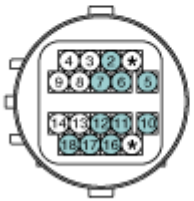
[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
17	TCM(23)	Line Pressure Control Solenoid Vale
16	TCM(43)	Underdrive Brake Control Solenoid Valve
11	TCM(46)	26 Brake Control Solenoid Vale
12	TCM(26)	SS-B Solenoid Valve (ON/OFF)
5	TCM(87)	Solenoid Valve power 1
2	TCM(45)	Torque Converter Control Solenoid Valve
7	TCM(22)	Overdrive Clutch Control Solenoid Valve
6	TCM(44)	35R Clutch Control Solenoid Valve
18	TCM(89)	SS-A Solenoid Valve (ON/OFF)
10	TCM(88)	Solenoid Valve power 2

[Harness Connector]



Solenoid Valve Connector

TCM Connector

Inspection

1. Turn ignition switch OFF.
2. Remove the air duct.
   (Refer to Engine Mechanical System - "Air cleaner")
3. Disconnect the solenoid valve connector (A).

4. Measure resistance between sensor signal terminal and sensor ground terminal.
5. Check that the resistance is within the specification.

Removal

⚠ CAUTION

- When the solenoid valve failure code (DTC) is on, perform the following procedure to replace it.
- Automatic transaxle is composed of delicate components. Be careful not to cause any damage on the component in the course of assembly and disassembly.
- Maintain clean condition so that foreign substance does not get into the automatic transaxle.
- Use a coated apron, latex gloves, and stainless tray to prevent foreign substance from getting into the transaxle.
- Automatic transaxle fluid (ATF) can be reused. Collect it using a clean 10-liter beaker.

1. Remove the air duct.
   (Refer to Engine Mechanical System - "Air cleaner")
2. Remove the battery and the battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
4. Remove the ATF warmer.
   (Refer to Automatic Transaxle System - "ATF Warmer") (if equipped ATF warmer)
5. Remove the drain plug (A) and reinstall the drain plug after draining ATF totally.

Tightening torque :
38.2 ~ 48.1 N.m (3.9 ~ 4.9 kgf.m, 28.2 ~ 35.4 lb-ft)

⚠ CAUTION

- Replace the gasket before reinstalling the drain plug.

6. Remove the air bleeder hose (B) after removing the clamp (A).

Click to see large image...

7. Disconnect the clip for fixing wiring from the valve body cover.
8. Remove the valve body cover (A).

Tightening torque :
(A) : 13.7 ~ 15.7 N.m (1.4 ~ 1.6 kgf.m, 10.1 ~ 11.6 lb-ft)

Click to see large image...

⚠ CAUTION
- When re-mounting the valve body cover, replace the gasket (A) with a new one.
- After mounting the valve body cover, check for oil leakage on the connecting part while the engine is on.

Click to see large image...

9. Disconnect the solenoid valve connector (B) and the oil temperature sensor (A) after removing the bolts.

Tightening torque :
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)

Click to see large image...

10. Remove the solenoid valve support bracket (A).

Tightening torque :
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)

Click to see large image...

11. Remove the valve body mounting bolt (A-1ea).

Click to see large image...

12. Remove the Underdrive brake control solenoid valve (A).

Click to see large image...

Installation

1. To install, reverse the removal procedure.
2. Check the ATF level after refilling the automatic transaxle with fluid.
(Refer to Automatic Transaxle System - "Fluid")
3. Clear the diagnostic trouble codes (DTC) using the GDS.

⚠ CAUTION
Even though disconnecting the battery negative terminal, the DTCs will not be cleared. So, be sure to clear the DTCs using the GDS.

4. Reset the automatic transaxle adaptive values using the GDS.

5. Perform Transaxle Control Module (TCM) learning after replacing the solenoid valve, TCM, automatic transaxle to prevent slow transaxle response, jerky acceleration and jerky startup.

NOTICE

TCM Learning

1) Learning Overview and Purpose
- It aims to correct the deviation between transaxle products to reduce learning time and secure initial driving safety.
- When gear shift shock has occurred at the 1-2-3-4-5-6 positions, delete the previous learning values using GDS device and perform TCM learning again.

2) Conditions that Require Learning
- After replacing automatic transaxle
- After replacing TCM
- After performing TCM reprogramming

3) TCM Learning Method

(1) Condition
- ATF temperature : 40 - 100°C

(2) Learning Method

a. Learning with the vehicle stopped
- While pressing and holding the brake (vehicle is stationery), set the throttle opening to 0% and repeat the following procedure four times.

Click to see large image...

b. Learning with the vehicle running
- Maintain a consistent throttle opening at the D position and gradually shift from 1st gear position to 6th gear position one by one. Then, gradually shift from 6th gear position to 1st gear position one by one (brake : on, throttle opening : 0%).
- Throttle opening (for shifting to upper gear) : 10 - 50% (less than 5% of throttle opening (APS) change)
- Repeat the above procedure four times.

Automatic Transaxle System

Description

Overdrive clutch control solenoid valve(OD/C) is attached to the valve body. This variable force solenoid valve directly controls the hydraulic pressure inside the overdrive clutch.

Automatic Transaxle System

Specifications

Direct control VFS[OD/C]

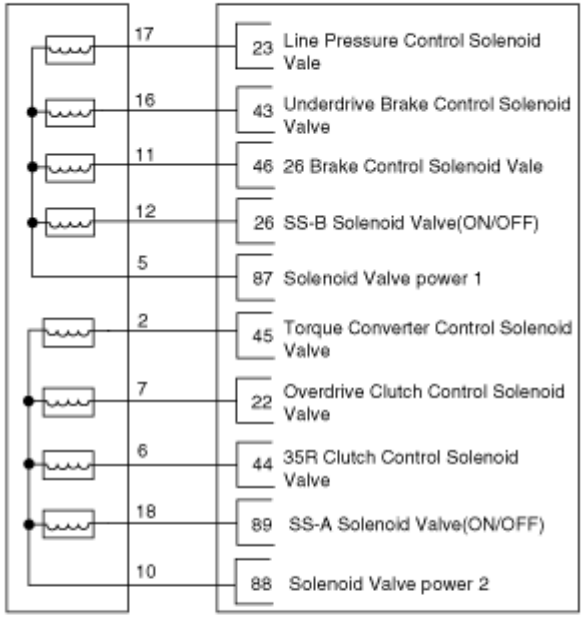
▹ Control type : Normal high type

Control Pressure kpa (kgf/cm², psi)	500.14 ~ 9.81 (5.1 ~ 0.1, 72.54 ~ 1.42)
Current value(mA)	50 ~ 850
Internal resistance(Ω)	5.1

Automatic Transaxle System

Circuit Diagram

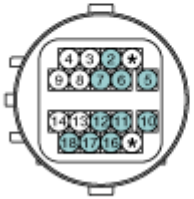
[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
17	TCM(23)	Line Pressure Control Solenoid Vale
16	TCM(43)	Underdrive Brake Control Solenoid Valve
11	TCM(46)	26 Brake Control Solenoid Vale
12	TCM(26)	SS-B Solenoid Valve (ON/OFF)
5	TCM(87)	Solenoid Valve power 1
2	TCM(45)	Torque Converter Control Solenoid Valve
7	TCM(22)	Overdrive Clutch Control Solenoid Valve
6	TCM(44)	35R Clutch Control Solenoid Valve
18	TCM(89)	SS-A Solenoid Valve (ON/OFF)
10	TCM(88)	Solenoid Valve power 2

[Harness Connector]



Solenoid Valve Connector

TCM Connector

Automatic Transaxle System

Inspection

1. Turn ignition switch OFF.
2. Remove the air duct.
   (Refer to Engine Mechanical System - "Air cleaner")
3. Disconnect the solenoid valve connector (A).

Click to see large image...

4. Measure resistance between sensor signal terminal and sensor ground terminal.
5. Check that the resistance is within the specification.

Removal

⚠ CAUTION

- When the solenoid valve failure code (DTC) is on, perform the following procedure to replace it.
- Automatic transaxle is composed of delicate components. Be careful not to cause any damage on the component in the course of assembly and disassembly.
- Maintain clean condition so that foreign substance does not get into the automatic transaxle.
- Use a coated apron, latex gloves, and stainless tray to prevent foreign substance from getting into the transaxle.
- Automatic transaxle fluid (ATF) can be reused. Collect it using a clean 10-liter beaker.

1. Remove the air duct.
   (Refer to Engine Mechanical System - "Air cleaner")
2. Remove the battery and the battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
4. Remove the ATF warmer.
   (Refer to Automatic Transaxle System - "ATF Warmer") (if equipped ATF warmer)
5. Remove the drain plug (A) and reinstall the drain plug after draining ATF totally.

   Tightening torque :
   38.2 ~ 48.1 N.m (3.9 ~ 4.9 kgf.m, 28.2 ~ 35.4 lb-ft)

   Click to see large image...

   ⚠ CAUTION

   - Replace the gasket before reinstalling the drain plug.

6. Remove the air bleeder hose (B) after removing the clamp (A).

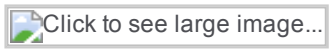
   Click to see large image...
7. Disconnect the clip for fixing wiring from the valve body cover.
8. Remove the valve body cover (A).

   Tightening torque :
   (A) : 13.7 ~ 15.7 N.m (1.4 ~ 1.6 kgf.m, 10.1 ~ 11.6 lb-ft)

   Click to see large image...

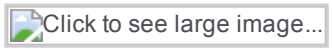
   ⚠ CAUTION

- When re-mounting the valve body cover, replace the gasket (A) with a new one.
- After mounting the valve body cover, check for oil leakage on the connecting part while the engine is on.



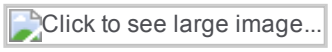
9. Disconnect the solenoid valve connector (B) and the oil temperature sensor (A) after removing the bolts.

Tightening torque :
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



10. Remove the solenoid valve support bracket (A).

Tightening torque :
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



11. Remove the valve body mounting bolt (A-1ea).

12. Remove the Overdrive clutch control solenoid valve (A).

Installation

1. To install, reverse the removal procedure.
2. Check the ATF level after refilling the automatic transaxle with fluid.
   (Refer to Automatic Transaxle System-"Fluid")
3. Clear the diagnostic trouble codes (DTC) using the GDS.

⚠ CAUTION
Even though disconnecting the battery negative terminal, the DTCs will not be cleared. So, be sure to clear the DTCs using the GDS.

4. Reset the automatic transaxle adaptive values using the GDS.
5. Perform Transaxle Control Module (TCM) learning after replacing the solenoid valve, TCM, automatic transaxle to prevent slow transaxle response, jerky acceleration and jerky startup.

NOTICE

TCM Learning

1) Learning Overview and Purpose
- It aims to correct the deviation between transaxle products to reduce learning time and secure initial driving safety.
- When gear shift shock has occurred at the 1-2-3-4-5-6 positions, delete the previous learning values using GDS device and perform TCM learning again.

2) Conditions that Require Learning
- After replacing automatic transaxle
- After replacing TCM
- After performing TCM reprogramming

3) TCM Learning Method

(1) Condition
- ATF temperature : 40 - 100°C

(2) Learning Method

a. Learning with the vehicle stopped
- While pressing and holding the brake (vehicle is stationery), set the throttle opening to 0% and repeat the following procedure four times.

Click to see large image...

b. Learning with the vehicle running
- Maintain a consistent throttle opening at the D position and gradually shift from 1st gear position to 6th gear position one by one. Then, gradually shift from 6th gear position to 1st gear position one by one (brake : on, throttle opening : 0%).
- Throttle opening (for shifting to upper gear) : 10 - 50% (less than 5% of throttle opening (APS) change)
- Repeat the above procedure four times.

Automatic Transaxle System

Description

SS-A solenoid valve is attached to the valve body and is an on/off solenoid valve that is used to change gears.
SS-A Solenoid valve(ON/OFF) is installed at valve body.

Automatic Transaxle System

Specifications

ON/OFF Solenoid Valve(SS-A)

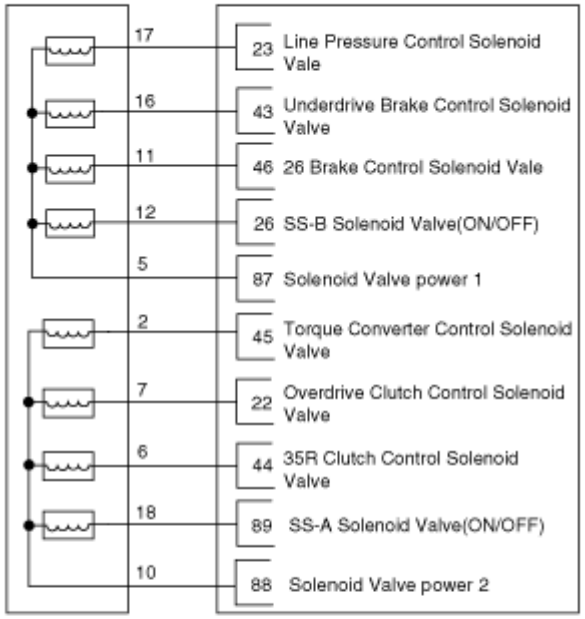
▹ Control type : Normal low type

Control pressure kpa (kgf/cm², psi)	490.33(5.0, 71.12)

Internal resistance(Ω)	10 ~ 11

Circuit Diagram

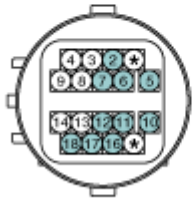
[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
17	TCM(23)	Line Pressure Control Solenoid Vale
16	TCM(43)	Underdrive Brake Control Solenoid Valve
11	TCM(46)	26 Brake Control Solenoid Vale
12	TCM(26)	SS-B Solenoid Valve (ON/OFF)
5	TCM(87)	Solenoid Valve power 1
2	TCM(45)	Torque Converter Control Solenoid Valve
7	TCM(22)	Overdrive Clutch Control Solenoid Valve
6	TCM(44)	35R Clutch Control Solenoid Valve
18	TCM(89)	SS-A Solenoid Valve (ON/OFF)
10	TCM(88)	Solenoid Valve power 2

[Harness Connector]



Solenoid Valve Connector

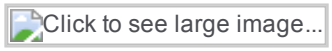
TCM Connector

Automatic Transaxle System

Inspection

1. Turn ignition switch OFF.

2. Remove the air duct.
   (Refer to Engine Mechanical System - "Air cleaner")
3. Disconnect the solenoid valve connector (A).



4. Measure resistance between sensor signal terminal and sensor ground terminal.
5. Check that the resistance is within the specification.

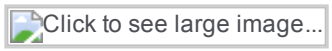
Removal

⚠ CAUTION

- When the solenoid valve failure code (DTC) is on, perform the following procedure to replace it.
- Automatic transaxle is composed of delicate components. Be careful not to cause any damage on the component in the course of assembly and disassembly.
- Maintain clean condition so that foreign substance does not get into the automatic transaxle.
- Use a coated apron, latex gloves, and stainless tray to prevent foreign substance from getting into the transaxle.
- Automatic transaxle fluid (ATF) can be reused. Collect it using a clean 10-liter beaker.

1. Remove the air duct.
   (Refer to Engine Mechanical System - "Air cleaner")
2. Remove the battery and the battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
4. Remove the ATF warmer.
   (Refer to Automatic Transaxle System - "ATF Warmer") (if equipped ATF warmer)
5. Remove the drain plug (A) and reinstall the drain plug after draining ATF totally.

Tightening torque :
38.2 ~ 48.1 N.m (3.9 ~ 4.9 kgf.m, 28.2 ~ 35.4 lb-ft)



⚠ CAUTION

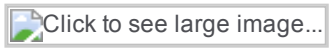
- Replace the gasket before reinstalling the drain plug.

6. Remove the air bleeder hose (B) after removing the clamp (A).

7. Disconnect the clip for fixing wiring from the valve body cover.
8. Remove the valve body cover (A).

Tightening torque :
(A) : 13.7 ~ 15.7 N.m (1.4 ~ 1.6 kgf.m, 10.1 ~ 11.6 lb-ft)

⚠ CAUTION
- When re-mounting the valve body cover, replace the gasket (A) with a new one.
- After mounting the valve body cover, check for oil leakage on the connecting part while the engine is on.

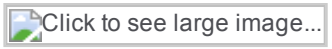


9. Disconnect the solenoid valve connector (B) and the oil temperature sensor (A) after removing the bolts.

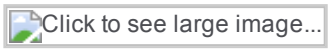
Tightening torque :
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)

10. Remove the solenoid valve support bracket (A).

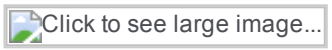
Tightening torque :
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



11. Remove the SS-A solenoid valve (A).



⚠ CAUTION
- When installing, apply the ATF oil or white vaseline to the O-ring (A) not to be damaged.



Installation

1. To install, reverse the removal procedure.
2. Check the ATF level after refilling the automatic transaxle with fluid.
(Refer to Automatic Transaxle System - "Fluid")
3. Clear the diagnostic trouble codes (DTC) using the GDS.

⚠ CAUTION
Even though disconnecting the battery negative terminal, the DTCs will not be cleared. So, be sure to clear the DTCs using the GDS.

4. Reset the automatic transaxle adaptive values using the GDS.
5.

Perform Transaxle Control Module (TCM) learning after replacing the solenoid valve, TCM, automatic transaxle to prevent slow transaxle response, jerky acceleration and jerky startup.

NOTICE

TCM Learning

1) Learning Overview and Purpose
- It aims to correct the deviation between transaxle products to reduce learning time and secure initial driving safety.
- When gear shift shock has occurred at the 1-2-3-4-5-6 positions, delete the previous learning values using GDS device and perform TCM learning again.

2) Conditions that Require Learning
- After replacing automatic transaxle
- After replacing TCM
- After performing TCM reprogramming

3) TCM Learning Method

(1) Condition
- ATF temperature : 40 - 100°C

(2) Learning Method

a. Learning with the vehicle stopped
- While pressing and holding the brake (vehicle is stationery), set the throttle opening to 0% and repeat the following procedure four times.

Click to see large image...

b. Learning with the vehicle running
- Maintain a consistent throttle opening at the D position and gradually shift from 1st gear position to 6th gear position one by one. Then, gradually shift from 6th gear position to 1st gear position one by one (brake : on, throttle opening : 0%).
- Throttle opening (for shifting to upper gear) : 10 - 50% (less than 5% of throttle opening (APS) change)
- Repeat the above procedure four times.

Description

SS-B solenoid valve is attached to the valve body and is an on/off solenoid valve that is used to change gears.
SS-B Solenoid valve(ON/OFF) is installed at valve body.

Automatic Transaxle System

Specifications

ON/OFF Solenoid Valve(SS-B)

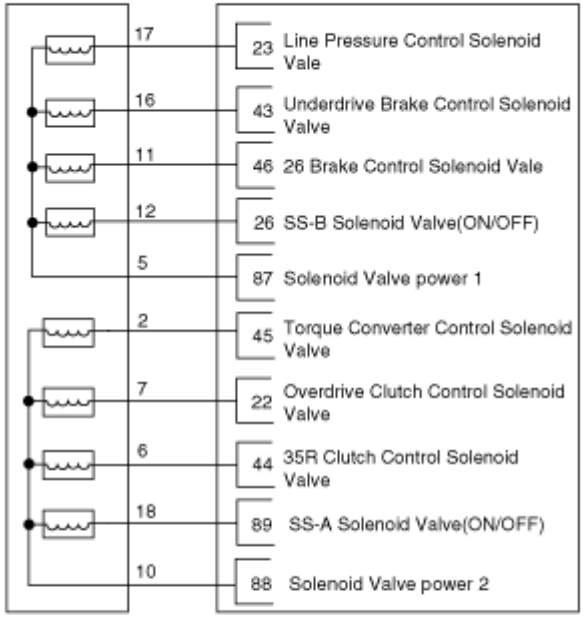
▹ Control type : Normal low type

Control pressure kpa (kgf/cm², psi)	490.33(5.0, 71.12)
Internal resistance(Ω)	10 ~ 11

Automatic Transaxle System

Circuit Diagram

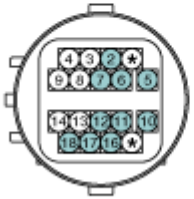
[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
17	TCM(23)	Line Pressure Control Solenoid Vale
16	TCM(43)	Underdrive Brake Control Solenoid Valve
11	TCM(46)	26 Brake Control Solenoid Vale
12	TCM(26)	SS-B Solenoid Valve (ON/OFF)
5	TCM(87)	Solenoid Valve power 1
2	TCM(45)	Torque Converter Control Solenoid Valve
7	TCM(22)	Overdrive Clutch Control Solenoid Valve
6	TCM(44)	35R Clutch Control Solenoid Valve
18	TCM(89)	SS-A Solenoid Valve (ON/OFF)
10	TCM(88)	Solenoid Valve power 2

[Harness Connector]



Solenoid Valve Connector

TCM Connector

Automatic Transaxle System

Inspection

1. Turn ignition switch OFF.
2. Remove the air duct.
   (Refer to Engine Mechanical System - "Air cleaner")
3. Disconnect the solenoid valve connector (A).

Click to see large image...

4. Measure resistance between sensor signal terminal and sensor ground terminal.
5. Check that the resistance is within the specification.

Removal

CAUTION

- When the solenoid valve failure code (DTC) is on, perform the following procedure to replace it.
- Automatic transaxle is composed of delicate components. Be careful not to cause any damage on the component in the course of assembly and disassembly.
- Maintain clean condition so that foreign substance does not get into the automatic transaxle.
- Use a coated apron, latex gloves, and stainless tray to prevent foreign substance from getting into the transaxle.
- Automatic transaxle fluid (ATF) can be reused. Collect it using a clean 10-liter beaker.

1. Remove the air duct.
   (Refer to Engine Mechanical System - "Air cleaner")
2. Remove the battery and the battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
4. Remove the ATF warmer.
   (Refer to Automatic Transaxle System - "ATF Warmer") (if equipped ATF warmer)
5. Remove the drain plug (A) and reinstall the drain plug after draining ATF totally.

   Tightening torque :
   38.2 ~ 48.1 N.m (3.9 ~ 4.9 kgf.m, 28.2 ~ 35.4 lb-ft)

   Click to see large image...

   CAUTION

   - Replace the gasket before reinstalling the drain plug.

6. Remove the air bleeder hose (B) after removing the clamp (A).

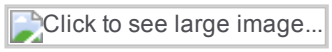
   Click to see large image...
7. Disconnect the clip for fixing wiring from the valve body cover.
8. Remove the valve body cover (A).

   Tightening torque :
   (A) : 13.7 ~ 15.7 N.m (1.4 ~ 1.6 kgf.m, 10.1 ~ 11.6 lb-ft)

   Click to see large image...

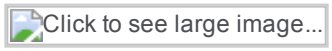
   CAUTION

- When re-mounting the valve body cover, replace the gasket (A) with a new one.
- After mounting the valve body cover, check for oil leakage on the connecting part while the engine is on.



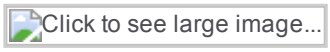
9. Disconnect the solenoid valve connector (B) and the oil temperature sensor (A) after removing the bolts.

Tightening torque :
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



10. Remove the solenoid valve support bracket (A).

Tightening torque :
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



11. Remove the SS-B solenoid valve (A).

⚠ CAUTION

- When installing, apply the ATF oil or white vaseline to the O-ring (A) not to be damaged.

Installation

1. To install, reverse the removal procedure.
2. Check the ATF level after refilling the automatic transaxle with fluid.
   (Refer to Automatic Transaxle System - "Fluid")
3. Clear the diagnostic trouble codes (DTC) using the GDS.

⚠ CAUTION

Even though disconnecting the battery negative terminal, the DTCs will not be cleared. So, be sure to clear the DTCs using the GDS.

4. Reset the automatic transaxle adaptive values using the GDS.
5. Perform Transaxle Control Module (TCM) learning after replacing the solenoid valve, TCM, automatic transaxle to prevent slow transaxle response, jerky acceleration and jerky startup.

NOTICE

TCM Learning

1) Learning Overview and Purpose
- It aims to correct the deviation between transaxle products to reduce learning time and secure initial driving safety.
- When gear shift shock has occurred at the 1-2-3-4-5-6 positions, delete the previous learning values using GDS device and perform TCM learning again.

2) Conditions that Require Learning
- After replacing automatic transaxle
- After replacing TCM
- After performing TCM reprogramming

3) TCM Learning Method

(1) Condition
- ATF temperature : 40 - 100°C

(2) Learning Method

a. Learning with the vehicle stopped
- While pressing and holding the brake (vehicle is stationery), set the throttle opening to 0% and repeat the following procedure four times.

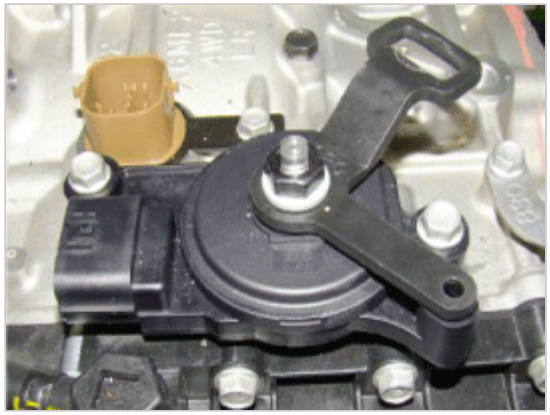
Click to see large image...

b. Learning with the vehicle running
- Maintain a consistent throttle opening at the D position and gradually shift from 1st gear position to 6th gear position one by one. Then, gradually shift from 6th gear position to 1st gear position one by one (brake : on, throttle opening : 0%).
- Throttle opening (for shifting to upper gear) : 10 - 50% (less than 5% of throttle opening (APS) change)
- Repeat the above procedure four times.

Automatic Transaxle System

Description

Inhibitor Switch monitors the lever"s position(P, R, N, D) and is used to control gear setting signals.



Automatic Transaxle System

Specifications

▹ Type: Combination of output signals from 4 terminals

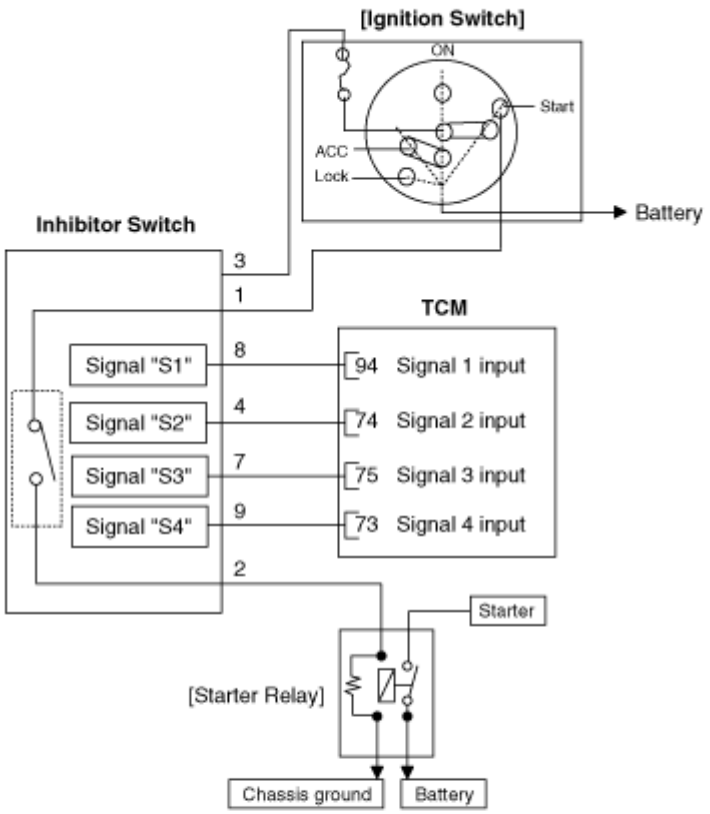
Power supply (V)	12
Output type	Pin to Pin

Signal Code Table

	P	P-R	R	R-N	N	N-D	D
S1	12V	12V	0	0	0	0	0
S2	0	12V	12V	12V	0	12V	0
S3	0	0	0	12V	12V	0	0
S4	0	0	0	0	0	12V	12V

Circuit Diagram

[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
4	TCM (74)	Signal 2 input
8	TCM (94)	Signal 1 input
7	TCM (75)	Signal 3 input
9	TCM (73)	Signal 4 input
3	Ignition switch	Ignition ON
1	Ignition switch	Starter power(ON)
2	Starter relay	Starter relay

[Harness Connector]

Inhibitor Switch Connector

TCM Connector

Automatic Transaxle System

Fault Diagnosis

Fault Diagnosis for Symptom

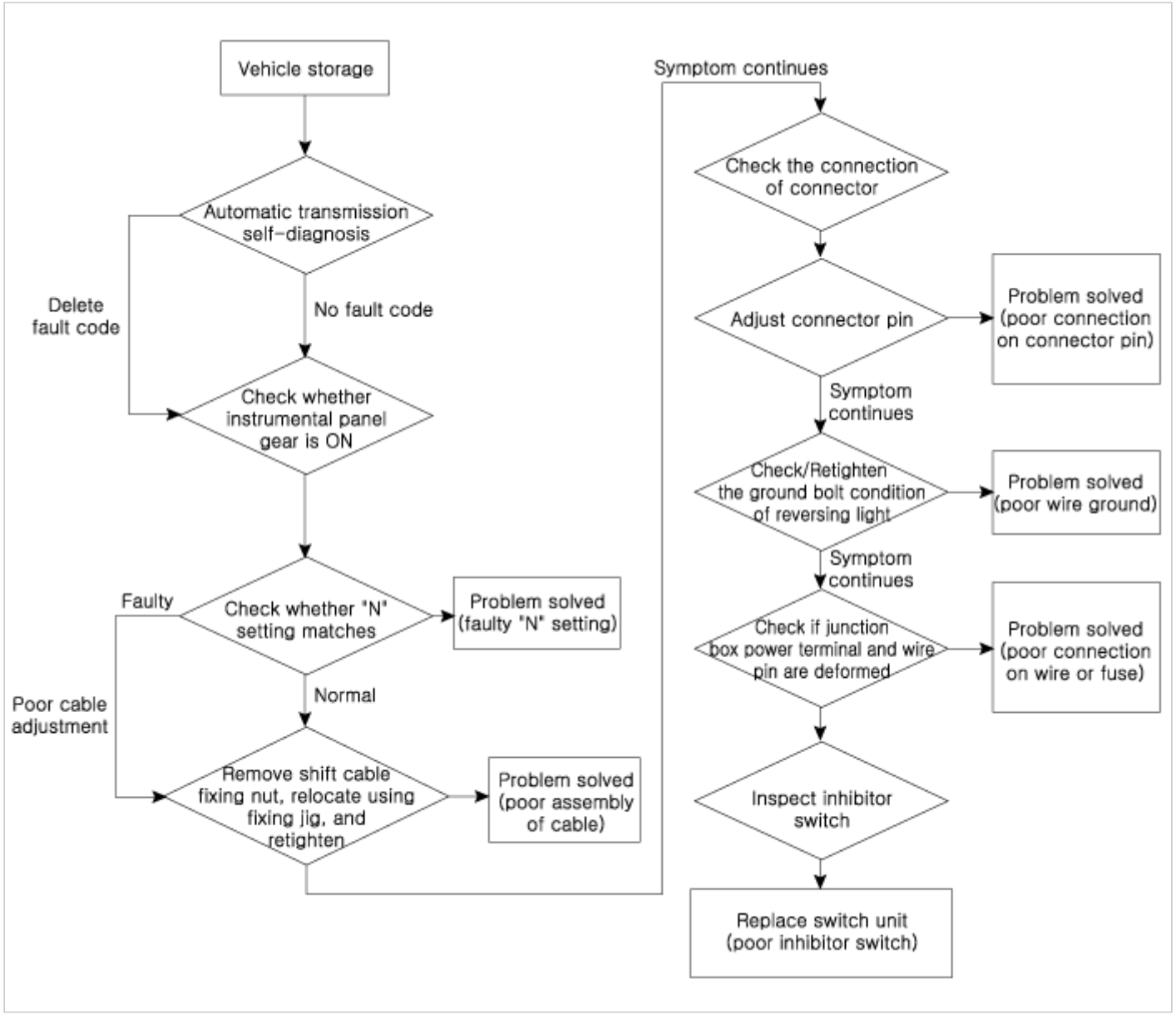
Major Symptom	Expected Cause	Items to Check and Measures
Shift lever not operating Gear not marked on cluster	Inhibitor switch circuit abnormal Inhibitor switch function abnormal	Check the inspection FLOW and replace the inhibitor switch
Shock occurs while shifting lever Warning lamp ON	Inhibitor switch "N" setting faulty	Adjust "N" setting using "N" setting jig (refer to automatic transmission system - "inhibitor switch")
Engine OFF while vehicle is parked	Shift cable separation faulty	Adjust shift cable separation (refer to automatic transmission system - "inhibitor switch")
	Poor ground condition on reversing light circuit	Check the ground condition on reversing light and retighten it
	Inhibitor switch vehicle side circuit abnormal	Check the connection of junction box power terminal, fuse (TCU2) terminal and replace the junction box or adjust the gap
		Check inside the inhibitor switch connector for foreign substance and whether terminal is bent
	Poor ground condition on inhibitor switch wire	Check the ground condition of wire and retighten it
	Poor inhibitor unit (disconnection/short-circuit)	Replace inhibitor switch (refer to inhibitor switch inspection)

Inspection

NOTICE

- Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.

Inspection flow

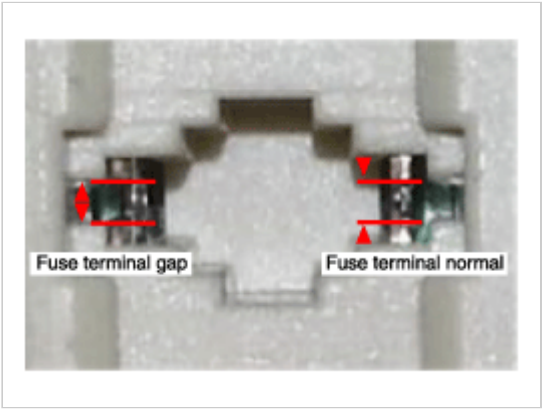


Items to check

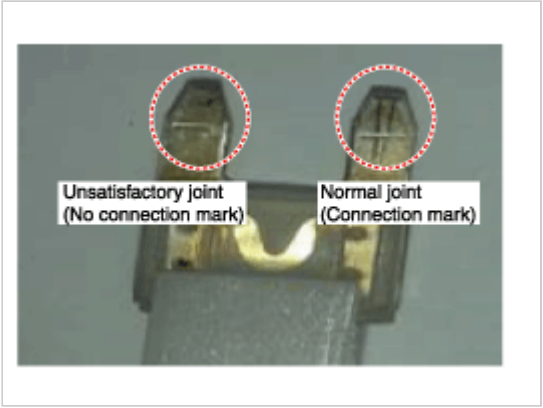
1. Inspect DTC code.
2. Inspect whether N setting matches.
   – Adjust N setting (refer to automatic transmission system - "inhibitor switch")
3. Inspect shift cable separation.

- Adjust shift cable separation (refer to automatic transmission system - "shift cable")

4. Inspect whether connector is connected.
   - Inspect connector thoroughly for looseness, poor connection, bending, corrosion, contamination, deformation, or damage.
   - Turn ignition key "ON" and engine "OFF" and measure the power supplied to inhibitor switch circuit and voltage between ground.
     Specification: approx. 12 V
   - Fix the pin wiring when connector pin wiring is faulty (refer to ETM - "wiring repair").
5. Inspect ground condition on reversing light circuit.
   - Check the ground location of reversing light (refer to ETM - "harness location map").
   - Reattach reversing light if ground condition is faulty.
6. Inspect wiring connection on junction box power terminal and fuse lamp.
   - Check whether fuse holder is separated and holder is holding the fuse tight.



   - Attach tester fuse to check if it is connected appropriately.



   - Check whether fuse capacity is appropriate for each circuit.
   - Check if fuse is damaged.
   - Check pulling of fuse fixing wiring, inflow of foreign substance, and arrangement condition of terminal.
   -

Relocate the terminal that has been pulled and inspect using the method explained above.

– When problem is not solved, refer to the circuit diagram wiring repair instructions to fix or replace the terminal.

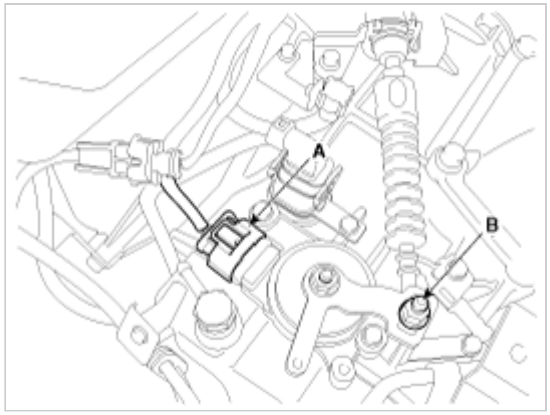
7. Inspect inhibitor switch signal.
   – Turn ignition key "ON" and engine "OFF".
   – Measure the voltage between each terminal and chassis ground when shifting lever to "P, R, N, D" range.

   Specified value: refer to specification "signal code" table

Removal

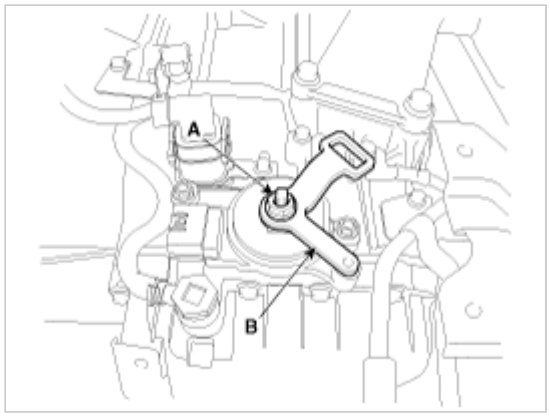
1. Set shift lever to "N" position.
2. Remove the air duct.
   (Refer to Engine Mechanical System - "Air cleaner")
3. Remove the battery and the battery tray.
   (Refer to Engine Electrical System - "Battery")
4. Disconnect the inhibitor switch connector (A).
5. Remove the shift cable mounting nut (B).

   Tightening torque:
   0.8 ~ 1.2 kgf.m



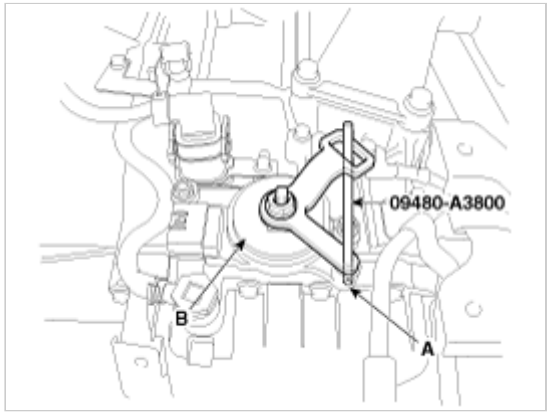
6. Remove the manual control lever (B) and the washer after removing a nut (A).

   Tightening torque:
   1.8 ~ 2.5 kgf.m



⚠ CAUTION

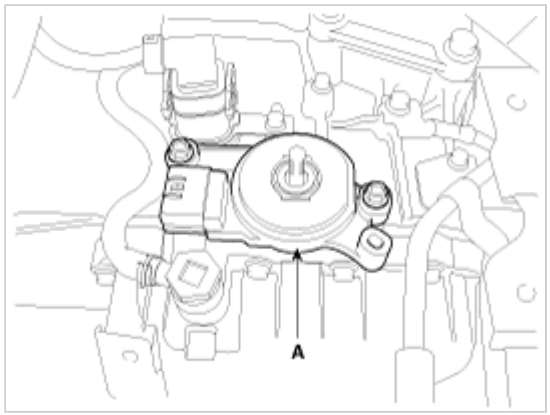
Using a SST(09480-A3800), fix the inhibitor manual control lever in the N jig hole (A) when you assemble the inhibitor (B).



7. Remove the inhibitor assembly (A) after removing the bolts (2ea).

Tightening torque:

9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



CAUTION

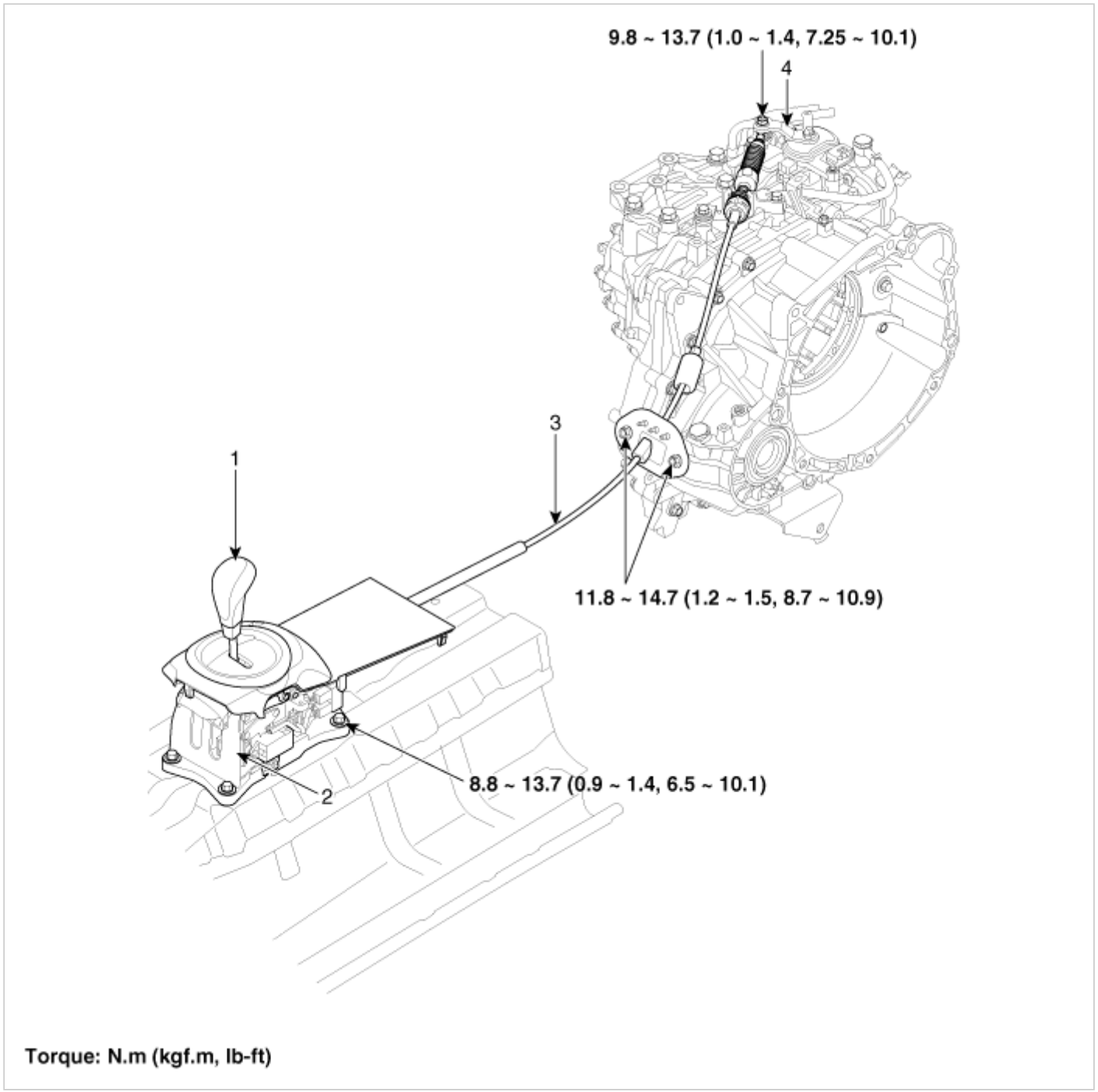
When installing, tighten the inhibitor assembly mounting bolt lightly.

Installation

1. Install in the reverse order of removal.

Automatic Transaxle System

Components



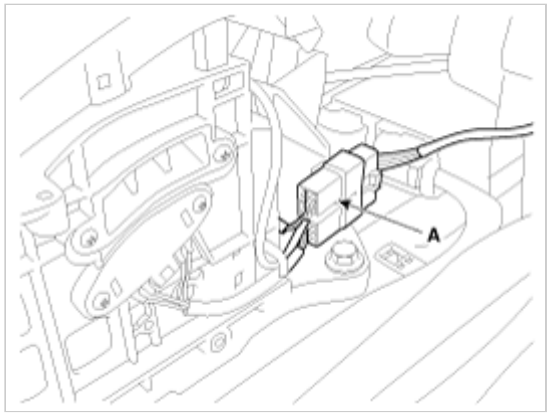
1. Shift lever knob
2. Shift lever assembly
4. Manual control lever (T/M side)
5. Automatic transaxle assembly

3. Control cable assembly

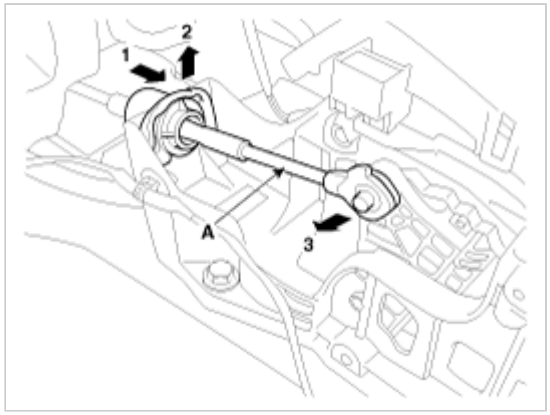
Automatic Transaxle System

Removal

1. Remove the floor console.
   (Refer to Body - "Floor Console")
2. Disconnect sports mode connector (A).

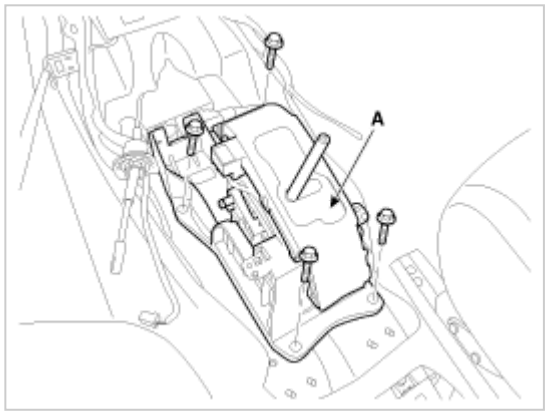


3. Disconnect the shift cable (A).



4. Remove the shift lever assembly (A) by removing the bolts (C-4ea).

Tightening torque:
8.8 ~ 13.7 N.m (0.9 ~ 1.4 kgf.m, 6.5 ~ 10.1 lb-ft)



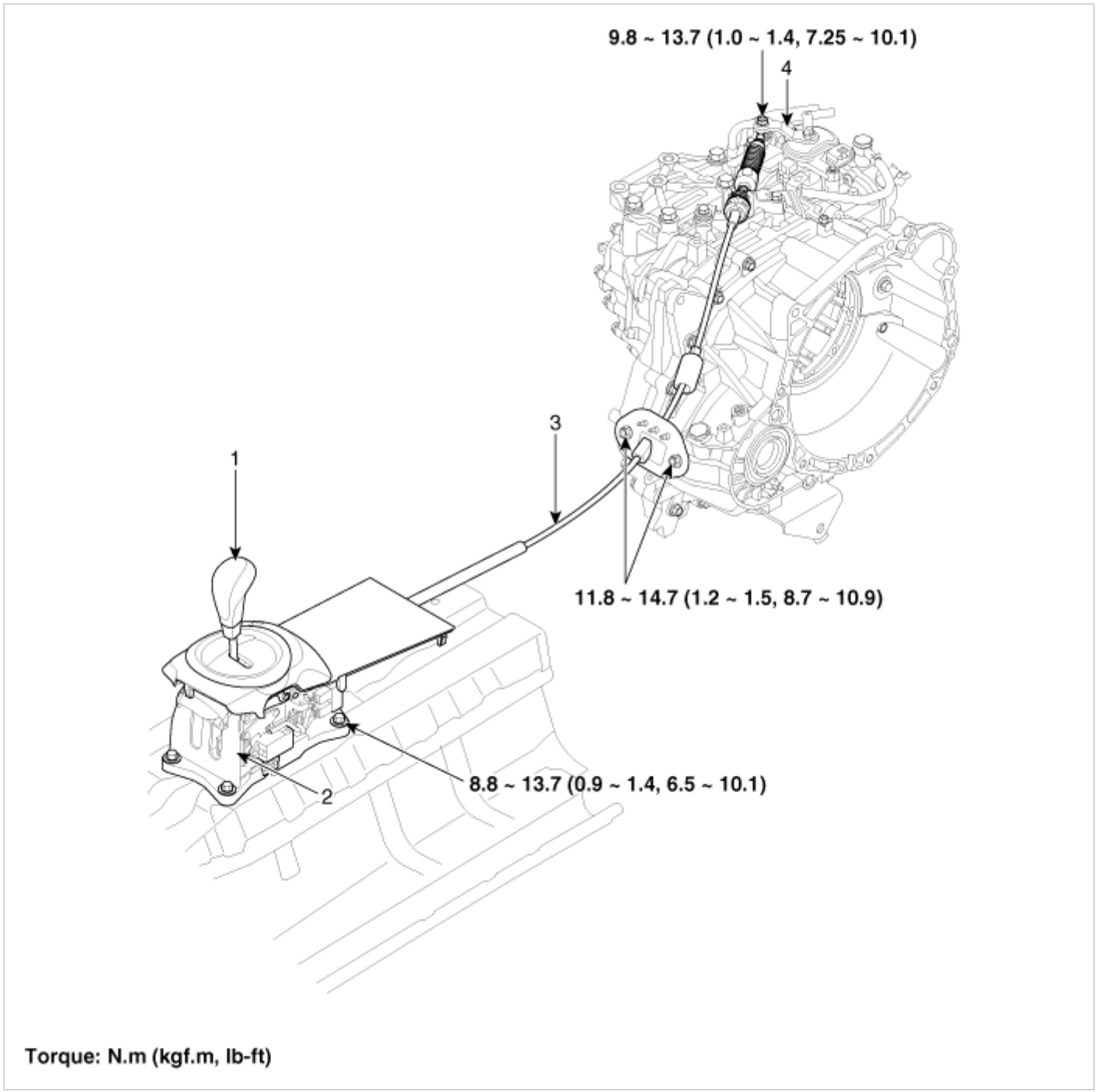
Installation

1. Install in the reverse order of removal.

> **⚠ CAUTION**
> Set shift lever and inhibitor switch manual control lever to "N" position.

Automatic Transaxle System

Components

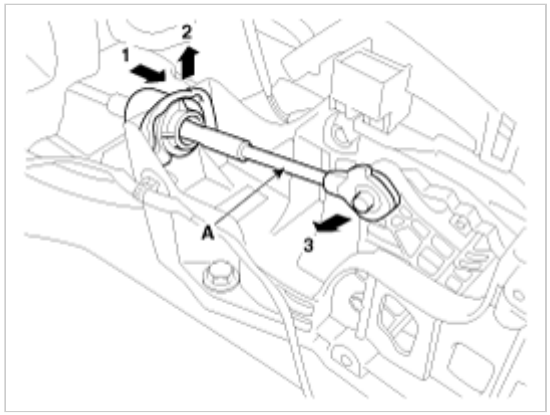


1. Shift lever knob
2. Shift lever assembly
4. Manual control lever (T/M side)
5. Automatic transaxle assembly

3. Control cable assembly

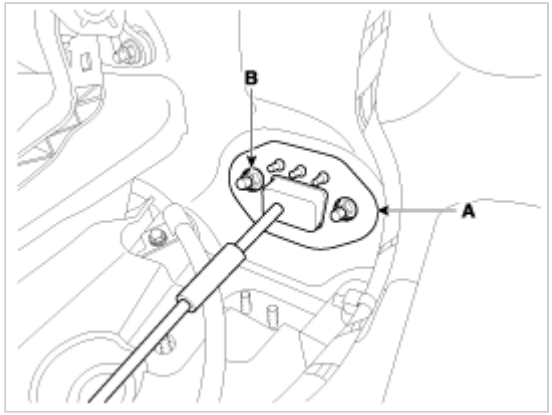
Removal

1. Remove the floor console.
   (Refer to Body - "Floor Console")
2. Disconnect the shift cable (A).



3. Remove the retainer (A) and nut (B).

Tightening torque:
7.8 ~ 11.8 N.m (0.8 ~ 1.2 kgf.m, 5.8 ~ 8.7 lb-ft)

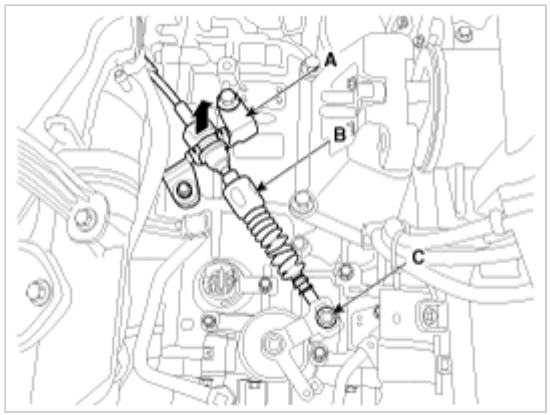


4. Remove the nut (C) from the manual control lever.

Tightening torque:
14.7 ~ 21.6 N.m (1.5 ~ 2.2 kgf.m, 10.9 ~ 15.9 lb-ft)

5. Remove the cable (B) from the bracket (A) at transaxle assembly side.

6. Remove the shift cable by pulling it toward the interior.



Installation

1. Install in the reverse order of removal.

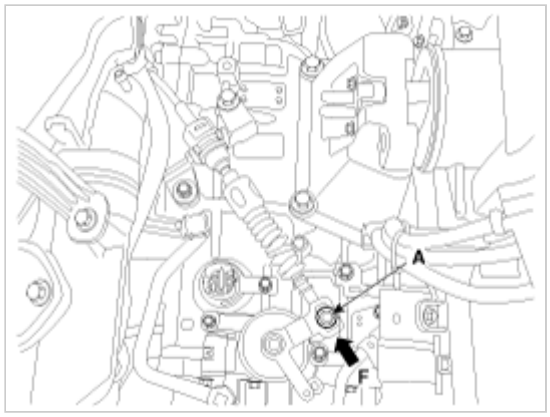
> **⚠ CAUTION**
> Set shift lever and inhibitor switch manual control lever to "N" position.

Adjustment

Adjusting method for T/M control cable

1. Set room side shift lever and T/M side manual control lever to "N" position.
2. Connect room side shift lever and shift cable.
3. Push cable to "F" direction shown to eliminate FREE PLAY.
4. Tighten adjusting nut (A).

Tightening torque:
7.8 ~ 11.8 N.m (0.8 ~ 1.2 kgf.m, 5.8 ~ 8.7 lb-ft)



5. After adjusting according check to be sure that this part operates surely at each range of T/M side corresponding to each position of shift lever.