SANTAFE(DMA) > 2013 > G 2.4 GDI > Automatic Transaxle System

Automatic Transaxle System > General Information > Specifications

Specifications

Item		Specifications
Transaxle type		A6MF2
Engine model		Gasoline 2.4GDI
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 ~ 1.65) 0.0374 ~ 0.0649
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.		(0.25 ~ 0.70) 0.0098 ~ 0.0276
Output voltage (V)	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	0.03

Inhibiter 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 : Connedted 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	10.9 ~ 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	8.8 ~ 13.7	0.9 ~ 1.4	9.4 ~ 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

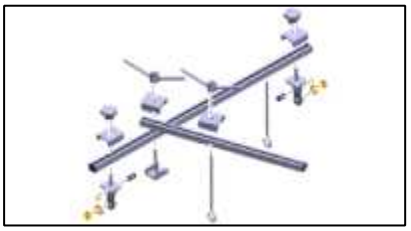
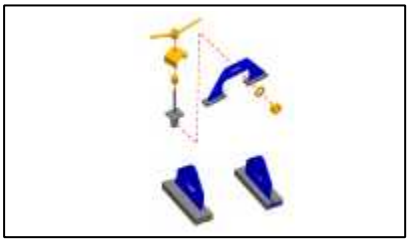
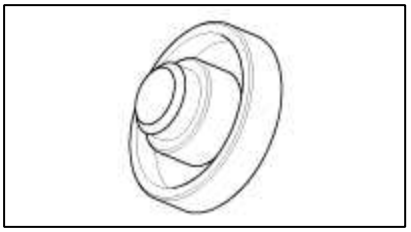
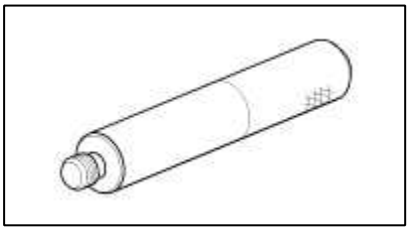
Item	Specified lubricant	Quantity
Transaxle fluid	SK ATF SP- , MICHANG ATF SP- ,NOCA ATF SP- , Hyundai Genuine ATF SP- or other brands meeting the above specification approved by Hyundai Motors Corp.	7.1L (1.88 U.S gal., 7.50 U.S.qt., 6.24 Imp.qt.)

Sealant

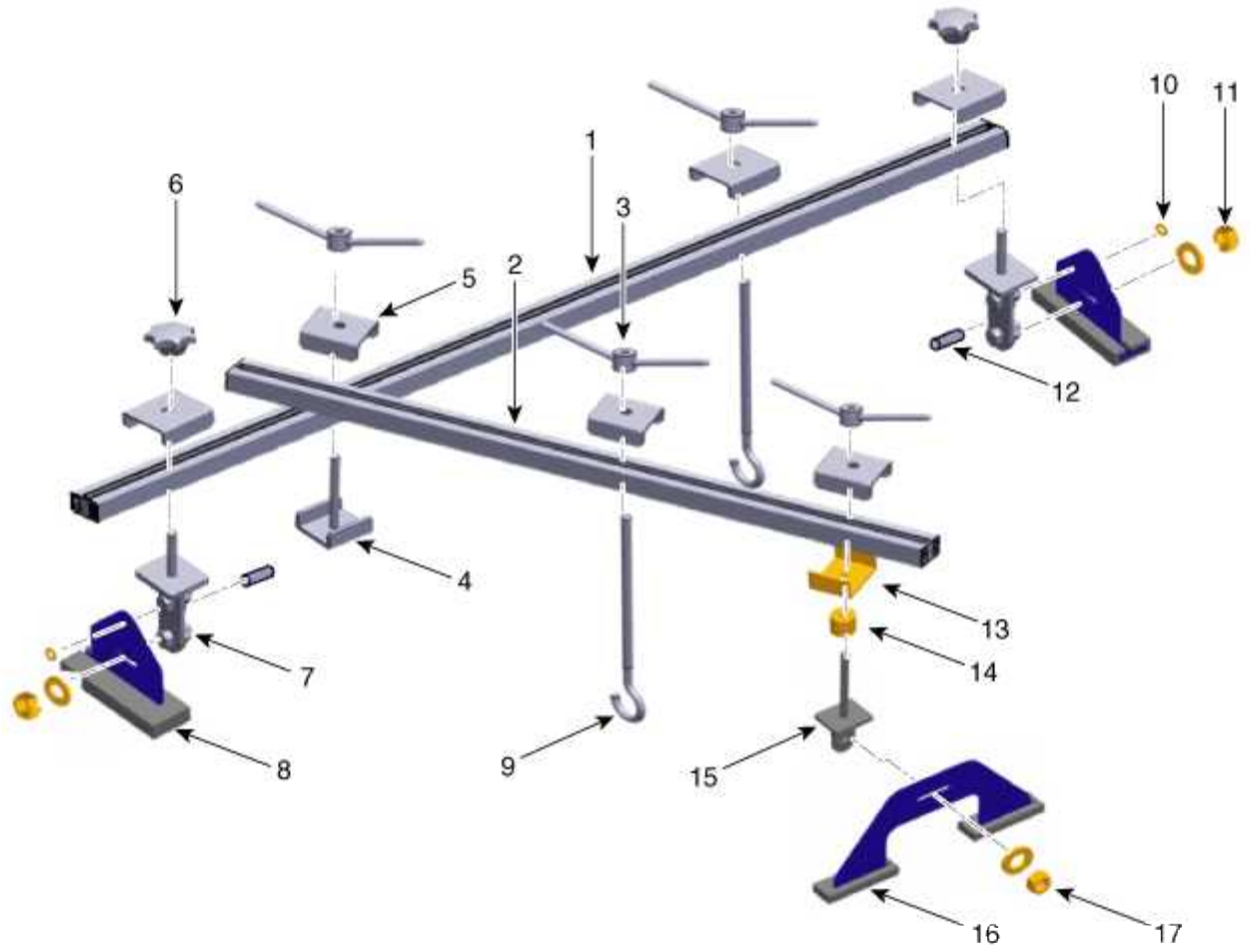
Item	Specified sealant
Rear cover	LOCTITE FMD-546 or THREE-BOND TB1281B
Torque converter housing	

Automatic Transaxle System > General Information > Special Service Tools

Special Service Tools

Tools (Number and name)	Illustration	Use
09200-3N000 Engine support fixture(Beam)		Removal and installation of the transaxle. Except lower supporter, use beam only with new engine support fixture supporter(SST No.:09200-2S000)
09200-2S000 Supporter		Removal and installation of the transaxle. Use this beam (SST No. : 09200-38001/3N000) with the supporter (SST No. : 09200-2S000)
09453-3L240 Oil seal installer(2WD)		Installation of transaxle case oil seal. [Using with bar (SST No.:09231-H1100)]
09453-2W100 Oil seal installer(4WD)		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.:09453-3L241, 09453-2W100)]
09480-A3800 Inhibitor neutral fixed pin		Inhibitor neutral fixed.

Engine support fixture special tool assembly drawing



1. 09200-3N000(Main bar)	10. 09200-3N000(Clip)
2. 09200-3N000(Sub bar)	11. 09200-3N000(Nut)
3. 09200-3N000(Handle)	12. 09200-3N000(Pin)
4. 09200-3N000(Stopper)	13. 09200-2S000(Stopper)
5. 09200-3N000(Stopper)	14. 09200-2S000(Spacer)
6. 09200-3N000(Knobe)	15. 09200-2S000(Adapter)
7. 09200-3N000(Adapter)	16. 09200-2S000(Nut)
8. 09200-2S000(Supporter)	17. 09200-2S000(Supporter)
9. 09200-3N000(Hanger)	

Automatic Transaxle System > General Information > 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

Automatic Transaxle System.

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.
- 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.

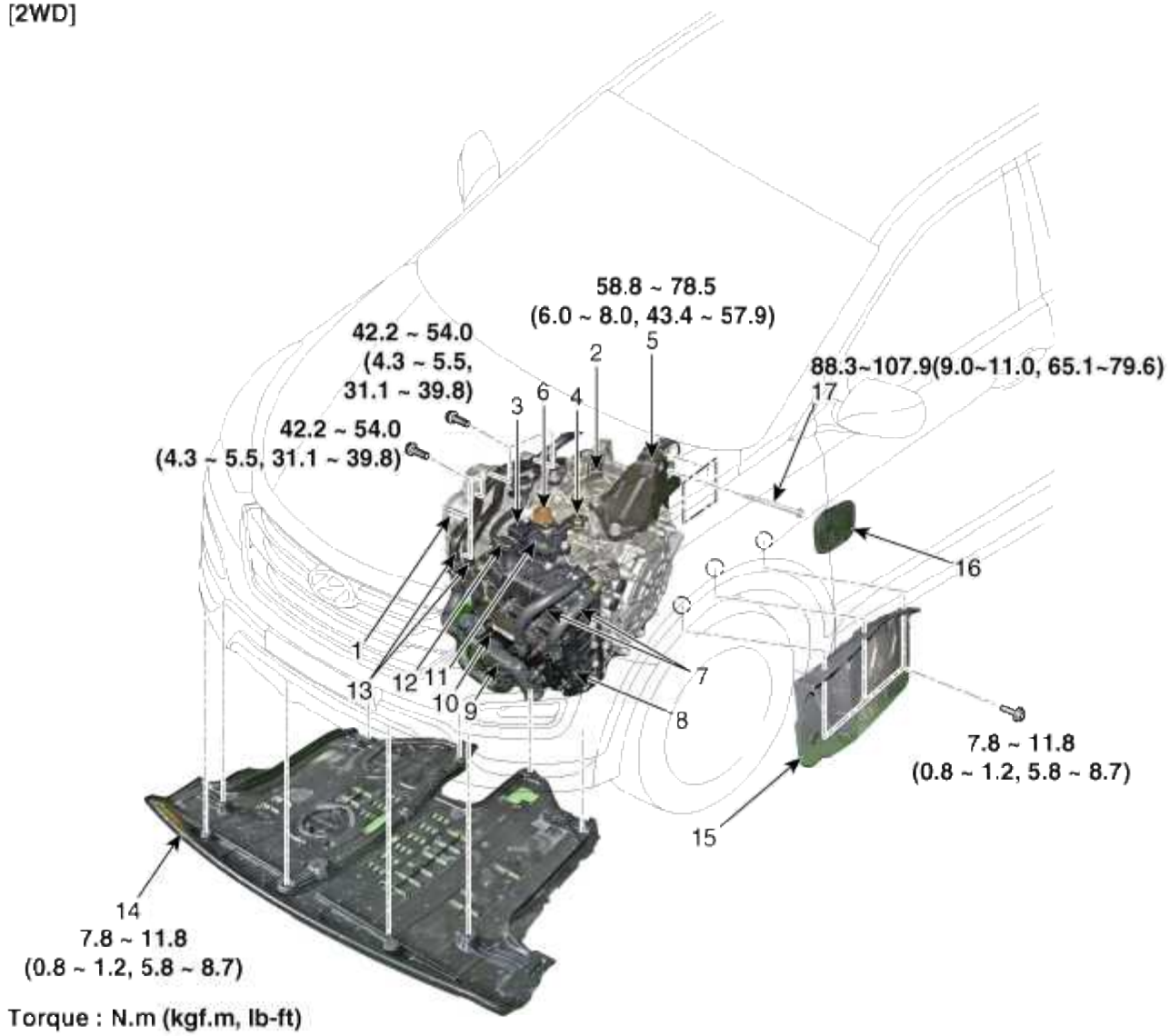
CAUTION

- 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.

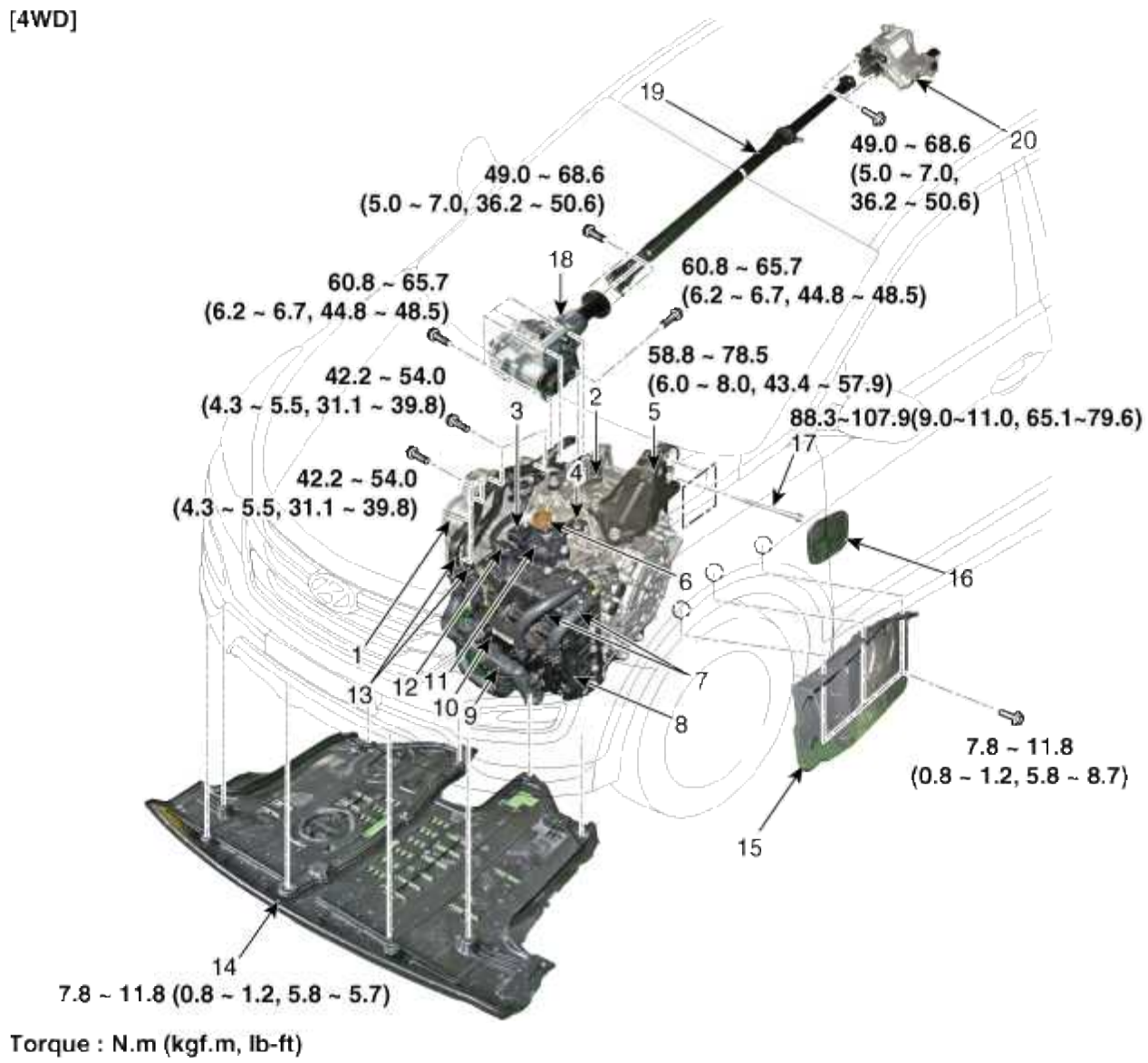
Automatic Transaxle System > Automatic Transaxle System > Automatic Transaxle > Components and Components Location

Components Location

[2WD]



1. Automatic transaxle	10. ATF Warmer
2. Shift cable bracket	11. Inhibitor switch
3. Inhibitor switch connector	12. ATF Injection hole(eyebolt)
4. Manual control lever	13. Coolant hose&pipe assembly
5. Automatic transaxle mounting support bracket	14. Under cover
6. Solenoid valve connector	15. Side cover
7. ATF hose&pipe	16. Automatice transaxle mounting bracket cover
8. Valve body cover	
9. Bypass valve	17. Automatice transaxle mounting bracket bolt



1. Automatic transaxle	11. Inhibitor switch
2. Shift cable bracket	12. ATF Injection hole(eyebolt)
3. Inhibitor switch connector	13. Coolant hose&pipe assembly
4. Manual control lever	14. Under cover
5. Automatic transaxle mounting support bracket	15. Side cover
6. Solenoid valve connector	16. Automatice transaxle mounting bracket cover
7. ATF hose&pipe	17. Automatice transaxle mounting bracket bolt
8. Valve body cover	18. Transfer assembly
9. Bypass valve	19. Propeller shaft
10. ATF Warmer	20. Coupling Assembly

Automatic Transaxle System > Automatic Transaxle System > Automatic Transaxle > Repair procedures

Removal

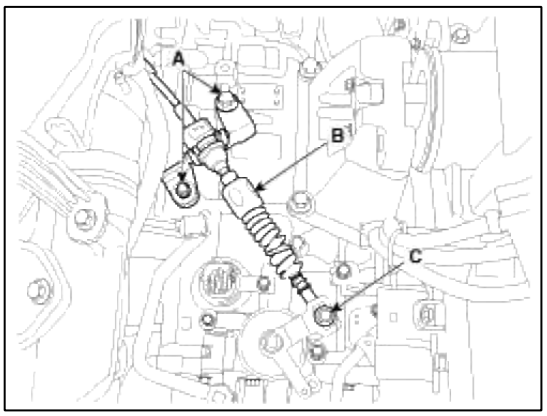
1. Remove the engine cover.
   (Refer to Engine Mechanical System - "Enginecover")

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).



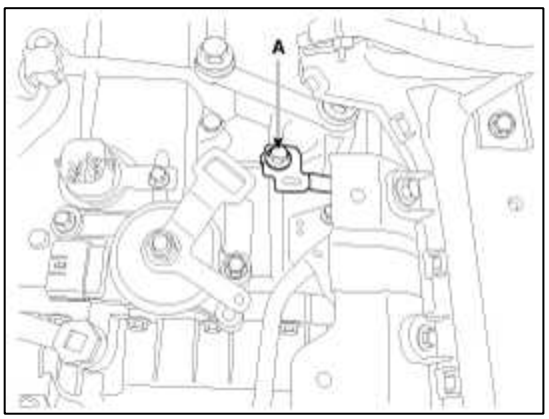
5. Remove the shift cable (B) after removing the nut (C) and the bolt (A).

Tightening torque:
(A) 14.7 ~21.6 N.m(1.5 ~2.2 kgf.m, 10.9 ~15.9 lb-ft)
(C) 7.8 ~ 11.8 N.m (0.8 ~ 1.2 kgf.m, 5.8 ~ 8.7 lb-ft)



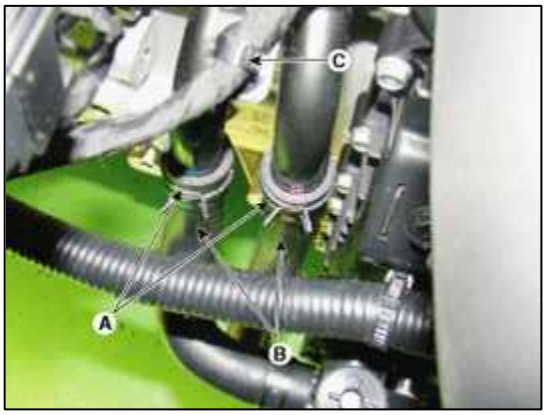
6. Remove the ground line after removing the bolt (A).

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



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

8. Remove the wiring mounting clip (C).





9. Remove the coolant pipe mounting bolts (A).
10. Remove the coolant pipe(B).

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

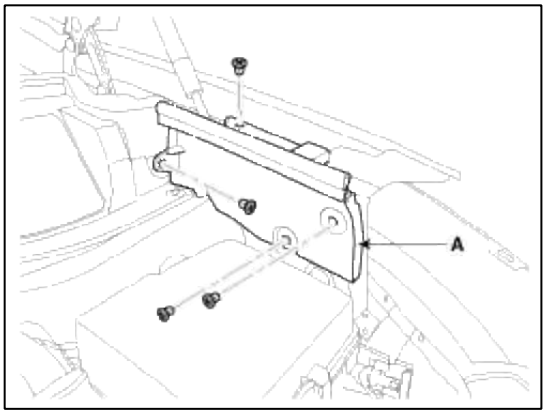




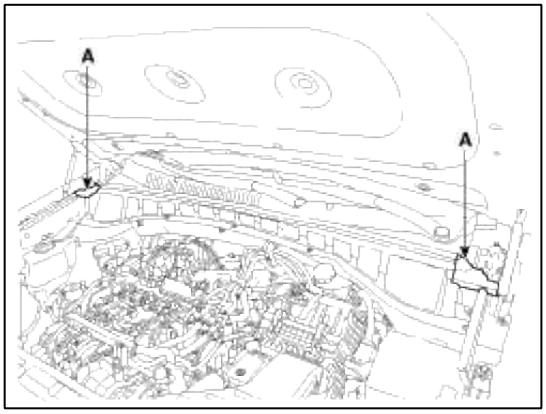
11. Remove the wiring bracket installation bolt (A).



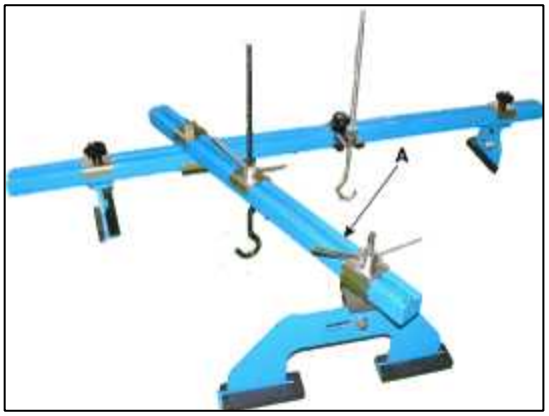
12. After loosening the mounting clips, then remove the fender side cover (A).



13. Disconnect the pad(A).



14. Assembled the engine support fixture (A).
(Refer to Special Service Tools-" Engine support fixture special tool assembly drawing")



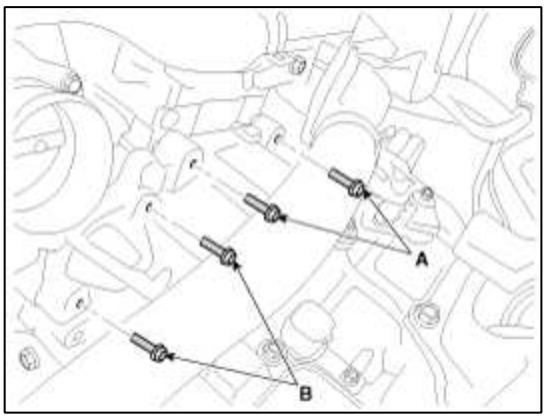
15. Remove the hood lift.
(Refer to Body-"Hood")

16. Using the engine support fixture (A) , hold the engine and transaxle assembly safely.



17. 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)

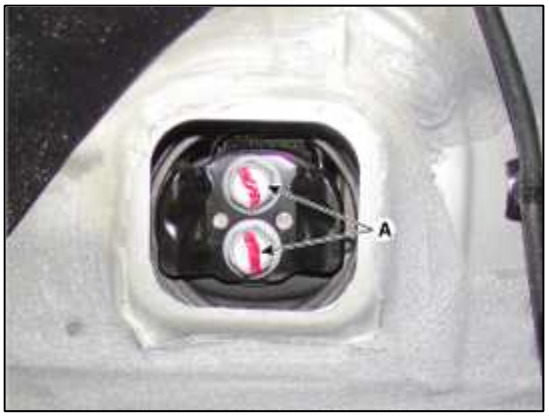


18. Remove the mounting bracket cover (A).



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

Tightening torque:
88.3~107.9 N.m (9.0~11.0 kgf.m, 65.1~79.6 lb-ft)



20. Remove the automatic transaxle mounting support bracket bolts (A).
21. Remove the automatic transaxle mounting support bracket (B).

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



22. Remove the under cover (A).

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



23. Remove the side cover (A).

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



24. Remove the following items;

2WD

A. Sub frame assembly.
(Refer to "Front suspension system" in SS group.)

B. Remove the drive shaft assembly.
(Refer to "Drive shaft assembly " in DS group.)

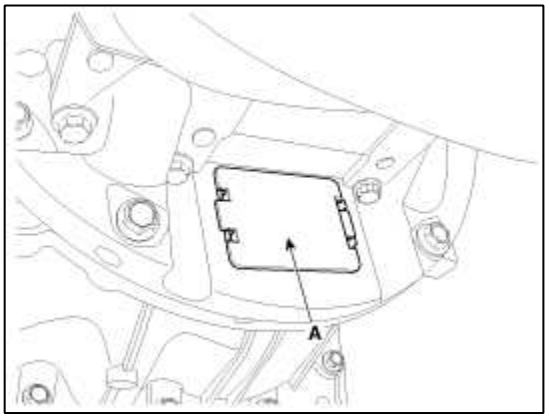
4WD

A. Sub frame assembly.
(Refer to "Front suspension system" in SS group.)

B. Drive shaft assembly.
(Refer to "Drive shaft assembly " in DS group.)

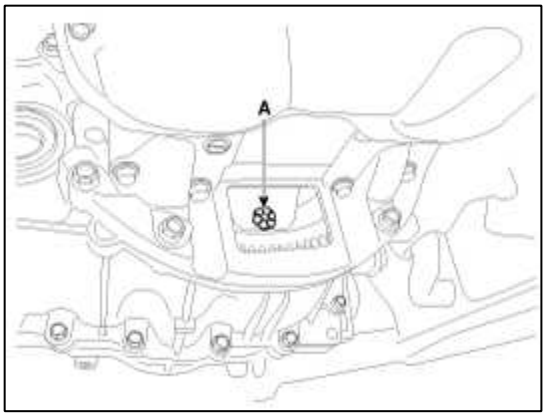
C. Transfer assembly.
(Refer to "Transfer assembly" in WD group)

25. Remove the dust cover(A).



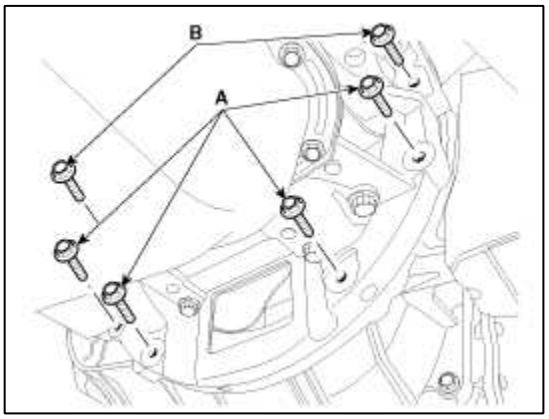
26. Remove the torque converter mounting bolt (A) with rotating the crankshaft.

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



27. 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. Installation is the reverse of removal.

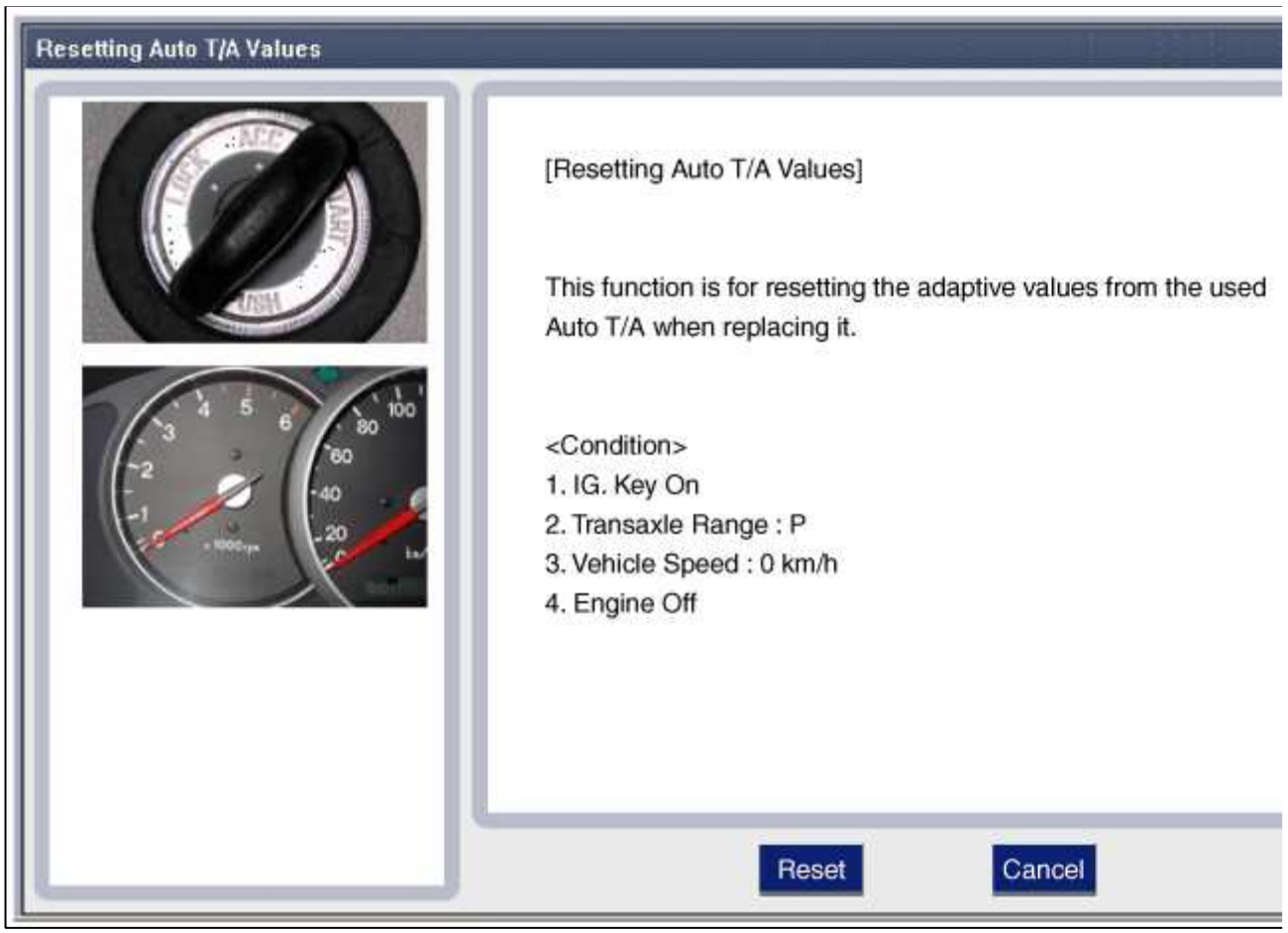
CAUTION

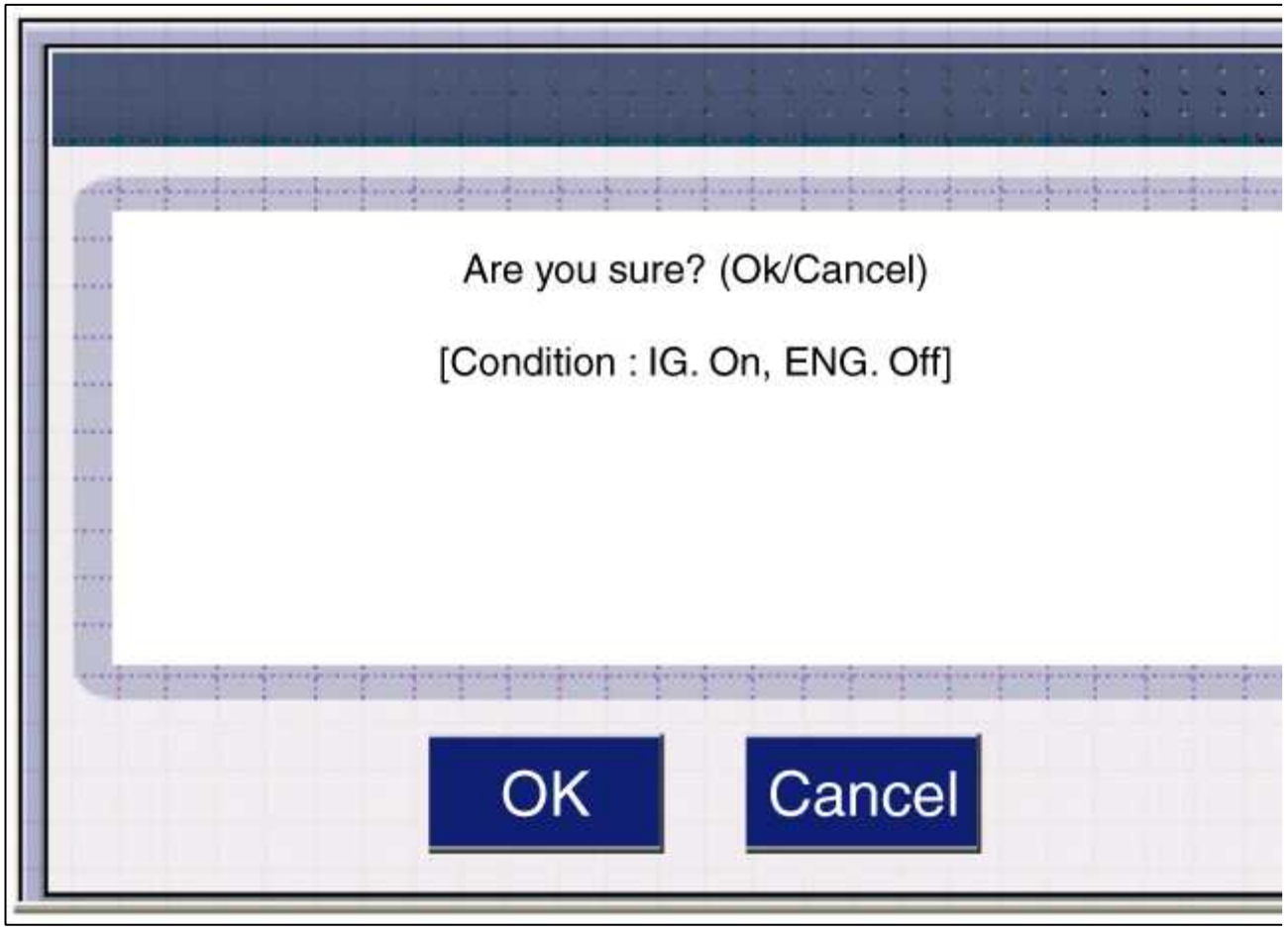
If the oil seal on the transaxle case side is damaged and fluid is leaking, replace the oil seal with a new unit. When installing the new oil seal, use the specialized tool (oil seal installer, 09453-3L240).

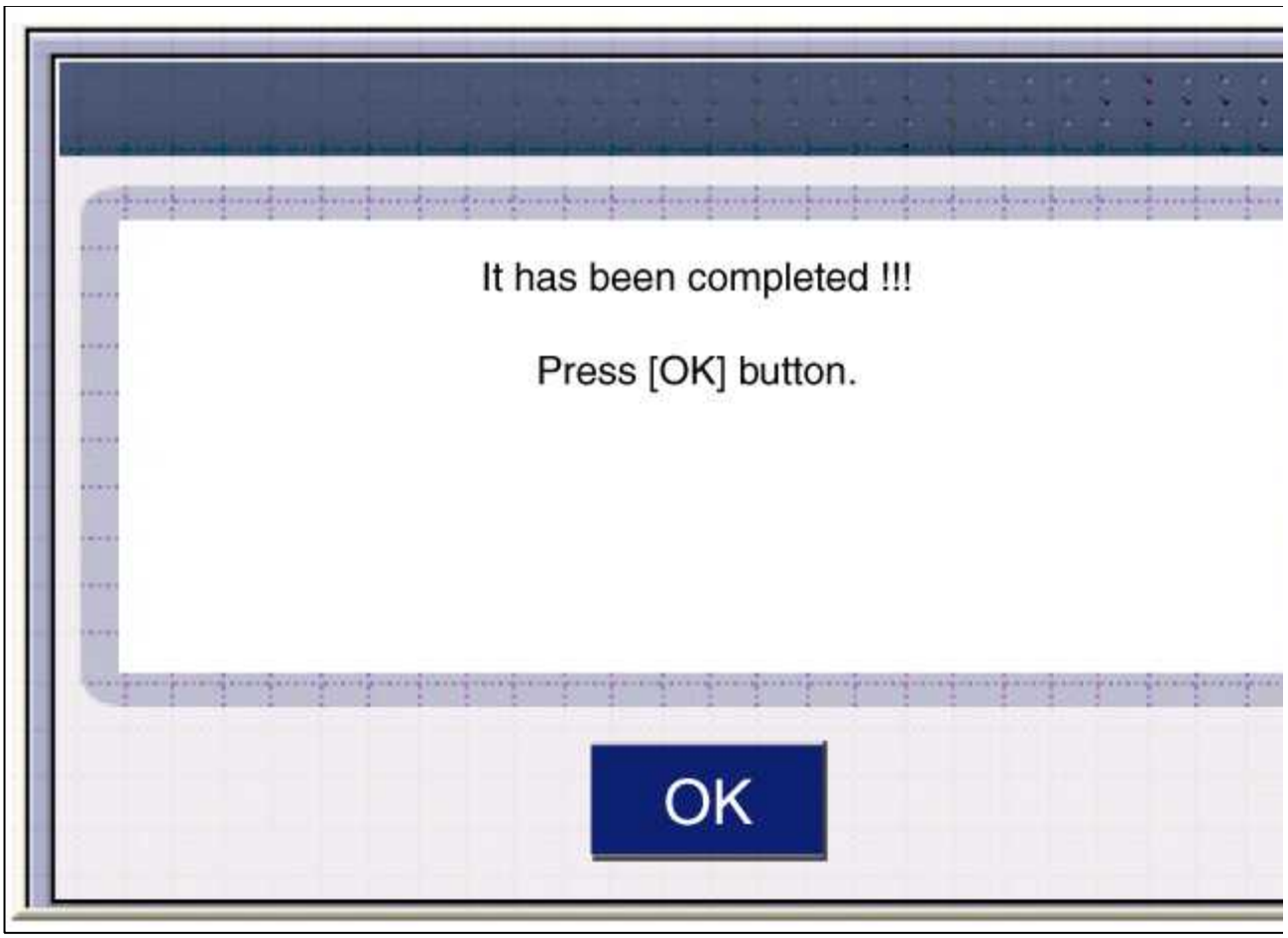
NOTE

After replacement or reinstallation procedure of the automatic transaxle assembly, must perform procedures bel

- Adding automatic transaxle fluid.
  (Refer to Hydraulic System - "Fluid")
- Adding coolant.
  (Refer to Engine Mechanical System - "Coolant")
- After replacing the automatic transaxle, clear the Diagnostic Trouble Code(DTC) using the GDS tool. DTC be cleared by disconnecting the battery.
- When replacing the automatic transaxle, reset the automatic transaxle's values by using the GDS.


Resetting Auto T/A Values
[Resetting Auto T/A Values]
This function is for resetting the adaptive values from the used Auto T/A when replacing it.
<Condition>
1. IG. Key On
2. Transaxle Range : P
3. Vehicle Speed : 0 km/h
4. Engine Off
Reset
Cancel


Are you sure? (Ok/Cancel)
[Condition : IG. On, ENG. Off]
OK
Cancel



- Perform TCM learning after replacing the transaxle to prevent slow transaxle response, jerky acceleration ar startup.
  (Refer to Automatic Transaxle Control System - "Repair procedures")

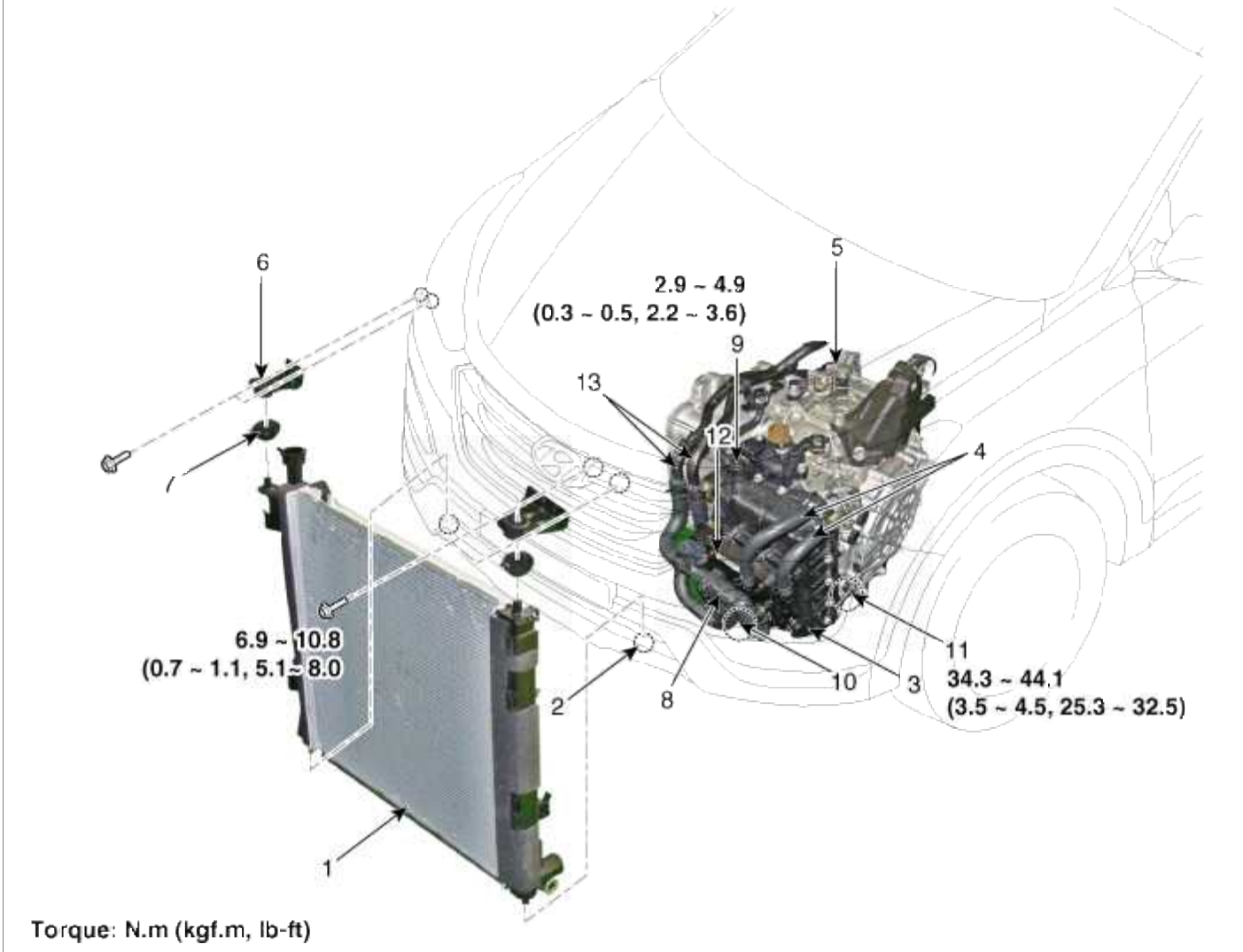
Automatic Transaxle System > Hydraulic System > Description and Operation

Description

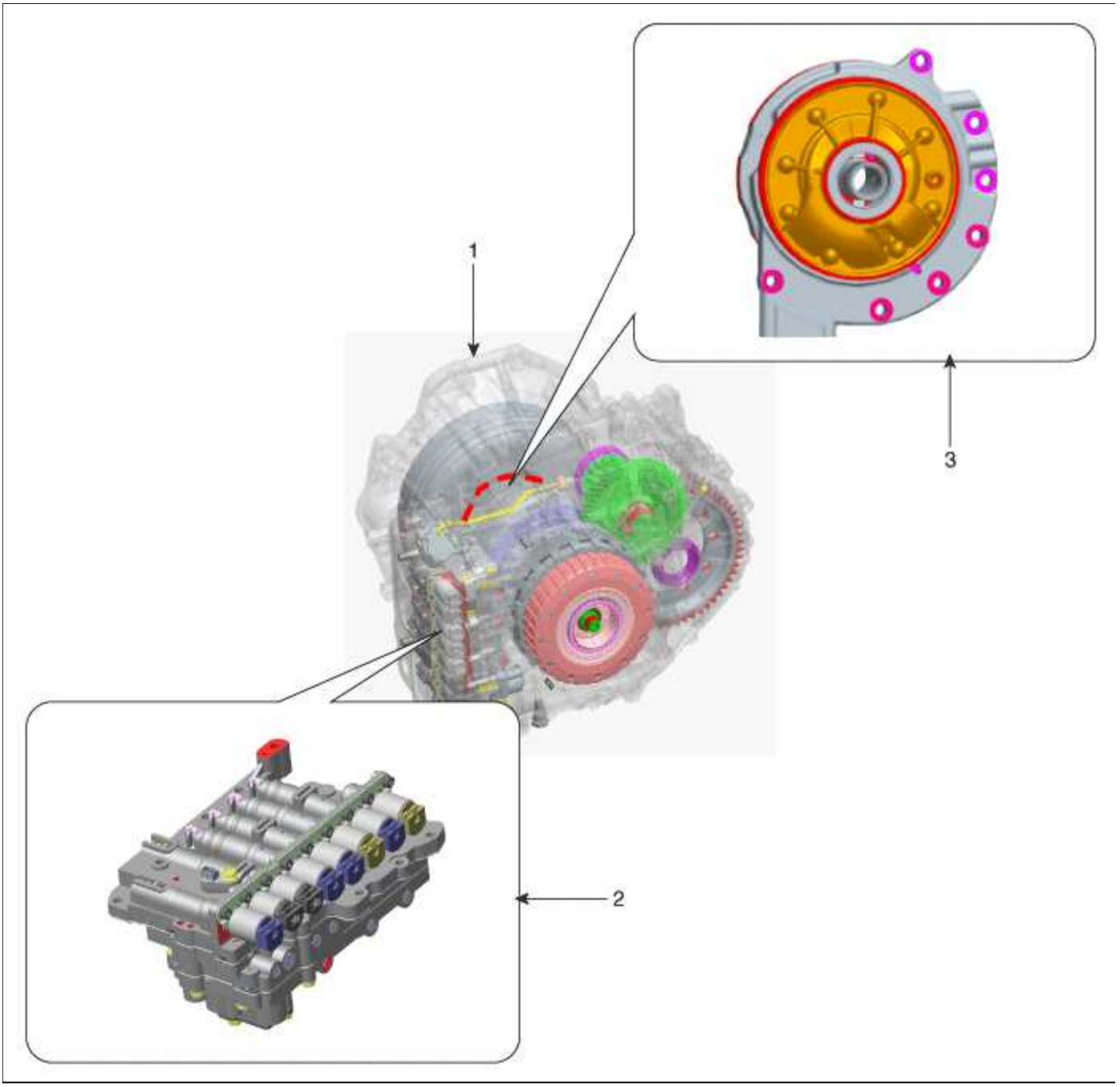
The hydraulic system consists of oil, an oil filter, an oil pump, and a valve body (valves and solenoid valves).
The oil pump is powered by the engine. ATF passes through the oil filter and gets distributed along the oil channels. The oil becomes highly pressurized as it exits the oil pump and passes 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 > Hydraulic System > Components and Components Location

Component Location



1. Radiator 2. Mounting insulator 3. Valve body cover 4. ATF hose&pipe 5. Automatic transaxle 6. Radiator(Automatic transaxle oil cooler) upper mounting bracket 7. Upper mounting insulator	8. Bypass valve 9. ATF injection hole(eyebolt) 10. Oil level plug 11. Oil drain plug 12. ATF Warmar 13. Coolant hose&pipe



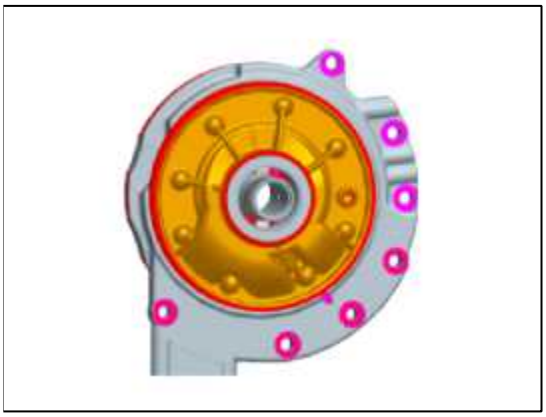
1. Automatic transaxle 2. Valve body assembly 3. Oil pump assembly	

Automatic Transaxle System > Hydraulic System > Oil Pump > Description and Operation

Description

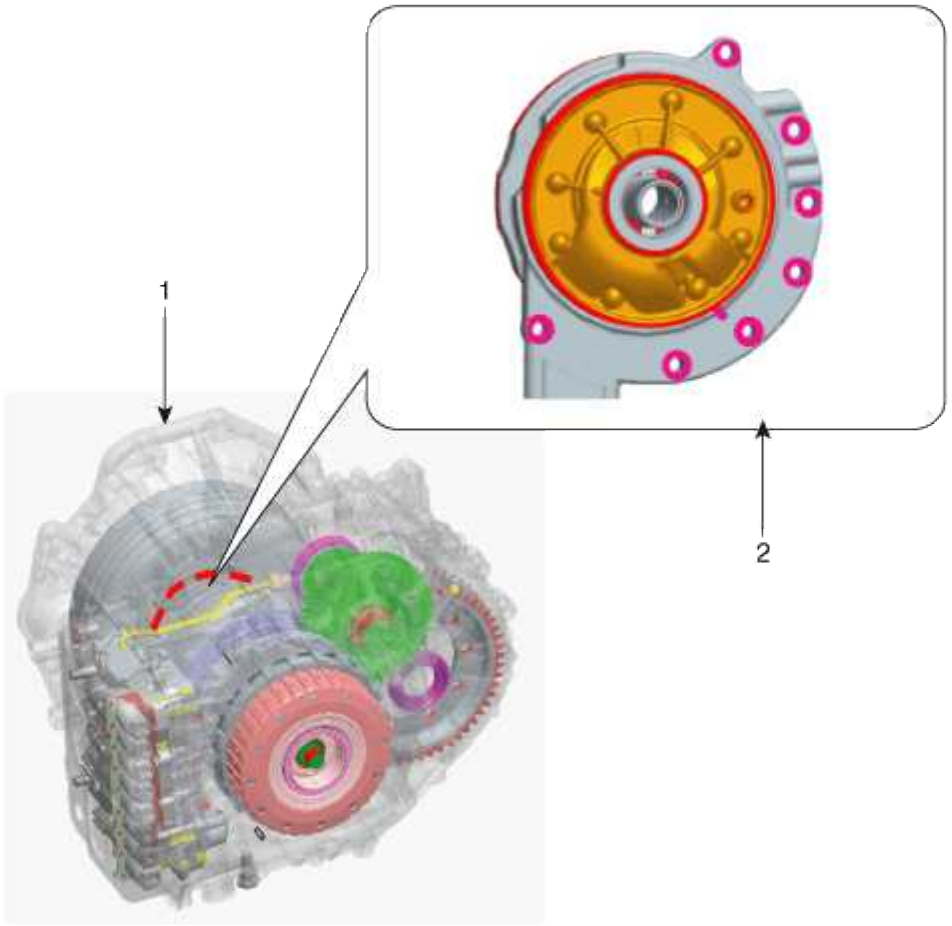
The oil pump is built-in as a single unit with the 26Brake chamber. Rotation of the pump builds the hydraulic pressure needed for the lubrication of the various parts of the transaxle and operation of the clutch and brakes. The oil also circulates through the torque converter and the cooler.

Automatic Transaxle System.



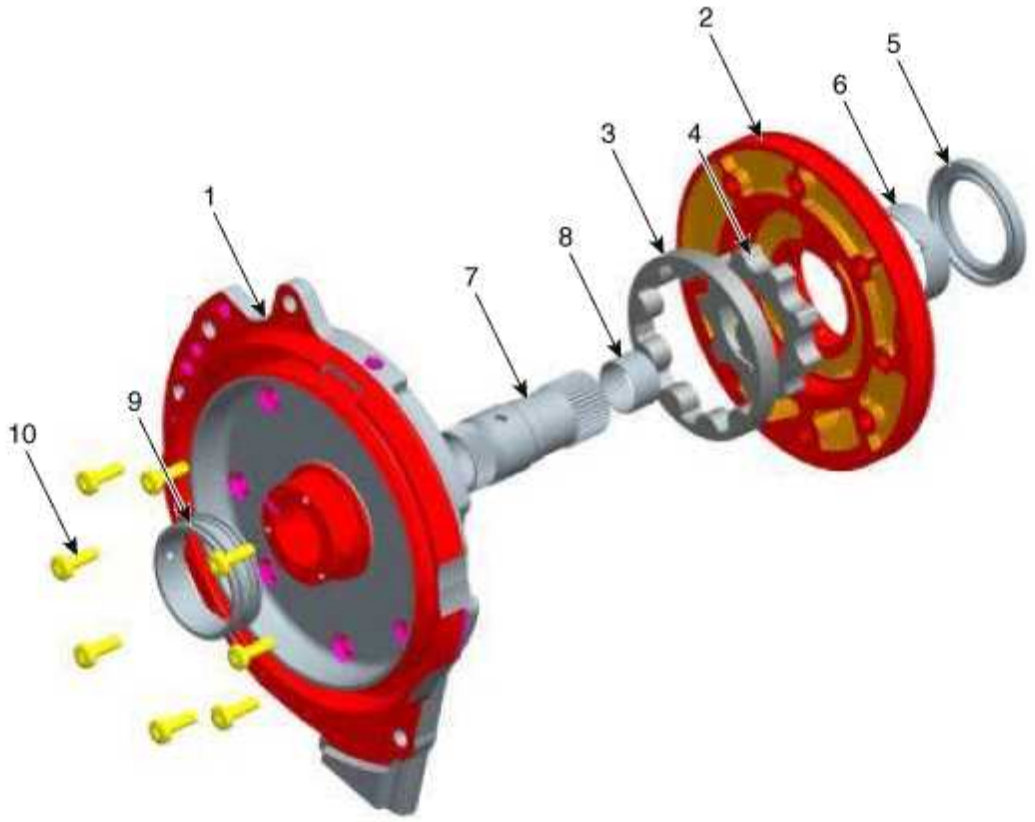
Automatic Transaxle System > Hydraulic System > Oil Pump > Components and Components Location

Component Location



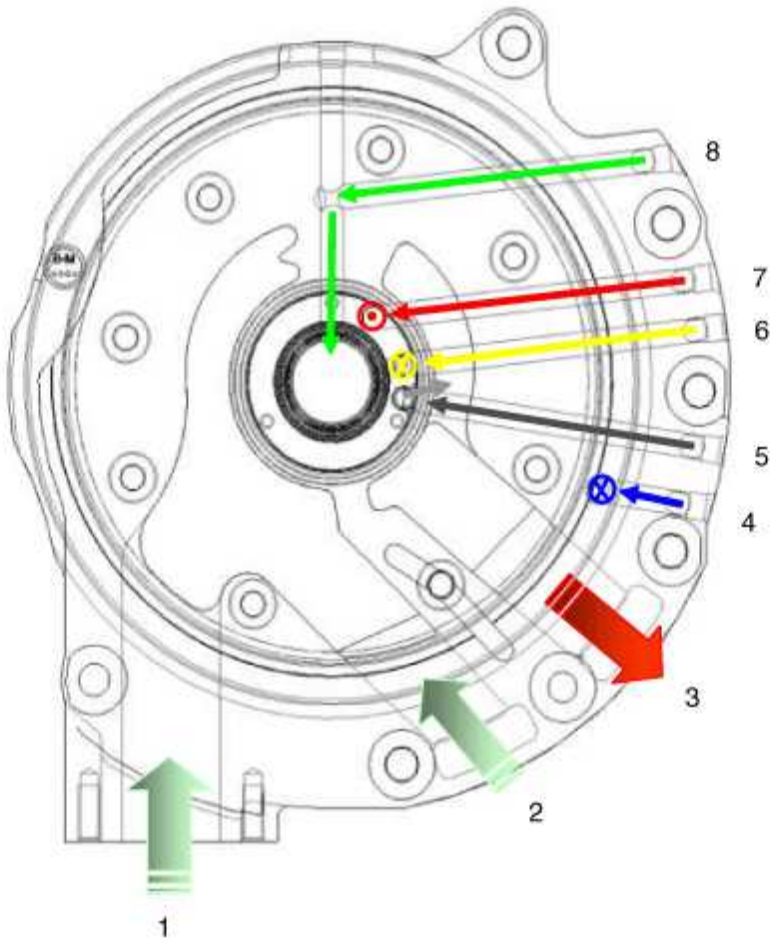
1. Automatic transaxle 2. Oil pump assembly	

Component



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

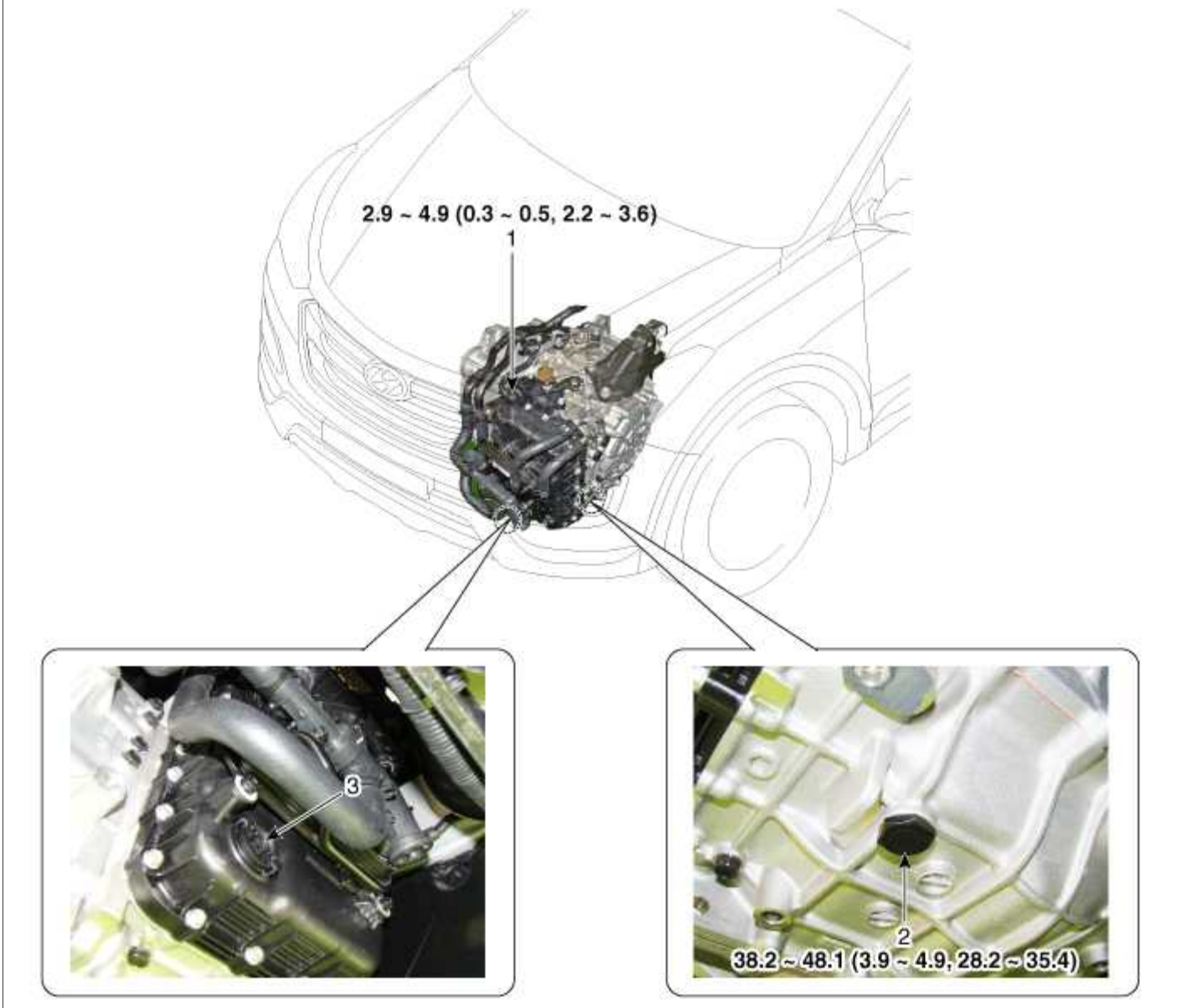
Oil pump operation flow



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

Automatic Transaxle System > Hydraulic System > Fluid > Components and Components Location

Component Location



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

Automatic Transaxle System > Hydraulic System > Fluid > Repair procedures

Service Adjustment Procedure

Oil level Check

NOTE

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 a horizontal 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.

NOTE

Oil level check (excess or shortage) method
- Excess: Drain quantity exceed 900cc for tow minutes.{50~60°C(122~140°F)}
- Shortage: No drain.

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 for oil leaks.

CAUTION

Replace the gasket before reinstalling the oil level plug.

Oil level plug tightening torque:
Tightening up stopper

8. Lower the vehicle with the lift and then tighten the eyebolt.

Replacement

NOTE

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

Replace the gasket before reinstalling the drain plug.

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

Automatic Transaxle System > Hydraulic System > Valve Body > Description and Operation

Description

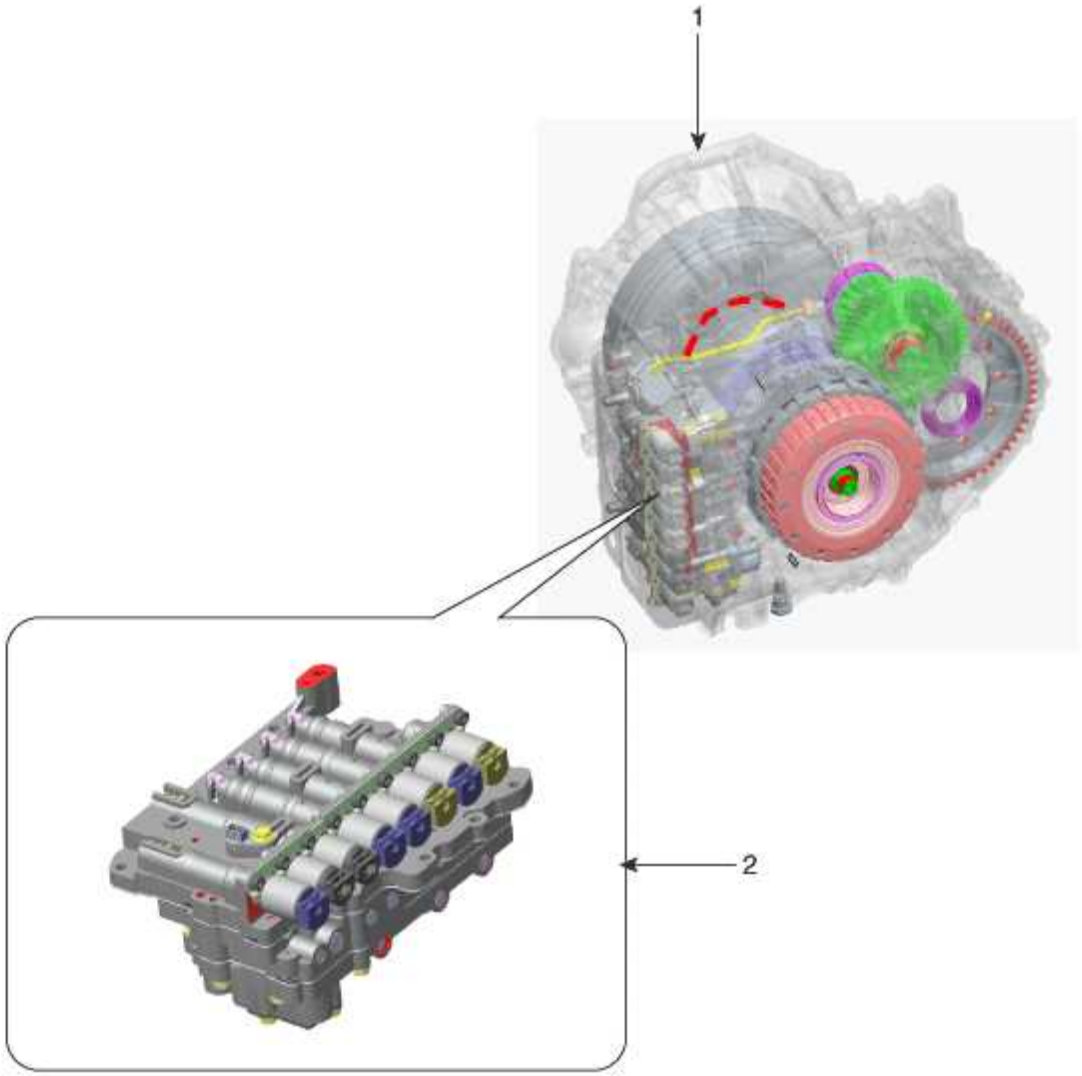
The valve body is essential to automatic transaxle control and consists of various valves used to control the oil feed from the oil pump. Specifically, these valves consist of pressure regulator valves, oil redirection valves, shift valves, and manual valves. The body also features electronic solenoid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



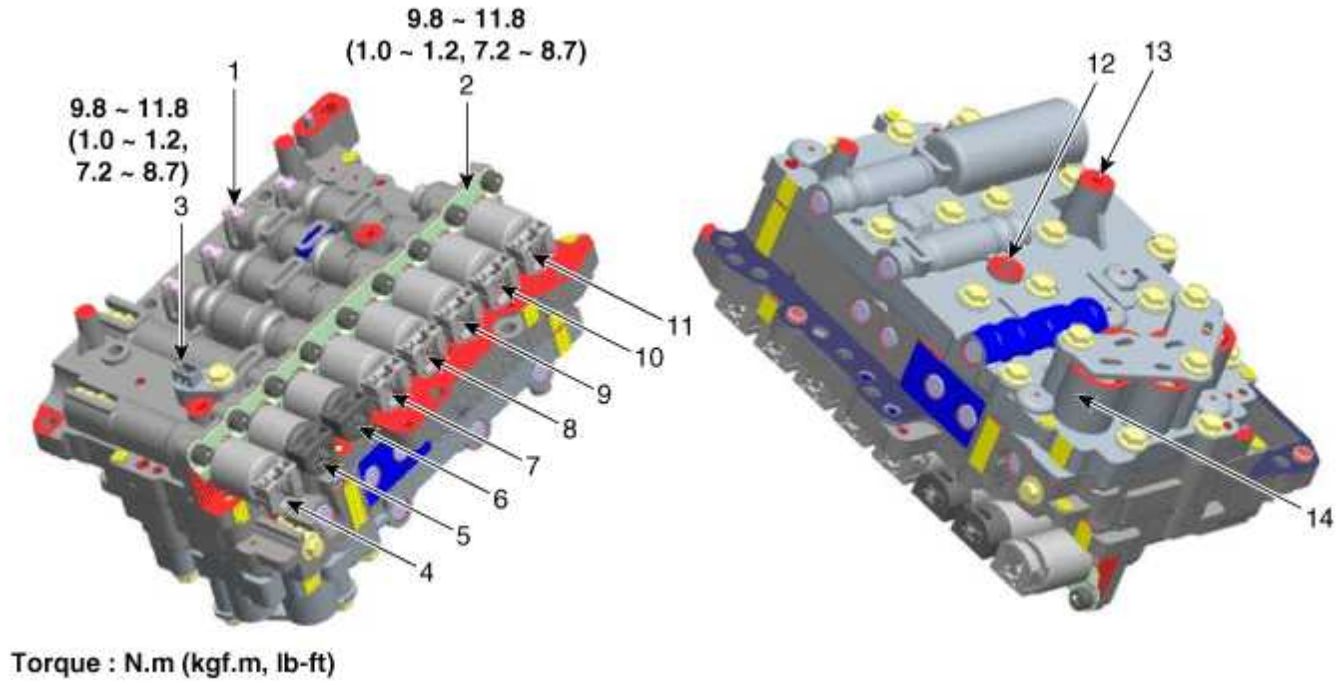
Automatic Transaxle System.

Automatic Transaxle System > Hydraulic System > Valve Body > Components and Components Location

Component Location

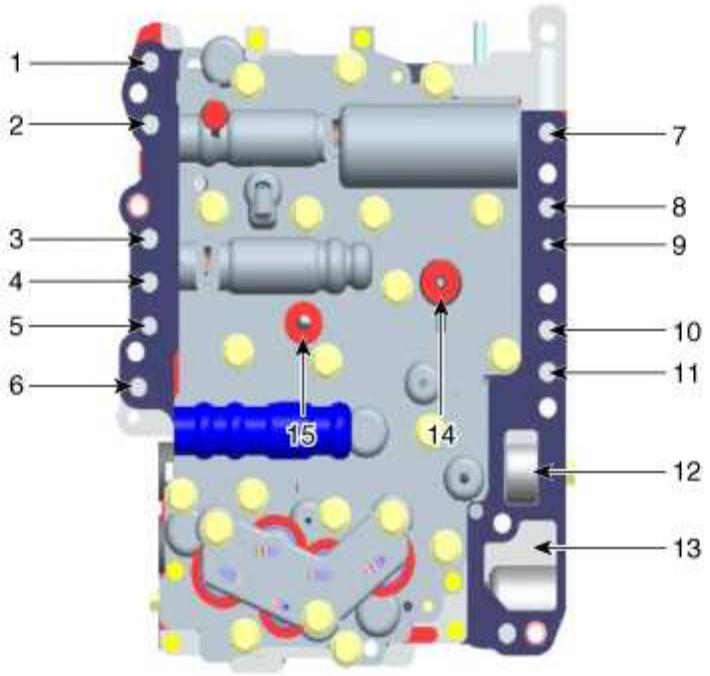


1. Automatic transaxle 2. Valve body assembly	



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. Low & reverse brake(LR/B)pressure flow hole 13. Under drive brake(UD/B)pressure flow hole 14. Accumulator

Valve Body Flow



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

Automatic Transaxle System > Hydraulic System > Valve Body > Repair procedures

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(A).

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



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

Replace the gasket before reinstalling the drain plug.

6. Remove the wiring bracket installation bolt (A).



7. 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

Replace the O-Ring (A) before reinstalling the eyebolt.



8. Disconnect the coolant hose (B) after removing the coolant hose clamp (A).

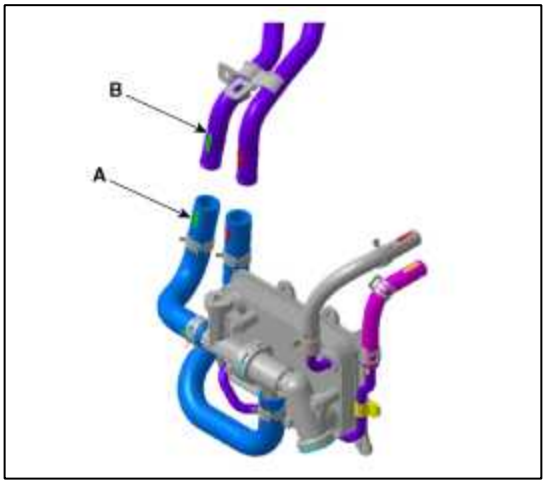


9. Disconnect the hose (B) after removing the automatic transaxle fluid cooler hose clamp (A).



CAUTION

When hose&pipe assembly
Align marking of pipe(B), marking of hose(A), and matching color each other.



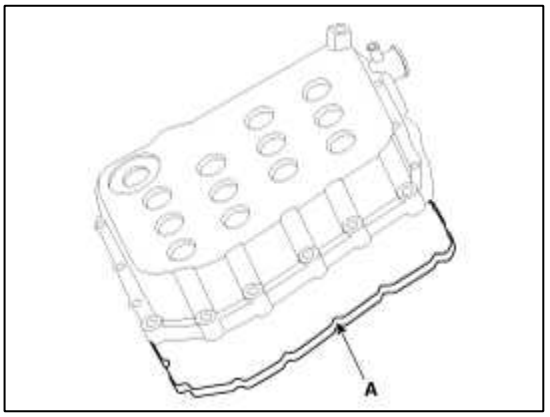
10. Remove the valve body cover (A).

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



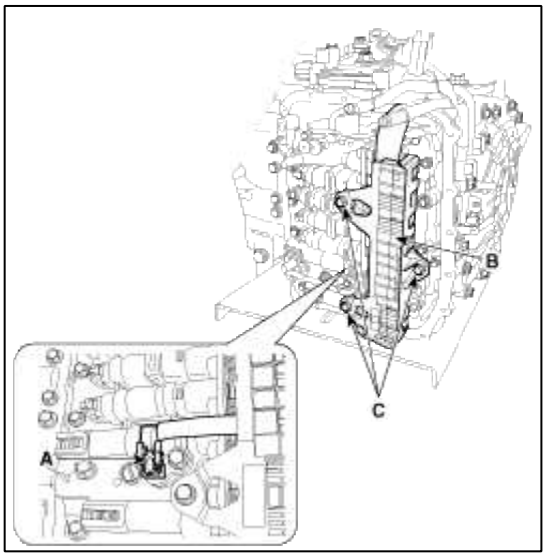
CAUTION

• Replace the gasket (A) before reinstalling the valve body cover.



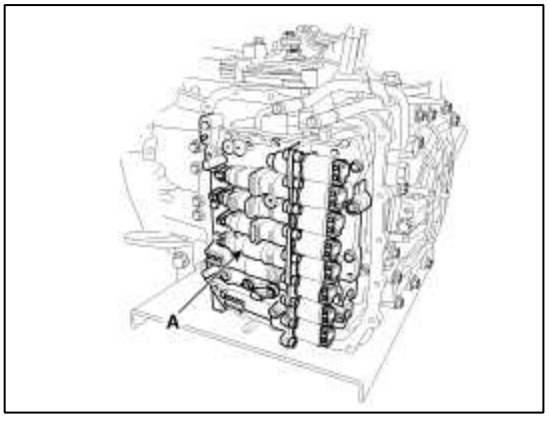
11. Remove the bolts (C) after disconnecting the solenoid valve connector (B) and the oil temperature sensor connector (A).

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



12. 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. Installation is the reverse of removal.

NOTE

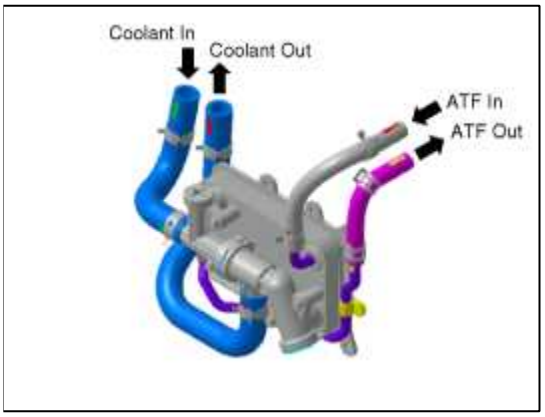
- Adding coolant.
  (Refer to Engine Mechanical System - "Coolant")
- Adding Automatic Transaxle Fluid(ATF).
  (Refer to Hydraulic System - "Fluid")
- Perform Transaxle Control Module(TCM) learning after replacing the valve body to prevent slow transaxle response, jerky acceleration and jerky startup.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

Automatic Transaxle System > Hydraulic System > ATF Warmer > Description and Operation

Description

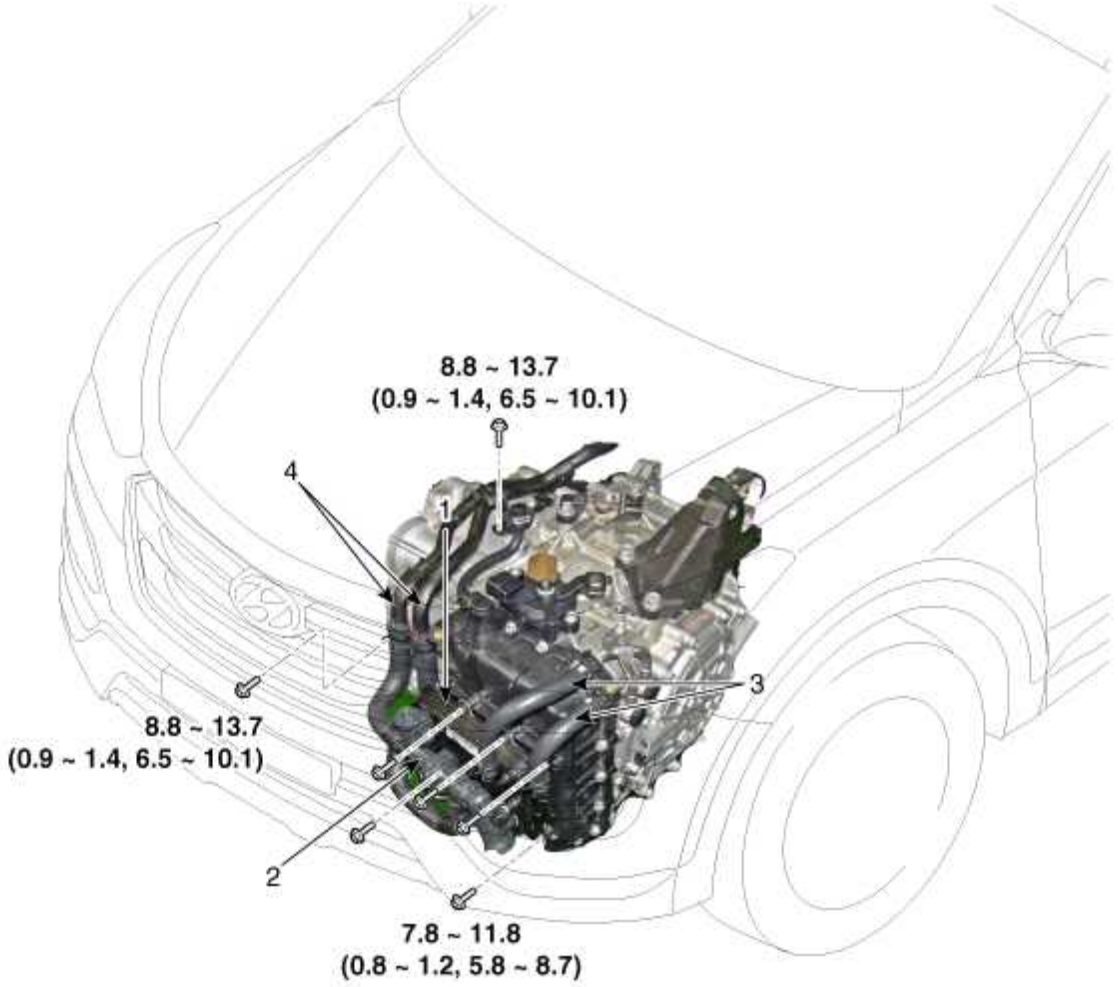
The ATF warmer is mounted on the valve body cover to reduce oil viscosity friction by increasing oil temperature under cold condition, which in turn improves fuel efficiency. It is serial mounted on the entry of the Electronic Throttle Controller (ETC), as shown in the diagram, and minimizes the effects of cabin heating system.

- Engine coolant is used for circulating heat in order to heat and cool the transaxle oil.
- Rapidly elevates the transaxle oil temperature during the initial cold start of the engine.
- Prevents over heating of the transaxle oil while the vehicle is moving.
- Transaxle oil warm-up and cooling can be done with a single system.
- The water coolant and oil are separate in order to exchange heat



Automatic Transaxle System > Hydraulic System > ATF Warmer > Components and Components Location

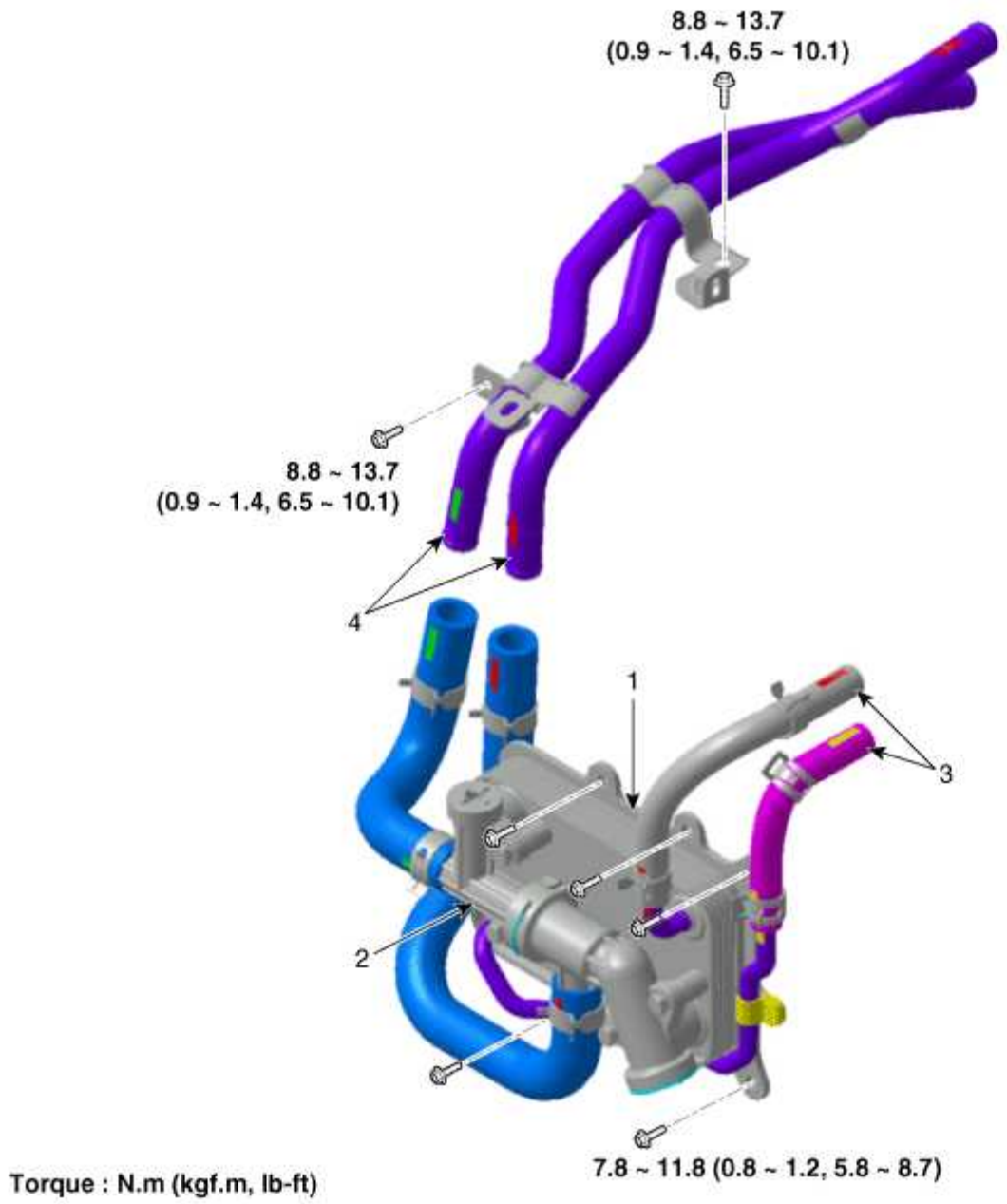
Component Location



Torque : N.m (kgf.m, lb-ft)

1. ATF Warmar 2. Bypass valve	3. ATF hose&pipe 4. Coolant hose&pipe

Component



1. ATF Warmar 2. Bypass valve	3. ATF hose&pipe 4. Coolant hose&pipe

Automatic Transaxle System > Hydraulic System > ATF Warmer > Repair procedures

Removal

1. Drain the coolant.
   (Refer to Engine Mechanical System-"Coolant").
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. Remove the under cover(A).

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



5. Disconnect the coolant hose (B) after removing the coolant hose clamp (A).

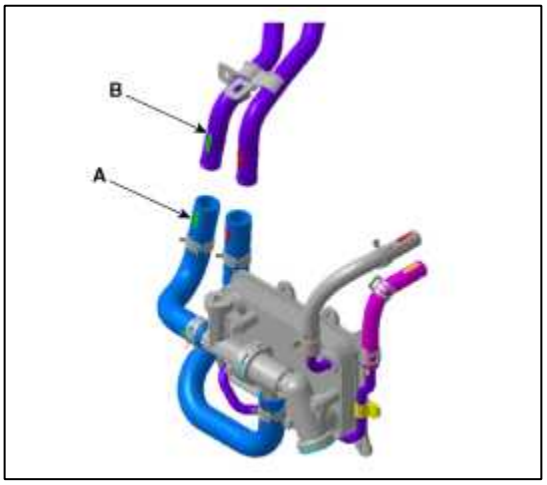


6. Disconnect the hose (B) after removing the automatic transaxle fluid cooler hose clamp (A).



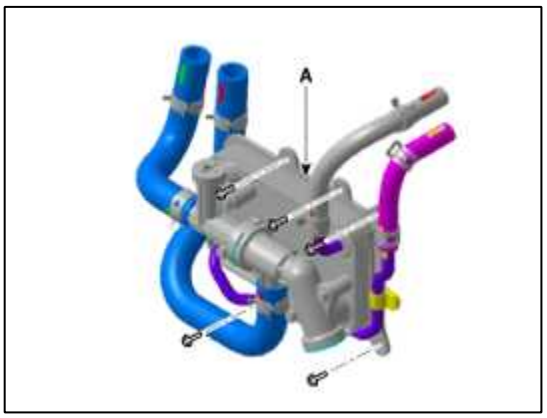
CAUTION

When hose&pipe assembly
Align marking of pipe(B), marking of hose(A), and matching color each other.



7. Remove the ATF Warmer (A).

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



Installation

1. Installation is the reverse of removal.

NOTE

- Adding automatic transaxle fluid.
  (Refer to Hydraulic System - "Fluid")
- Adding coolant.
  (Refer to Engine Mechanical System - "Coolant")

Automatic Transaxle System > Clutch & Brake > Description and Operation

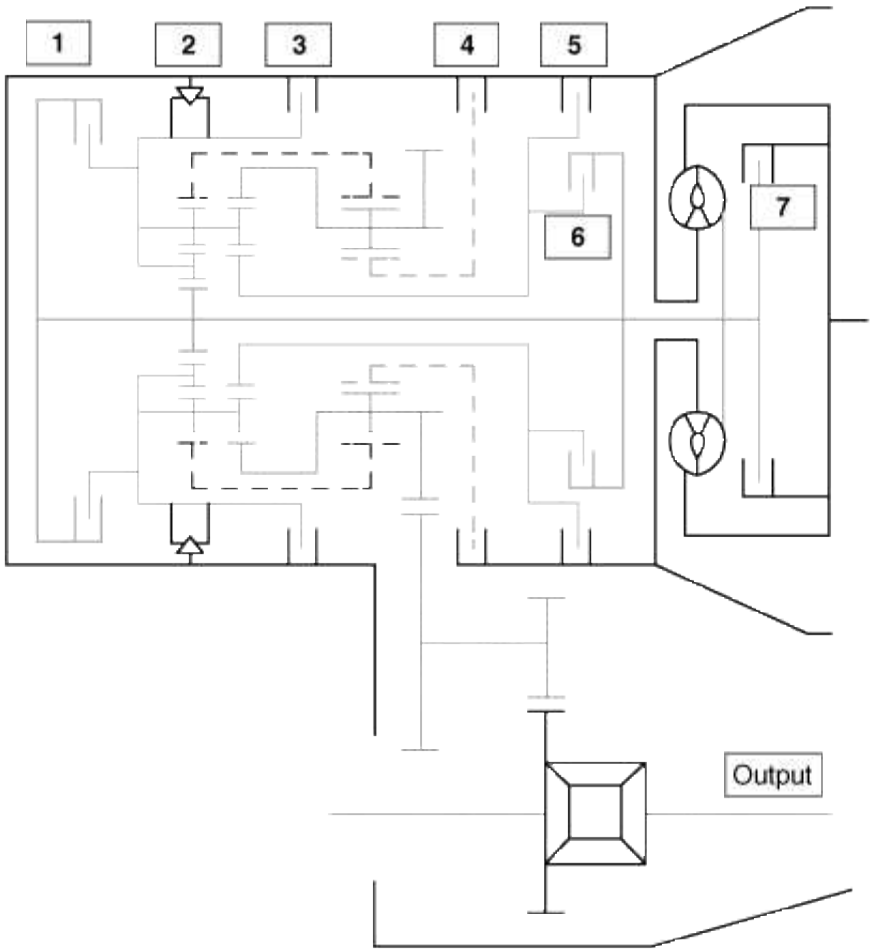
Description

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.

Automatic Transaxle System > Clutch & Brake > Components and Components Location

Component Location

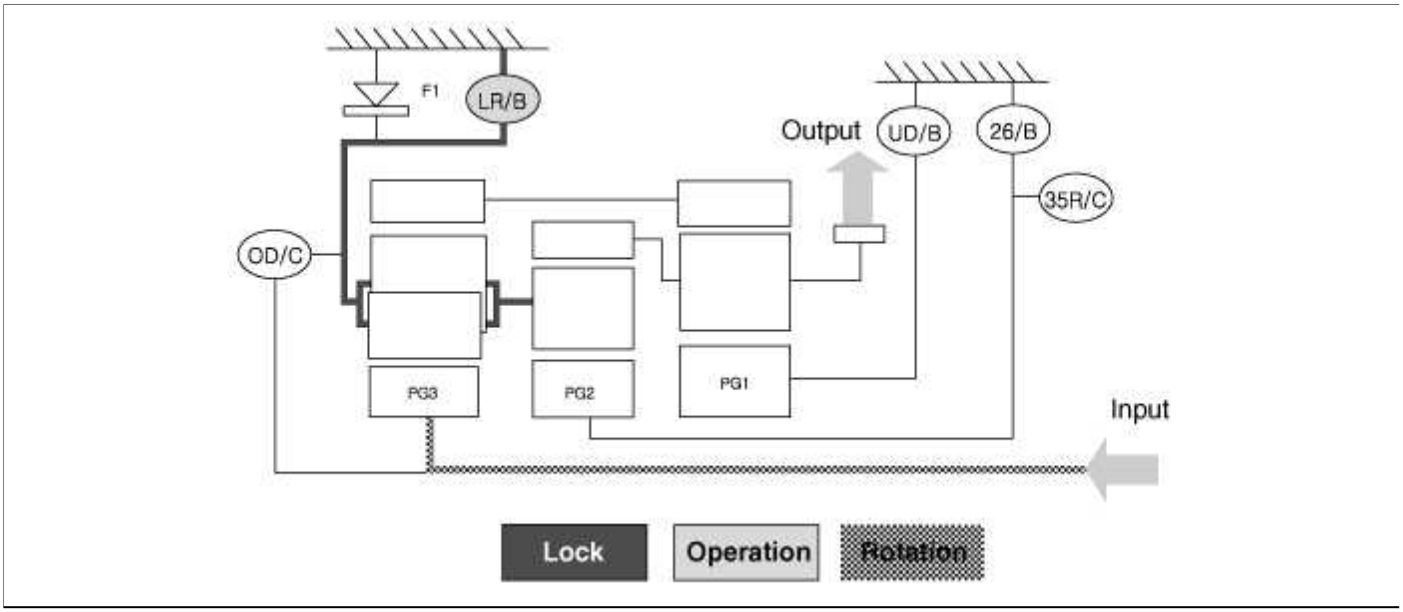


1. Overdrive Clutch (OD/C) 2. One way Clutch (OWC) 3. Low & Reverse Brake (LR/B) 4. Underdrive Brake (UD/B)	5. 26 Brake(26/B) 6. 35R Clutch (35R/C) 7. Damper Clutch (D/C)

Automatic Transaxle System > Clutch & Brake > Flow Diagram

Power Flow Chart

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



Direction of Rotation

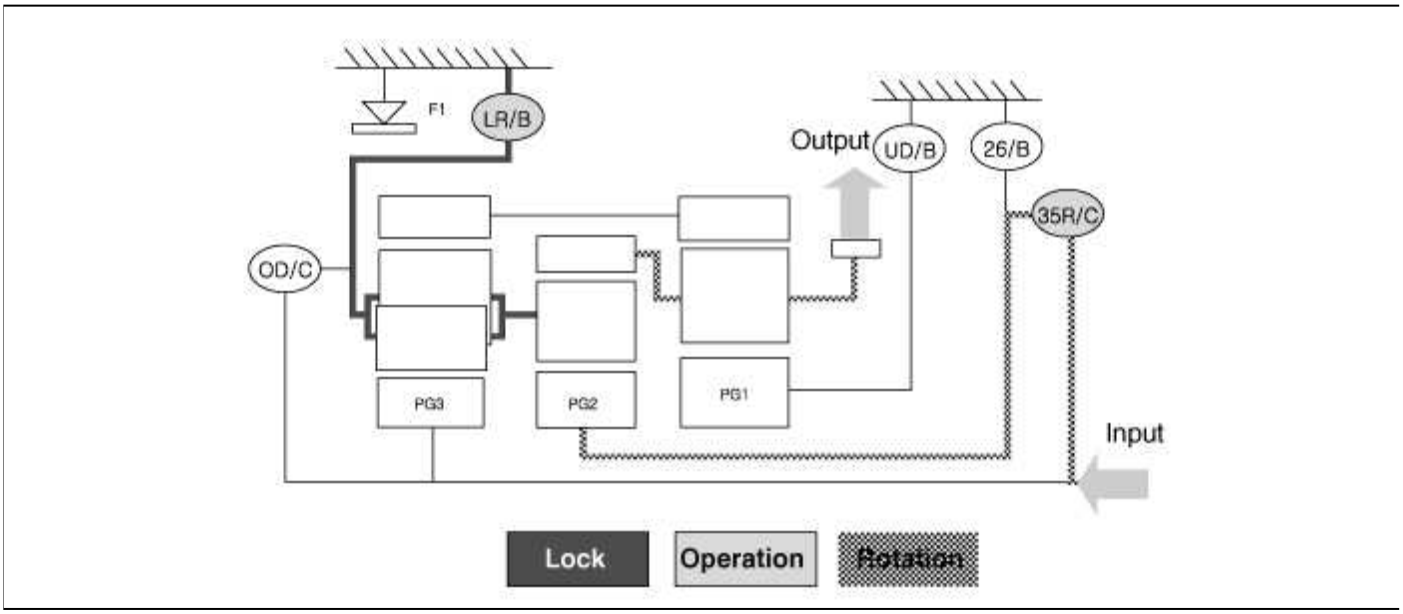
Lower & Reverse Brake (LR/B) Activation → Overdrive (O/D) Hub Lock → Mid & Rear P/C Lock

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		●		●		



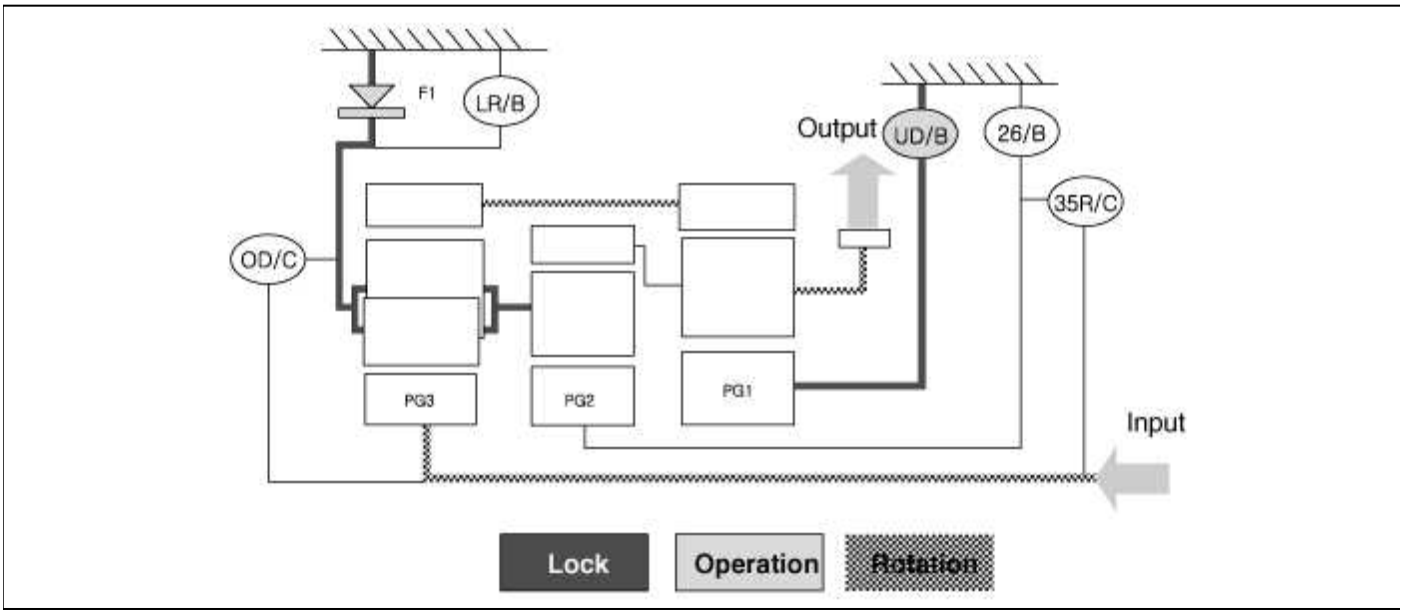
Power Delivery Route

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.

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



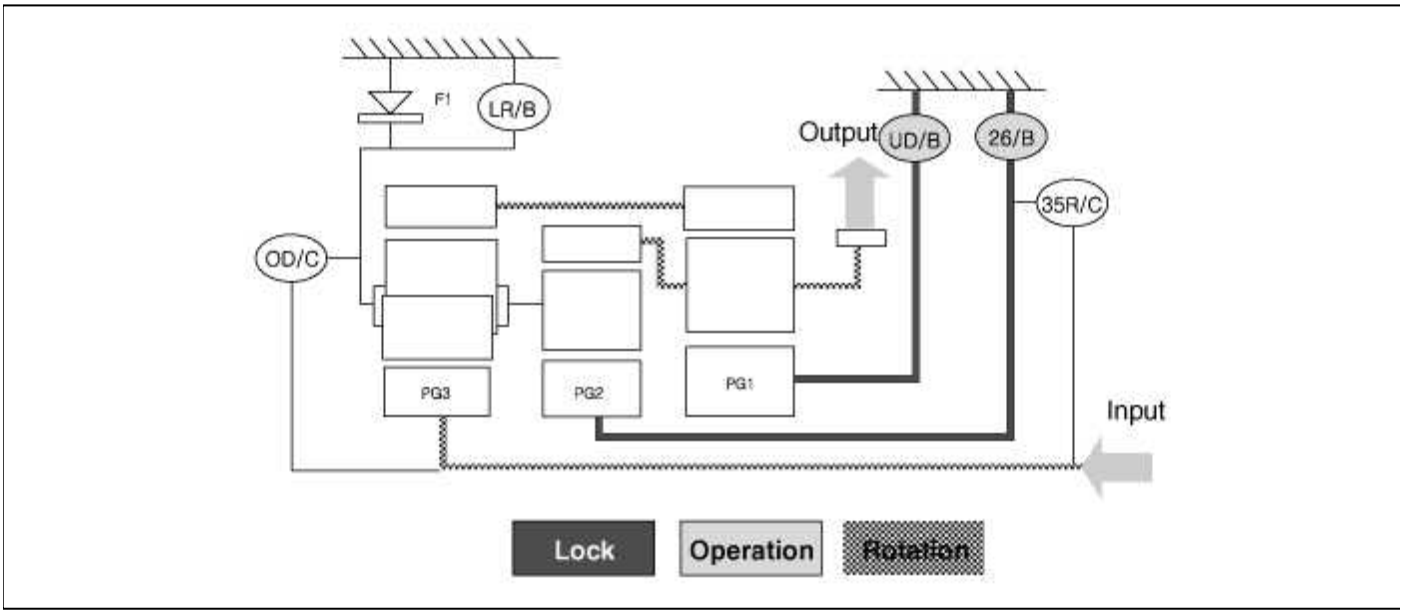
Power Delivery Route

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
	●		●			



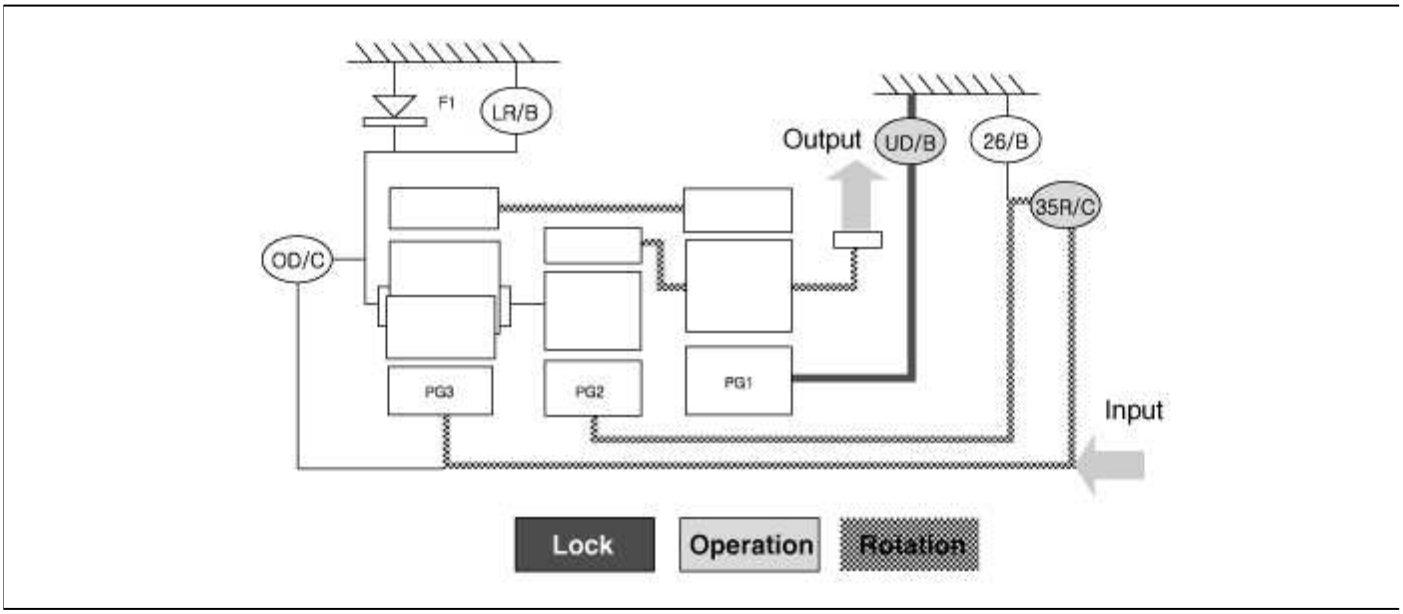
Power Delivery Route

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.

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

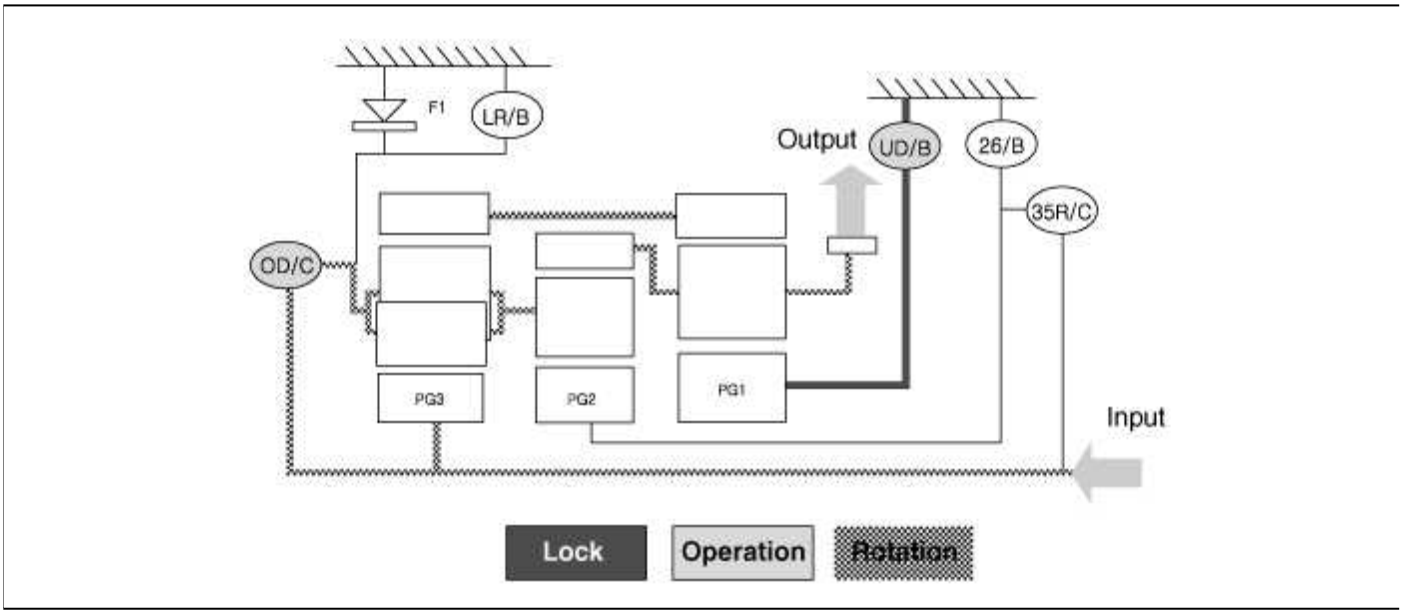


Power Delivery Route

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.

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



Power Delivery Route

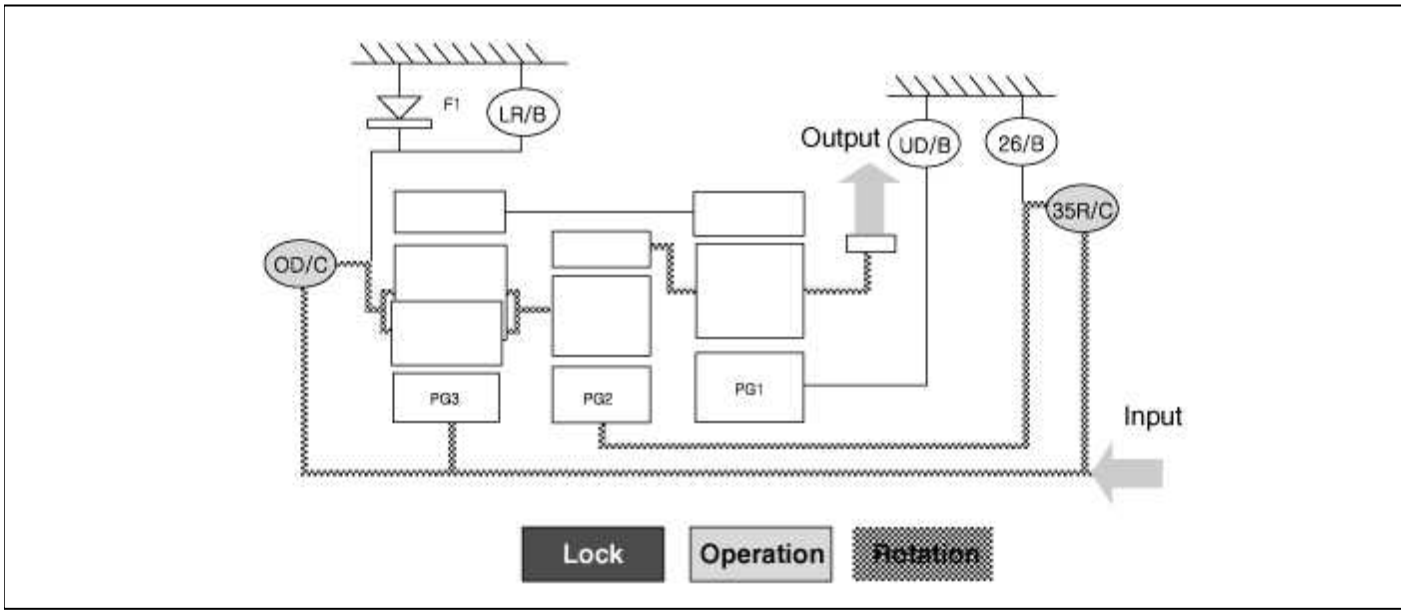
Front sun gear locked and rear carrier and rear sun gears in rotation

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.

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



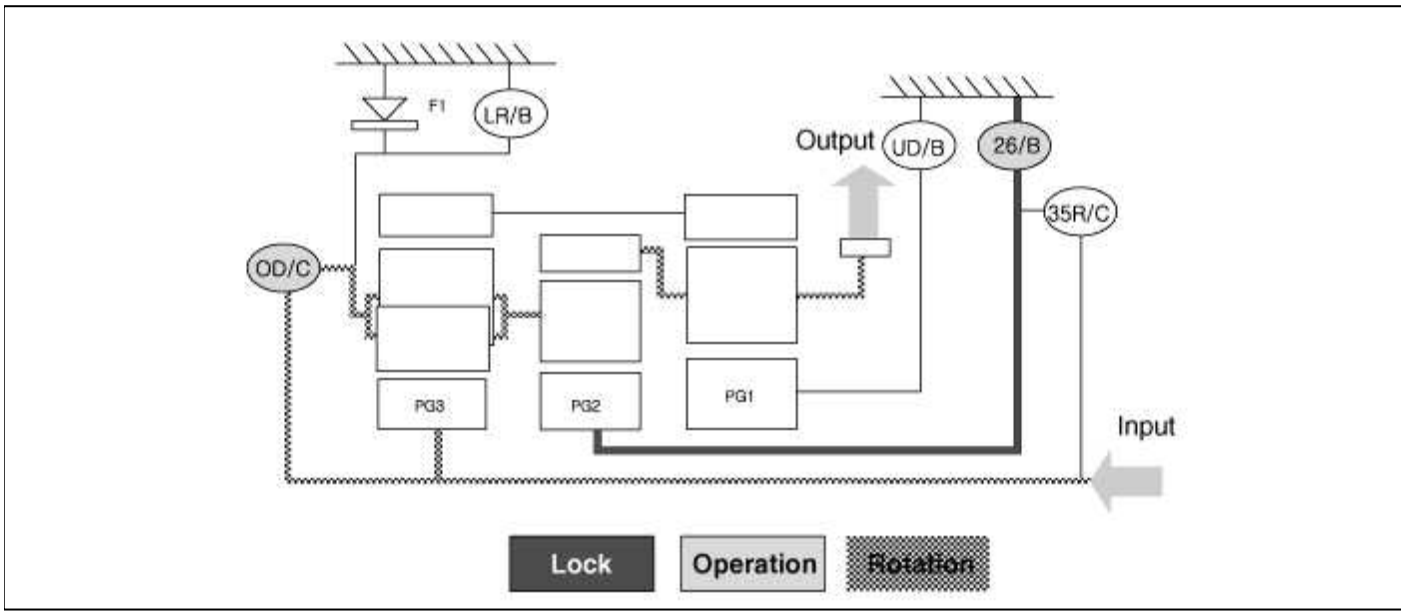
Power Delivery Route

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 > Automatic Transaxle Control System > Repair procedures

Adjustment

Transaxle Control Module(TCM) Learning

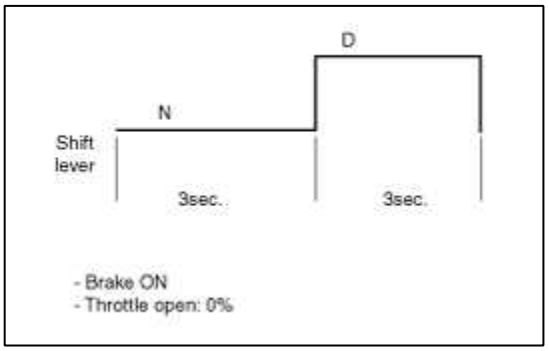
When shift shock is occurred or parts related with the transaxle are replaced, TCM learning should be performed. In the following case, TCM learning is required.

- 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

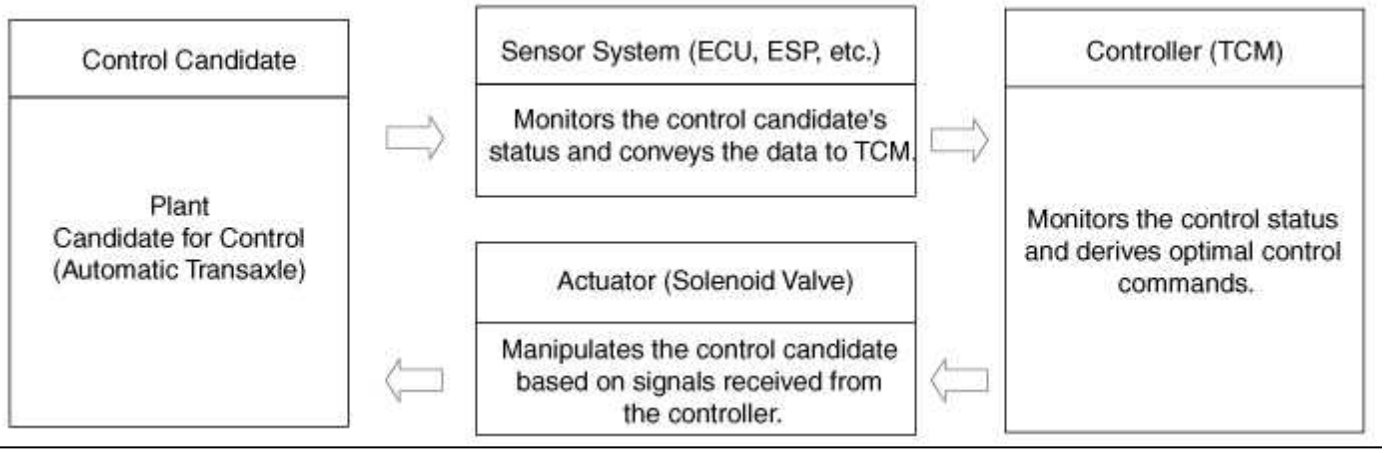
   Drive the vehicle from a stop in D through all gears 1st, 2nd, 3rd, 4th, 5th and 6th gear while holding the throttle steady at the specified Throttle Position Sensor (TPS) value (15~25%).

Automatic Transaxle System > Automatic Transaxle Control System > Description and Operation

Description

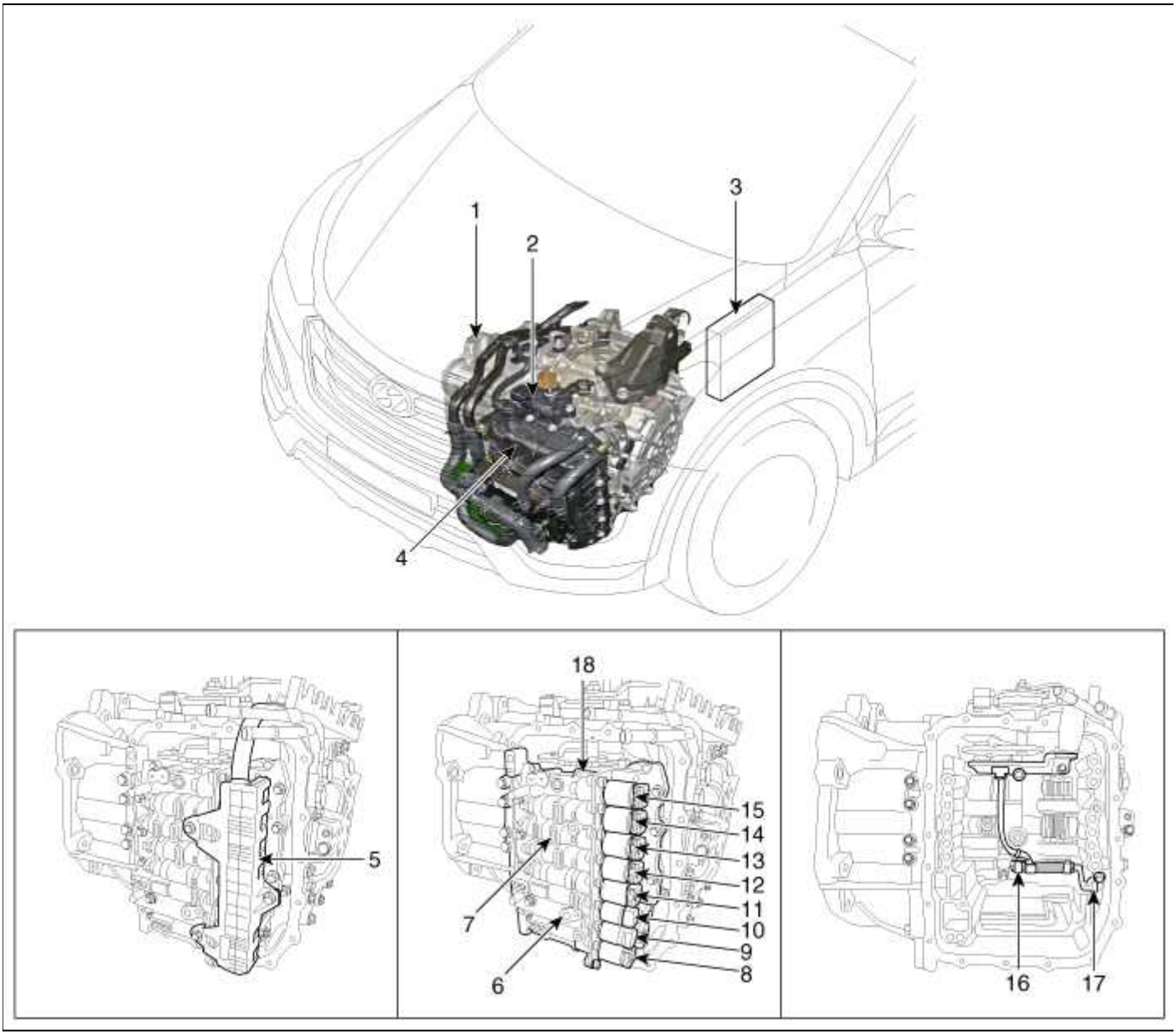
Automatic transaxle system relies on various measurement data to determine the current control status and extrapolate the necessary compensation values. These values are used to control the actuators and achieve the desired control output. If a problem with the drivetrain, including the transaxle, has 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 > Automatic Transaxle Control System > Components and Components Location

Component Location



Automatic Transaxle System.

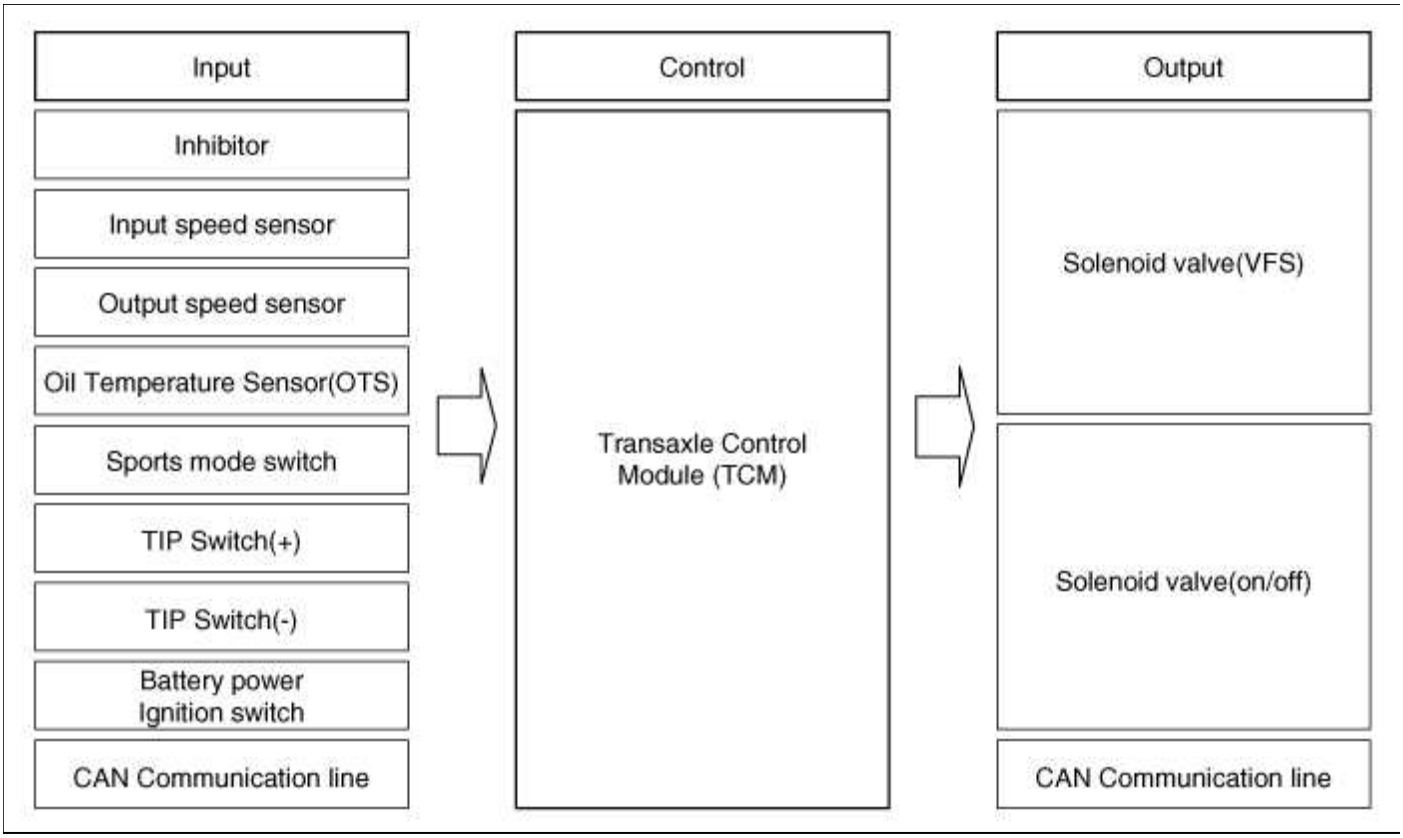
1. Automatic transaxle 2. Inhibitor switch 3. Transaxle Control Module (TCM) 4. Valve body cover 5. Solenoid valve connect 6. Oil temperature sensor 7. Valve body assembly 8. Line Pressure Control Solenoid Valve 9. SS-A Solenoid Valve(ON/OFF)	10. SS-B Solenoid Valve(ON/OFF) 11. Overdrive Clutch Control Solenoid Valve(OD/C) 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 > Automatic Transaxle Control System > Schematic Diagrams

Circuit Diagram



Automatic Transaxle System > Automatic Transaxle Control System > Transaxle Control Module (TCM) > Description and Operation

Description

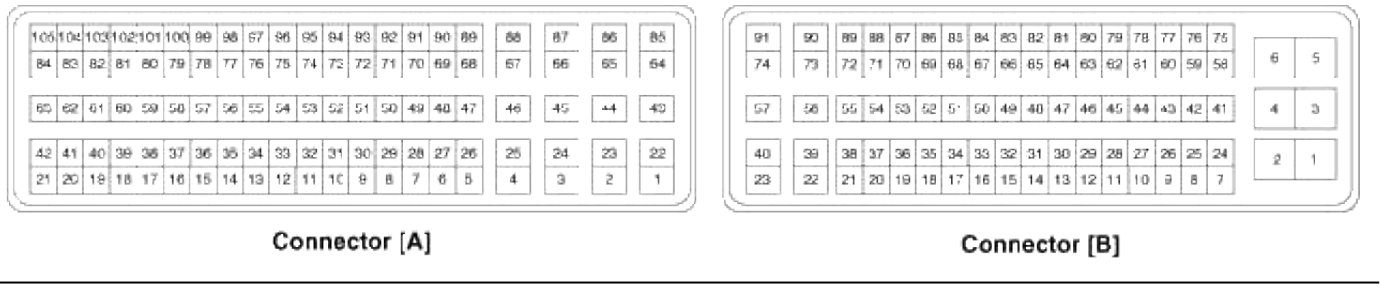
Transaxle Control Module (TCM) is the automatic transaxle's brain. The module receives and processes signals from various sensors and implements a wide range of transaxle controls to ensure optimal driving conditions for the driver. TCM is programmed for optimal response to any on-road situation. In 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 > Automatic Transaxle Control System > Transaxle Control Module (TCM) > Schematic Diagrams

1. TCM connector and terminal function



2. TCM Terminal Function

Connector [A]

Pin	Description	Pin	Description
1		54	
2	Line pressure control solenoid valve (LINE_VFS)	55	
3	Torque converter control solenoid valve (T/CON_VFS)	56	
4	35R clutch control solenoid valve (35R/C_VFS)	57	
5		58	
6		59	
7	Inhibitor switch signal "S1"	60	
8	Inhibitor switch signal "S2"	61	
9	Inhibitor switch signal "S3"	62	
10	Inhibitor switch signal "S4"	63	
11		64	
12		65	SS-B Solenoid valve (ON/OFF)
13		66	SS-A Solenoid valve (ON/OFF)
14		67	Battery (B+)
15		68	
16		69	Oil temperature sensor (+)
17		70	
18		71	
19		72	
20		73	Output speed sensor signal
21		74	Sports mode up switch
22		75	

23	Underdrive brake control solenoid valve (UD/B_VFS)	76	
24	26 Brake control solenoid valve (26/B_VFS)	77	
25	Overdrive clutch control solenoid valve (OD/C_VFS)	78	
26		79	
27		80	
28		81	
29		82	
30		83	
31		84	
32		85	
33		86	Solenoid supply power 1
34		87	Solenoid supply power 2
35		88	Battery (B+)
36		89	
37		90	Output speed sensor power
38		91	Input speed sensor power
39		92	
40		93	
41		94	Input speed sensor signal
42		95	Sports mode down switch
43		96	
44	Ground (Power 1)	97	
45	Ground (Power 2)	98	
46	Shift lock solenoid	99	
47		100	
48	Oil temperature sensor (-)	101	
49		102	
50		103	
51		104	
52	Sports mode select switch	105	
53			

3. TCM Terminal Input/ Output Signal

Connector [A]

Pin	Description	Condition	Input/output value	
			Type	Level
1	-			
2	Line pressure control solenoid valve (LINE_VFS)		Output	0V/Battery voltage level 9V < Battery voltage level < 16V
3	Torque converter control solenoid valve (T/CON_VFS)		Output	0V/Battery voltage level 9V < Battery voltage level < 16V
4	35R clutch control solenoid valve (35R/C_VFS)		Output	0V/Battery voltage level 9V < Battery voltage level < 16V
5	-			
6	-			
7	Inhibitor switch signal "S1"	High Low	Input	0V/Battery voltage level 9V < Battery voltage level < 16V
8	Inhibitor switch signal "S2"	High Low	Input	0V/Battery voltage level 9V < Battery voltage level < 16V
9	Inhibitor switch signal "S3"	High Low	Input	0V/Battery voltage level 9V < Battery voltage level < 16V
10	Inhibitor switch signal "S4"	High Low	Input	0V/Battery voltage level 9V < Battery voltage level < 16V
11	-			
12	-			
13	-			
14	-			
15	-			
16	-			
17	-			
18	-			
19	-			
20	-			
21	-			

22	-			
23	Underdrive brake control solenoid valve		Output	0V/Battery voltage level
	(UD/B_VFS)			9V < Battery voltage level < 16V
				Power supply : V_SOL2
24	26 Brake control solenoid valve		Output	0V/Battery voltage level
	(26/B_VFS)			9V < Battery voltage level < 16V
				Power supply : V_SOL2
25	Overdrive clutch control solenoid valve		Output	0V/Battery voltage level
	(OD/C_VFS)			9V < Battery voltage level < 16V
				Power supply : V_SOL1
26	-			
27	-			
28	-			
29	-			
30	-			
31	-			
32	-			
33	-			
34	-			
35	-			
36	-			
37	-			
38	-			
39	-			
40	-			
41	-			
42	-			
43	-			
44	Ground (Power 1)		Ground	0V
45	Ground (Power 2)		Ground	0V
46	Shift lock solenoid	High	Output	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
47	-			

48	Oil temperature sensor (-)		Ground	0V
49	-			
50	-			
51	-			
52	Sports mode select switch	Sport mode	Input	0V/Battery voltage level
		Other		9V < Battery voltage level < 16V
53	-			
54	-			
55	-			
56	-			
57	-			
58	-			
59	-			
60	-			
61	-			
62	-			
63	-			
64	-			
65	SS-B Solenoid valve (ON/OFF)	High	Output	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
66	SS-A Solenoid valve (ON/OFF)	High	Output	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
67	Battery power (B+)	ON	Power	0V/Battery voltage level
		OFF		9V < Battery voltage level < 16V
68	-			
69	Oil temperature sensor (+)	ON	Input	0V/3.3V
		71		
72	-			
73	Output speed sensor signal	High	Input	0.7V/1.4V
		Low		
74	Sports mode up switch	Up ON	Input	0V/Battery voltage level
		Other		9V < Battery voltage level < 16V
75	-			

70				
-				

76	-			
77	-			
78	-			
79	-			
80	-			
81	-			
82	-			
83	-			
84	-			
85	-			
86	Solenoid supply power 1	ON	Power	0V/Battery voltage level
		OFF		9V < Battery voltage level < 16V
87	Solenoid supply power 2	ON	Power	0V/Battery voltage level
		OFF		9V < Battery voltage level < 16V
88	Battery power (B+)	ON	Power	0V/Battery voltage level
		OFF		9V < Battery voltage level < 16V
89	-			
90	Output speed sensor power	ON	Power	0V/7.5V
		OFF		
91	Input speed sensor power	ON	Power	0V/7.5V
		OFF		
92	-			
93	-			
94	Input speed sensor signal	High	Input	0.7V/1.4V
		Low		
95	Sports mode down switch	Down ON	Input	0V/Battery voltage level
		Other		9V < Battery voltage level < 16V
96	-			
97	-			
98	-			
99	-			
100	-			
101	-			

102	-			
103	-			
104	-			
105	-			

Automatic Transaxle System > Automatic Transaxle Control System > Transaxle Control Module (TCM) > Repair procedures

Removal

CAUTION

When replacing the TCM, the vehicle equipped with the immobilizer must be performed procedure as below.

[In the case of installing used TCM]

1. Perform "TCM Neutral mode" procedure with GDS.
   (Refer to Body Electrical System - "Immobilizer System")
2. After finishing "TCM Neutral mode", perform "Key teaching" procedure with GDS.
   (Refer to Body Electrical System - "Immobilizer System")

[In the case of installing new TCM]

Perform "Key teaching" procedure with GDS.
(Refer to Body Electrical System - "Immobilizer System")

CAUTION

When replacing the TCM, the vehicle equipped with the smart key system (Button start) must be performed procedure as below.

[In the case of installing used TCM]

1. Perform "TCM Neutral mode" procedure with GDS.
   (Refer to Body Electrical System - "Immobilizer System")
2. After finishing "TCM Neutral mode", insert the key (or press the start button) and turn it to the IGN ON and OFF position. Then the TCM learns the smart key information automatically.

[In the case of installing new TCM]

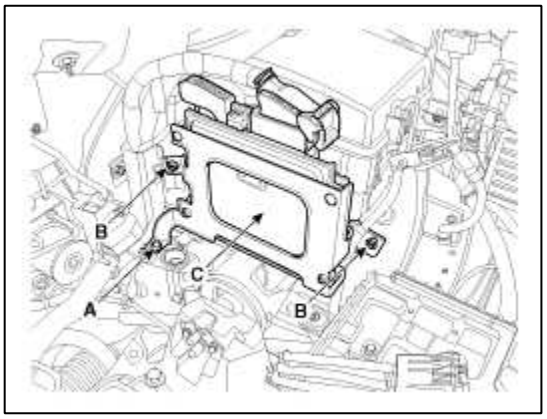
Insert the key (or press the start button) and turn it to the IGN ON and OFF position. Then the TCM learns the smart key information automatically.

1. Turn ignition switch OFF and disconnect the negative (-) battery cable.
2. Disconnect the TCM Connector (A).

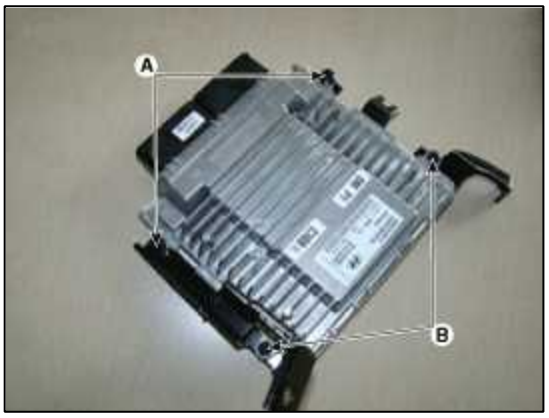


3. Remove the battery.
   (Refer to Engine Electrical System - "Battery")

4. Remove the air cleaner assembly.
   (Refer to Engine Mechanical System - "Air Cleaner")
5. Remove the mounting bolts (A) and nut (B), and then remove the TCM (C).



6. After removing the installation nuts (A) and screws (B), remove the TCM (C) from the bracket.



Installation

CAUTION

When replacing the TCM, the vehicle equipped with the immobilizer must be performed procedure as below.

[In the case of installing used TCM]

1. Perform "TCM Neutral mode" procedure with GDS.
   (Refer to Body Electrical System - "Immobilizer System")
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[In the case of installing new TCM]

Perform "Key teaching" procedure with GDS.
(Refer to Body Electrical System - "Immobilizer System")

CAUTION

When replacing the TCM, the vehicle equipped with the smart key system (Button start) must be performed procedure as below.

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1. Perform "TCM Neutral mode" procedure with GDS.
   (Refer to Body Electrical System - "Immobilizer System")
2. After finishing "TCM Neutral mode", insert the key (or press the start button) and turn it to the IGN ON and OFF position. Then the TCM learns the smart key information automatically.

[In the case of installing new TCM]

Insert the key (or press the start button) and turn it to the IGN ON and OFF position. Then the TCM learns the smart key information automatically.

1. Install in the reverse order of removal.

TCM installation bolt:
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m,7.2 ~ 8.7 lb-ft)
TCM bracket installation bolt/nut:
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m,7.2 ~ 8.7 lb-ft)

CAUTION

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

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.

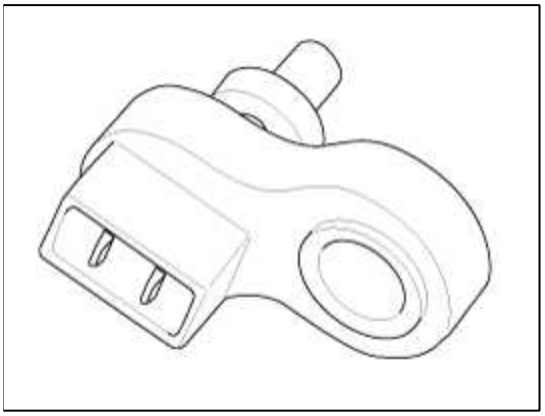
Specification: Below 1Ω

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).

Automatic Transaxle System > Automatic Transaxle Control System > Transaxle Oil Temperature Sensor > Description and Operation

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.

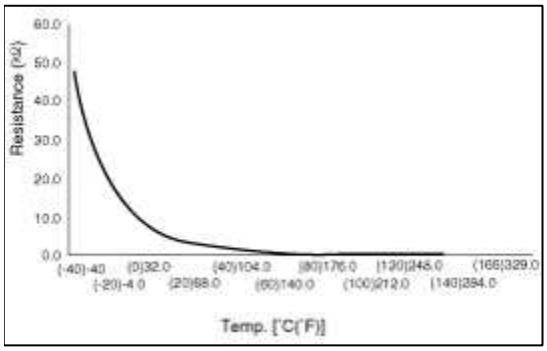


Automatic Transaxle System > Automatic Transaxle Control System > Transaxle Oil Temperature Sensor > Specifications

Specifications

Type: Negative Thermal Coefficient Type(NTC)

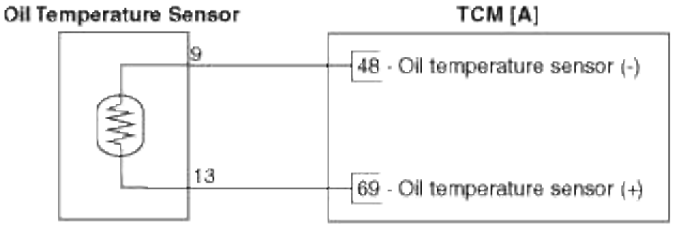
Temp.(°C)°F	Resistance (kΩ)
(-40)-40	48.1
(-20)-4.0	15.6
(0)32.0	5.88
(20)68.0	2.51
(40)104.0	1.11
(60)140.0	0.61
(80)176.0	0.32
(100)212.0	0.18
(120)248.0	0.10
(140)284.0	0.06
(165)329.0	0.03



Automatic Transaxle System > Automatic Transaxle Control System > Transaxle Oil Temperature Sensor > Schematic Diagrams

Circuit Diagram

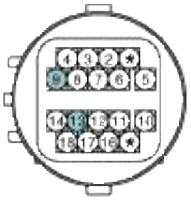
[Circuit Diagram]



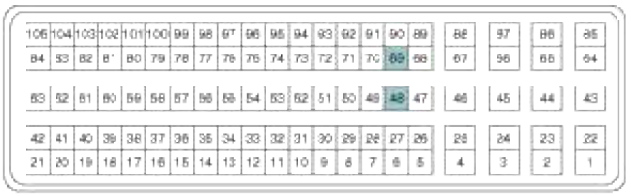
[Connection Information]

Terminal	Connected to	Function
9	TCM (48)	Oil temperature sensor (-)
13	TCM (69)	Oil temperature sensor (+)

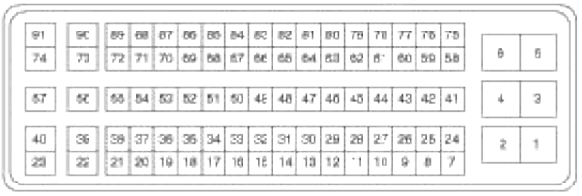
[Harness Connector]



Solenoid Valve Connector



TCM Connector [A]



TCM Connector [B]

Automatic Transaxle System > Automatic Transaxle Control System > Transaxle Oil Temperature Sensor > Repair procedures

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

1. Remove the battery and the battery tray.
   (Refer to Engine Electrical System - "Battery")

2. Remove the under cover(A).

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



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.

Drain plug 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.

5. Remove the wiring bracket installation bolt (A).



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

Replace the O-Ring (A) before reinstalling the eyebolt.



7. Disconnect the coolant hose (B) after removing the coolant hose clamp (A).

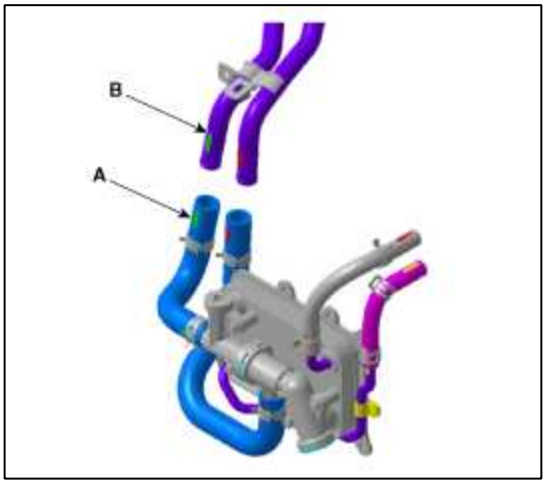


8. Disconnect the hose (B) after removing the automatic transaxle fluid cooler hose clamp (A).



CAUTION

When hose&pipe assembly
Align marking of pipe(B), marking of hose(A), and matching color each other.



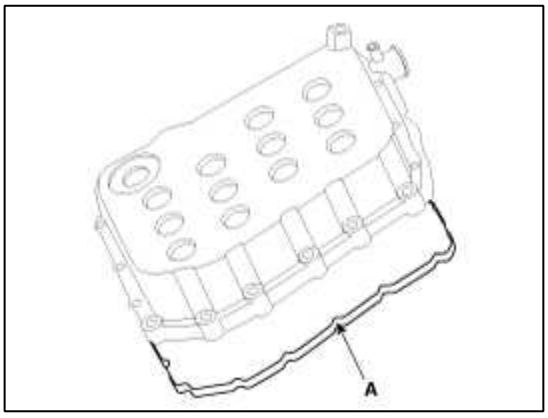
9. Remove the valve body cover (A).

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

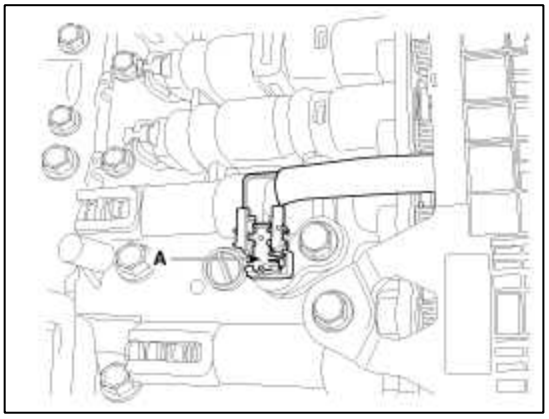


CAUTION

• Replace the gasket (A) before reinstalling the valve body cover.



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

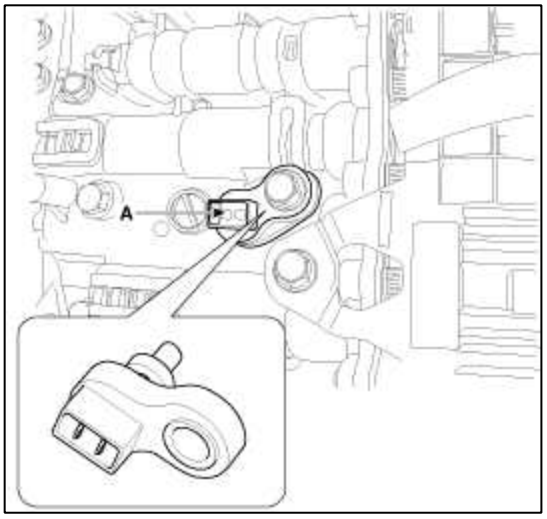


11. Remove the oil temperature sensor (A) after removing a bolt.

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.

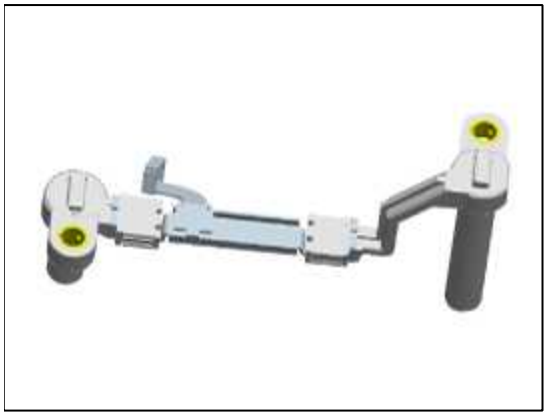
NOTE

- Adding coolant.
  (Refer to Engine Mechanical System - "Coolant")
- Adding Automatic Transaxle Fluid(ATF).
  (Refer to Hydraulic System - "Fluid")

Automatic Transaxle System > Automatic Transaxle Control System > Input Speed Sensor > Description and Operation

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.



Automatic Transaxle System > Automatic Transaxle Control System > Input Speed Sensor > Specifications

Specifications

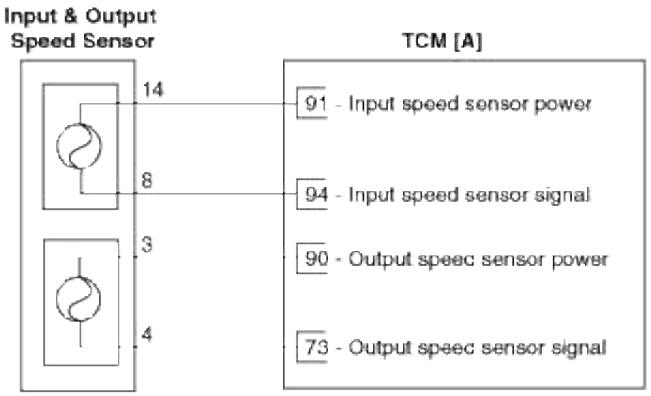
Type: Hall effect sensor

Operation condition (°C)°F		((-)40~150)) -40~302
Air gap(mm)in.		(0.95~1.65) 0.0374~0.0649
Output voltage(V)	High	1.18~1.68
	Low	0.59~0.84

Automatic Transaxle System > Automatic Transaxle Control System > Input Speed Sensor > Schematic Diagrams

Circuit Diagram

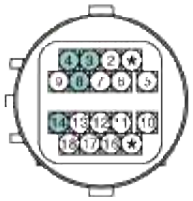
[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
14	TCM (91)	Input speed sensor power
8	TCM (94)	Input speed sensor signal
3	TCM (90)	Output speed sensor power
4	TCM (73)	Output speed sensor signal

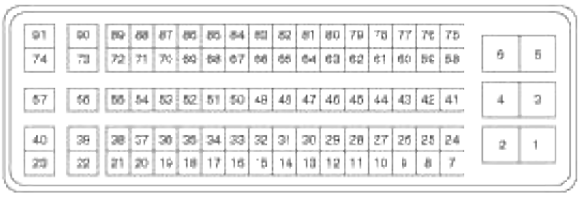
[Hamess Connector]



Solenoid Valve Connector



TCM Connector [A]



TCM Connector [B]

Automatic Transaxle System > Automatic Transaxle Control System > Input Speed Sensor > Troubleshooting

Signal Waveform

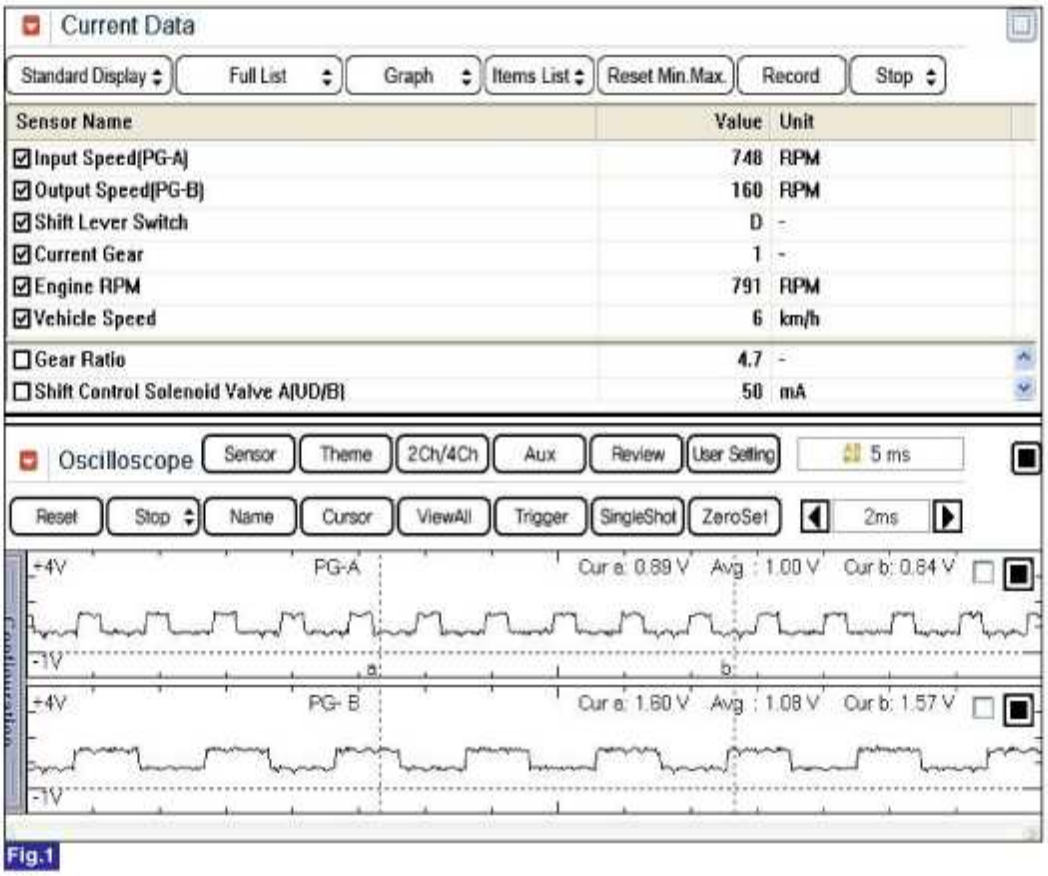


Fig.1

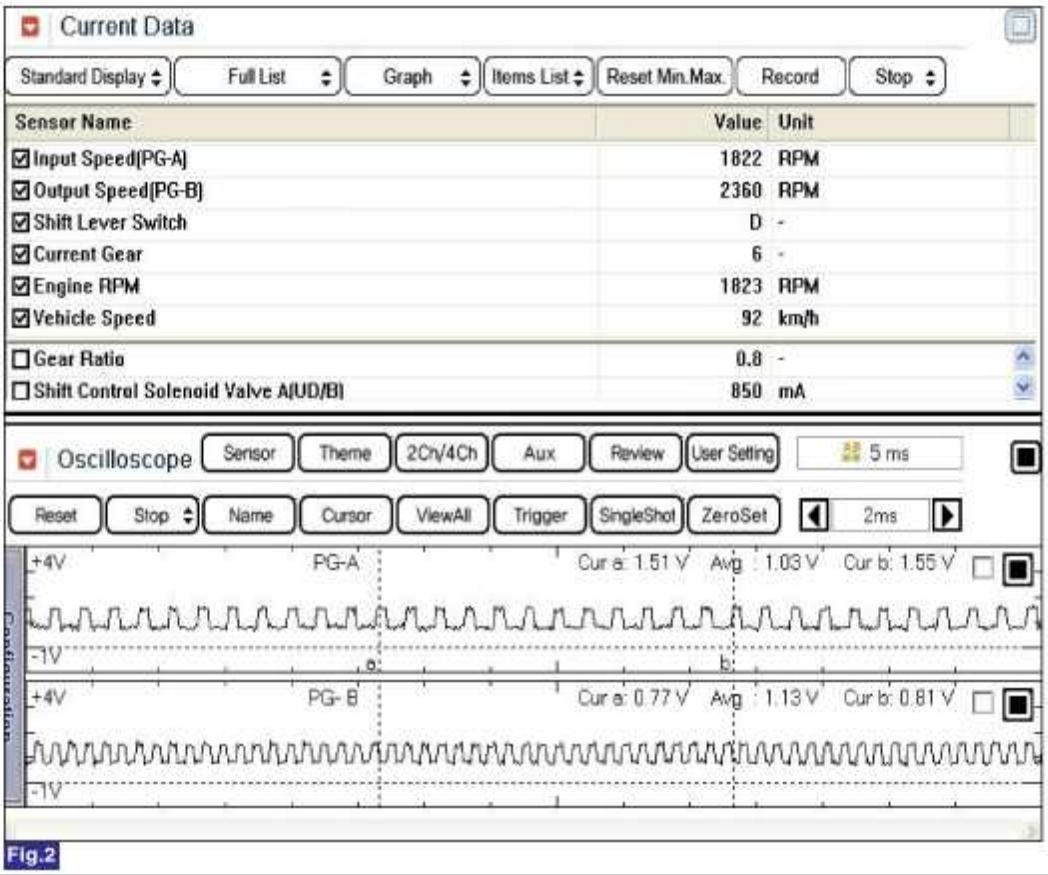


Fig.2

Automatic Transaxle System > Automatic Transaxle Control System > Input Speed Sensor > Repair procedures

Inspection

Automatic Transaxle System.

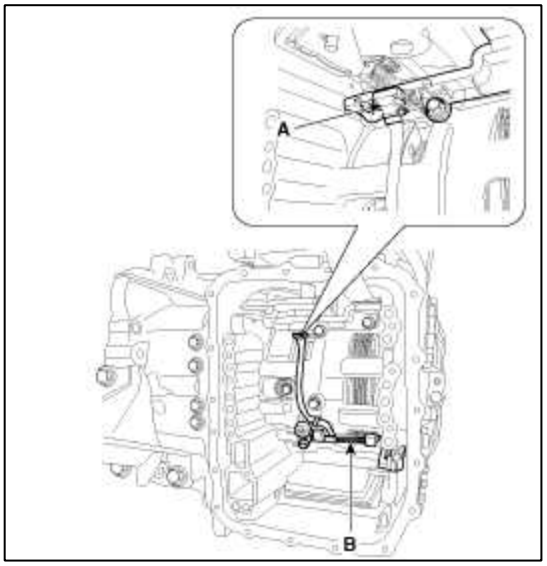
1. Check signal waveform of Input & output speed sensor using the GDS.

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.

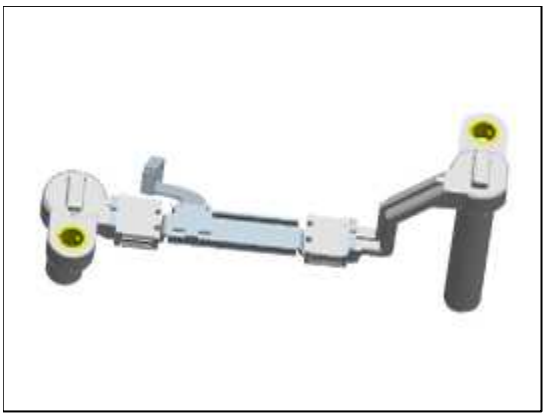
NOTE

- Adding coolant.
  (Refer to Engine Mechanical System - "Coolant")
- Adding Automatic Transaxle Fluid(ATF).
  (Refer to Hydraulic System - "Fluid")

Automatic Transaxle System > Automatic Transaxle Control System > Output Speed Sensor > Description and Operation

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 > Automatic Transaxle Control System > Output Speed Sensor > Specifications

Specifications

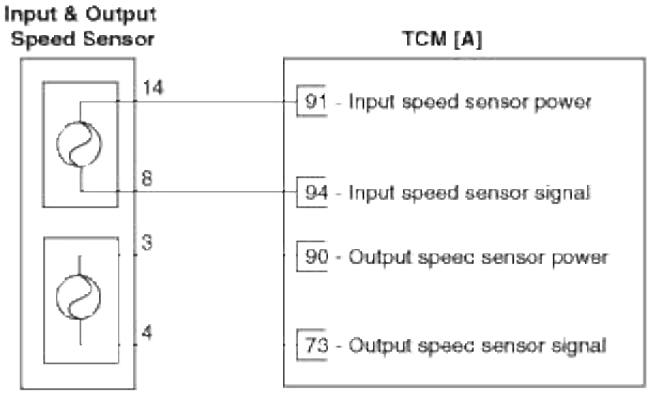
Type: Hall effect sensor

Operation condition (°C)°F		((-)40~150)) -40~302
Air gap(mm)in.		(0.25~0.70) 0.0098~0.0276
Output voltage (V)	High	1.18~1.68
	Low	0.59~0.84

Automatic Transaxle System > Automatic Transaxle Control System > Output Speed Sensor > Schematic Diagrams

Circuit Diagram

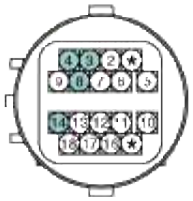
[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
14	TCM (91)	Input speed sensor power
8	TCM (94)	Input speed sensor signal
3	TCM (90)	Output speed sensor power
4	TCM (73)	Output speed sensor signal

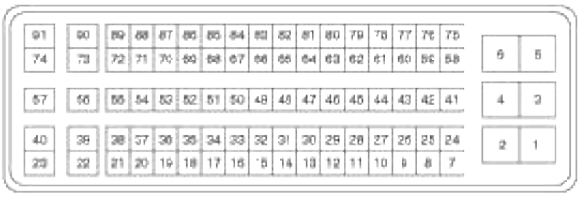
[Hamess Connector]



Solenoid Valve Connector



TCM Connector [A]



TCM Connector [B]

Automatic Transaxle System > Automatic Transaxle Control System > Output Speed Sensor > Troubleshooting

Signal Waveform

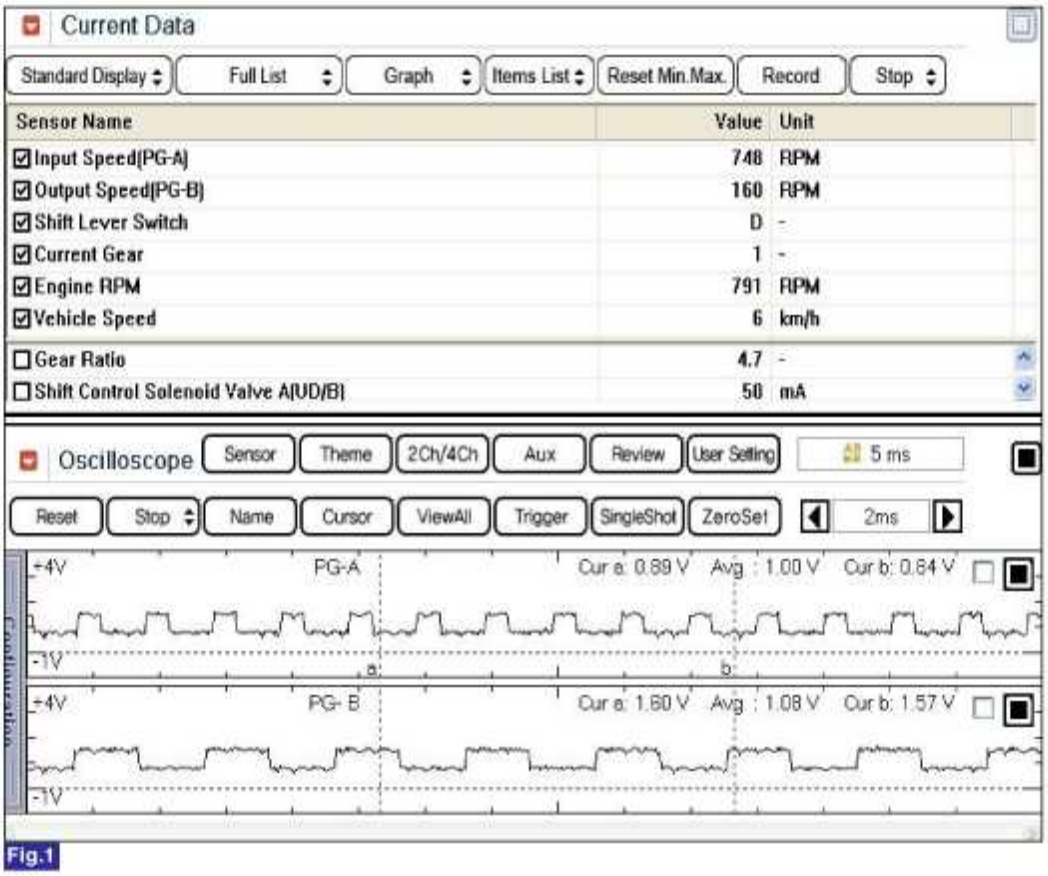


Fig.1

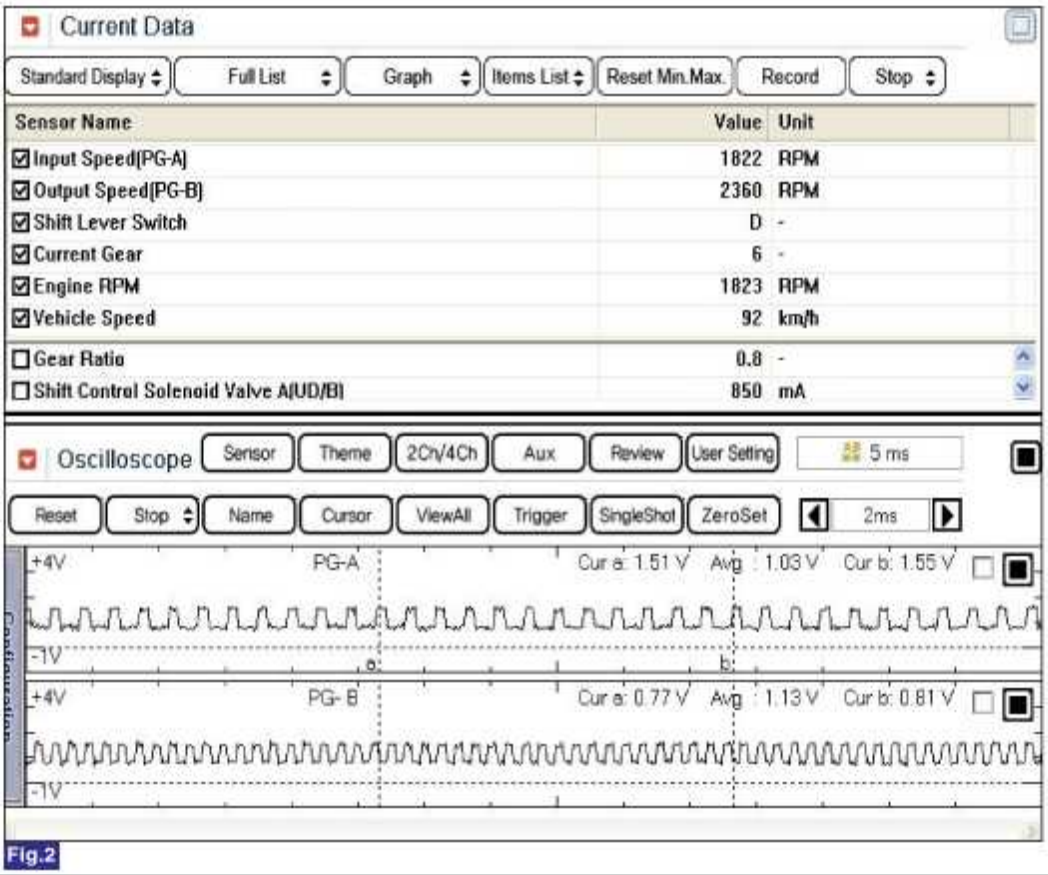


Fig.2

Automatic Transaxle System > Automatic Transaxle Control System > Output Speed Sensor > Repair procedures

Inspection

Automatic Transaxle System.

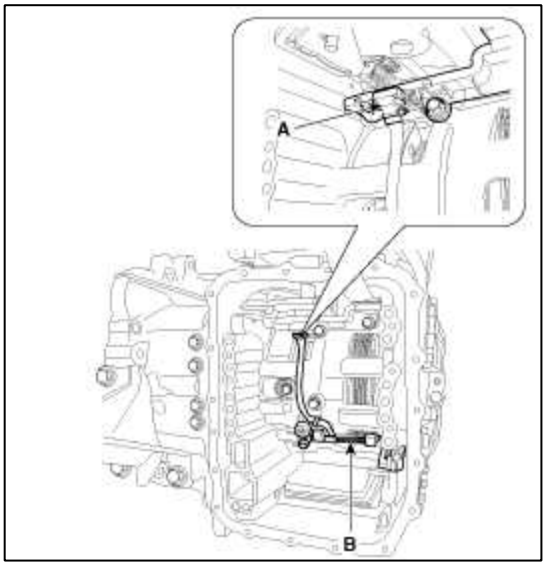
1. Check signal waveform of Input & output speed sensor using the GDS.

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.

NOTE

- Adding coolant.
  (Refer to Engine Mechanical System - "Coolant")
- Adding Automatic Transaxle Fluid(ATF).
  (Refer to Hydraulic System - "Fluid")

Automatic Transaxle System > Automatic Transaxle Control System > Torque Converter Control Solenoid Valve (T/CON_VFS) > Description and Operation

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 > Automatic Transaxle Control System > Torque Converter Control Solenoid Valve (T/CON_VFS) > Specifications

Specifications

Direct control VFS[T/CON]

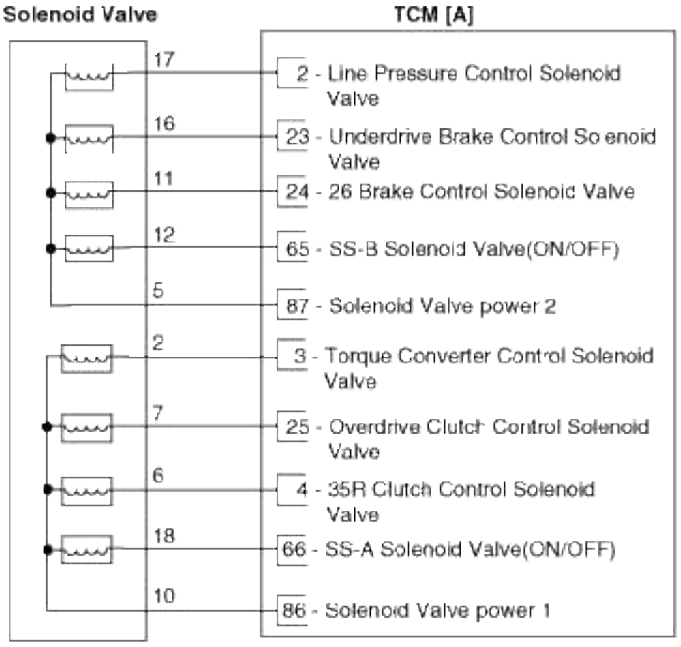
Control type : Normal low type

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 > Automatic Transaxle Control System > Torque Converter Control Solenoid Valve (T/CON_VFS) > Schematic Diagrams

Circuit Diagram

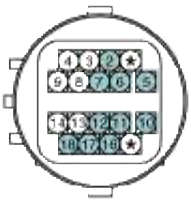
[Circuit Diagram]



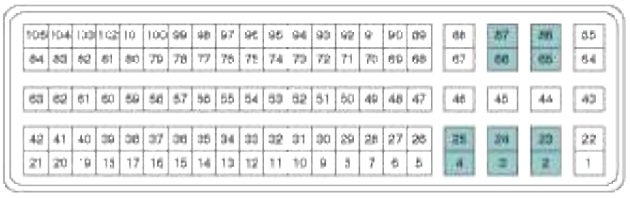
[Connection Information]

Terminal	Connected to	Function
17	TCM (2)	Line Pressure Control Solenoid Valve
16	TCM (23)	Underdrive Brake Control Solenoid Valve
11	TCM (24)	26 Brake Control Solenoid Valve
12	TCM (65)	SS-B Solenoid Valve(ON/OFF)
5	TCM (87)	Solenoid Valve power 2
2	TCM (3)	Torque Converter Control Solenoid Valve
7	TCM (25)	Overdrive Clutch Control Solenoid Valve
6	TCM (4)	35R Clutch Control Solenoid Valve
18	TCM (66)	SS-A Solenoid Valve(ON/OFF)
10	TCM (86)	Solenoid Valve power 1

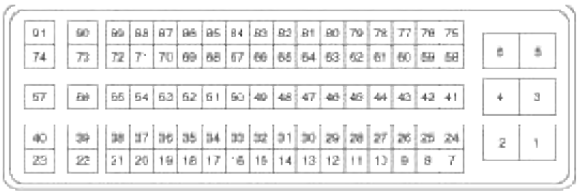
[Harness Connector]



Solenoid Valve Connector



TCM Connector [A]



TCM Connector [B]

Automatic Transaxle System > Automatic Transaxle Control System > Torque Converter Control Solenoid Valve (T/CON_VFS) > Repair procedures

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

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(A).

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



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

Replace the gasket before reinstalling the drain plug.

6. Remove the wiring bracket installation bolt (A).



7. 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

Replace the O-Ring (A) before reinstalling the eyebolt.



8. Disconnect the coolant hose (B) after removing the coolant hose clamp (A).

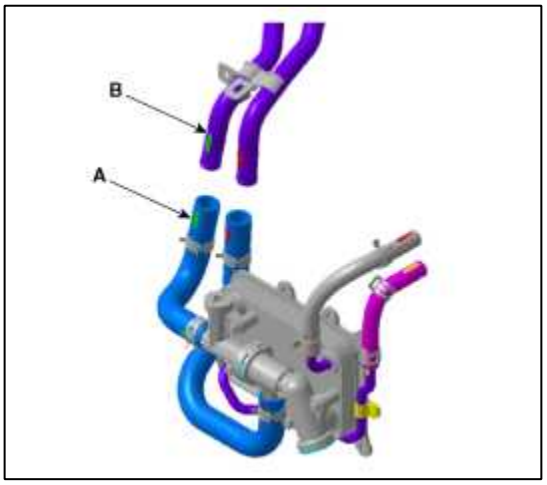


9. Disconnect the hose (B) after removing the automatic transaxle fluid cooler hose clamp (A).



CAUTION

When hose&pipe assembly
Align marking of pipe(B), marking of hose(A), and matching color each other.



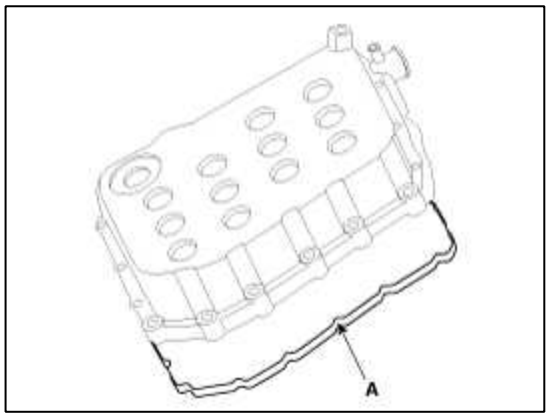
10. Remove the valve body cover (A).

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



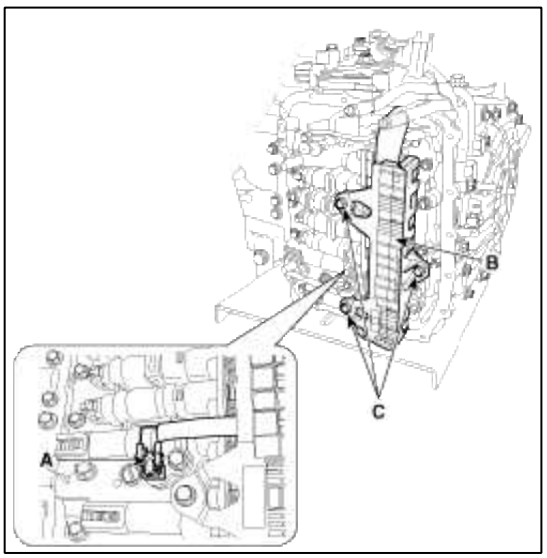
CAUTION

• Replace the gasket (A) before reinstalling the valve body cover.



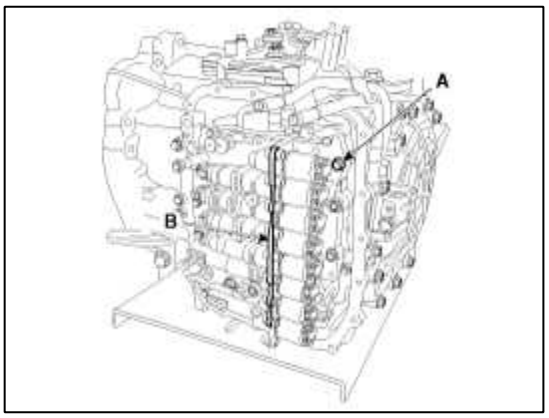
11. Remove the bolts (C) after disconnecting the solenoid valve connector (B) and the oil temperature sensor connector (A).

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

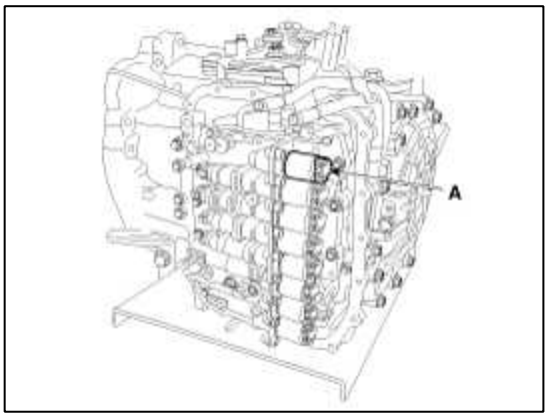


12. Remove the solenoid valve support bracket (B) and the valve body mounting bolt (A-1ea).

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



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



Installation

1. Install in the reverse order of removal.

NOTE

- Adding coolant.
  (Refer to Engine Mechanical System - "Coolant")
- 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 > Automatic Transaxle Control System > 26 Brake Control Solenoid Valve(26/B_VFS) > Description and Operation

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.



Automatic Transaxle System > Automatic Transaxle Control System > 26 Brake Control Solenoid Valve(26/B_VFS) > Specifications

Specifications

Direct control VFS[26/B]

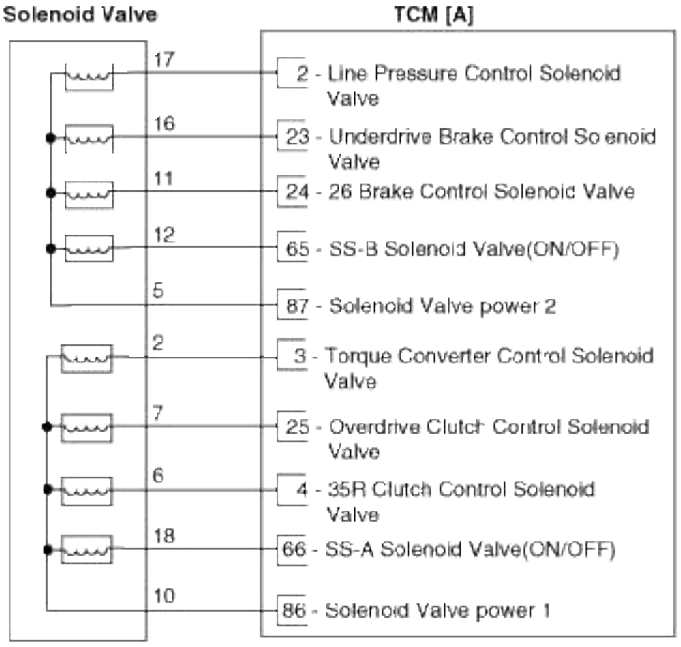
Control type : Normal low type

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

Automatic Transaxle System > Automatic Transaxle Control System > 26 Brake Control Solenoid Valve(26/B_VFS) > Schematic Diagrams

Circuit Diagram

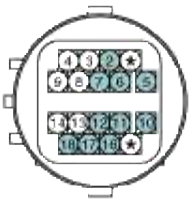
[Circuit Diagram]



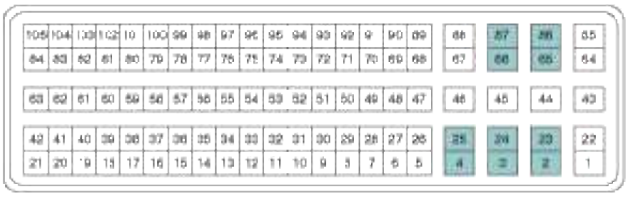
[Connection Information]

Terminal	Connected to	Function
17	TCM (2)	Line Pressure Control Solenoid Valve
16	TCM (23)	Underdrive Brake Control Solenoid Valve
11	TCM (24)	26 Brake Control Solenoid Valve
12	TCM (65)	SS-B Solenoid Valve(ON/OFF)
5	TCM (87)	Solenoid Valve power 2
2	TCM (3)	Torque Converter Control Solenoid Valve
7	TCM (25)	Overdrive Clutch Control Solenoid Valve
6	TCM (4)	35R Clutch Control Solenoid Valve
18	TCM (66)	SS-A Solenoid Valve(ON/OFF)
10	TCM (86)	Solenoid Valve power 1

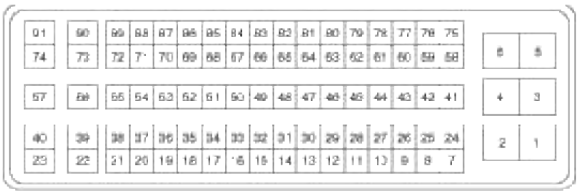
[Harness Connector]



Solenoid Valve Connector



TCM Connector [A]



TCM Connector [B]

Automatic Transaxle System > Automatic Transaxle Control System > 26 Brake Control Solenoid Valve(26/B_VFS) > Repair procedures

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

NOTE

Replacing an on/off solenoid valve (SS-A, SS-B) does not require additional hydraulic pressure adjustment; however, the hydraulic pressure will need to be adjusted after replacing the VFS solenoid valve. If replacing the VFS solenoid valve; also replace the valve body assembly.
(Refer to Hydraulic System - "Valve Body")

Automatic Transaxle System > Automatic Transaxle Control System > Line Pressure Control Solenoid Valve > Description and Operation

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 > Automatic Transaxle Control System > Line Pressure Control Solenoid Valve > Specifications

Specifications

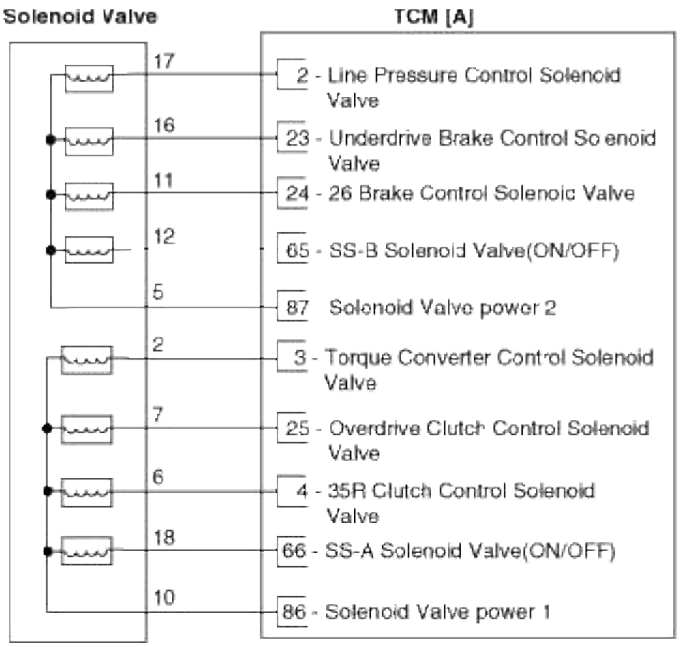
Direct control VFS[LINE Pressure]
Control type : Normal high type

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

Automatic Transaxle System > Automatic Transaxle Control System > Line Pressure Control Solenoid Valve > Schematic Diagrams

Circuit Diagram

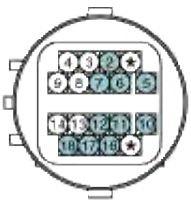
[Circuit Diagram]



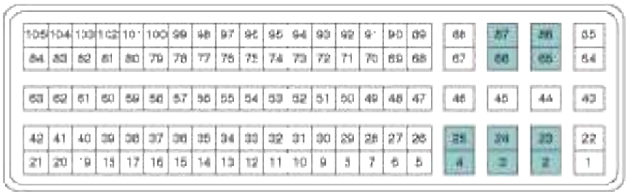
[Connection Information]

Terminal	Connected to	Function
17	TCM (2)	Line Pressure Control Solenoid Valve
16	TCM (23)	Underdrive Brake Control Solenoid Valve
11	TCM (24)	26 Brake Control Solenoid Valve
12	TCM (65)	SS-B Solenoid Valve(ON/OFF)
5	TCM (87)	Solenoid Valve power 2
2	TCM (3)	Torque Converter Control Solenoid Valve
7	TCM (25)	Overdrive Clutch Control Solenoid Valve
6	TCM (4)	35R Clutch Control Solenoid Valve
18	TCM (66)	SS-A Solenoid Valve(ON/OFF)
10	TCM (86)	Solenoid Valve power 1

[Harness Connector]



Solenoid Valve Connector



TCM Connector [A]



TCM Connector [B]

Automatic Transaxle System > Automatic Transaxle Control System > Line Pressure Control Solenoid Valve > Repair procedures

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

NOTE

Replacing an on/off solenoid valve (SS-A, SS-B) does not require additional hydraulic pressure adjustment; however, the hydraulic pressure will need to be adjusted after replacing the VFS solenoid valve. If replacing the VFS solenoid valve; also replace the valve body assembly.
(Refer to Hydraulic System - "Valve Body")

Automatic Transaxle System > Automatic Transaxle Control System > 35R Clutch Control Solenoid Valve(35R/C_VFS) > Description and Operation

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.



Automatic Transaxle System > Automatic Transaxle Control System > 35R Clutch Control Solenoid Valve(35R/C_VFS) > Specifications

Specifications

Direct control VFS[35R/C]

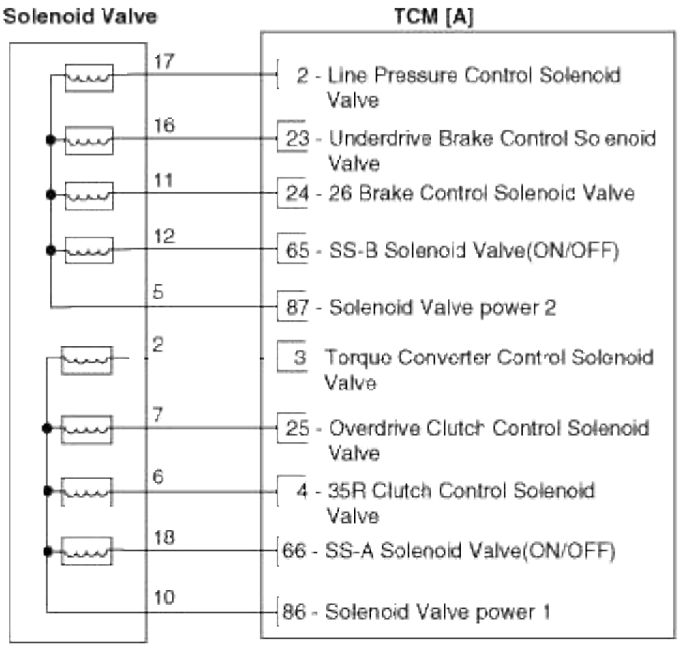
Control type : Normal high type

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

Automatic Transaxle System > Automatic Transaxle Control System > 35R Clutch Control Solenoid Valve(35R/C_VFS) > Schematic Diagrams

Circuit Diagram

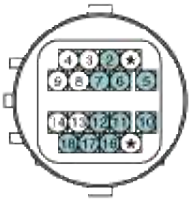
[Circuit Diagram]



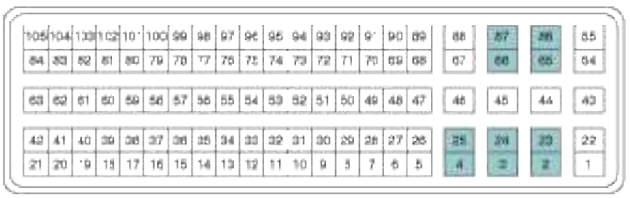
[Connection Information]

Terminal	Connected to	Function
17	TCM (2)	Line Pressure Control Solenoid Valve
16	TCM (23)	Underdrive Brake Control Solenoid Valve
11	TCM (24)	26 Brake Control Solenoid Valve
12	TCM (65)	SS-B Solenoid Valve(ON/OFF)
5	TCM (87)	Solenoid Valve power 2
2	TCM (3)	Torque Converter Control Solenoid Valve
7	TCM (25)	Overdrive Clutch Control Solenoid Valve
6	TCM (4)	35R Clutch Control Solenoid Valve
18	TCM (66)	SS-A Solenoid Valve(ON/OFF)
10	TCM (86)	Solenoid Valve power 1

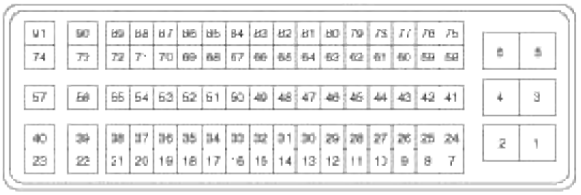
[Harness Connector]



Solenoid Valve Connector



TCM Connector [A]



TCM Connector [B]

Automatic Transaxle System > Automatic Transaxle Control System > 35R Clutch Control Solenoid Valve(35R/C_VFS) > Repair procedures

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

NOTE

Replacing an on/off solenoid valve (SS-A, SS-B) does not require additional hydraulic pressure adjustment; however, the hydraulic pressure will need to be adjusted after replacing the VFS solenoid valve. If replacing the VFS solenoid valve; also replace the valve body assembly.
(Refer to Hydraulic System - "Valve Body")

Automatic Transaxle System > Automatic Transaxle Control System > Underdrive Brake Control Solenoid Valve(UD/B_VFS) > Description and Operation

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.



Automatic Transaxle System > Automatic Transaxle Control System > Underdrive Brake Control Solenoid Valve(UD/B_VFS) > Specifications

Specifications

Direct control VFS[UD/B]

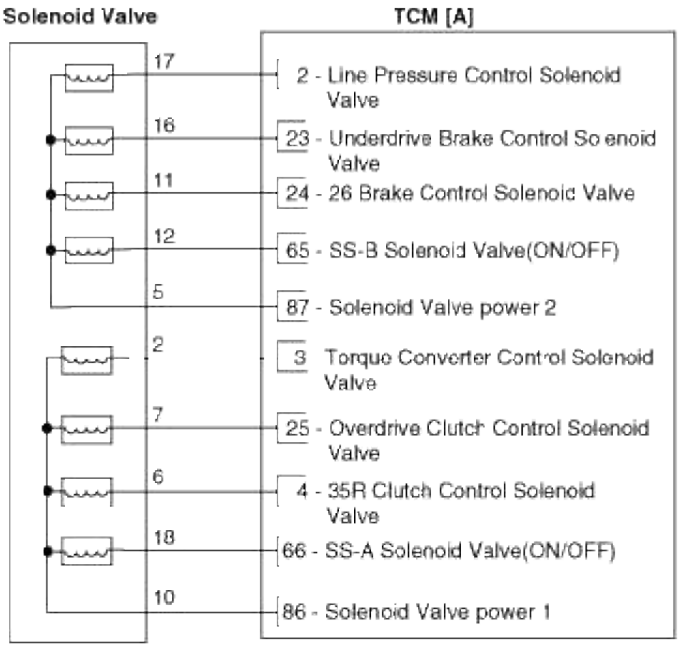
Control type : Normal high type

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

Automatic Transaxle System > Automatic Transaxle Control System > Underdrive Brake Control Solenoid Valve(UD/B_VFS) > Schematic Diagrams

Circuit Diagram

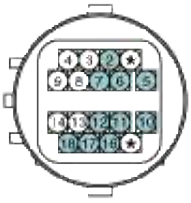
[Circuit Diagram]



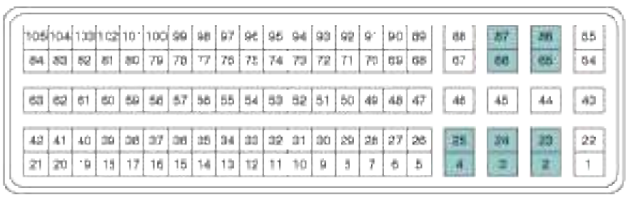
[Connection Information]

Terminal	Connected to	Function
17	TCM (2)	Line Pressure Control Solenoid Valve
16	TCM (23)	Underdrive Brake Control Solenoid Valve
11	TCM (24)	26 Brake Control Solenoid Valve
12	TCM (65)	SS-B Solenoid Valve(ON/OFF)
5	TCM (87)	Solenoid Valve power 2
2	TCM (3)	Torque Converter Control Solenoid Valve
7	TCM (25)	Overdrive Clutch Control Solenoid Valve
6	TCM (4)	35R Clutch Control Solenoid Valve
18	TCM (66)	SS-A Solenoid Valve(ON/OFF)
10	TCM (86)	Solenoid Valve power 1

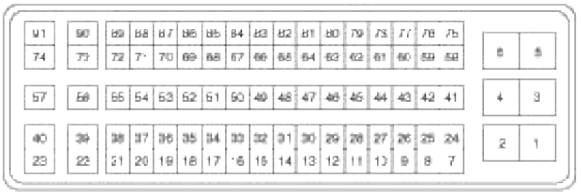
[Harness Connector]



Solenoid Valve Connector



TCM Connector [A]



TCM Connector [B]

Automatic Transaxle System > Automatic Transaxle Control System > Underdrive Brake Control Solenoid Valve(UD/B_VFS) > Repair procedures

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

NOTE

Replacing an on/off solenoid valve (SS-A, SS-B) does not require additional hydraulic pressure adjustment; however, the hydraulic pressure will need to be adjusted after replacing the VFS solenoid valve. If replacing the VFS solenoid valve; also replace the valve body assembly.
(Refer to Hydraulic System - "Valve Body")

Automatic Transaxle System > Automatic Transaxle Control System > Overdrive Clutch Control Solenoid Valve(OD/C_VFS) > Description and Operation

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 > Automatic Transaxle Control System > Overdrive Clutch Control Solenoid Valve(OD/C_VFS) > Specifications

Specifications

Direct control VFS[OD/C]

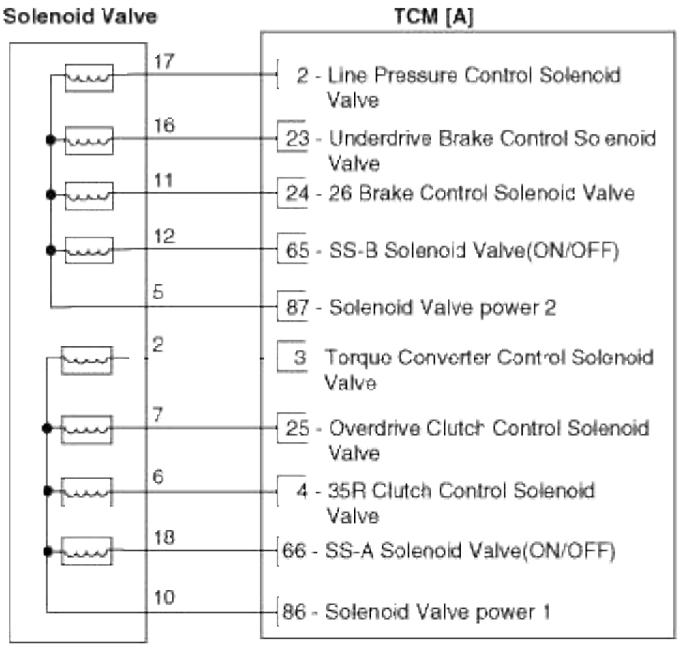
Control type : Normal high type

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 > Automatic Transaxle Control System > Overdrive Clutch Control Solenoid Valve(OD/C_VFS) > Schematic Diagrams

Circuit Diagram

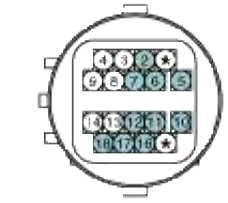
[Circuit Diagram]



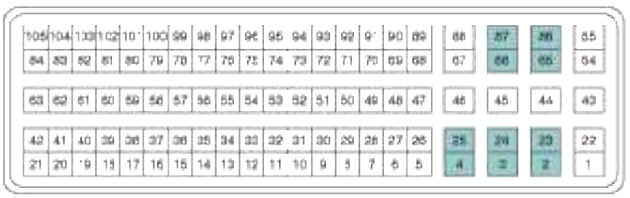
[Connection Information]

Terminal	Connected to	Function
17	TCM (2)	Line Pressure Control Solenoid Valve
16	TCM (23)	Underdrive Brake Control Solenoid Valve
11	TCM (24)	26 Brake Control Solenoid Valve
12	TCM (65)	SS-B Solenoid Valve(ON/OFF)
5	TCM (87)	Solenoid Valve power 2
2	TCM (3)	Torque Converter Control Solenoid Valve
7	TCM (25)	Overdrive Clutch Control Solenoid Valve
6	TCM (4)	35R Clutch Control Solenoid Valve
18	TCM (66)	SS-A Solenoid Valve(ON/OFF)
10	TCM (86)	Solenoid Valve power 1

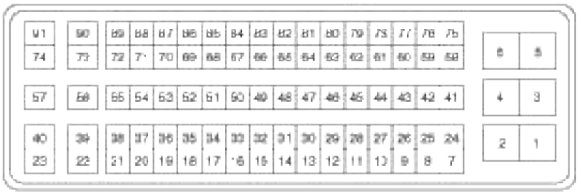
[Harness Connector]



Solenoid Valve Connector



TCM Connector [A]



TCM Connector [B]

Automatic Transaxle System > Automatic Transaxle Control System > Overdrive Clutch Control Solenoid Valve(OD/C_VFS) > Repair procedures

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

NOTE

Replacing an on/off solenoid valve (SS-A, SS-B) does not require additional hydraulic pressure adjustment; however, the hydraulic pressure will need to be adjusted after replacing the VFS solenoid valve. If replacing the VFS solenoid valve; also replace the valve body assembly.
(Refer to Hydraulic System - "Valve Body")

Automatic Transaxle System > Automatic Transaxle Control System > SS-A Solenoid Valve(ON/OFF) > Description and Operation

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 > Automatic Transaxle Control System > SS-A Solenoid Valve(ON/OFF) > Specifications

Specifications

ON/OFF Solenoid Valve(SS-A)

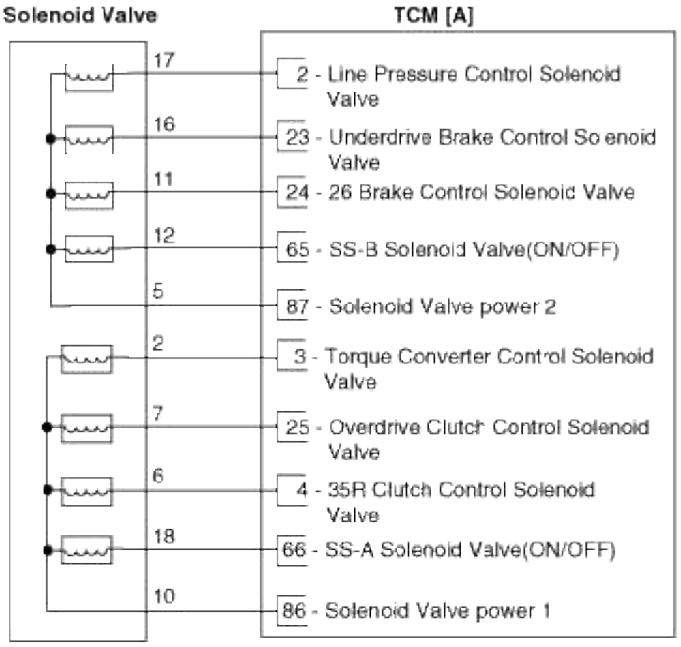
Control type : Normal low type

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

Automatic Transaxle System > Automatic Transaxle Control System > SS-A Solenoid Valve(ON/OFF) > Schematic Diagrams

Circuit Diagram

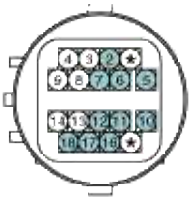
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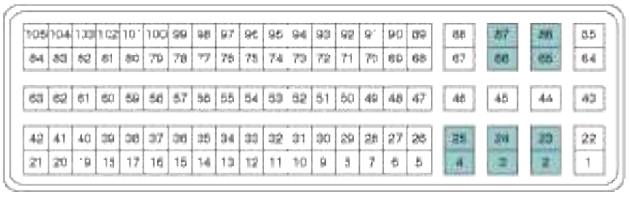
[Connection Information]

Terminal	Connected to	Function
17	TCM (2)	Line Pressure Control Solenoid Valve
16	TCM (23)	Underdrive Brake Control Solenoid Valve
11	TCM (24)	26 Brake Control Solenoid Valve
12	TCM (65)	SS-B Solenoid Valve(ON/OFF)
5	TCM (87)	Solenoid Valve power 2
2	TCM (3)	Torque Converter Control Solenoid Valve
7	TCM (25)	Overdrive Clutch Control Solenoid Valve
6	TCM (4)	35R Clutch Control Solenoid Valve
18	TCM (66)	SS-A Solenoid Valve(ON/OFF)
10	TCM (86)	Solenoid Valve power 1

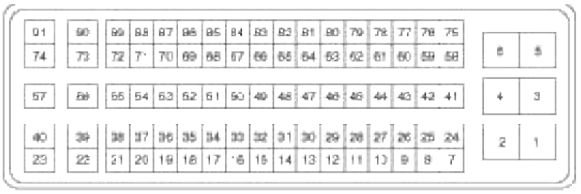
[Harness Connector]



Solenoid Valve Connector



TCM Connector [A]



TCM Connector [B]

Automatic Transaxle System > Automatic Transaxle Control System > SS-A Solenoid Valve(ON/OFF) > Repair procedures

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

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(A).

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



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

Replace the gasket before reinstalling the drain plug.

6. Remove the wiring bracket installation bolt (A).



7. 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

Replace the O-Ring (A) before reinstalling the eyebolt.



8. Disconnect the coolant hose (B) after removing the coolant hose clamp (A).

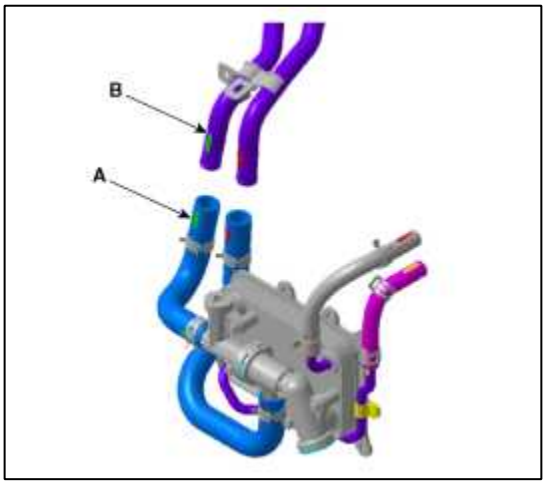


9. Disconnect the hose (B) after removing the automatic transaxle fluid cooler hose clamp (A).



CAUTION

When hose&pipe assembly
Align marking of pipe(B), marking of hose(A), and matching color each other.



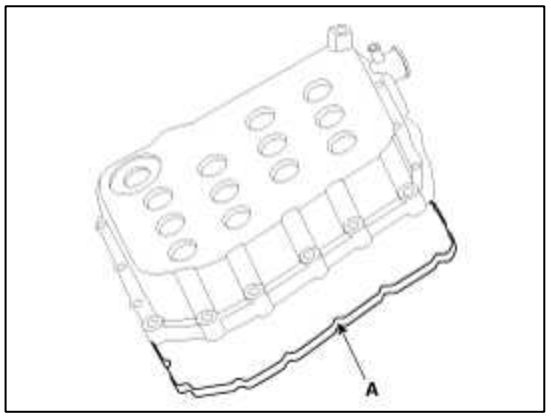
10. Remove the valve body cover (A).

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



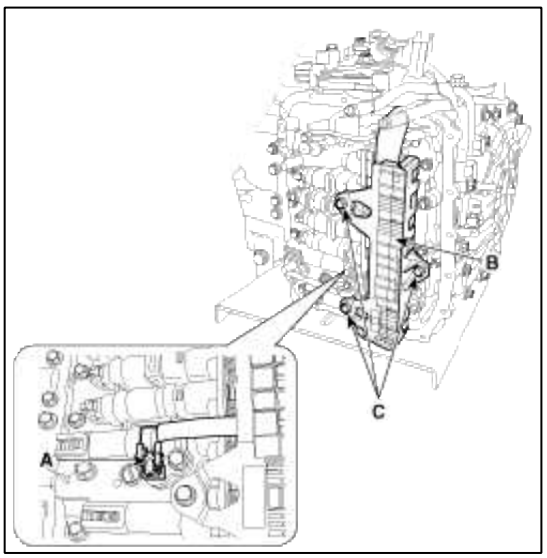
CAUTION

• Replace the gasket (A) before reinstalling the valve body cover.



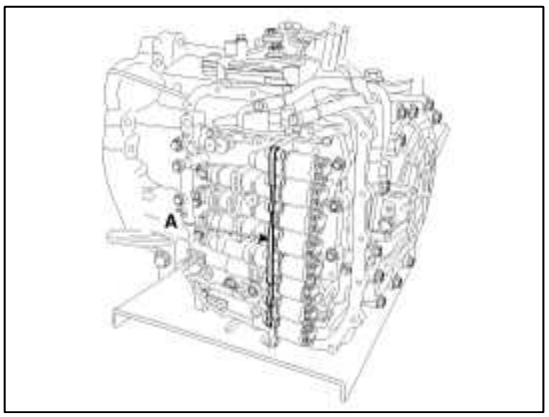
11. Remove the bolts (C) after disconnecting the solenoid valve connector (B) and the oil temperature sensor connector (A).

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

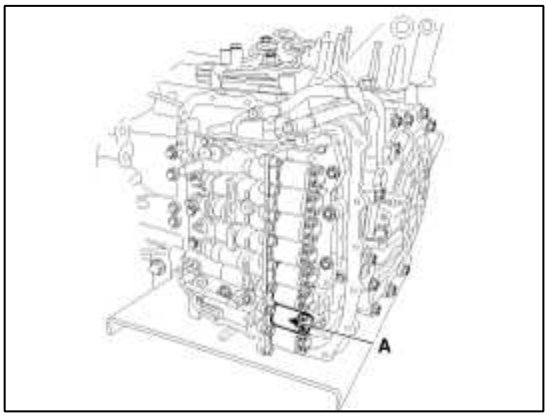


12. Remove the solenoid valve support bracket (A).

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

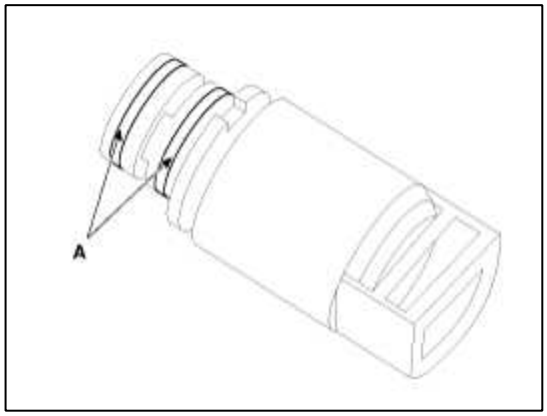


13. Remove the solenoid valve (A).



CAUTION

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



Installation

1. Install in the reverse order of removal.

NOTE

- Adding coolant.
  (Refer to Engine Mechanical System - "Coolant")
- 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 > Automatic Transaxle Control System > SS-B Solenoid Valve(ON/OFF) > Description and Operation

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 > Automatic Transaxle Control System > SS-B Solenoid Valve(ON/OFF) > Specifications

Specifications

ON/OFF Solenoid Valve(SS-B)

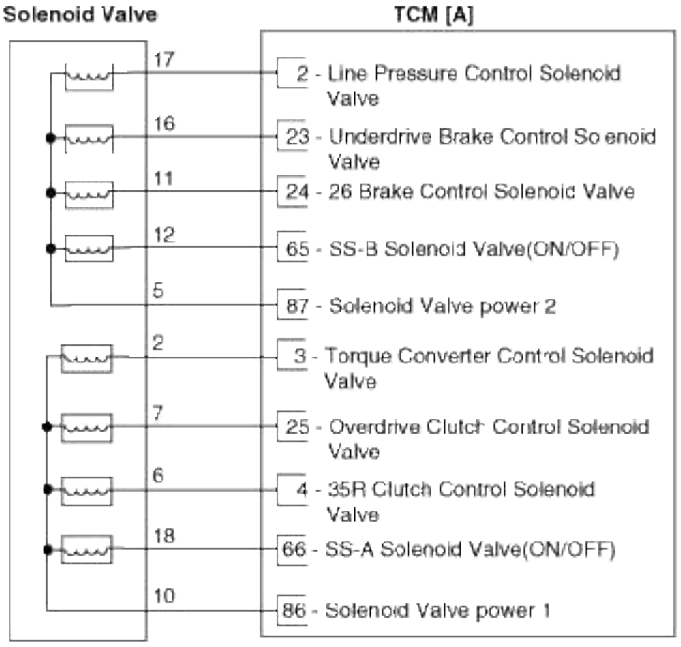
Control type : Normal low type

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

Automatic Transaxle System > Automatic Transaxle Control System > SS-B Solenoid Valve(ON/OFF) > Schematic Diagrams

Circuit Diagram

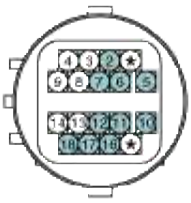
[Circuit Diagram]



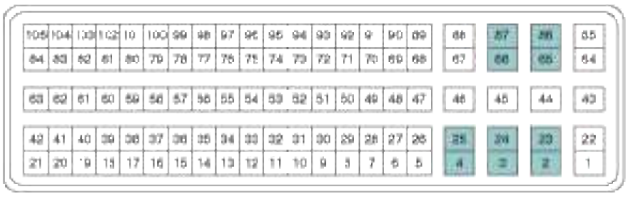
[Connection Information]

Terminal	Connected to	Function
17	TCM (2)	Line Pressure Control Solenoid Valve
16	TCM (23)	Underdrive Brake Control Solenoid Valve
11	TCM (24)	26 Brake Control Solenoid Valve
12	TCM (65)	SS-B Solenoid Valve(ON/OFF)
5	TCM (87)	Solenoid Valve power 2
2	TCM (3)	Torque Converter Control Solenoid Valve
7	TCM (25)	Overdrive Clutch Control Solenoid Valve
6	TCM (4)	35R Clutch Control Solenoid Valve
18	TCM (66)	SS-A Solenoid Valve(ON/OFF)
10	TCM (86)	Solenoid Valve power 1

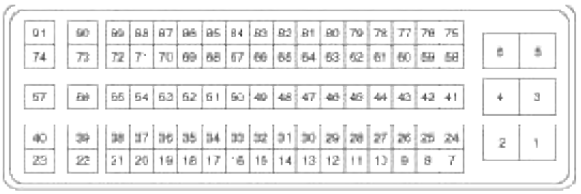
[Harness Connector]



Solenoid Valve Connector



TCM Connector [A]



TCM Connector [B]

Automatic Transaxle System > Automatic Transaxle Control System > SS-B Solenoid Valve(ON/OFF) > Repair procedures

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

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(A).

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



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

Replace the gasket before reinstalling the drain plug.

6. Remove the wiring bracket installation bolt (A).



7. 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

Replace the O-Ring (A) before reinstalling the eyebolt.



8. Disconnect the coolant hose (B) after removing the coolant hose clamp (A).

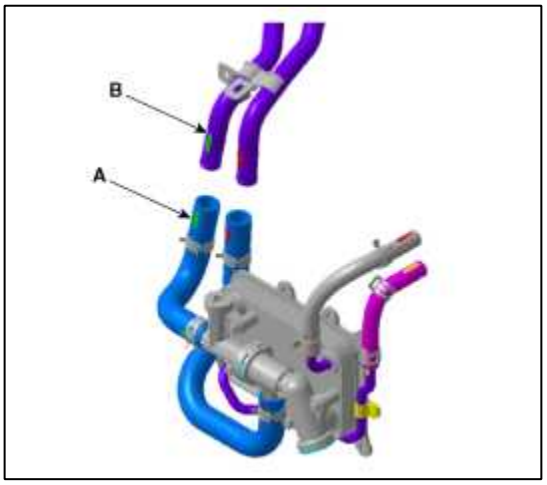


9. Disconnect the hose (B) after removing the automatic transaxle fluid cooler hose clamp (A).



CAUTION

When hose&pipe assembly
Align marking of pipe(B), marking of hose(A), and matching color each other.



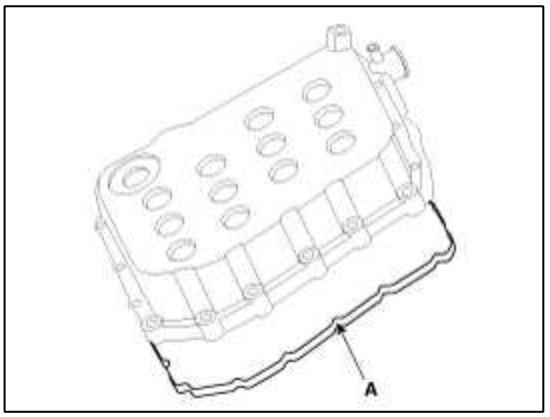
10. Remove the valve body cover (A).

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



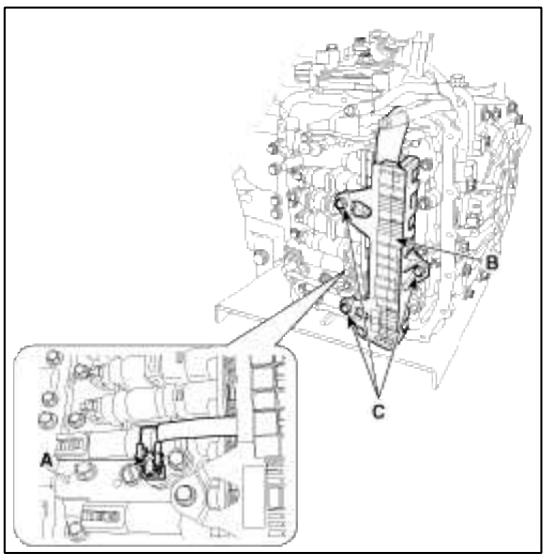
CAUTION

• Replace the gasket (A) before reinstalling the valve body cover.



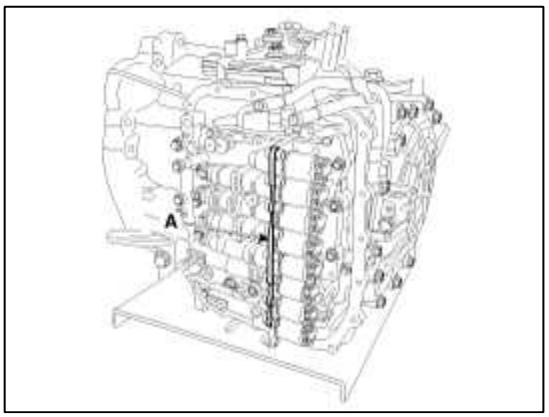
11. Remove the bolts (C) after disconnecting the solenoid valve connector (B) and the oil temperature sensor connector (A).

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

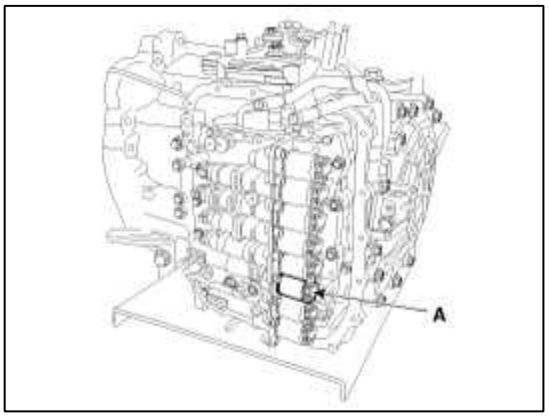


12. Remove the solenoid valve support bracket (A).

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

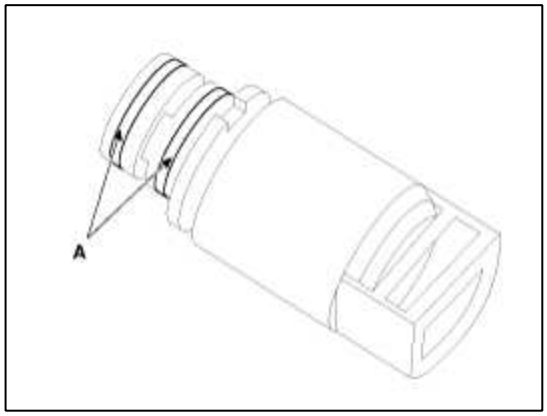


13. Remove the solenoid valve (A).



CAUTION

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



Installation

1. Install in the reverse order of removal.

NOTE

- Adding coolant.
  (Refer to Engine Mechanical System - "Coolant")
- 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 > Automatic Transaxle Control System > Inhibitor Switch > Description and Operation

Description

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



Automatic Transaxle System > Automatic Transaxle Control System > Inhibitor Switch > Specifications

Specifications

Type: Combination of output signals from 4 terminals

Specifications

Power supply (V)	12
Output type	Pin to Pin

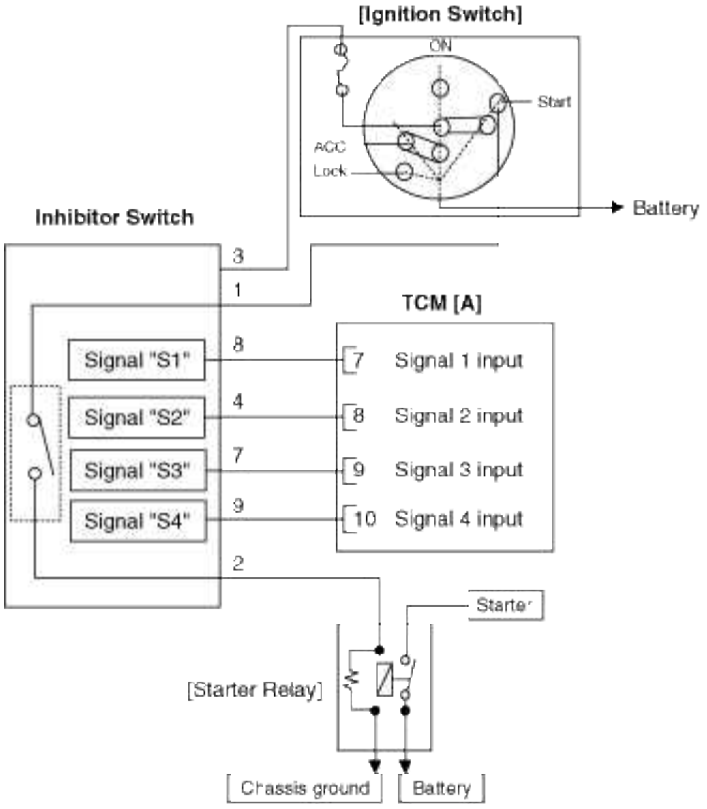
Signal Code Table

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

Automatic Transaxle System > Automatic Transaxle Control System > Inhibitor Switch > Schematic Diagrams

Circuit Diagram

[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
8	TCM (7)	Signal 1 input
4	TCM (8)	Signal 2 input
7	TCM (9)	Signal 3 input
9	TCM (10)	Signal 4 input
3	gnition switch	Ignition ON
1	gnition switch	Starter power(ON)
2	Starter relay	Starter relay

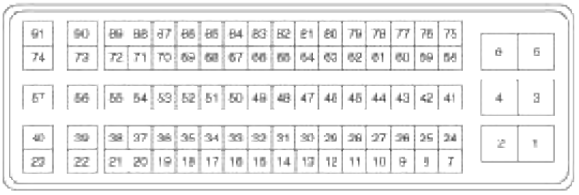
[Harness Connector]



Inhibitor Switch Connector



TCM Connector [A]



TCM Connector [B]

Automatic Transaxle System > Automatic Transaxle Control System > Inhibitor Switch > Repair procedures

Inspection

NOTE

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

Power Circuit Inspection

1. Disconnect the Inhibitor swtich connector.
2. Ignition KEY "ON"" & Engine "OFF".

3. Measure voltge between supplied power and ground at inhibitor circuit.

Specification : Approx. 12V

Signal Circuit Inspection

1. Connect the Inhibitor switch connector.
2. Ignition KEY "ON" & Engine "OFF".
3. Measure voltages between each terminal and chassis ground during shift lever changed "P, R, N, D".

Specification : See below "Signal Code Table"

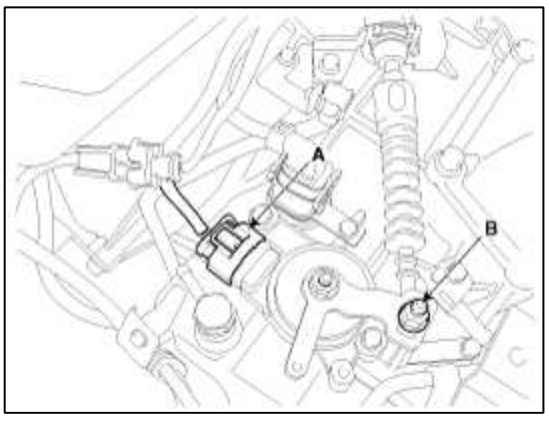
Signal Code Table

	P	P-R	R	R-N	N	N-D	D
Signal "1"	12V	12V	0	0	0	0	0
Signal "2"	0	12V	12V	12V	0	0	0
Signal "3"	0	0	0	12V	12V	12V	0
Signal "4"	0	0	0	0	0	12V	12V

Removal

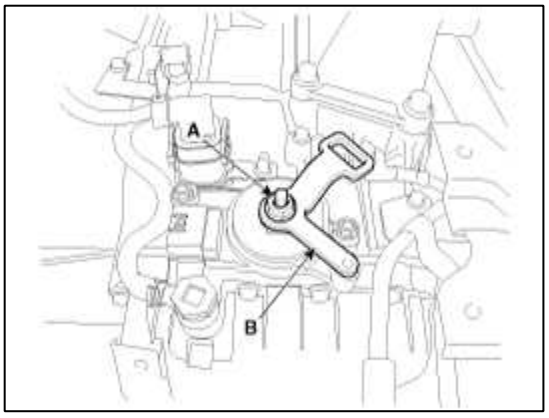
1. Set shift lever to "N" position.
2. Remove the air duct.
   (Refer to Engine Mechanical System - "Air cleaner")
3. Remove the battery and the battery tray.
   (Refer to Engine Electrical System - "Battery")
4. Disconnect the inhibitor switch connector (A).
5. Remove the shift cable mounting nut (B).

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



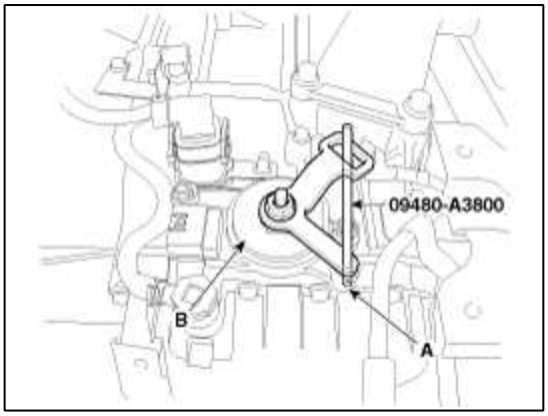
6. Remove the manual control lever (B) and the washer after removing a nut (A).

Tightening torque: 17.7~24.5 N.m (1.8~ 2.5 kgf.m, 13.0 ~ 18.1 lb-ft)



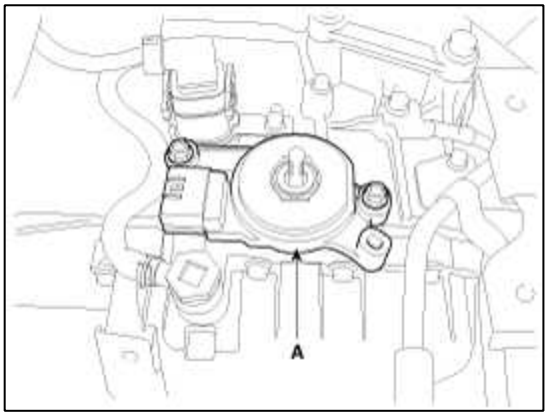
CAUTION

Use a SST (09480-A3800) or 0.1969in.(5mm) bolt, 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

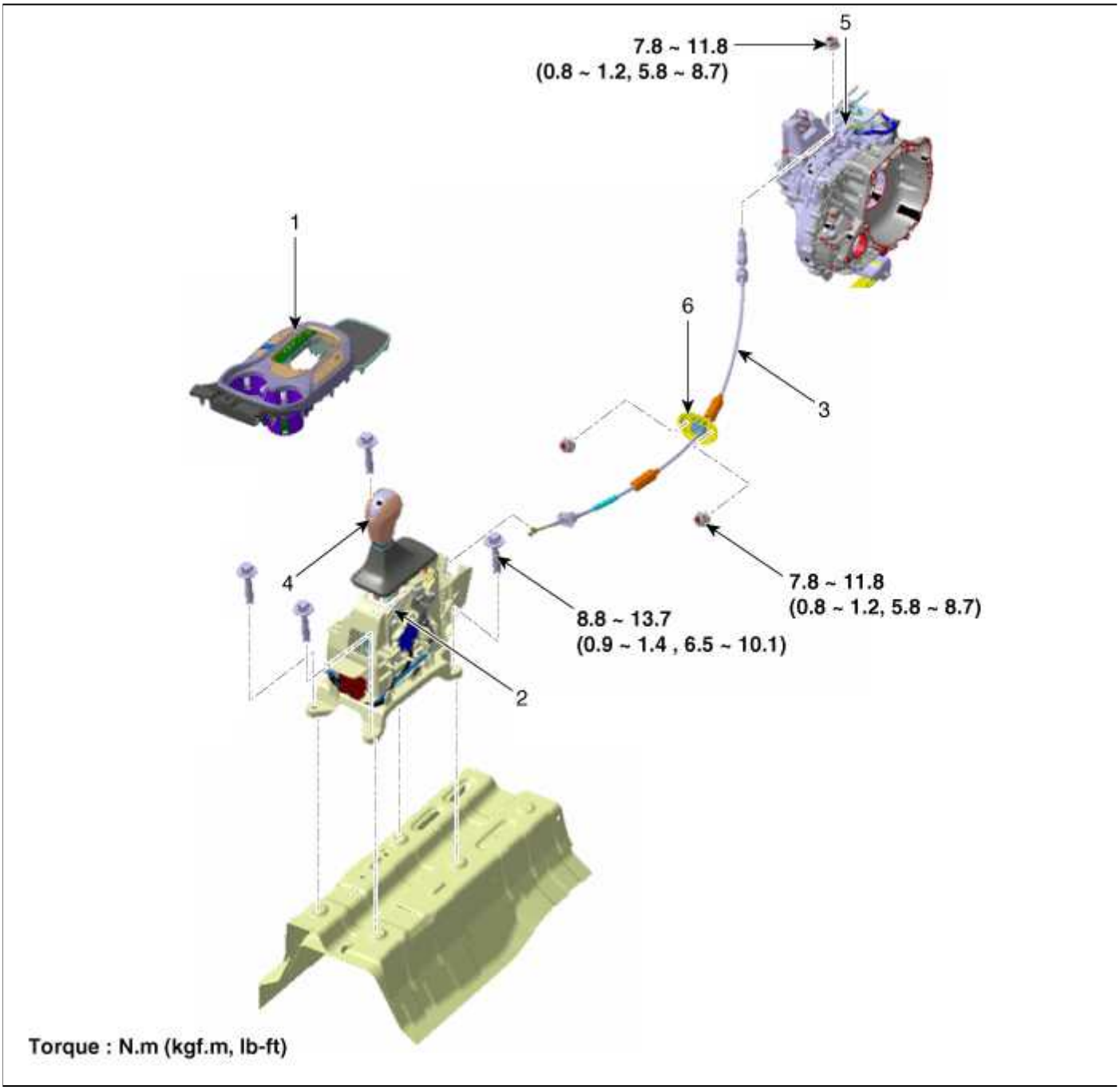
When installing, tighten the inhibitor assembly mounting bolt to the specification shown above.

Installation

1. Install in the reverse order of removal.

Automatic Transaxle System > Automatic Transaxle Control System > Shift Lever > Components and Components Location

Components



1. Console upper cover 2. Shift lever assembly 3. Shift cable assembly	4. Shift lever knob & boots assembly 5. Manual control lever 6. Retainer

Automatic Transaxle System > Automatic Transaxle Control System > Shift Lever > Repair procedures

Removal

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

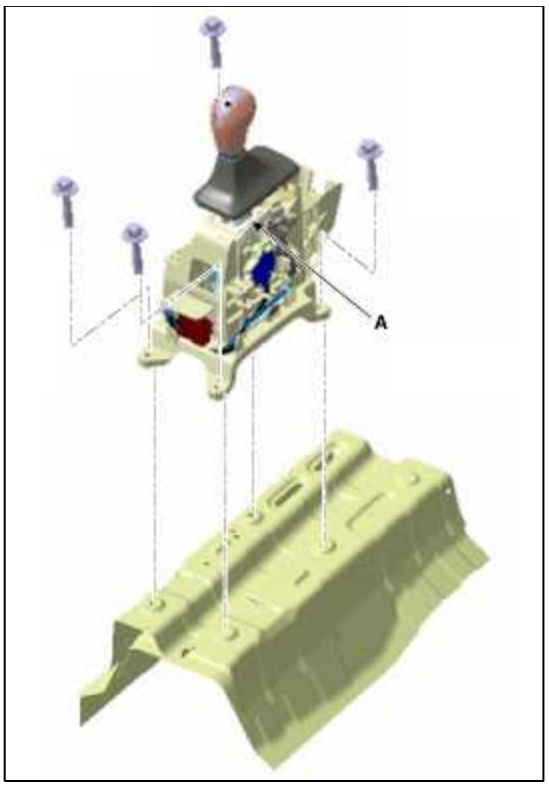


4. Disconnect the shift cable (A).



5. 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)



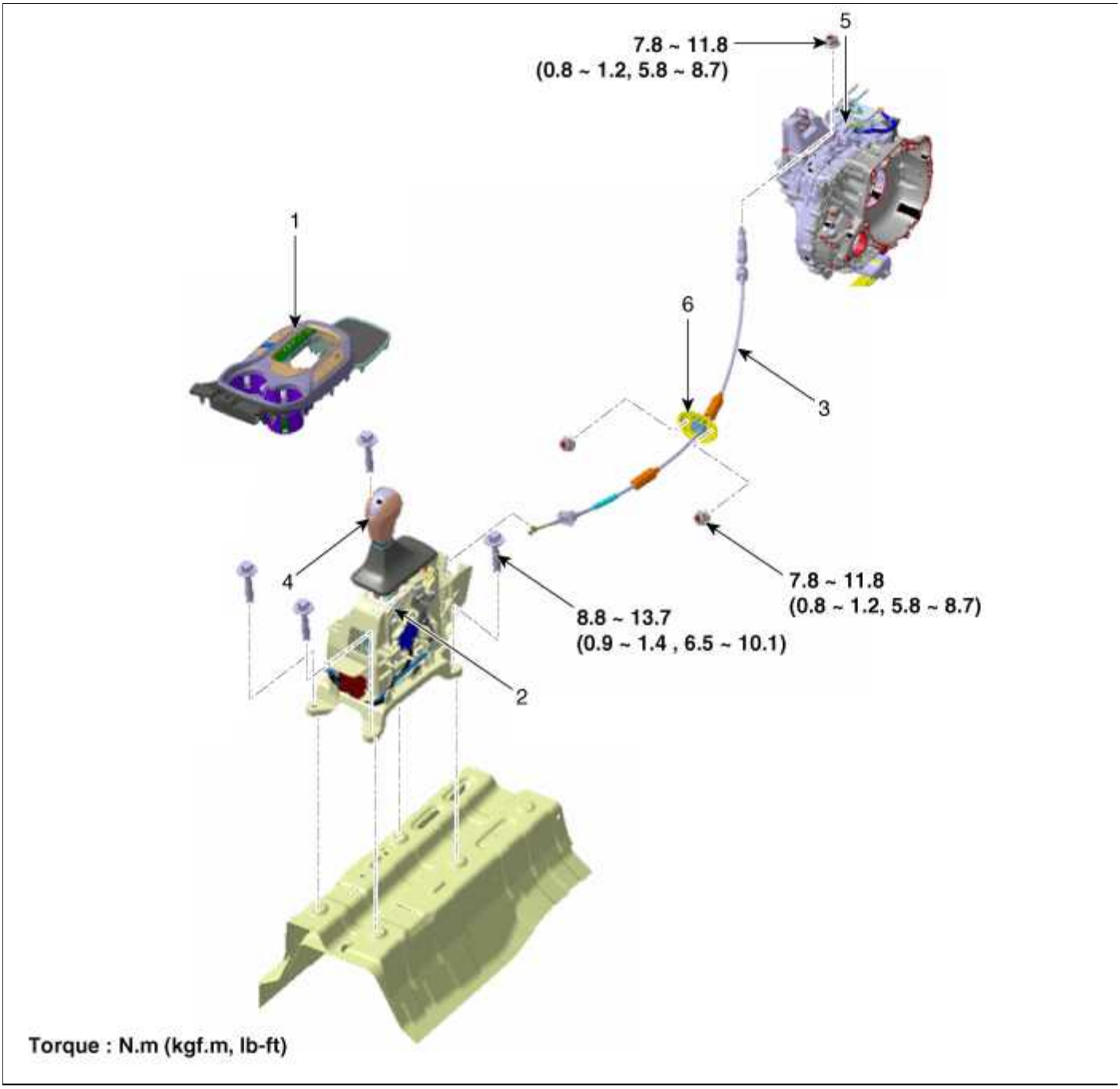
Installation

1. Install in the reverse order of removal.

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

Automatic Transaxle System > Automatic Transaxle Control System > Shift Cable > Components and Components Location

Components



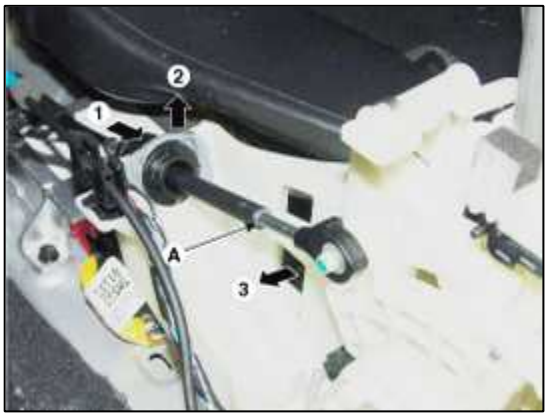
1. Console upper cover 2. Shift lever assembly 3. Shift cable assembly	4. Shift lever knob & boots assembly 5. Manual control lever 6. Retainer

Automatic Transaxle System > Automatic Transaxle Control System > Shift Cable > Repair procedures

Removal

1. Remove the floor console.
   (Refer to Body-"Floor console")
2. Remove the air duct.

3. Disconnect the shift cable (A).



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

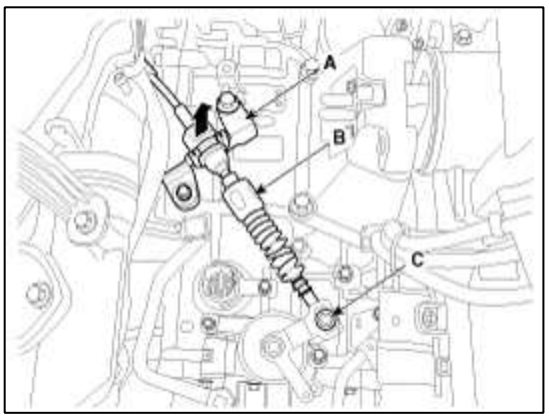
Tightening torque :
7.8 ~ 11.8 N.m (0.8 ~ 1.2 kgf.m, 5.8~8.7 lb-ft)



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

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

6. Remove the cable (B) from the bracket (A) at transaxle assembly side.
7. Remove the shift cable by pulling it toward the interior.



Installation

1. Install in the reverse order of removal.

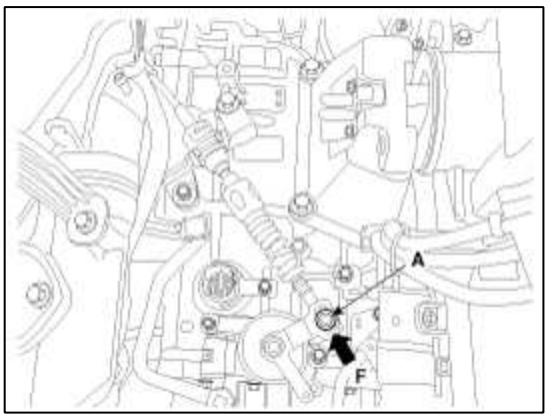
> CAUTION
>
> Set shift lever and inhibitor switch manual control lever to "N" position.

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.