Specifications

| Item | | Specifications |
|---|---|---|
| Transaxle type | | A6MF2 |
| Engine model | | Gasoline 2.4 |
| 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) 0.0374~0.0650 |
| 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. | | (1.48~1.9)<br>0.0583~0.0748 |
| 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) | 0 ~ 539.37(0 ~ 5.5, 0 ~ 78.23) |
| Current value(mA) | 0 ~ 850 |
| Internal resistance(Ω) | 5.1 ± 0.3 |

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

Control Type : Normal high type

| | |
|---|---|
| Control Pressure kpa (kgf/cm², psi) | 539.370 ~ 0 ( 5.5 ~ 0, 78.23 ~ 0) |
| Current value(mA) | 0 ~ 850 |
| Internal resistance(Ω) | 5.1 ± 0.3 |

Line Pressure Control VFS

Control type : Normal high type

| | |
|---|---|
| Control Pressure kpa (kgf/cm², psi) | 539.370 ~ 0 ( 5.5 ~ 0, 78.23 ~ 0) |
| Current value(mA) | 0 ~ 850 |
| Internal resistance(Ω) | 5.1 ± 0.3 |

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

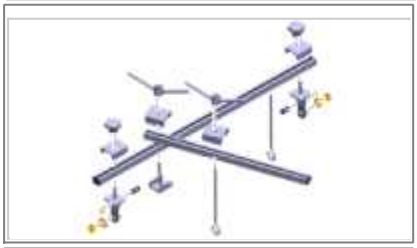
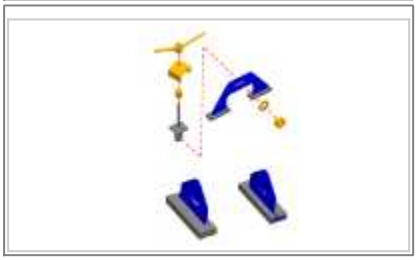
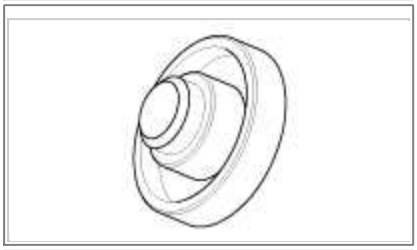
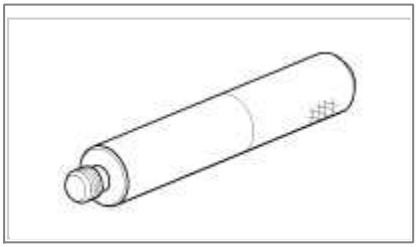
| Item | N.m | Kgf.m | lb-ft |
|---|---|---|---|
| TCM mounting bolt/nut | 9.8 ~ 11.8 | 1.0 ~ 1.2 | 7.2 ~ 8.7 |
| Shift cable bracket mounting bolt | 14.7 ~ 21.6 | 1.5 ~ 2.2 | 10.9 ~ 15.9 |
| Input shaft speed sensor mounting bolt | 9.8 ~ 11.8 | 1.0 ~ 1.2 | 7.2 ~ 8.7 |
| Output shaft speed sensor mounting 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 |
| Manual control lever | 17.6 ~ 24.5 | 1.8 ~ 2.5 | 13.0 ~ 18.1 |
| Valve body mounting bolts | 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 |
| 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 mounting bolt | 49.0 ~ 63.7 | 5.0 ~ 6.5 | 36.2 ~ 47.0 |
| 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 support bracket mounting bolt/nuts | 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

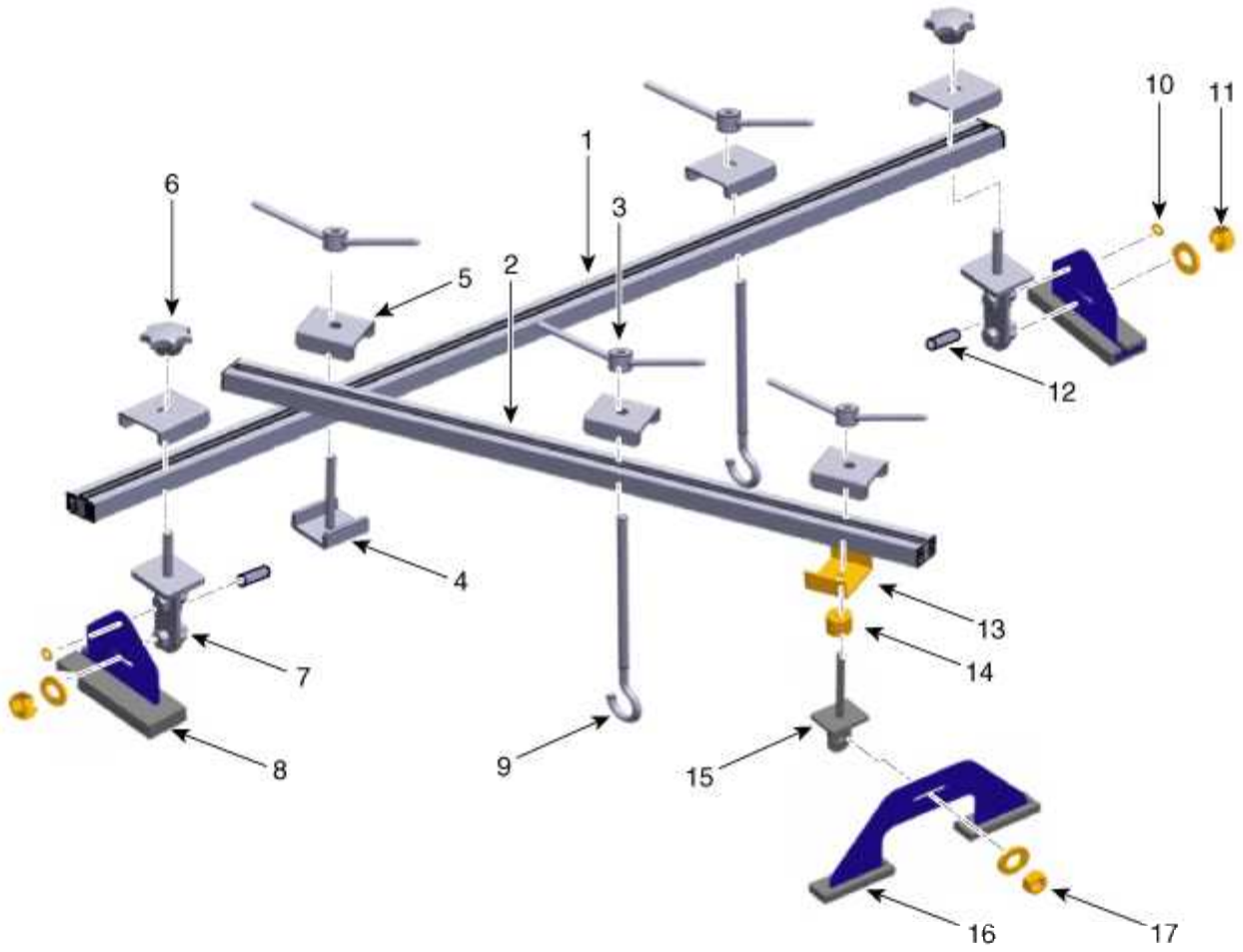
| Item | Specified lubricant | Quantity |
|---|---|---|
| Transaxle fluid | ATF SP- or equivalent | 7.1L<br>(1.88 U.S gal., 7.50 U.S.qt., 6.24 Imp.qt.) |

## Automatic Transaxle System

Special Service Tools

| Tools (Number and name) | Illustration | Use |
|---|---|---|
| 09200-3N000<br>Engine support fixture(Beam) |  | Removal and installation of the transaxle.<br>Except lower supporter, use beam only with new engine su fixture supporter(SST No.:09200-2S000) |
| 09200-2S000<br>Supporter |  | Removal and installation of the transaxle.<br>Use this beam (SST No. : 09200-38001/3N000) with the (SST No. : 09200-2S000) |
| 09453-3L240<br>Oil seal installer(2WD) |  | Installation of transaxle case oil seal.<br>(In case of 2WD vehicle use this tool to both sides when ins seal, and 4WD vehicle should use transaxle case side only.<br>[Using with bar (SST No.:09231-H1100)] |
| 09453-2W100<br>Oil seal installer(4WD) |  | Installation of transaxle case oil seal.<br>(In case of 4WD vehicle use this tool to transaxle housing s installing oil seal.)<br>[Using with bar (SST No.:09231-H1100)] |
| 09231-H1100<br>Bar |  | Installation of transaxle case oil seal.<br>[Using with oil seal installer (SST No.:09453-3L241, 094 2W100)] |
| 09480-A3800<br>Inhibitor switch guide pin |  | |

**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(Han) | |

## Automatic Transaxle System

Fault Diagnosis

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

Self-diagnosis

Transaxle Control Module (TCM) is in constant communication with the control system's components (sensors and s

If an abnormal signal is received for longer than the predefined duration, TCM recognizes a fault, stores the fault code memory, and then sends out a fault signal through the self-diagnosis terminal. Such fault codes are independently bacl will not be cleared even if the ignition switch is turned off, the battery is disconnected, or the TCM connector is disco

**⚠ CAUTION**

- Disconnecting a sensor or an actuator connector while the ignition switch is in the "On" position generates a Diagı Trouble Code (DTC) and commits the code to memory. In such event, disconnecting the battery will not clear th 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 t cable during engine operation or while the ignition switch is ON could cause damage to the Transaxle Control M (TCM).
- When checking the generator for the charging state, do not disconnect the battery '+' terminal to prevent the Engi 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 dam 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 f 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.

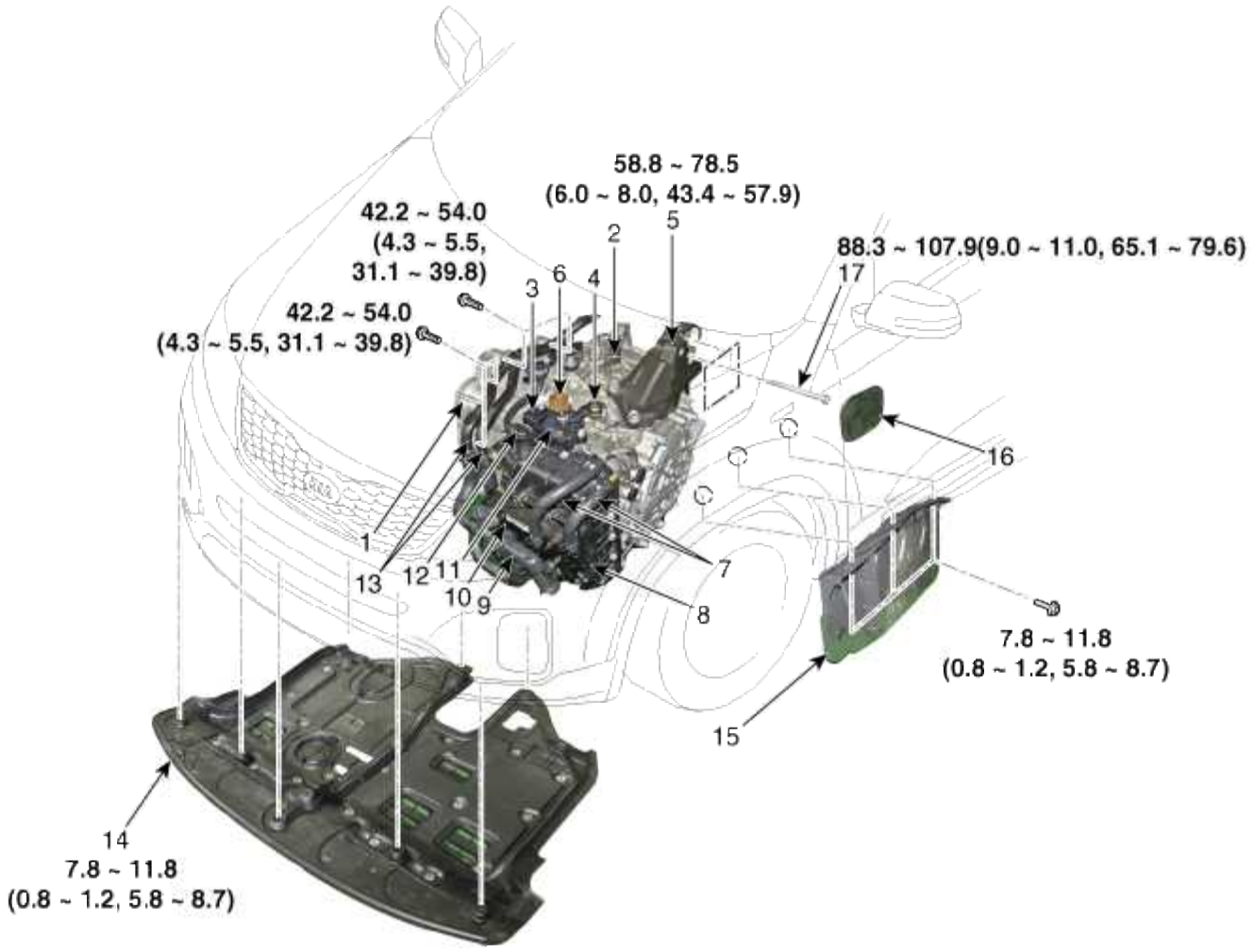
**⚠ CAUTION**

- After replacing the automatic transaxle, use the GDS to reset (erase the TCM learning values). Then perform Tra 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. D Trouble Codes (DTC) cannot be cleared by disconnecting the battery.

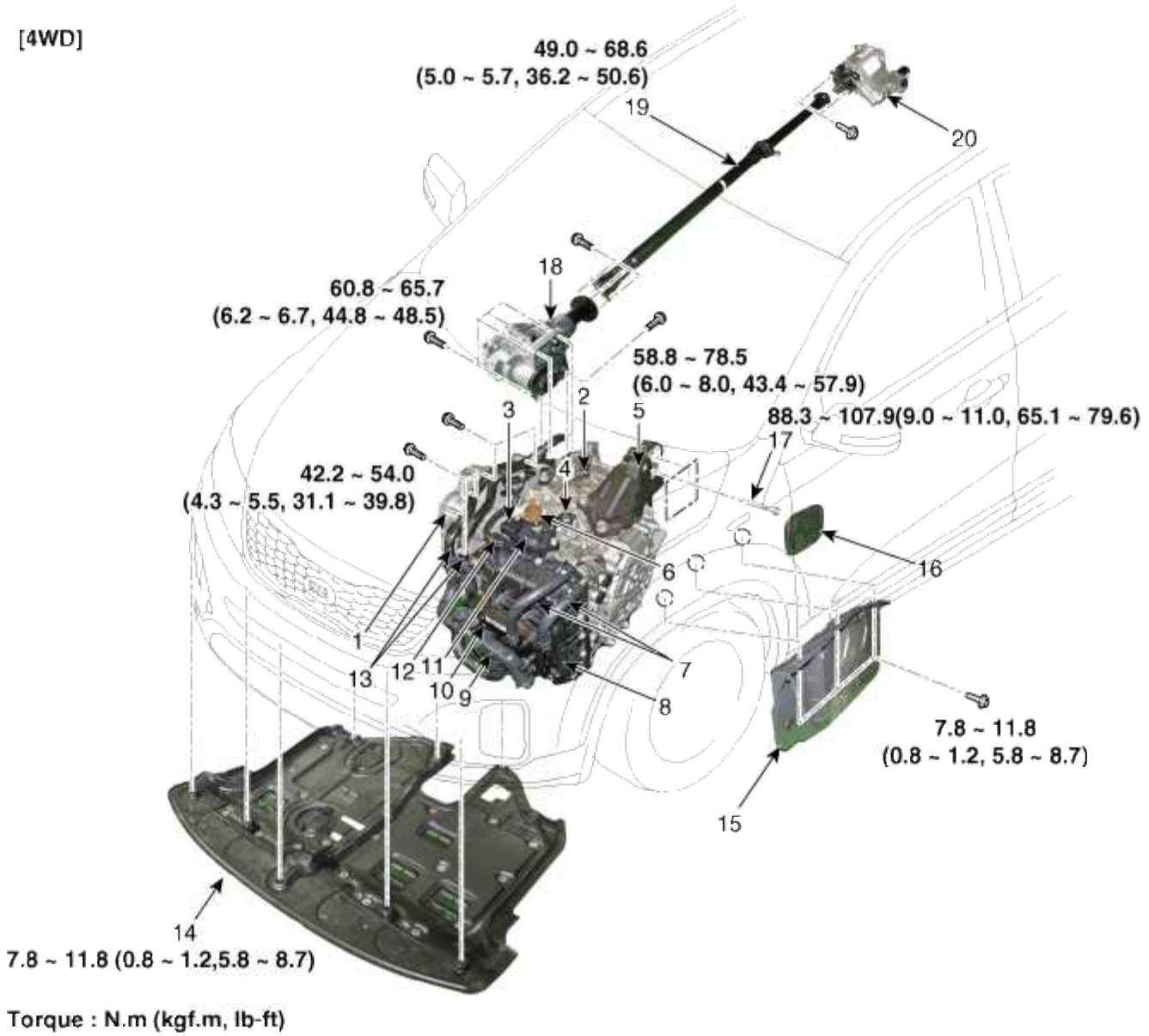
## Automatic Transaxle System

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 | 17. Automatice transaxle mounting bracket bolt |
| 9. Bypass valve | |




| | |
|---|---|
| 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

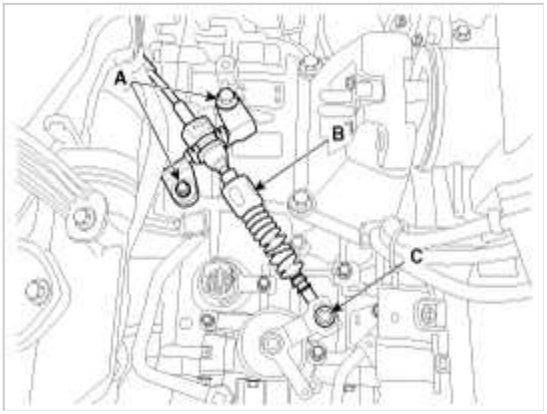
Removal

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

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

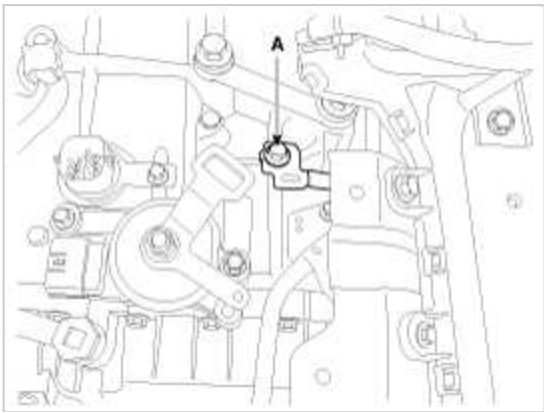

5. Remove the shift cable (B) after removing the nut (C) and the bolt (A).

**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)



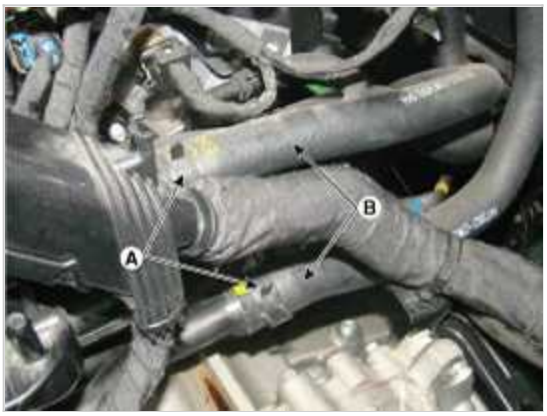

6. Remove the ground line after removing the bolt (A).

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



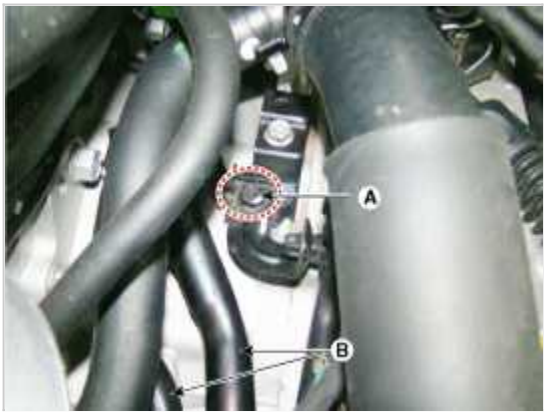

7. Disconnect the coolant hose (B) after removing the automatic transaxle coolant hose clamp (A).

8. Remove the wiring mounting clip (C).

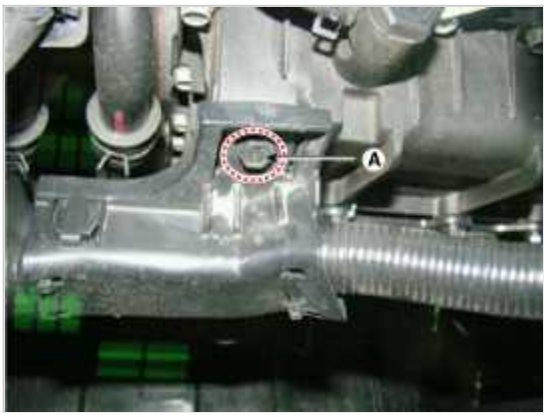




9. Remove the coolant pipe mounting bolts (A).
10. Remove the coolant pipe (B).

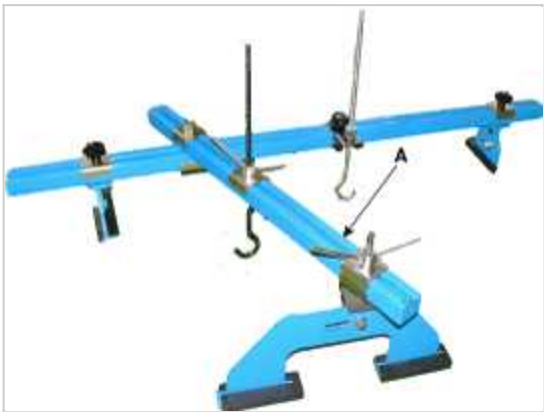
**Tightening torque :**
(A) 8.8 ~ 13.7 N.m (0.9 ~ 1.4 kgf.m, 6.5 ~ 10.1 lb-ft)




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



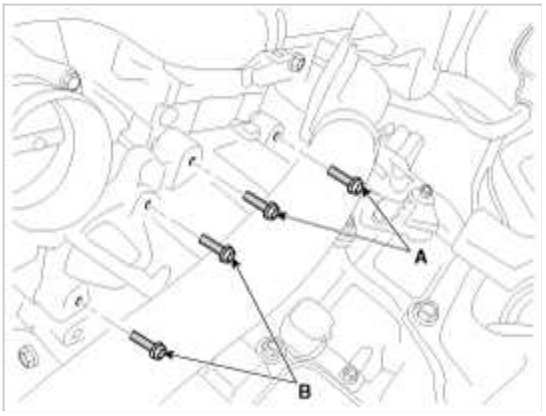

12. Remove the hood lift.
    (Refer to Body - "Hood")
13. Assembled the engine support fixture (A).
    (Refer to Special Service Tools - " Engine support fixture special tool assembly drawing")




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

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

**Tightening torque :**
(A) 42.2 ~ 54.0 N.m (4.3 ~ 5.5 kgf.m, 31.1 ~ 39.8 lb-ft)
(B) 49.0 ~ 63.7 N.m (5.0 ~ 6.5 kgf.m, 36.2 ~ 47.0 lb-ft)




16. Remove the mounting bracket cover (A).


17. 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)


18. Remove the automatic transaxle mounting support bracket bolts (A).

19. Remove the automatic transaxle support bracket (A) after removing bolts (4ea).

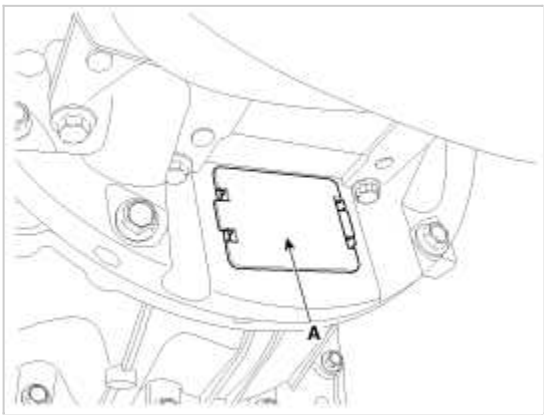
**Tightening torque :**
58.8 ~ 78.5 N.m (6.0 ~ 8.0 kgf.m, 43.4 ~ 57.9 lb-ft)


20. Remove the under cover.
(Refer to Engine Mechanical System - "Engine Room Under Cover")
21. Remove the side cover (A).

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

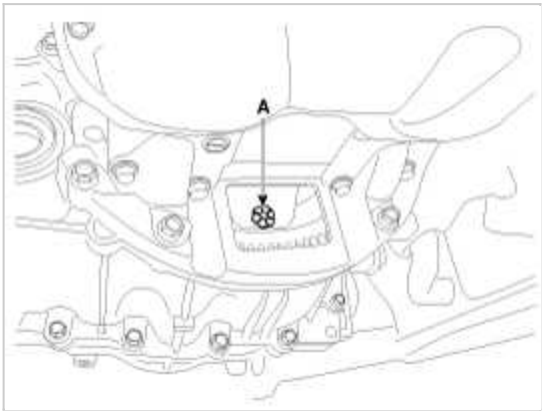

22. Remove the following items;
**2WD**
A. Sub frame assembly.
(Refer to Suspension System - "Sub Frame")
B. Drive shaft assembly.
(Refer to Driveshaft and axle - "Drive shaft assembly")
**4WD**
A. Sub frame assembly.
(Refer to Suspension System - "Sub Frame")
B. Drive shaft assembly.
(Refer to Driveshaft and axle - "Drive shaft assembly")
C. Transfer assembly.
(Refer to Transfer system - "Transfer assembly")

23. Remove the dust cover (A).



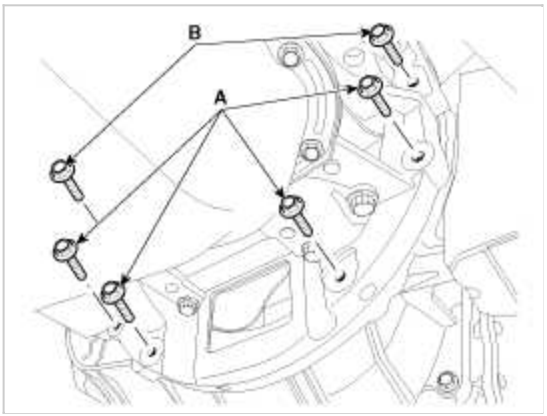

24. Remove the torque converter mounting bolt (A) with rotating the crankshaft.

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




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

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




Installation

1. Install in the reverse order of removal.

**⚠ CAUTION**

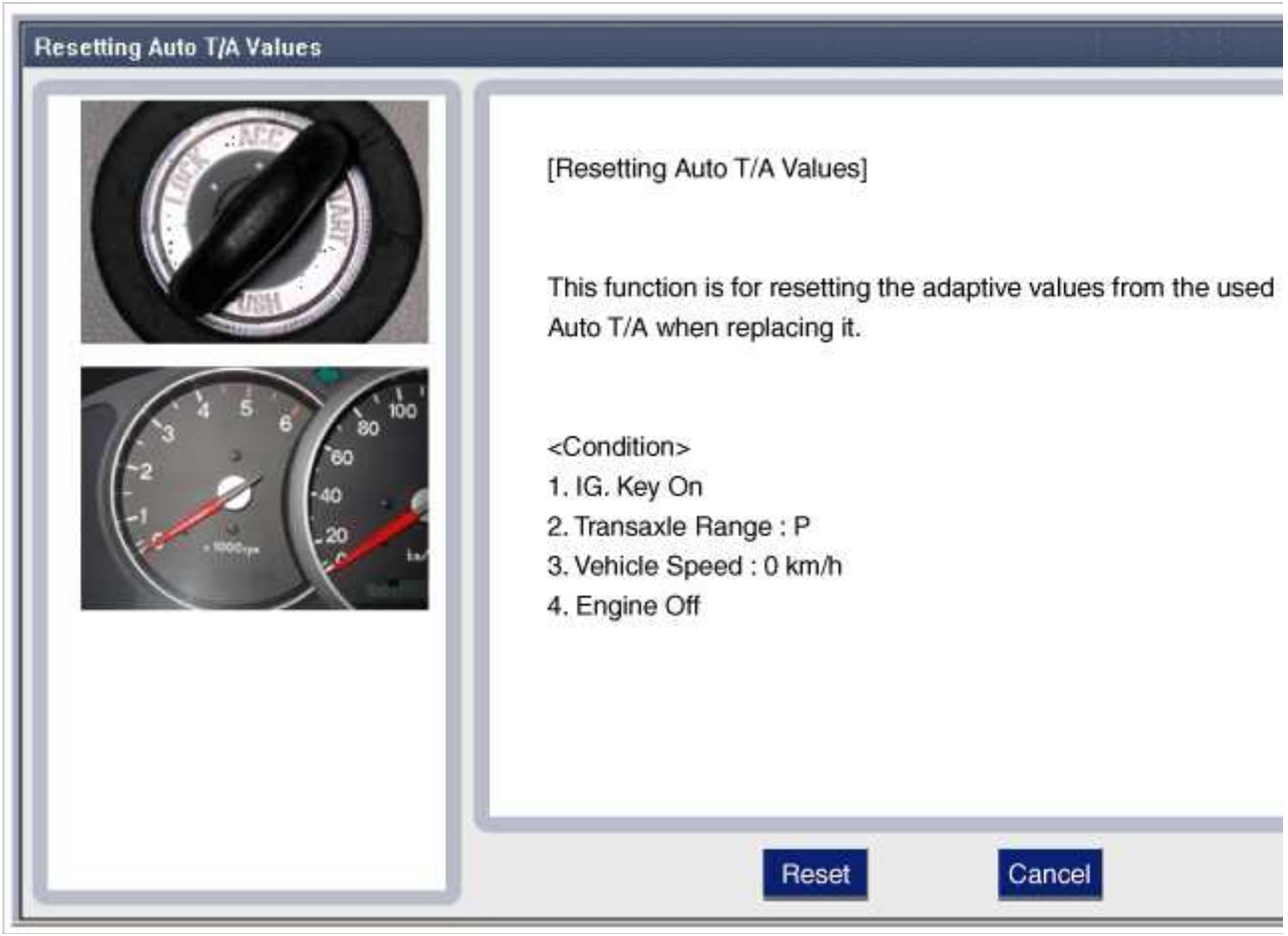
If the oil seal on the transaxle case side is damaged and fluid is leaking, replace the oil seal with a new unit. When installing the new oil seal, use the specialized tool.

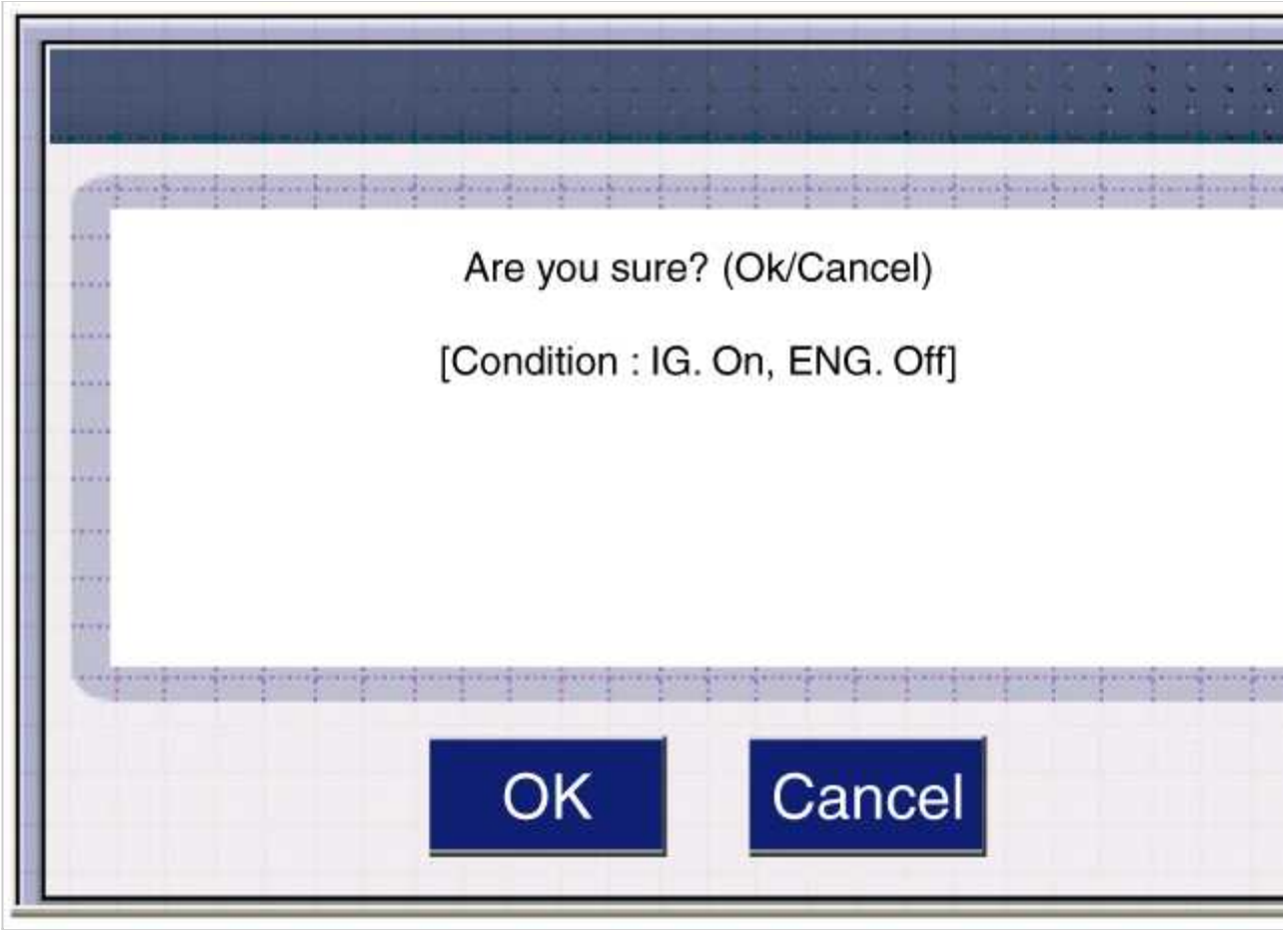
**2WD both side:** 09453-3L240
**4WD transaxle case side:** 09453-3L240
**4WD transaxle housing side :** 09453-2W100

**NOTICE**

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

- 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.







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

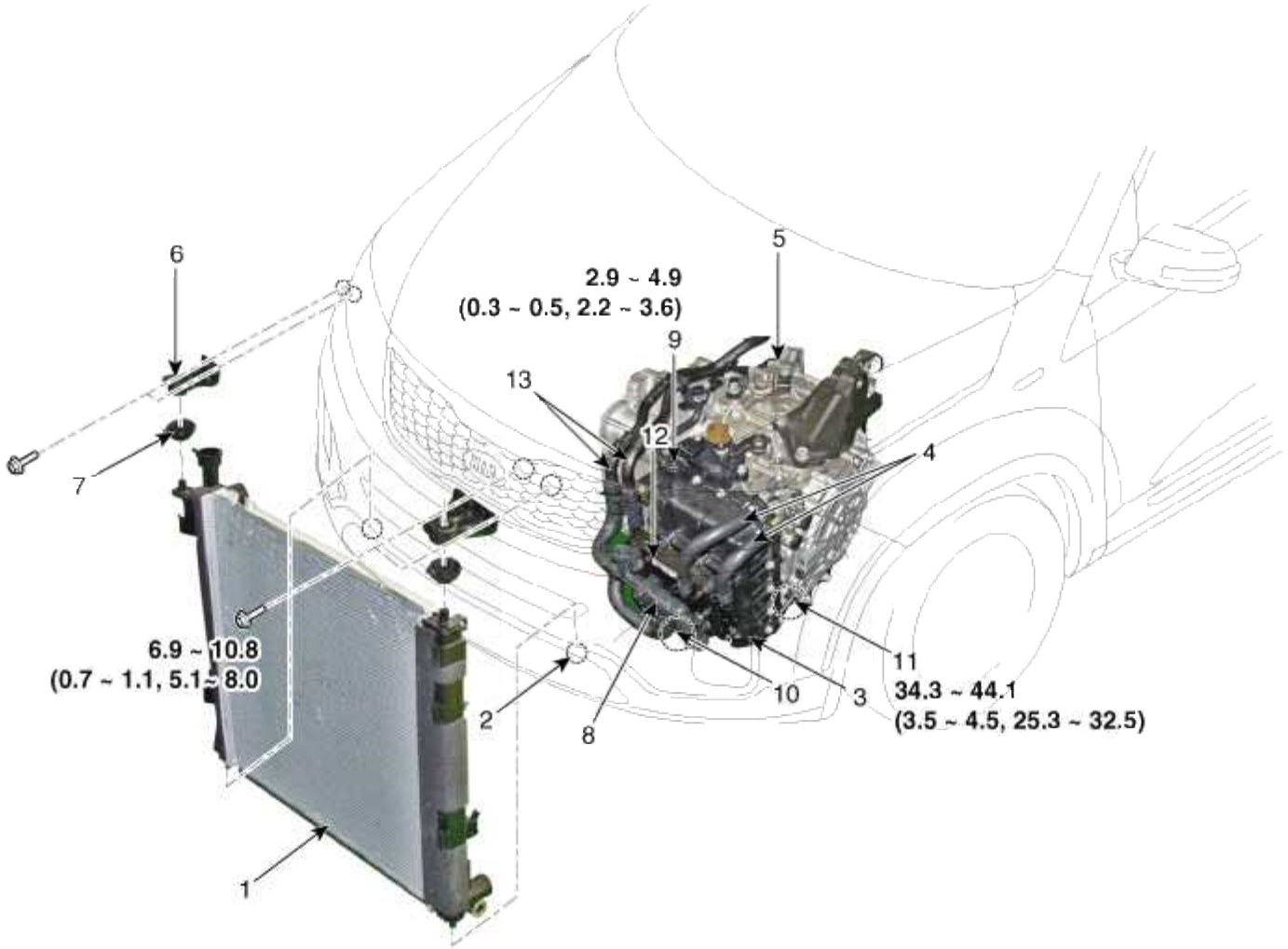
## Automatic Transaxle System

### Description

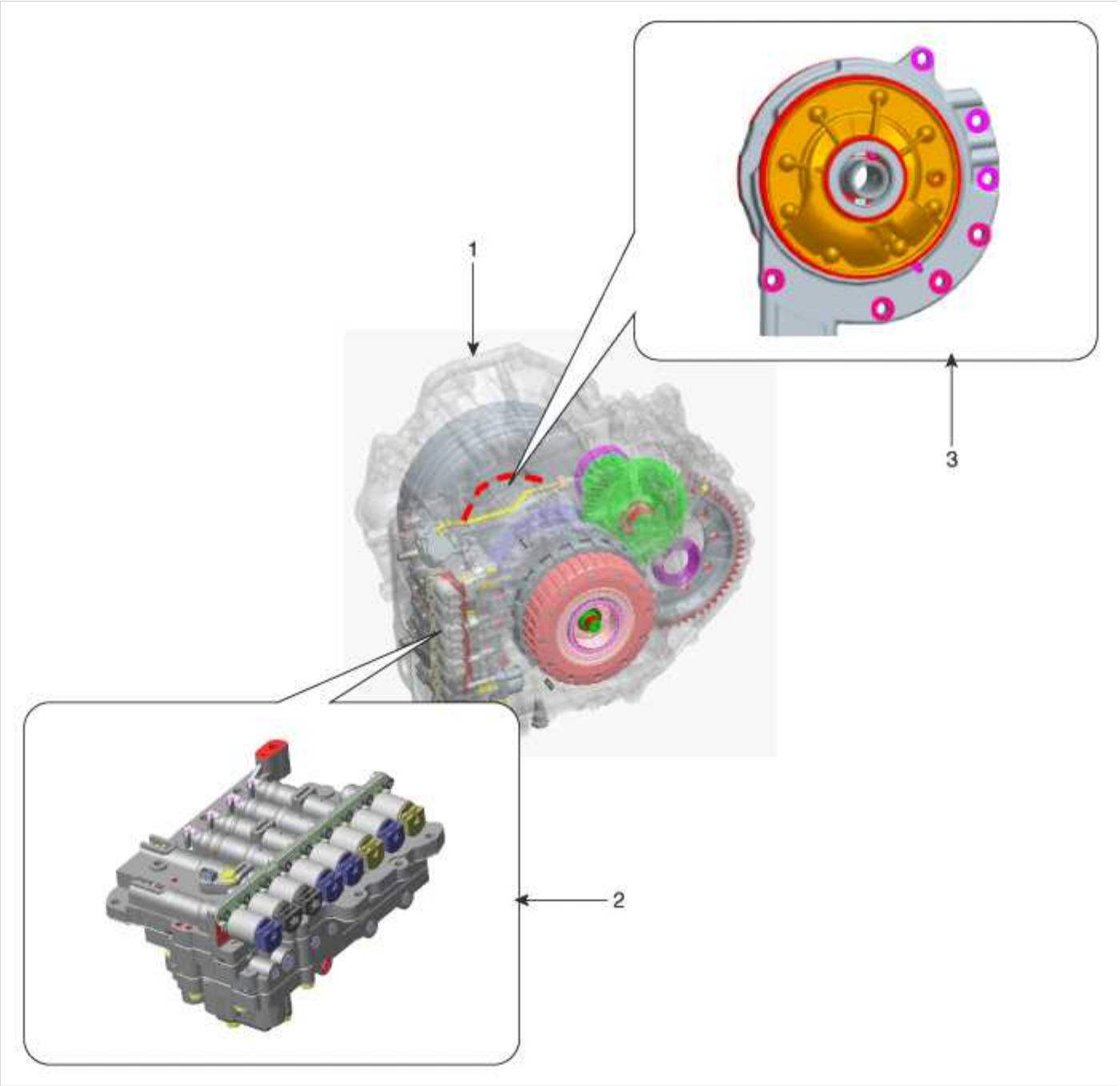
The hydraulic system consists of oil, an oil filter, an oil pump, and a valve body (valves and solenoid valves).
The oil pump is powered by the engine. ATF passes through the oil filter and gets distributed along the oil channels.
The oil becomes highly pressurized as it exits the oil pump and passes through the line pressure valve before being fed
clutch & brake control valve, clutch, and brakes. TCM controls the hydraulic pressure using solenoid valves and cont
and brake operations.

## Automatic Transaxle System

### Component Location




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

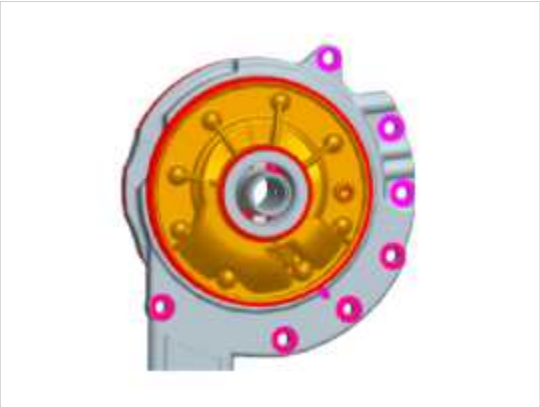



| | |
|---|---|
| 1. Automatic transaxle<br>2. Valve body assembly<br>3. Oil pump assembly | |

## Automatic Transaxle System

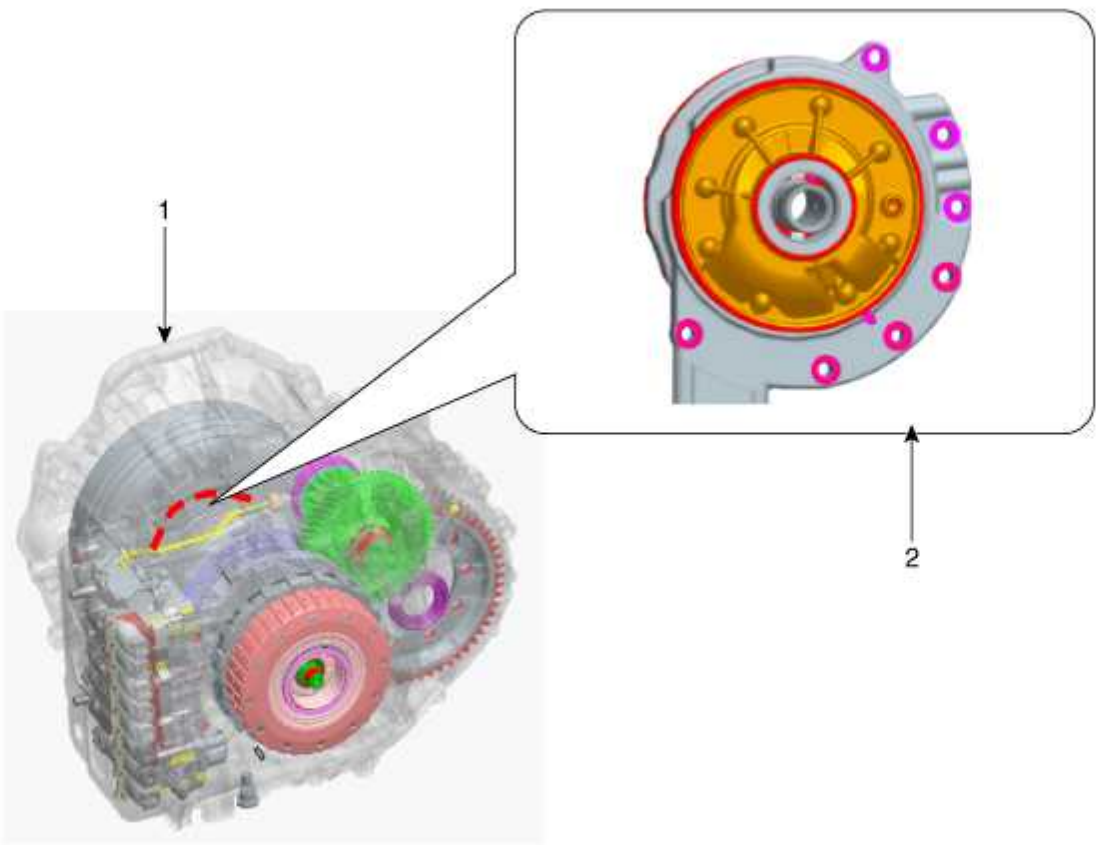
Description

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



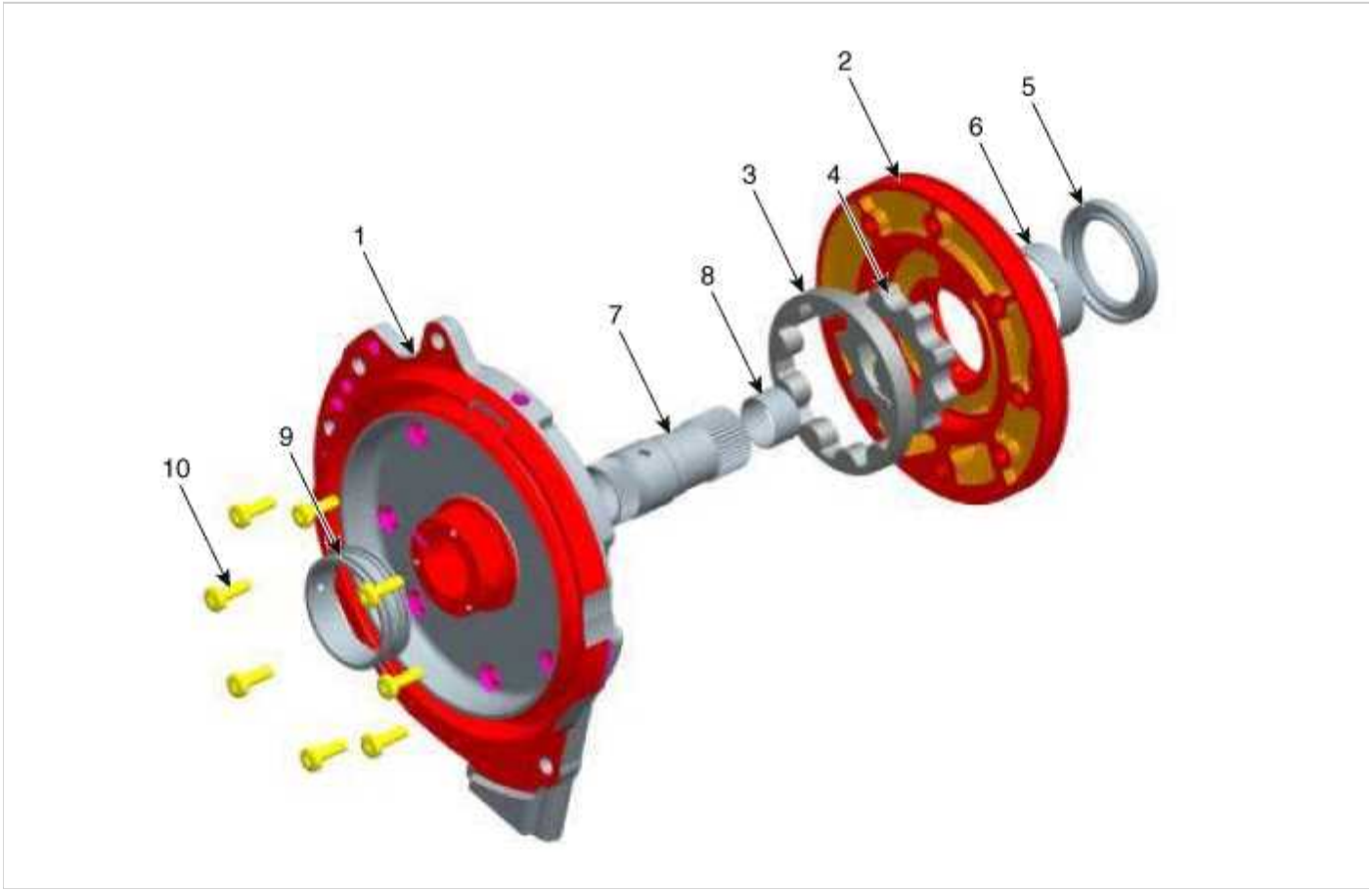
## Automatic Transaxle System

Component Location



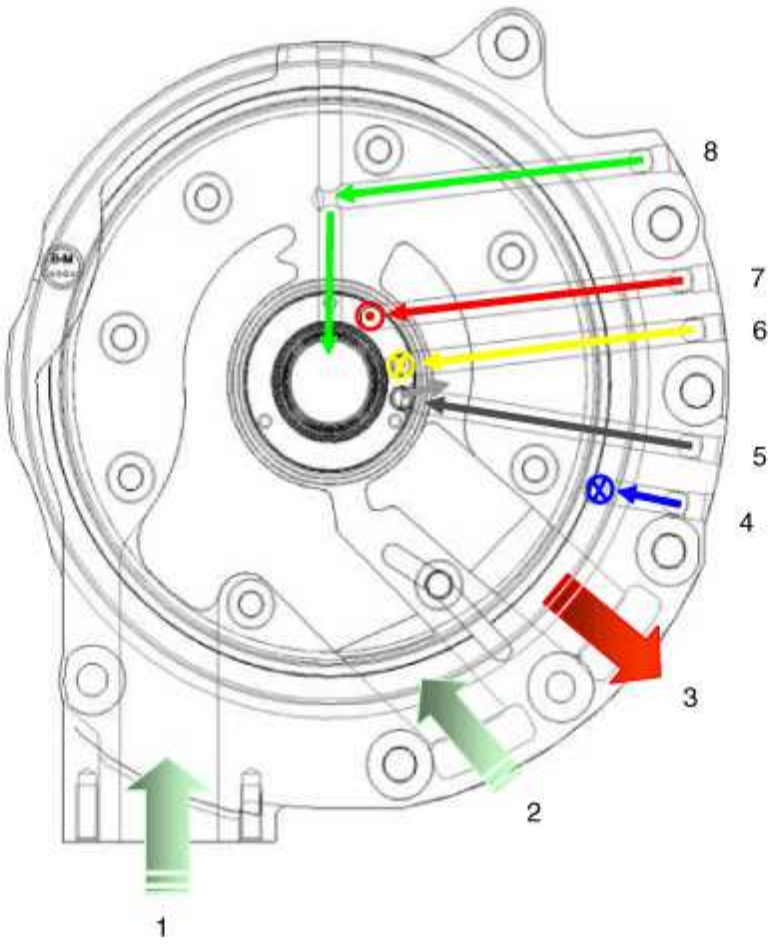

| | |
|---|---|
| 1. Automatic transaxle<br>2. Oil pump assembly | |

Component




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

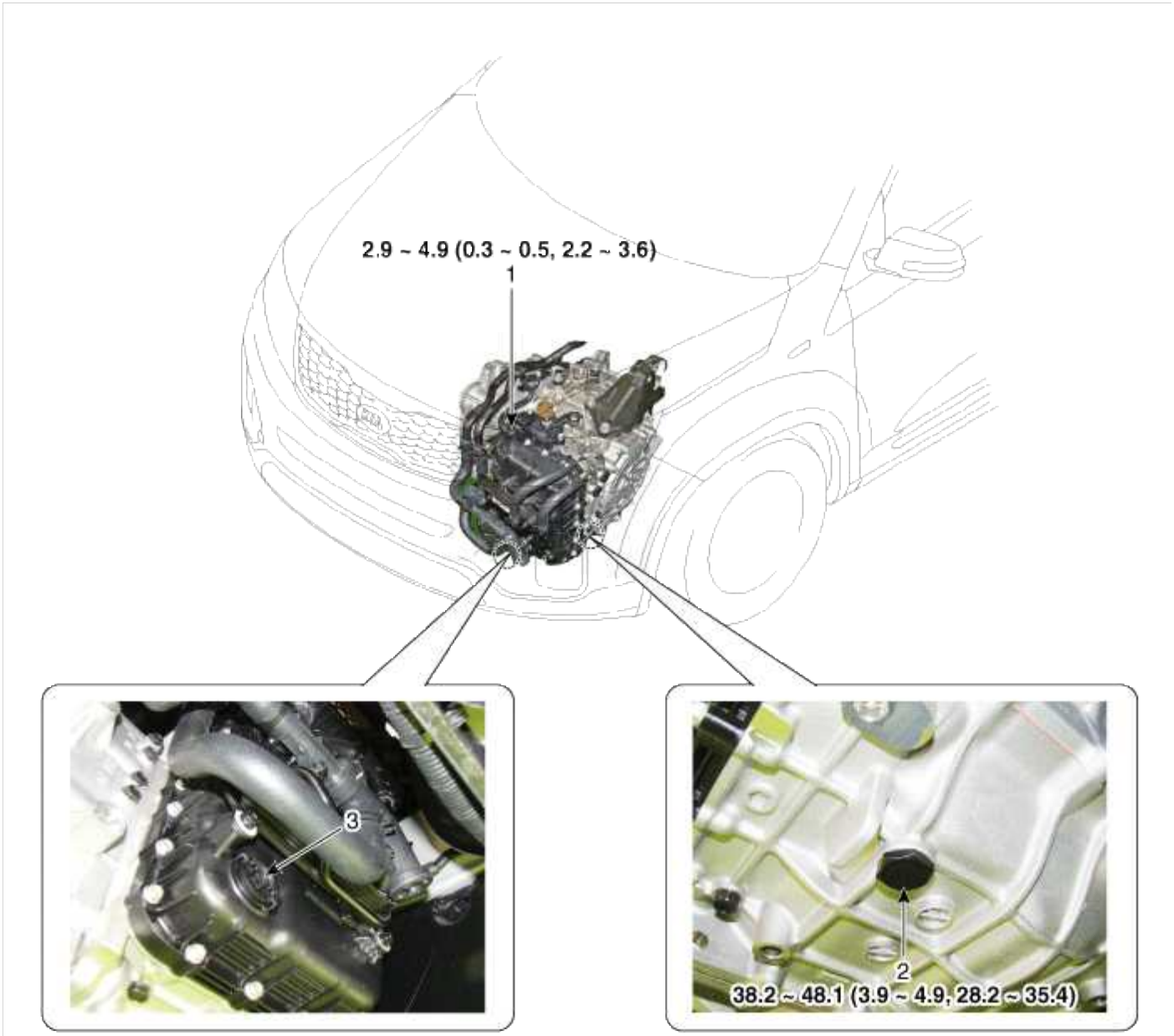
Oil pump operation flow




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

## Automatic Transaxle System

Component Location




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

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

## Automatic Transaxle System

Service Adjustment Procedure

### Oil level Check

**NOTICE**

A check of ATF level is not normally required during scheduled services. If an oil leak is found, perform the oil level 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).


**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.

**NOTICE**

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 bo tightening state are normal, ATF must drop out after performing above 1 to 7 procedures. After performing ab 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

**NOTICE**

The ATF of the 6 speed automatic transaxle does not need to be replaced.If the vehicle is used in severe conditions business use, replace ATF every 60,000 miles.
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")

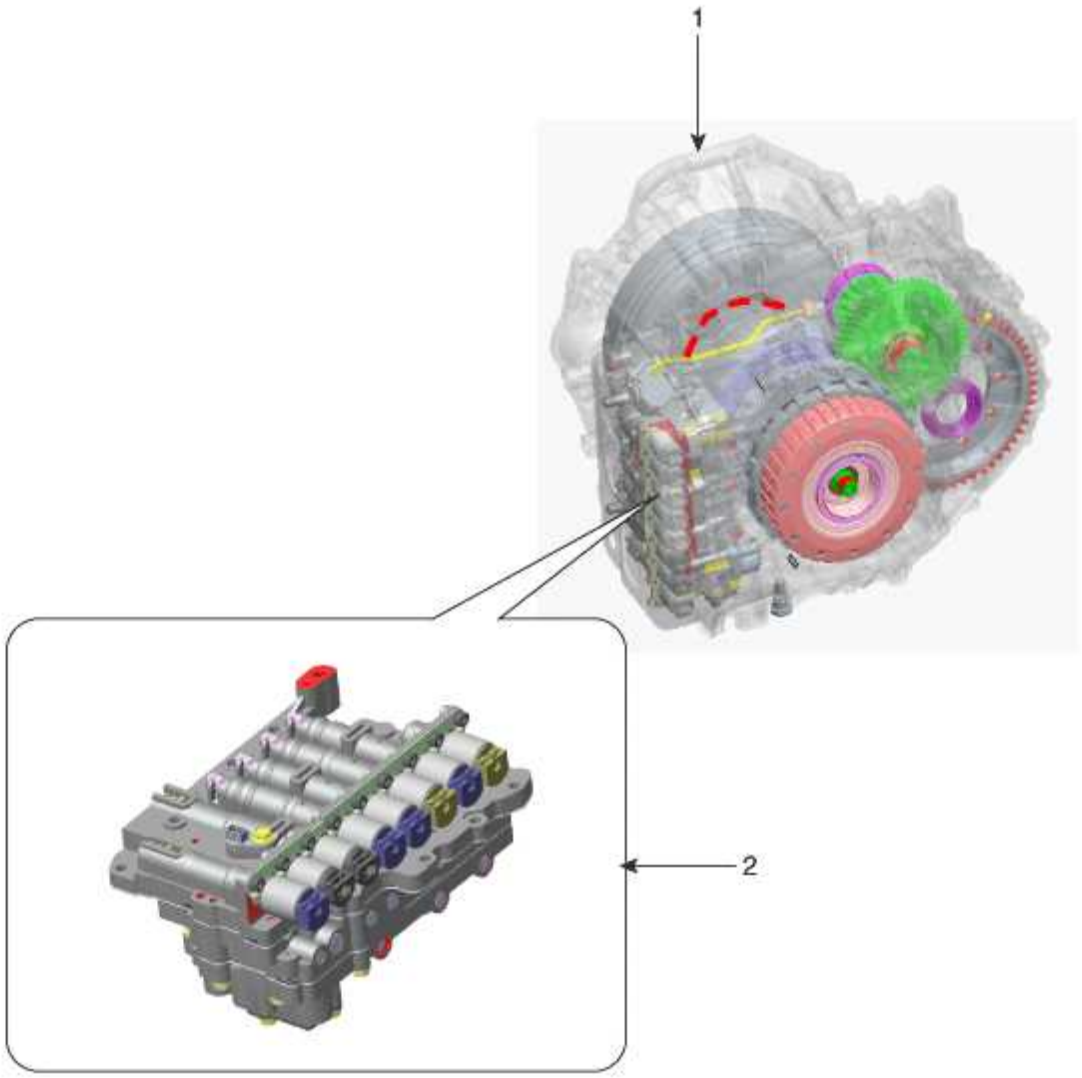
## Automatic Transaxle System

Description

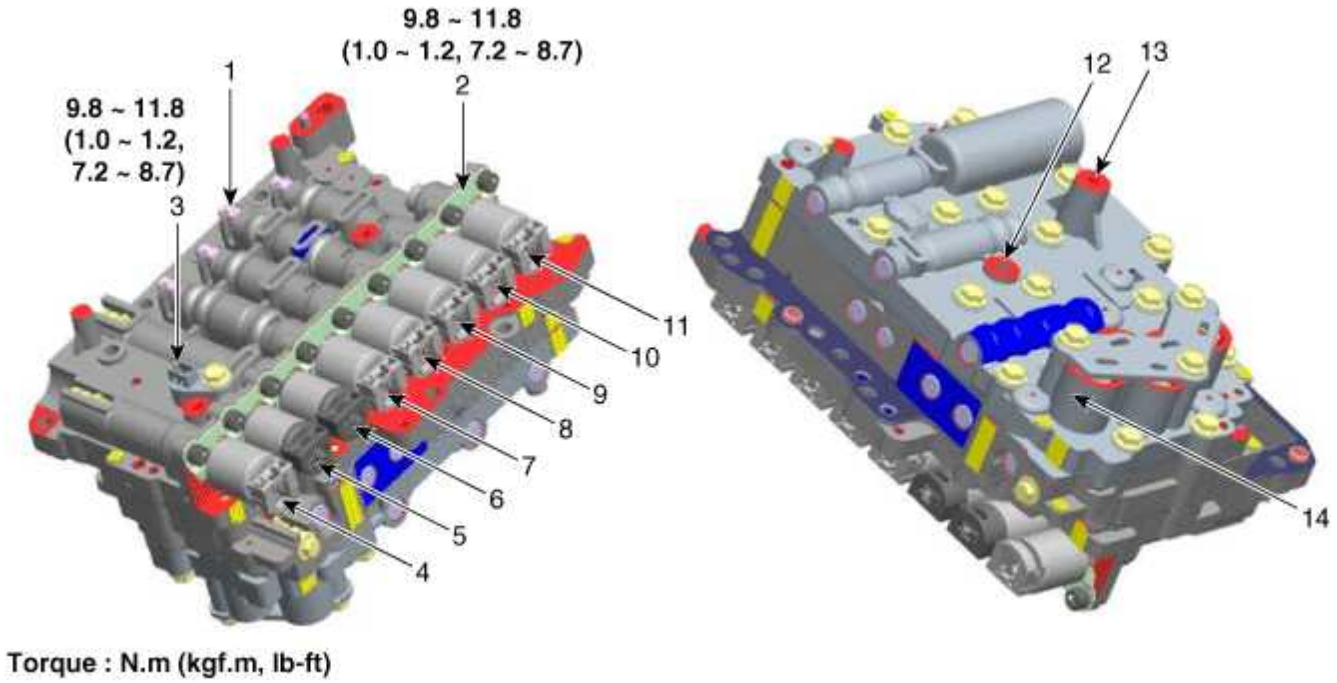
The valve body is essential to automatic transaxle control and consists of various valves used to control the oil feed fr pump. Specifically, these valves consist of pressure regulator valves, oil redirection valves, shift valves, and manual va body also features electronic solenoid valves that ensure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

## Automatic Transaxle System

Component Location

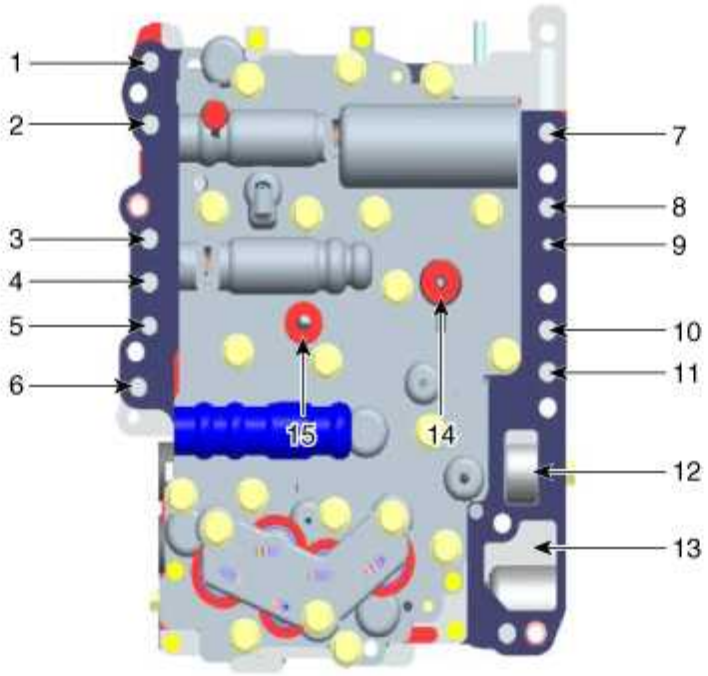



| | |
|---|---|
| 1. Automatic transaxle<br>2. Valve body assembly | |




| | |
|---|---|
| 1. Pressure Control Valve(PCV) adjust screw<br>2. Solenoid valve bracket<br>3. Oil temperature sensor<br>4. Line Pressure Control Solenoid Valve<br>5. SS-A Solenoid Valve(ON/OFF)<br>6. SS-B Solenoid Valve(ON/OFF)<br>7. Overdrive Clutch Control Solenoid Valve(OD/C) | 8. Underdrive Brake Control Solenoid Valve(UD/B)<br>9. 26 Brake Control Solenoid Valve(26/B)<br>10. 35R Clutch Control Solenoid Valve(35R/C)<br>11. Torque Converter Control Solenoid Valve (T/CON)<br>12. LR/B pressure fiow hole<br>13. UD/B pressure fiow hole<br>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

Removal

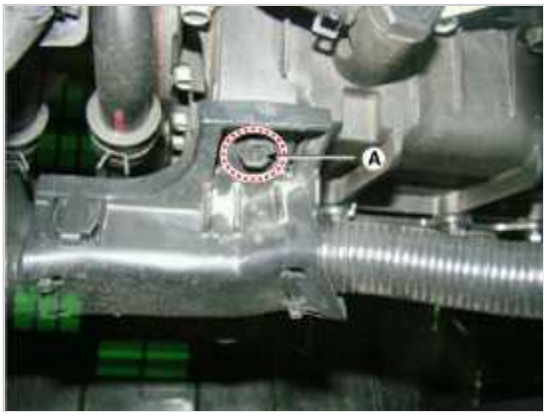
1. Remove the air duct.
   (Refer to Engine Mechanical System - "Air cleaner")
2. Remove the battery and the battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
4. Drain the coolant.
   (Refer to Engine Mechanical System - "Coolant")

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

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


**CAUTION**
Replace the gasket before reinstalling the drain plug.

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




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

**CAUTION**

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

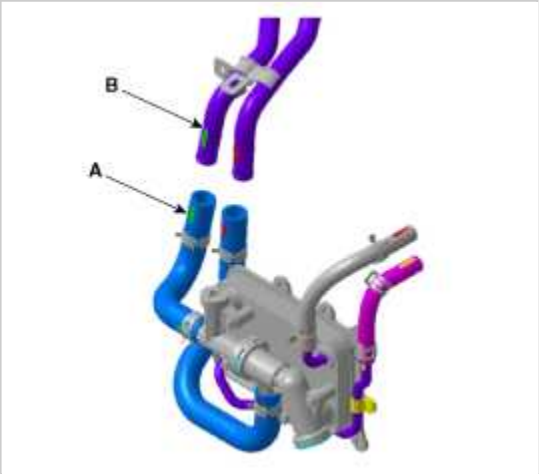

8. Disconnect the coolant hose (B) after removing the coolant hose clamp (A).


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.



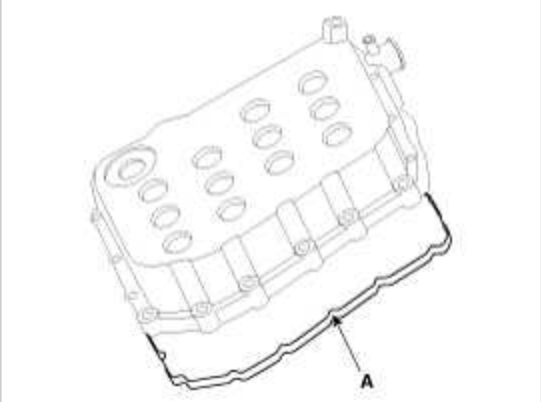

10. Remove the valve body cover (A).

**Tightening torque :**

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

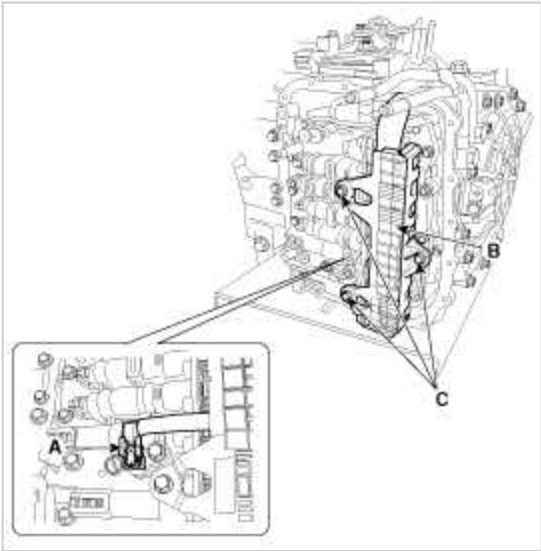

**CAUTION**

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



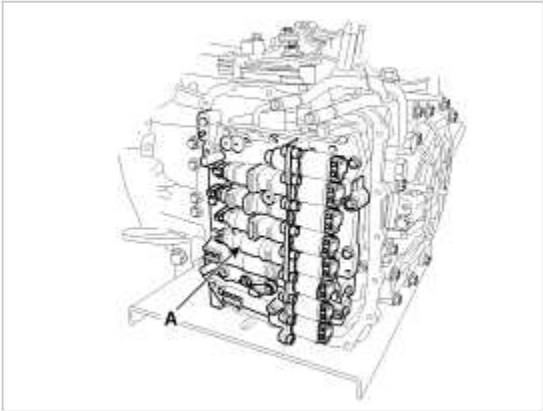
11. Remove the bolts (C) after disconnecting the solenoid valve connector (B) and the oil temperature sensor conne

**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. Install in the reverse order of removal.

**NOTICE**

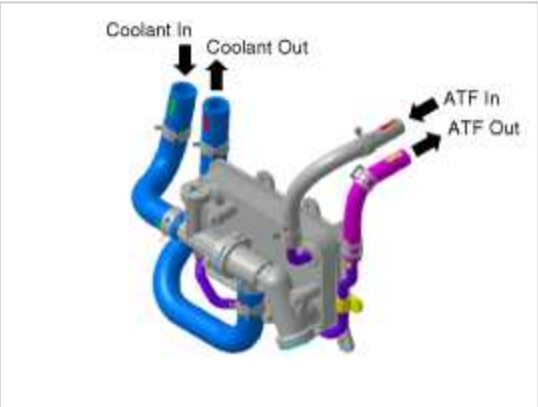
- Adding coolant.
  (Refer to Engine Mechanical System - "Coolant")
- Adding Automatic Transaxle Fluid(ATF).
  (Refer to Hydraulic System - "Fluid")
- Perform Transaxle Control Module(TCM) learning after replacing the valve body to prevent slow transaxle response, jerky acceleration and jerky startup.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

## Automatic Transaxle System

Description

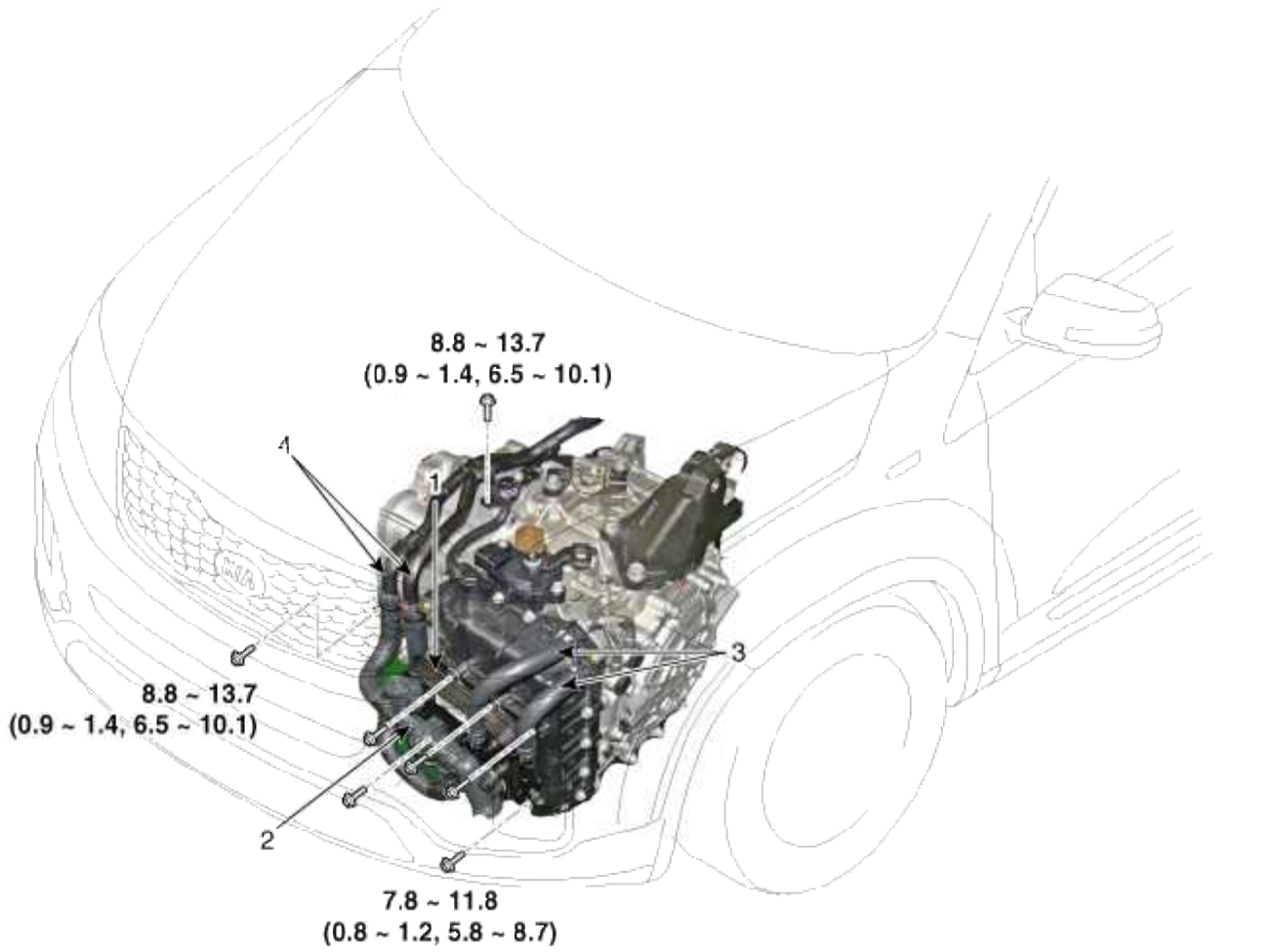
The ATF warmer is mounted on the valve body cover to reduce oil viscosity friction by increasing oil temperature un condition, which in turn improves fuel efficiency. It is serial mounted on the entry of the Electronic Throttle Controller shown in the diagram, and minimizes the effects of cabin heating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



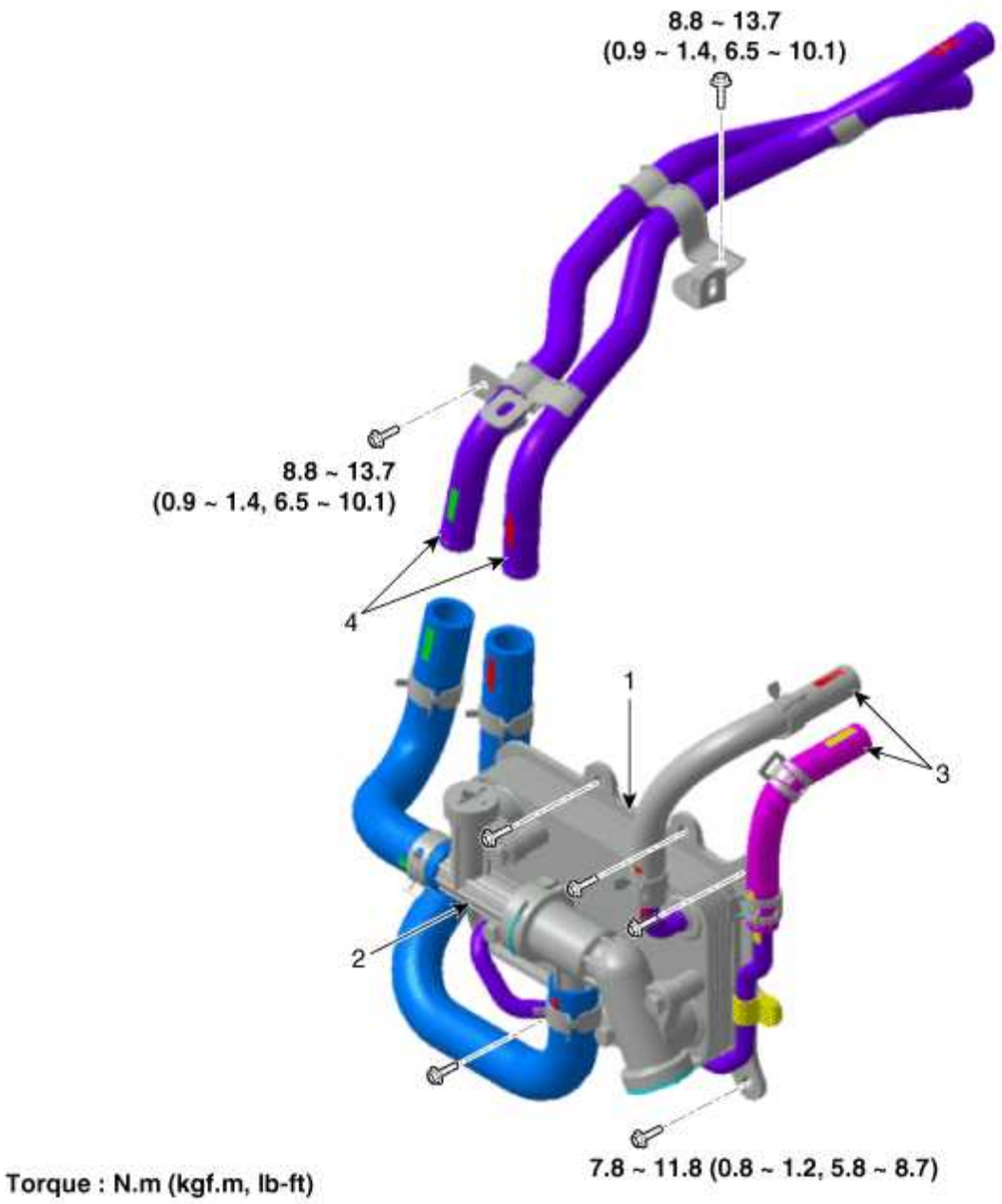

## Automatic Transaxle System

Component Location




| | |
|---|---|
| 1. ATF Warmar<br>2. Bypass valve | 3. ATF hose & pipe<br>4. Coolant hose & pipe |

Component




| | |
|---|---|
| 1. ATF Warmar<br>2. Bypass valve | 3. ATF hose & pipe<br>4. Coolant hose & pipe |

## Automatic Transaxle System

Removal

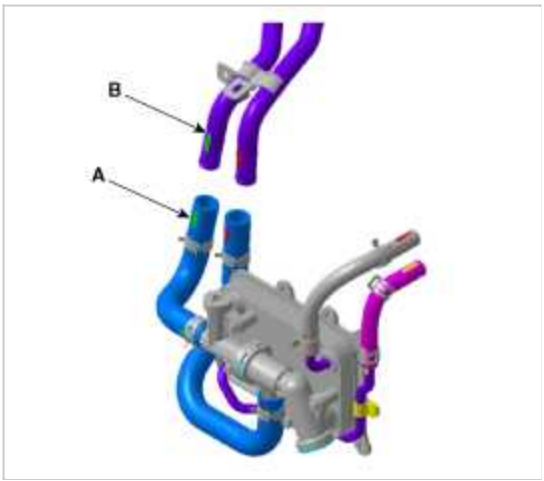
1. Drain the coolant.
   (Refer to Engine Mechanical System - "Coolant")
2. Remove the air cleaner assembly and air duct.
   (Refer to Engine Mechanical System - "Air cleaner")
3. Remove the battery and battery tray.
   (Refer to Engine Electrical System - "Battery")

4. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
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).

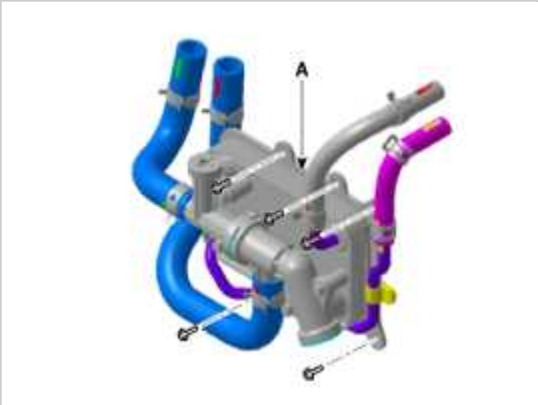

**⚠ CAUTION**

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




Installation

1. Install in the reverse order of removal.

**NOTICE**

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

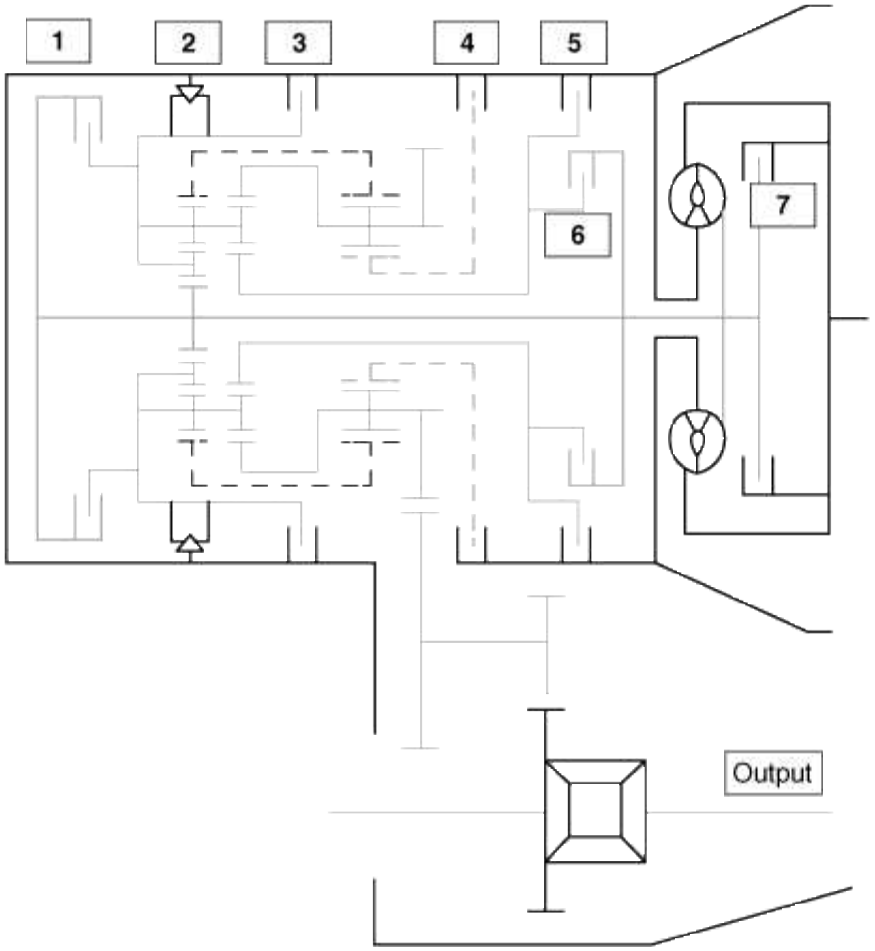
## Automatic Transaxle System

Description

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

## Automatic Transaxle System

Component Location

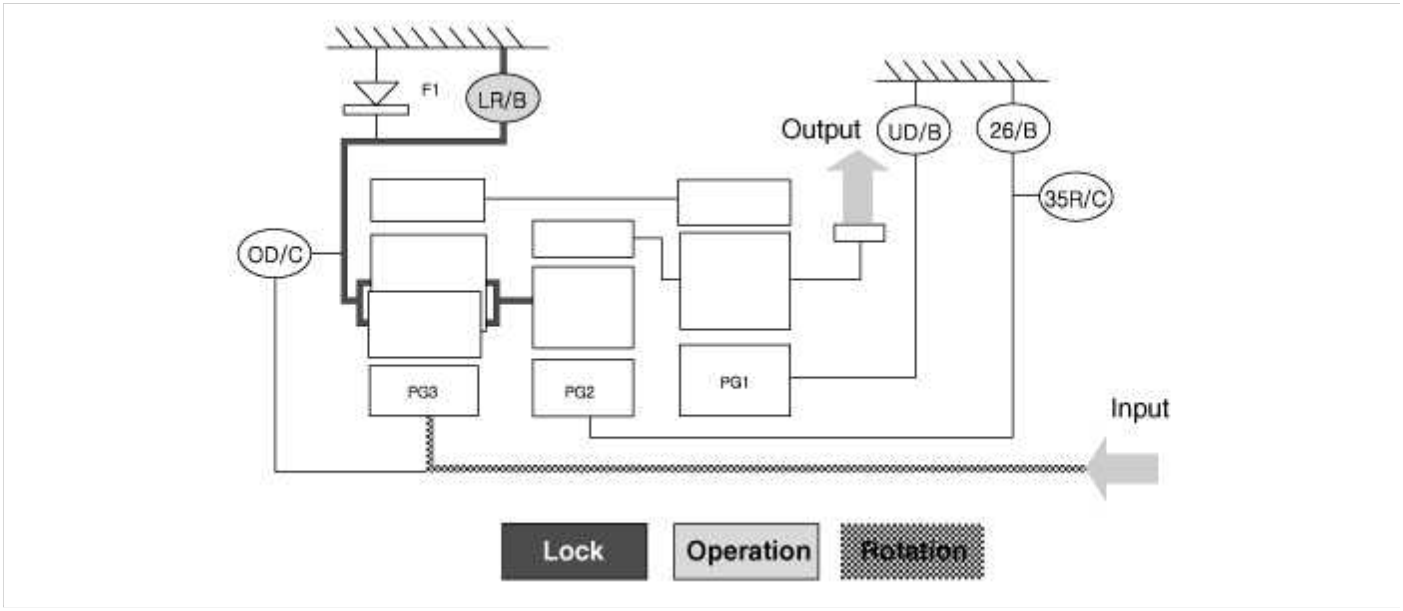



| | |
|---|---|
| 1. Overdrive Clutch (OD/C)<br>2. One way Clutch (OWC)<br>3. Low & Reverse Brake (LR/B)<br>4. Underdrive Brake (UD/B) | 5. 26 Brake(26/B)<br>6. 35R Clutch (35R/C)<br>7. Damper Clutch (D/C) |

## Automatic Transaxle System

Power Flow Chart

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




Direction of Rotation

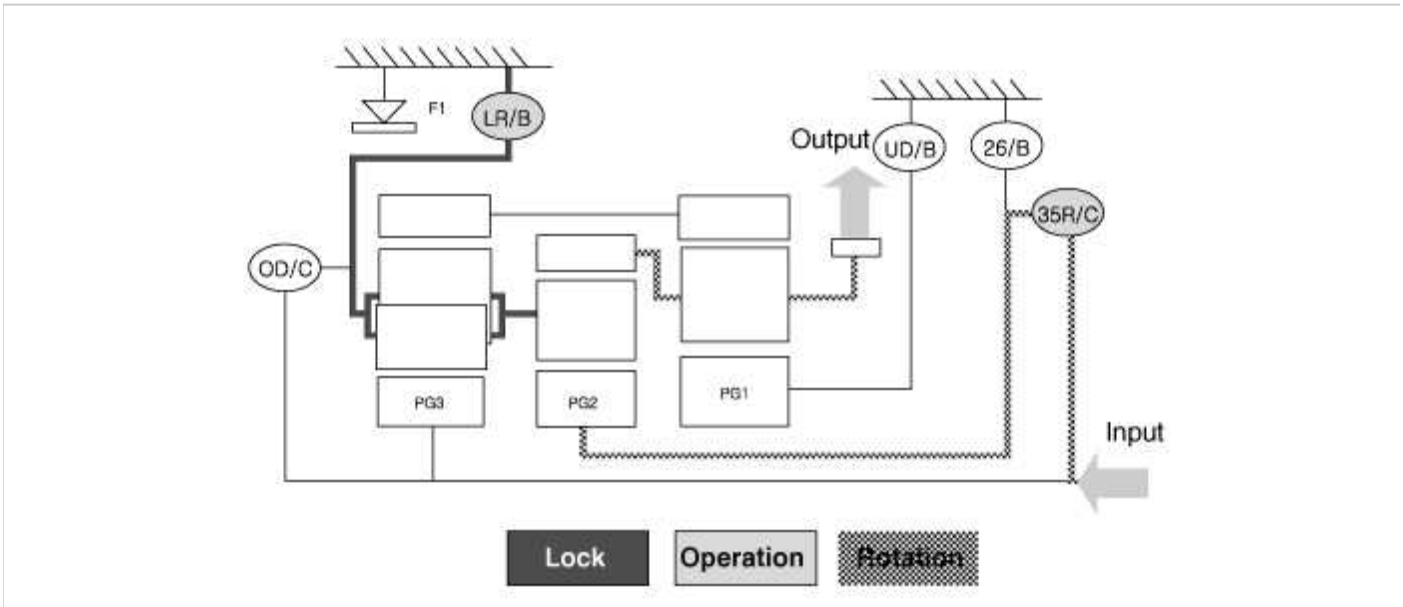
Lower & Reverse Brake (LR/B) Activation → Overdrive (O/D) Hub Lock → Mid & Rear P/C Lock

Input Shaft Rotation → Rear Sun Gear Rotation → Rear Inner Pinion Rotation (Reverse) → Rear Outer Pinion Ro Rear Annulus Gear Rotation → Front Annulus Gear Rotation → Front Pinion Rotation → Front Sun Gear Rotation ( → 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 | | ● | | ● | | |



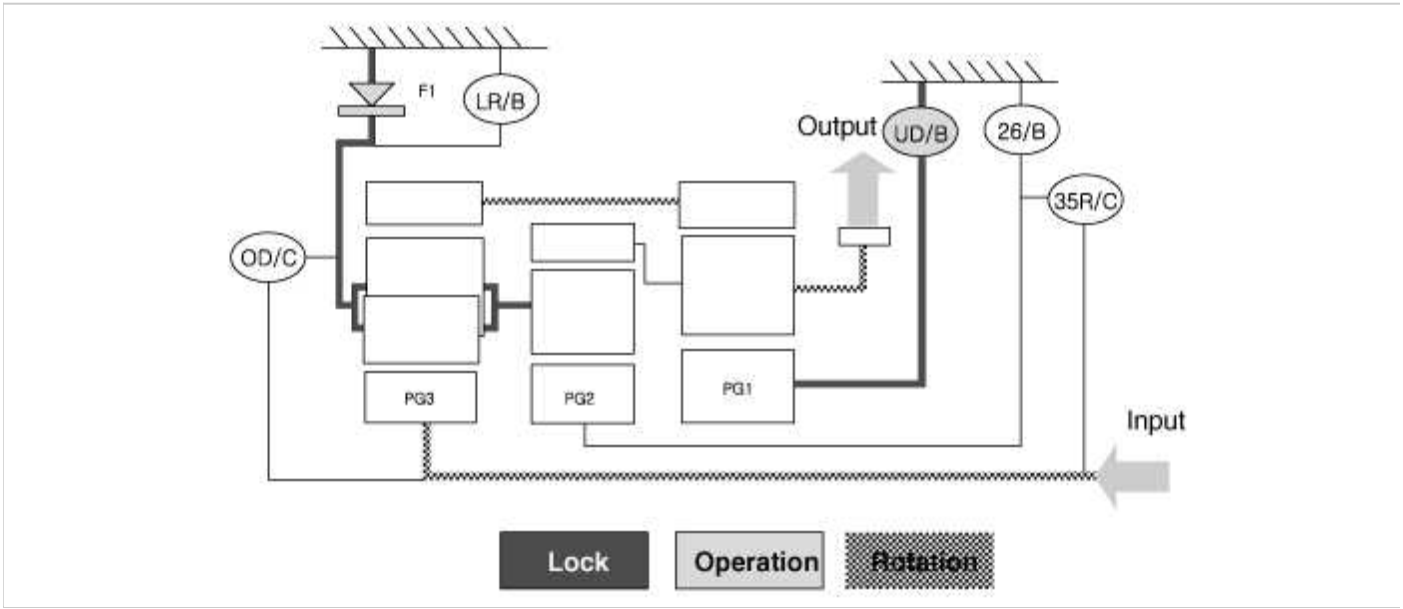

Power Delivery Route

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 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 rotati front planetary gear's front sun gear.

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



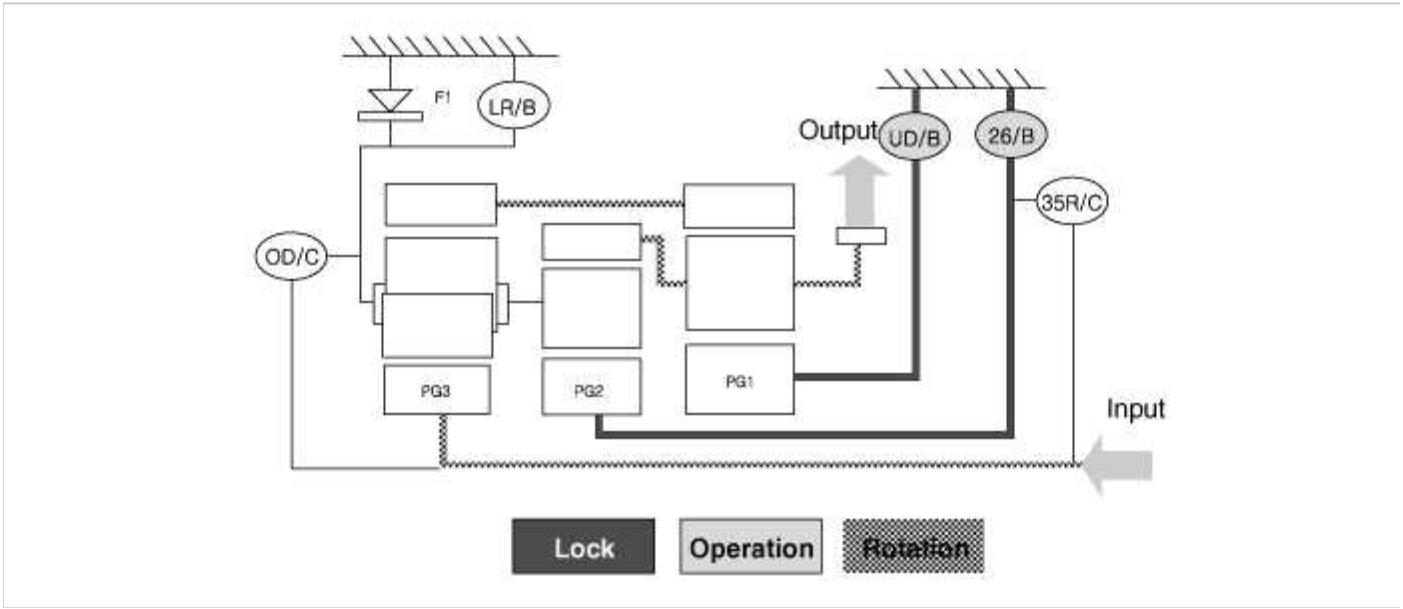

Power Delivery Route

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 fr gears. The power is then reduced again at the front planetary gear, whose sun gear is locked in place, and then delive front carrier.

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

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



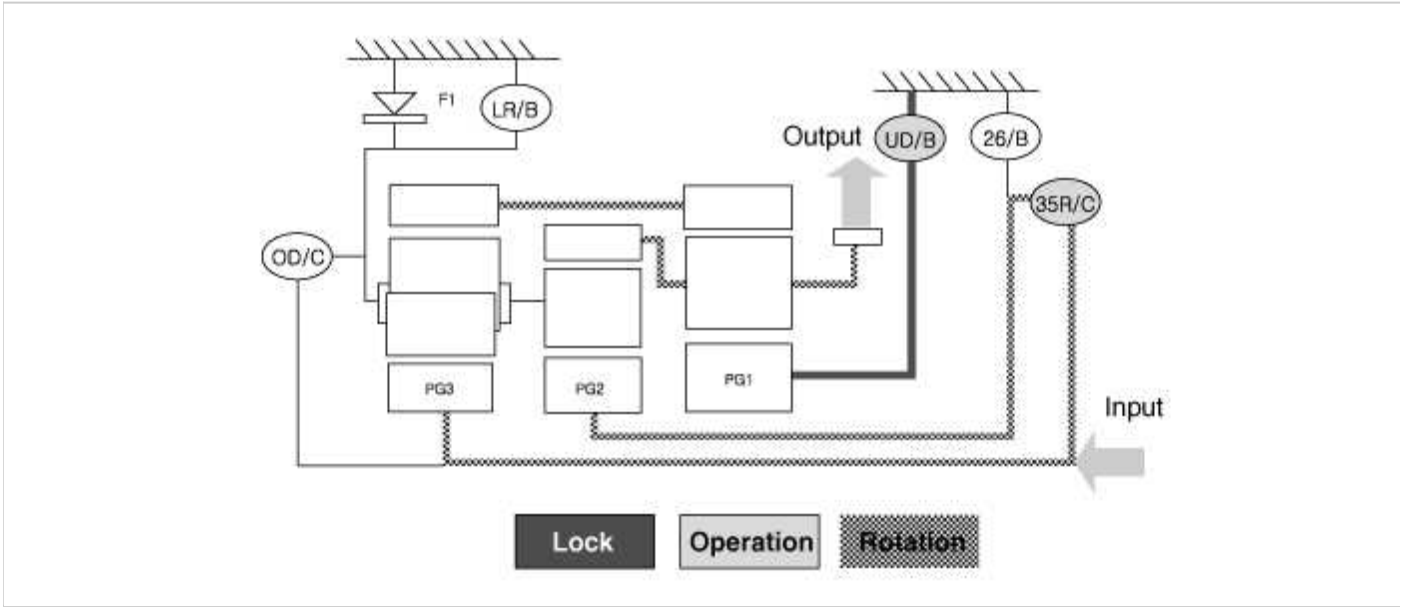

Power Delivery Route

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

annulus gear, to which the sun gear is attached, transfers to the middle and rear carriers, resulting in power equilibriun
power transfer to the front carrier.

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

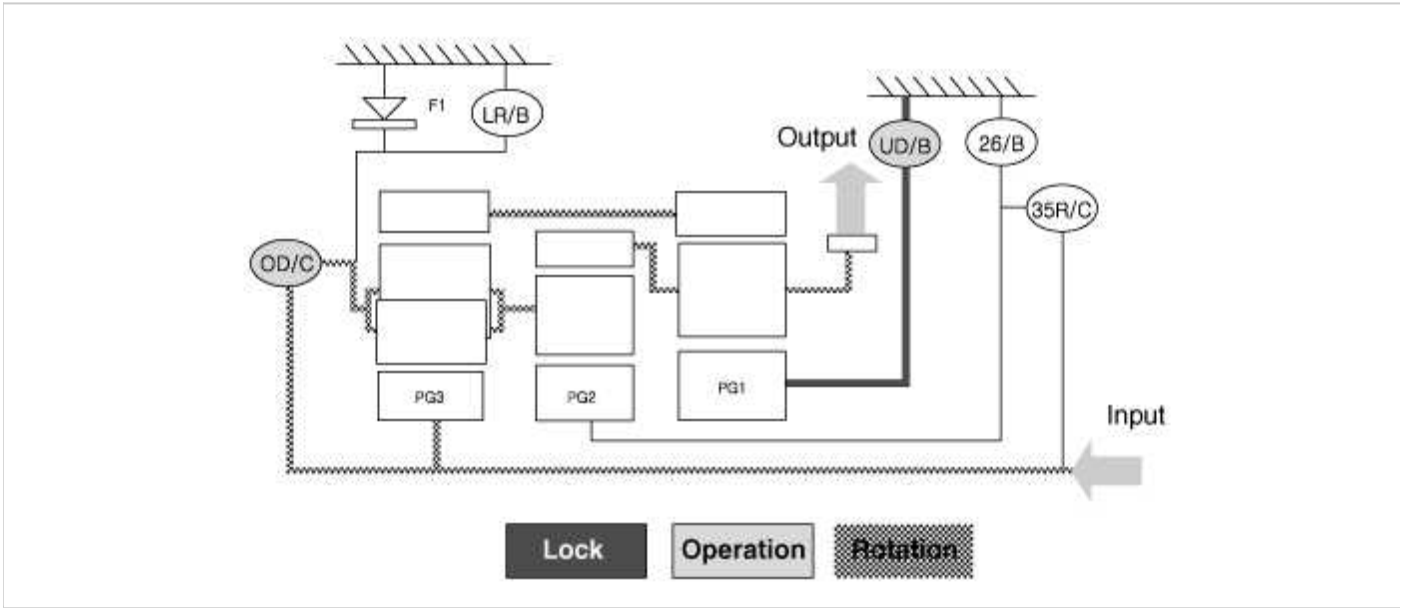



Power Delivery Route

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 reactior
front carrier and the middle annulus gear, to which the sun gear is attached, transfers to the middle and rear carriers, re
power equilibrium and power transfer to the front carrier.

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




Power Delivery Route

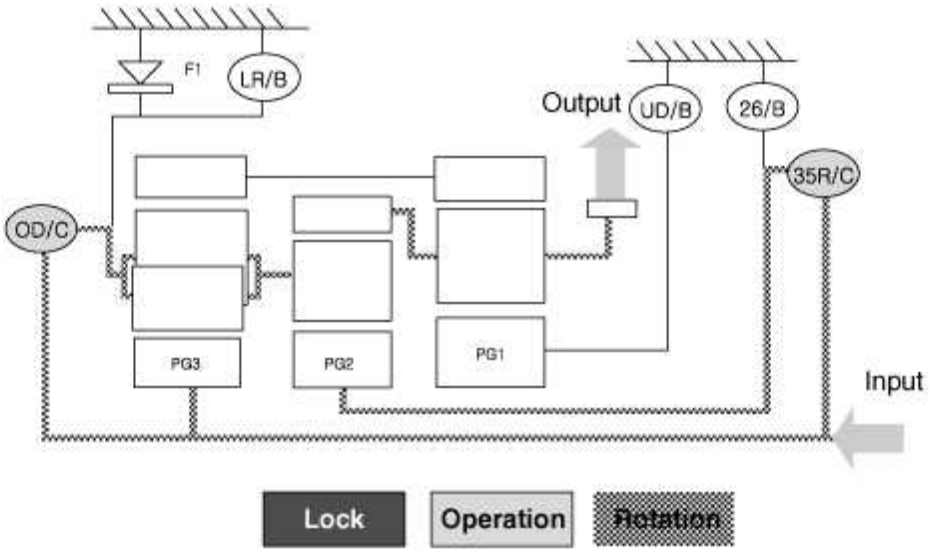
Front sun gear locked and rear carrier and rear sun gears in rotation

Activation of the overdrive clutch (OD/C) synchronizes the rear planetary gear's carrier and sun gears. The 1:1 rota

passes through the rear and front annulus gears and reaches the front planetary gear's front carrier, to which the sun g attached.

Here, the middle planetary gear's middle sun gear rotates at a faster rate in the normal direction and at zero load du 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 | | | | ● | ● | |



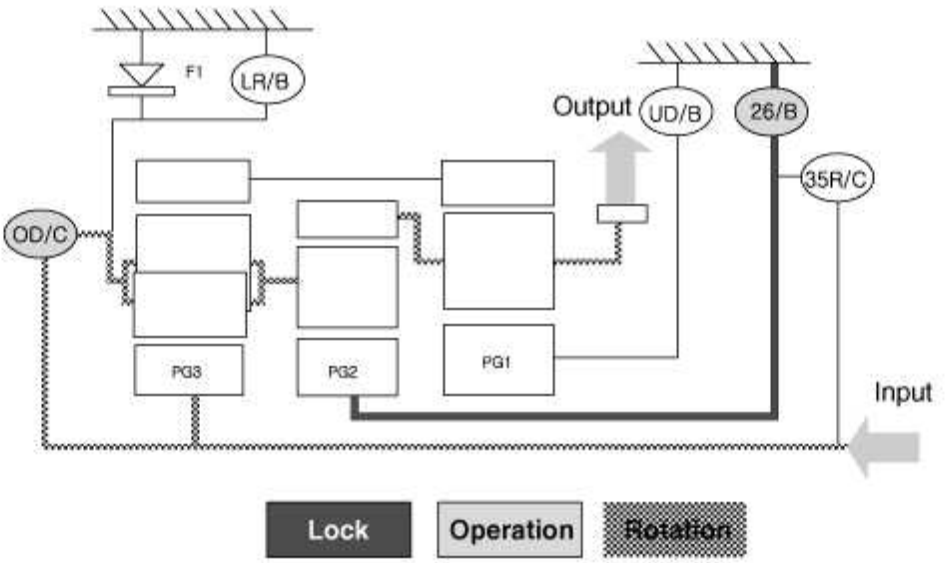

Power Delivery Route

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 bein 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 planetary gear remains unrestrained and the front sun gear rotates in the normal direction, at a zero load, and at a rota 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 a increases its rate of rotation and transfers power to the front carrier.

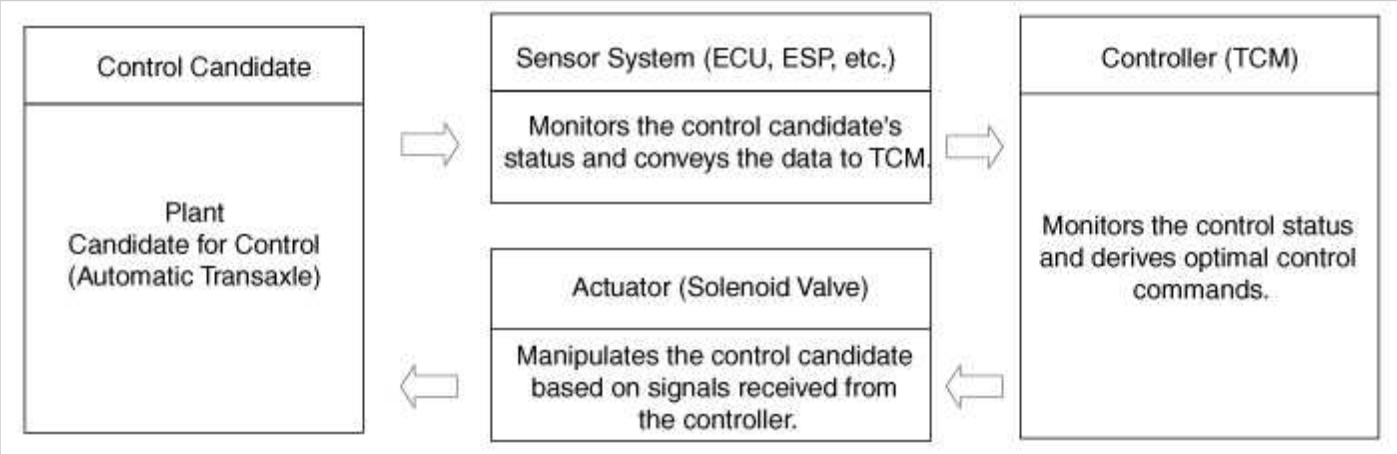
Here, the rear planetary gear maintains a 1:1 rotation ratio as it would when 4th or 5th gear is engaged; however, t planetary gear remains unrestrained and the front sun gear rotates at a faster rate in the normal direction and at zero l

## Automatic Transaxle System

Description

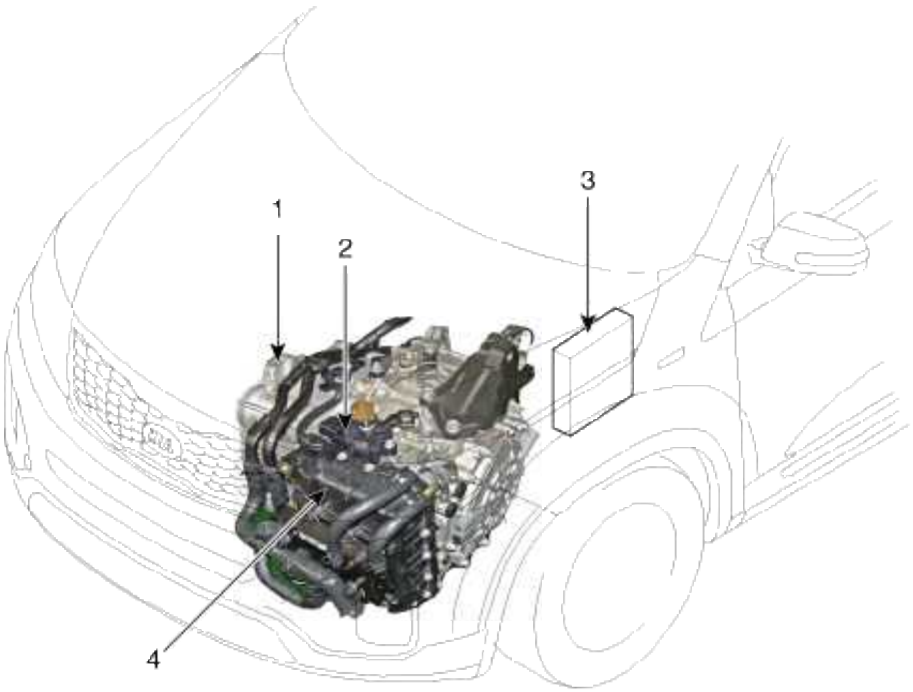
Automatic transaxle system relies on various measurement data to determine the current control status and extrapolat necessary compensation values. These values are used to control the actuators and achieve the desired control outpu problem with the drivetrain, including the transaxle, has been identified,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

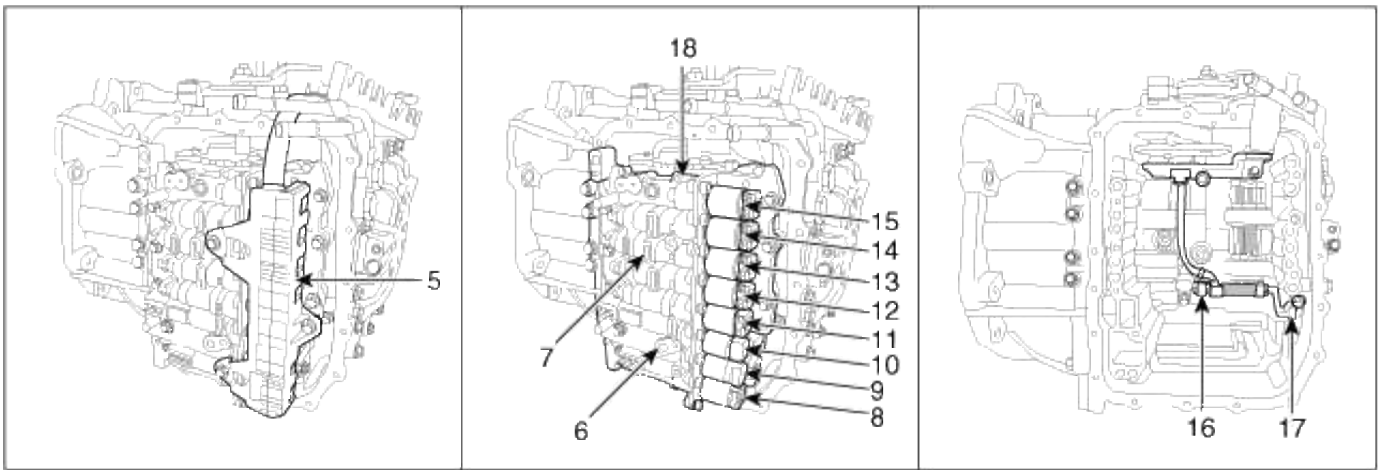
Control System Composition



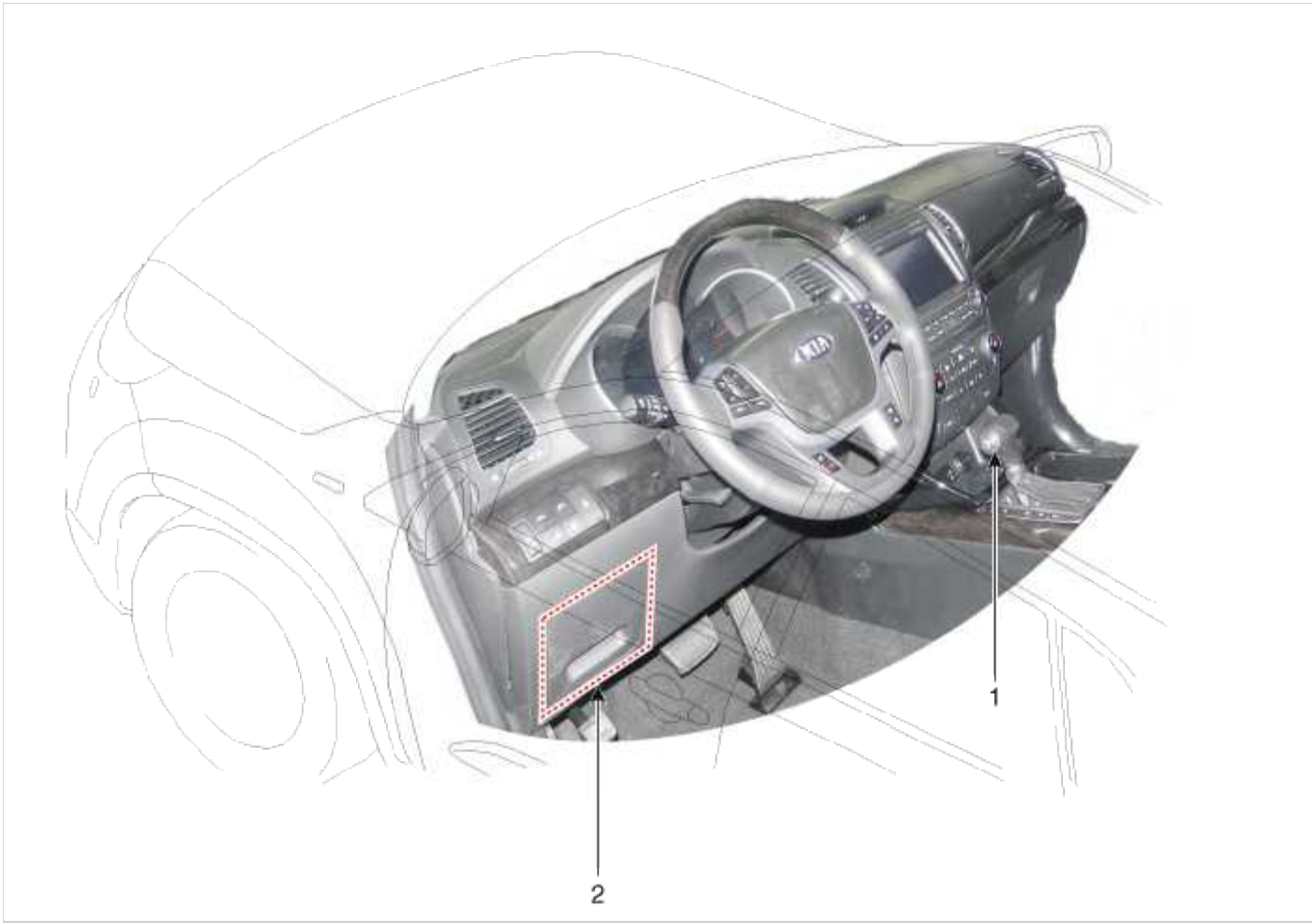

## Automatic Transaxle System

Component Location



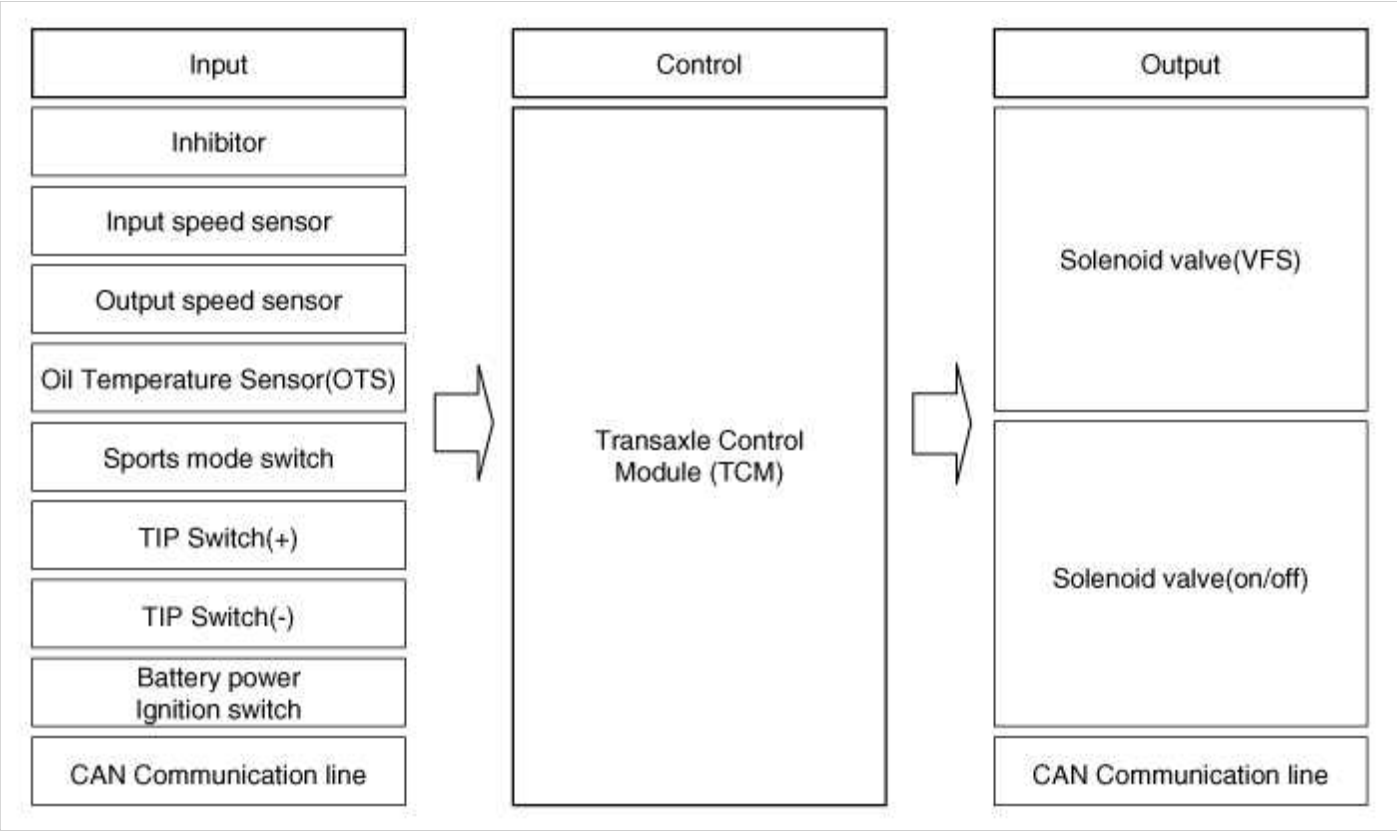

| | |
|---|---|
| 1. Automatic transaxle<br>2. Inhibitor switch<br>3. Transaxle Control Module (TCM)<br>4. Valve body cover<br>5. Solenoid valve connect<br>6. Oil temperature sensor<br>7. Valve body assembly<br>8. Line Pressure Control Solenoid Valve<br>9. SS-A Solenoid Valve(ON/OFF) | 10. SS-B Solenoid Valve(ON/OFF)<br>11. Overdrive Clutch Control Solenoid Valve(OD/C)<br>12. Underdrive Brake Control Solenoid Valve(UD/B)<br>13. 26 Brake Control Solenoid Valve(26/B)<br>14. 35R Clutch Control Solenoid Valve(35R/C)<br>15. Torque Converter Control Solenoid Valve(T/CON)<br>16. Output speed sensor<br>17. Input speed sensor<br>18. Valve body assembly |




| | |
|---|---|
| 1. Shift lever<br>2. Data Link Connector (DLC) | |

## Automatic Transaxle System

Circuit Diagram






Adjustment

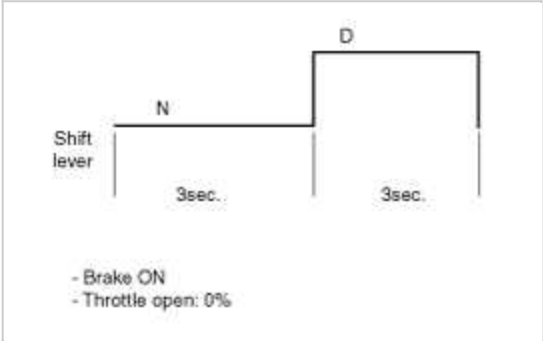
Transaxle Control Module(TCM) Learning

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 s the specified Throttle Position Sensor (TPS) value (15~25%).



Description

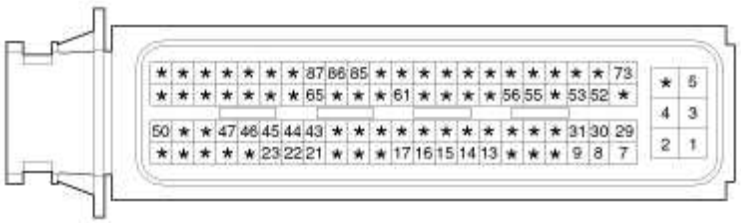
Transaxle Control Module (TCM) is the automatic transaxle's brain. The module receives and processes signals from sensors and implements a wide range of transaxle controls to ensure optimal driving conditions for the driver. TCM is programmed for optimal response to any on-road situation. In the event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

Functions

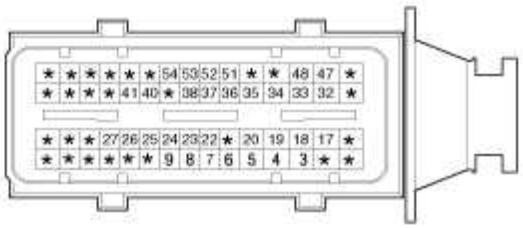
- Monitors the vehicle's operating conditions to determine the optimal gear setting.
- Performs a gear change if the current gear setting differs from the identified optimal gear setting.
- Determines the need for damper clutch (D/C) activation and engages the clutch accordingly.
- Calculates the optimal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

## Automatic Transaxle System

1. TCM connector and terminal function



Connector [A]



Connector [B]

2. TCM terminal function

**Connector [B]**

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | - | 31 | - |
| 2 | - | 32 | ON/OFF solenoid valve B(SS-B) |
| 3 | Line pressure control solenoid valve | 33 | ON/OFF solenoid valve A (SS-A) |
| 4 | Torque converter control solenoid valve | 34 | Ground (Power 1) |
| 5 | 35R clutch control solenoid valve | 35 | Ground (Power 2) |
| 6 | Input speed sensor power | 36 | Sports mode down switch |
| 7 | Output speed sensor power | 37 | Sports mode up switch |
| 8 | Input speed sensor signal | 38 | Sports mode Select switch |
| 9 | Output speed sensor signal | 39 | - |
| 10 | - | 40 | Inhibitor switch signal "S1" |
| 11 | - | 41 | - |
| 12 | - | 42 | - |
| 13 | - | 43 | - |
| 14 | - | 44 | - |

| | | | |
|---|---|---|---|
| 15 | - | 45 | - |
| 16 | - | 46 | - |
| 17 | Underdrive brake control solenoid valve | 47 | Solenoid supply power 1 |
| 18 | 26 brake control solenoid valve | 48 | Solenoid supply power 2 |
| 19 | Shift lock solenoid | 49 | TCM Input power 1 (For solenoid) |
| 20 | Overdrive clutch control solenoid valve | 50 | TCM Input power 2 (For solenoid) |
| 21 | - | 51 | Reserved |
| 22 | Rear lamp relay | 52 | Reserved |
| 23 | - | 53 | Oil temperature sensor (-) |
| 24 | Start relay | 54 | Oil temperature sensor (+) |
| 25 | Inhibitor switch signal "S2" | 55 | - |
| 26 | Inhibitor switch signal "S3" | 56 | - |
| 27 | Inhibitor switch signal "S4" | 57 | - |
| 28 | - | 58 | - |
| 29 | - | 59 | - |
| 30 | - | 60 | - |

**Connector [A]**

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | Power ground | 31 | Power ground |
| 2 | Battery power (B+) | 32 | Battery power (B+) |
| 3 | Power ground | 33 | CAN communication line (HIGH) |
| 4 | Battery power (B+) | 34 | CAN communication line (Low) |

3. TCM Terminal input/ output signal

**Connector [B]**

| Pin | Description | Condition | Input/output value | |
|---|---|---|---|---|
| | | | Type | Level |
| 1 | - | | | |
| 2 | - | | | |
| 3 | Line pressure control solenoid valve | | Output | 0V/Battery voltage level |
| | | | | 9V < Battery voltage level < 16V |
| 4 | Torque converter control solenoid valve | | Output | 0V/Battery voltage level |
| | | | | 9V < Battery voltage level < 16V |

| | | | | |
|---|---|---|---|---|
| 5 | 35R clutch control solenoid valve | | Output | 0V/Battery voltage level<br>9V < Battery voltage level < 16V |
| 6 | Input speed sensor power | ON<br>OFF | Power | 0V/7.5V |
| 7 | Output speed sensor power | ON<br>OFF | Power | 0V/7.5V |
| 8 | Input speed sensor signal | High<br>Low | Input | 0.7V/1.4V |
| 9 | Output speed sensor signal | High<br>Low | Input | 0.7V/1.4V |
| 10 | - | | | |
| 11 | - | | | |
| 12 | - | | | |
| 13 | - | | | |
| 14 | - | | | |
| 15 | - | | | |
| 16 | - | | | |
| 17 | Underdrive brake control solenoid valve | | Output | 0V/Battery voltage level<br>9V < Battery voltage level < 16V<br>Power supply : V_SOL2 |
| 18 | 26 brake control solenoid valve | | Output | 0V/Battery voltage level<br>9V < Battery voltage level < 16V<br>Power supply : V_SOL2 |
| 19 | Shift lock solenoid | High<br>Low | Output | 0V/Battery voltage level<br>9V < Battery voltage level < 16V |
| 20 | Overdrive clutch control solenoid valve | | Output | 0V/Battery voltage level<br>9V < Battery voltage level < 16V<br>Power supply : V_SOL1 |
| 21 | - | | | |
| 22 | Rear lamp relay | R ON<br>Other | Output | 0V/Battery voltage level<br>9V < Battery voltage level < 16V |
| 23 | - | | | |
| 24 | Start relay | High<br>Low | Output | 0V/Battery voltage level<br>9V < Battery voltage level < 16V |

| | | | | |
|---|---|---|---|---|
| 25 | Inhibitor switch signal "S2" | High | Input | 0V/Battery voltage level |
| | | Low | | 9V < Battery voltage level < 16V |
| 26 | Inhibitor switch signal "S3" | High | Input | 0V/Battery voltage level |
| | | Low | | 9V < Battery voltage level < 16V |
| 27 | Inhibitor switch signal "S4" | High | Input | 0V/Battery voltage level |
| | | Low | | 9V < Battery voltage level < 16V |
| 28 | - | | | |
| 29 | - | | | |
| 30 | - | | | |
| 31 | - | | | |
| 32 | ON/OFF solenoid valve B(SS-B) | High | Output | 0V/Battery voltage level |
| | | Low | | 9V < Battery voltage level < 16V |
| 33 | ON/OFF solenoid valve A (SS-A) | High | Output | 0V/Battery voltage level |
| | | Low | | 9V < Battery voltage level < 16V |
| 34 | Ground (Power 1) | | Ground | 0V |
| 35 | Ground (Power 2) | | Ground | 0V |
| 36 | Sports mode down switch | Down ON | Input | 0V/Battery voltage level |
| | | Other | | 9V < Battery voltage level < 16V |
| 37 | Sports mode up switch | Up ON | Input | 0V/Battery voltage level |
| | | Other | | 9V < Battery voltage level < 16V |
| 38 | Sports mode select switch | Sport mode | Input | 0V/Battery voltage level |
| | | Other | | 9V < Battery voltage level < 16V |
| 39 | - | | | |
| 40 | Inhibitor switch signal "S1" | High | Input | 0V/Battery voltage level |
| | | Low | | 9V < Battery voltage level < 16V |
| 41 | - | | | |
| 42 | - | | | |
| 43 | - | | | |
| 44 | - | | | |
| 45 | - | | | |
| 46 | - | | | |

| | | | | |
|---|---|---|---|---|
| 47 | Solenoid supply power 1 | ON | Power | 0V/Battery voltage level |
| | | OFF | | 9V < Battery voltage level < 16V |
| 48 | Solenoid supply power 2 | ON | Power | 0V/Battery voltage level |
| | | OFF | | 9V < Battery voltage level < 16V |
| 49 | TCM Input power 1 (For solenoid) | | Power | Battery voltage level |
| | | | | 9V < Battery voltage level < 16V |
| 50 | TCM Input power 2 (For solenoid) | | Power | Battery voltage level |
| | | | | 9V < Battery voltage level < 16V |
| 51 | - | | | |
| 52 | - | | | |
| 53 | Oil temperature sensor (-) | | Ground | 0V |
| 54 | Oil temperature sensor (+) | ON | Input | 0V/3.3V |
| | | OFF | | |
| 54 | - | | | |
| 55 | - | | | |
| 56 | - | | | |
| 57 | - | | | |
| 58 | - | | | |
| 59 | - | | | |
| 60 | - | | | |

**Connector [A]**

| Pin | Description | Condition | Type | Level |
|---|---|---|---|---|
| 1 | Power ground | | Ground | 0V |
| 2 | Battery power (B+) | ON | Power | 0V/Battery voltage level |
| | | OFF | | 9V < Battery voltage level < 16V |
| 3 | Power ground | | Ground | 0V |
| 4 | Battery power (B+) | ON | Power | 0V/Battery voltage level |
| | | OFF | | 9V < Battery voltage level < 16V |
| 5 | Power ground | | Ground | 0V |
| 6 | Battery power (B+) | | Power | Battery voltage level |
| | | | | 9V < Battery voltage level < 16V |

## Automatic Transaxle System

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 proced 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 OF position. Then the TCM learns the smart key information automatically.

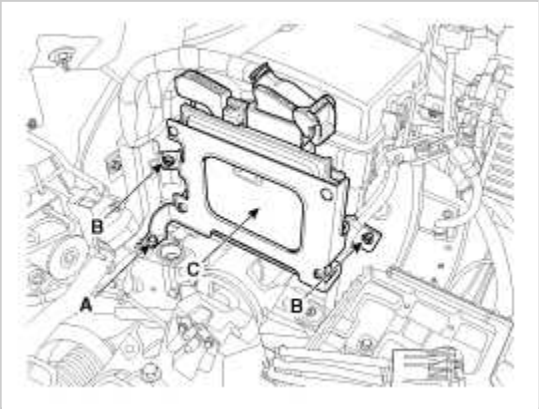
**[In the case of installing new TCM]**

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

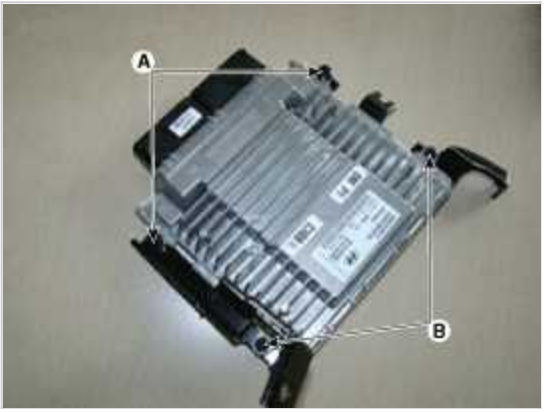
1. Turn ignition switch OFF and disconnect the negative (-) battery cable.
2. Disconnect the TCM Connector (A).


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")
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 proced 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 OF 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 sm 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 a 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 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 s 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 s the TCM with a new one, and then check the vehicle again. If DTC's were found, examine this first before swapp
4. RE-TEST THE ORIGINAL TCM: Install the original TCM (may be broken) into a known-good vehicle and che vehicle. If the problem occurs again, replace the original TCM with a new one. If problem does not occur, this is i problem (Refer to “Intermittent Problem Inspection Procedure” in Basic Inspection Procedure).

## Automatic Transaxle System

Description

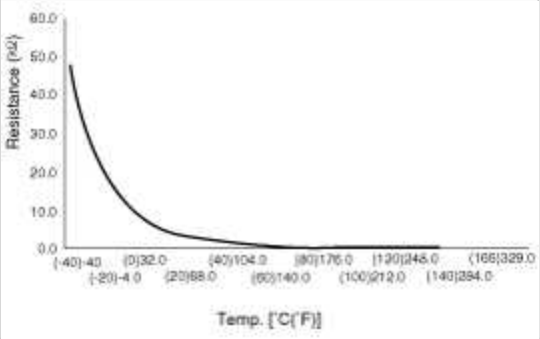
Transaxle Oil Temperature Sensor(OTS) monitors the automatic transaxle fluid's temperature and conveys the readin It is an Negativen Thermal Coefficient(NTC) sensor whose resistance has an inversely proportional relationship with t temperature level. Data produced by this sensor is used to identify damper clutch activation and deactivation zones wi low temperature and high temperature range and to compensate hydraulic pressure levels during gear changes.

## Automatic Transaxle System

Specifications

Type: Negative Thermal Coefficient Type(NTC)

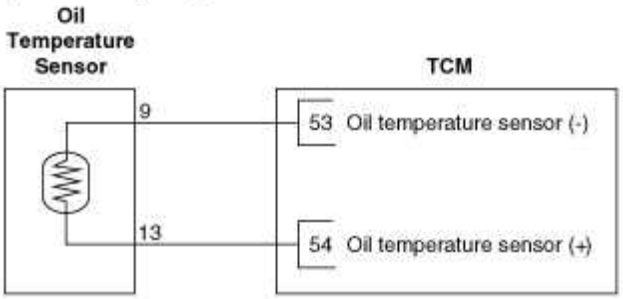
| Temp.(°C)°F | Resistance (kΩ) |
|---|---|
| (-40)-40 | 48.1 |
| (-20)-4.0 | 15.6 |
| (0)32.0 | 5.88 |
| (20)68.0 | 2.51 |
| (40)104.0 | 1.11 |
| (60)140.0 | 0.61 |
| (80)176.0 | 0.32 |
| (100)212.0 | 0.18 |
| (120)248.0 | 0.10 |
| (140)284.0 | 0.06 |
| (165)329.0 | 0.03 |




## Automatic Transaxle System

Circuit Diagram

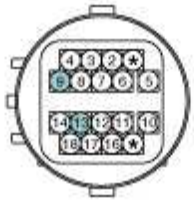
[Circuit Diagram]



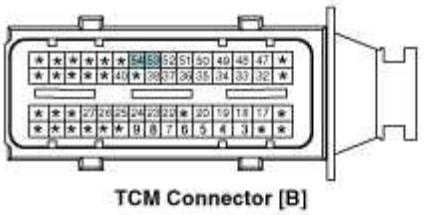

[Connection Information]

| Terminal | Connected to | Function |
|---|---|---|
| 9 | TCM (53) | Oil temperature sensor (-) |
| 13 | TCM (54) | Oil temperature sensor (+) |

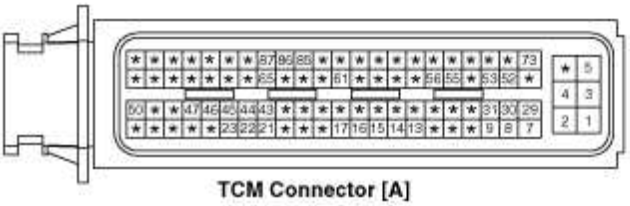
[Harness Connector]



Solenoid Valve Connector



TCM Connector [B]



TCM Connector [A]

## 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

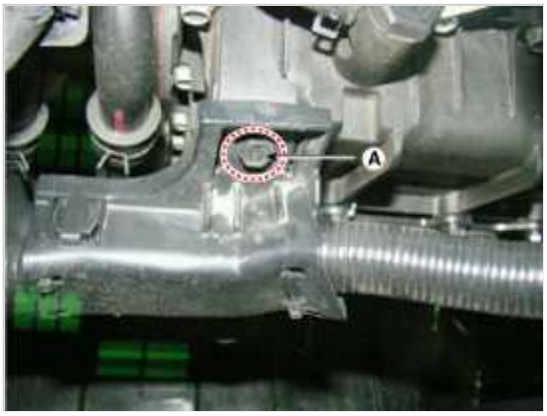
1. Remove the battery and the battery tray.
   (Refer to Engine Electrical System - "Battery")
2. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")

3. Drain the coolant.
   (Refer to Engine Mechanical System - "Coolant")
4. Remove the drain plug (A) and reinstall the drain plug after draining ATF totally.

**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).

**CAUTION**

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

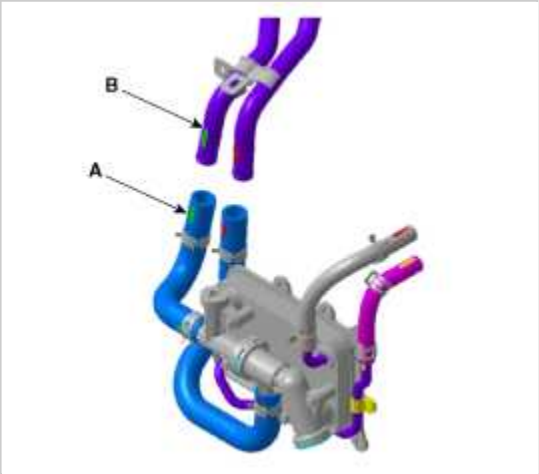

7. Disconnect the coolant hose (B) after removing the coolant hose clamp (A).


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.



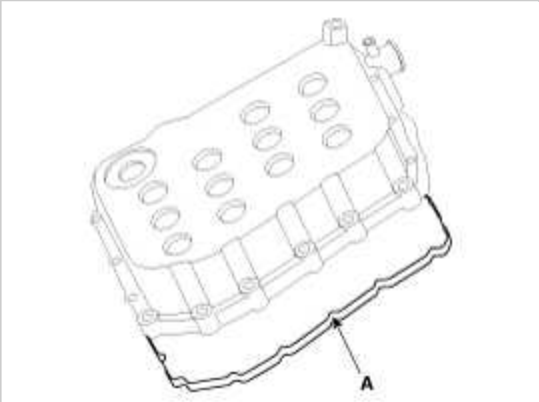

9. Remove the valve body cover (A).

**Tightening torque :**

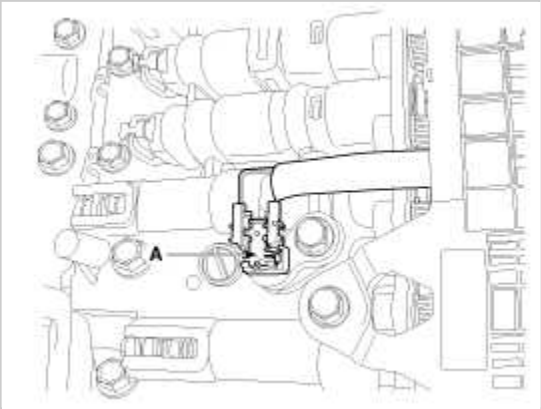
(A) 13.7 ~ 15.7 N.m (1.4 ~ 1.6 kgf.m, 10.1 ~ 11.6 lb-ft)


**CAUTION**

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



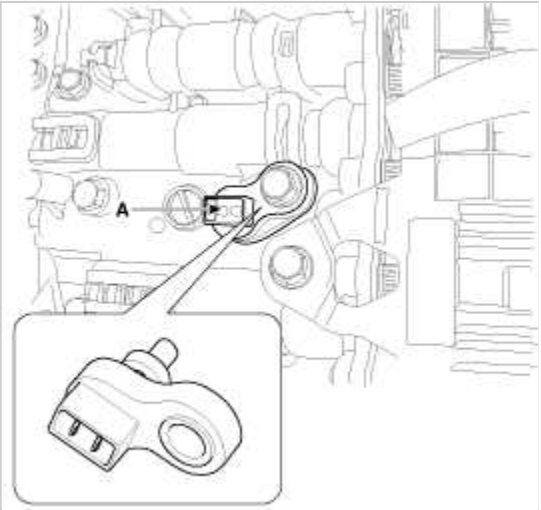
10. Disconnect the oil temperature sensor connector (A).




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.

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

## Automatic Transaxle System

Description

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

## Automatic Transaxle System

Specifications

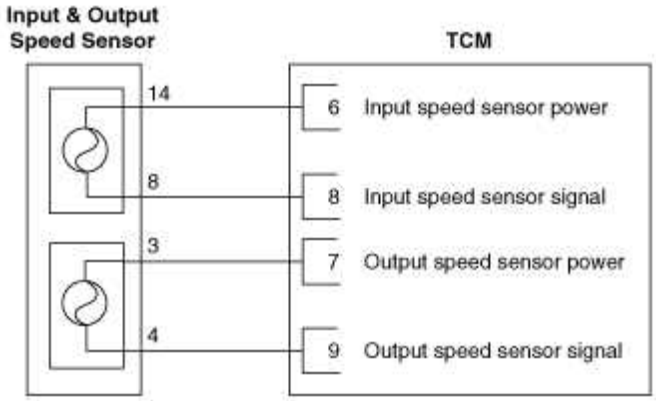
Type: Hall effect sensor

| | | |
|---|---|---|
| Operation condition (°C)°F | | ((-)40 ~ 150)) -40 ~ 302 |
| Air gap(mm)in. | | (0.95~1.65)<br>0.0374~0.0650 |
| Output voltage(V) | High | 1.18 ~ 1.68 |
| | Low | 0.59 ~ 0.84 |

## Automatic Transaxle System

Circuit Diagram

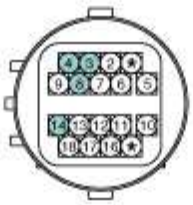
[Circuit Diagram]



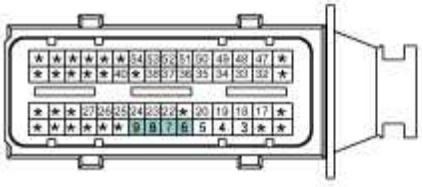

[Connection Information]

| Terminal | Connected to | Function |
|---|---|---|
| 14 | TCM (6) | Input speed sensor power |
| 8 | TCM (8) | Input speed sensor signal |
| 3 | TCM (7) | Output speed sensor power |
| 4 | TCM (9) | Output speed sensor signal |

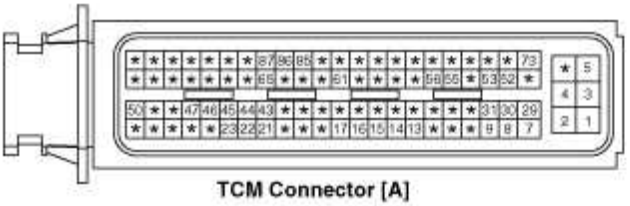
[Harness Connector]



Solenoid Valve Connector



TCM Connector [B]



TCM Connector [A]

Signal Waveform

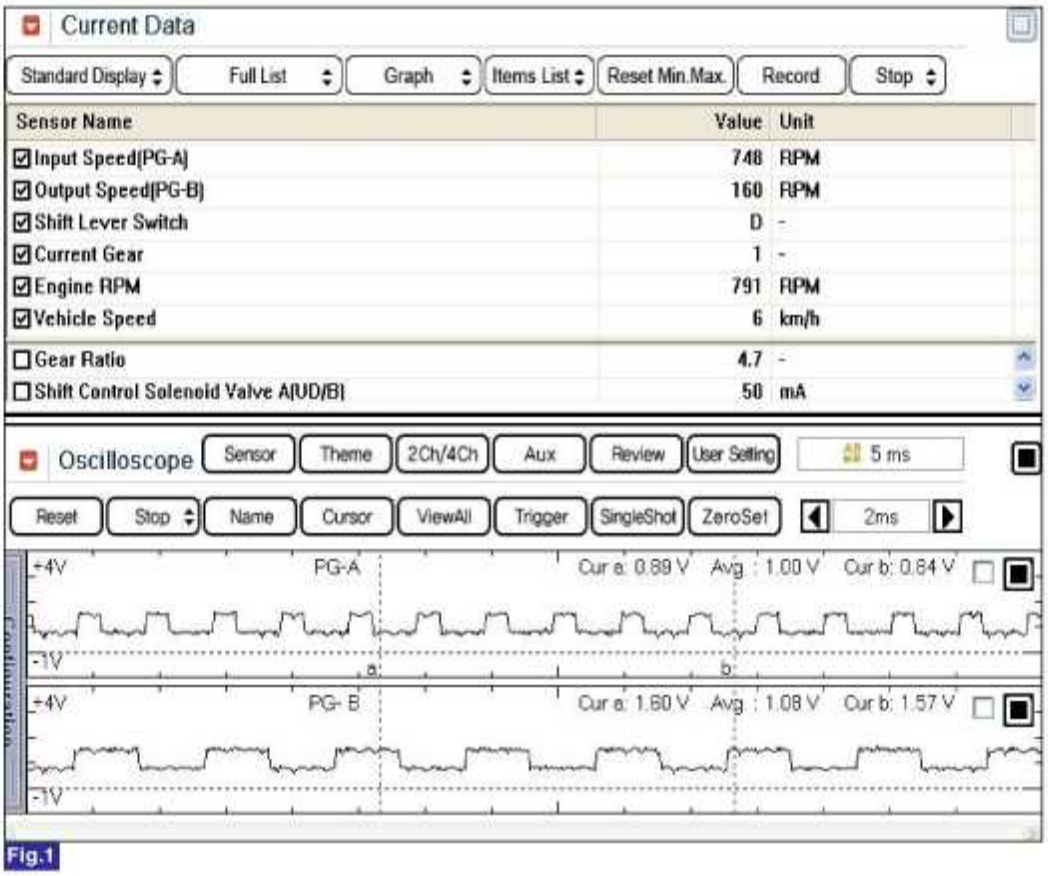


Fig.1

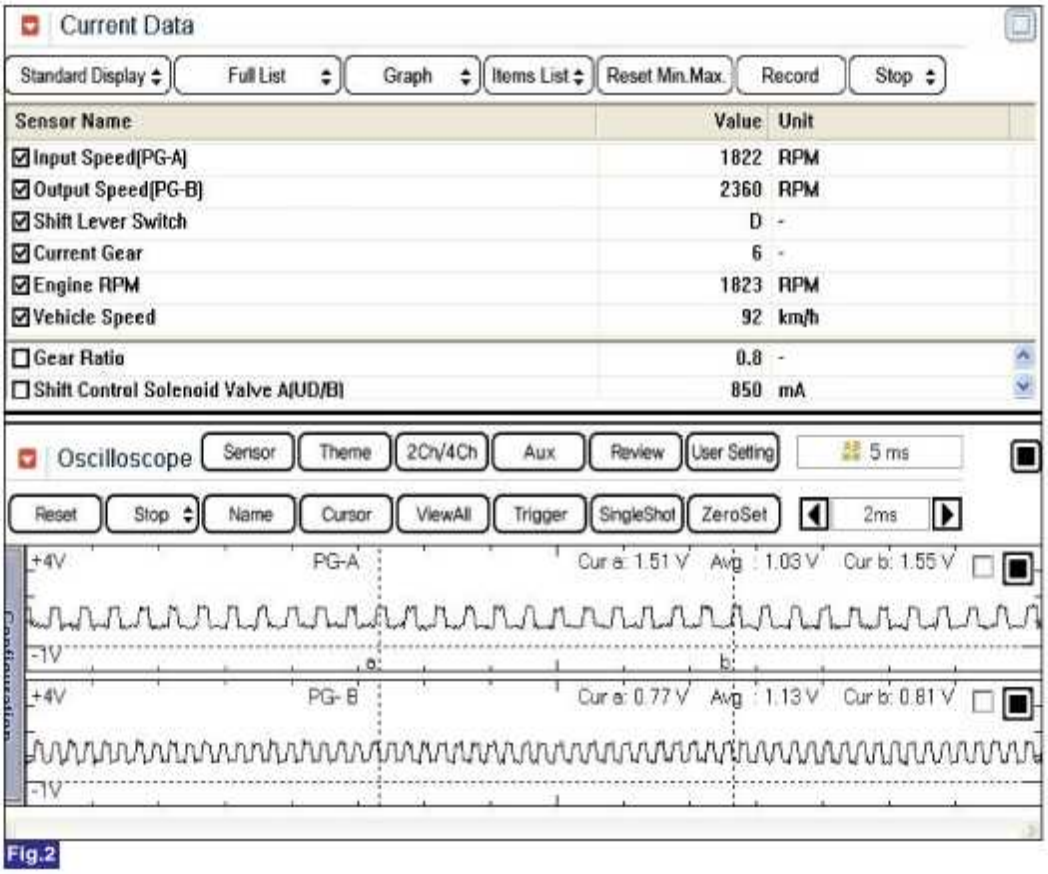


Fig.2

Inspection

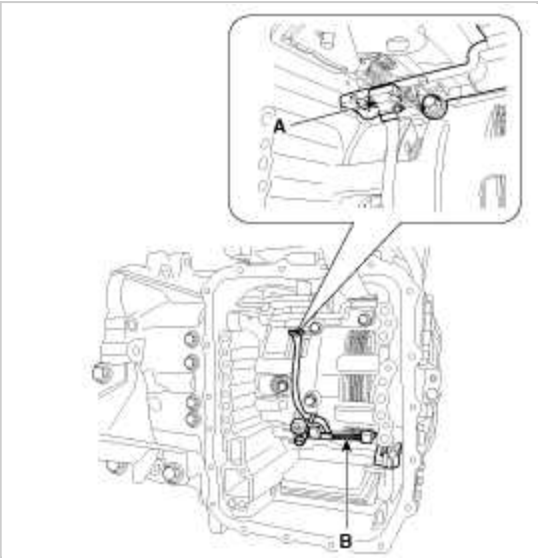
1. Check signal waveform of Input & output speed sensor using the GDS.

**Specification :** Refer to "Signal Wave Form" section.

Removal

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

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




Installation

1. Install in the reverse order of removal.

**NOTICE**

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

Automatic Transaxle System

Description

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

## Automatic Transaxle System

Specifications

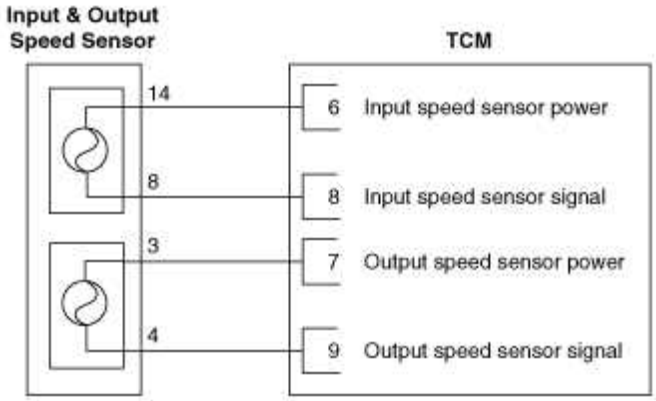
Type: Hall effect sensor

| | | |
|---|---|---|
| Operation condition (°C)°F | | ((-)40 ~ 150)) -40 ~ 302 |
| Air gap(mm)in. | | (1.48~1.9)<br>0.0583~0.0748 |
| Output voltage (V) | High | 1.18 ~ 1.68 |
| | Low | 0.59 ~ 0.84 |

## Automatic Transaxle System

Circuit Diagram

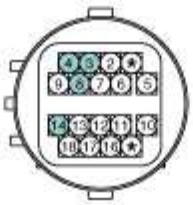
[Circuit Diagram]



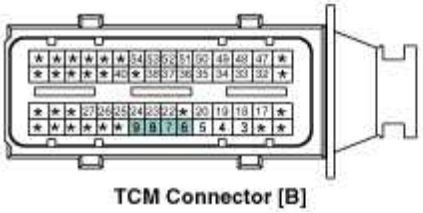

[Connection Information]

| Terminal | Connected to | Function |
|---|---|---|
| 14 | TCM (6) | Input speed sensor power |
| 8 | TCM (8) | Input speed sensor signal |
| 3 | TCM (7) | Output speed sensor power |
| 4 | TCM (9) | Output speed sensor signal |

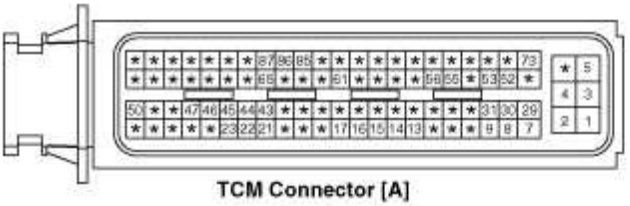
[Harness Connector]



Solenoid Valve Connector



TCM Connector [B]



TCM Connector [A]

Signal Waveform

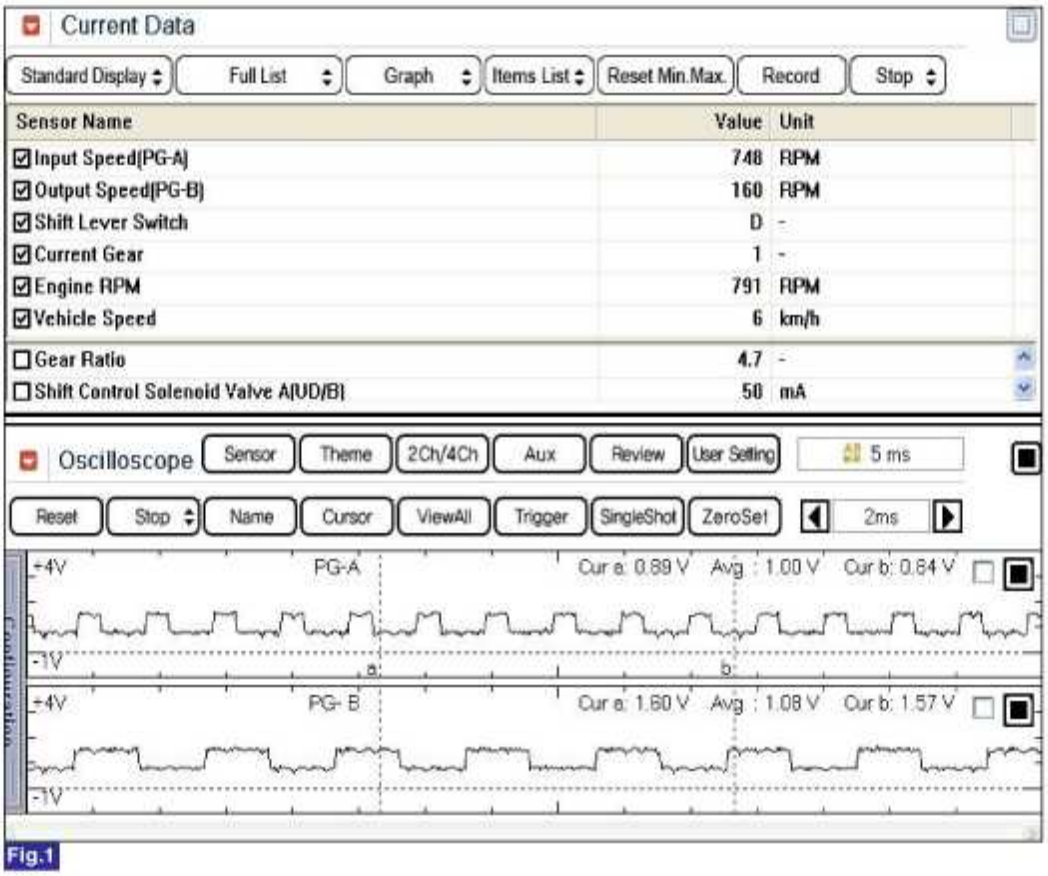


Fig.1

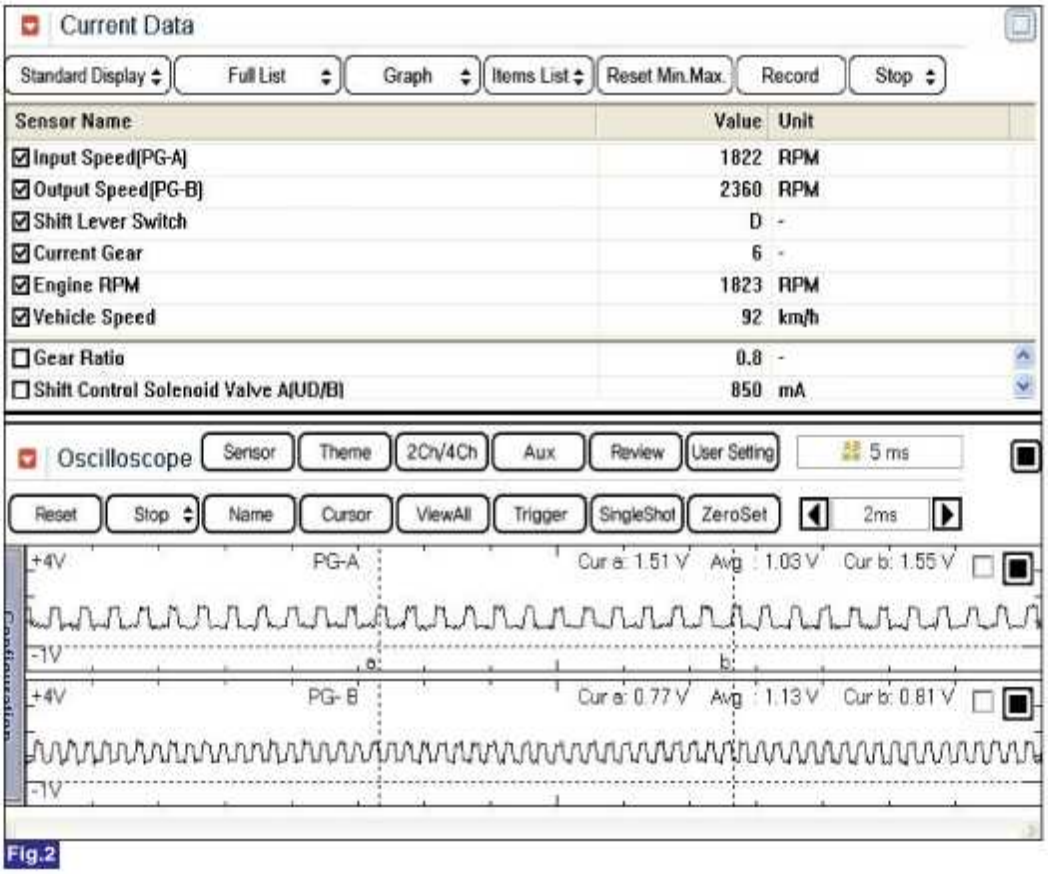


Fig.2

Inspection

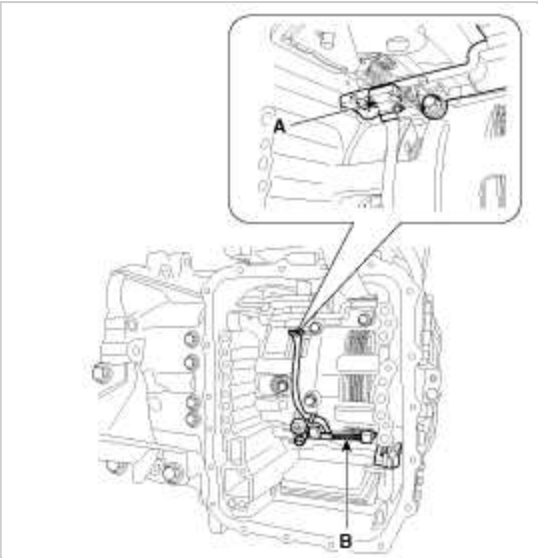
1. Check signal waveform of Input & output speed sensor using the GDS.

**Specification :** Refer to "Signal Wave Form" section.

Removal

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

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




Installation

1. Install in the reverse order of removal.

**NOTICE**

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



Description

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

## Automatic Transaxle System

Specifications

Direct control VFS[T/CON]

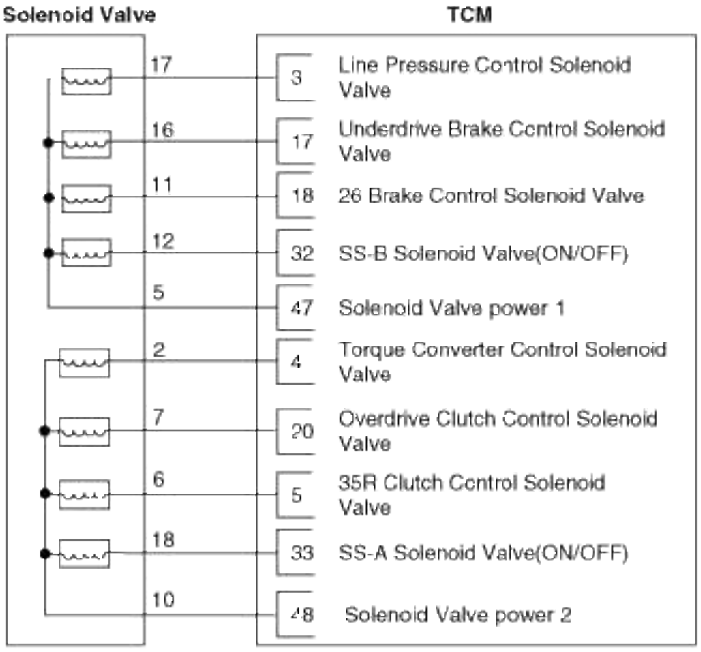
Control type : Normal low type

| | |
|---|---|
| Control Pressure kpa (kgf/cm², psi) | 0 ~ 539.37 (0 ~ 5.5, 0 ~ 78.23) |
| Current value(mA) | 0 ~ 850 |
| Internal resistance(Ω) | 5.1 ± 0.3 |

## Automatic Transaxle System

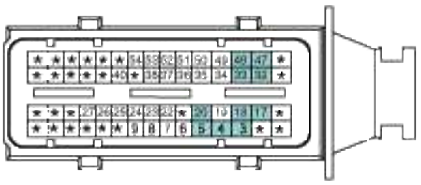
Circuit Diagram

[Circuit Diagram]



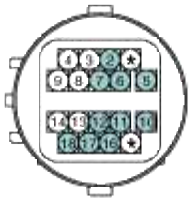

[Connection Information]

| Terminal | Connected to | Function |
|---|---|---|
| 17 | TCM(3) | Line Pressure Control Solenoid Valve |
| 16 | TCM(17) | Underdrive Brake Control Solenoid Valve |
| 11 | TCM(18) | 26 Brake Control Solenoid Valve |
| 12 | TCM(32) | SS-B Solenoid Valve(ON/OFF) |
| 5 | TCM(47) | Solenoid Valve power 1 |
| 2 | TCM(4) | Torque Converter Control Solenoid Valve |
| 7 | TCM(20) | Overdrive Clutch Control Solenoid Valve |
| 6 | TCM(5) | 35R Clutch Control Solenoid Valve |
| 18 | TCM(33) | SS-A Solenoid Valve(ON/OFF) |
| 10 | TCM(48) | Solenoid Valve power 2 |

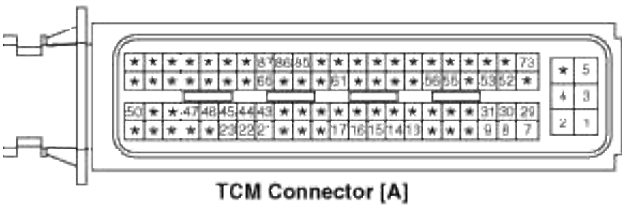


TCM Connector [B]

[Harness Connector]



Solenoid Valve Connector



TCM Connector [A]

## 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.

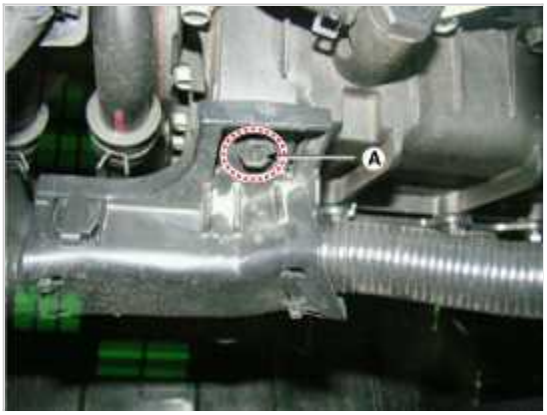
Removal

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

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


**⚠ CAUTION**
Replace the gasket before reinstalling the drain plug.

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



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


**⚠ CAUTION**

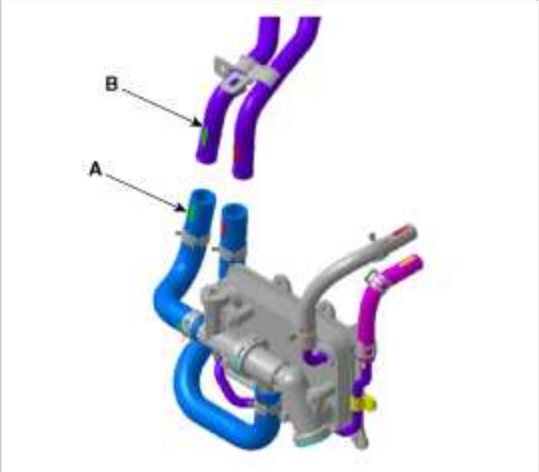
Replace the O-Ring (A) before reinstalling the eyebolt.


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.

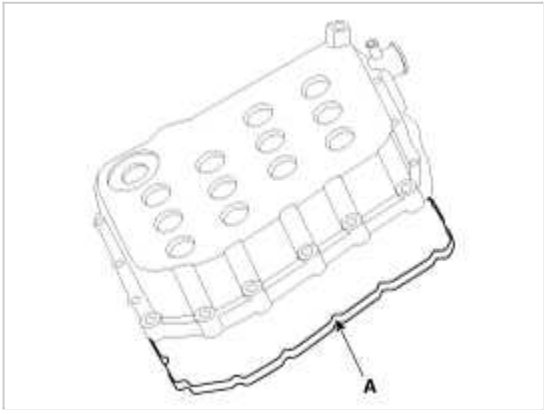



10. Remove the valve body cover (A).

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

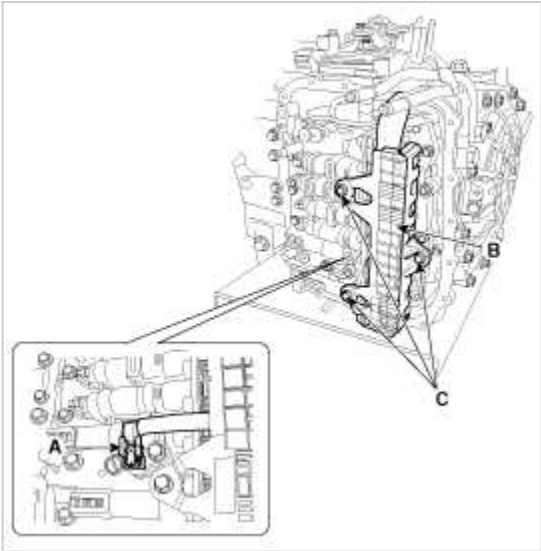
**⚠ CAUTION**

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



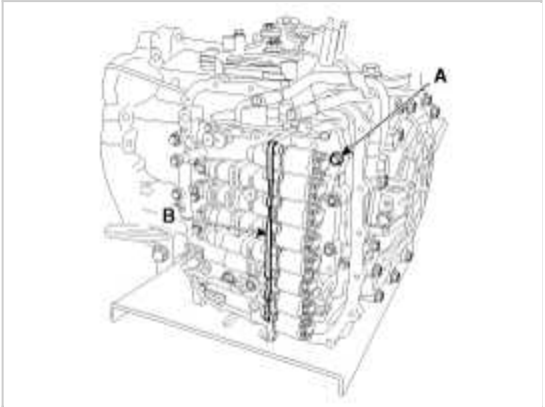

11. Remove the bolts (C) after disconnecting the solenoid valve connector (B) and the oil temperature sensor conne

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

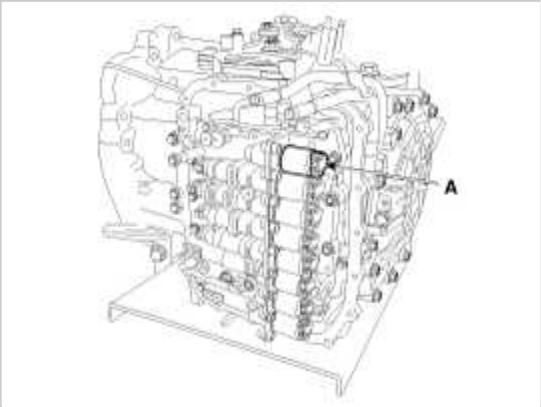



12. Remove the solenoid valve support bracket (B) and the valve body mounting bolt (A-1ea).

**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.

**NOTICE**

- 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

Description

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

## Automatic Transaxle System

Specifications

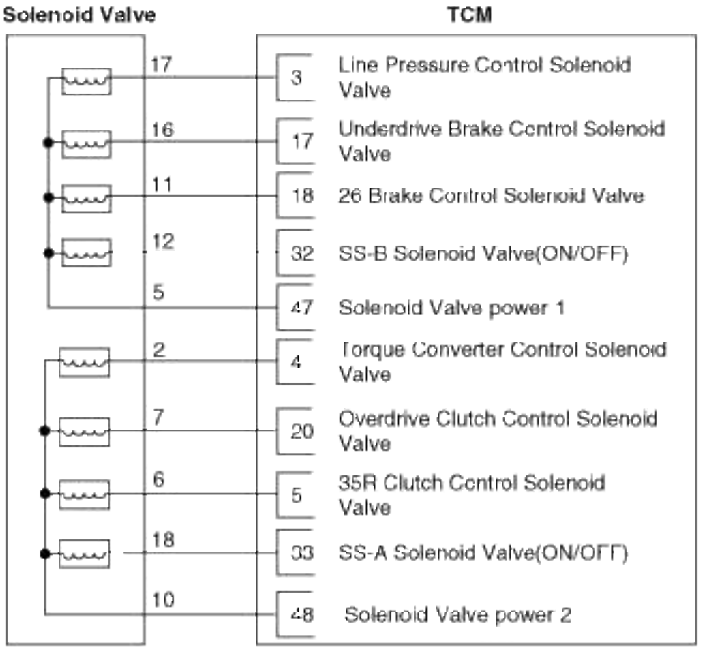
Direct control VFS[26/B]

Control type : Normal low type

| | |
|---|---|
| Control Pressure kpa (kgf/cm², psi) | 0 ~ 539.37 (0 ~ 5.5, 0 ~ 78.23) |
| Current value(mA) | 0 ~ 850 |
| Internal resistance(Ω) | 5.1 ± 0.3 |

## Circuit Diagram

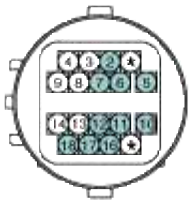
[Circuit Diagram]



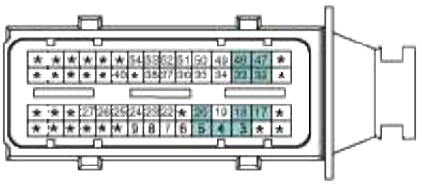

[Connection Information]

| Terminal | Connected to | Function |
|---|---|---|
| 17 | TCM(3) | Line Pressure Control Solenoid Valve |
| 16 | TCM(17) | Underdrive Brake Control Solenoid Valve |
| 11 | TCM(18) | 26 Brake Control Solenoid Valve |
| 12 | TCM(32) | SS-B Solenoid Valve(ON/OFF) |
| 5 | TCM(47) | Solenoid Valve power 1 |
| 2 | TCM(4) | Torque Converter Control Solenoid Valve |
| 7 | TCM(20) | Overdrive Clutch Control Solenoid Valve |
| 6 | TCM(5) | 35R Clutch Control Solenoid Valve |
| 18 | TCM(33) | SS-A Solenoid Valve(ON/OFF) |
| 10 | TCM(48) | Solenoid Valve power 2 |

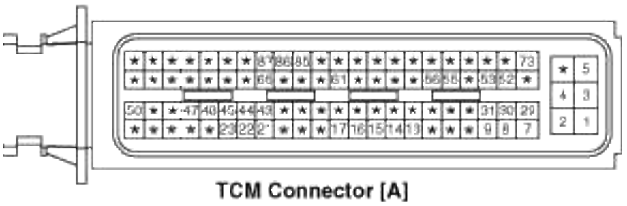
[Harness Connector]



Solenoid Valve Connector



TCM Connector [B]



TCM Connector [A]



## 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

**NOTICE**

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

## Automatic Transaxle System

Description

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

## Automatic Transaxle System

Specifications

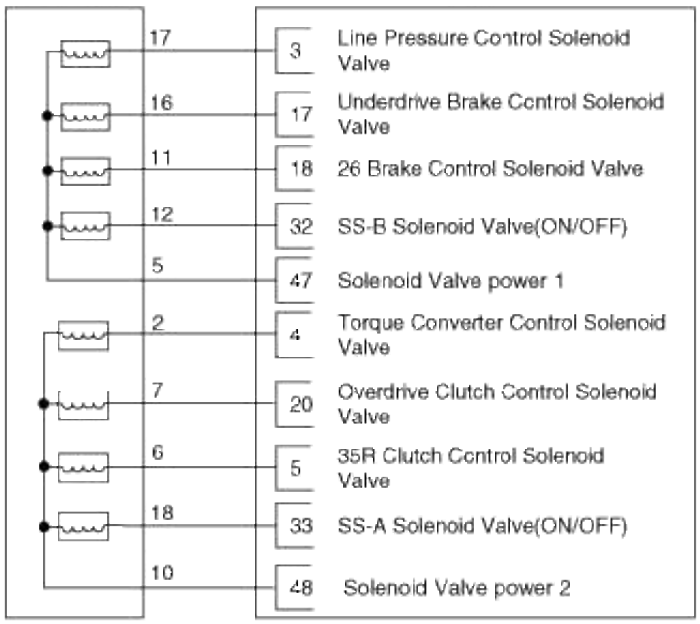
Direct control VFS[LINE Pressure]

Control type : Normal high type

| | |
|---|---|
| Control Pressure kpa (kgf/cm², psi) | 539.370 ~ 0 ( 5.5 ~ 0, 78.23 ~ 0) |
| Current value(mA) | 0 ~ 850 |
| Internal resistance(Ω) | 5.1 ± 0.3 |

## Automatic Transaxle System

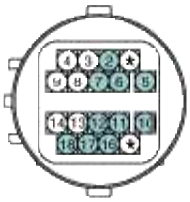
[Circuit Diagram]



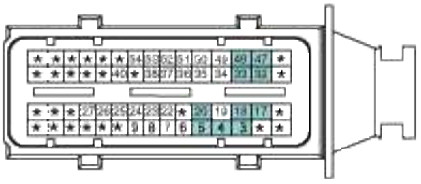

[Connection Information]

| Terminal | Connected to | Function |
|---|---|---|
| 17 | TCM(3) | Line Pressure Control Solenoid Valve |
| 16 | TCM(17) | Underdrive Brake Control Solenoid Valve |
| 11 | TCM(18) | 26 Brake Control Solenoid Valve |
| 12 | TCM(32) | SS-B Solenoid Valve(ON/OFF) |
| 5 | TCM(47) | Solenoid Valve power 1 |
| 2 | TCM(4) | Torque Converter Control Solenoid Valve |
| 7 | TCM(20) | Overdrive Clutch Control Solenoid Valve |
| 6 | TCM(5) | 35R Clutch Control Solenoid Valve |
| 18 | TCM(33) | SS-A Solenoid Valve(ON/OFF) |
| 10 | TCM(48) | Solenoid Valve power 2 |

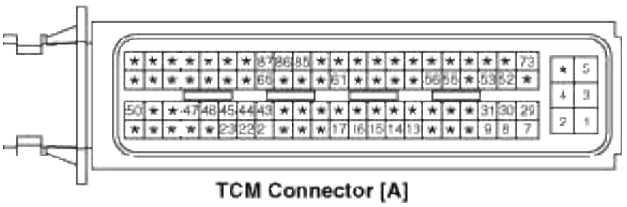
[Hamess Connector]



Solenoid Valve Connector



TCM Connector [B]



TCM Connector [A]

## 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

**NOTICE**

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

## Automatic Transaxle System

Description

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

## Automatic Transaxle System

Specifications

Direct control VFS[35R/C]

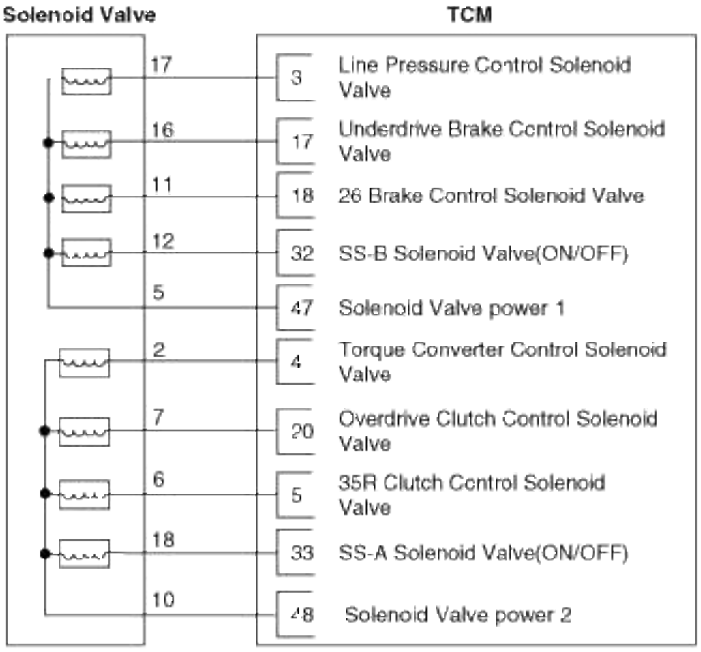
Control type : Normal high type

| | |
|---|---|
| Control Pressure kpa (kgf/cm², psi) | 539.370 ~ 0 ( 5.5 ~ 0, 78.23 ~ 0) |
| Current value(mA) | 0 ~ 850 |
| Internal resistance(Ω) | 5.1 ± 0.3 |

## Automatic Transaxle System

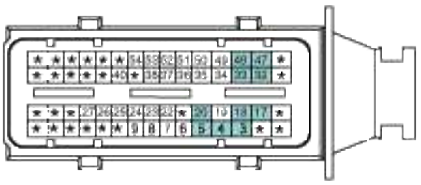
Circuit Diagram

[Circuit Diagram]



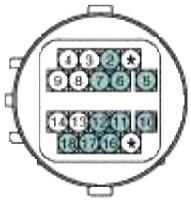

[Connection Information]

| Terminal | Connected to | Function |
|---|---|---|
| 17 | TCM(3) | Line Pressure Control Solenoid Valve |
| 16 | TCM(17) | Underdrive Brake Control Solenoid Valve |
| 11 | TCM(18) | 26 Brake Control Solenoid Valve |
| 12 | TCM(32) | SS-B Solenoid Valve(ON/OFF) |
| 5 | TCM(47) | Solenoid Valve power 1 |
| 2 | TCM(4) | Torque Converter Control Solenoid Valve |
| 7 | TCM(20) | Overdrive Clutch Control Solenoid Valve |
| 6 | TCM(5) | 35R Clutch Control Solenoid Valve |
| 18 | TCM(33) | SS-A Solenoid Valve(ON/OFF) |
| 10 | TCM(48) | Solenoid Valve power 2 |

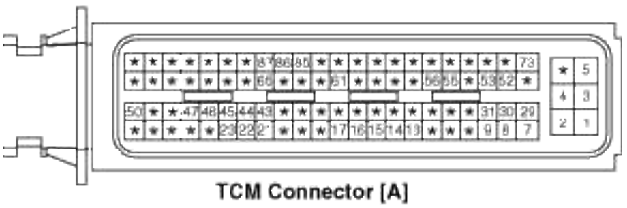


TCM Connector [B]

[Harness Connector]



Solenoid Valve Connector



TCM Connector [A]

## 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

**NOTICE**

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

## Automatic Transaxle System

Description

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

## Automatic Transaxle System

Specifications

Direct control VFS[UD/B]

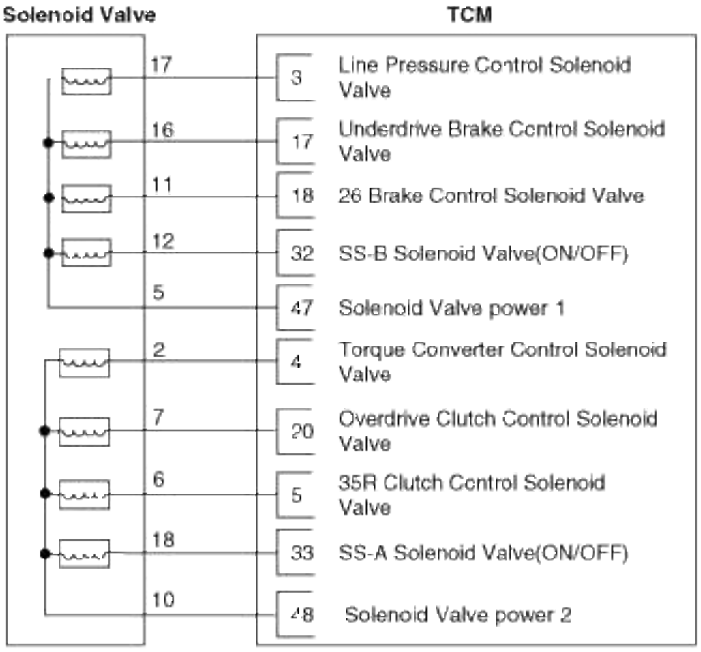
Control type : Normal high type

| | |
|---|---|
| Control Pressure kpa (kgf/cm², psi) | 539.370 ~ 0 ( 5.5 ~ 0, 78.23 ~ 0) |
| Current value(mA) | 0 ~ 850 |
| Internal resistance(Ω) | 5.1 ± 0.3 |

## Automatic Transaxle System

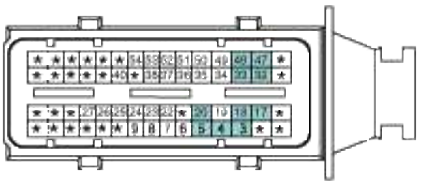
Circuit Diagram

[Circuit Diagram]



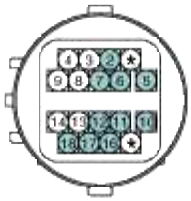

[Connection Information]

| Terminal | Connected to | Function |
|---|---|---|
| 17 | TCM(3) | Line Pressure Control Solenoid Valve |
| 16 | TCM(17) | Underdrive Brake Control Solenoid Valve |
| 11 | TCM(18) | 26 Brake Control Solenoid Valve |
| 12 | TCM(32) | SS-B Solenoid Valve(ON/OFF) |
| 5 | TCM(47) | Solenoid Valve power 1 |
| 2 | TCM(4) | Torque Converter Control Solenoid Valve |
| 7 | TCM(20) | Overdrive Clutch Control Solenoid Valve |
| 6 | TCM(5) | 35R Clutch Control Solenoid Valve |
| 18 | TCM(33) | SS-A Solenoid Valve(ON/OFF) |
| 10 | TCM(48) | Solenoid Valve power 2 |

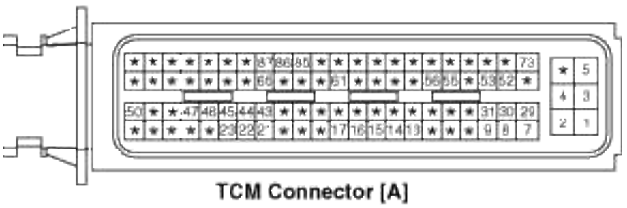


TCM Connector [B]

[Harness Connector]



Solenoid Valve Connector



TCM Connector [A]

## 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

**NOTICE**

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

## Automatic Transaxle System

Description

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

## Automatic Transaxle System

Specifications

Direct control VFS[OD/C]

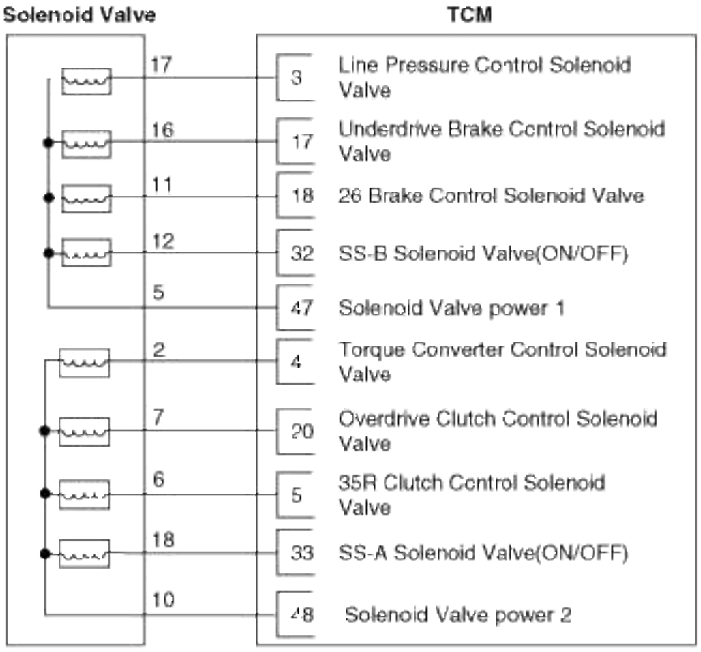
Control type : Normal high type

| | |
|---|---|
| Control Pressure kpa (kgf/cm², psi) | 539.370 ~ 0 ( 5.5 ~ 0, 78.23 ~ 0) |
| Current value(mA) | 0 ~ 850 |
| Internal resistance(Ω) | 5.1 ± 0.3 |

## Automatic Transaxle System

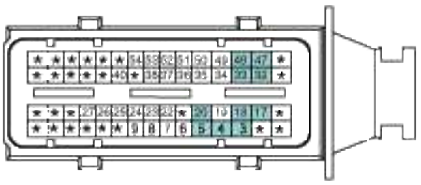
Circuit Diagram

[Circuit Diagram]



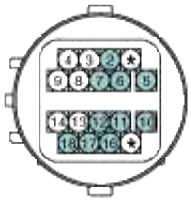

[Connection Information]

| Terminal | Connected to | Function |
|---|---|---|
| 17 | TCM(3) | Line Pressure Control Solenoid Valve |
| 16 | TCM(17) | Underdrive Brake Control Solenoid Valve |
| 11 | TCM(18) | 26 Brake Control Solenoid Valve |
| 12 | TCM(32) | SS-B Solenoid Valve(ON/OFF) |
| 5 | TCM(47) | Solenoid Valve power 1 |
| 2 | TCM(4) | Torque Converter Control Solenoid Valve |
| 7 | TCM(20) | Overdrive Clutch Control Solenoid Valve |
| 6 | TCM(5) | 35R Clutch Control Solenoid Valve |
| 18 | TCM(33) | SS-A Solenoid Valve(ON/OFF) |
| 10 | TCM(48) | Solenoid Valve power 2 |

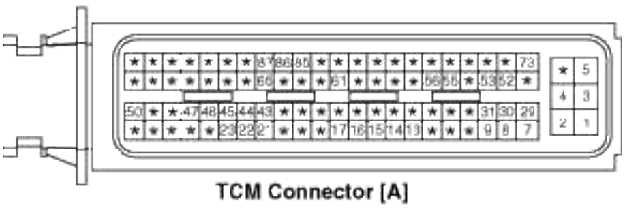


TCM Connector [B]

[Harness Connector]



Solenoid Valve Connector



TCM Connector [A]

## 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

**NOTICE**

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

## Automatic Transaxle System

Description

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

## Automatic Transaxle System

Specifications

ON/OFF Solenoid Valve(SS-A)

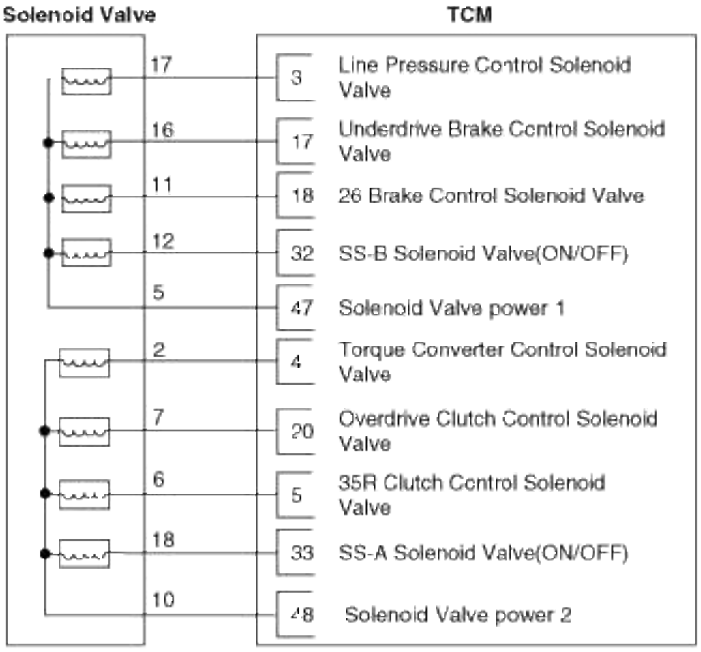
Control type : Normal low type

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

## Automatic Transaxle System

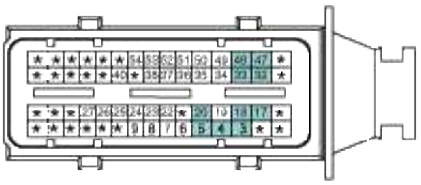
Circuit Diagram

[Circuit Diagram]



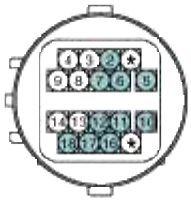

[Connection Information]

| Terminal | Connected to | Function |
|---|---|---|
| 17 | TCM(3) | Line Pressure Control Solenoid Valve |
| 16 | TCM(17) | Underdrive Brake Control Solenoid Valve |
| 11 | TCM(18) | 26 Brake Control Solenoid Valve |
| 12 | TCM(32) | SS-B Solenoid Valve(ON/OFF) |
| 5 | TCM(47) | Solenoid Valve power 1 |
| 2 | TCM(4) | Torque Converter Control Solenoid Valve |
| 7 | TCM(20) | Overdrive Clutch Control Solenoid Valve |
| 6 | TCM(5) | 35R Clutch Control Solenoid Valve |
| 18 | TCM(33) | SS-A Solenoid Valve(ON/OFF) |
| 10 | TCM(48) | Solenoid Valve power 2 |

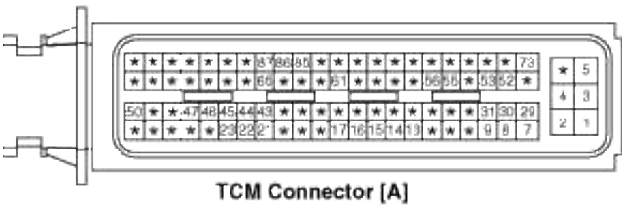


TCM Connector [B]

[Harness Connector]



Solenoid Valve Connector



TCM Connector [A]

## 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.

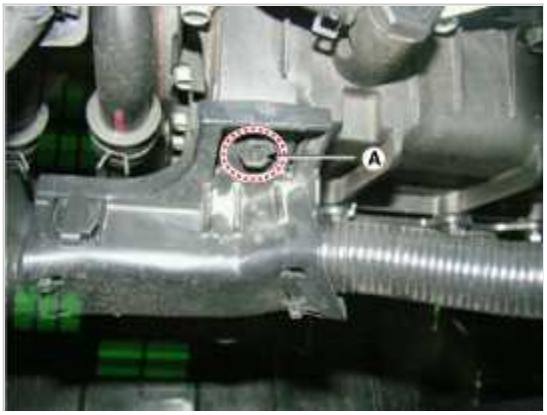
Removal

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

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


**⚠ CAUTION**
Replace the gasket before reinstalling the drain plug.

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



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


**⚠ CAUTION**

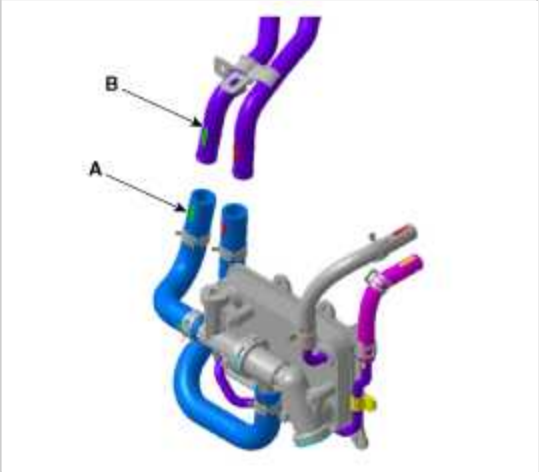
Replace the O-Ring (A) before reinstalling the eyebolt.


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.

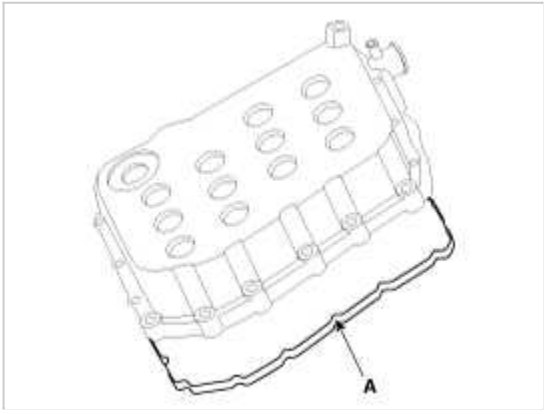



10. Remove the valve body cover (A).

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

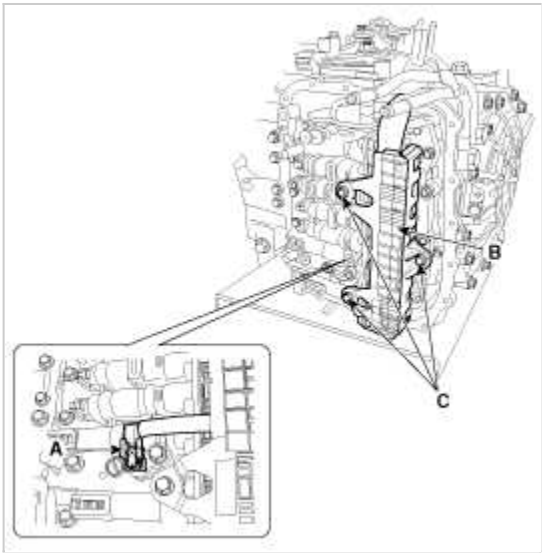
**CAUTION**

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



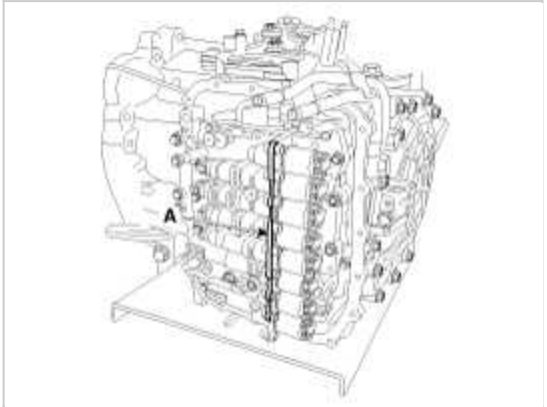

11. Remove the bolts (C) after disconnecting the solenoid valve connector (B) and the oil temperature sensor conne

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

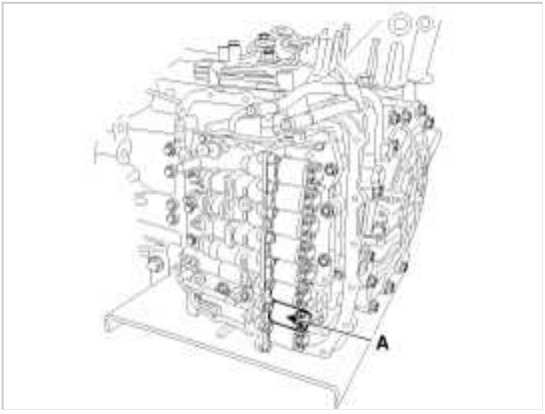



12. Remove the solenoid valve support bracket (A).

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

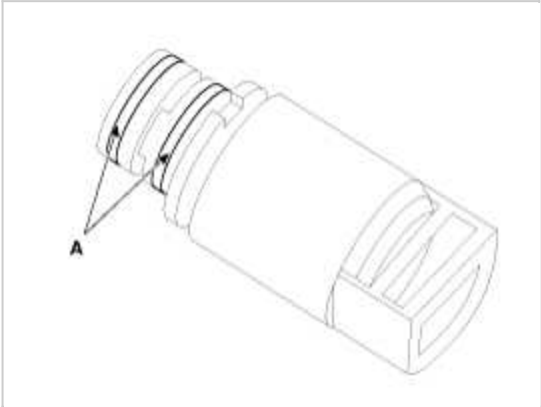


13. Remove the solenoid valve (A).




**⚠ 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.

**NOTICE**

- 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

Description

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

## Automatic Transaxle System

Specifications

ON/OFF Solenoid Valve(SS-B)

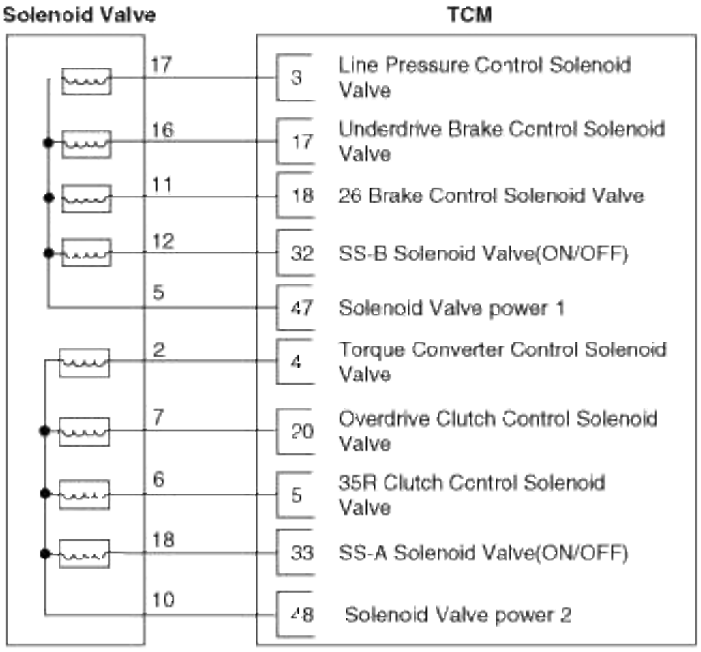
Control type : Normal low type

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

## Automatic Transaxle System

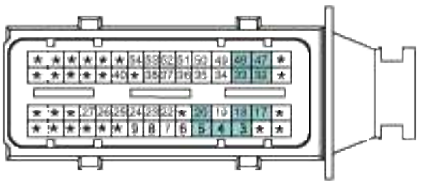
Circuit Diagram

[Circuit Diagram]



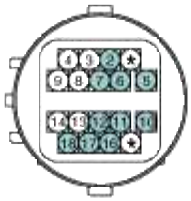

[Connection Information]

| Terminal | Connected to | Function |
|---|---|---|
| 17 | TCM(3) | Line Pressure Control Solenoid Valve |
| 16 | TCM(17) | Underdrive Brake Control Solenoid Valve |
| 11 | TCM(18) | 26 Brake Control Solenoid Valve |
| 12 | TCM(32) | SS-B Solenoid Valve(ON/OFF) |
| 5 | TCM(47) | Solenoid Valve power 1 |
| 2 | TCM(4) | Torque Converter Control Solenoid Valve |
| 7 | TCM(20) | Overdrive Clutch Control Solenoid Valve |
| 6 | TCM(5) | 35R Clutch Control Solenoid Valve |
| 18 | TCM(33) | SS-A Solenoid Valve(ON/OFF) |
| 10 | TCM(48) | Solenoid Valve power 2 |

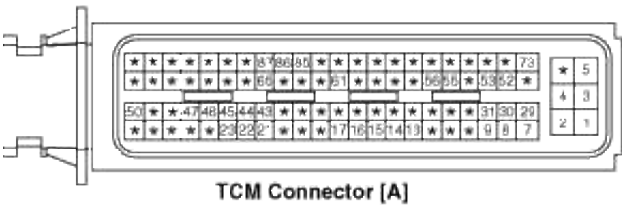


TCM Connector [B]

[Harness Connector]



Solenoid Valve Connector



TCM Connector [A]

## 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.

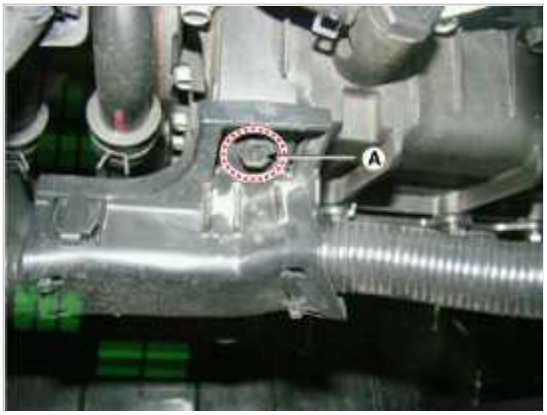
Removal

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

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


**⚠ CAUTION**
Replace the gasket before reinstalling the drain plug.

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



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


**⚠ CAUTION**

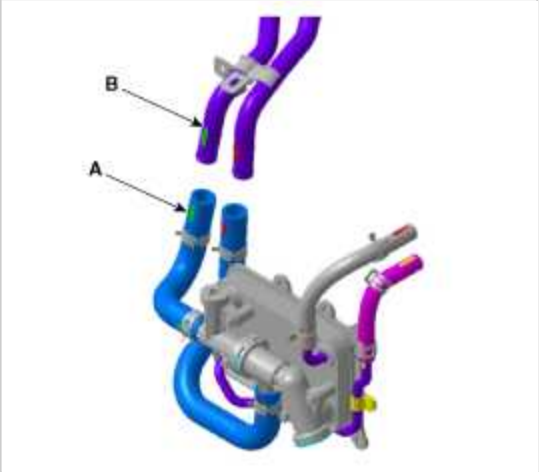
Replace the O-Ring (A) before reinstalling the eyebolt.


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.

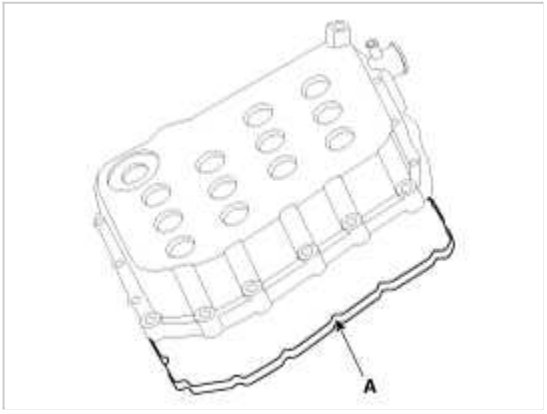



10. Remove the valve body cover (A).

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

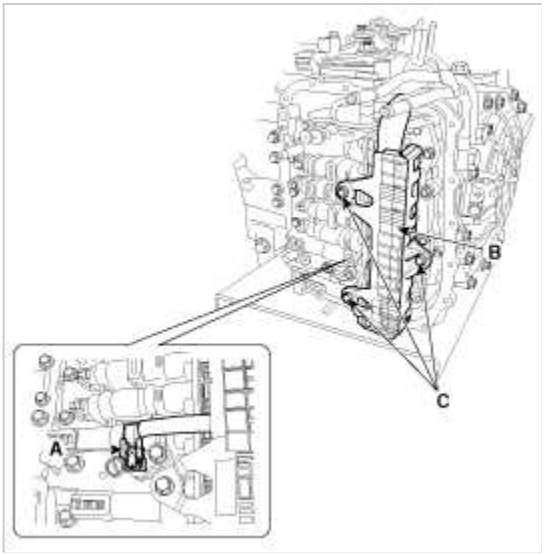
**CAUTION**

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



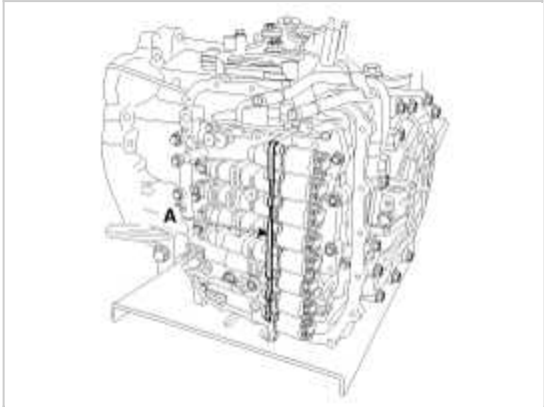

11. Remove the bolts (C) after disconnecting the solenoid valve connector (B) and the oil temperature sensor conne

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

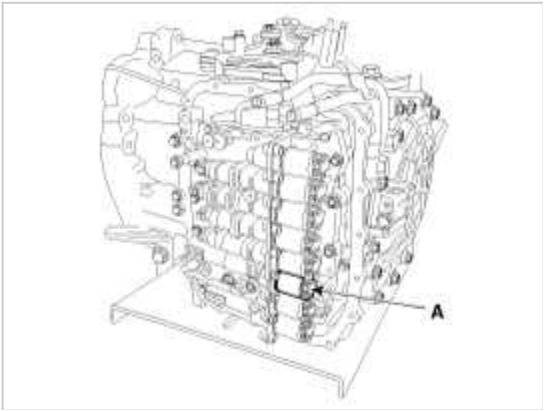



12. Remove the solenoid valve support bracket (A).

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

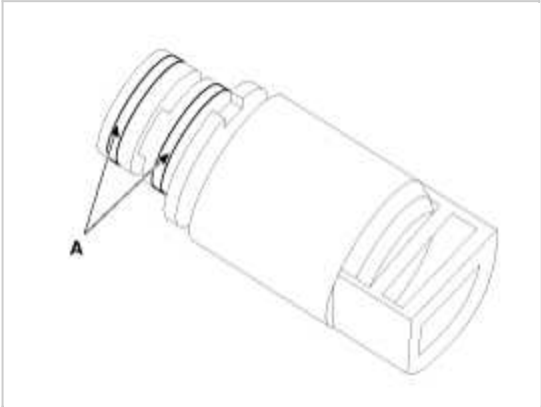


13. Remove the solenoid valve (A).




**⚠ 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.

**NOTICE**

- 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

Description

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

## Automatic Transaxle System

Specifications

Type: Combination of output signals from 4 terminals

Specifications

| | |
|---|---|
| Power supply (V) | 12 |
| Output type | Pin to Pin |

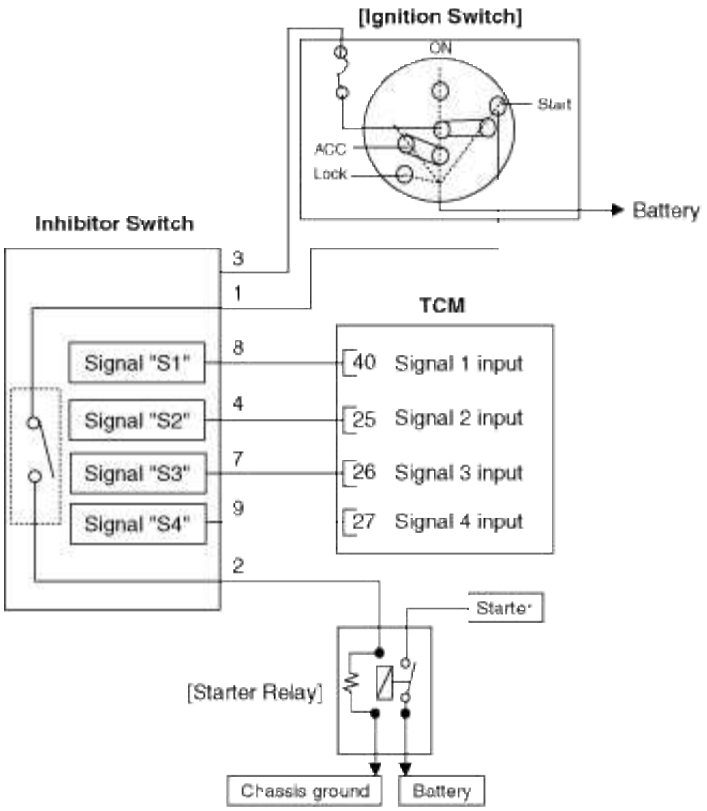
Signal Code Table

| | 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

Circuit Diagram

[Circuit Diagram]

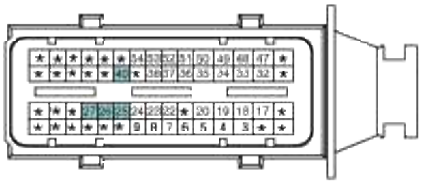



[Connection Information]

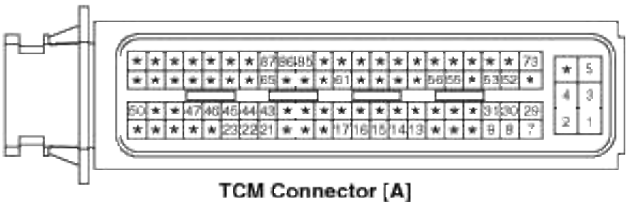
| Terminal | Connected to | Function |
|---|---|---|
| 8 | TCM 40 | Signal 1 input |
| 4 | TCM 25 | Signal 2 input |
| 7 | TCM 26 | Signal 3 input |
| 9 | TCM 27 | Signal 4 input |
| 3 | Ignition switch | Ignition ON |
| 1 | Ignition switch | Starter power(ON) |
| 2 | Starter relay | Starter relay |

[Harness Connector]


Inhibitor Switch Connector



TCM Connector [B]



TCM Connector [A]





Inspection

**NOTICE**

- Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, c 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".

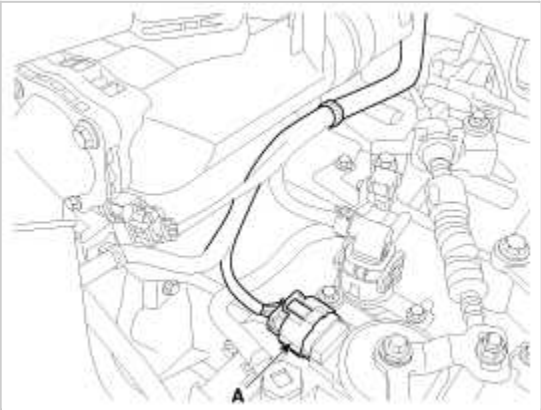
**Specification :** See below "Signal Code Table"

**Signal Code Table**

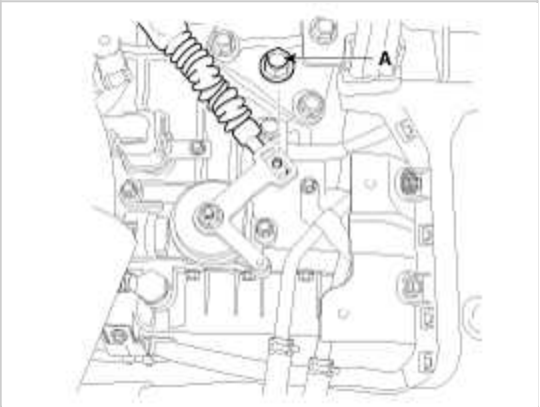
| | P | P-R | R | R-N | N | N-D | D |
|---|---|---|---|---|---|---|---|
| Signal "1" | 12V | 12V | 0 | 0 | 0 | 0 | 0 |
| Signal "2" | 0 | 12V | 12V | 12V | 0 | 0 | 0 |
| Signal "3" | 0 | 0 | 0 | 12V | 12V | 12V | 0 |
| Signal "4" | 0 | 0 | 0 | 0 | 0 | 12V | 12V |

Removal

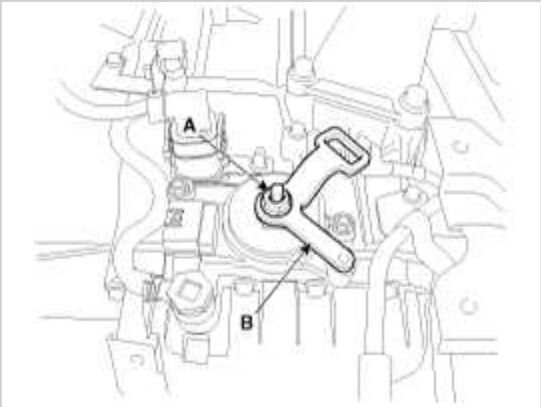
1. Place the shift lever into the "N" position.
2. Remove the air cleaner assembly.
   (Refer to Engine Mechanical System - "Air cleaner")
3. Remove the battery and the battery tray.
   (Refer to Engine Electrical System - "Battery")
4. Disconnect the inhibitor switch connector (A).



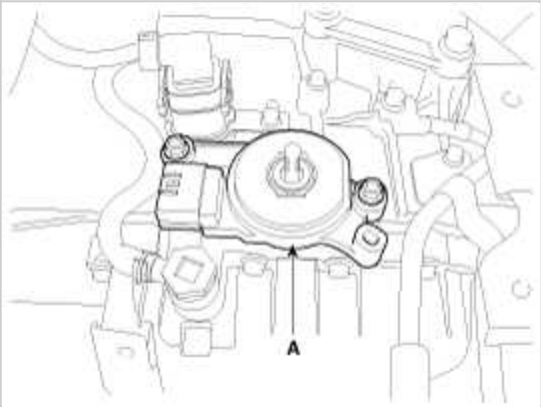

5. Remove the shift cable mounting nut (A).



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



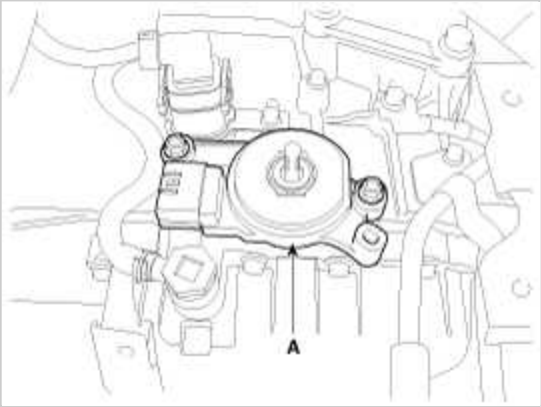

7. Remove the inhibitor switch (A) after removing the bolts (2ea).




Installation

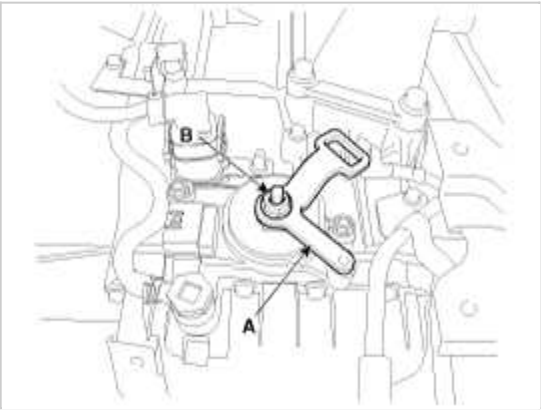
1. Check that the shift lever is placed in the "N" position
2. Install the inhibitor switch (A).

> **NOTICE**
>
> Lightly tighten the inhibitor switch mounting bolts so that necessary adjustments can be made.

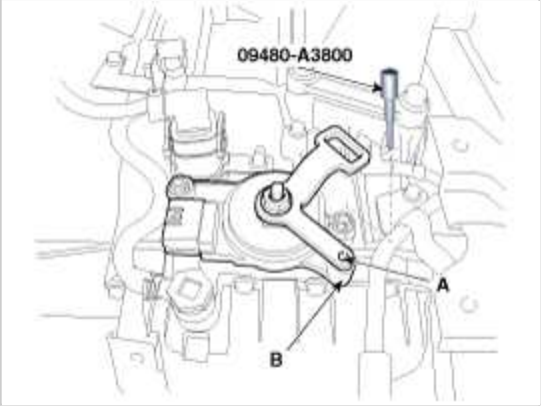


3. Install the manual control lever (A).

> **NOTICE**
> Lightly tighten the manual contorl lever nut (B) so that necessary adjustments can be made.

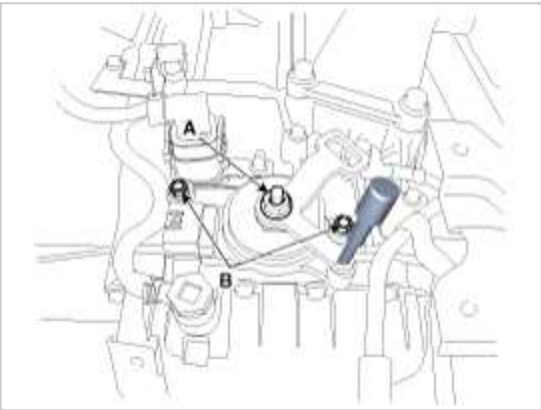



4. Align the hole (A) in the manual control lever with the "N" position hole (B) of the inhibitor switch and then insert inhibitor switch guide pin (09480-A3800).



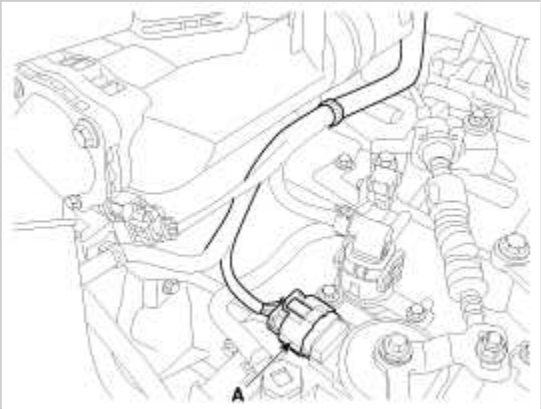

5. Tighten the nut (A) and bolts (B) with the specified torque.

**Tightening torque:**
A : 17.7~24.5 N.m (1.8~ 2.5 kgf.m, 13.0 ~ 18.1 lb-ft)
B : 9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



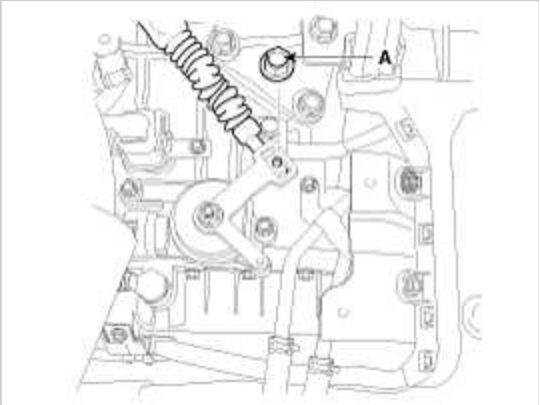

6. Remove the SST (09480-A3800) from the hole.

7. Connect the inhibitor switch connector (A).



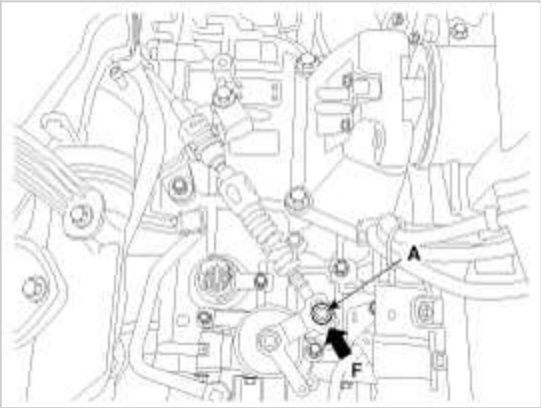

8. Install the shift cable by tightening nut (A).

> **NOTICE**
> Lightly tighten the shift cable mounting nut (A) so that necessary adjustments can be made.

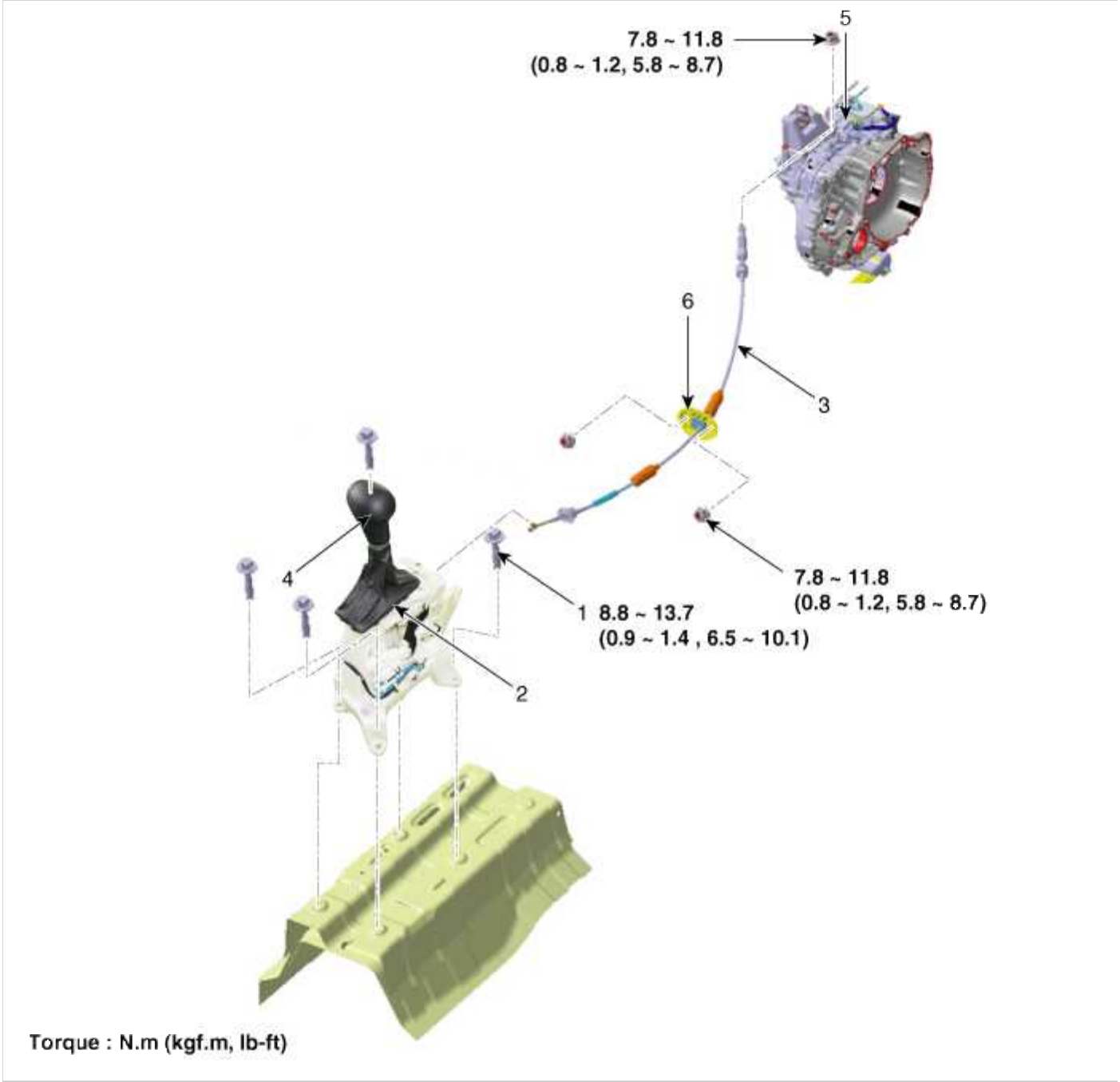



9. Push the shift cable to the arrow "F" to eliminate free play and then tighten the nut (A) with the specified torque.

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




10. Install the battery and battery tray.
(Refer to Engine Electrical System - "Battery")
11. Install the air cleaner assembly.
(Refer to Engine Mechanical System - "Air cleaner")




| | |
|---|---|
| 1. Shift lever mounting bolt<br>2. Shift lever assembly<br>3. Shift cable assembly | 4. Shift lever knob & boots assembly<br>5. Manual control lever<br>6. Retainer |

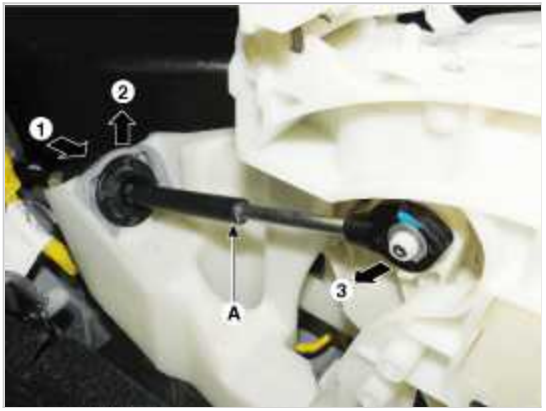
## Automatic Transaxle System

Removal

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

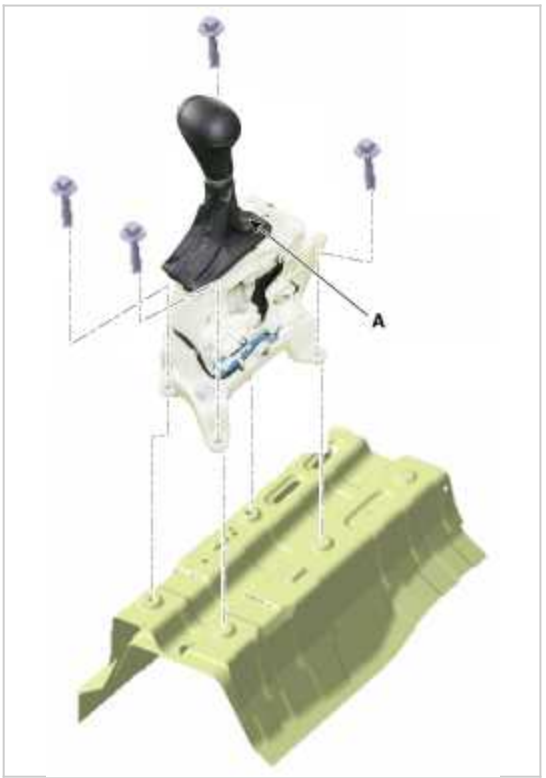
3. Disconnect the sports mode connector (A).


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)



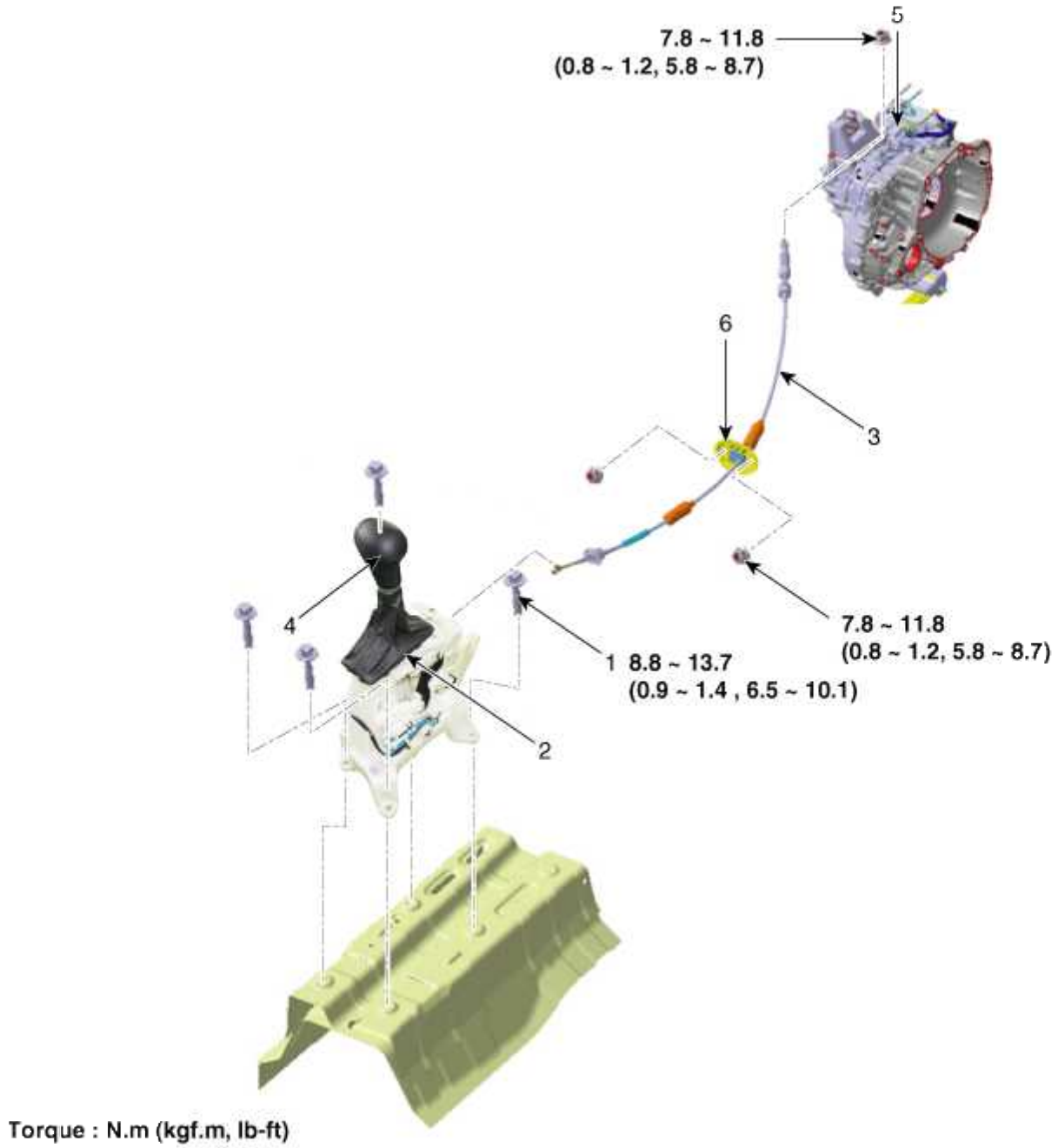

Installation

1. Install in the reverse order of removal.

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

## Automatic Transaxle System

Components

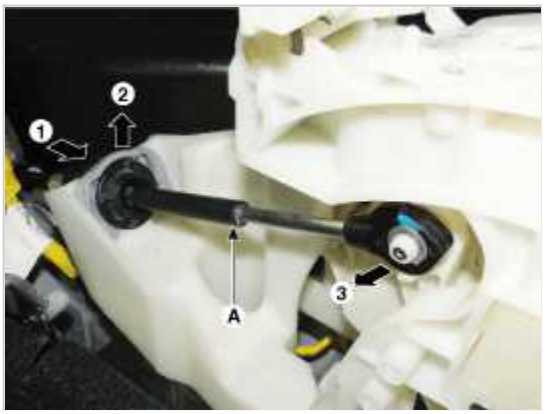



| | |
|---|---|
| 1. Shift lever mounting bolt<br>2. Shift lever assembly<br>3. Shift cable assembly | 4. Shift lever knob & boots assembly<br>5. Manual control lever<br>6. Retainer |

## Automatic Transaxle System

Removal

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



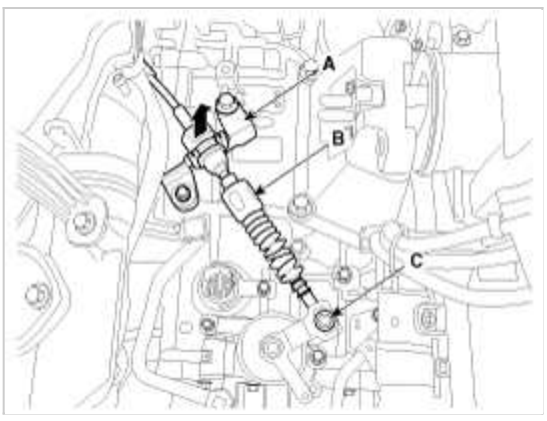

4. Remove the retainer (A) and nut (B).

**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.

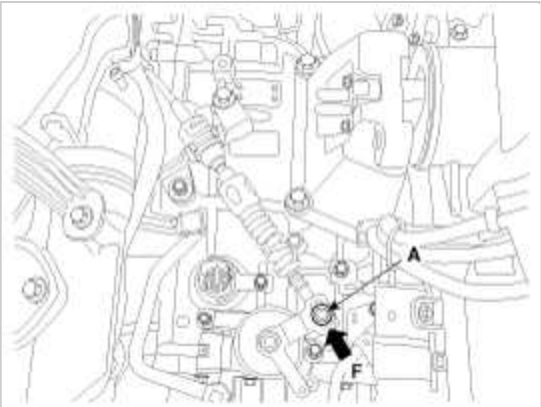
> **⚠ CAUTION**
> Set shift lever and inhibitor switch manual control lever to "N" position.

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 position of shift lever.