**Kia Cadenza Service Manual**
Full download: http://manualplace.com/download/kia-cadenza-service-manual/



## Specifications

| Item | | Specifications |
|---|---|---|
| Transaxle type | | A6LF2 |
| Engine model | | Gasoline 3.3 GDI |
| Torque converter type | | 3-element, 1-stage, 2-phase type |
| Torque converter size | | Φ260mm(10.2362 in) |
| Oil pump system | | Parachoid |
| Friction elements | | Clutch: 2EA |
| | | Brake: 3EA |
| | | OWC : 1EA |
| Planetary gear | | 3EA |
| Gear ration | 1st | 4.252 |
| | 2nd | 2.654 |
| | 3rd | 1.804 |
| | 4th | 1.386 |
| | 5th | 1.000 |
| | 6th | 0.772 |
| | Reverse | 3.393 |
| Final gear ratio | | 3.041 |
| Fluid pressure balance piston | | 2EA |
| Accumulator | | 4EA |
| Solenoid valve | | 8EA (VFS:6EA, ON/OFF:2EA) |
| Shift lever position | | 4 Range (P,R,N,D) |
| Oil filter | | 1EA |

VFS: Variable Force Solenoid

## Sensors

Input Speed Sensor
▹ Type: Hall effect sensor
▹ Specifications

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

Output Speed Sensor
▹ Type: Hall effect sensor
▹ Specifications

| | | |
|---|---|---|
| Operation condition (°C)°F | | ((-)40 ~ 150)) -40 ~ 302 |
| Air gap(mm)in. | | (1.45 ~ 1.9) 0.0571 ~ 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 |

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| | |
|---|---|
| (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 | 0.100 |
| (140)284.0 | 0.06 |
| (165)329.0 | 0.03 |

## Inhibitor Switch

▹ Type: Combination of output signals from 4 terminals
▹ Specifications

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

## Solenoid Valves

Direct control VFS[26/B, T/CON]
▹ Control type : Normal low type

| | |
|---|---|
| Control Pressure kpa (kgf/cm², psi) | 0 ~ 539.37<br>(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<br>( 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<br>( 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<br>N/H | OD/C-VFS<br>N/H | 35R/C-VFS<br>N/H | 26/B-VFS<br>N/L |
|---|---|---|---|---|---|---|
| N, P | ● | | ● | | ● | |
| 1 | Δ | | | Δ | ● | |
| 2 | | | | ● | ● | ● |
| 3 | | ● | | ● | | |
| 4 | | | | | ● | |
| | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 5 | | ● | ● | | | |
| 6 | | | ● | | ● | ● |
| L | ● | | | | ● | |
| R | ● | ● | ● | | | |

● : Connected status
Δ : Connected at vehicle speed above 8km/h

## Tightening Torques

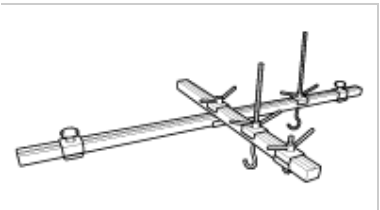
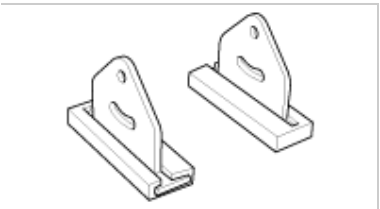
| Item | N.m | Kgf.m | lb-ft |
|---|---|---|---|
| TCM installation mounting bolt/nut | 9.8 ~ 11.8 | 1.0 ~ 1.2 | 7.2 ~ 8.7 |
| Shift cable bracket mounting bolt | 14.7 ~ 21.6 | 1.5 ~ 2.2 | 10.9 ~ 15.9 |
| Input shaft speed sensor mounting bolt | 9.8 ~ 11.8 | 1.0 ~ 1.2 | 7.2 ~ 8.7 |
| Output shaft speed sensor mounting bolt | 9.8 ~ 11.8 | 1.0 ~ 1.2 | 7.2 ~ 8.7 |
| Shift lever assembly bolt | 8.8 ~ 13.7 | 0.9 ~ 1.4 | 9.4 ~ 10.8 |
| Inhibitor switch mounting bolt | 9.8 ~ 11.8 | 1.0 ~ 1.2 | 7.2 ~ 8.7 |
| Valve body cover mounting bolt | 13.7 ~ 15.7 | 1.4 ~ 1.6 | 10.1 ~ 11.6 |
| Injection hole (eyebolt) | 4.9 ~ 5.9 | 0.5 ~ 0.6 | 3.6 ~ 4.3 |
| Oil drain plug | 34.3 ~ 44.1 | 3.5 ~ 4.5 | 25.3 ~32.6 |
| 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) | 63.7 ~ 83.4 | 6.5 ~ 8.5 | 47.0 ~ 61.5 |
| | 32.4 ~ 49.0 | 3.3 ~ 5.0 | 23.9 ~ 36.2 |
| Automatic transaxle lower mounting bolt (Eng=>TM) | 78.5 ~ 98.1 | 8.0 ~ 10.0 | 57.9 ~ 72.3 |
| | 39.2 ~ 46.1 | 4.0 ~ 4.7 | 28.9 ~ 34.0 |
| Automatic transaxle support bracket bolt | 58.8 ~ 78.5 | 6.0 ~ 8.0 | 43.4 ~ 57.9 |
| Automatic transaxle support bracket nut | 78.5 ~ 98.1 | 8.0 ~ 10.0 | 57.9 ~ 72.3 |
| Automatic transaxle mounting bracket bolt | 88.3 ~ 107.9 | 9.0 ~ 11.0 | 65.1 ~ 79.6 |

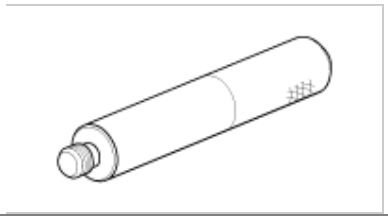
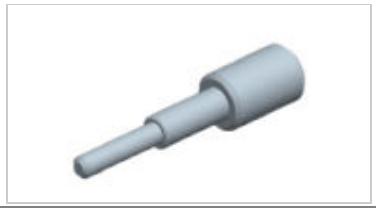
## Lubricants

| Item | Specified lubricant | Quantity |
|---|---|---|
| Transaxle fluid | ATF SP-Ⅳ or equivalent | 7.8L<br>(2.06 U.S gal., 8.24 U.S.qt., 6.86 Imp.qt.) |

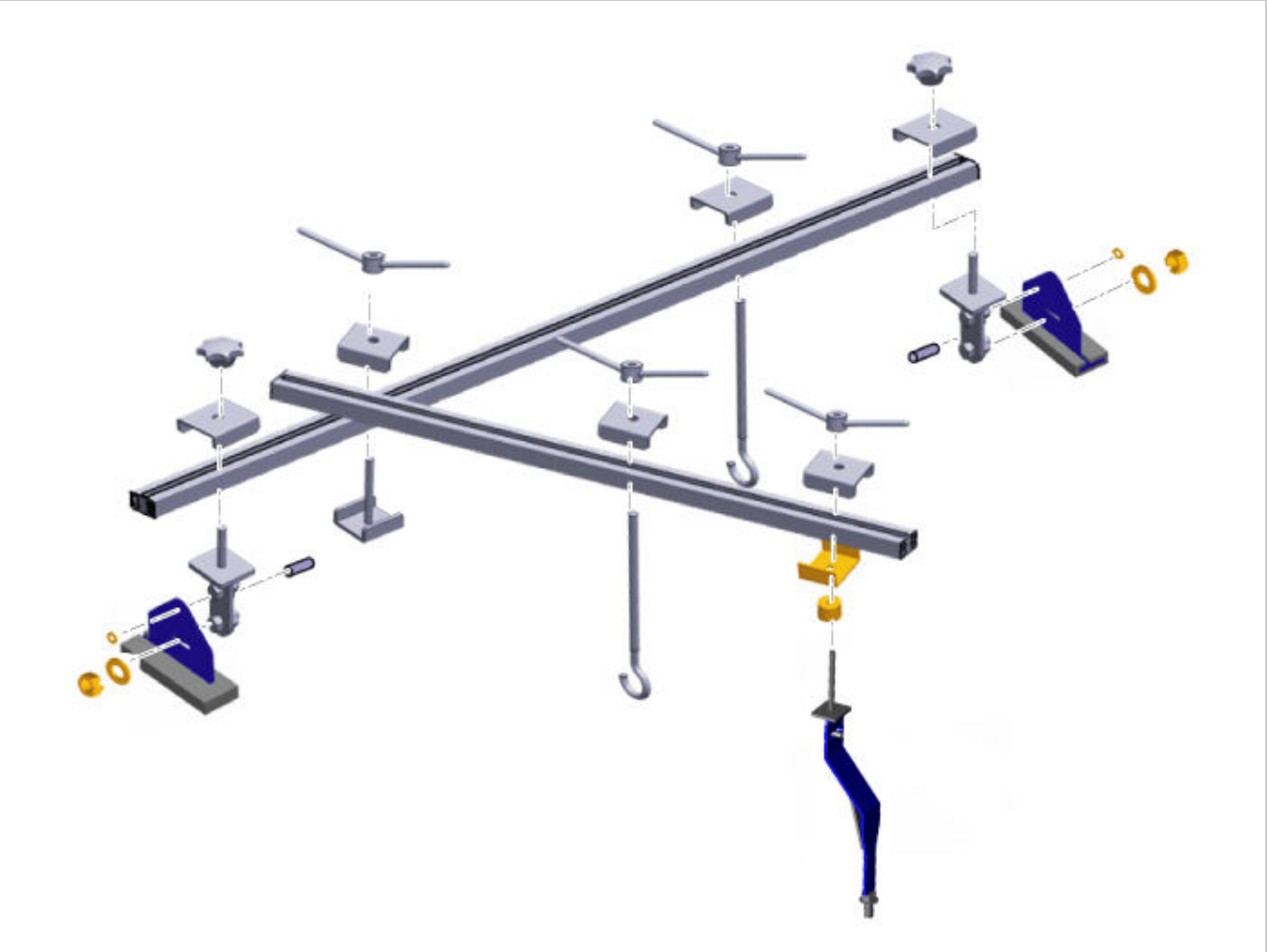


## Special Service Tools

| Tools<br>(Number and name) | Illustration | Use |
|---|---|---|
| 09200-3N000<br>Engine support fixture<br>(Beam) |  | Used for holding engine assembly when removing / installing transaxle.<br>Used with the supporter (09200-2S200) and adapter (09200-1P100). |
| 09200-2S200<br>Engine support fixture<br>(Supporter) |  | Used for holding engine assembly when removing / installing transaxle.<br>Used with the beam (09200-3N000) and adapter (09200-1P100). |
| | | |

| | | |
|---|---|---|
| 09200-1P100<br>Engine support fixture<br>(Adaptor) |  | Used for holding engine assembly when removing / installing transaxle.<br>Used with the beam (09200-3N000) and supporter (09200-2S200). |
| 09453-3L240<br>Oil seal installer |  | Installation of transaxle oil seal.<br>Used with the handle (09231-H1100). |
| 09231-H1100<br>handle |  | Installation of transaxle oil seal.<br>Used with the oil seal installer (09453-3L240). |
| 09480-A3800<br>Inhibitor switch guide pin |  | |

## ※ Engine support fixture assembly drawing



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 owner's home or dealer shop.

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

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

## Self-diagnosis

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

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

**⚠ CAUTION**

- Disconnecting a sensor or an actuator connector while the ignition switch is in the "On" position generates a Diagnostic Trouble Code (DTC) and commits the code to memory. In such event, disconnecting the battery will not clear the fault diagnosis memory. The diagnosis tool must be used to clear the fault diagnosis memory.
- Before removing or installing any part, read the diagnostic trouble codes and then disconnect the battery negative (-) terminal.
- Before disconnecting the cable from battery terminal, turn the ignition switch to OFF. Removal or connection of the battery cable during engine operation or while the ignition switch is ON could cause damage to the Transaxle Control Module (TCM).
- When checking the generator for the charging state, do not disconnect the battery '+' terminal to prevent the Engine Control Module (ECM) from damage due to the voltage.
- When charging the battery with the external charger, disconnect the vehicle side battery terminals to prevent damage to the TCM.

## Checking Procedure (Self-diagnosis)

**⚠ CAUTION**

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

**Inspection Procedure (Using the GDS)**

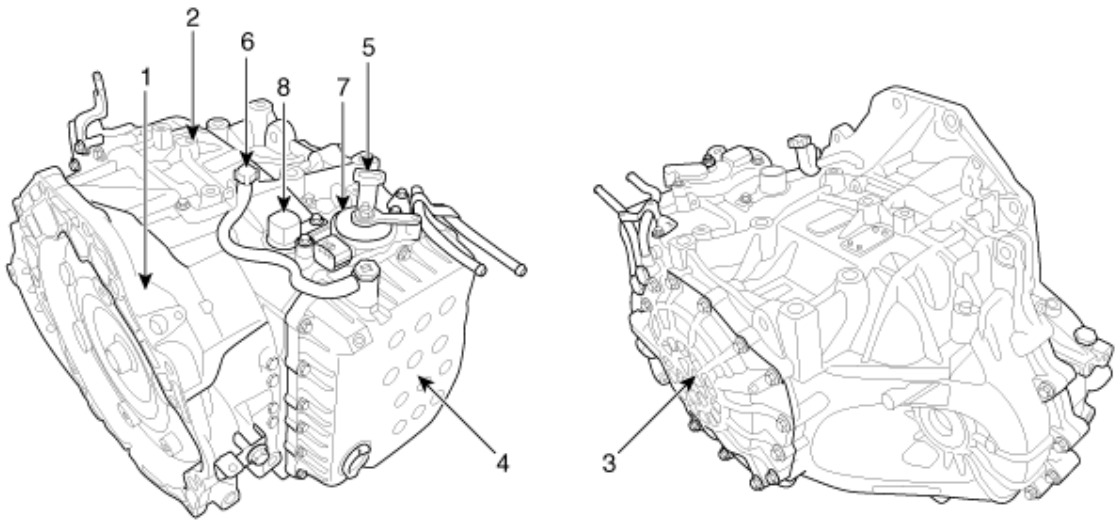
1. Turn OFF the ignition switch.
2. Connect the GDS to the data link connector on the lower crash pad.
3. Turn ON the ignition switch.
4. Use the GDS to check the diagnostic trouble code.
5. Repair the faulty part from the diagnosis chart.
6. Erase the diagnostic trouble code.
7. Disconnect the GDS.

**⚠ CAUTION**

- After replacing the automatic transaxle, use the GDS to reset (erase the TCM learning values). Then perform Transaxle Control Module (TCM) learning to provide optimum shift quality.
  (Refer to Automatic Transaxle Control System - "Repair procedures")
- Adding automatic transaxle fluid.
  (Refer to Hydraulic System - "Fluid")
- After servicing the automatic transaxle or TCM, clear the Diagnostic Trouble Code (DTC) using the GDS tool. Diagnostic Trouble Codes (DTC) cannot be cleared by disconnecting the battery.



## Components

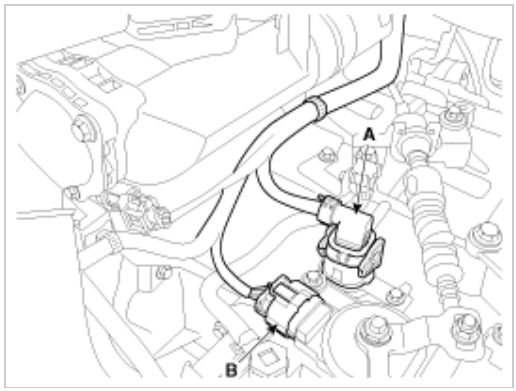



| | |
|---|---|
| 1. Converter housing | 5. Manual control lever |
| 2. Automatic transaxle case | 6. Air breather hose |
| 3. Rear cover | 7. Inhibitor switch |
| 4. Valve body cover | 8. Solenoid valve connector |



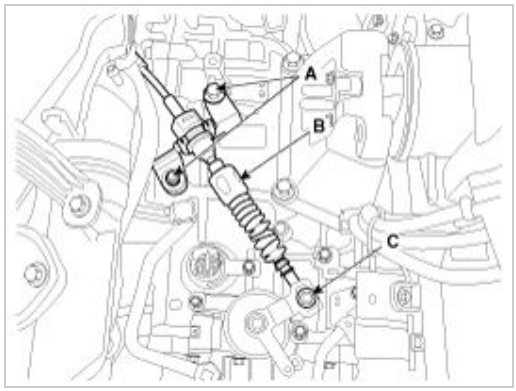
## Removal

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

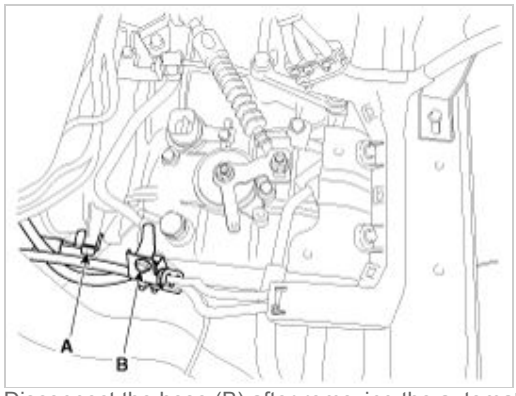



4. Remove the control cable (B) after removing the nut (C) and the bolt (A).

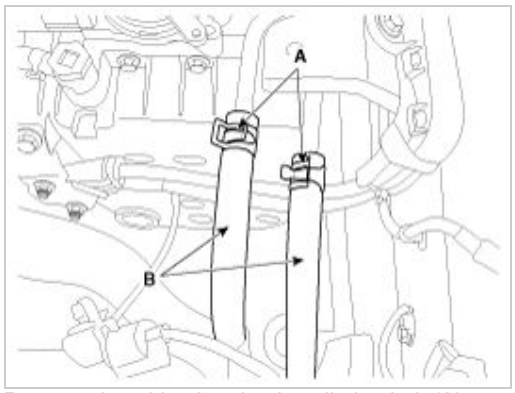
   **Tightening torque**
   (A) 14.7 ~21.6 N.m(1.5 ~ 2.2 kgf.m, 10.9 ~ 15.9 lb-ft)
   (C) 8.8 ~ 13.7 N.m (0.9 ~ 1.4 kgf.m, 6.5 ~ 10.1 lb-ft)



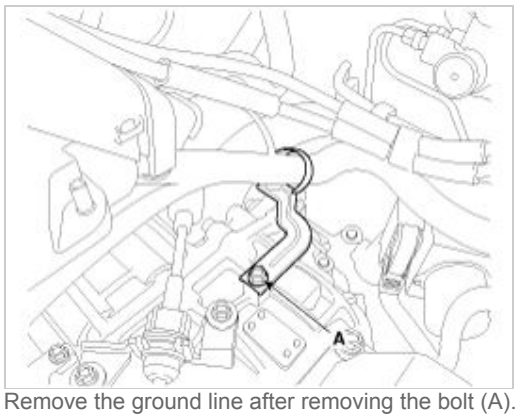

5. Remove the wiring bracket installation bolt (A, B).




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

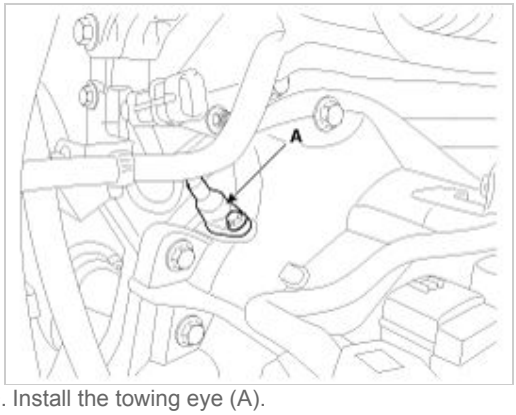



7. Remove the wiring bracket installation bolt (A).

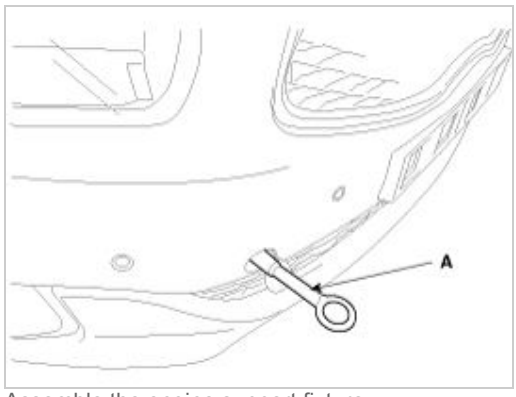



8. Remove the ground line after removing the bolt (A).

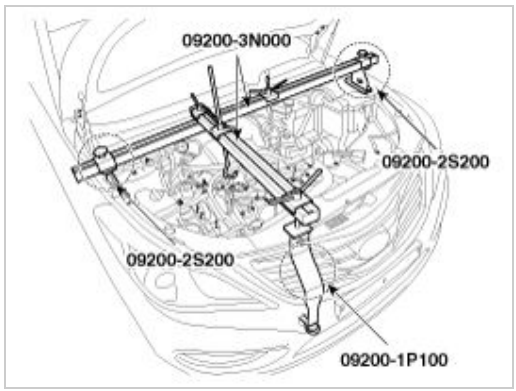

9. Remove the Crankshaft Position Sensor (A).




10. Install the towing eye (A).

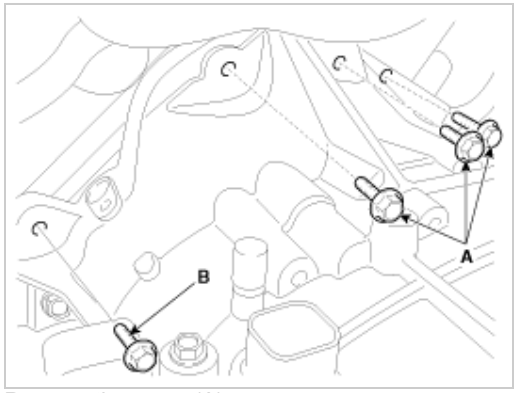



11. Assemble the engine support fixture.
    (Refer to Special Service Tools - "Engine support fixture assembly drawing")
12. Install the engine support fixture.

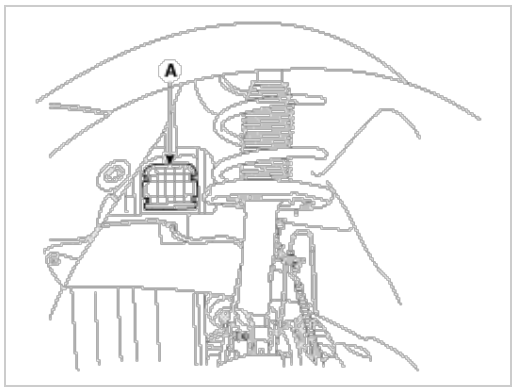



13. Remove the automatic transaxle upper mounting bolts (A, B).

**Tightening torque**
(A): 63.7 ~ 83.4 N.m (6.5 ~ 8.5 kgf.m, 47.0 ~ 61.5 lb-ft)
(B): 32.4 ~ 49.0 N.m (3.3 ~ 5.0 kgf.m, 23.9 ~ 36.2 lb-ft)

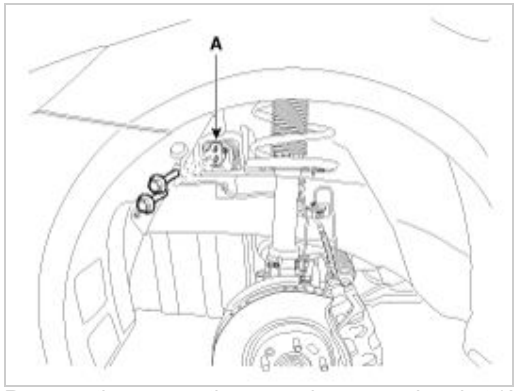



14. Remove the cover (A).



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

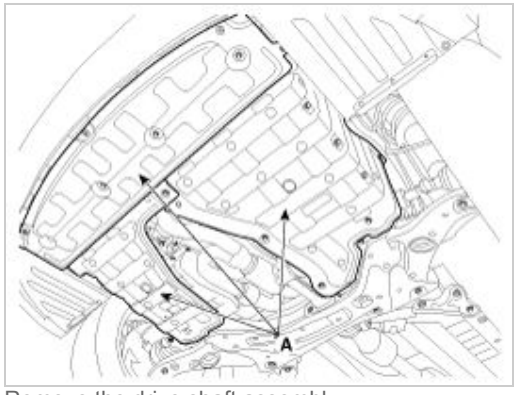
**Tightening torque:**
88.2 ~ 107.8 N.m (9.0 ~ 11.0 Kgf.m, 65 ~ 79.5 lb-ft)




16. Remove the automatic transaxle support bracket (A).

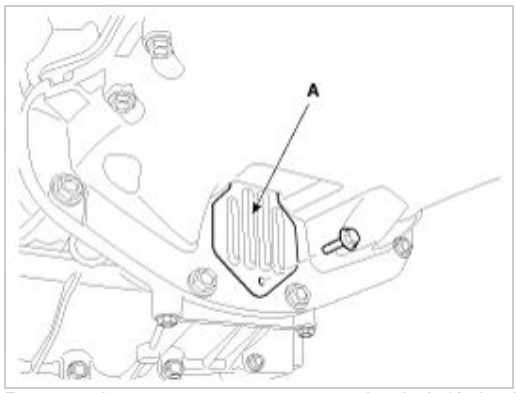
**Tightening torque**
Bolt: 58.8 ~ 78.4 N.m (6.0 ~ 8.0 kgf.m, 43.3 ~ 57.8 lb-ft)
Nut: 78.5 ~ 98.1 N.m (8.0 ~ 10.0 kgf.m, 57.9 ~ 72.3 lb-ft)


17. Lift the vehicle with a jack.
18. Remove the under cover (A).



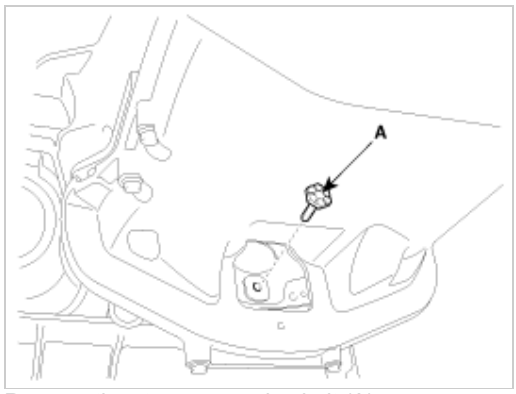

19. Remove the drive shaft assembly.
    (Refer to Driveshaft and axle - "Front Driveshaft")
20. Remove the sub frame assembly.
    (Refer to Suspension System - "Sub Frame")
21. Remove the bell housing cover (A).

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



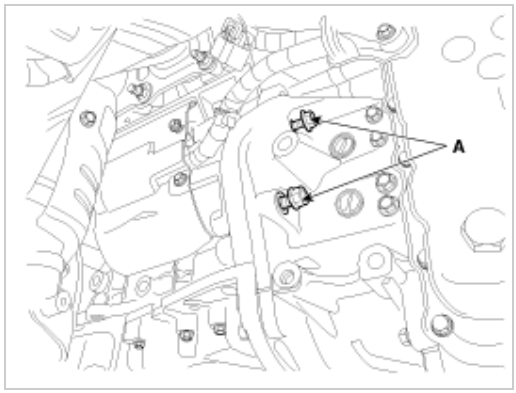

22. Remove the torque converter mounting bolt (A-6ea) with rotating the crankshaft.

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



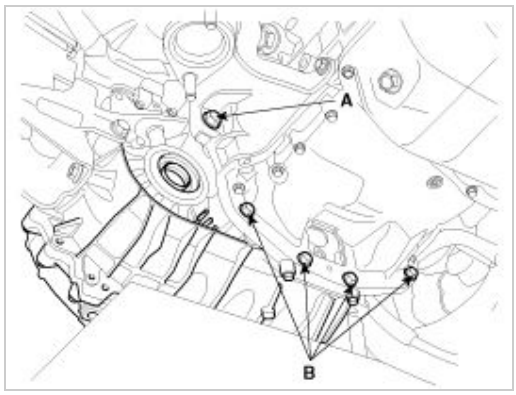

23. Remove the starter mounting bolt (A).

**Tightening torque:**
49.0 ~ 63.7 N.m (5.0 ~ 6.5 kgf.m, 36.2 ~ 47.0 lb-ft)




24. Remove the automatic transaxle with a jack after removing the mounting bolt (A-1ea, B-4ea).

**Tightening torque**
(A) 39.2 ~ 46.1 N.m (4.0 ~ 4.7 kgf.m, 28.9 ~ 34.0 lb-ft)
(B) 78.5 ~ 98.1 N.m (8.0 ~ 10.0 kgf.m, 57.9 ~ 72.3 lb-ft)




## Installation

1. Install in the reverse order of removal.

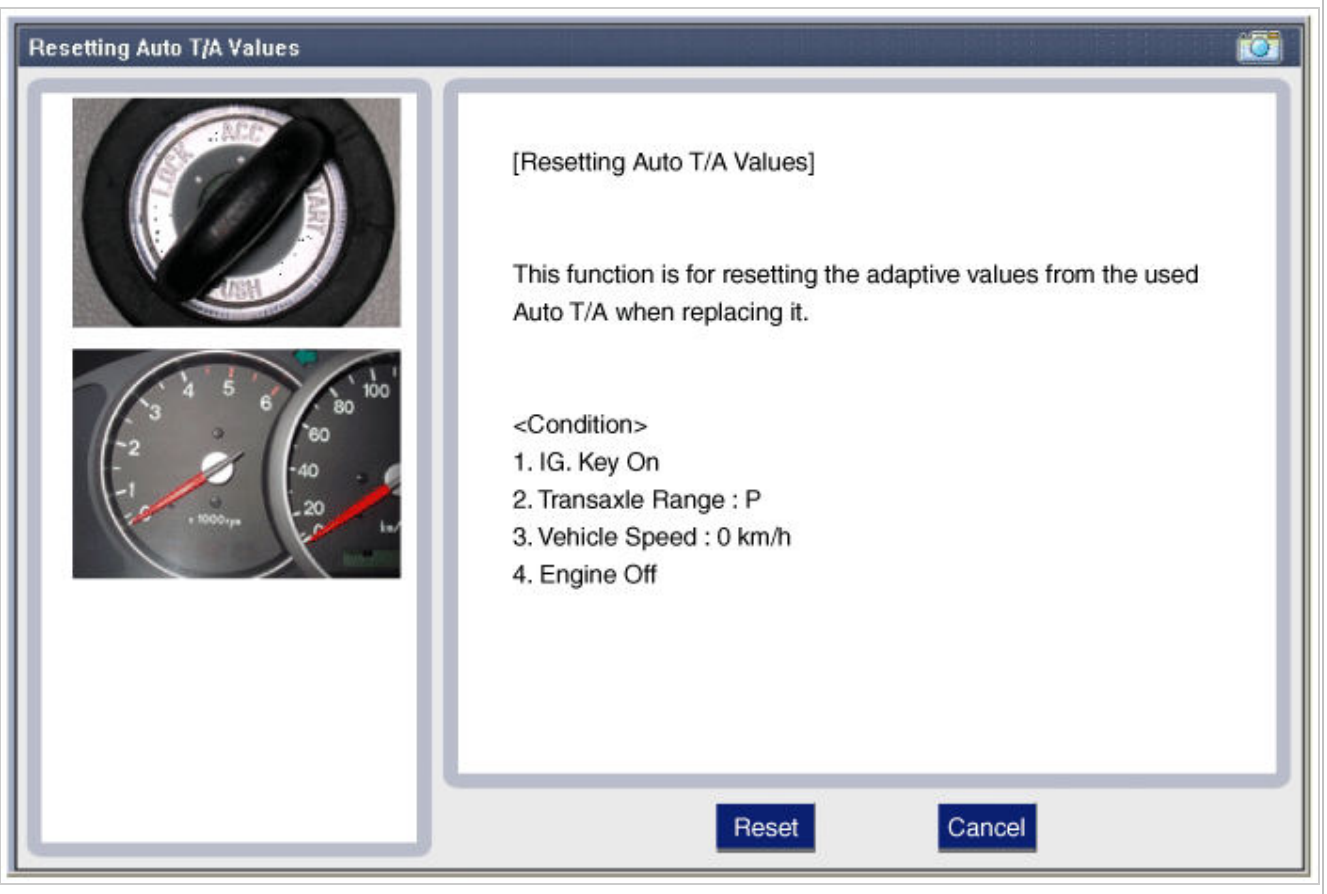
**⚠ CAUTION**

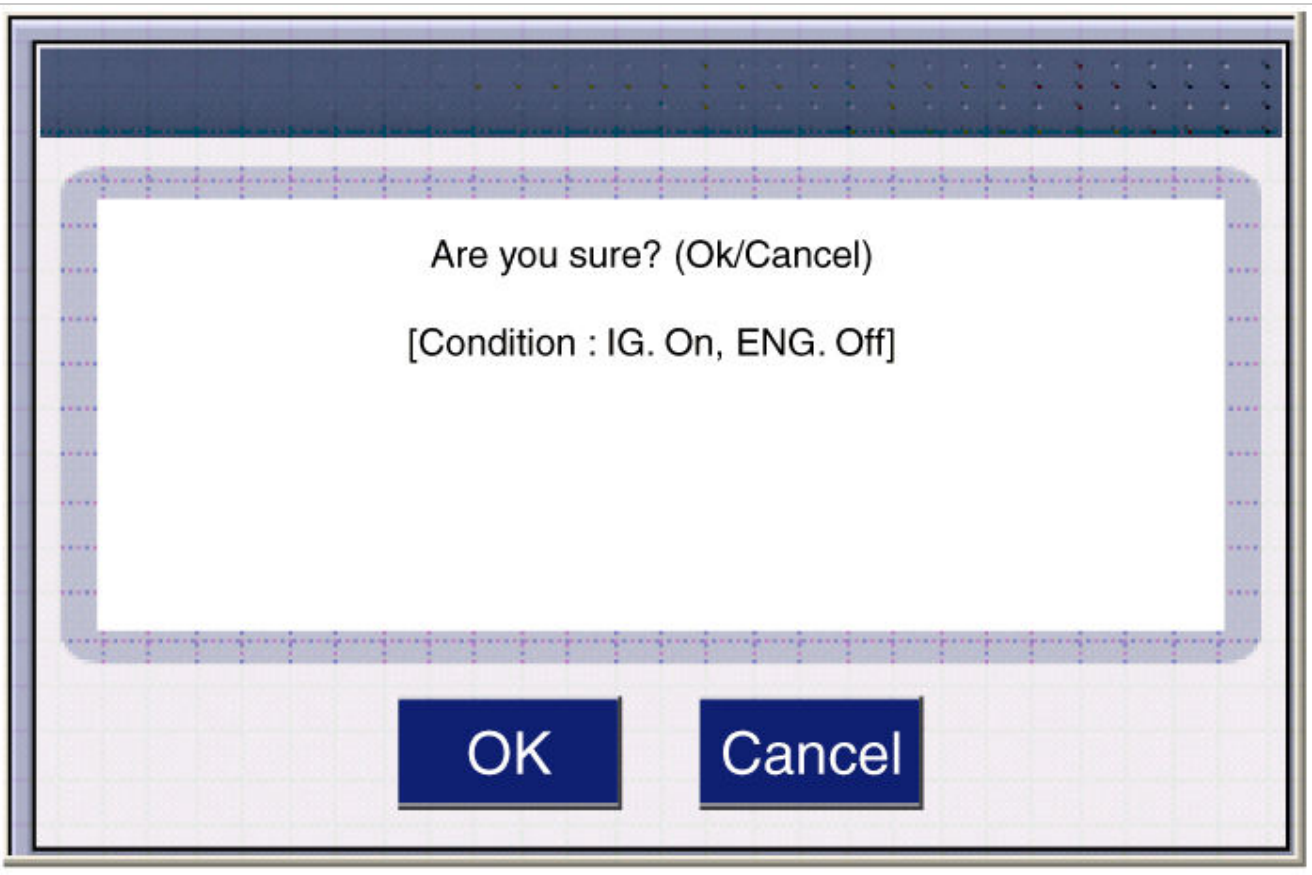
If the oil seal on the transaxle case side is damaged and fluid is leaking, replace the oil seal with a new unit. When installing the new oil seal, use the specialized tool (oil seal installer, 09453-3L240).

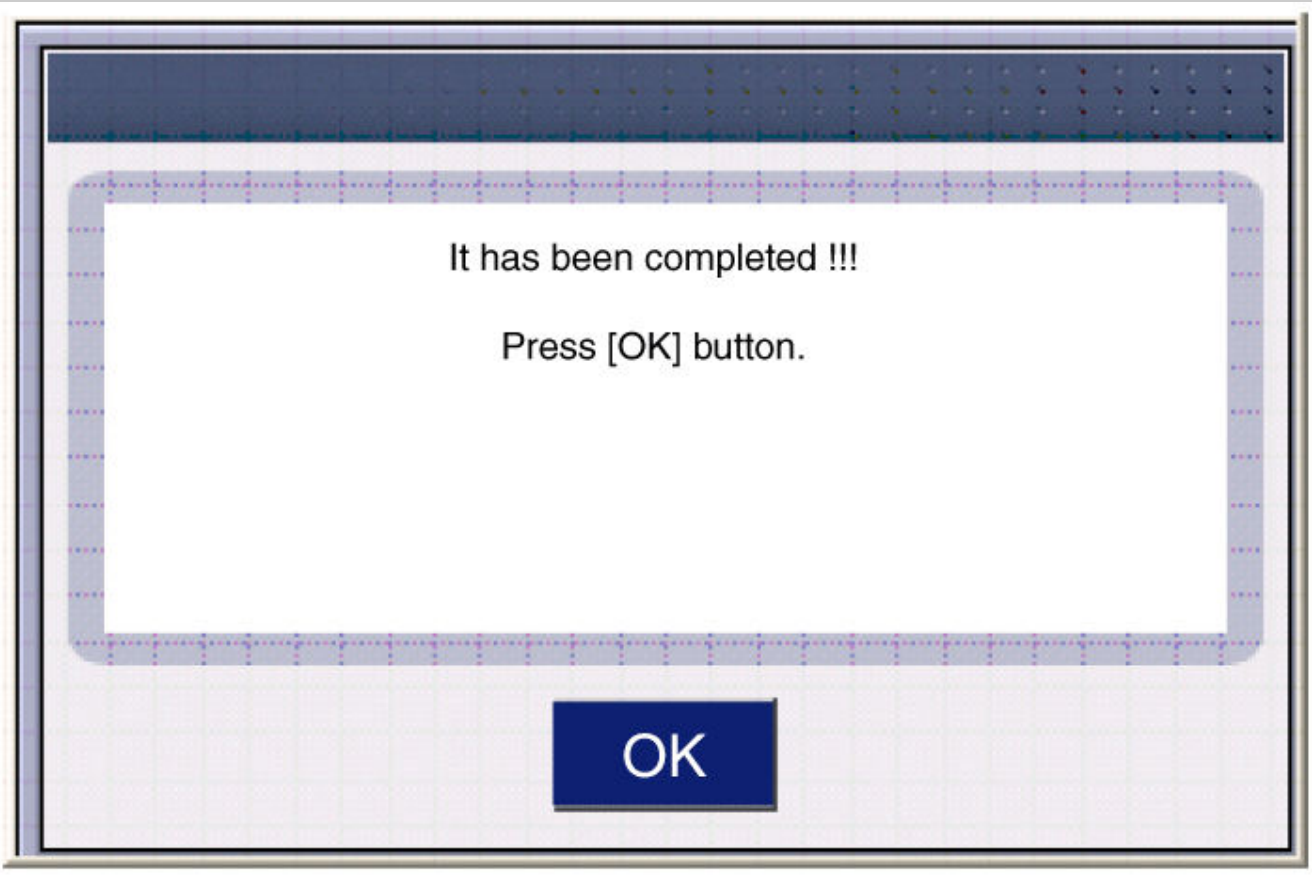
**NOTICE**

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

- Adding automatic transaxle fluid.
  (Refer to Hydraulic System - "Fluid")
- After replacing the automatic transaxle, clear the Diagnostic Trouble Code(DTC) using the GDS tool. DTC cannot 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 and jerky startup.

(Refer to Automatic Transaxle Control System - "Repair procedures")

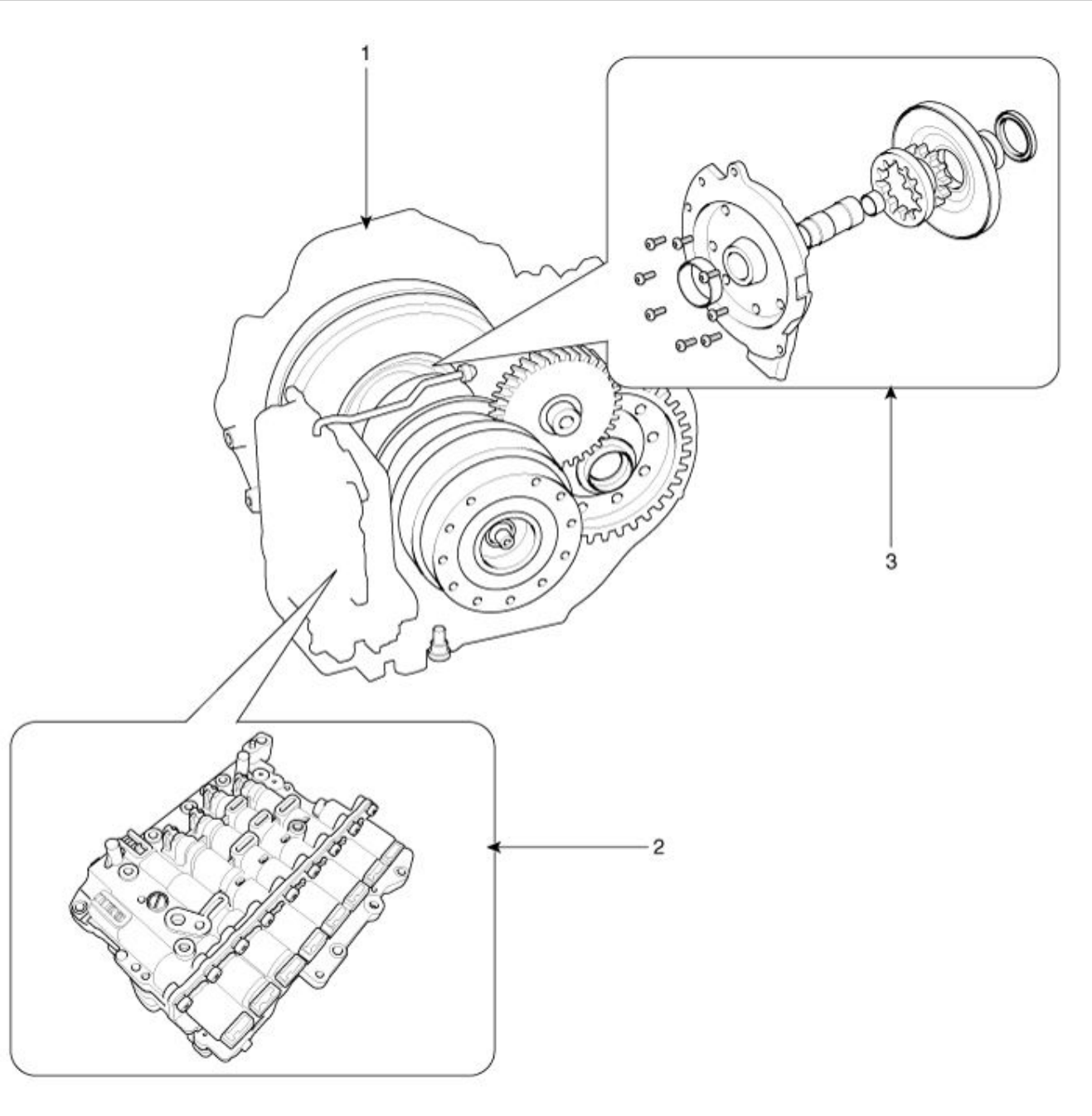
**Automatic Transaxle System**

## 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 to the clutch & brake control valve, clutch, and brakes. TCM controls the hydraulic pressure using solenoid valves and controls clutch and brake operations.

**Automatic Transaxle System**

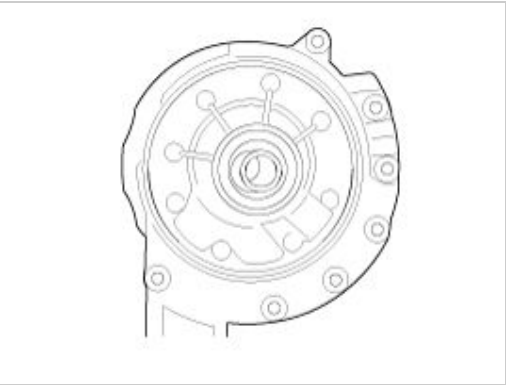
## Components Location




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

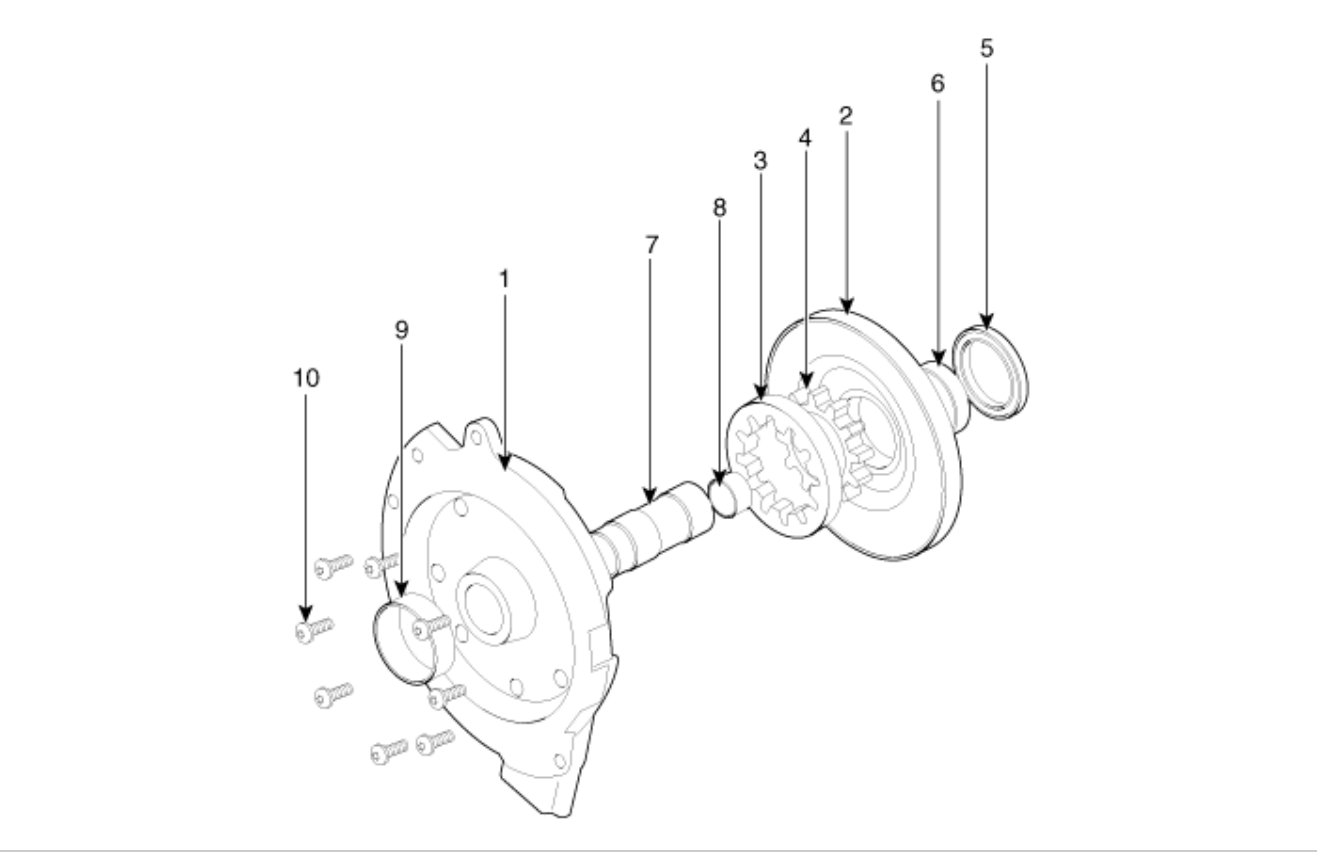
## Description

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



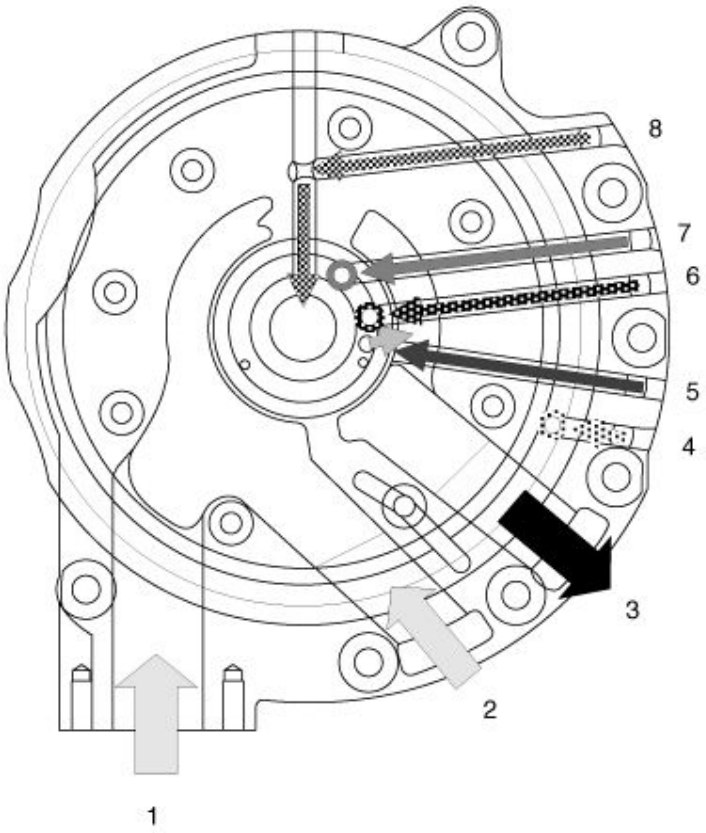
Automatic Transaxle System

## Components




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

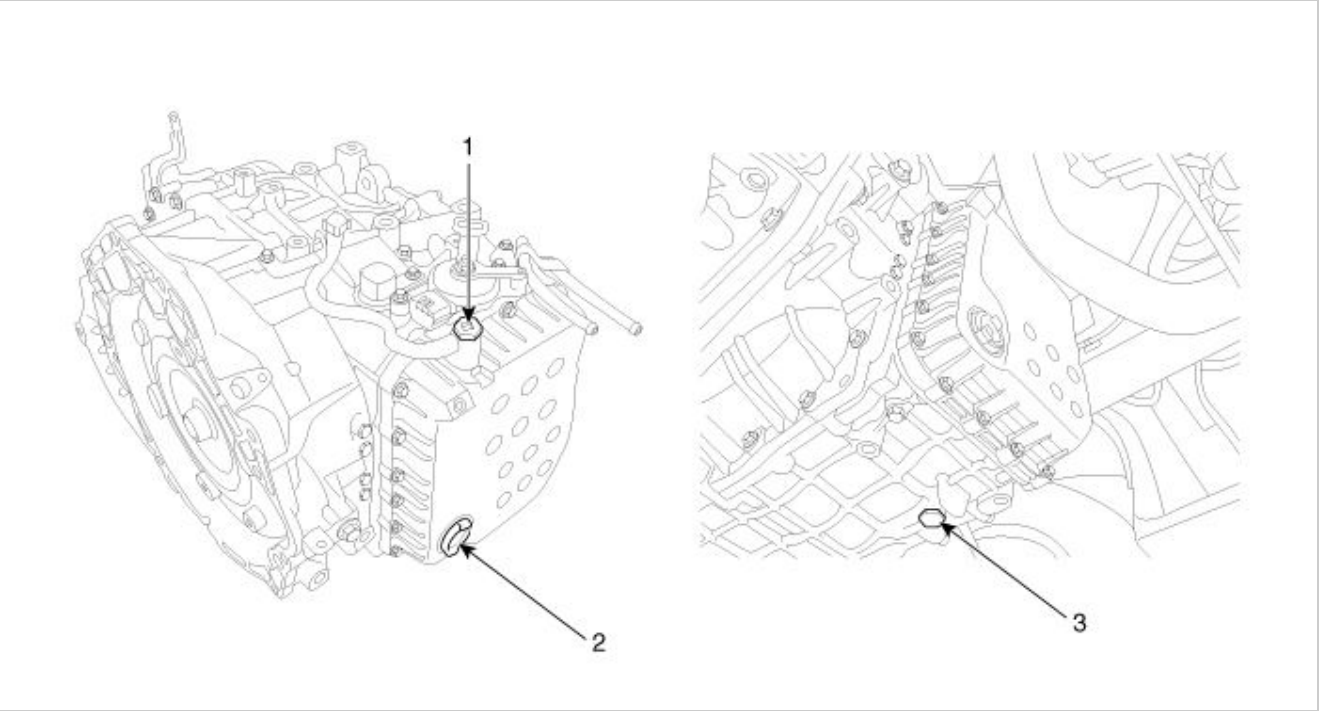
## Oil Pump Operation Flow




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



## Components Location




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



## Service Adjustment Procedure

**Oil level Check**

**NOTICE**

A check of Automatic Transaxle Fluid(ATF) level is not normally required during scheduled services. If an oil leak is found, perform the oil level check procedure after repairs are completed.

**⚠ CAUTION**

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

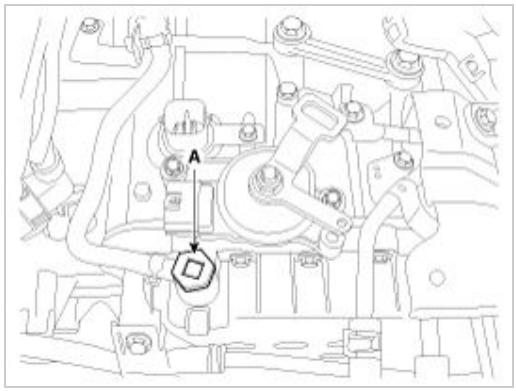
1. Remove the eyebolt (A).

   **Eyebolt tightening torque:**
   4.9 N.m ~ 5.9 N.m (0.5 ~ 0.6 kgf.m, 3.6 ~ 4.3 lb.ft)

   **⚠ CAUTION**

   Always replace the gasket of the eyebolt use new one whenever loosening eyebolt.

2. Add ATF SP-IV 700cc to the ATF injection hole.

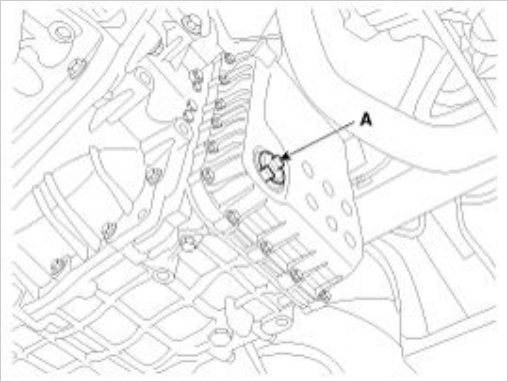


3. Start the engine. (Don’t step on brake and accelerator simultaneously.)
4. Confirm that the temperature of the Automatic Transaxle(AT) Oil Temperature Sensor(OTS) is 50~60°C(122~140°F) with the GDS.
5. Shift the select lever slowly from “P” to “D”, then “D” to “P” and repeat one more at idle.

**⚠ CAUTION**

Stop in each gear position for 3 seconds.

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




**⚠ CAUTION**

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

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

***NOTICE***

Oil level check (excess or shortage) method

- Excess: Oil flows out in thick stream.
- Shortage: No oil flows out of the overflow plug.

**⚠ CAUTION**

If there is no damage at the automatic transaxle and the oil cooler, the oil cooler hose, transaxle case, valve body tightening state are normal, ATF must drip out after performing above 1 to 7 procedures. After performing Steps 1 to 7, if the oil doesn't flow out in a thin steady stream, inspect the transaxle for an oil leak. If no oil leaks are found, perform Steps 2~7 again.

**⚠ CAUTION**

Replace the gasket of the oil level plug and use new one whenever loosening the oil level plug.

**To tighten oil level plug:**

Turn the oil level plug clockwise until it is set.

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

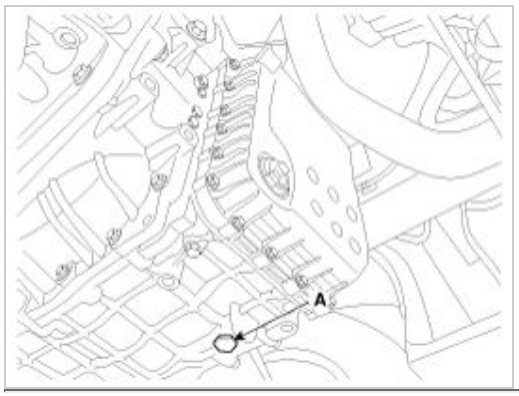
## Replacement

***NOTICE***

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

- 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 drain the ATF totally. Reinstall the drain plug.




**Drain plug tightening torque:**
34.3 ~ 44.1 N.m (3.5 ~ 4.5 kgf.m, 25.3 ~32.6 lb-ft)

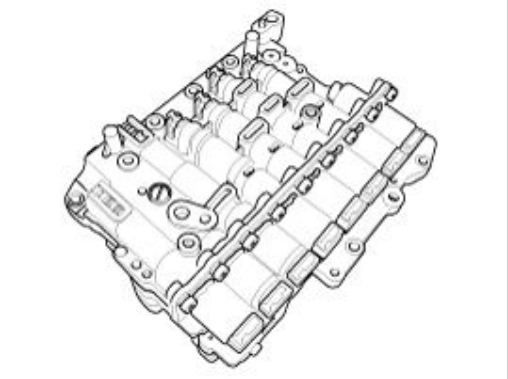
**⚠ CAUTION**
The gasket of the drain plug use new one.

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

**Automatic Transaxle System**

## Description

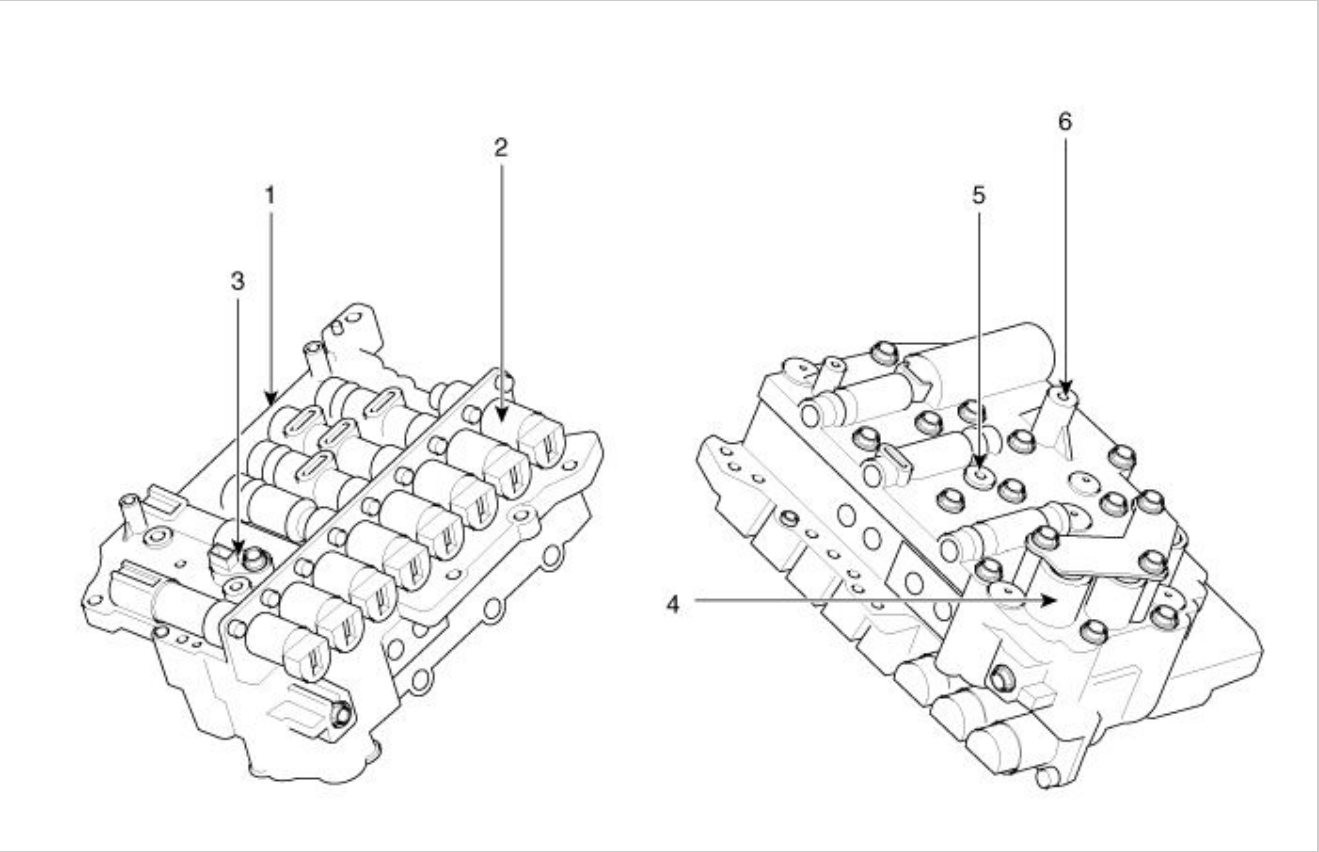
The valve body is essential to automatic transaxle control and consists of various valves used to control the oil feed from the oil pump. Specifically, these valves consist of pressure regulator valves, oil redirection valves, shift valves, and manual valves. The body also features electronic solenoid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



**Automatic Transaxle System**

## Components Location

**Kia Cadenza Service Manual**
Full download: http://manualplace.com/download/kia-cadenza-service-manual/




| | |
|---|---|
| 1. PCV adjust screw | 4. Accumulator |
| 2. Solenoid valve | 5. Low & reverse brake(LR/B) pressure flow hole |
| 3. Oil temperature sensor | 6. Under drive brake (UD/B) pressure flow hole |

### Valve Body Flow

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