

## SOUL(AM) &gt; 2013 &gt; G 1.6 GDI &gt; Automatic Transaxle System

## Automatic Transaxle System &gt; General Information &gt; Specifications

## Specifications

Item		Specifications
Transmission type		A6GF1
Engine model		Gasoline 1.6 GDI
Torque converter type		3-element, 1-stage, 2-phase type
Torque converter size		Ø225 mm (8.8583 in.)
Oil pump system		Parachoid
Friction elements		Clutch: 2EA
		Brake: 3EA
		OWC: 1EA
Planetary gear		3EA
Gear ratio	1st	4.400
	2nd	2.726
	3rd	1.834
	4th	1.392
	5th	1.000
	6th	0.774
	Reverse	3.440
Final gear ratio		3.796
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.		(1.2 ~ 1.8) 0.0472 ~ 0.0709
Output voltage(V)	High	1.18 ~ 1.68
	Low	0.59 ~ 0.84

## Output Speed Sensor

Type: Hall effect sensor

## Specifications

Operation condition (°C)°F	((-)40 ~ 150)) -40 ~ 302	
Air gap(mm)in.	(0.85 ~ 1.3) 0.0335 ~ 0.0512	
Output voltage	High	1.18 ~ 1.68
	Low	0.59 ~ 0.84

## Oil Temperature Sensor

Type: Negative thermal coefficient type

## Specifications

Temp. [(°C)°F]	Resistance (kΩ)
(-40)-40	48.1
(-20)-4.0	15.6
(0)32.0	5.88
(20)68.0	2.51
(40)104.0	1.11
(60)140.0	0.61
(80)176.0	0.32
(100)212.0	0.18
(120)248.0	0.10
(140)284.0	0.06
(150)302.0	0.05

## Inhibitor Switch

Type: Combination of output signals from 4 terminals

## Specifications

Power supply (V)	12
Output type	Combination of output signals

## Solenoid Valves

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

Control type : Normal low type

Control Pressure kpa (kgf/cm <sup>2</sup> , psi)	9.81 ~ 500.14 (0.1 ~ 5.1, 1.42 ~ 72.54)
Current value(mA)	50 ~ 850
Internal resistance(Ω)	5.1

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

Control Type : Normal high type

Control Pressure kpa (kgf/cm <sup>2</sup> , psi)	500.14 ~ 9.81 (5.1 ~ 0.1, 72.54 ~ 1.42)
Current value(mA)	50 ~ 850
Internal resistance( $\Omega$ )	5.1

Line Pressure Control VFS

Control type : Normal high type

Control Pressure kpa (kgf/cm <sup>2</sup> , psi)	500.14 ~ 9.81 (5.1 ~ 0.1, 72.54 ~ 1.42)
Current value(mA)	50 ~ 850
Internal resistance( $\Omega$ )	5.1

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

Control type : Normal low type

Control pressure kpa (kgf/cm <sup>2</sup> , psi)	490.33(5.0, 71.12)
Internal resistance( $\Omega$ )	10 ~ 11

**Solenoid Valve Operation Table**

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

● : Connected status

Δ : Connected at vehicle speed above 8km/h

Tightening Torques

Item	N.m	Kgf.m	lb-ft
TCM installation mounting bolt	9.8 ~ 11.8	1.0 ~ 1.2	7.2 ~ 8.7
Shift cable bracket mounting bolt	14.7 ~ 21.6	1.5 ~ 2.2	10.8 ~ 15.9
Input shaft speed sensor mounting bolt	9.8 ~ 11.8	1.0 ~ 1.2	7.2 ~ 8.7
Output shaft speed sensor mounting bolt	9.8 ~ 11.8	1.0 ~ 1.2	7.2 ~ 8.7
Shift lever assembly bolt	9.8 ~ 13.7	1.0 ~ 1.4	7.2 ~ 10.8
Inhibitor switch mounting bolt	9.8 ~ 11.8	1.0 ~ 1.2	7.2 ~ 8.7
Valve body cover mounting bolt	13.7 ~ 15.7	1.4 ~ 1.6	10.8 ~ 11.6
Eyebolt	2.9 ~ 4.9	0.3 ~ 0.5	2.2 ~ 3.6
Oil drain plug	38.2 ~ 48.1	3.9 ~ 4.9	28.2 ~ 35.4
Torque converter mounting bolt	45.1 ~ 52.0	4.6 ~ 5.3	33.3 ~ 38.3
Starter motor mounting 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 bolt	88.3 ~ 107.9	9.0 ~ 11.0	65.1 ~ 79.6

## Lubricants

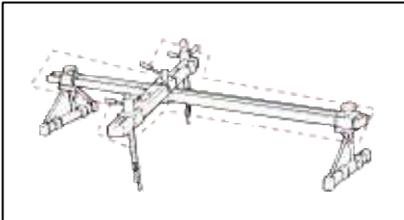
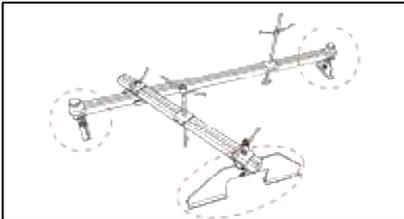
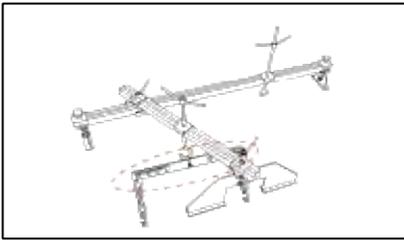
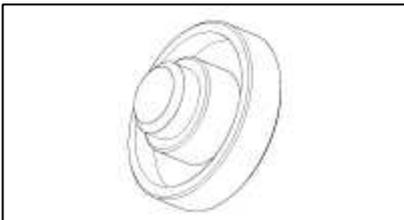
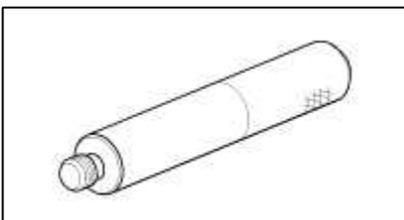
Item	Specified lubricant	Quantity
Transaxle fluid	SK ATF SP- , MICHANG ATF SP- , NOCA ATF SP- , Kia Genuine ATF SP- or other brands meeting the above specification approved by Kia Motors Corp.	7.3L (1.93 U.S gal., 7.71 U.S.qt., 6.42 Imp.qt.)

## Sealant

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

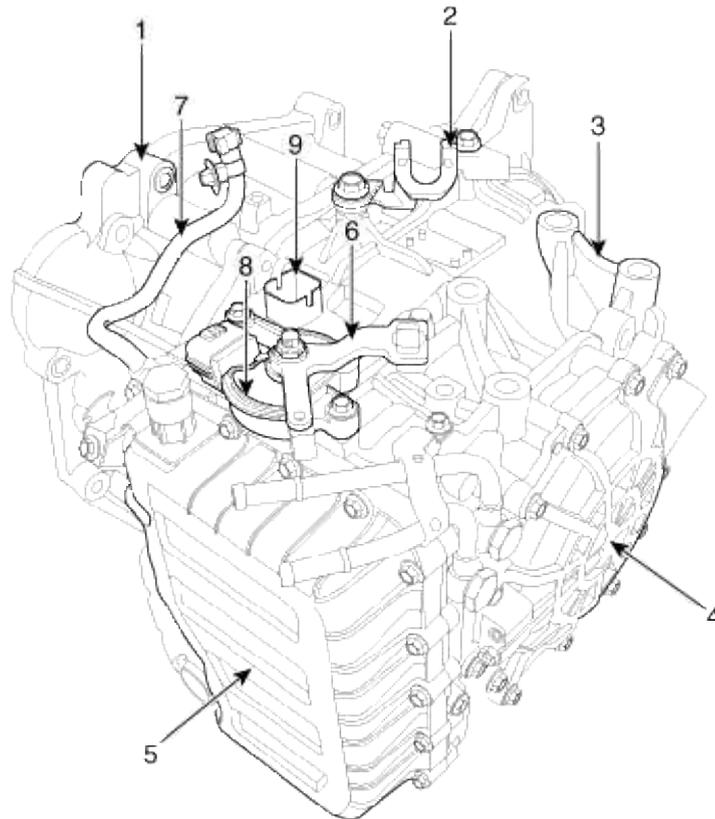
## Automatic Transaxle System &gt; General Information &gt; Special Service Tools

## Special Service Tools

Tools (Number and name)	Illustration	Use
09200-38001 Engine support fixture (Beam)		Removal and installation of the transaxle. Except lower supporter, use beam only with new engine support fixture supporter(SST No.:09200-2S000)
09200-2S000 Engine support fixture (supporter)		Removal and installation of the transaxle. [Using with handle (SST No.:09200-38001)]
09200-4X000 Engine support fixture (adapter)		Removal and installation of the transaxle. [Using with handle (SST No.:09200-38001) and supporter(SST No.: 09200-2S000)]
09452-26100 Oil seal installer		Installation of transaxle case oil seal. [Using with handle (SST No.:09231-H1100)]
09231-H1100 Bar		Installation of transaxle case oil seal. [Using with oil seal installer (SST No.:09452-26100)]

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

#### Components Location



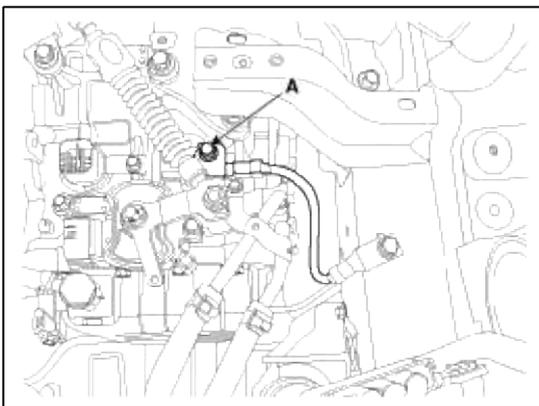
1. Converter housing	6. Manual control lever
2. Shift cable bracket	7. Air breather hose
3. Automatic transaxle case	8. Inhibitor switch
4. Rear cover	9. Solenoid valve connector
5. Valve body cover	

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

#### Removal

1. Remove the following items;
  - A. Engine cover.
  - B. Air cleaner assembly and air duct.  
(Refer to "Intake and Exhaust system" in EM group.)
  - C. Battery and battery tray.  
(Refer to "Charging system" in EE group.)

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

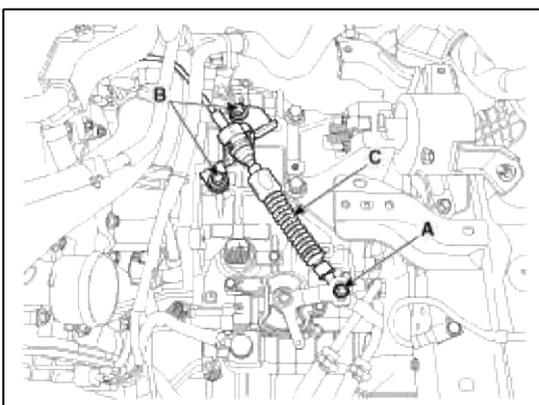


3. Remove the control cable (C) after removing the nut (A) and the bolt (B).

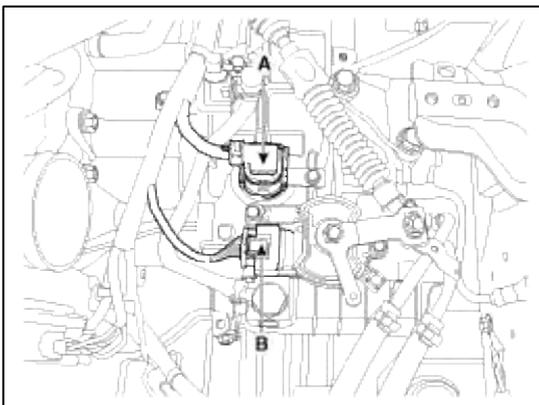
**Tightening torque:**

(A) 9.8 ~ 13.7 N.m (1.0 ~ 1.4 kgf.m, 7.2 ~ 10.1 lb-ft)

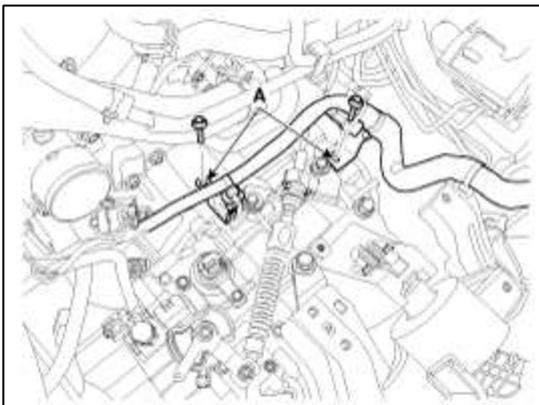
(B) 14.7 ~ 21.6 N.m (1.5 ~ 2.2 kgf.m, 10.9 ~ 15.9 lb-ft)



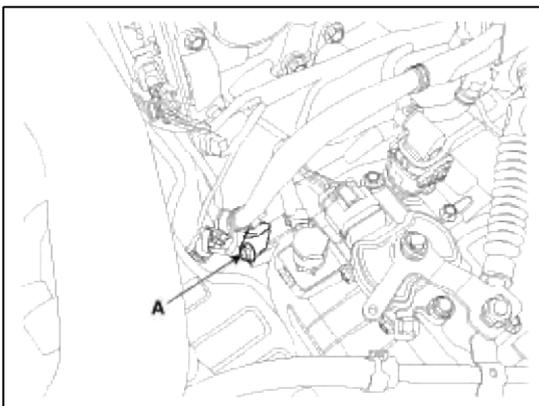
4. Disconnect the solenoid valve connector (A) and inhibitor switch connector (B).



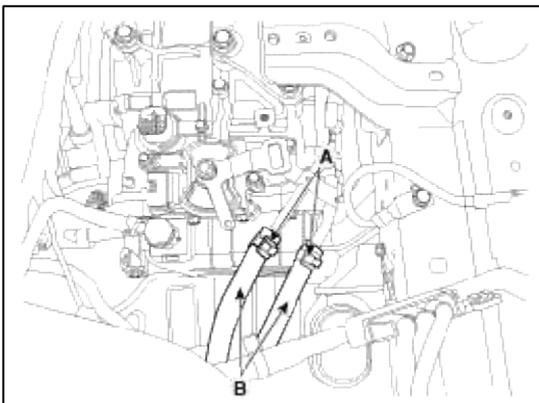
5. Remove the solenoid valve connector and inhibitor switch connector wiring mounting bracket (A).



6. Remove the wiring mounting bolt (A).



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



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

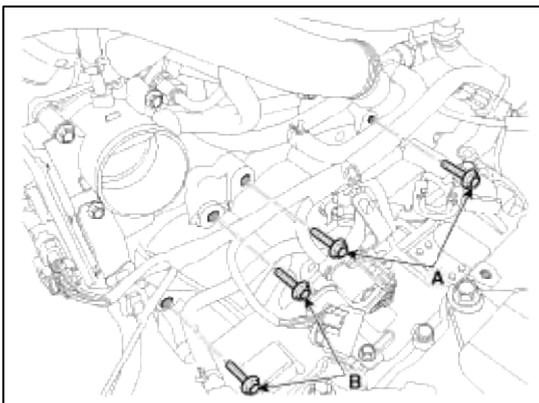
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**Tightening torque:**

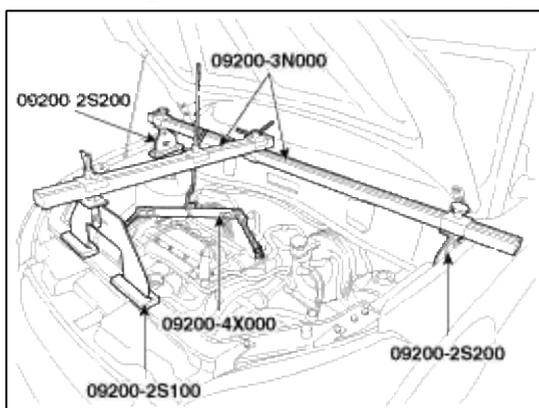
(A): 42.2 ~ 54.0 N.m (4.3 ~ 5.5 kgf.m, 31.1 ~ 39.8 lb-ft)

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

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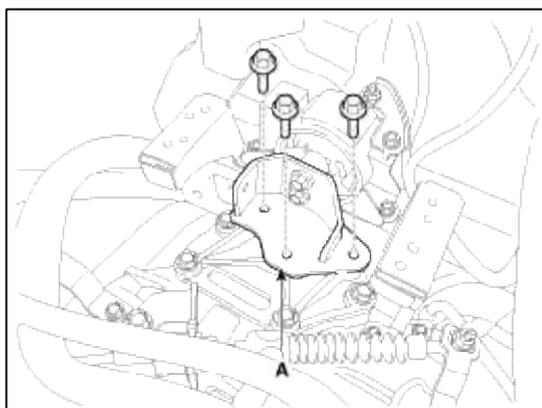
9. Using the SST (support SST No. : 09200-2S100, 09200-2S200, beam SST No. : 09200-38001 or 09200-3N000, adapter SST No. : 09200-4X000), hold the engine and transaxle assembly safely.



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

**Tightening torque:**

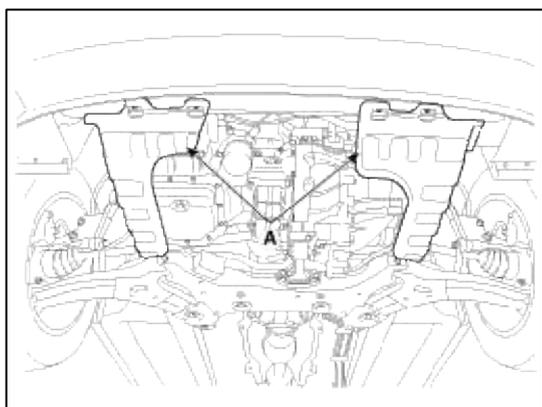
88.3 ~ 107.9 N.m (9.0 ~ 11.0 kgf.m, 65.1 ~ 79.6 lb-ft)



11. Lift the vehicle with a jack.  
12. Remove the under cover (A).

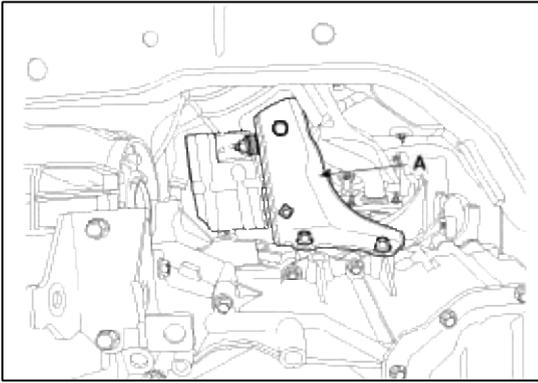
**Tightening torque:**

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

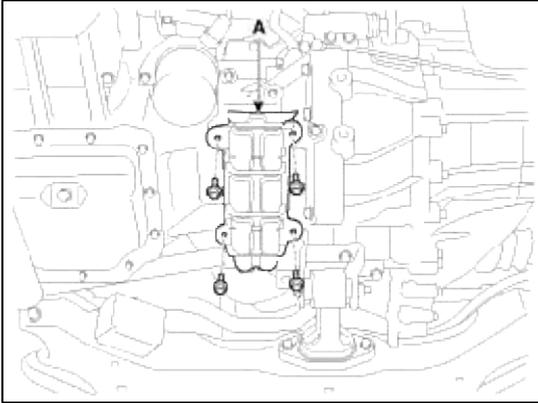


13. Remove the drive shaft assembly.  
(Refer to "Drive shaft assembly " in DS group.)

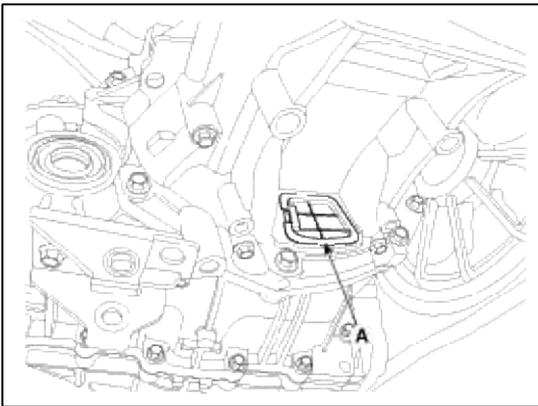
14. Remove the drive shaft cover (A).



15. Remove the bracket (A).



16. Remove the dust cover (A).



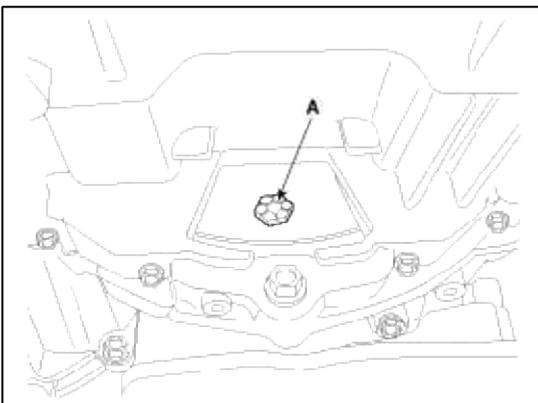
17. Remove the torque converter mounting bolt (A-4ea) with rotating the crankshaft.

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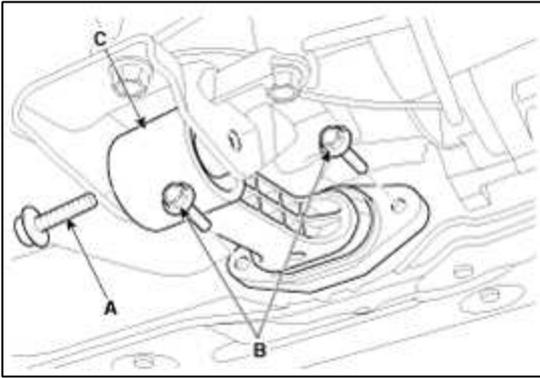
**Tightening torque:**

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

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18. Remove the roll stopper (C) after removing the bolts (A) and (B).

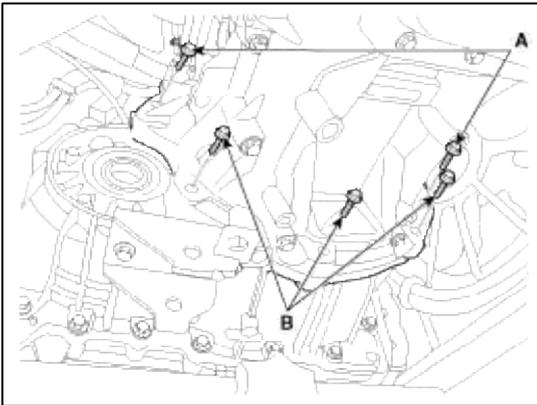


19. Remove the automatic transaxle with a jack after removing the mounting bolt (A-2ea, B-3ea).

**Tightening torque:**

(A) 42.2 ~ 53.9 N.m (4.3 ~ 5.5 kgf.m, 31.1 ~ 39.8 lb-ft)

(B) 42.2 ~ 48.1 N.m (4.3 ~ 4.9 kgf.m, 31.1 ~ 35.4 lb-ft)



**Installation**

1. Installation is the reverse of removal.

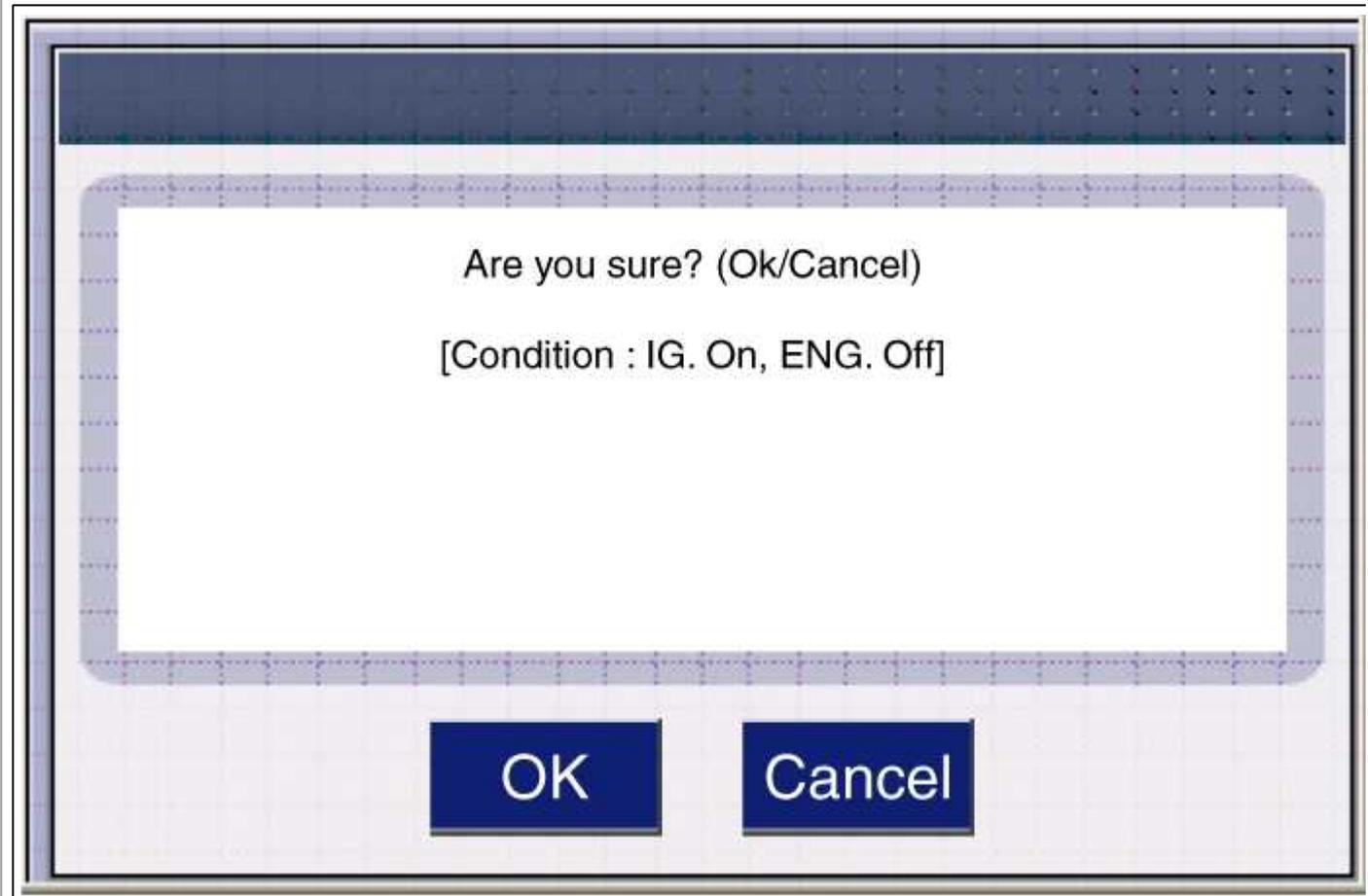
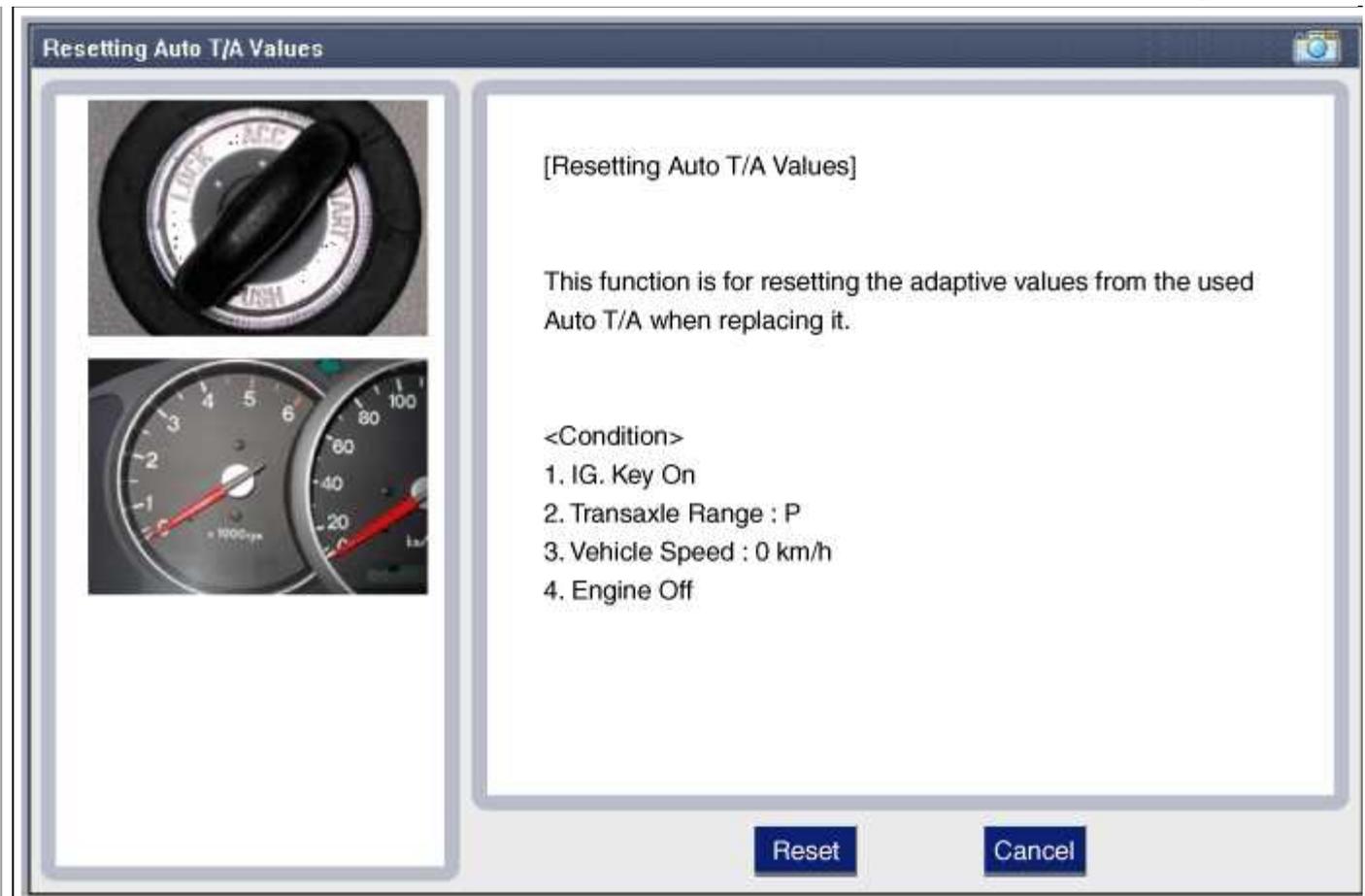
**CAUTION**

If the oil seal on the transaxle case side is damaged and fluid is leaking, replace the oil seal with a new unit. When installing the new oil seal, use the specialized tool (oil seal installer, 09452-26100).

**NOTE**

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

- Adding automatic transaxle fluid. (Refer to "Hydraulic system (Fluid)" in this group)
- After servicing the automatic transaxle or TCM, clear the diagnostic trouble codes (DTC) using the GDS tool. Diagnostic trouble codes (DTC) cannot be cleared by disconnecting the battery.
- When deleting diagnostic trouble code, use the GDS as possible.
- 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)" in this group)

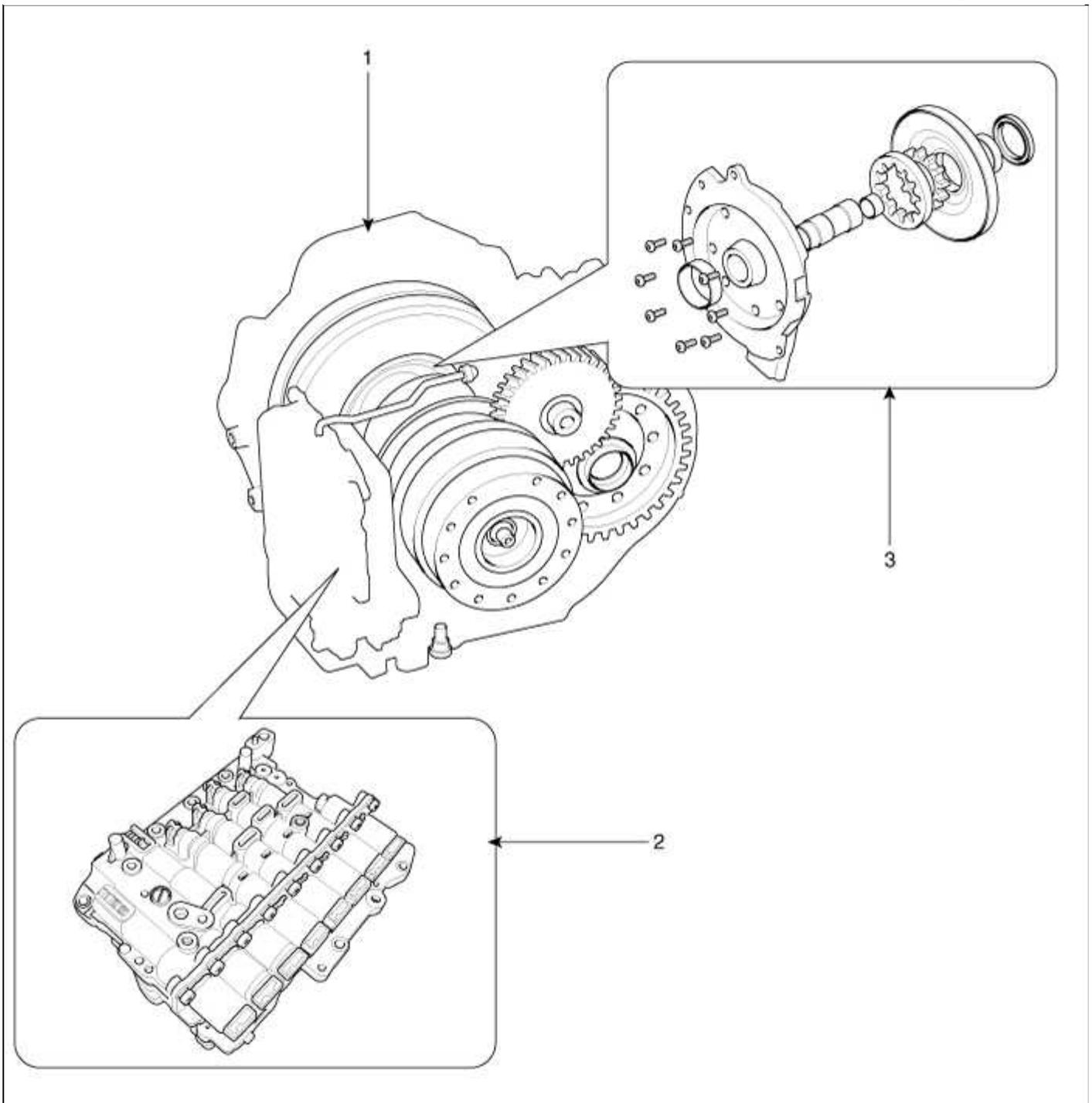
### **Automatic Transaxle System > Hydraulic System > Description and Operation**

#### Description

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

### **Automatic Transaxle System > Hydraulic System > Components and Components Location**

#### Components Location

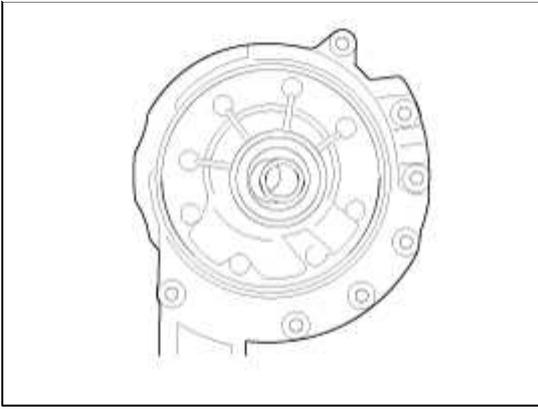


1. Automatic transaxle
2. Valve body assembly
3. Oil pump assembly

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

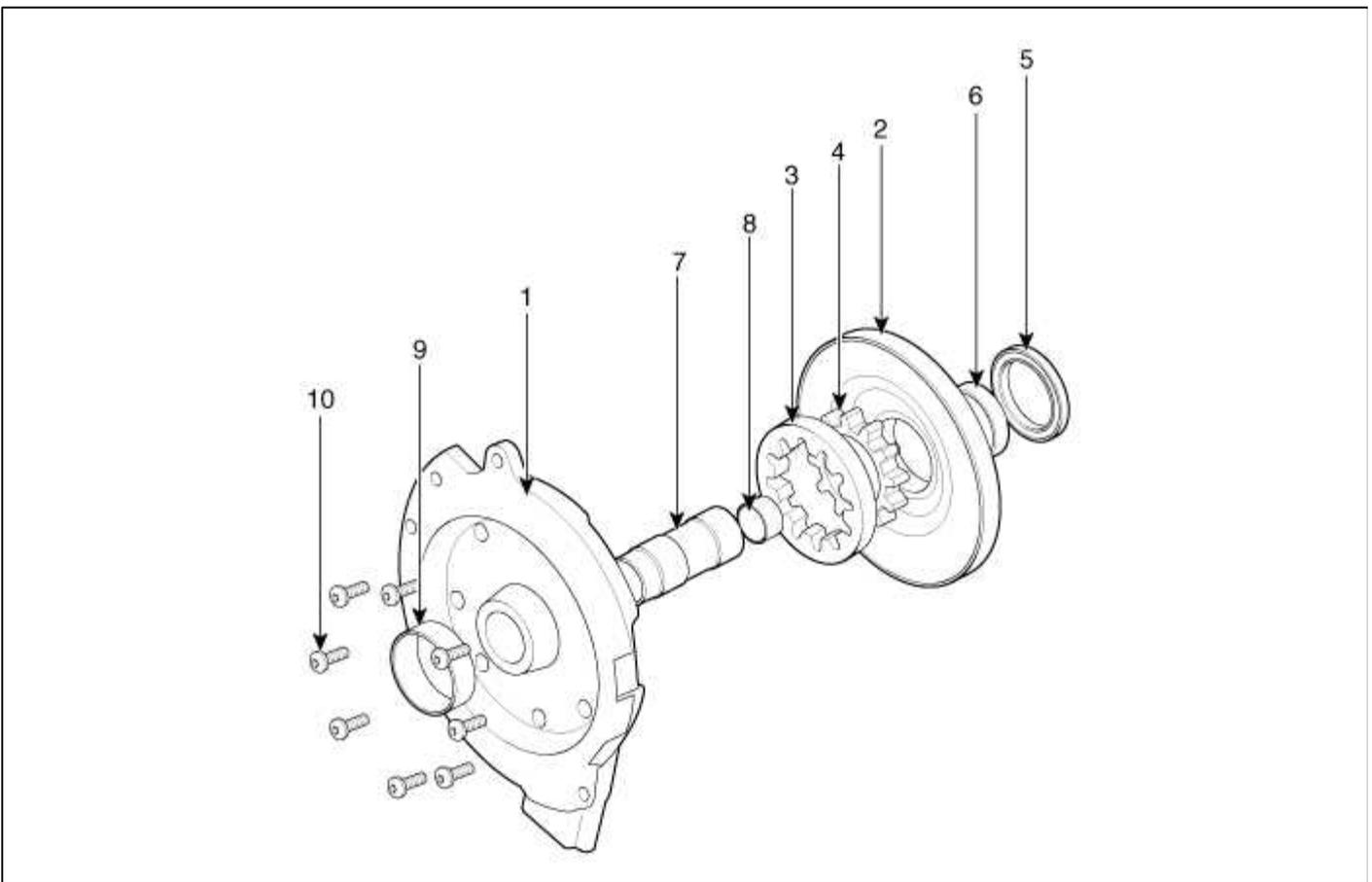
#### Description

The oil pump is built-in as a single unit with the 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.



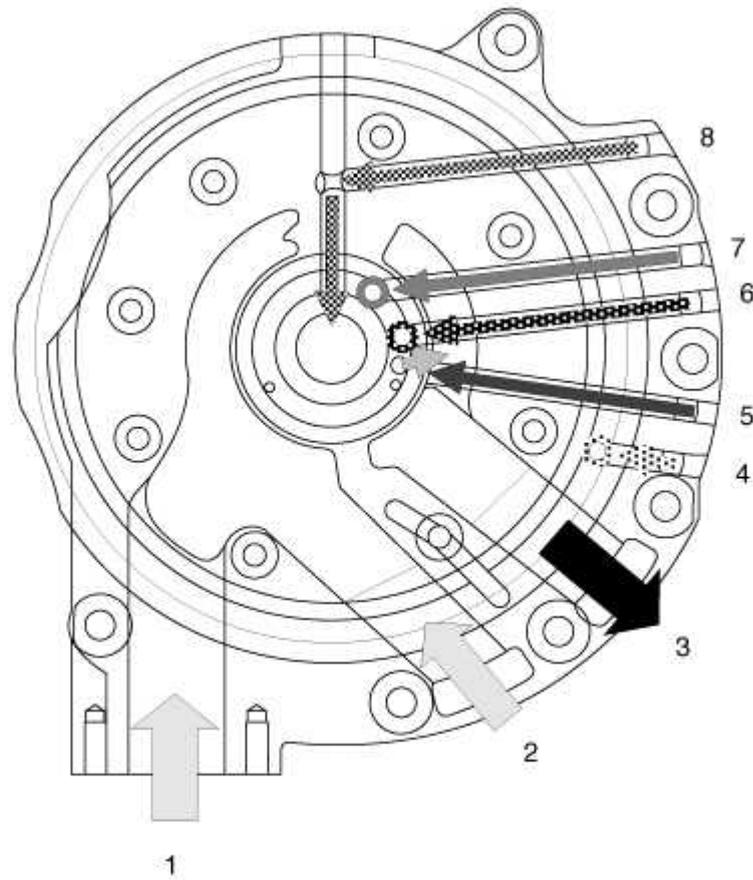
**Automatic Transaxle System > Hydraulic System > Oil Pump > Components and Components Location**

**Components**



1. Oil pump cover	6. Bushing-housing
2. Oil pump housing	7. Reaction shaft
3. Driven gear	8. Bushing-reaction shaft
4. Drive gear	9. Sleeve
5. Oil seal	10. Bolt

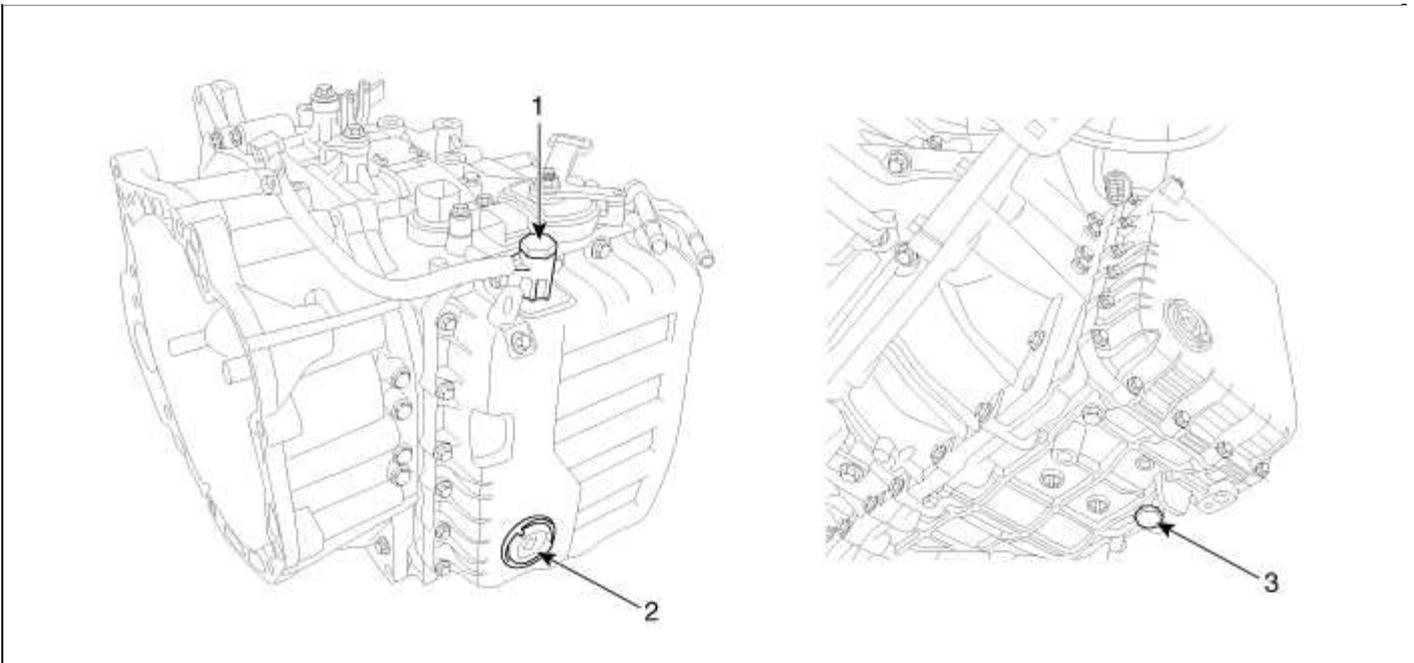
**Oil Pump Operation Flow**



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

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

Components Location



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

### Automatic Transaxle System > Hydraulic System > Fluid > Repair procedures

#### Service Adjustment Procedure

#### Oil level Check

##### NOTE

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

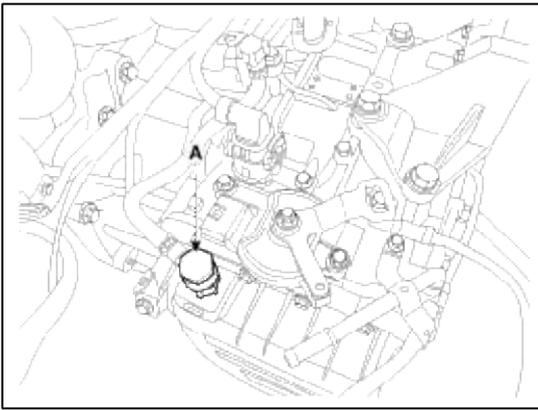
#### Eyebolt tightening torque:

2.9 ~ 4.9 N.m (0.3 ~ 0.5 kgf.m, 2.2 ~ 3.6 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.

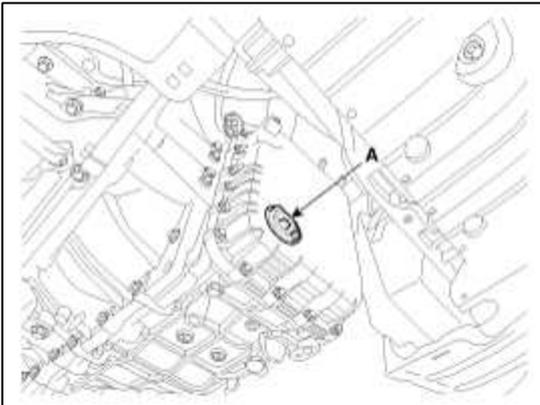


3. Start the engine. (Don't step on brake and accelerator simultaneously.)  
 4. Confirm that the temperature of the A/T oil temperature sensor is 50 ~ 60°C(122 ~ 140°F) with the GDS.  
 5. Shift the select lever slowly from "P" to "D", then "D" to "P" and repeat one more at idle.

**CAUTION**

Keep on each speed position more than 2 sec.

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.

**NOTE**

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 above 1 to 7 procedures, if the oil doesn't drip out, inspect the automatic transaxle assembly.

**CAUTION**

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

**Oil level plug tightening torque:**

Tightening up stopper

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

## Replacement

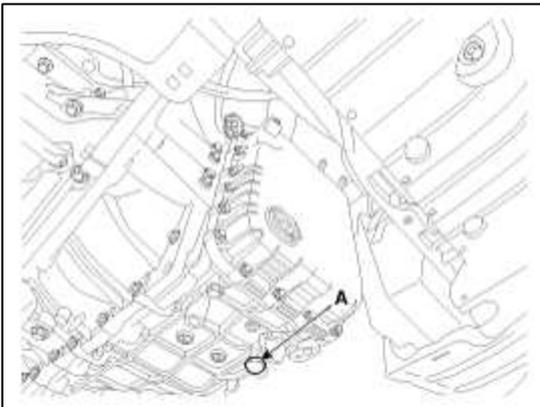
**NOTE**

ATF of 6 speed automatic transaxle doesn't need to be replaced. If the vehicle is used severely in business or personal 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

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

**Drain plug tightening torque:**

38.2 ~ 40.1 N.m (3.9 ~ 4.9 kgf.m, 28.2 ~ 35.4 lb-ft)

**CAUTION**

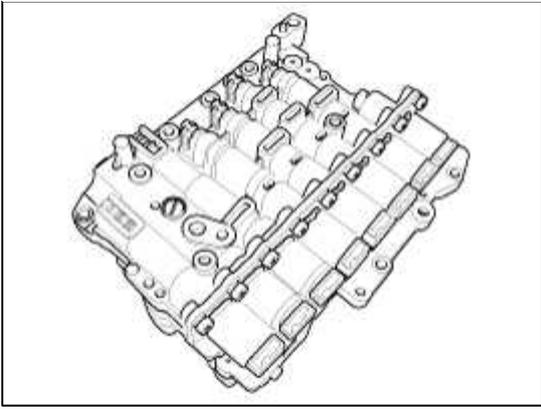
The gasket of the drain plug use new one.

- Fill the oil about 5 liters through eyebolt.
- Check the oil level.  
(Refer to "Hydraulic system (Fluid)" in this group)

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

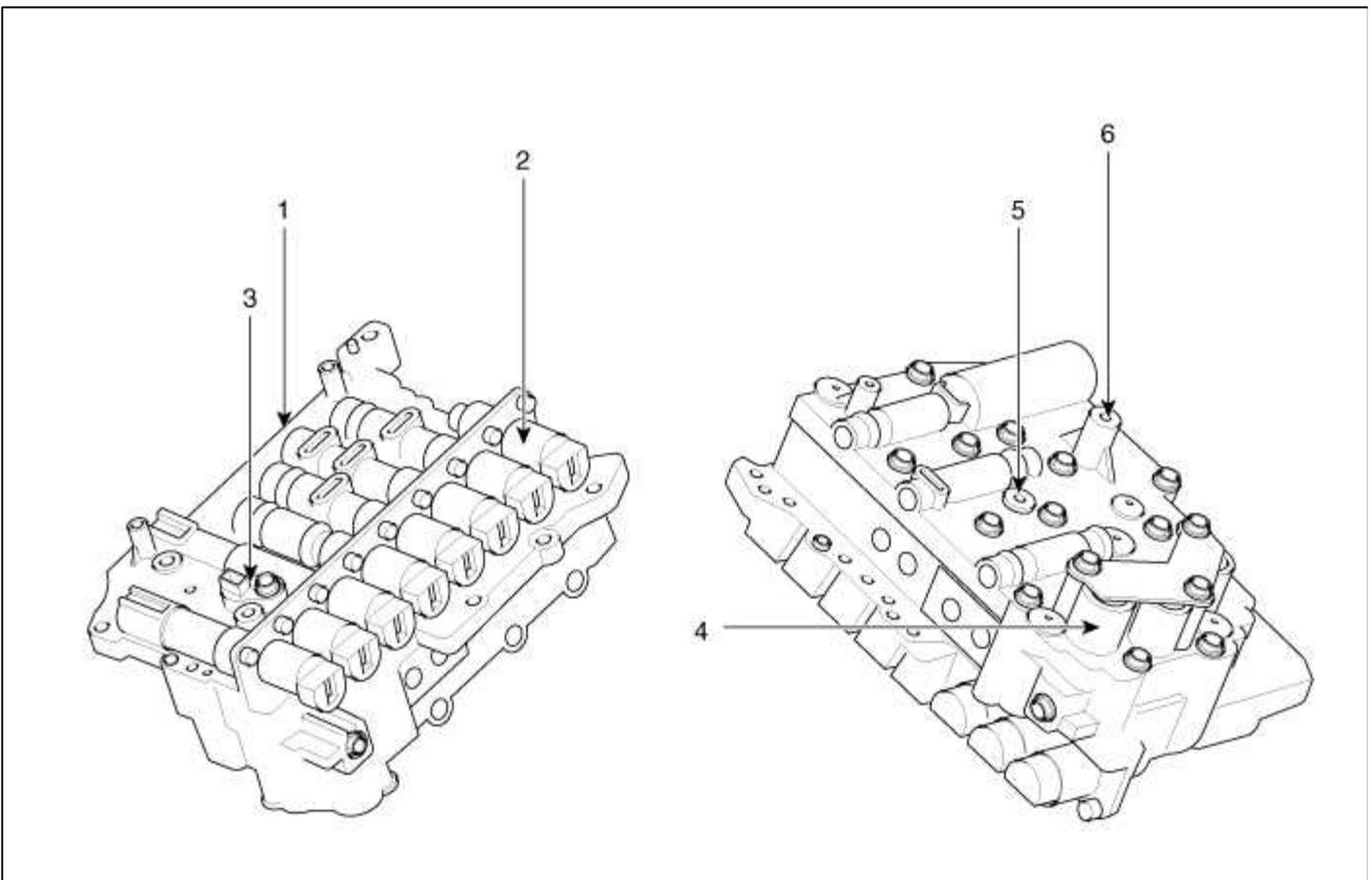
## Description

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



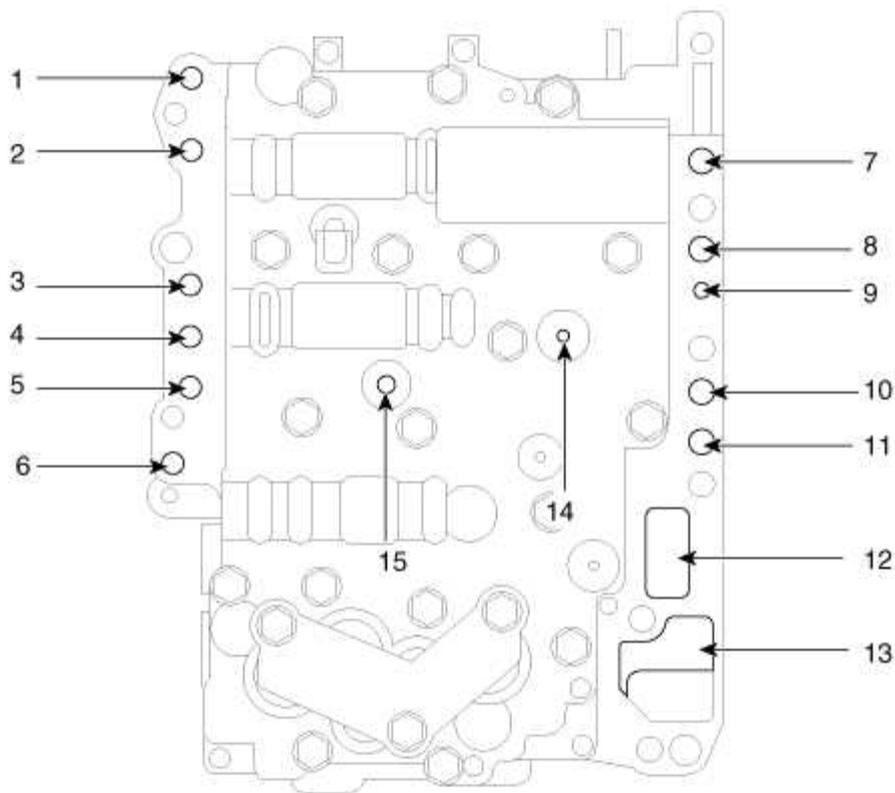
**Automatic Transaxle System > Hydraulic System > Valve Body > Components and Components Location**

Components Location



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



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

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

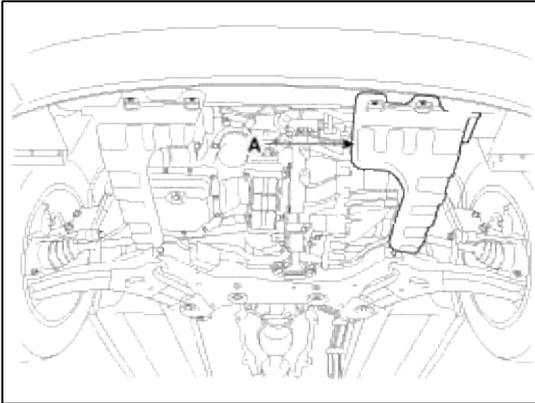
#### Removal

1. Remove the battery and the battery tray.  
(Refer to "Charging system" in EE group.)

2. Remove the under cover (A).

**Tightening torque:**

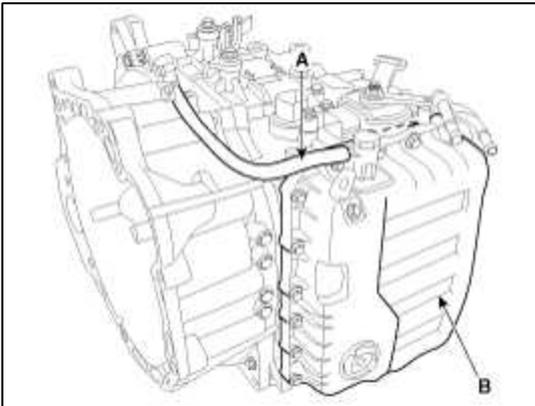
6.9 ~ 10.8 N.m (0.7 ~ 1.1 kgf.m, 5.1 ~ 8.0 lb-ft)



3. Replace new gasket and the plug after draining the automatic transaxle fluid by removing the drain plug. (Refer to "Hydraulic system (Fluid)" in this group)  
 4. Remove the air breather hose (A).  
 5. Remove the valve body cover (B).

**Tightening torque:**

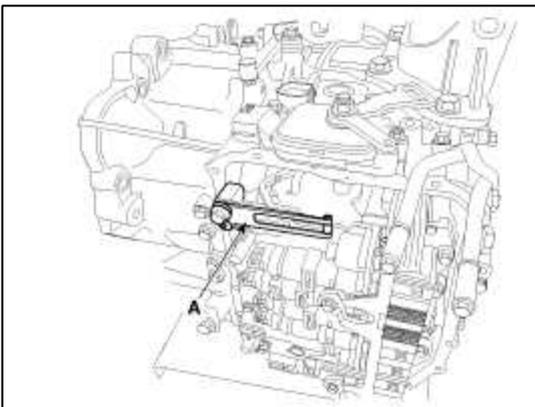
13.7 ~ 15.7 N.m (1.4 ~ 1.6 kgf.m, 10.1 ~ 11.6 lb-ft)



6. Remove the plate and the detent spring (A) after removing the bolt.

**Tightening torque:**

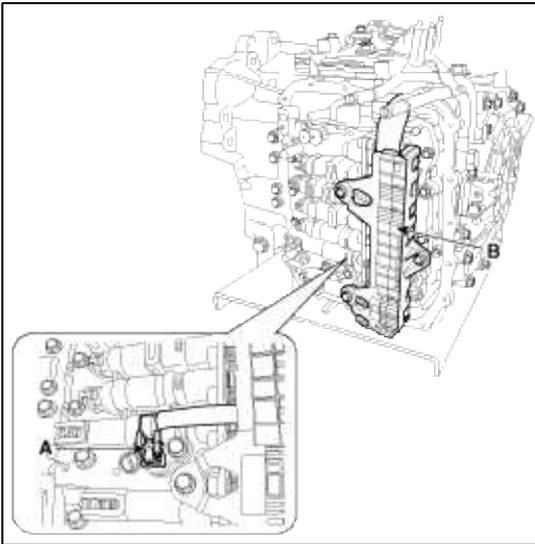
11.8 ~ 15.7 N.m (1.2 ~ 1.6 kgf.m, 8.7 ~ 11.6 lb-ft)



- Remove the bolt (3ea) after disconnecting the solenoid valve (B) connector and the oil temperature sensor connector (A).

**Tightening torque:**

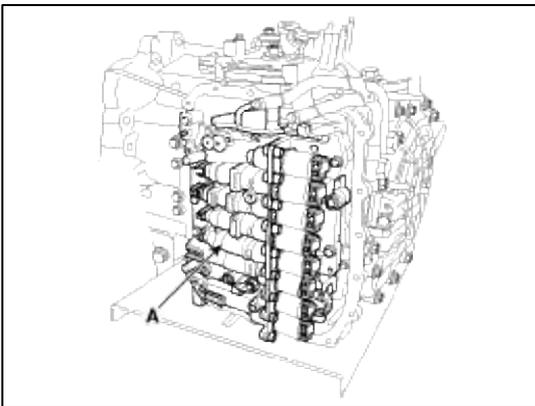
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



- 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**

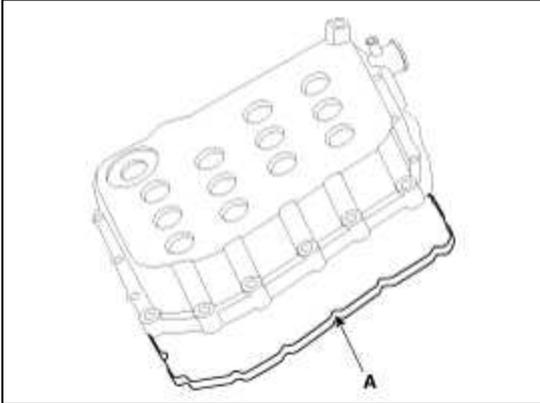
- Installation is the reverse of removal.

**CAUTION**

After replacement or reinstallation procedure of the valve body assembly, must perform procedures below.

**NOTE**

- The gasket of the valve body gasket (A) use new one.



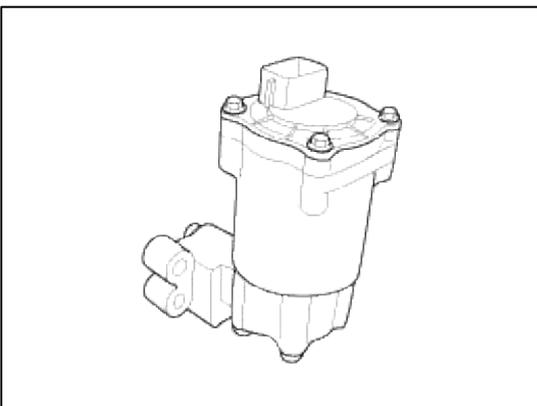
- Adding automatic transaxle fluid.  
(Refer to "Hydraulic system (Fluid)" in this group)
- Perform TCM learning after replacing the valve body to prevent slow transaxle response, jerky acceleration and jerky startup. (Refer to "Automatic transaxle control system (Repair procedures)" in this group)

### Automatic Transaxle System > Hydraulic System > Electronic Oil Pump (EOP) > Description and Operation

#### Description

ISG system has a standard Mechanical Oil Pump(MOP) linked to the input shaft to generates oil pressure when input shaft rotates. ISG system also has an Electric Oil Pump(EOP). Because the ISG features Auto-Stop which starts and stops the engine as needed. The Auto-Stop feature prevents the Mechanical Oil Pump(MOP) from operating and building enough pressure for the transaxle to operate. When the vehicle comes to a stop with the engine off, Mechanical Oil Pump(MOP) cannot generate sufficient oil pressure during the initial startup (below 5 KPH) or during low speed driving.

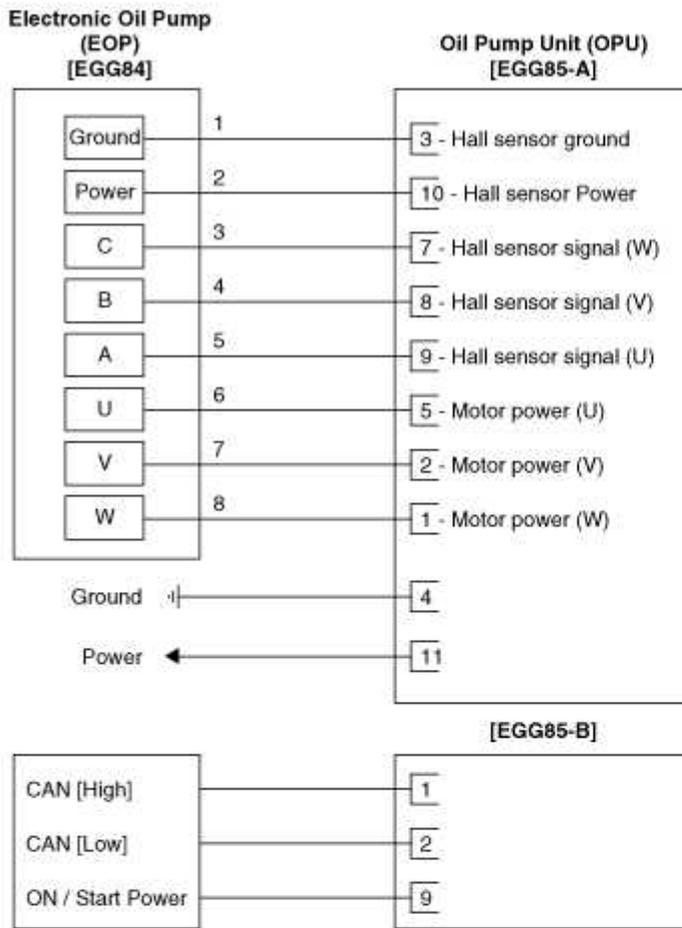
For these reasons, the Electric Oil Pump(EOP) takes on this role as an additional device that can generate the required oil pressure when the vehicle comes to a stop or during low speed driving. The Electric Oil Pump(EOP) supplies oil pressure to the Under Drive Brake(UD/B).



### Automatic Transaxle System > Hydraulic System > Electronic Oil Pump (EOP) > Schematic Diagrams

#### Schematic Diagrams

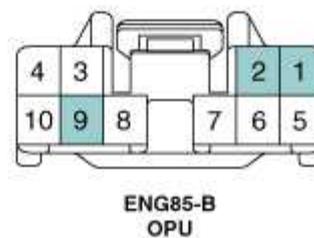
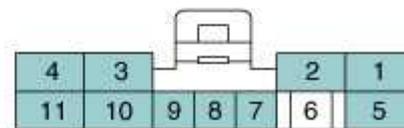
[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
1	OPU EGG85-A (3)	Hall sensor ground
2	OPU EGG85-A (10)	Hall sensor power
3	OPU EGG85-A (7)	Hall sensor signal (W)
4	OPU EGG85-A (8)	Hall sensor signal (V)
5	OPU EGG85-A (9)	Hall sensor signal (U)
6	OPU EGG85-A (5)	Motor power (U)
7	OPU EGG85-A (2)	Motor power (V)
8	OPU EGG85-A (1)	Motor power (W)

[Harness Connector]

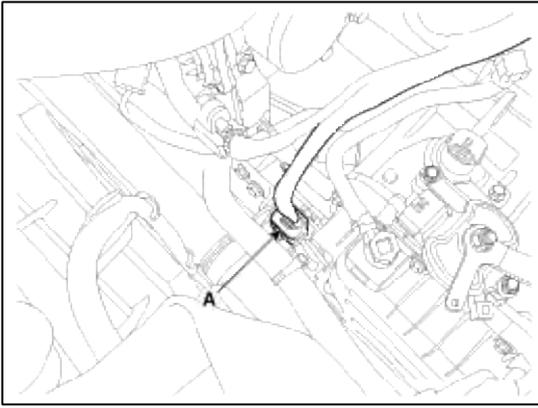


Automatic Transaxle System > Hydraulic System > Electronic Oil Pump (EOP) > Repair procedures

Removal

1. Disconnect the battery negative cable from the battery and then wait for at least 30 seconds.

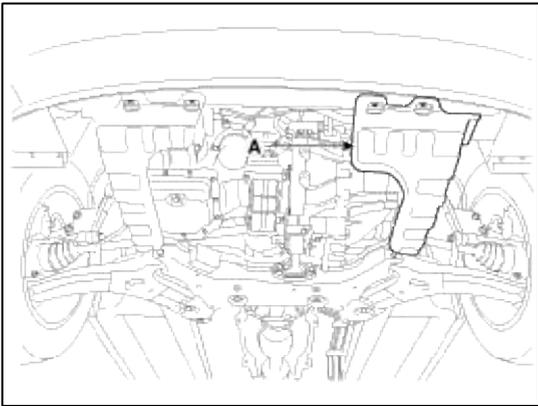
2. Disconnect the Electric Oil Pump (EOP) connector (A).



3. Remove the under cover (A).

**Tightening torque:**

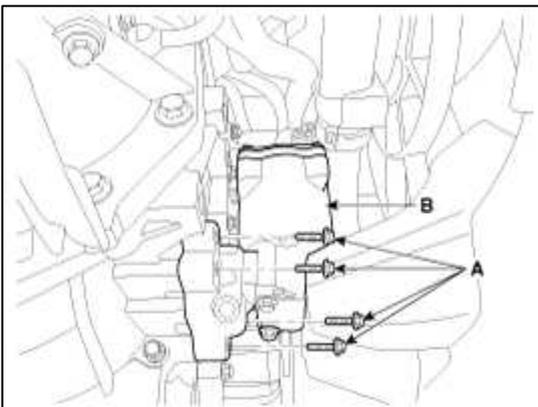
6.9 ~ 10.8 N.m (0.7 ~ 1.1 kgf.m, 5.1 ~ 8.0 lb-ft)



4. Remove the Electric Oil Pump (B) by loosening bolts (A-4ea).

**Tightening torque:**

19.6 ~ 25.5 N.m (2.0 ~ 2.6 kgf.m, 14.5 ~ 18.8 lb-ft)



Installation

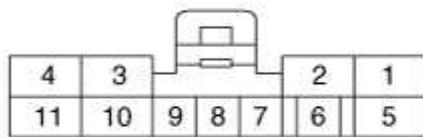
1. Install is the reverse of the removal.

**NOTE**

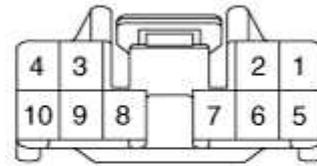
- Must be replaced with new O ring when assembling.
- Adding automatic transaxle fluid.  
(Refer to "Hydraulic system(Fluid)" in this group.)

**Automatic Transaxle System > Hydraulic System > Oil Pump Unit(OPU) > Schematic Diagrams**

OPU connector and terminal function



[EGG85-A]



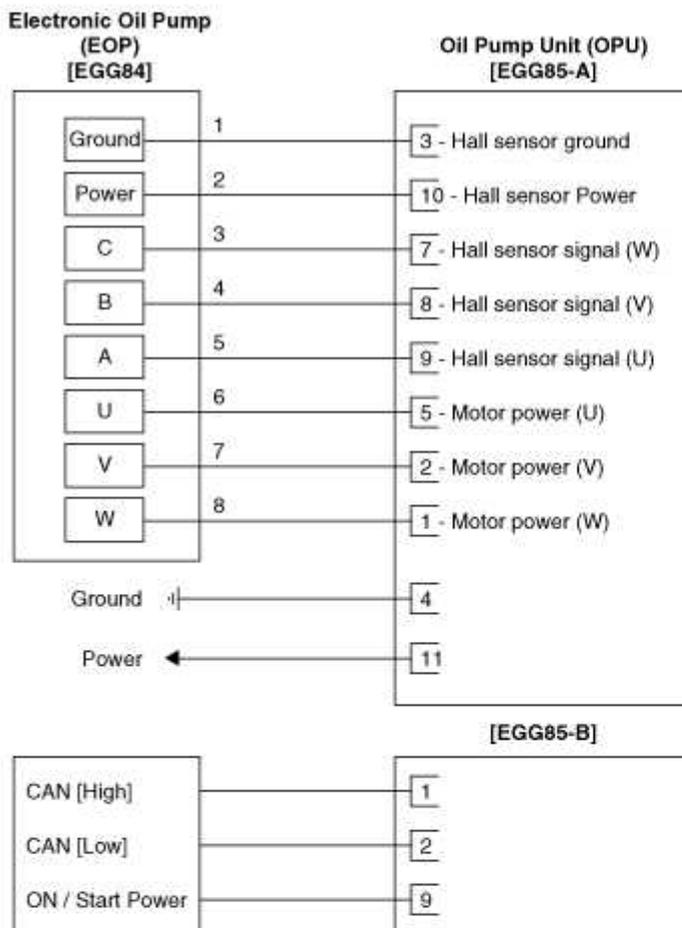
[EGG85-B]

**OPU terminal function**

EGG85-A		EGG85-B	
Pin	Description	Pin	Description
1	Motor power (W)	1	CAN (High)
2	Motor power (V)	2	CAN (Low)
3	Hall sensor (ground)	3	-
4	Ground	4	-
5	Motor power (U)	5	-
6	Shield ground	6	-
7	Hall sensor signal (W)	7	-
8	Hall sensor signal (V)	8	-
9	Hall sensor signal (U)	9	ON / Start power
10	Hall sensor (power)	10	-
11	Power		

Schematic Diagrams

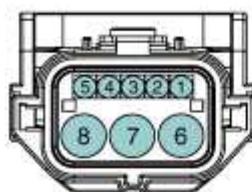
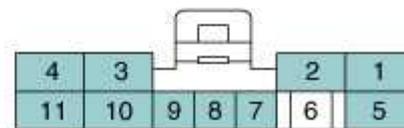
## [Circuit Diagram]



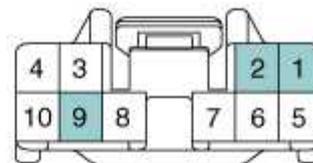
## [Connection Information]

Terminal	Connected to	Function
1	OPU EGG85-A (3)	Hall sensor ground
2	OPU EGG85-A (10)	Hall sensor power
3	OPU EGG85-A (7)	Hall sensor signal (W)
4	OPU EGG85-A (8)	Hall sensor signal (V)
5	OPU EGG85-A (9)	Hall sensor signal (U)
6	OPU EGG85-A (5)	Motor power (U)
7	OPU EGG85-A (2)	Motor power (V)
8	OPU EGG85-A (1)	Motor power (W)

## [Harness Connector]

ENG84  
EOP

ENG85-A

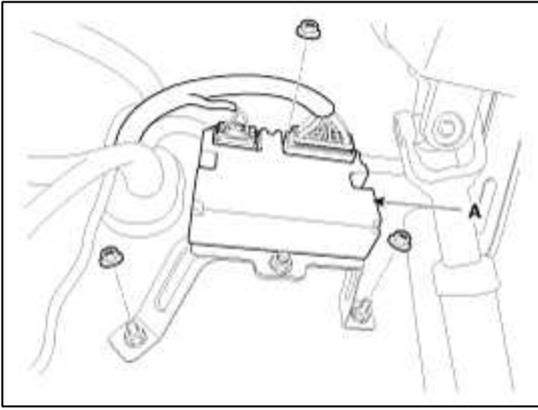
ENG85-B  
OPU

## Automatic Transaxle System &gt; Hydraulic System &gt; Oil Pump Unit(OPU) &gt; Repair procedures

## Removal

1. Disconnect the battery negative cable from the battery and then wait for at least 30 seconds.
2. Remove the crash lower pad.  
(Refer to "Interior / Crash panel" in BD group)
3. Remove the oil pump unit connector.

4. Remove the oil pump unit (A) by loosening bolts.



#### Installation

1. Install is the reverse of the removal.

#### Inspection

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

---

**Specification:** Below  $1\Omega$

---

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

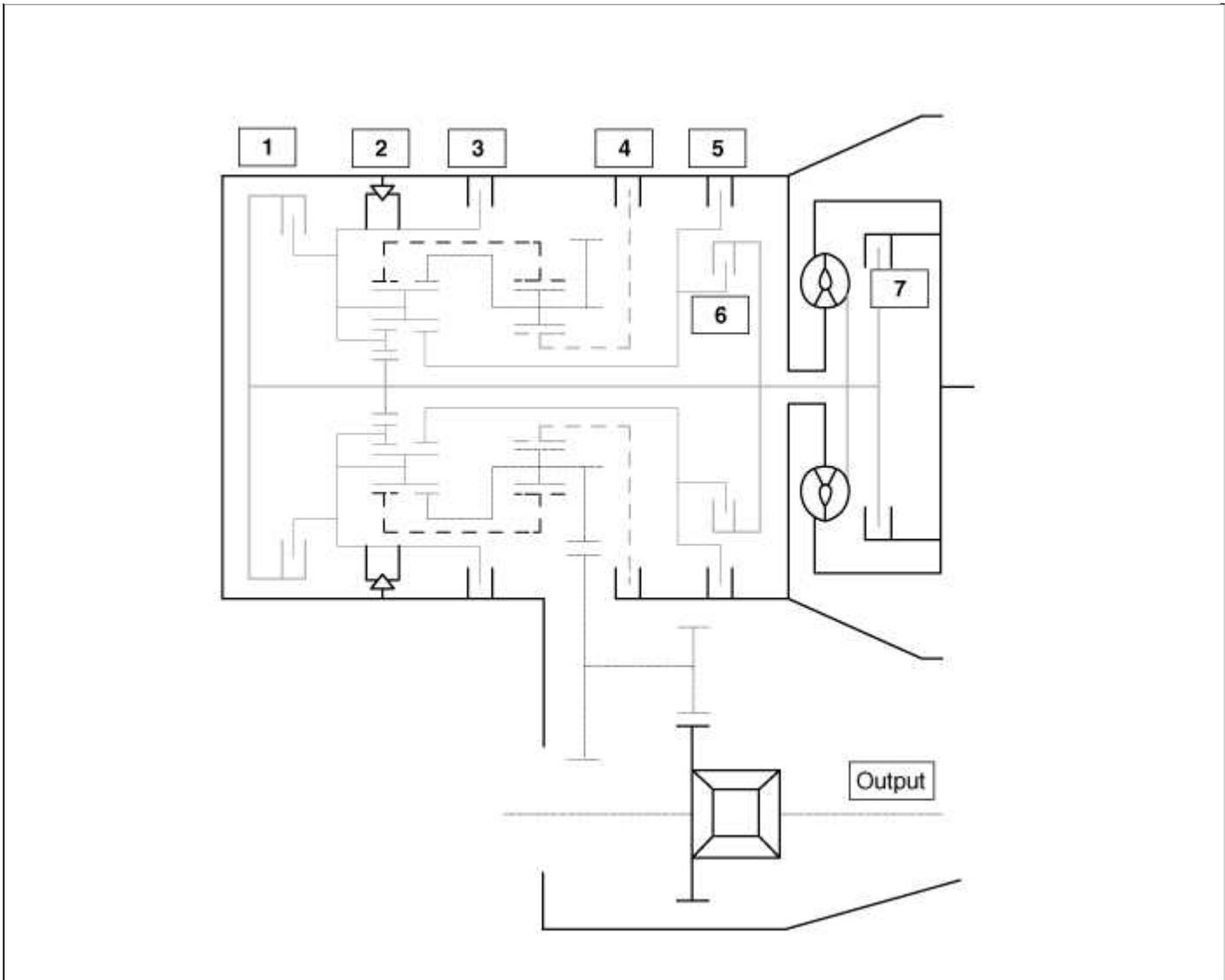
### Automatic Transaxle System > Clutch & Brake > Description and Operation

#### Description

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

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

#### Components Location

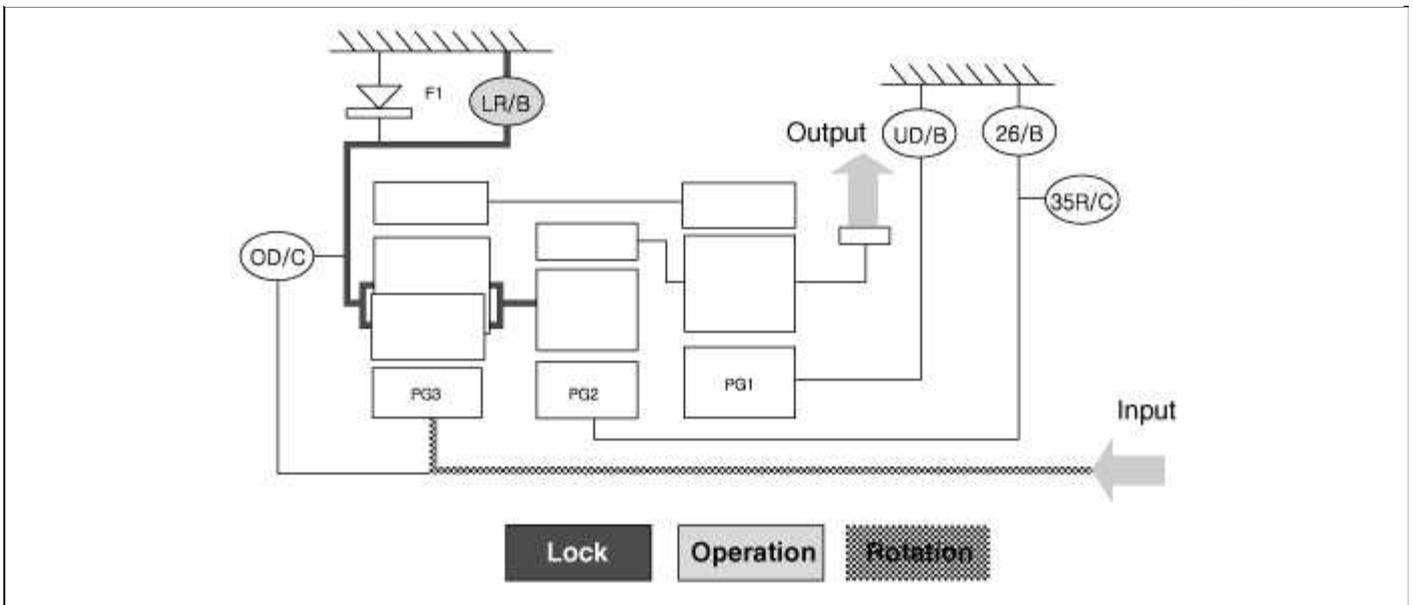


1. Overdrive clutch (OD/C)	5. 26 brake(26/B)
2. One way clutch (OWC)	6. 35R clutch (35R/C)
3. Low & Reverse brake (LR/B)	7. Damper clutch (D/C)
4. Underdrive brake (UD/B)	

**Automatic Transaxle System > Clutch & Brake > Flow Diagram**

Power Flow Chart

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



**Direction of Rotation**

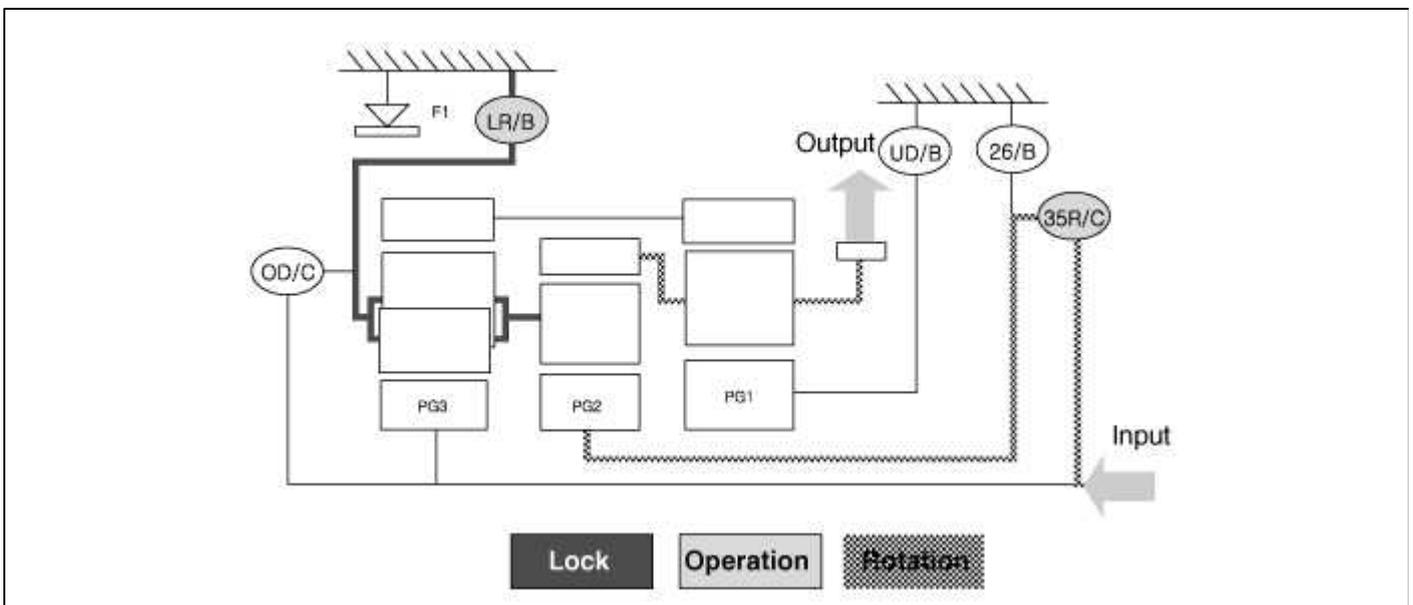
Lower & Reverse Brake (LR/B) Activation → Overdrive (O/D) Hub Lock → Mid & Rear P/C Lock

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

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

Input shaft rotation → 35R Clutch Rotation

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



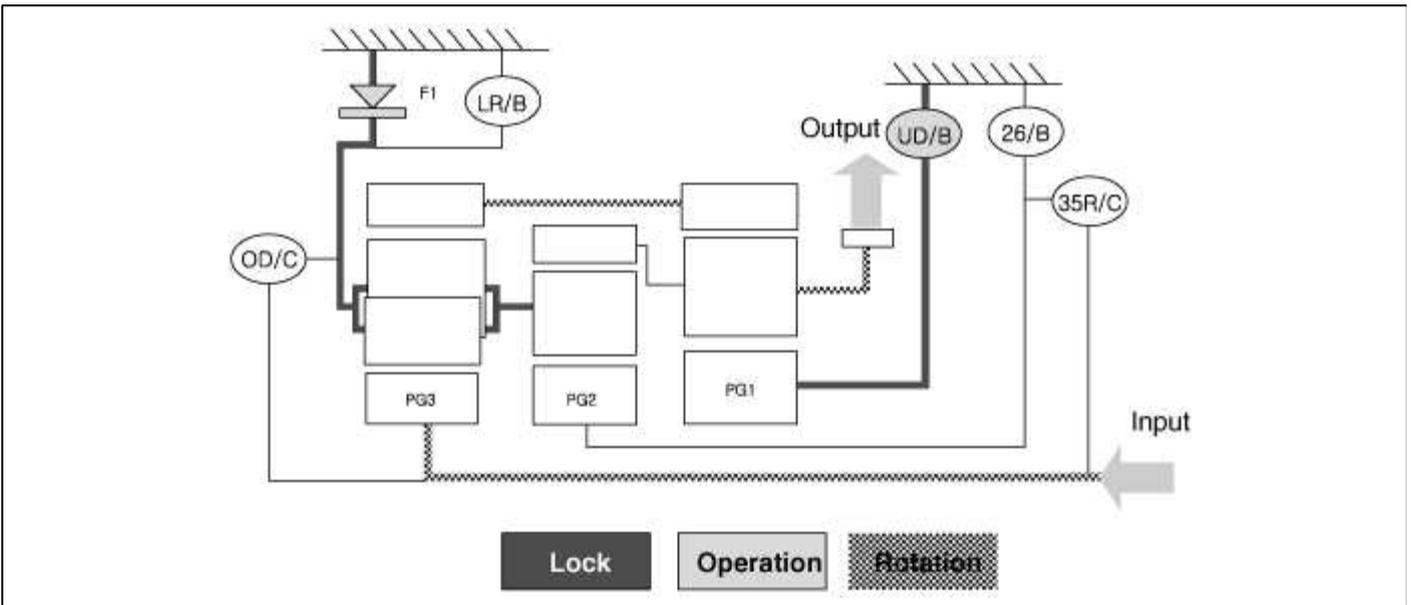
**Power Delivery Route**

Middle carrier locked and middle sun gear in rotation

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

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

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



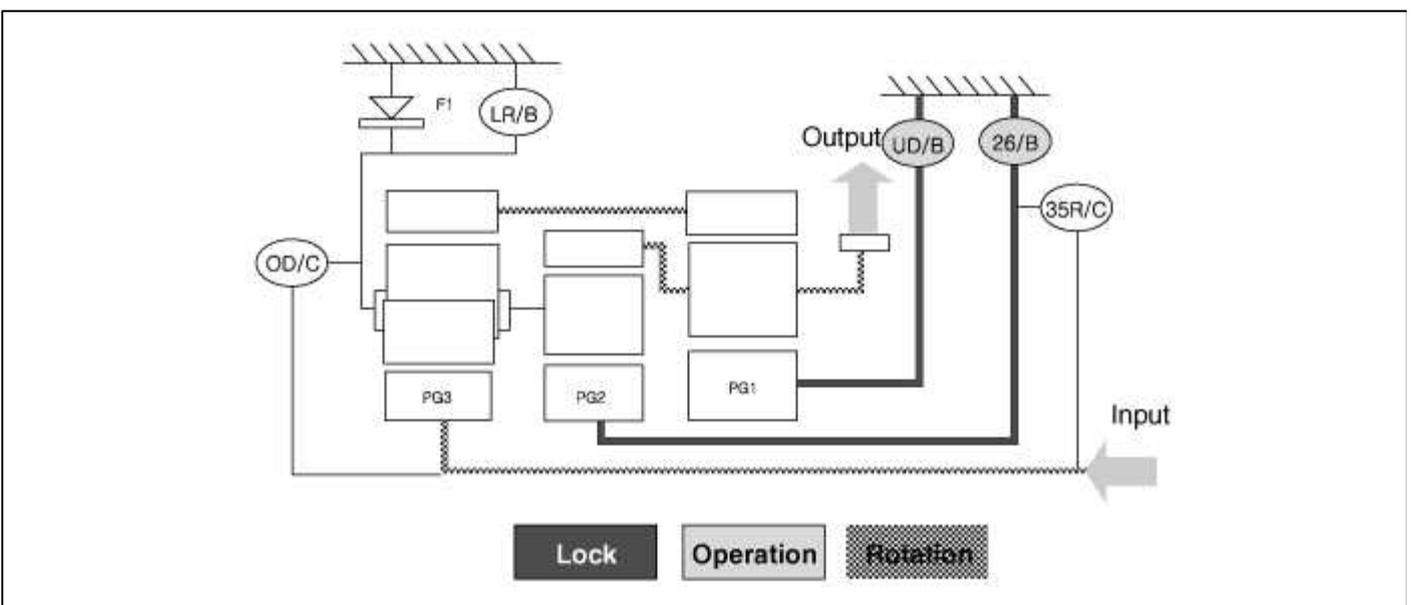
**Power Delivery Route**

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

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

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

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



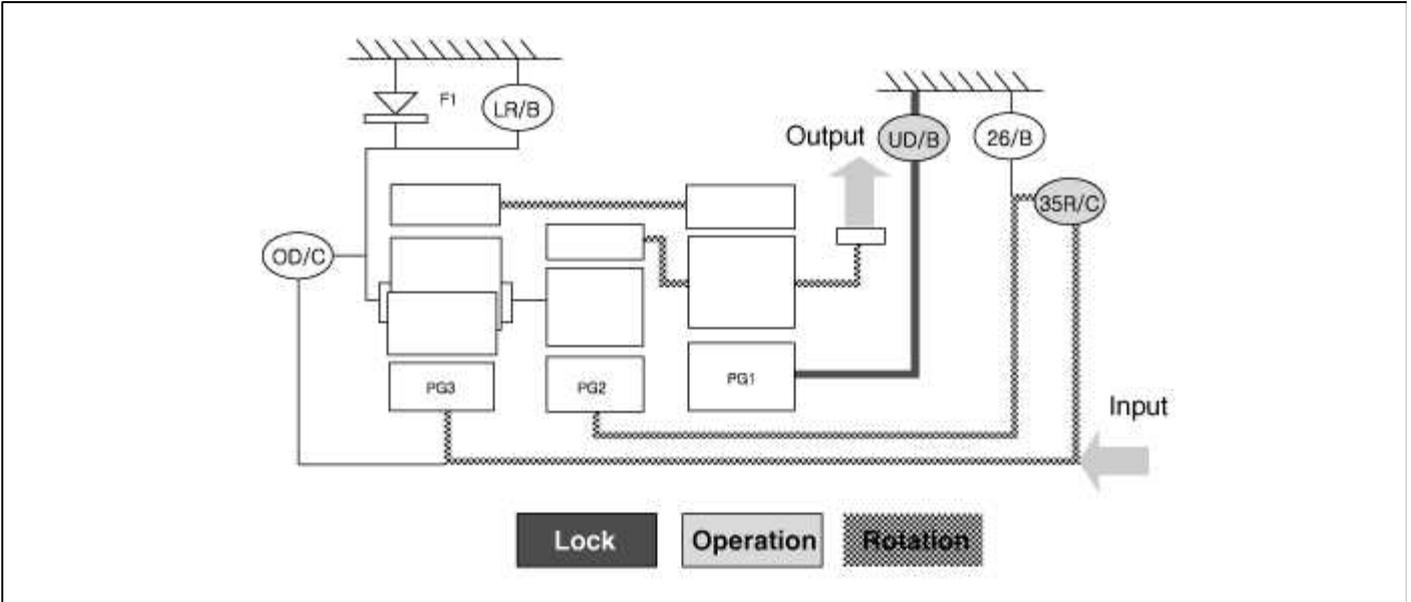
**Power Delivery Route**

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

Rotating the rear sun gear delivers power to the rear & front annulus gears, and reaction from the front carrier and

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

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

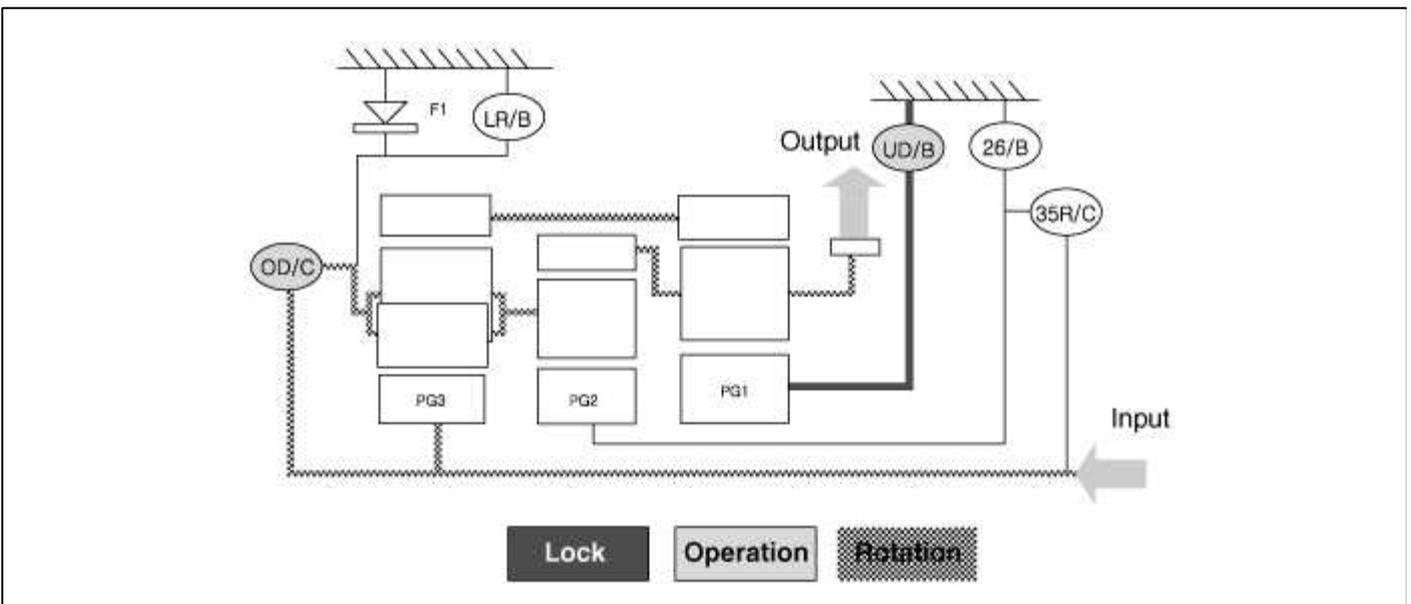


**Power Delivery Route**

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

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

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



**Power Delivery Route**

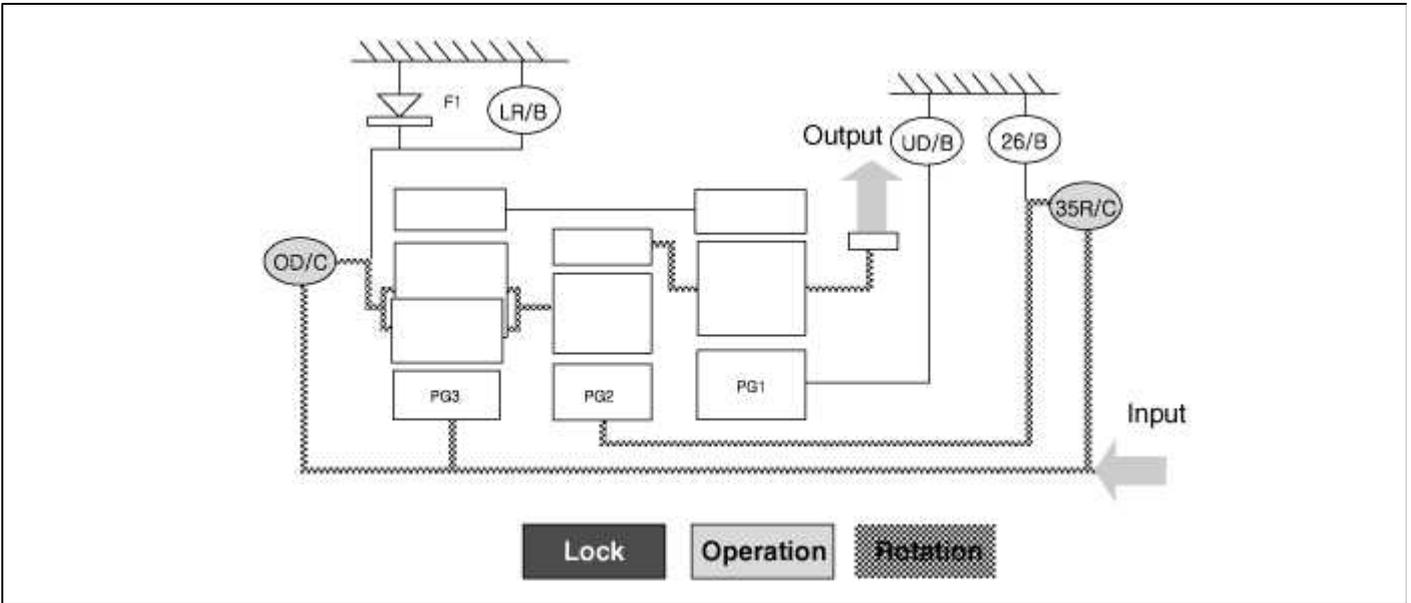
Front sun gear locked and rear carrier and rear sun gears in rotation

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

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

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

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



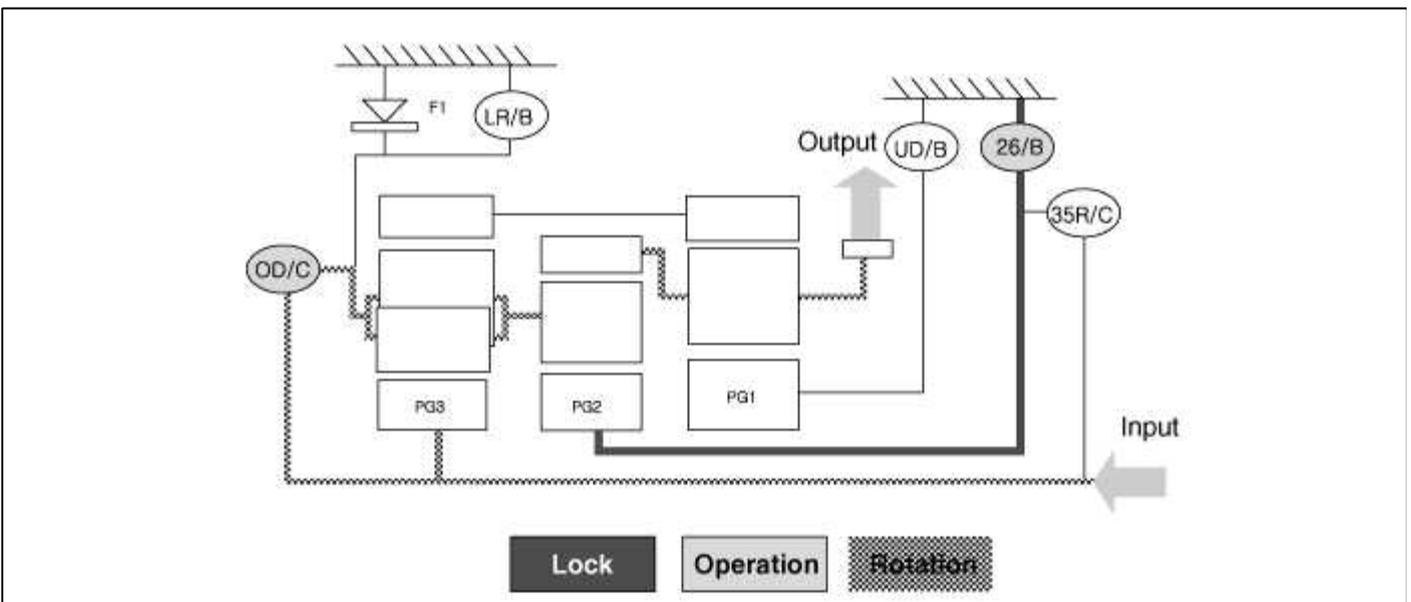
**Power Delivery Route**

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

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

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

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



## Power Delivery Route

Middle carrier in rotation and middle sun gear locked

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

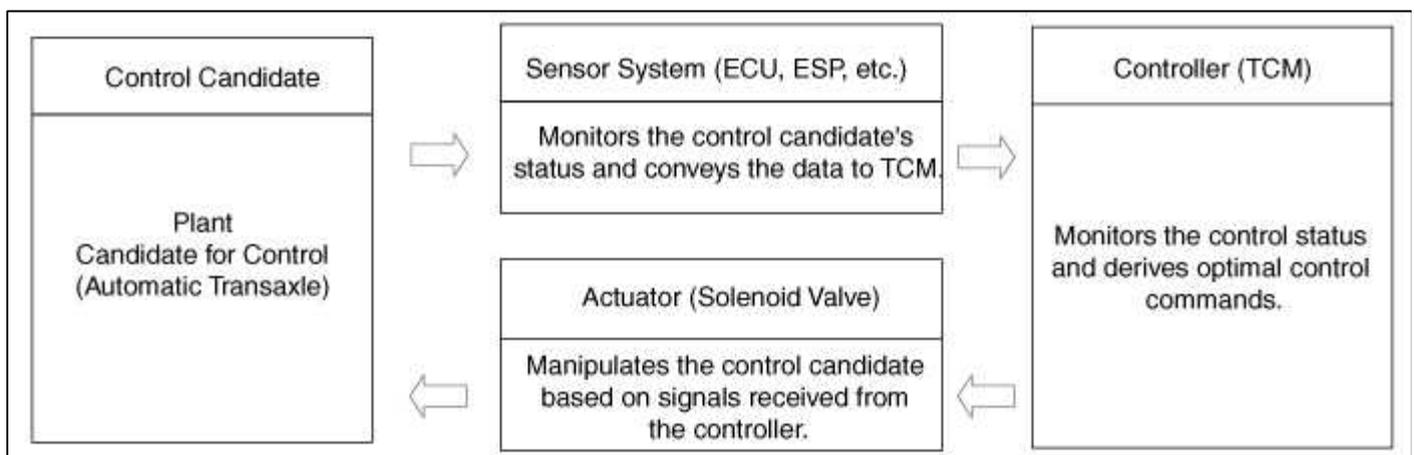
Here, the rear planetary gear maintains a 1:1 rotation ratio as it would when 4th or 5th gear is engaged; however, the front planetary gear remains unrestrained and the front sun gear rotates at a faster rate in the normal direction and at zero load.

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

### Description

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

### Control System Composition



### Fault Diagnosis

Features a fail-safe mechanism that prevents dangerous situations from developing in the event of a transaxle failure. The limp home mode engages if the transaxle malfunctions. In this mode, the transaxle operates at a minimal functionality level, making it possible for the vehicle to reach a service center.

Fail-Safe: Prevents dangerous situations from developing in the event of a malfunction.

Limp Home: Maintains minimal functionality (\*) in the event of a malfunction, making it possible for the vehicle to reach a service center.

(\*) Minimal Functionality: Drive (fixed gear setting), Reverse, and Neutral

### Self-diagnosis

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 TCM.
- When checking the generator for the charging state, do not disconnect the battery '+' terminal to prevent the 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
- Diagnosis memory is erased if the battery or the TCM connector is disconnected. Do not disconnect the battery before the diagnostic trouble codes (DTC) are completely read and recorded.

## 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**

- Perform TCM learning after replacing the automatic transaxle to prevent slow automatic transaxle response, jerky acceleration and jerky startup. (Refer to "Automatic transaxle control system (Repair procedures)" in this group)
- Adding automatic transaxle fluid. (Refer to "Hydraulic system (Fluid)" in this group)
- After servicing the automatic transaxle or TCM, clear the diagnostic trouble code (DTC) using the GDS tool. Diagnostic trouble codes (DTC) cannot be cleared by disconnecting the battery.

**Automatic Transaxle System > Automatic Transaxle Control System > Repair procedures**

## Adjustment

**TCM Learning**

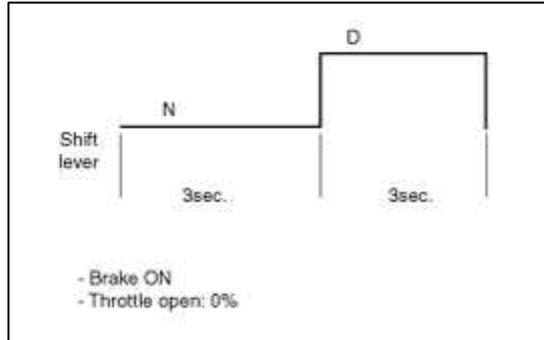
When shift shock is occurred or parts related with the transaxle are replaced, TCM learning should be performed. In the following case, TCM learning is required.

- Transaxle assembly replacement
  - TCM replacement
  - TCM upgrading
1. TCM learning condition
    - A. ATF temperature: 40 ~ 100°C (104 ~ 212°F)

## 2. TCM learning procedure

### A. Stop learning

Repeat the below shift pattern four times or more with stepping on the brake.

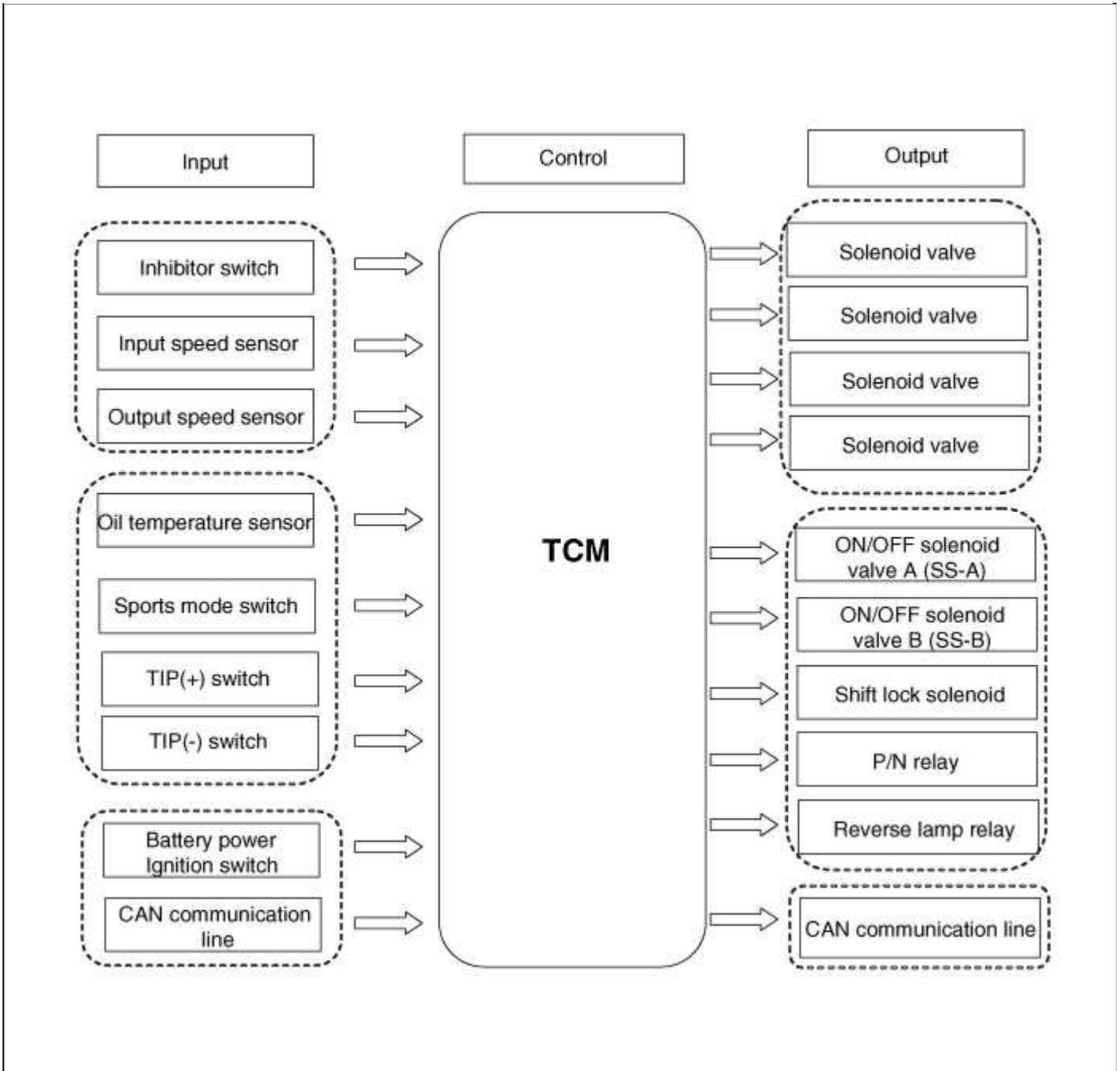


### B. Driving learning

1. Drive the vehicle through all gears at D range. Drive from stop to 1st to 2nd to 3rd to 4th to 5th to 6th with keeping fixed throttle open.
2. Down shift from 6th to 5th, 5th to 4th, 4th to 3rd, 3rd to 2nd, 2nd to 1st.
3. Repeat the above driving pattern four times or more.  
Up-shift throttle open : 15 ~ 25%

**Automatic Transaxle System > Automatic Transaxle Control System > Schematic Diagrams**

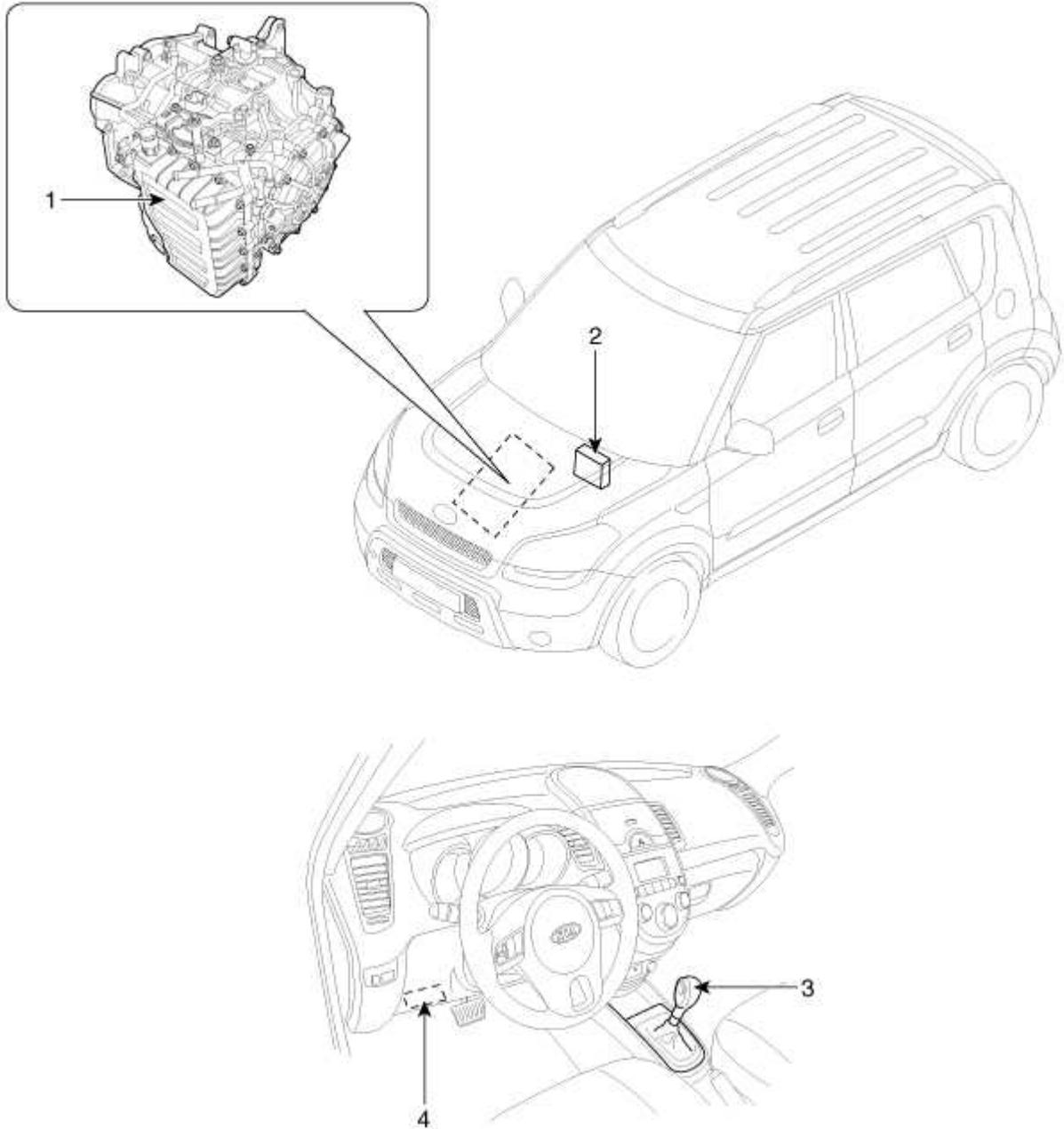
Circuit Diagram



cardiagn.com

**Automatic Transaxle System > Automatic Transaxle Control System > Components and Components Location**

Components Location  
[Vehicle Components]



cardiagn.com

- |                                   |                              |
|-----------------------------------|------------------------------|
| 1. Automatic transaxle            | 3. Shift lever               |
| 2. Transaxle control module (TCM) | 4. Data Link Connector (DLC) |

[Transaxle Components]



1. Input speed sensor	5. Valve body assembly
2. Output speed sensor	6. Solenoid valve
3. Solenoid valve connect	7. Inhibitor switch
4. Oil temperature sensor	

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

#### Description

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

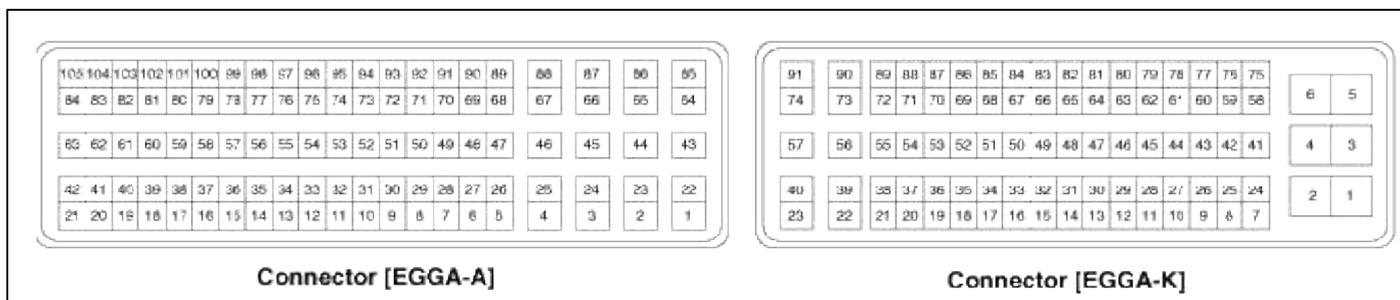
#### Functions

- Monitors the vehicle's operating conditions to determine the optimal gear setting.
- Performs a gear change if the current gear setting differs from the identified optimal gear setting.
- Determines the need for damper clutch (D/C) activation and engages the clutch accordingly.

- Calculates the optimal line pressure level by constantly monitoring the torque level and adjusts the pressure accordingly.
- Diagnoses the automatic transaxle for faults and failures.

### Automatic Transaxle System > Automatic Transaxle Control System > Transaxle Control Module (TCM) > Schematic Diagrams

#### TCM connector and terminal function



#### TCM Terminal Function

##### Connector [EGGA-A]

Pin	Description	Pin	Description
1	-	54	-
2	-	55	-
3	-	56	-
4	-	57	-
5	-	58	Sport mode down switch
6	-	59	Oil temperature sensor(-)
7	-	60	-
8	-	61	-
9	-	62	-
10	-	63	-
11	-	64	-
12	-	65	-
13	-	66	-
14	-	67	-
15	-	68	-
16	-	69	-
17	-	70	-
18	-	71	-
19	-	72	-
20	-	73	Inhibitor switch signal "S4"
21	-	74	Inhibitor switch signal "S2"

22	Overdrive clutch control solenoid valve	75	Inhibitor switch signal "S3"
23	Line pressure control solenoid valve	76	-
24	-	77	-
25	-	78	-
26	ON/OFF solenoid valve B(SS-B)	79	-
27	-	80	-
28	-	81	-
29	-	82	-
30	-	83	-
31	-	84	-
32	-	85	-
33	-	86	-
34	-	87	Solenoid supply power 2
35	-	88	Solenoid supply power 1
36	-	89	ON/OFF solenoid valve B(SS-A)
37	Sports mode up switch	90	-
38	Sports mode select switch	91	-
39	Oil temperature sensor (+)	92	-
40	-	93	-
41	-	94	Inhibitor switch signal "S1"
42	-	95	Output speed sensor power
43	Underdrive brake control solenoid valve	96	Input speed sensor power
44	35R clutch control solenoid valve	97	-
45	Torque converter control solenoid valve	98	-
46	26 brake control solenoid valve	99	Input speed sensor signal
47	-	100	Output speed sensor signal
48	-	101	-
49	-	102	-
50	-	103	-
51	-	104	-
52	-	105	-

53	-		
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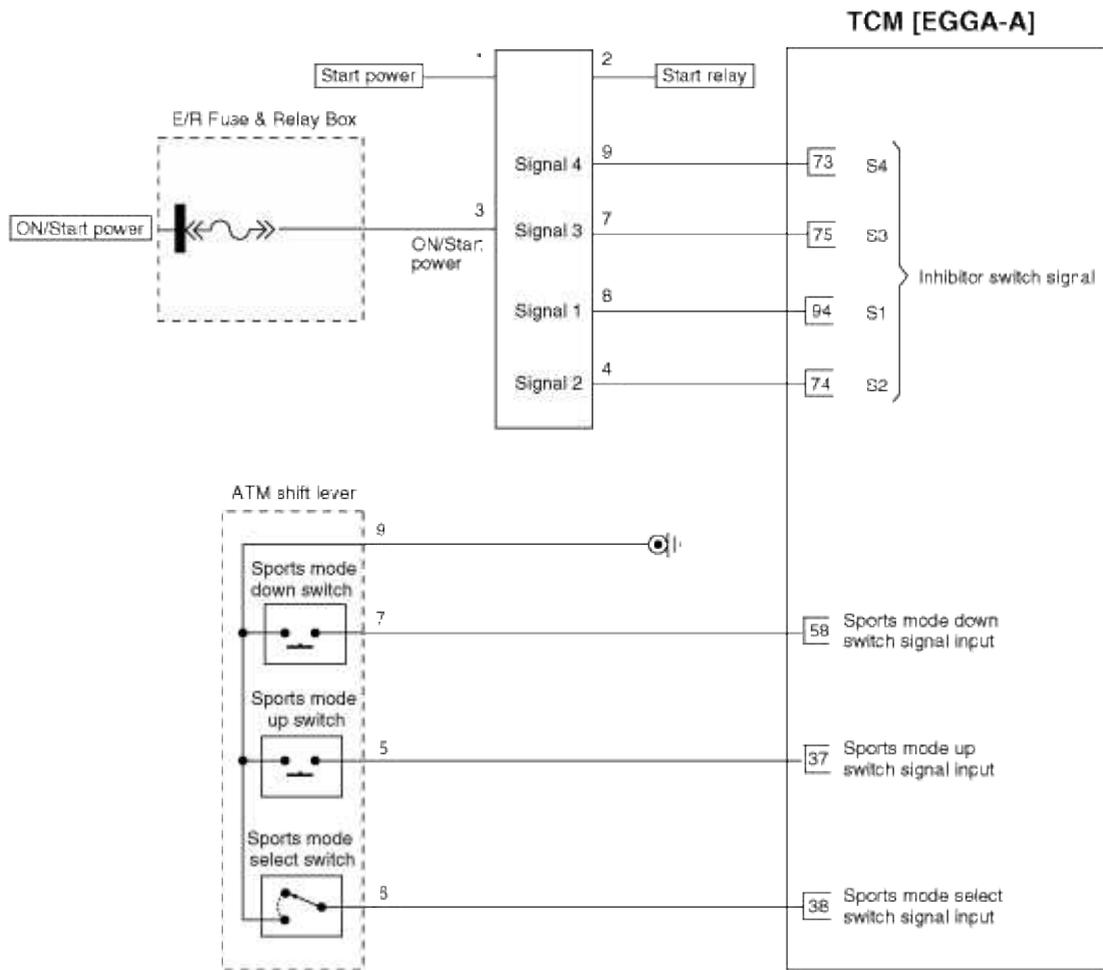
TCM Terminal input/ output signal

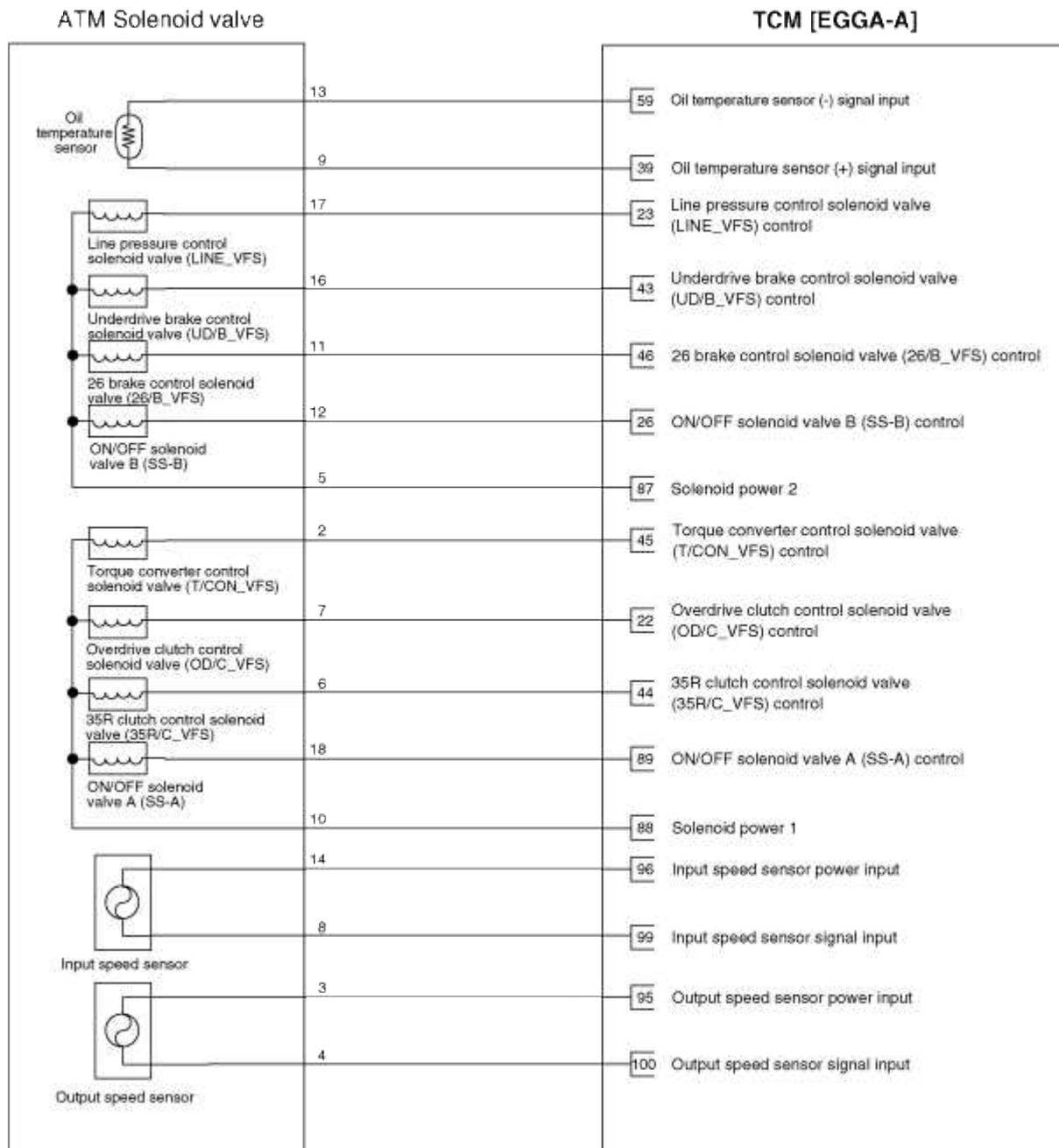
**Connector [EGGA-A]**

Pin	Description	Condition	Input/output value	
			Type	Level
22	Overdrive clutch control solenoid valve (OD/C_VFS)	-	Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
23	Line pressure control solenoid valve (LINE_VFS)	-	Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
26	ON/OFF solenoid valve B(SS-B)	High	Output	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
37	Sports mode up switch	Up ON	Input	0V/Battery voltage level
		Other		9V < Battery voltage level < 16V
38	Sports mode select switch	Sport mode	Input	0V/Battery voltage level
		Other		9V < Battery voltage level < 16V
39	Oil temperature sensor (+)	ON	Input	0V/3.3V
		OFF		
43	Underdrive brake control solenoid valve (UD/B_VFS)	-	Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
				Power supply : V_SOL2
44	35R clutch control solenoid valve (35R/C_VFS)	-	Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
45	Torque converter control solenoid valve (T/CON_VFS)	-	Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
46	26 brake control solenoid valve (26/B_VFS)	-	Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
				Power supply : V_SOL2

58	Sports mode down switch	Down ON	Input	0V/Battery voltage level
		Other		9V < Battery voltage level < 16V
59	Oil temperature sensor (-)	-	Ground	0V
73	Inhibitor switch signal "S4"	High	Input	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
74	Inhibitor switch signal "S2"	High	Input	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
75	Inhibitor switch signal "S3"	High	Input	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
89	ON/OFF solenoid valve A (SS-A)	High	Output	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
94	Inhibitor switch signal "S1"	High	Input	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
95	Output speed sensor power	ON	Power	0V/7.5V
		OFF		
96	Input speed sensor power	ON	Power	0V/7.5V
		OFF		
99	Input speed sensor signal	High	Input	0.7V/1.4V
		Low		
100	Output speed sensor signal	High	Input	0.7V/1.4V
		Low		

Circuit Diagram





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

### Inspection

#### TCM Problem Inspection Procedure

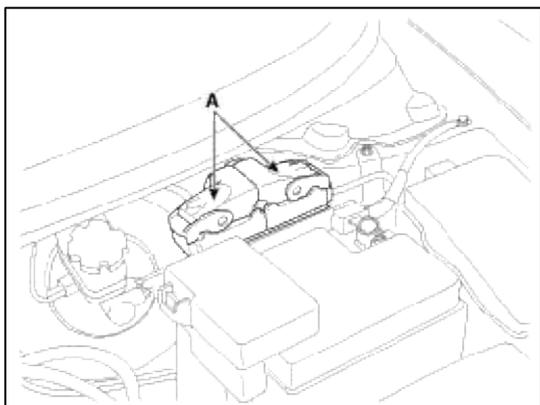
1. TEST TCM GROUND CIRCUIT: Measure resistance between TCM and chassis ground using the backside of TCM harness connector as TCM side check point. If the problem is found, repair it.

**Specification:** Below 1Ω

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

### Replacement

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



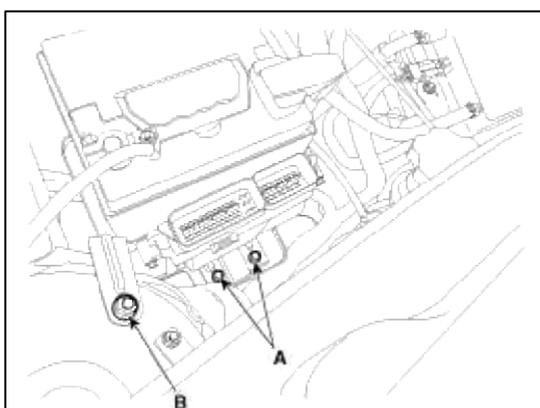
4. Remove the TCM after removing the mounting bolts (A-2ea) and nut (B).

---

#### TCM installation bolt/nut :

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

---



### Installation

1. Installation is reverse of removal.

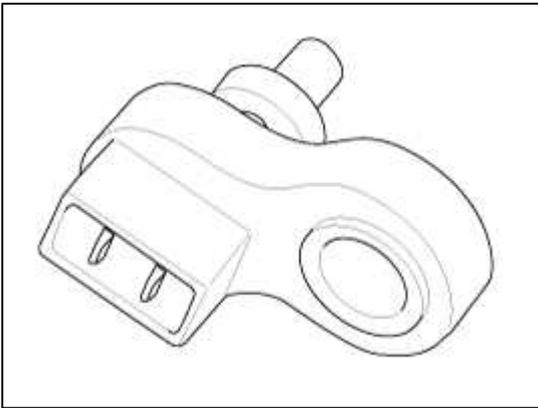
#### NOTE

In the case of the vehicle equipped with immobilizer or button engine start system, perform "Key Teaching" procedure together (Refer to "Immobilizer" or "Button Engine Start System in BE group).

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

### Description

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

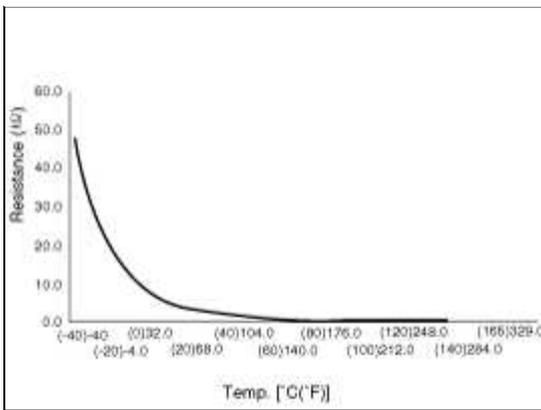


## Automatic Transaxle System > Automatic Transaxle Control System > Transaxle Oil Temperature Sensor > Specifications

### Specifications

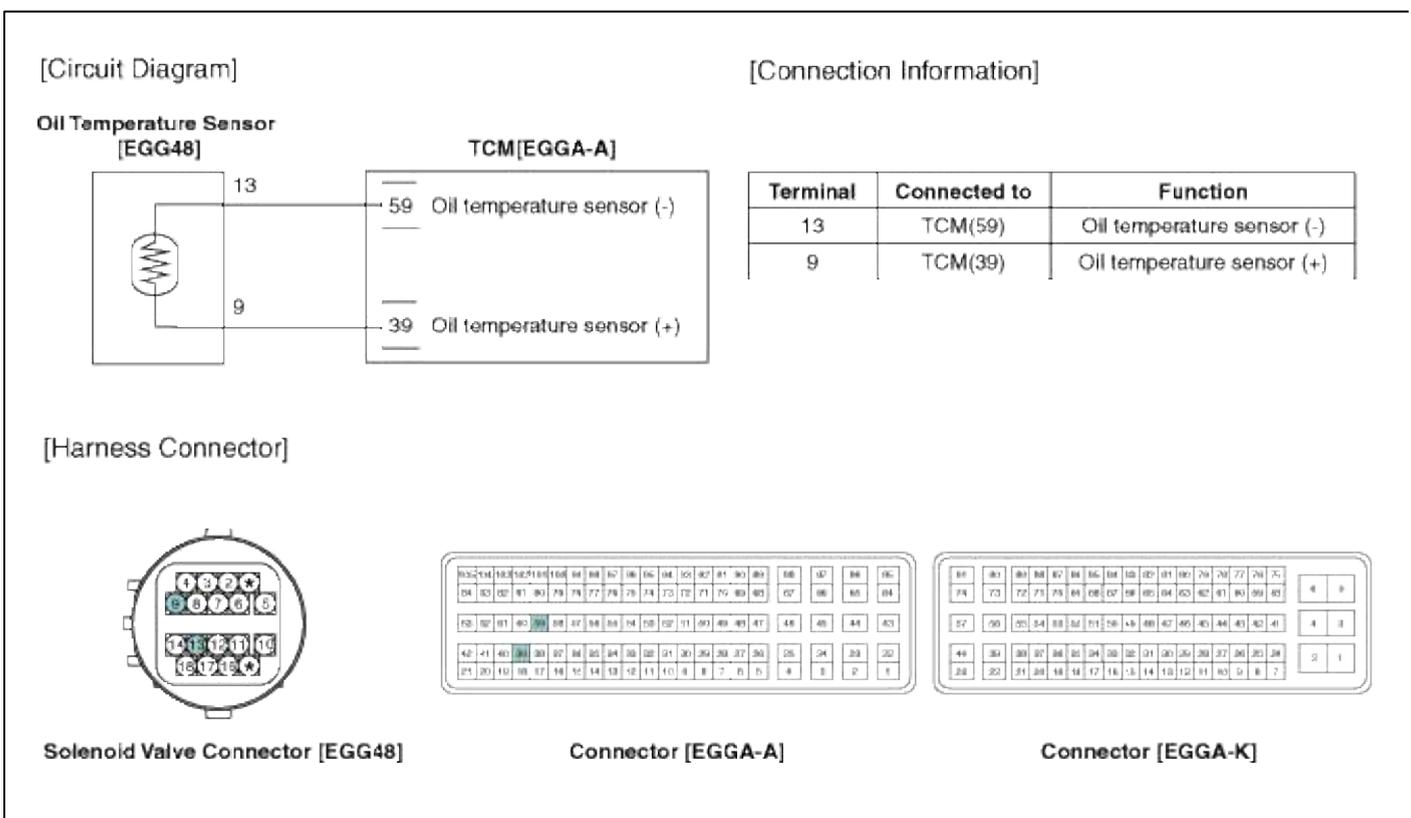
Type: Negative Thermal Coefficient Type

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
(150)302.0	0.05



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

### Circuit Diagram



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

### Inspection

1. Turn ignition switch OFF.
2. Disconnect the solenoid valve connector.
3. Measure resistance between sensor signal terminal and sensor ground terminal.
4. Check that the resistance is within the specification.

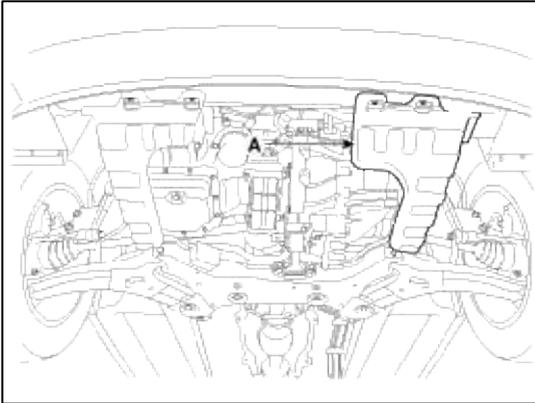
### Removal

1. Remove the battery and the battery tray.  
(Refer to "Charging system" in EE group.)

- Remove the under cover (A).

**Tightening torque:**

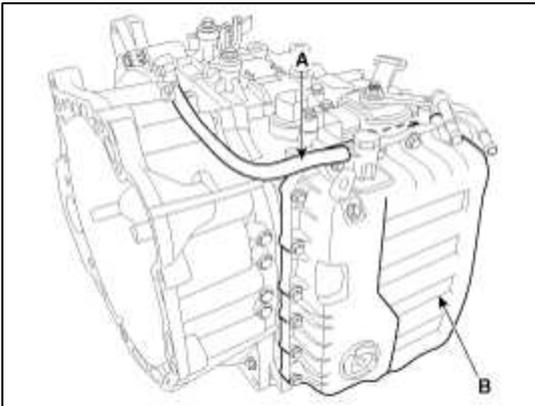
6.9 ~ 10.8 N.m (0.7 ~ 1.1 kgf.m, 5.1 ~ 8.0 lb-ft)



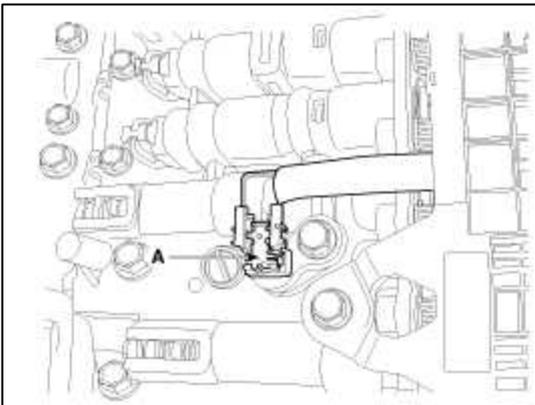
- Replace new gasket and the plug after draining the automatic transaxle fluid by removing the drain plug. (Refer to "Hydraulic system (Fluid)" in this group)
- Remove the air breather hose (A).
- Remove the valve body cover (B).

**Tightening torque:**

13.7 ~ 15.7 N.m (1.4 ~ 1.6 kgf.m, 10.8 ~ 11.6 lb-ft)



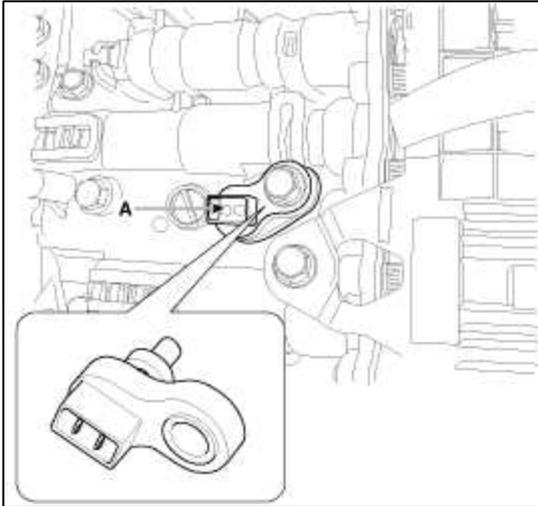
- Disconnect the oil temperature sensor connector (A).



7. 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)



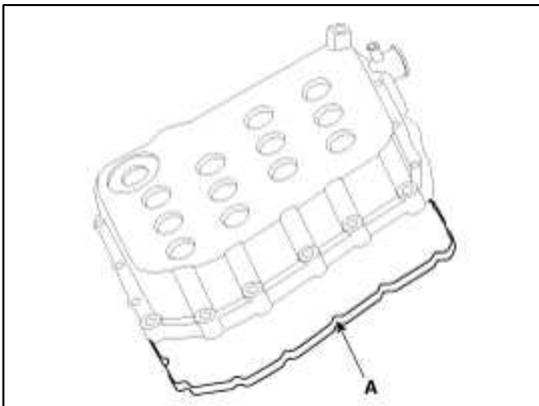
**Installation**

1. Installation is the reverse of removal.

**NOTE**

After replacement or reinstallation procedure of the valve body assembly, must perform procedures below.

- The gasket of the valve body gasket (A) use new one.

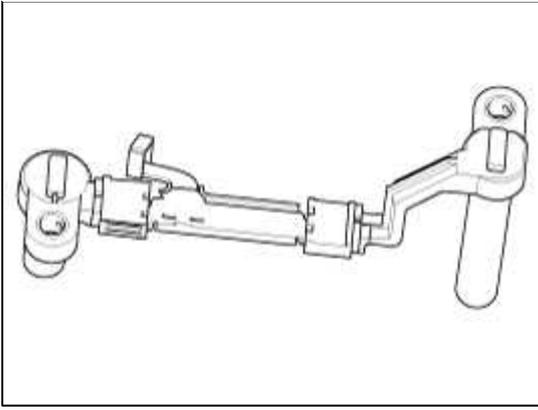


- Adding automatic transaxle fluid.  
(Refer to "Hydraulic system (Fluid)" in this group)

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

**Description**

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



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

#### Specifications

Type: Hall effect sensor

Operation condition [°C(°F)]	((-)40 ~ 150)) -40 ~ 302	
Air gap(mm)in.	(0.85 ~ 1.3) 0.0335 ~ 0.0512	
Output voltage(V)	High	1.18 ~ 1.68
	Low	0.59 ~ 0.84

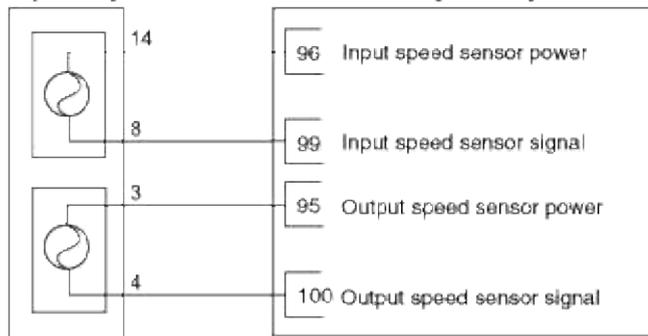
### Automatic Transaxle System > Automatic Transaxle Control System > Input Speed Sensor > Schematic Diagrams

#### Circuit Diagram

[Circuit Diagram]

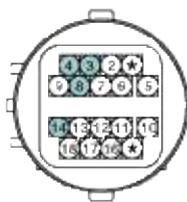
[Connection Information]

Input & Output Speed Sensor [EGG48]



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

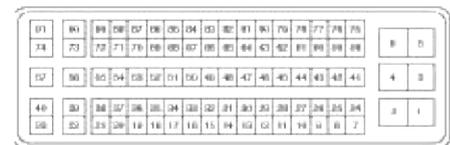
[Harness Connector]



Solenoid Valve Connector [EGG48]



Connector [EGGA-A]



Connector [EGGA-K]

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

Signal Waveform

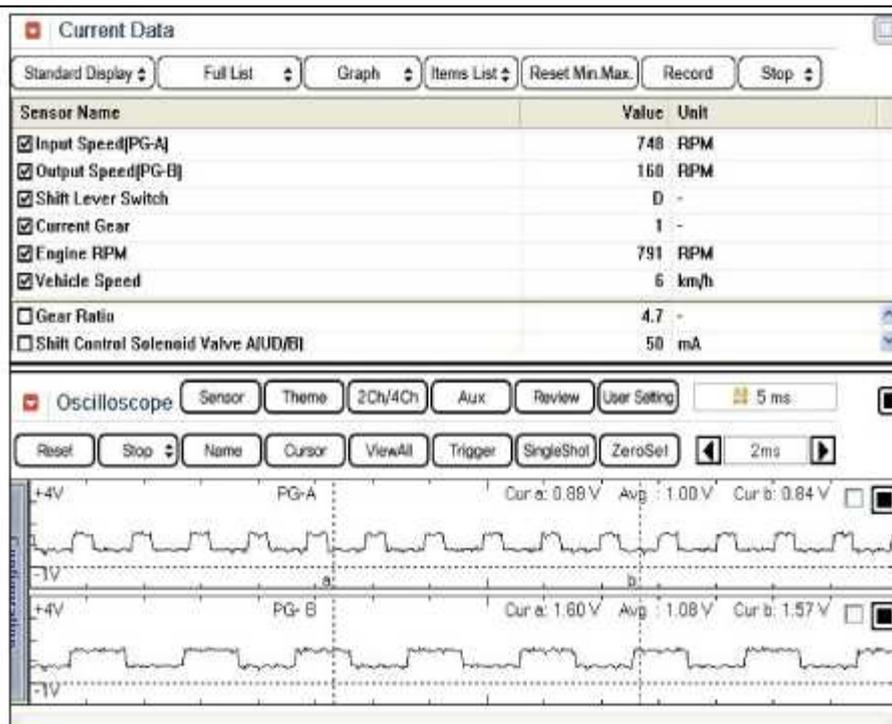


Fig.1

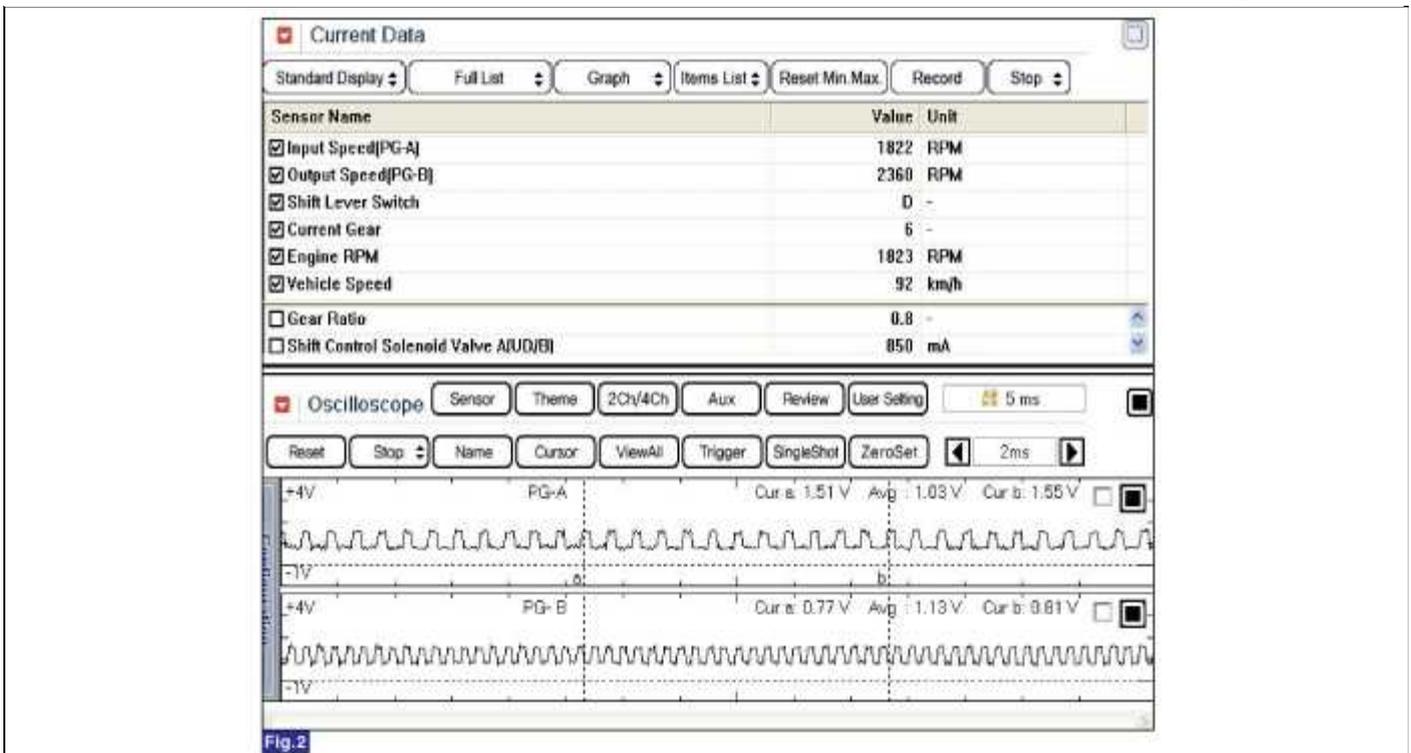


Fig 1) Input/Output speed sensor at low speed

Fig 2) Input/Output speed sensor at high speed

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

#### Inspection

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

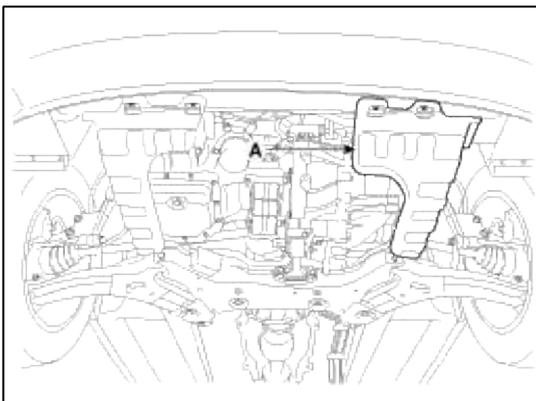
**Specification:** Refer to "Signal Wave Form" section.

#### Removal

1. Remove the battery and the battery tray.  
(Refer to "Charging system" in EE group.)
2. Remove the under cover (A).

#### Tightening torque:

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



3. Replace new gasket and the plug after draining the automatic transaxle fluid by removing the drain plug. (Refer to "Hydraulic system (Fluid)" in this group)
  4. Remove the air breather hose (A).
  5. Remove the valve body cover (B).
- 

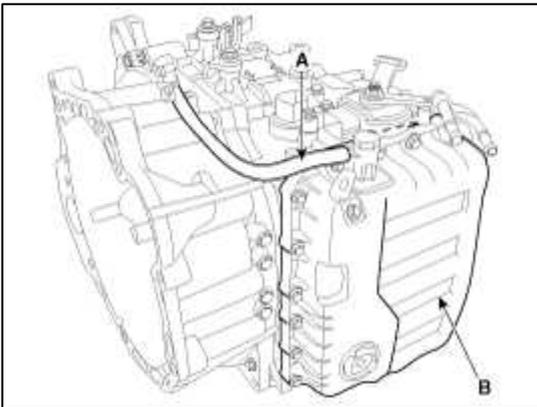
**Tightening torque:**

13.7 ~ 15.7 N.m (1.4 ~ 1.6 kgf.m, 10.8 ~ 11.6 lb-ft)

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**NOTE**

Remove installation bolts in the engine compartment first and then remove others under the vehicle.

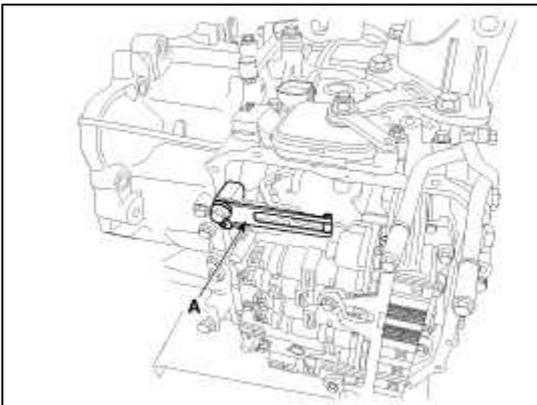


6. Remove the plate and the detent spring (A) after removing the bolt.
- 

**Tightening torque:**

11.8 ~ 15.7 N.m (1.2 ~ 1.6 kgf.m, 8.7 ~ 11.6 lb-ft)

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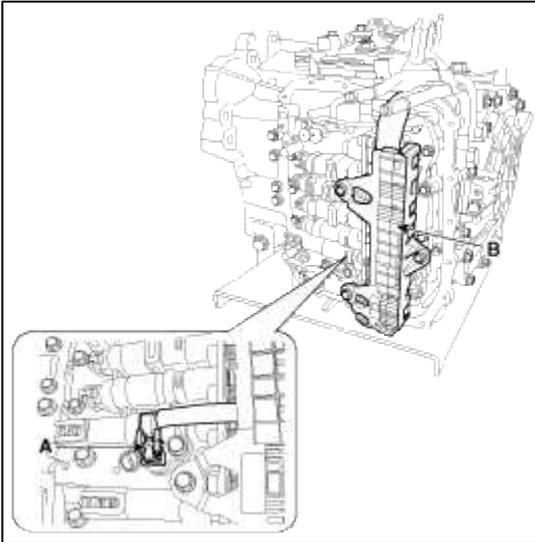
- Remove the bolt (3ea) after disconnecting the solenoid valve connector (B) and the oil temperature sensor connector (A).

**Tightening torque:**

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

**CAUTION**

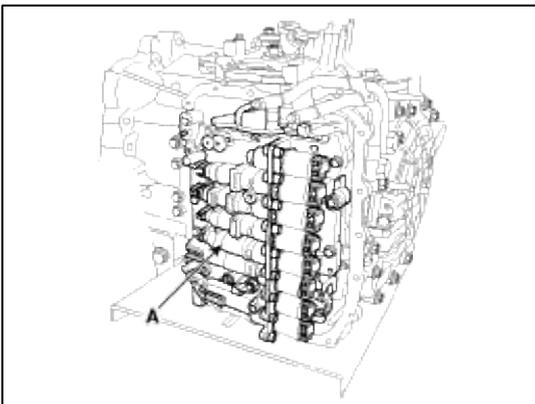
Be careful not to damage the harness lock connector.



- 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)

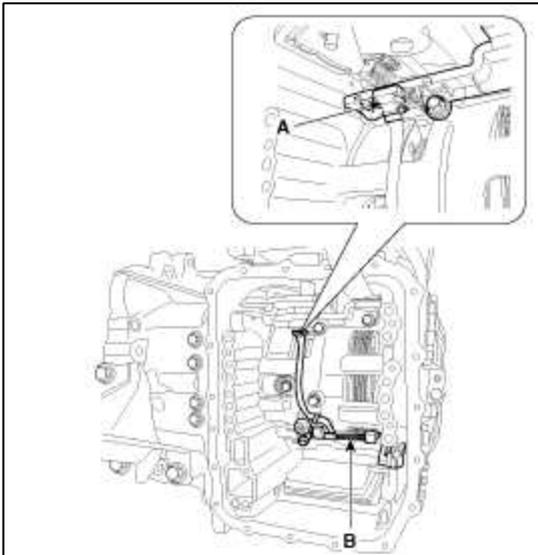


- Disconnect the input & output speed sensor connector (A).

10. 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)



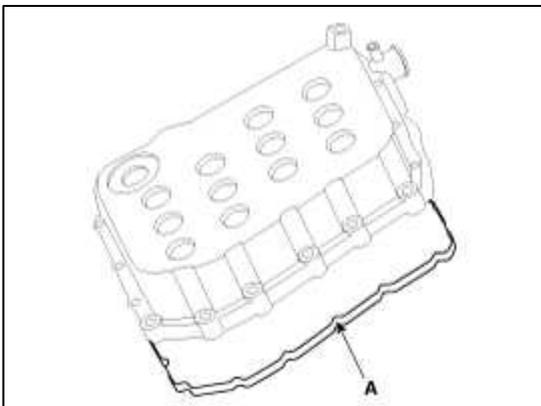
**Installation**

1. Installation is the reverse of removal.

**NOTE**

After replacement or reinstallation procedure of the valve body assembly, must perform procedures below.

- The gasket of the valve body gasket (A) use new one.

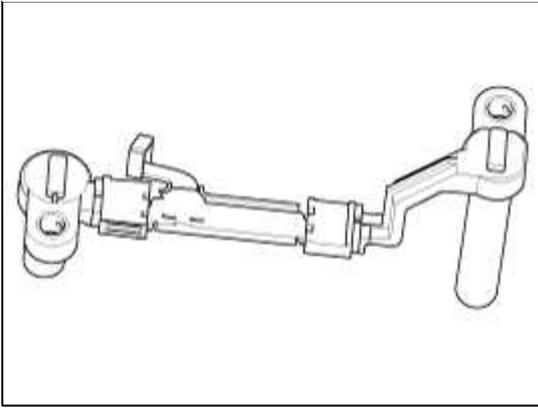


- Adding automatic transaxle fluid.  
(Refer to "Hydraulic system (Fluid)" in this group)

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

**Description**

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



### Automatic Transaxle System > Automatic Transaxle Control System > Output Speed Sensor > Specifications

#### Specifications

Type: Hall effect sensor

Operation condition [°C(°F)]	((-)40 ~ 150)) -40 ~ 302	
Air gap(mm)in.	(1.2 ~ 1.8) 0.0472 ~ 0.0709	
Output voltage	High	1.18 ~ 1.68
	Low	0.59 ~ 0.84

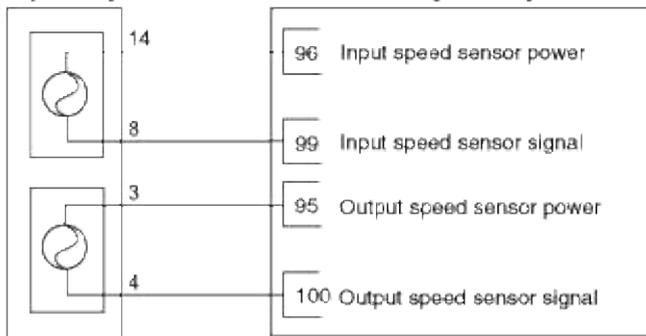
### Automatic Transaxle System > Automatic Transaxle Control System > Output Speed Sensor > Schematic Diagrams

#### Circuit Diagram

[Circuit Diagram]

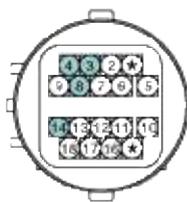
[Connection Information]

Input & Output Speed Sensor [EGG48]



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

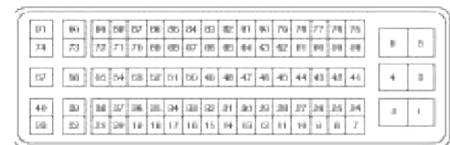
[Harness Connector]



Solenoid Valve Connector [EGG48]



Connector [EGGA-A]



Connector [EGGA-K]

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

Signal Waveform

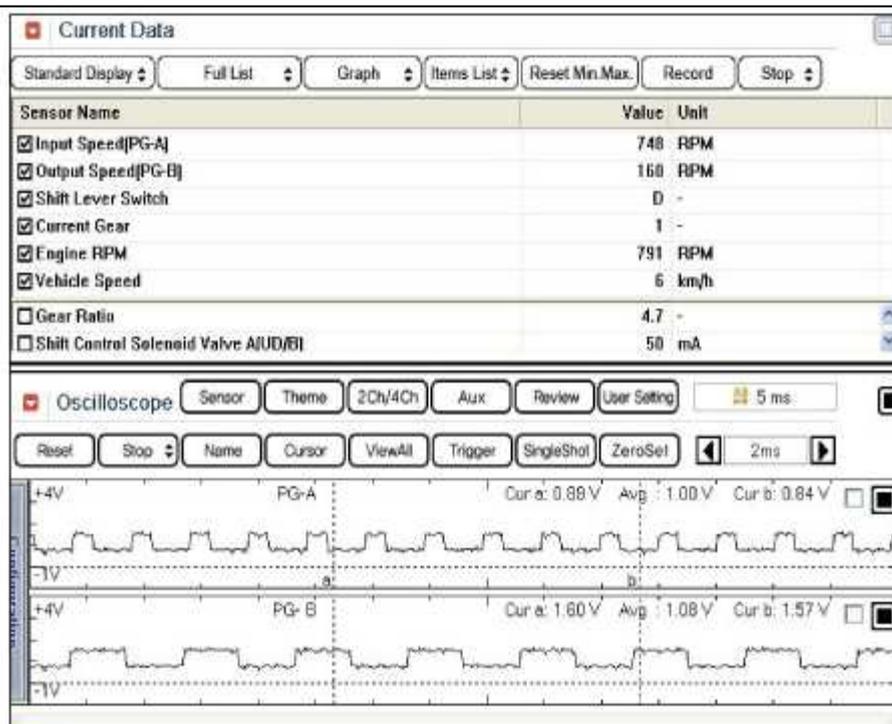


Fig.1

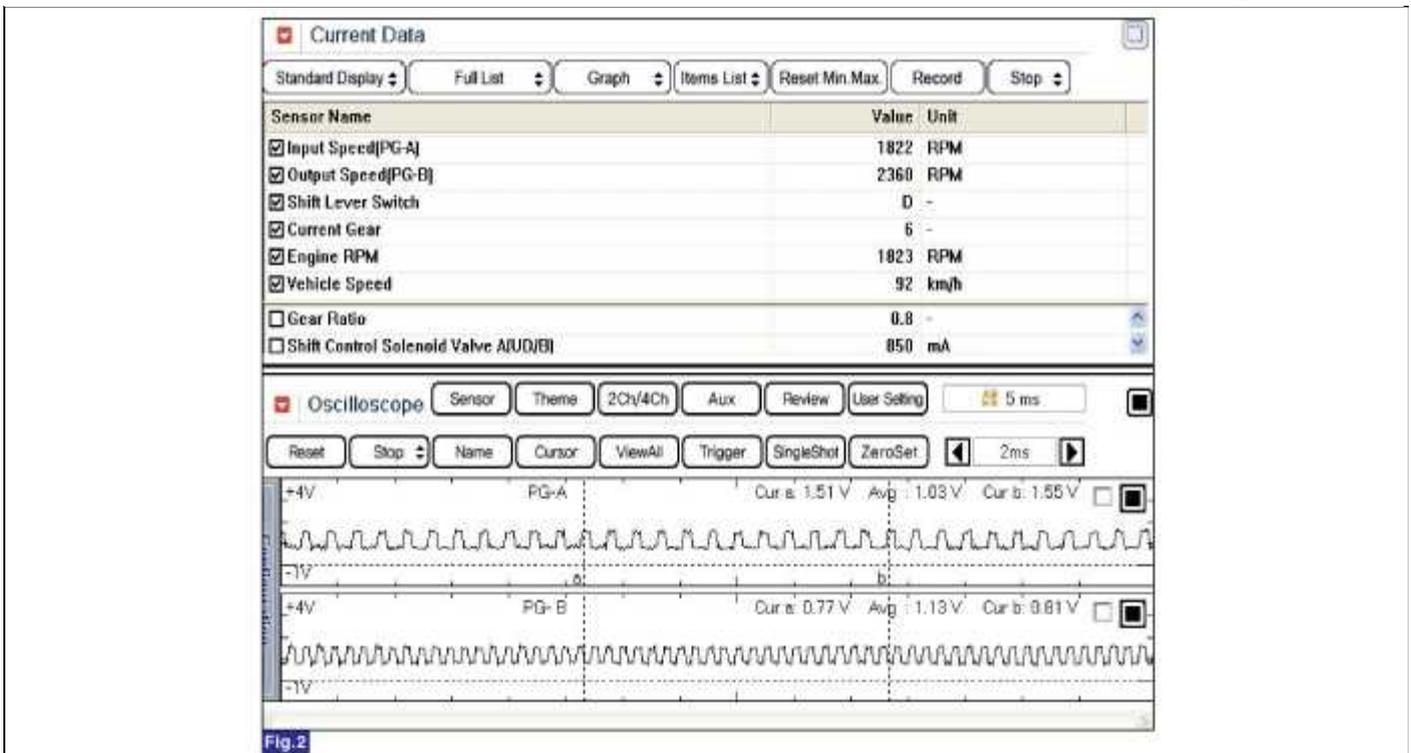


Fig 1) Input/Output speed sensor at low speed

Fig 2) Input/Output speed sensor at high speed

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

#### Inspection

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

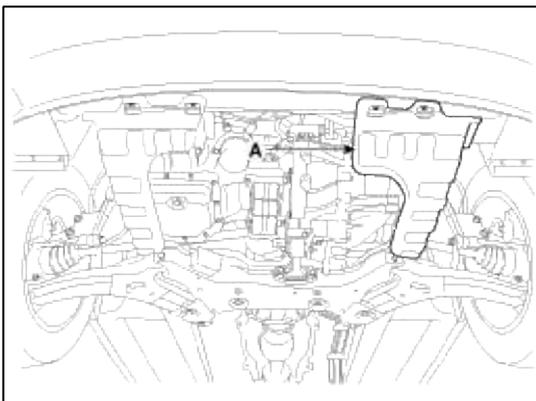
**Specification:** Refer to "Signal Wave Form" section.

#### Removal

1. Remove the battery and the battery tray.  
(Refer to "Charging system" in EE group.)
2. Remove the under cover (A).

#### Tightening torque:

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



3. Replace new gasket and the plug after draining the automatic transaxle fluid by removing the drain plug. (Refer to "Hydraulic system (Fluid)" in this group)
4. Remove the air breather hose (A).
5. Remove the valve body cover (B).

**Tightening torque:**

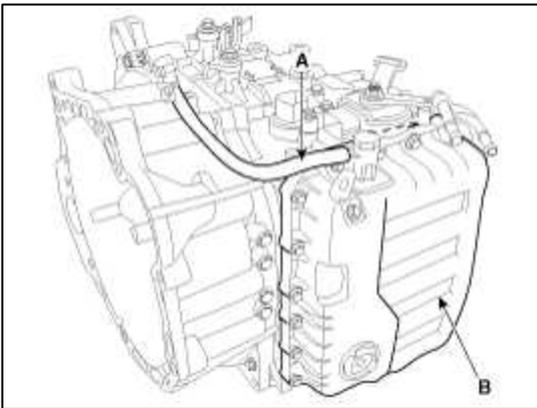
13.7 ~ 15.7 N.m (1.4 ~ 1.6 kgf.m, 10.8 ~ 11.6 lb-ft)

**CAUTION**

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

**NOTE**

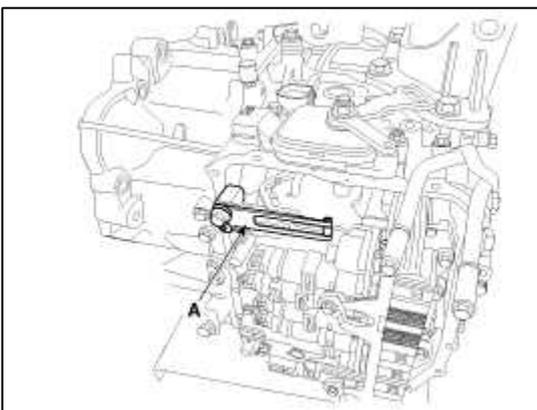
Remove installation bolts in the engine compartment first and then remove others under the vehicle.



6. Remove the plate and the detent spring (A) after removing the bolt.

**Tightening torque:**

11.8 ~ 15.7 N.m (1.2 ~ 1.6 kgf.m, 8.7 ~ 11.6 lb-ft)



7. Remove the bolt (3ea) after disconnecting the solenoid valve connector (B) and the oil temperature sensor connector (A).
- 

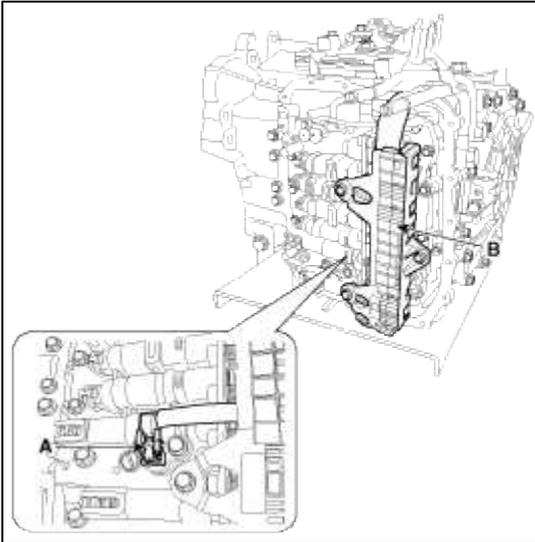
**Tightening torque:**

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

---

**CAUTION**

Be careful not to damage the harness lock connector.

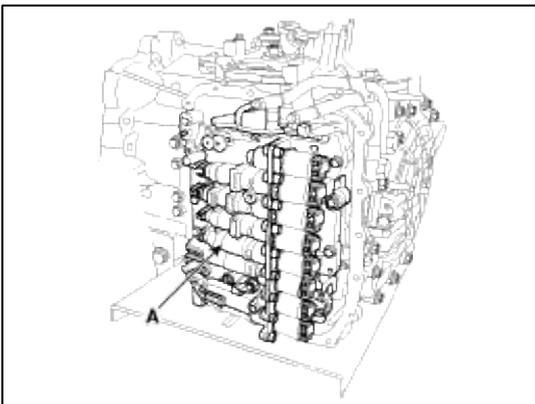


8. Remove the valve body assembly (A).
- 

**Tightening torque:**

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

---

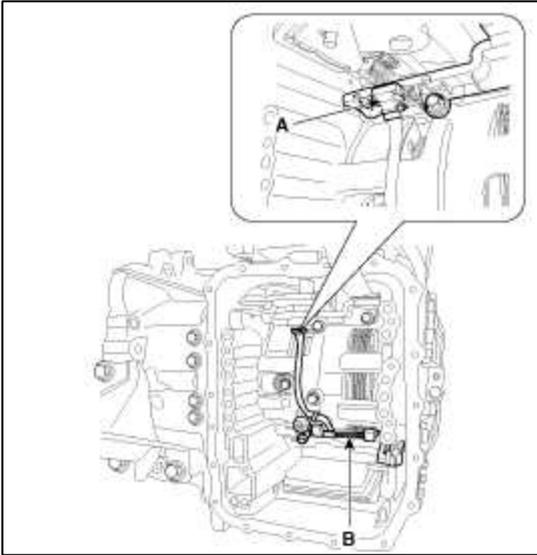


9. Disconnect the input & output speed sensor connector (A).

10. 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)



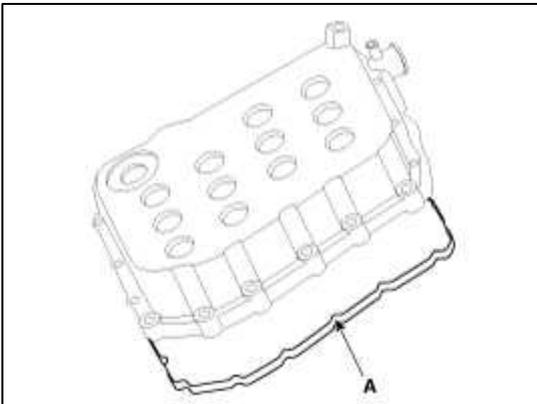
**Installation**

1. Installation is the reverse of removal.

**NOTE**

After replacement or reinstallation procedure of the valve body assembly, must perform procedures below.

- The gasket of the valve body gasket (A) use new one.

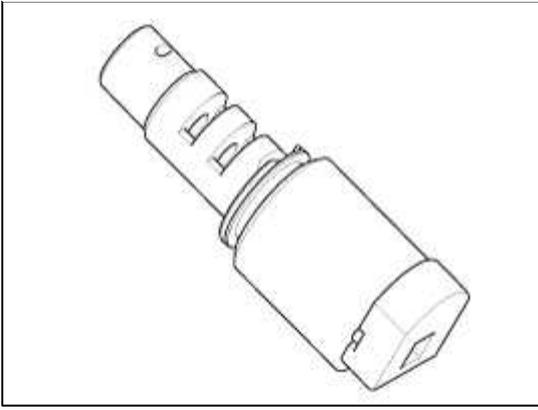


- Adding automatic transaxle fluid.  
(Refer to "Hydraulic system (Fluid)" in this group)

**Automatic Transaxle System > Automatic Transaxle Control System > Torque Converter Control Solenoid Valve (T/CON\_VFS) > Description and Operation**

**Description**

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



**Automatic Transaxle System > Automatic Transaxle Control System > Torque Converter Control Solenoid Valve (T/CON\_VFS) > Specifications**

Specifications

Direct control VFS[T/CON]

Control type : Normal low type

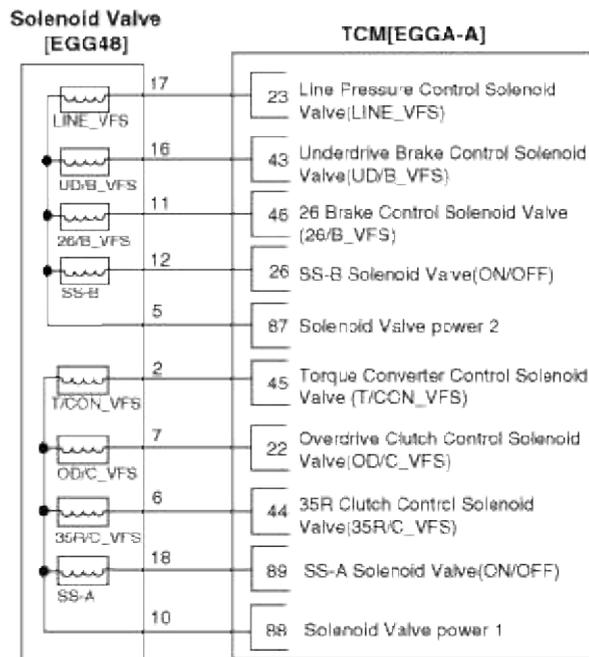
Control Pressure kpa (kgf/cm <sup>2</sup> , psi)	9.81 ~ 500.14 (0.1 ~ 5.1, 1.42 ~ 72.54)
Current value(mA)	50 ~ 850
Internal resistance( $\Omega$ )	5.1

**Automatic Transaxle System > Automatic Transaxle Control System > Torque Converter Control Solenoid Valve (T/CON\_VFS) > Schematic Diagrams**

Circuit Diagram

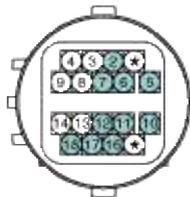
## [Circuit Diagram]

## [Connection Information]



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

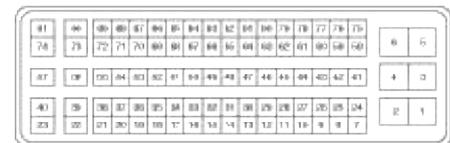
## [Harness Connector]



Solenoid Valve Connector [EGG48]



Connector [EGGA-A]



Connector [EGGA-K]

## Automatic Transaxle System > Automatic Transaxle Control System > Torque Converter Control Solenoid Valve (T/CON\_VFS) > Repair procedures

### Inspection

1. Turn ignition switch OFF.
2. Disconnect the solenoid valve connector.
3. Measure resistance between sensor signal terminal and sensor ground terminal.
4. Check that the resistance is within the specification.

### Removal

1. Remove the battery and the battery tray.  
(Refer to "Charging system" in EE group.)

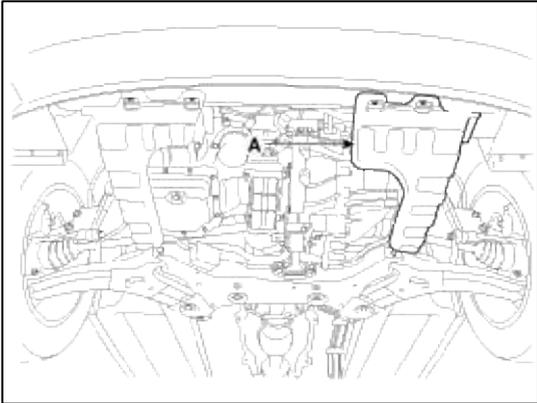
2. Remove the under cover (A).

---

**Tightening torque :**

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

---



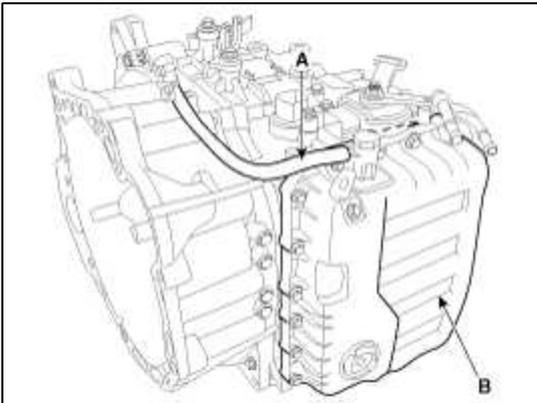
3. Replace new gasket and the plug after draining the automatic transaxle fluid by removing the drain plug.  
(Refer to "Hydraulic system (Fluid)" in this group)
4. Remove the air breeder hose (A).
5. Remove the valve body cover (B).

---

**Tightening torque :**

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

---



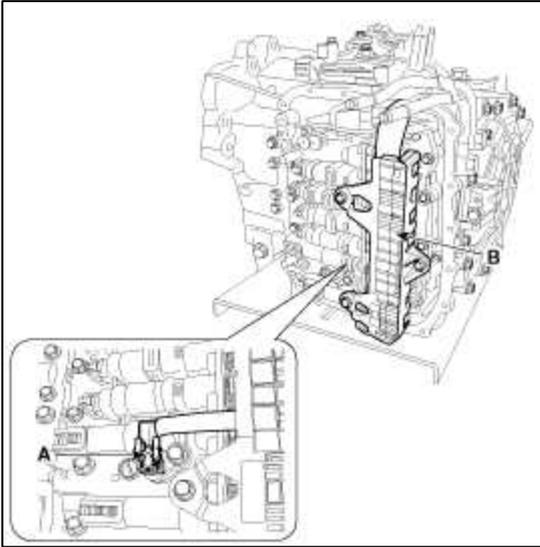
6. Remove the bolt (3ea) after disconnecting the solenoid valve connector (B) and the oil temperature sensor connector (A).

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**Tightening torque :**

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

---



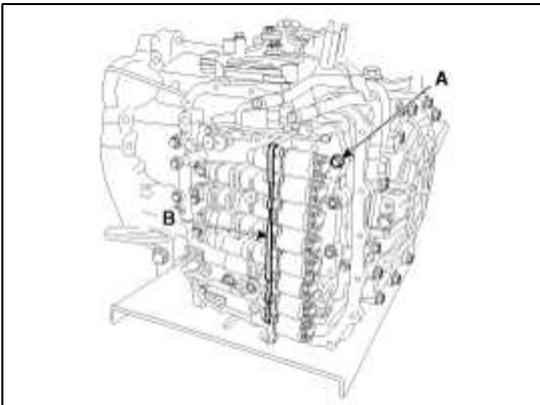
7. Remove the solenoid valve support bracket (B) and the valve body mounting bolt (A-1ea).

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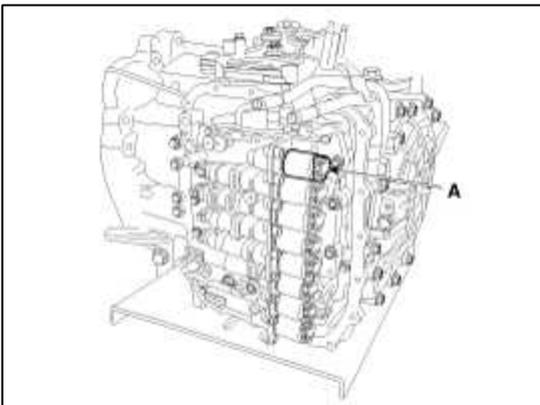
**Tightening torque :**

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

---



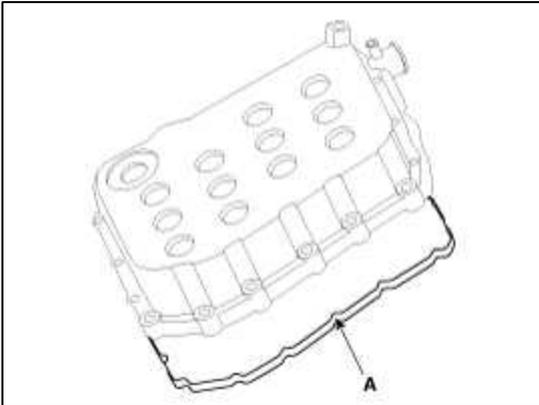
8. Remove the torque converter control solenoid valve (A).



1. Installation is the reverse of removal.

**NOTE**

- The gasket of the valve body gasket (A) use new one.
- Adding automatic transaxle fluid.  
(Refer to "Hydraulic system (Fluid)" in this group)

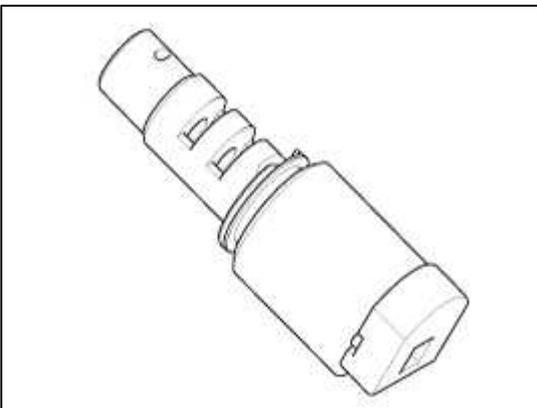


- Perform TCM learning after replacing the automatic transaxle to prevent slow automatic transaxle response, jerky acceleration and jerky startup.  
(Refer to "Automatic transaxle control system (Repair procedures)" in this group)

**Automatic Transaxle System > Automatic Transaxle Control System > 26 Brake Control Solenoid Valve(26/B\_VFS) > Description and Operation**

**Description**

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



**Automatic Transaxle System > Automatic Transaxle Control System > 26 Brake Control Solenoid Valve(26/B\_VFS) > Specifications**

**Specifications**

Direct control VFS[26/B]

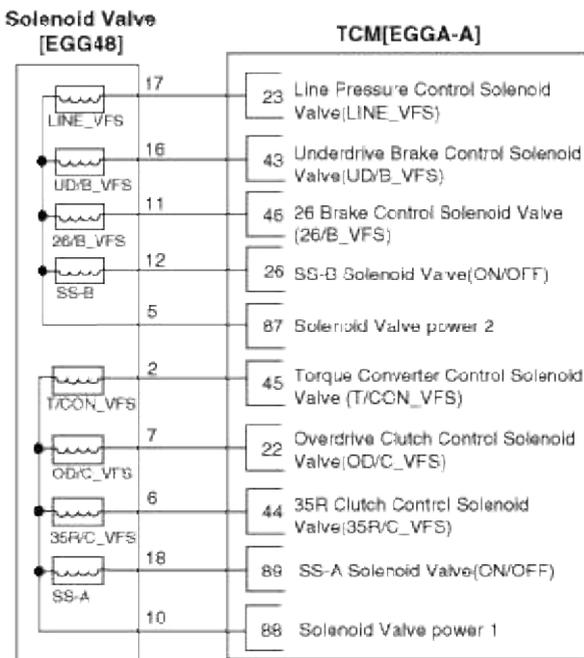
Control type : Normal low type

Control Pressure kpa (kgf/cm <sup>2</sup> , psi)	9.81 ~ 500.14 (0.1 ~ 5.1, 1.42 ~ 72.54)
Current value(mA)	50 ~ 850
Internal resistance( $\Omega$ )	5.1

## Automatic Transaxle System > Automatic Transaxle Control System > 26 Brake Control Solenoid Valve(26/B\_VFS) > Schematic Diagrams

### Circuit Diagram

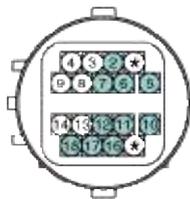
[Circuit Diagram]



[Connection Information]

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

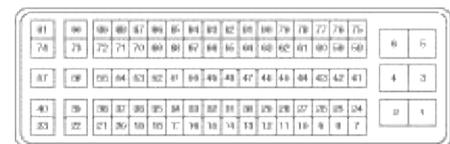
[Harness Connector]



Solenoid Valve Connector [EGG48]



Connector [EGGA-A]



Connector [EGGA-K]

## Automatic Transaxle System > Automatic Transaxle Control System > 26 Brake Control Solenoid Valve(26/B\_VFS) > Repair procedures

### Inspection

1. Turn ignition switch OFF.
2. Disconnect the solenoid valve connector.
3. Measure resistance between sensor signal terminal and sensor ground terminal.
4. Check that the resistance is within the specification.

### Removal

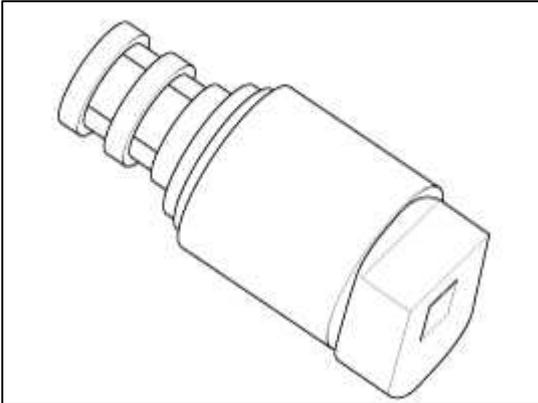
**NOTE**

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

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

#### Description

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



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

#### Specifications

Direct control VFS[LINE Pressure]

Control type : Normal low type

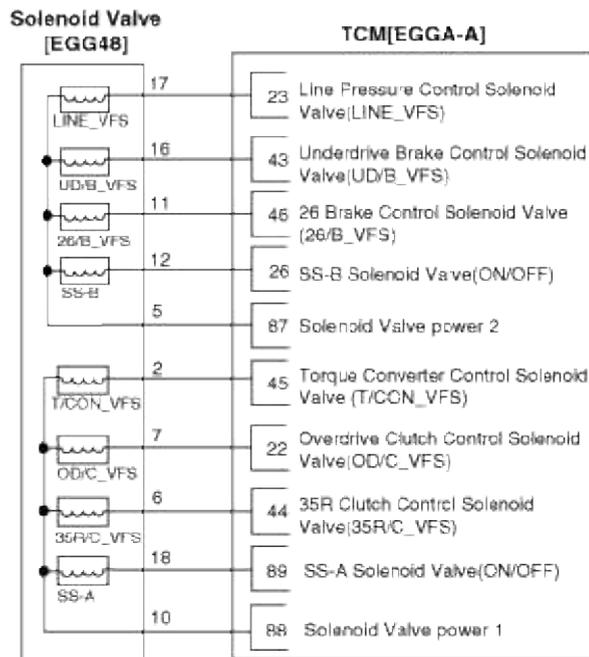
Control Pressure kpa (kgf/cm <sup>2</sup> , psi)	500.14 ~ 9.81 (5.1 ~ 0.1, 72.54 ~ 1.42)
Current value(mA)	50 ~ 850
Internal resistance( $\Omega$ )	5.1

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

#### Circuit Diagram

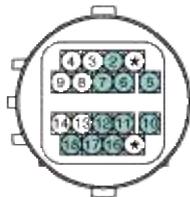
## [Circuit Diagram]

## [Connection Information]



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

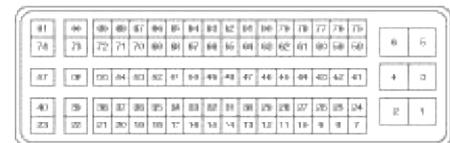
## [Harness Connector]



Solenoid Valve Connector [EGG48]



Connector [EGGA-A]



Connector [EGGA-K]

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

### Inspection

1. Turn ignition switch OFF.
2. Disconnect the solenoid valve connector.
3. Measure resistance between sensor signal terminal and sensor ground terminal.
4. Check that the resistance is within the specification.

### Removal

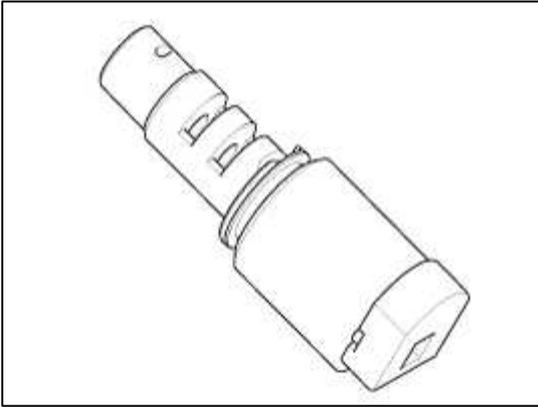
#### NOTE

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

## Automatic Transaxle System > Automatic Transaxle Control System > 35R Clutch Control Solenoid Valve(35R/C\_VFS) > Description and Operation

## Description

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



**Automatic Transaxle System > Automatic Transaxle Control System > 35R Clutch Control Solenoid Valve(35R/C\_VFS) > Specifications**

## Specifications

Direct control VFS[35R/C]

Control type : Normal low type

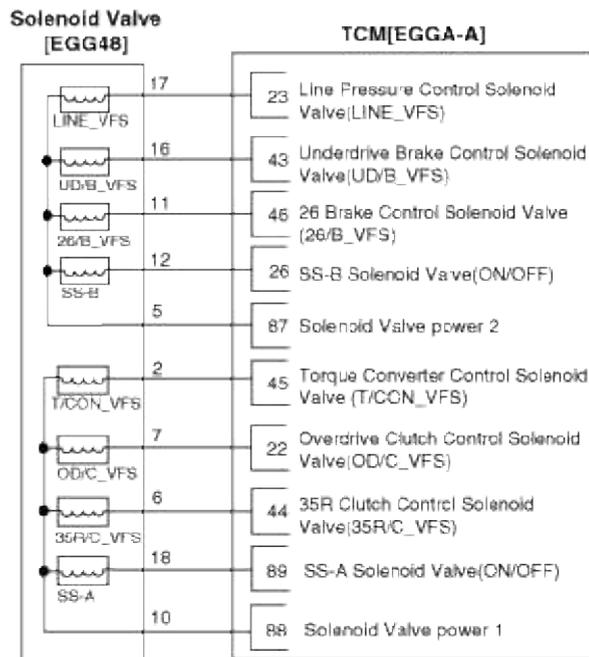
Control Pressure kpa (kgf/cm <sup>2</sup> , psi)	500.14 ~ 9.81 (5.1 ~ 0.1, 72.54 ~ 1.42)
Current value(mA)	50 ~ 850
Internal resistance( $\Omega$ )	5.1

**Automatic Transaxle System > Automatic Transaxle Control System > 35R Clutch Control Solenoid Valve(35R/C\_VFS) > Schematic Diagrams**

## Circuit Diagram

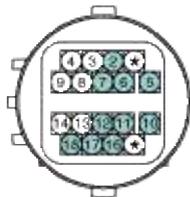
## [Circuit Diagram]

## [Connection Information]



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

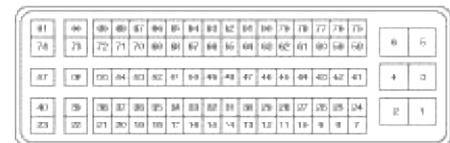
## [Harness Connector]



Solenoid Valve Connector [EGG48]



Connector [EGGA-A]



Connector [EGGA-K]

## Automatic Transaxle System > Automatic Transaxle Control System > 35R Clutch Control Solenoid Valve(35R/C\_VFS) > Repair procedures

### Inspection

1. Turn ignition switch OFF.
2. Disconnect the solenoid valve connector.
3. Measure resistance between sensor signal terminal and sensor ground terminal.
4. Check that the resistance is within the specification.

### Removal

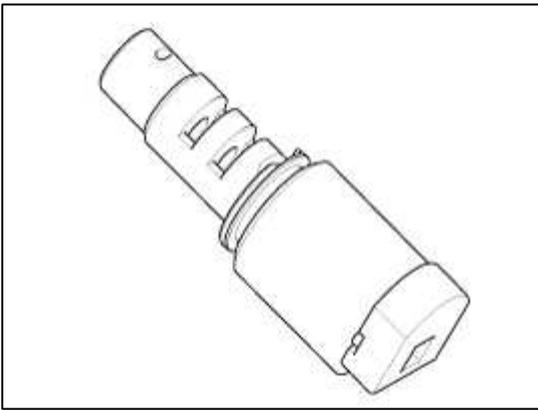
#### NOTE

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

## Automatic Transaxle System > Automatic Transaxle Control System > Underdrive Brake Control Solenoid Valve(UD/B\_VFS) > Description and Operation

### Description

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



### Automatic Transaxle System > Automatic Transaxle Control System > Underdrive Brake Control Solenoid Valve(UD/B\_VFS) > Specifications

#### Specifications

Direct control VFS[35R/C]

Control type : Normal low type

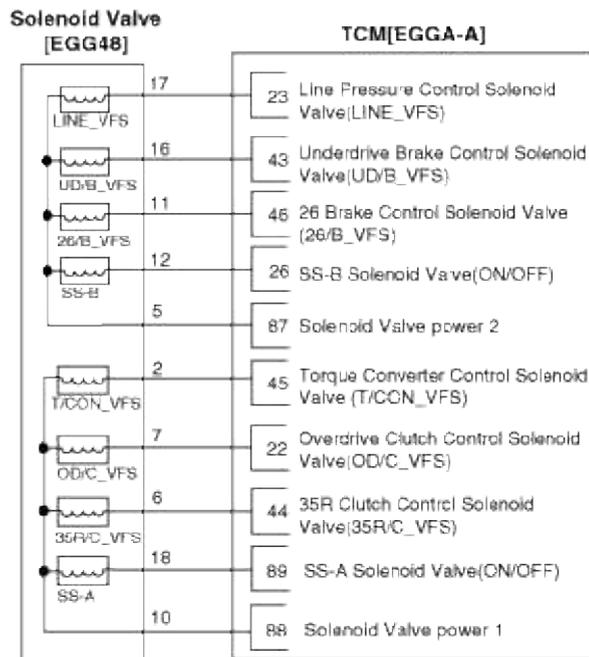
Control Pressure kpa (kgf/cm <sup>2</sup> , psi)	500.14 ~ 9.81 (5.1 ~ 0.1, 72.54 ~ 1.42)
Current value(mA)	50 ~ 850
Internal resistance( $\Omega$ )	5.1

### Automatic Transaxle System > Automatic Transaxle Control System > Underdrive Brake Control Solenoid Valve(UD/B\_VFS) > Schematic Diagrams

#### Circuit Diagram

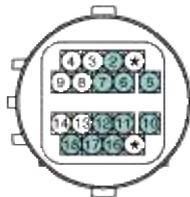
## [Circuit Diagram]

## [Connection Information]



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

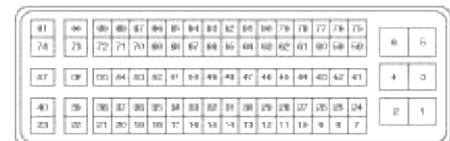
## [Harness Connector]



Solenoid Valve Connector [EGG48]



Connector [EGGA-A]



Connector [EGGA-K]

### Automatic Transaxle System > Automatic Transaxle Control System > Underdrive Brake Control Solenoid Valve(UD/B\_VFS) > Repair procedures

#### Inspection

1. Turn ignition switch OFF.
2. Disconnect the solenoid valve connector.
3. Measure resistance between sensor signal terminal and sensor ground terminal.
4. Check that the resistance is within the specification.

#### Removal

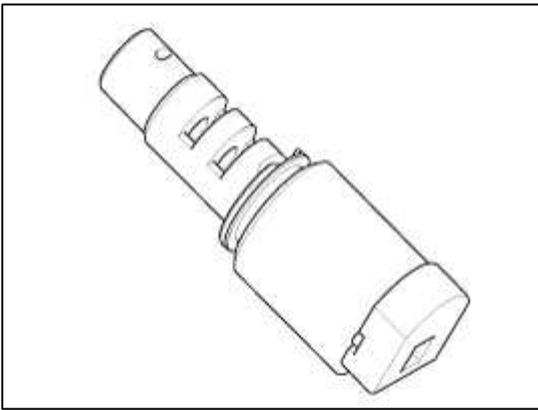
##### NOTE

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

### Automatic Transaxle System > Automatic Transaxle Control System > Overdrive Clutch Control Solenoid Valve(OD/C\_VFS) > Description and Operation

## Description

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



**Automatic Transaxle System > Automatic Transaxle Control System > Overdrive Clutch Control Solenoid Valve(OD/C\_VFS) > Specifications**

## Specifications

Direct control VFS[35R/C]

Control type : Normal low type

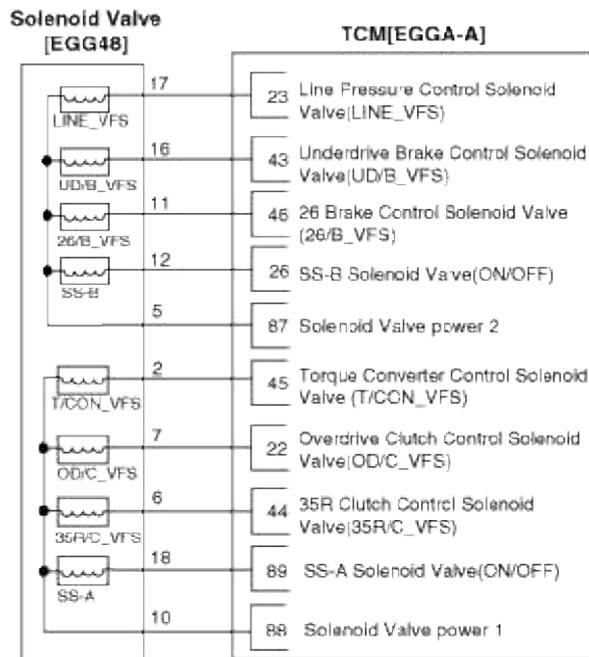
Control Pressure kpa (kgf/cm <sup>2</sup> , psi)	500.14 ~ 9.81 (5.1 ~ 0.1, 72.54 ~ 1.42)
Current value(mA)	50 ~ 850
Internal resistance( $\Omega$ )	5.1

**Automatic Transaxle System > Automatic Transaxle Control System > Overdrive Clutch Control Solenoid Valve(OD/C\_VFS) > Schematic Diagrams**

## Circuit Diagram

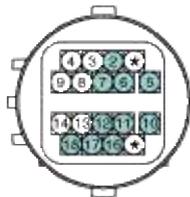
## [Circuit Diagram]

## [Connection Information]



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

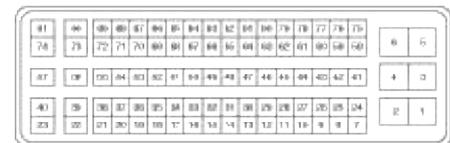
## [Harness Connector]



Solenoid Valve Connector [EGG48]



Connector [EGGA-A]



Connector [EGGA-K]

## Automatic Transaxle System > Automatic Transaxle Control System > Overdrive Clutch Control Solenoid Valve(OD/C\_VFS) > Repair procedures

### Inspection

1. Turn ignition switch OFF.
2. Disconnect the solenoid valve connector.
3. Measure resistance between sensor signal terminal and sensor ground terminal.
4. Check that the resistance is within the specification.

### Removal

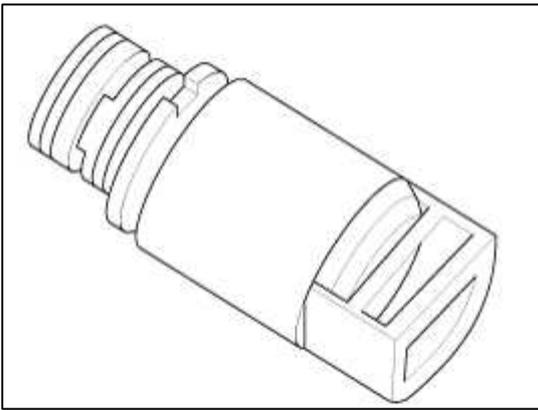
#### NOTE

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

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

### Description

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



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

#### Specifications

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

Control type : Normal low type

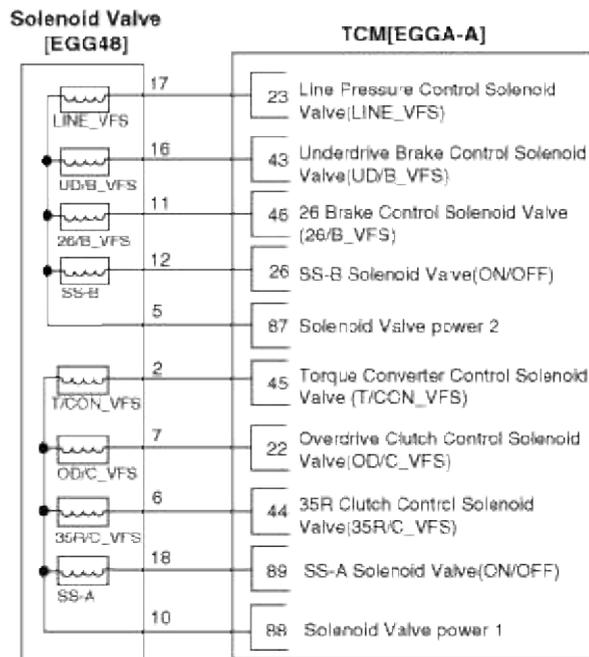
Control pressure kpa (kgf/cm <sup>2</sup> , psi)	490.33(5.0, 71.12)
Internal resistance( $\Omega$ )	10 ~ 11

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

#### Circuit Diagram

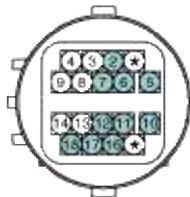
## [Circuit Diagram]

## [Connection Information]



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

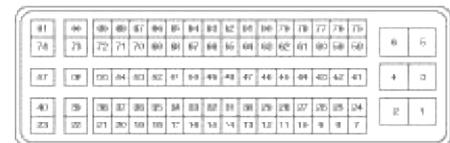
## [Harness Connector]



Solenoid Valve Connector [EGG48]



Connector [EGGA-A]



Connector [EGGA-K]

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

### Inspection

1. Turn ignition switch OFF.
2. Disconnect the solenoid valve connector.
3. Measure resistance between sensor signal terminal and sensor ground terminal.
4. Check that the resistance is within the specification.

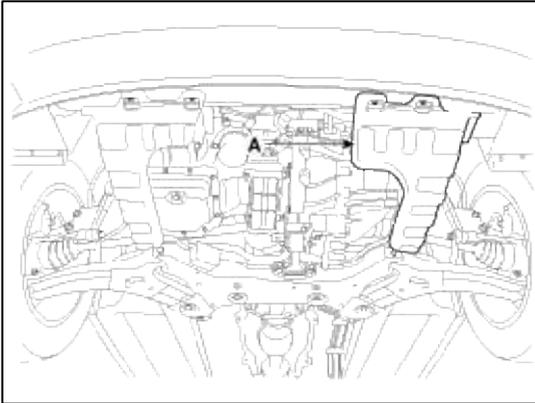
### Removal

1. Remove the battery and the battery tray.  
(Refer to "Charging system" in EE group.)

- Remove the under cover (A).

**Tightening torque:**

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



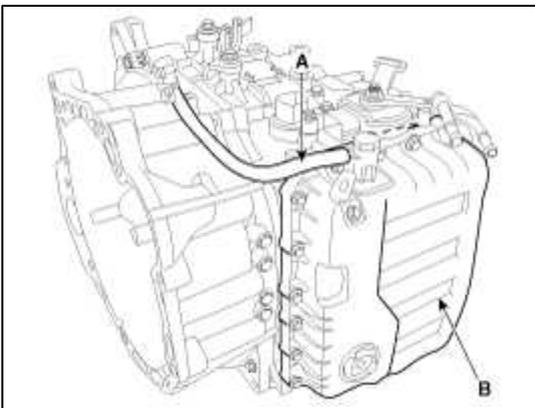
- Replace new gasket and the plug after draining the automatic transaxle fluid by removing the drain plug. (Refer to "Hydraulic system (Fluid)" in this group)
- Remove the air breather hose (A).
- Remove the valve body cover (B).

**Tightening torque:**

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

**CAUTION**

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



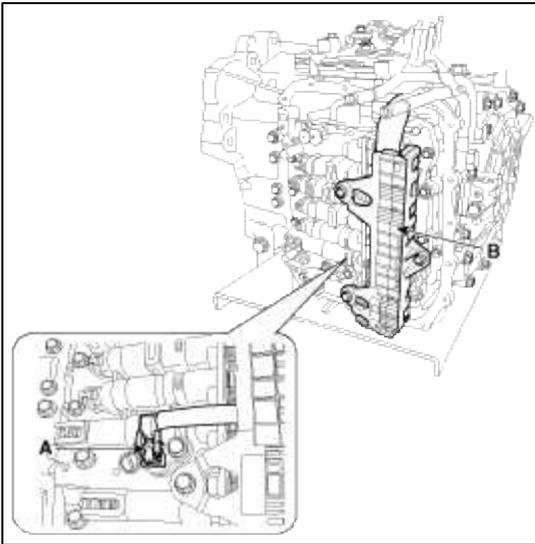
**NOTE**

Remove installation bolts in the engine room first and then remove others under the vehicle.

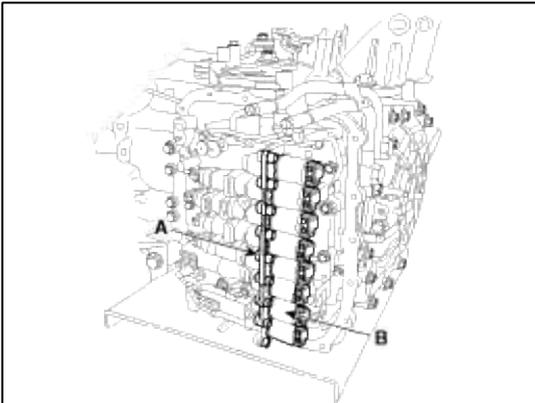
- Remove the bolt (3ea) after disconnecting the solenoid valve connector (B) and the oil temperature sensor connector (A).

**Tightening torque:**

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



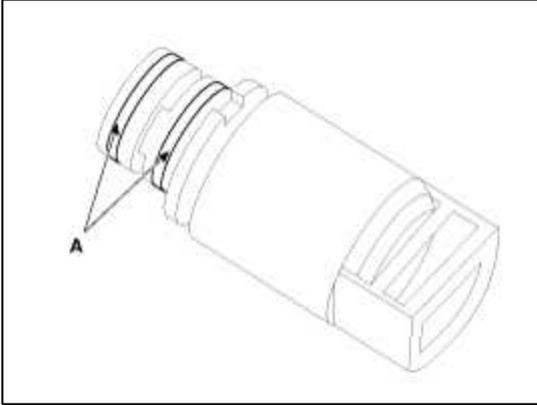
- Remove the solenoid valve (B) after removing the solenoid support (A).

**Installation**

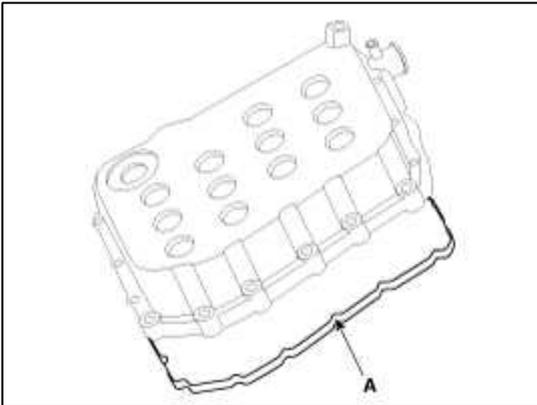
- Installation is the reverse of removal.

**NOTE**

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



- The gasket of the valve body gasket (A) use new one.

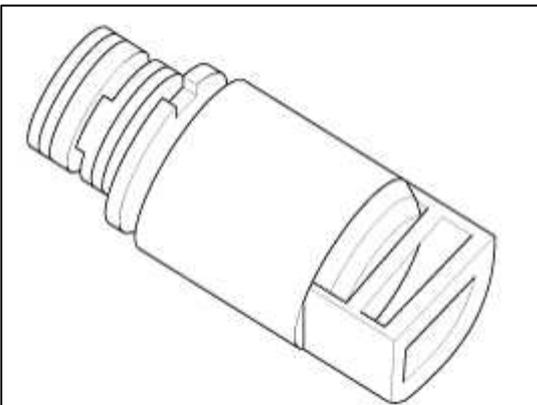


- Adding automatic transaxle fluid.  
(Refer to "automatic transaxle system" in this group.)

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

**Description**

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



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

**Specifications**

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

Control type : Normal low type

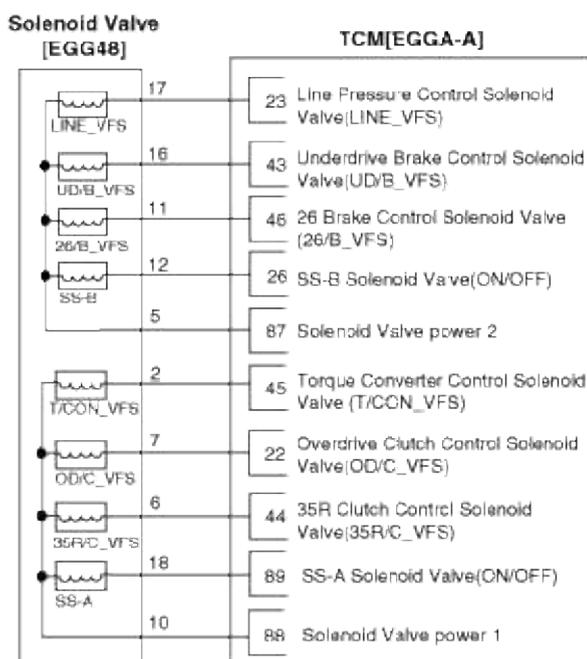
Control pressure kpa (kgf/cm <sup>2</sup> , psi)	490.33(5.0, 71.12)
Internal resistance(Ω)	10 ~ 11

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

Circuit Diagram

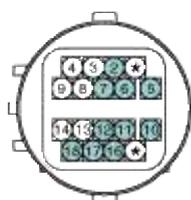
[Circuit Diagram]

[Connection Information]



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

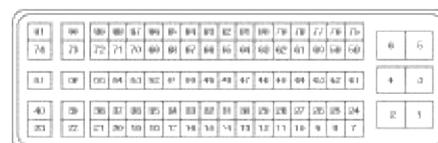
[Harness Connector]



Solenoid Valve Connector [EGG48]



Connector [EGGA-A]



Connector [EGGA-K]

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

Inspection

1. Turn ignition switch OFF.
2. Disconnect the solenoid valve connector.
3. Measure resistance between sensor signal terminal and sensor ground terminal.

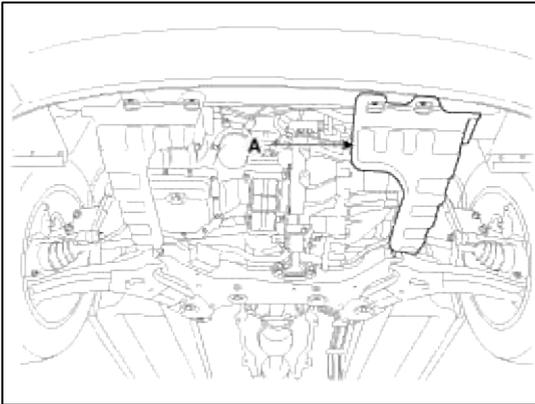
4. Check that the resistance is within the specification.

#### Removal

1. Remove the battery and the battery tray.  
(Refer to "Charging system" in EE group.)
2. Remove the under cover (A).

#### Tightening torque:

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



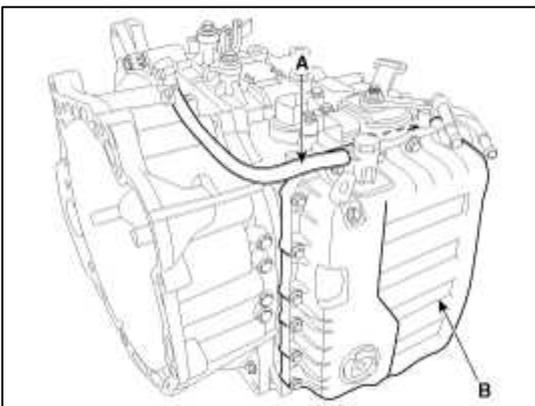
3. Replace new gasket and the plug after draining the automatic transaxle fluid by removing the drain plug. (Refer to "Hydraulic system (Fluid)" in this group)
4. Remove the valve air breather hose (A) and valve body cover (B).

#### Tightening torque:

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

#### CAUTION

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



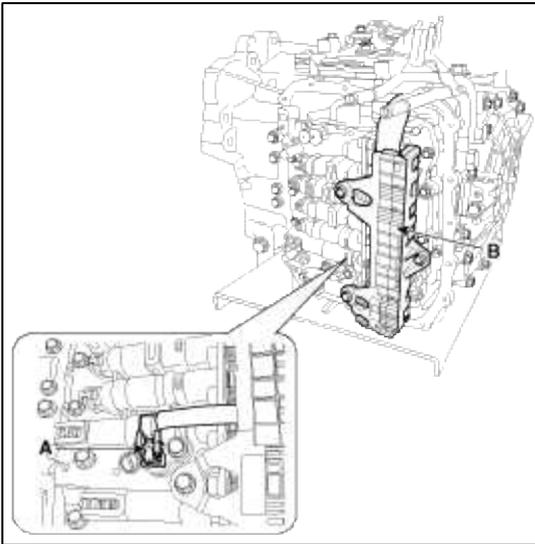
#### NOTE

Remove installation bolts in the engine room first and then remove others under the vehicle.

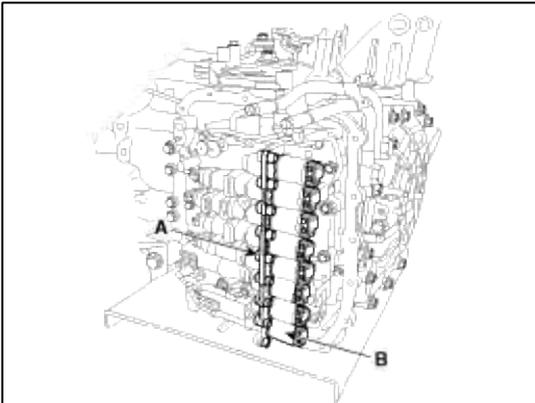
- Remove the bolt (3ea) after disconnecting the solenoid valve connector (B) and the oil temperature sensor connector (A).

**Tightening torque:**

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



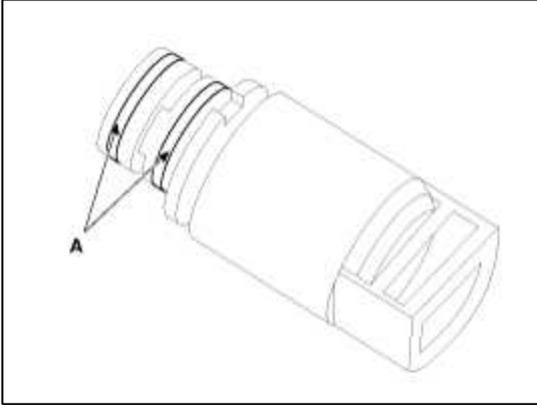
- Remove the solenoid valve (B) after removing the solenoid support (A).

**Installation**

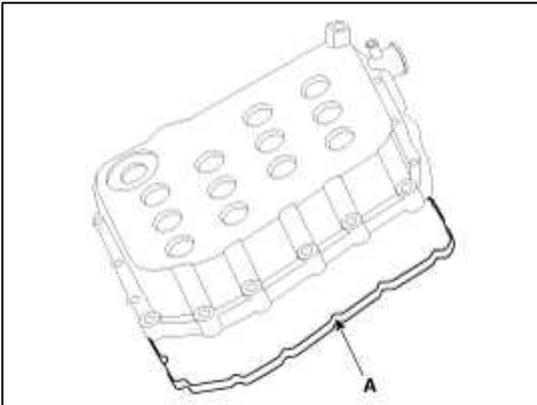
- Installation is the reverse of removal.

**NOTE**

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



- The gasket of the valve body gasket (A) use new one.

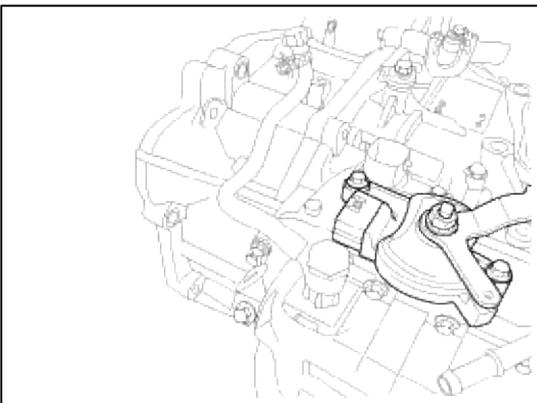


- Adding automatic transaxle fluid.  
(Refer to "Hydraulic system (Fluid)" in this group)

### Automatic Transaxle System > Automatic Transaxle Control System > Inhibitor Switch > Description and Operation

#### Description

Inhibitor Switch monitors the lever's position(PRND) and is used to control gear setting signals.



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

#### Specifications

Type: Combination of output signals from 4 terminals

Power supply (V)	12
Output type	Combination of output signals

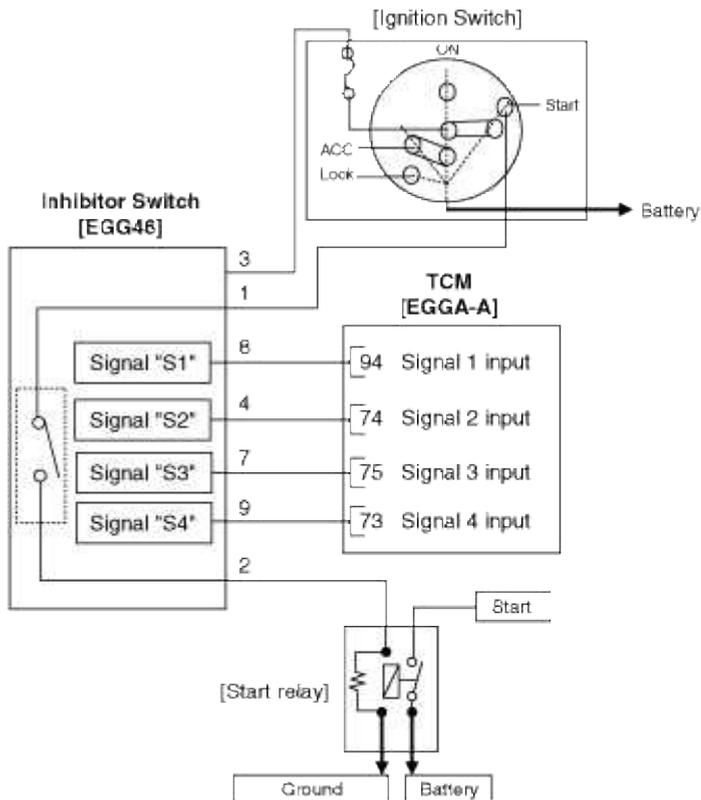
Signal Code Table

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

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

Circuit Diagram

[Circuit Diagram]



[Connection Information]

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

[Harness Connector]



Solenoid Valve Connector [EGG46]



Connector [EGGA-A]



Connector [EGGA-K]

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

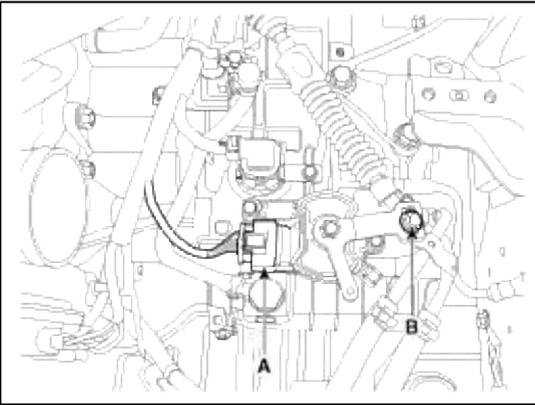
### Removal

1. Make sure vehicle does not roll before setting room side shift lever and T/M side manual control lever to "N" position.
2. Remove the battery and the battery tray.  
(Refer to "Charging system" in EE group.)
3. Remove the air cleaner assembly.  
(Refer to "Intake manifold" in EM group.)
4. Remove the shift cable mounting nut (B).

### Tightening torque:

14.7 ~ 21.6 N.m (1.5 ~ 2.2 kgf.m, 10.8 ~ 15.9 lb-ft)

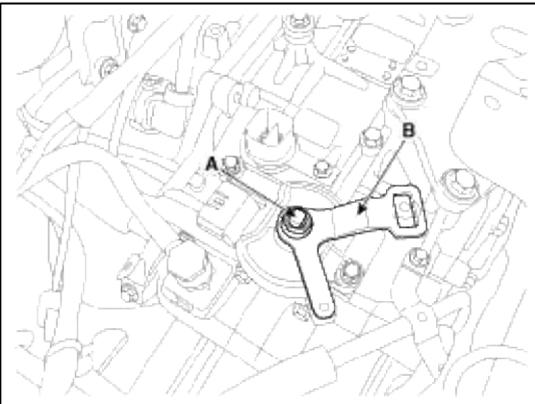
5. Disconnect the inhibitor switch connector (A).



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

**Tightening torque:**

7.8 ~ 9.8 N.m (0.8 ~ 1.0 kgf.m, 5.8 ~ 7.2 lb-ft)



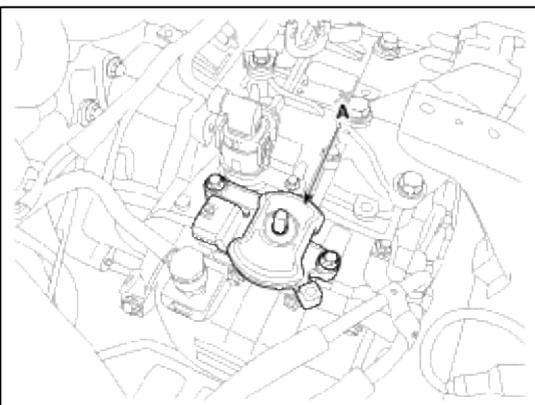
**CAUTION**

When installing, affix the manual control lever and the inhibitor switch with  $\varnothing 5\text{mm}$  (0.1969in.). Then tighten the inhibitor assembly mounting bolts.

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

**Tightening torque:**

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



**CAUTION**

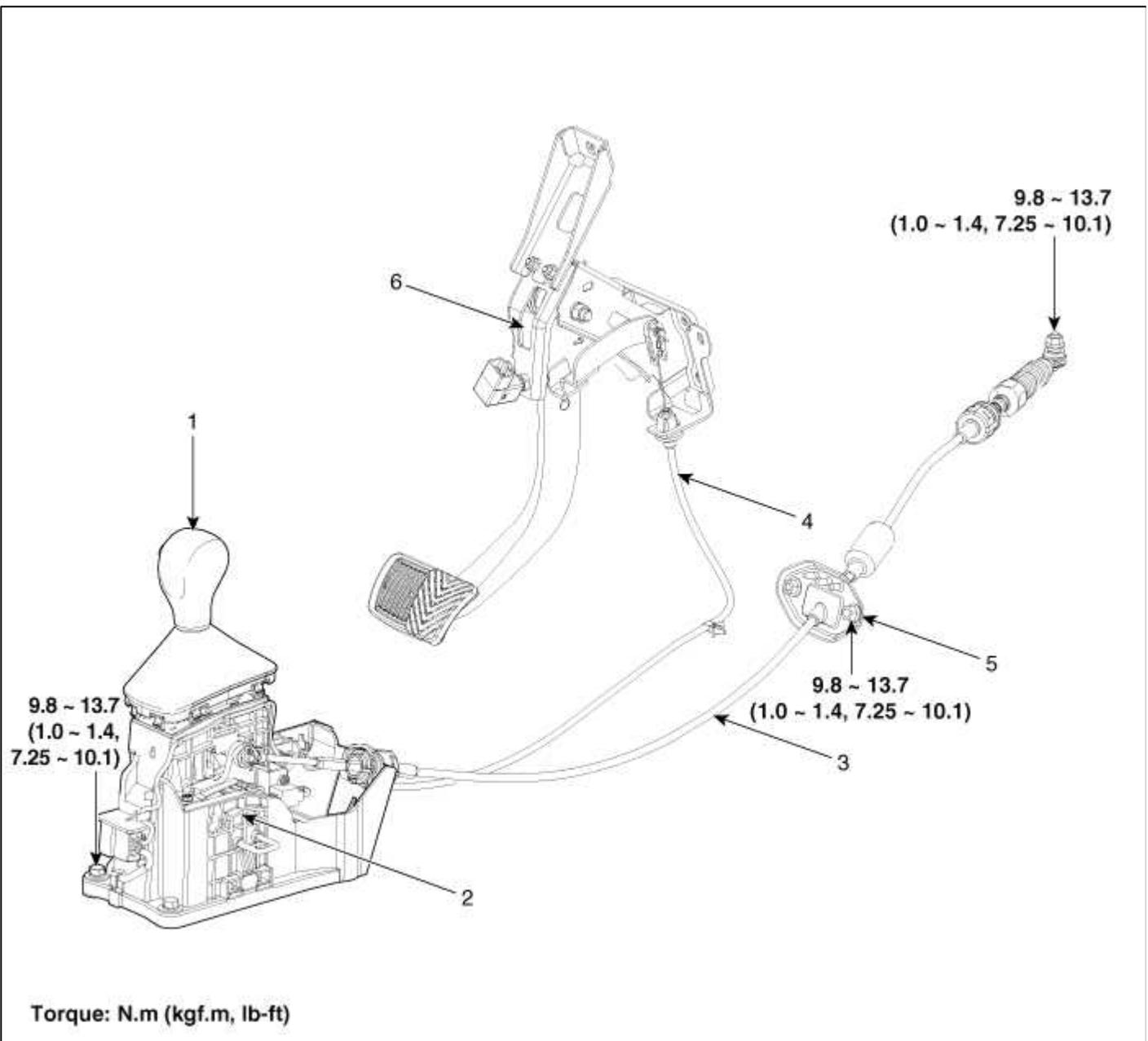
When installing, tighten the inhibitor assembly mounting bolt lightly, so that necessary adjustments can be made. Tighten to specifications.

## Installation

1. Installation is the reverse of removal.

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

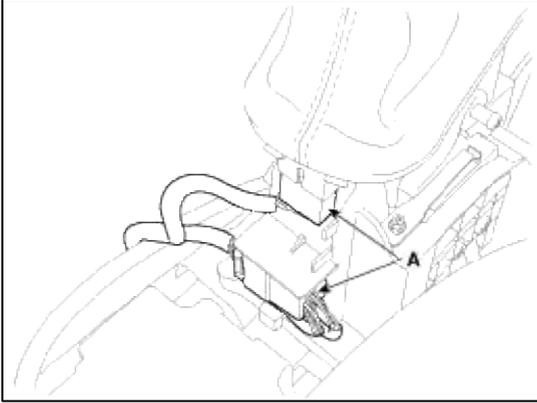
## Components



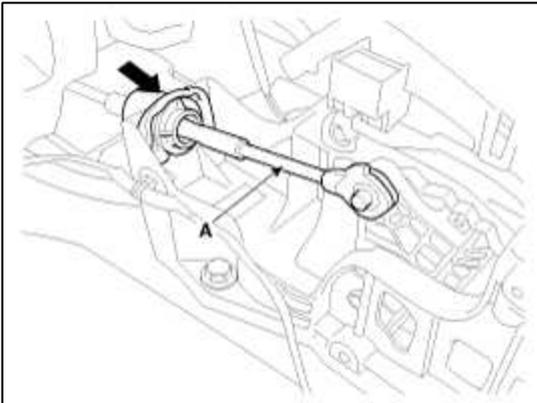
1. Shift lever knob	4. Shift lock cable assembly
2. Shift lever assembly	5. Retainer
3. Shift cable assembly	6. Brake pedal assembly

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

1. Remove the floor console assembly.  
(Refer to "Interior(console)" in BD group.)
2. Disconnect sports mode connector (A).



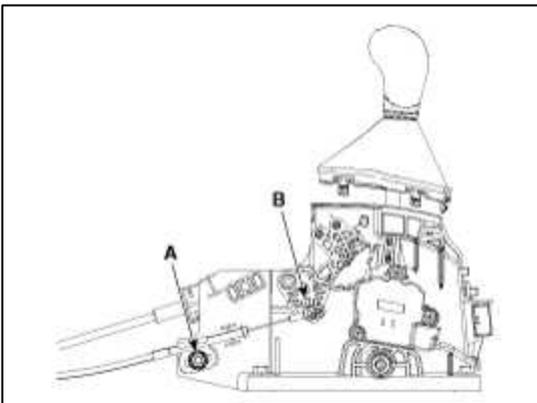
3. Remove the control cable (A).



4. Loosen the mounting nut (A) and shift lock cable from the shift lock cam (B).

**Tightening torque:**

9.8 ~ 13.7 N.m (1.0 ~ 1.4 kgf.m, 7.2 ~ 10.1 lb-ft)



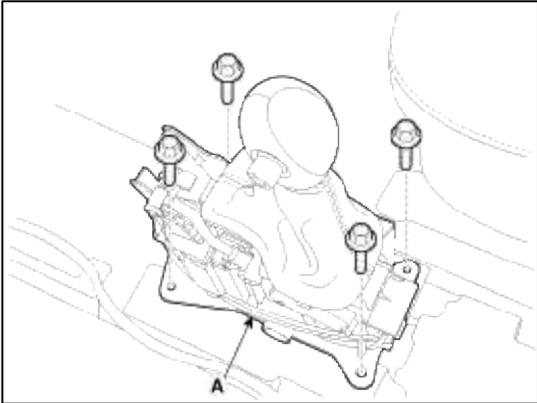
5. Remove the shift lever assembly (A) by removing the bolts.

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**Tightening torque:**

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

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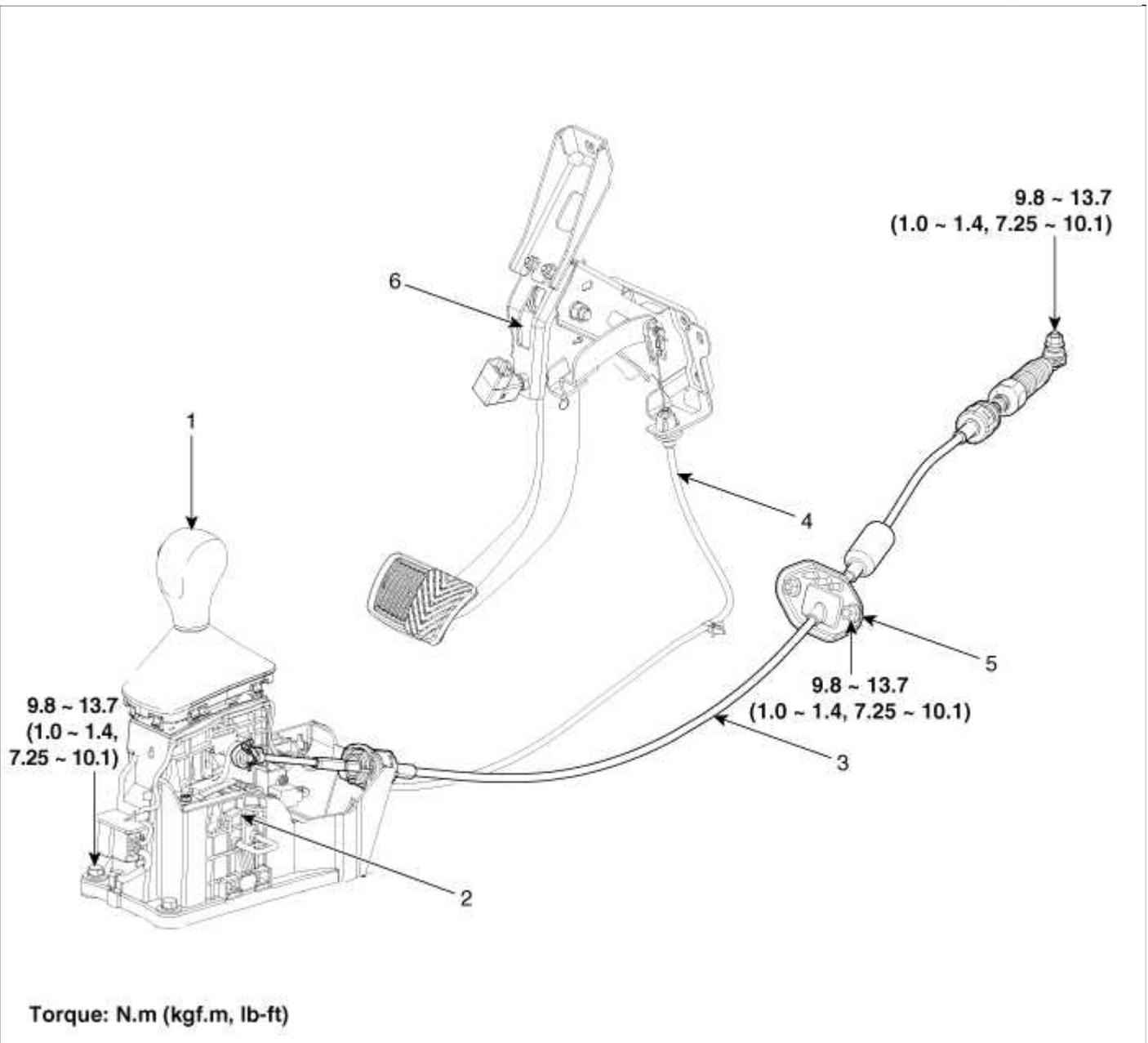
6. Installation is the reverse of removal.

**NOTE**

- When installing, set room side lever and T/M side lever to N position.
- Adjust the shift lock cable after installing.  
(Refer to " Shift Lock Cable (Adjust) " in this group)

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

Components



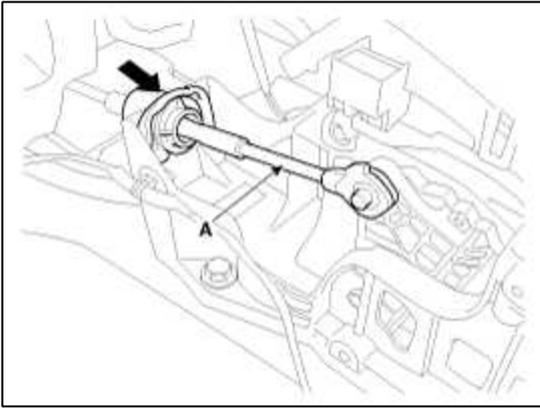
1. Shift lever knob	4. Shift lock cable assembly
2. Shift lever assembly	5. Retainer
3. Shift cable assembly	6. Brake pedal assembly

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

#### Replacement

1. Remove the floor console assembly.  
(Refer to "Interior(console)" in BD group.)

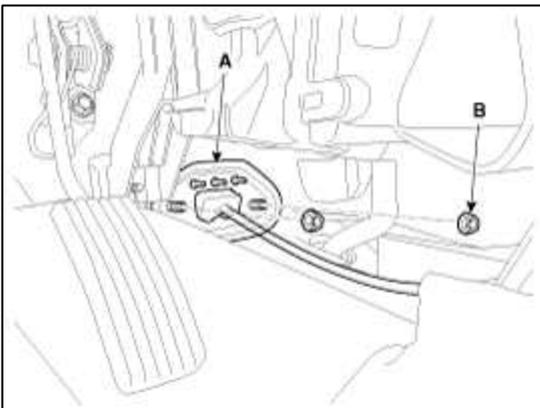
2. Remove the shift cable (A).



3. Remove the retainer (A) by loosening the nut (B-2ea).

**Tightening torque:**

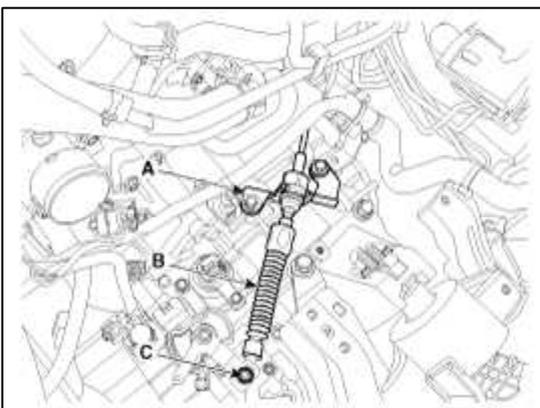
9.8 ~ 13.7 N.m (1.0 ~ 1.4 kgf.m, 7.2 ~ 10.1 lb-ft)



4. Loosen the nut (C) and then remove the cable (B) from the bracket (A) at transaxle assembly side.

**Tightening torque:**

9.8 ~ 13.7 N.m (1.0 ~ 1.4 kgf.m, 7.2 ~ 10.1 lb-ft)



5. Remove the shift cable inside of cab.

6. Installation is the reverse of removal.

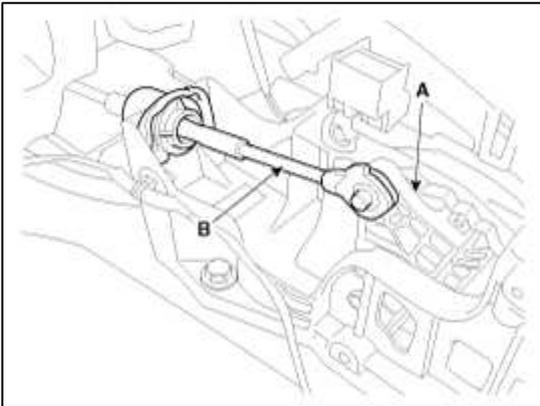
**NOTE**

- When installing, set room side lever and T/M side lever to N position.
- Adjust the shift lock cable after installing.  
(Refer to " Shift Lock Cable (adjust) " in this group)

### Adjustment

#### Adjusting method for T/M shift cable

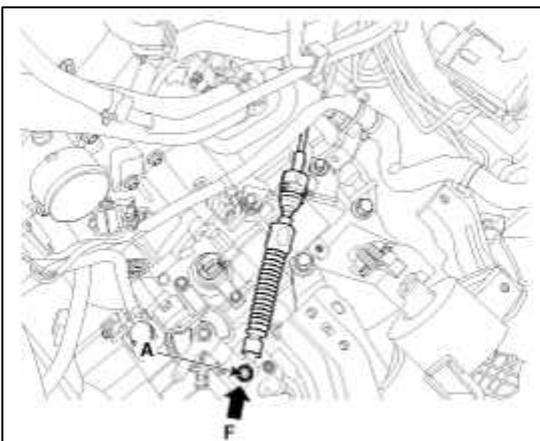
1. Set room side lever and T/M side lever to N position.
2. Connect the room side lever (A) and shift cable (B).



3. Push cable to "F" direction shown to eliminate FREE PLAY.
4. Tighten adjusting nut (A).

#### Tightening torque:

9.8 ~ 13.7 N.m (1.0 ~ 1.4 kgf.m, 7.2 ~ 10.1 lb-ft)



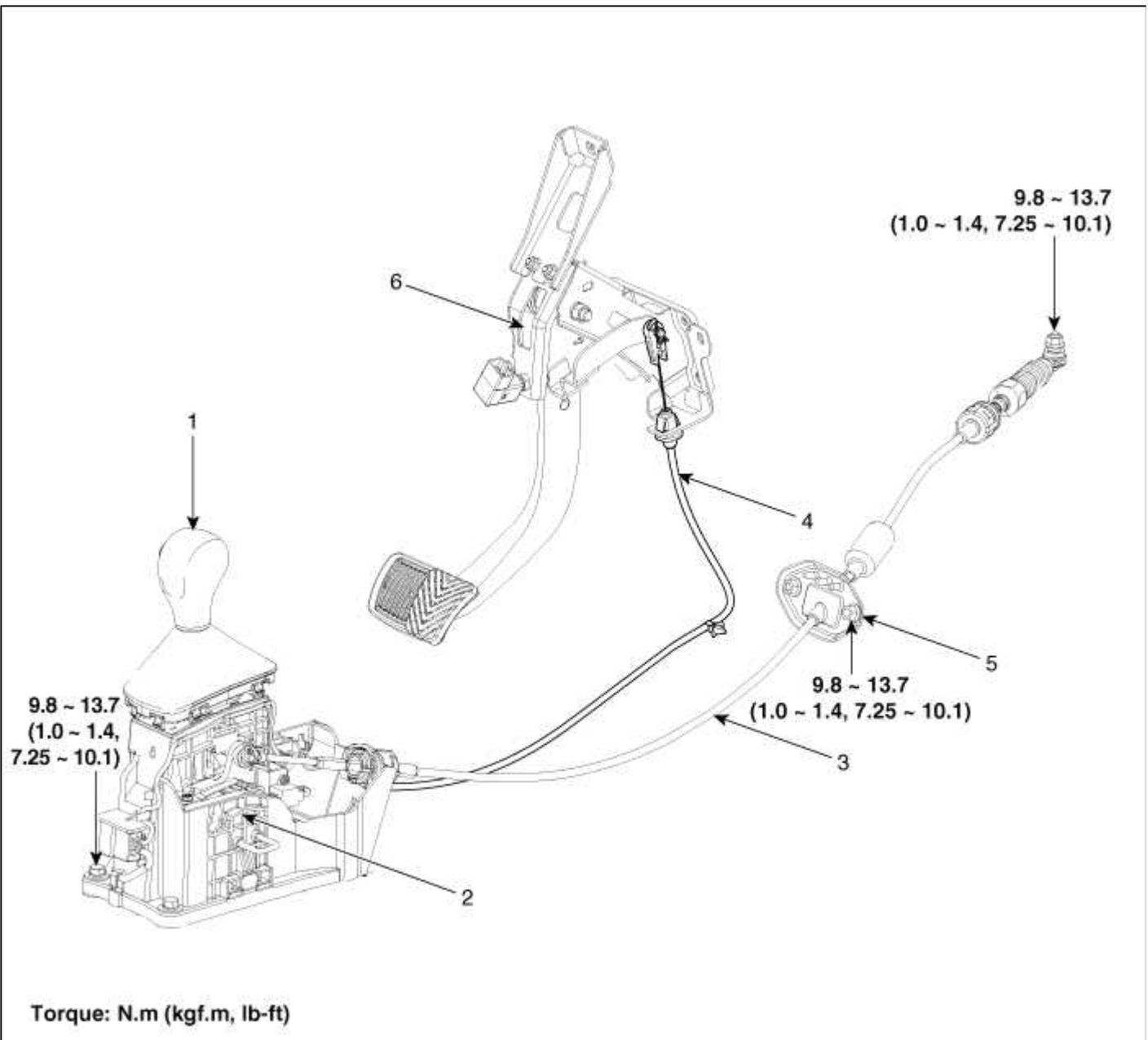
5. After adjusting, check to be sure that this part operates as designed at each range of T/M side corresponding to each position of room lever.

### Inspection

1. Check the damage and operation of the control cable.
2. Check the damage of the boot.
3. Check the damage and corrosion of the bushing.
4. Check the damage or weakening of the spring.

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

### Components



1. Shift lever knob	4. Shift lock cable assembly
2. Shift lever assembly	5. Retainer
3. Shift cable assembly	6. Brake pedal assembly

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

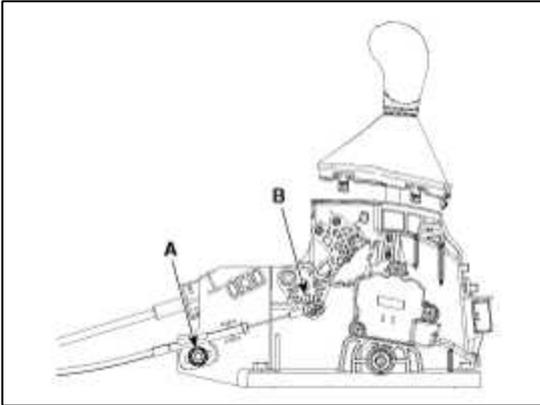
### Replacement

1. Remove the floor console assembly.  
(Refer to "Interior(console)" in BD group.)

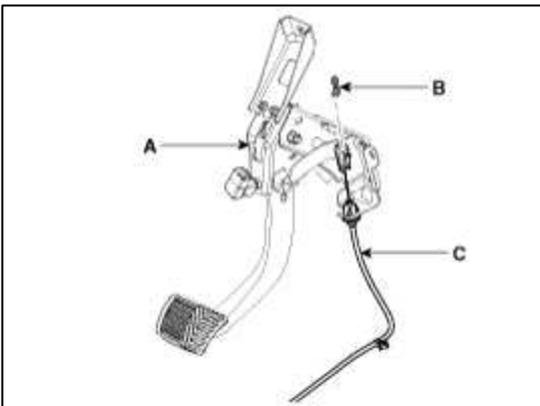
- Loosen the mounting nut (A) and then remove the shift lock cable from the shift lock cam (B).

**Tightening torque:**

9.8 ~ 13.7 N.m (1.0 ~ 1.4 kgf.m, 7.2 ~ 10.1 lb-ft)



- Remove the snap pin (B) and shift lock cable (C) from the brake pedal assembly (A).



- Installation is the reverse of removal.

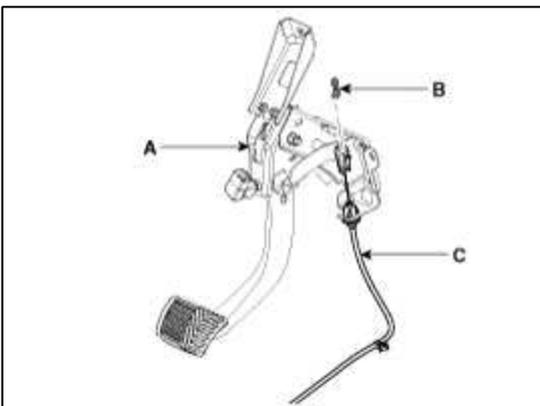
**NOTE**

Adjust the shift lock cable after installing.  
(Refer to " Shift Lock Cable (Adjust) " in this group)

**Adjustment**

**Adjusting method for shift lock cable**

- Install the snap pin (B) and shift lock cable (C) to brake pedal assembly (A).



- Move the shift lever to P range.
- Temporarily install shift lock cable to P lock cam fixing pin (B).

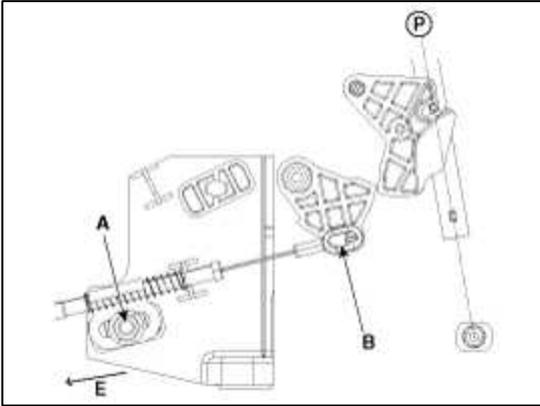
4. Slightly pull outer casing of shift lock cable to direction "E", this prevents shift lock cable from being loose.
5. After checking portion of cable end touches cable fixing pin of P lock cam, tighten the nut (A).

---

**Tightening torque:**

9.8 ~ 13.7 N.m (1.0 ~ 1.4 kgf.m, 7.2 ~ 10.1 lb-ft)

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6. Again check that cable end touches.

**Inspection**

1. With shift lever at "P" position and brake pedal not depressed, push button can not operated.(shift lever can not be shifted to other positions from "P") push button can be operated at th positions except "P".
2. With brake pedal stroke 15 ~ 25mm (with shift lever at "P" position), push button can be operated and shift lever can be shifted to smoothly to other from "P".
3. With brake pedal not depressed, shift lever can be shifted smoothly to "P" positions from other position.