

SPORTAGE(SL) > 2013 > G 2.0 T-GDI > Automatic Transaxle System**Automatic Transaxle System > General Information > Specifications**

Specifications

Item		Specifications
Transmission type		A6LF2
Engine model		Gasoline 2.0 T-GDI
Torque converter type		3-element, 1-stage, 2-phase type
Torque converter size		Ø236 mm (9.2913 in.)
Oil pump system		Parachoid
Friction elements		Clutch: 2EA
		Brake: 3EA
		OWC : 1EA
Planetary gear		3EA
Gear ratio	1st	4.651
	2nd	2.831
	3rd	1.842
	4th	1.386
	5th	1.000
	6th	0.772
	Reverse	3.393
Final gear ratio		2.885
Fluid pressure balance piston		2EA
Accumulator		4EA
Solenoid valve		8EA (VFS:6EA, ON/OFF:2EA)
Shift lever position		4 Range (P,R,N,D)
Oil filter		1EA

VFS: Variable Force Solenoid

Sensors

Input Speed Sensor

Type: Hall effect sensor

Specifications

Operation condition (°C)°F		((-)40~150)) -40~302
Air gap(mm)in.		(0.95~1.65)0.037~0.065
Output voltage(V)	High	1.18~1.68
	Low	0.59~0.84

Output Speed Sensor

Type: Hall effect sensor

Specifications

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

Oil Temperature Sensor

Type: Negative thermal coefficient type

Specifications

Temp.[(°C)°F]	Resistance (kΩ)
(-40)-40	48.1
(-20)-4.0	15.6
(0)32.0	5.88
(20)68.0	2.51
(40)104.0	1.11
(60)140.0	0.61
(80)176.0	0.32
(100)212.0	0.18
(120)248.0	0.10
(140)284.0	0.06
(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 ² , 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 ² , psi)	500.14~9.81(5.1~0.1, 72.54~1.42)
Current value(mA)	50~850
Internal resistance(Ω)	5.1

Line Pressure Control VFS

Control type : Normal high type

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

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

Control type : Normal low type

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

Solenoid Valve Operation Table

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

● : Connected status

 Δ : Connected at vehicle speed above 8km/h

Tightening Torques

Item	N.m	Kgf.m	lb-ft
TCM installation mounting bolt	9.8~11.8	1.0~1.2	7.2~8.7
Shift cable bracket mounting bolt	14.7~21.6	1.5~2.2	10.8~15.9
Input shaft speed sensor mounting bolt	9.8~11.8	1.0~1.2	7.2~8.7
Output shaft speed sensor mounting bolt	9.8~11.8	1.0~1.2	7.2~8.7
Shift lever assembly bolt	9.8~14.7	1.0~1.5	7.2~10.8
Inhibitor switch mounting bolt	9.8~11.8	1.0~1.2	7.2~8.7
Valve body cover mounting bolt	13.8~14.7	1.3~1.5	9.4~10.8
Eyebolt	34.3~44.1	3.5~4.5	25.3~32.6
Oil drain plug	34.3~44.1	3.5~4.5	25.3~32.6
Oil level plug	34.3~44.1	3.5~4.5	25.3~32.6
Torque converter mounting bolt	45.1~52.0	4.6~5.3	33.3~38.3
Starter motor mounting bolts	42.2~53.9	4.3~5.5	31.1~39.8
Automatic transaxle upper mounting bolt (TM=>Eng)	42.2~53.9	4.3~5.5	31.1~39.8
Automatic transaxle lower mounting bolt (Eng=>TM)	42.2~48.1	4.3~4.9	31.1~35.4
	42.2~53.9	4.3~5.5	31.1~39.8
Automatic transaxle support bracket bolt	88.3~107.9	9.0~11.0	65.1~79.6

Lubricants

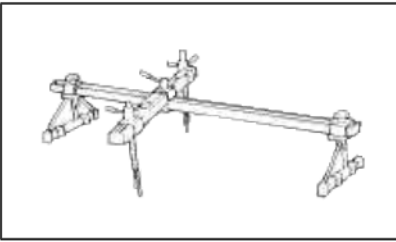
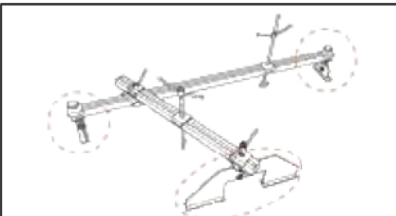
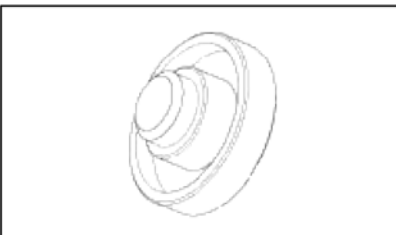
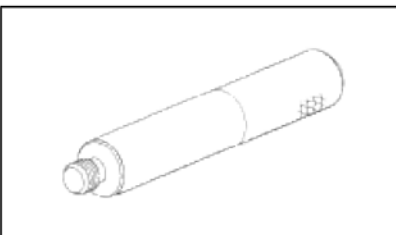
Item	Specified lubricant	Quantity
Transaxle fluid	SK ATF SP- , MICHANG ATF SP- , NOCA ATF SP- , Kia Genuine ATF SP- or other brands meeting the above specification approved by Kia Motors Corp.	7.8L (2.06 U.S gal., 8.24 U.S.qt., 6.86 Imp.qt.)

Sealant

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

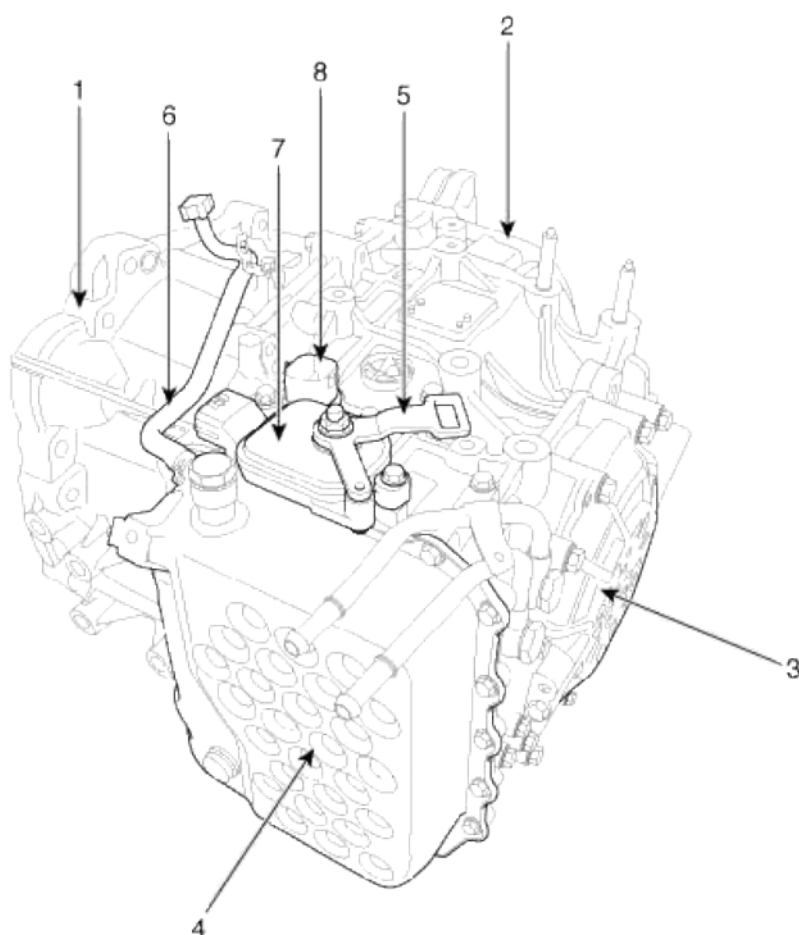
Automatic Transaxle System > General Information > Special Service Tools

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. Use this supporter with the upper beam of the engine support fixture(SST No.:09200-38001)
09453-3L240 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.:09453-3L240)]

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

Components Location



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

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

Removal

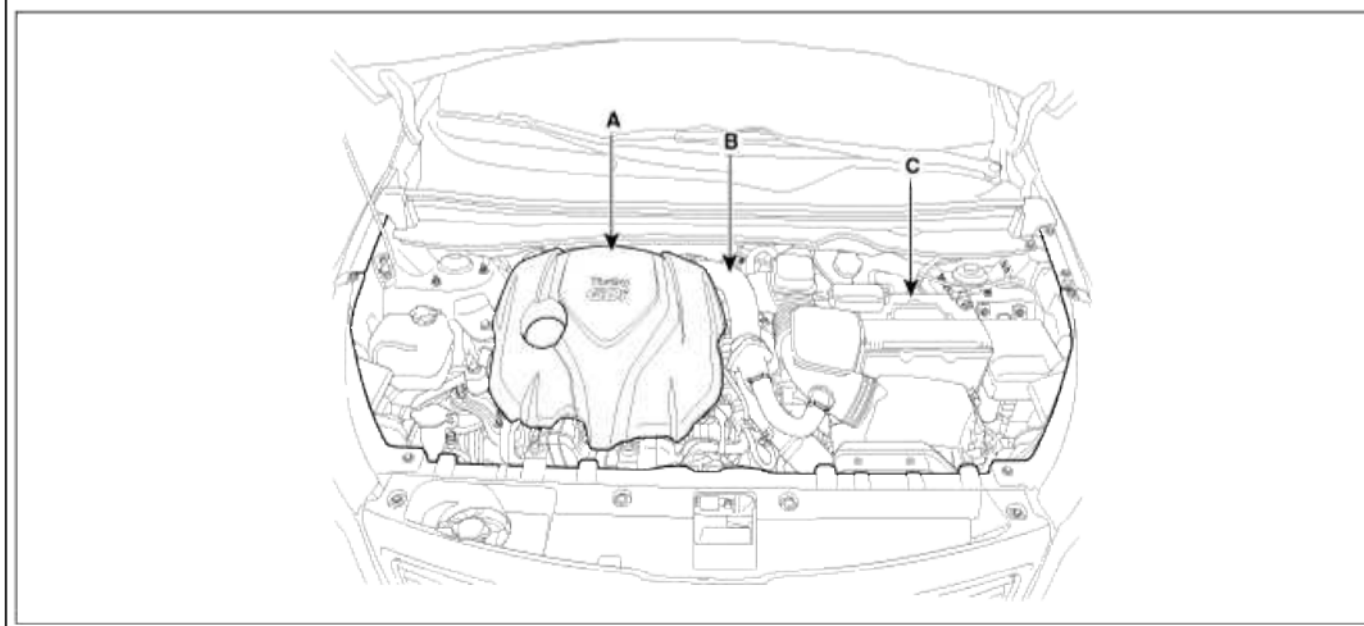
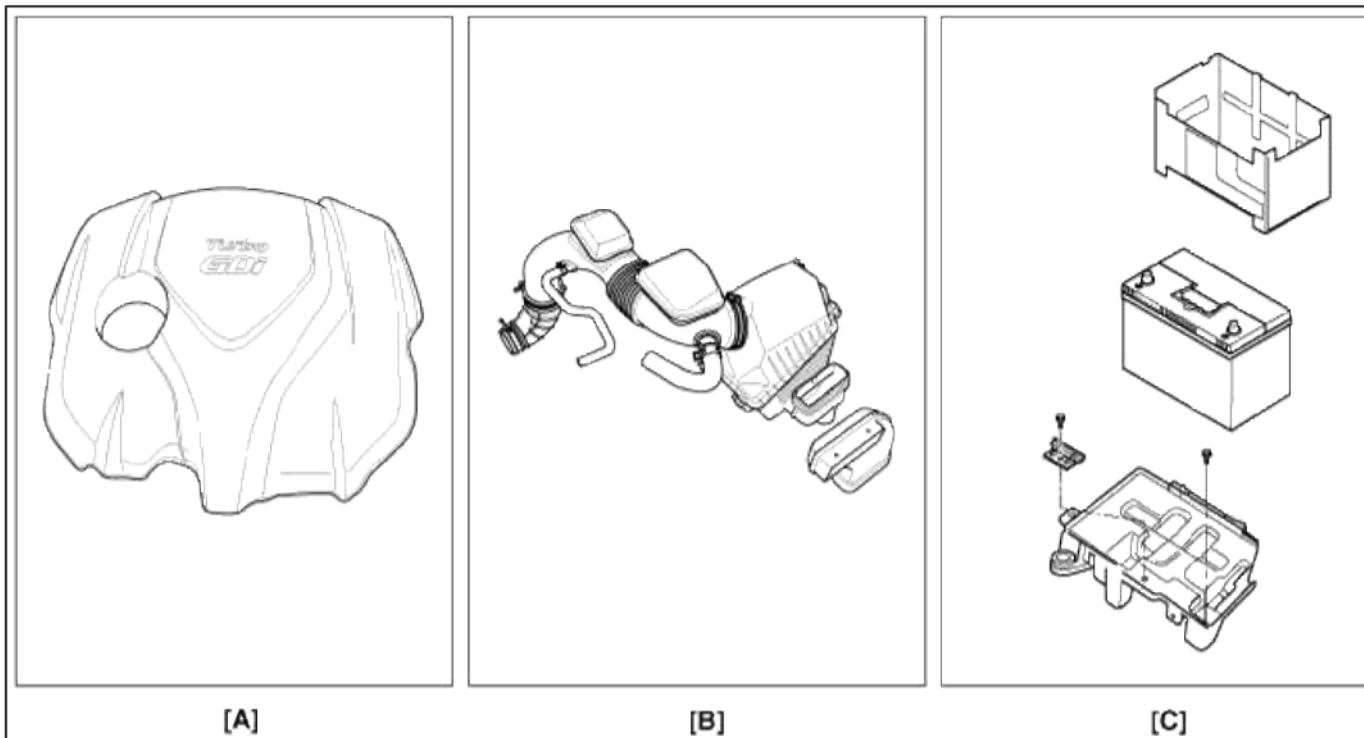
1. Remove the following items;

A. Engine cover (A).

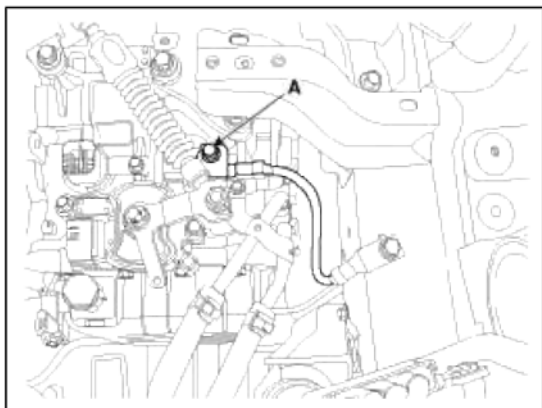
B. Air cleaner assembly and air duct (B). (Refer to "Intake and Exhaust system" in EM group.)

C. Battery and battery tray (C).

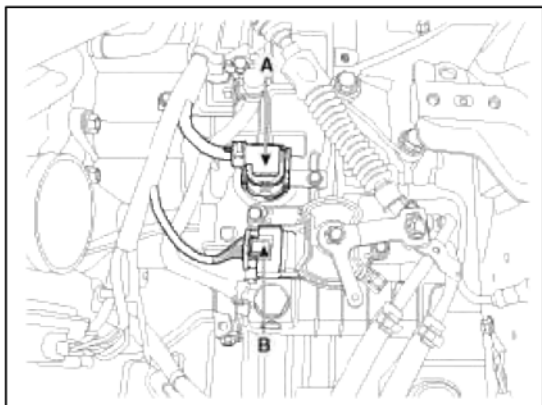
(Refer to "Charging system" in EE group.)



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



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

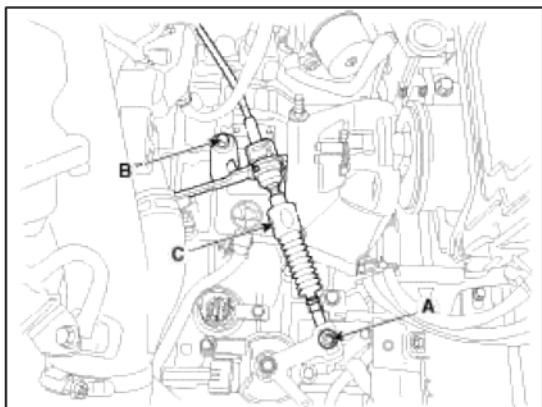


4. Remove the control cable (C) after removing the nut (A) and the bolt (B).

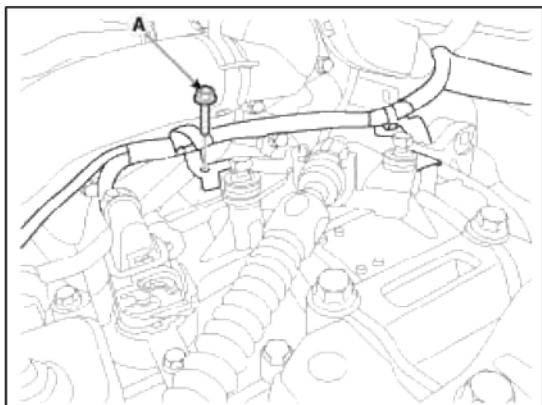
Tightening torque:

(A) 9.8 ~ 14.7 N.m (1.0 ~ 1.5 kgf.m, 7.2 ~ 10.8 lb-ft)

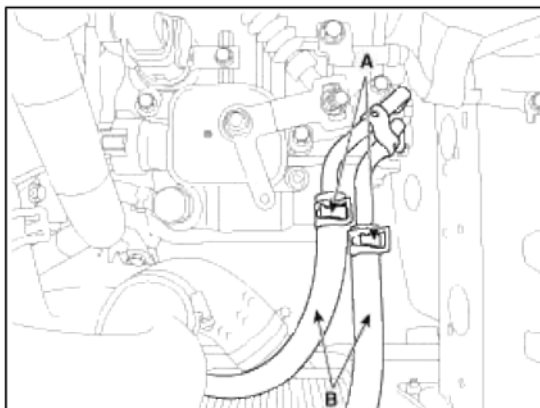
(B) 14.7 ~ 21.6 N.m (1.5 ~ 2.2 kgf.m, 10.9 ~ 15.9 lb-ft)



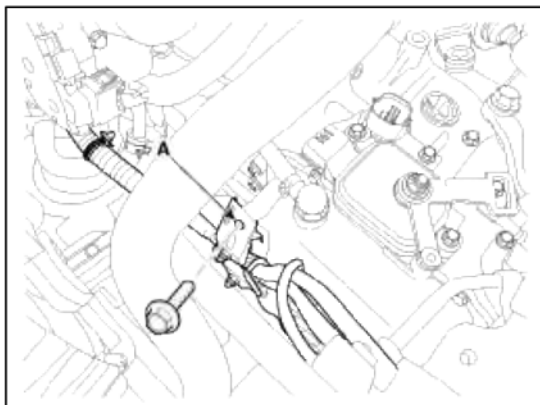
5. Remove the solenoid valve connector and inhibitor switch connector wiring mounting bracket (A).



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



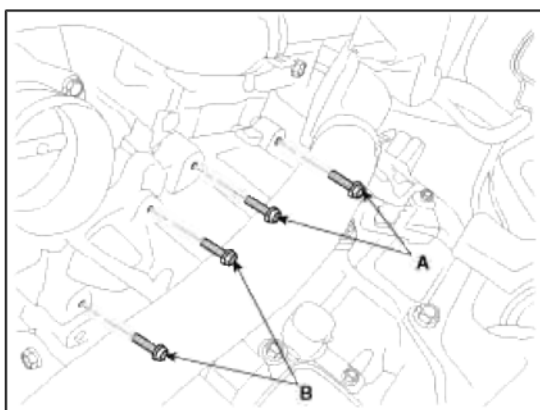
7. Remove the wiring bracket installation bolt (A).



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

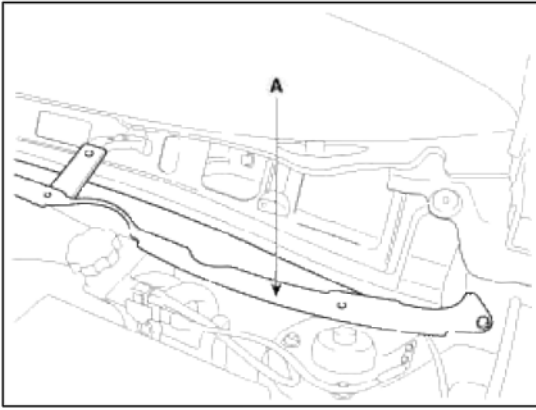
Tightening torque:

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

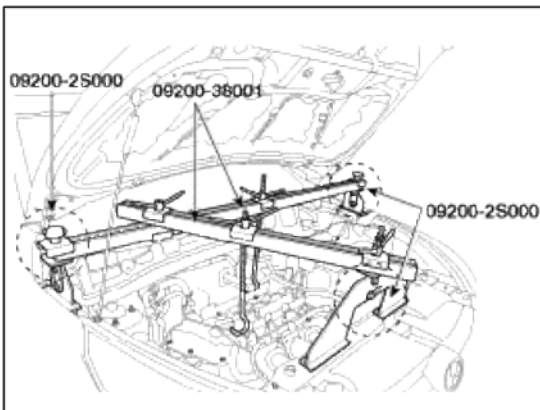


9. Remove the cowl top cover.
(Refer to "Interior(cowl top cover)" in BD group.)
10. Remove the wiper motor.
(Refer to "Windshield Wiper motor" in BE group.)

11. Remove the cowl complete assembly panel (A).



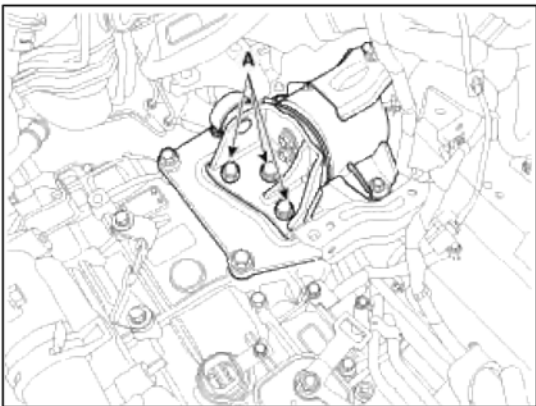
12. Using the engine support fixture (Support SST No.: 09200-2S000, Beam SST No.: 09200-38001), hold the engine and transaxle assembly safely.



13. Remove the automatic transaxle mounting support bracket bolt (A).

Tightening torque:

88.3 ~ 107.9 N.m (9.0 ~ 11.0 kgf.m, 65.1 ~ 79.8 lb-ft)

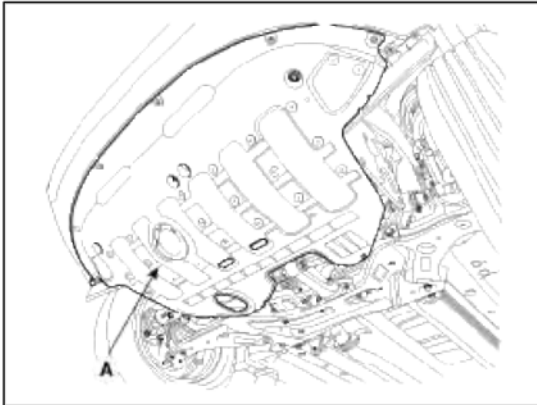


14. Lift the vehicle with a jack.

15. Remove the under cover (A).

Tightening torque:

19.6 ~ 24.5 N.m (2.0 ~ 2.5 kgf.m, 14.5 ~ 18.1 lb-ft)

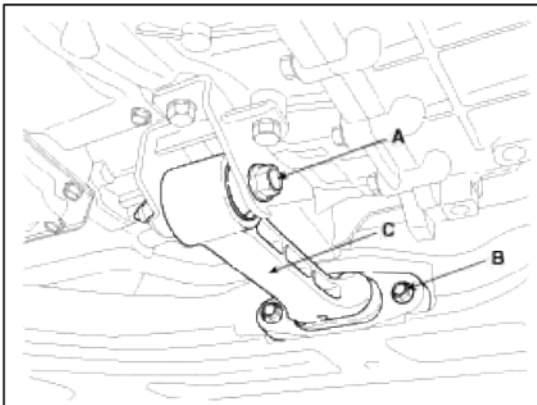


16. Remove the drive shaft assembly.
(Refer to "Drive shaft assembly " in DS group.)
17. Remove the roll rod bracket (C) after removing bolt (A,B).

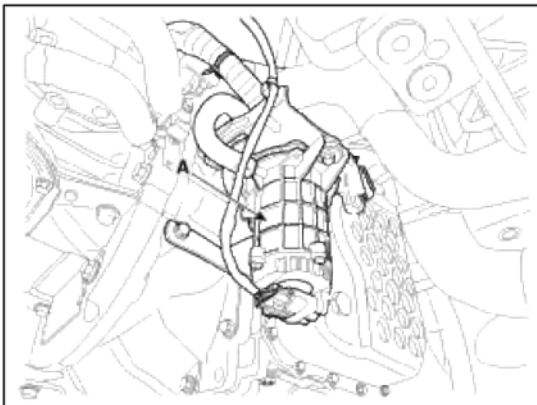
Tightening torque:

(A) 107.9 ~ 127.5 N.m (11.0 ~ 13.0 kgf.m, 79.6 ~ 94.1 lb-ft)

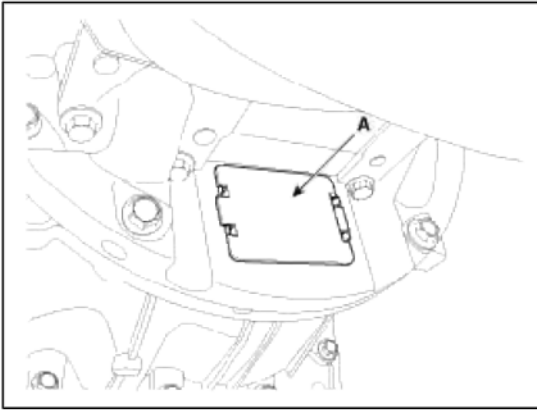
(B) 49.0 ~ 63.7 N.m (5.0 ~ 6.5 kgf.m, 36.2 ~ 47.0 lb-ft)



18. Remove the vacuum pump (A).



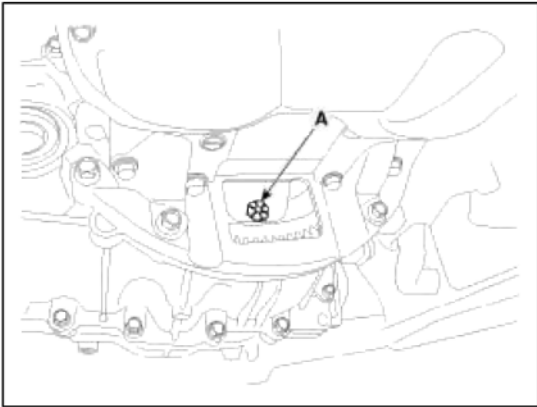
19. Remove the dust cover (A).



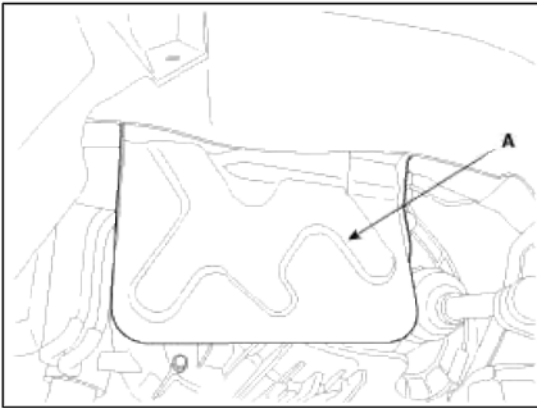
20. Remove the torque converter mounting bolt (A-6ea) with rotating the crankshaft.

Tightening torque:

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



21. Remove the side cover (A).

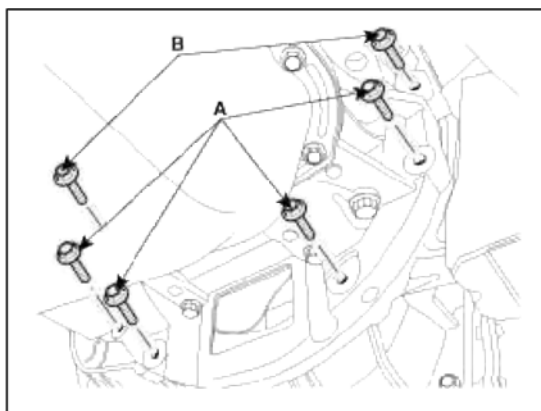


22. Remove the automatic transaxle with a jack after removing the mounting bolt (A-4ea, B-2ea).

Tightening torque:

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

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



Installation

1. Installation is the reverse of removal.

CAUTION

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

NOTE

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

- Power steering fluid replacement and air bleeding. (Refer to "General information" in ST group)
- 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 replacing the automatic transaxle and TCM, reset the diagnostic trouble code by using GDS.
- 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)

NOTE

- When replacing the automatic transaxle, reset the automatic transaxle's values by using the GDS.
[Condition]
 - IG Key On
 - Transaxle Range:P
 - Vehicle Speed :0 km/h
 - Engine Off

Resetting Auto T/A Values



[Resetting Auto T/A Values]

This function is for resetting the adaptive values from the used Auto T/A when replacing it.

<Condition>

1. IG. Key On
2. Transaxle Range : P
3. Vehicle Speed : 0 km/h
4. Engine Off

Reset

Cancel

Are you sure? (Ok/Cancel)

[Condition : IG. On, ENG. Off]

OK

Cancel



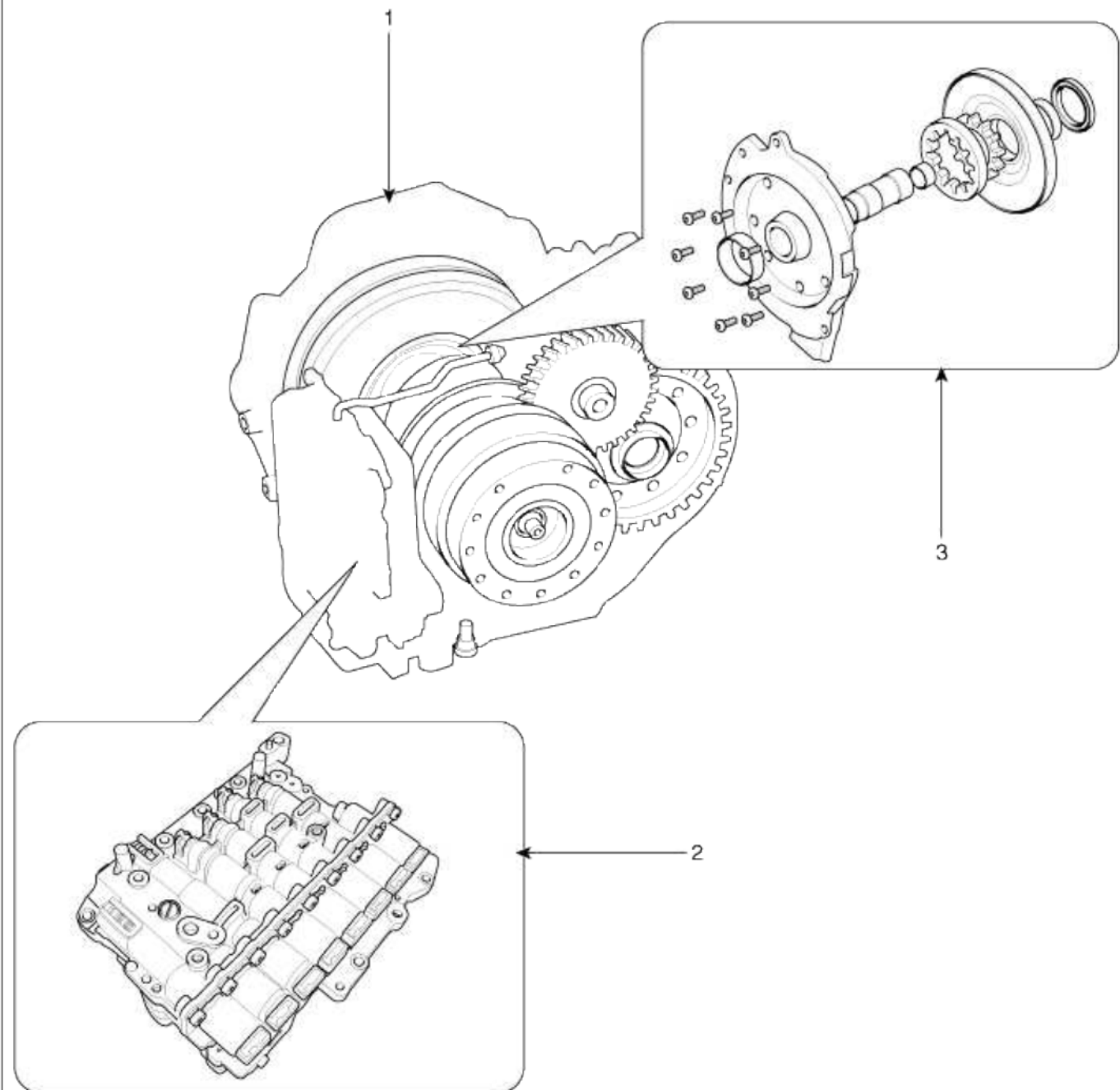
Automatic Transaxle System > Hydraulic System > Description and Operation

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

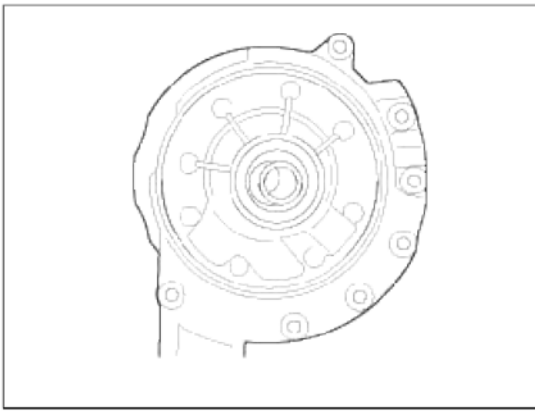


1. Automatic transaxle
2. Valve body assembly
3. Oil pump assembly

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

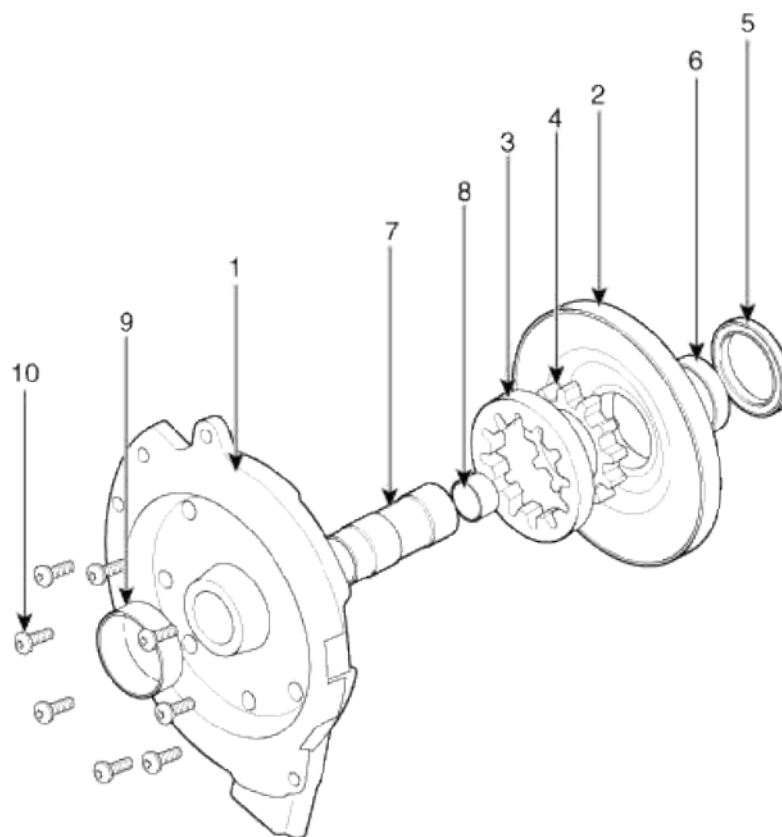
Description

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.



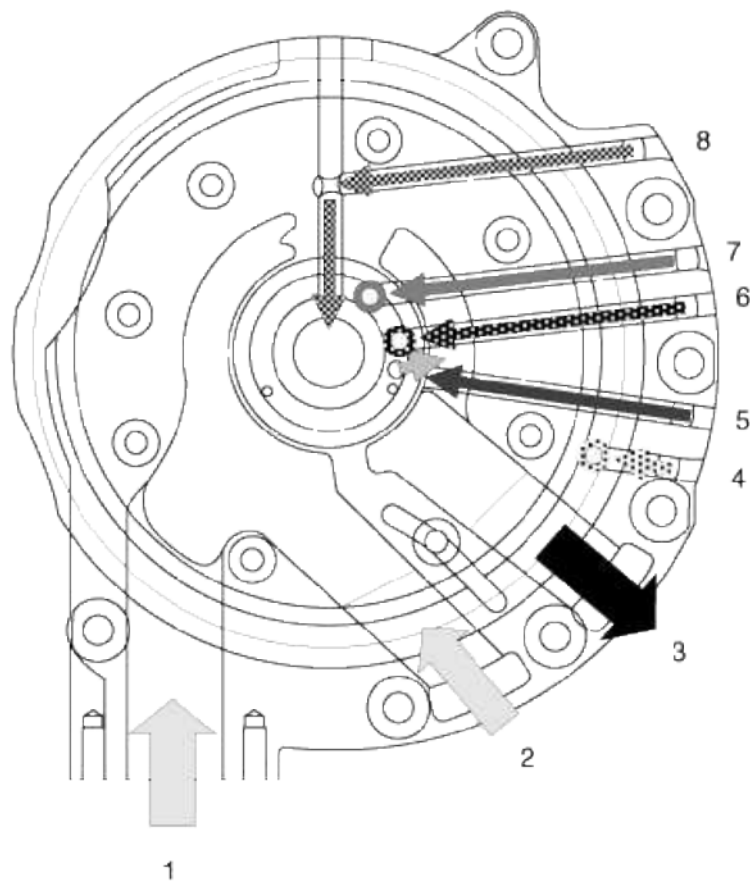
Automatic Transaxle System > Hydraulic System > Oil Pump > Components and Components Location

Components



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

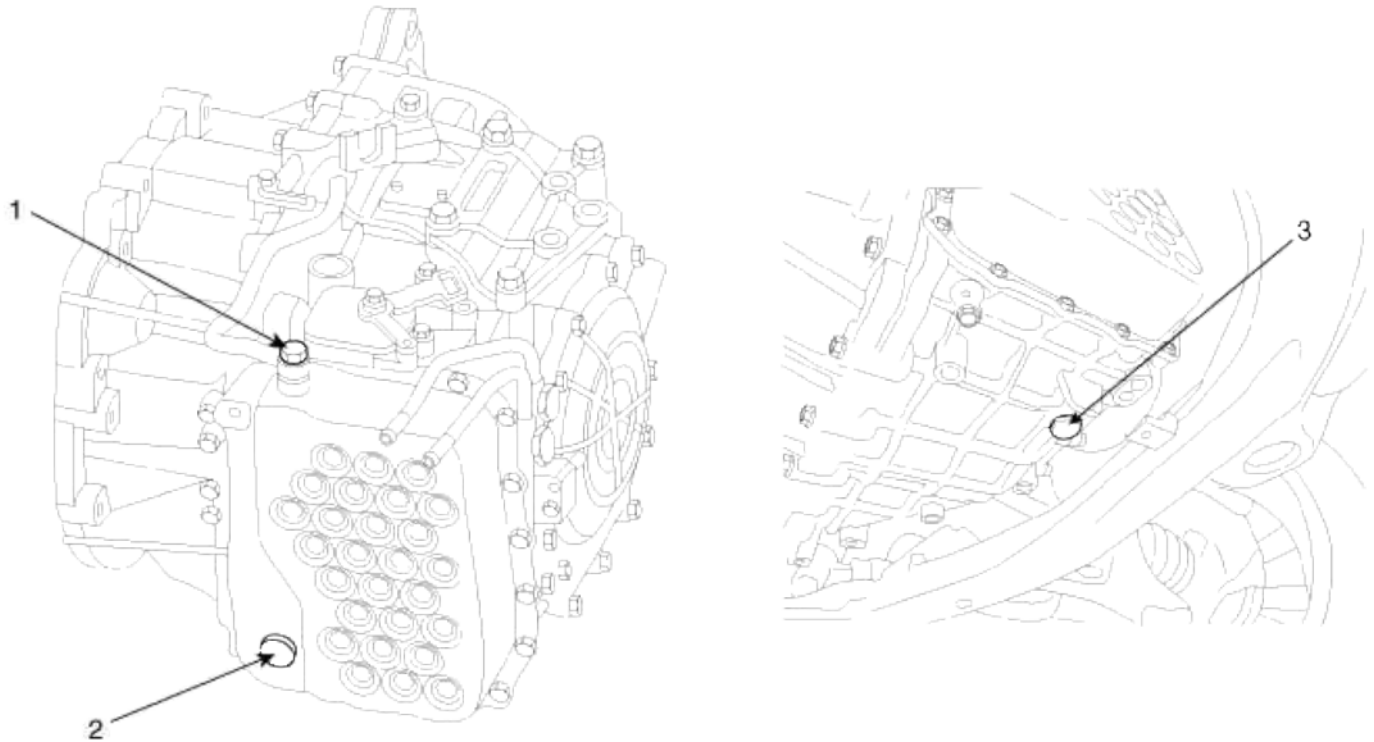
Oil Pump Operation Flow



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

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).

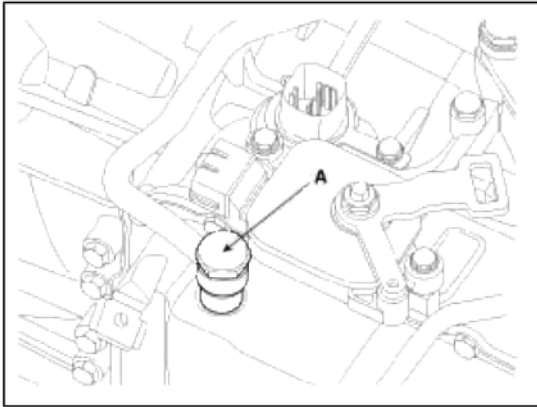
Eyebolt tightening torque:

34.3 ~ 44.1 N.m (3.5 ~ 4.5 kgf.m, 25.3 ~ 32.6 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.

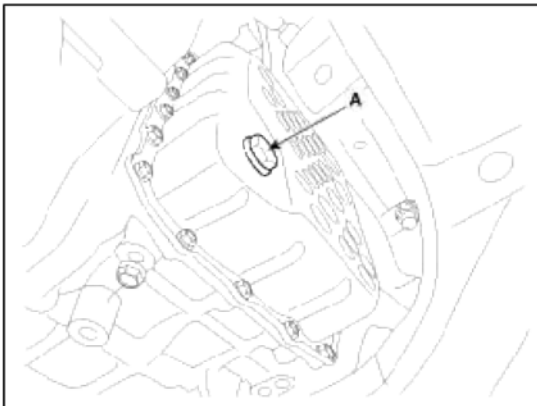


3. Start the engine. (Don't step on brake and accelerator simultaneously.)
 4. Confirm that the temperature of the A/T oil temperature sensor is 50~60°C(122~140°F) with the GDS.
 5. Shift the select lever slowly from "P" to "D", then "D" to "P" and repeat one more at idle.

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:

34.3 ~ 44.1 N.m (3.5 ~ 4.5 kgf.m, 25.3 ~ 32.6 lb-ft)

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

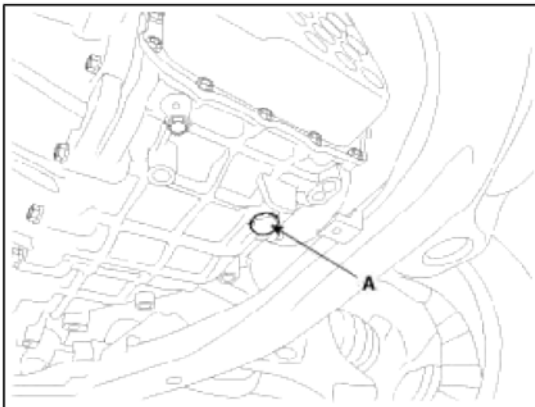
Replacement**NOTE**

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

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

**Drain plug tightening torque:**

34.3 ~ 44.1 N.m (3.5 ~ 4.5 kgf.m, 25.3 ~ 32.6 lb-ft)

CAUTION

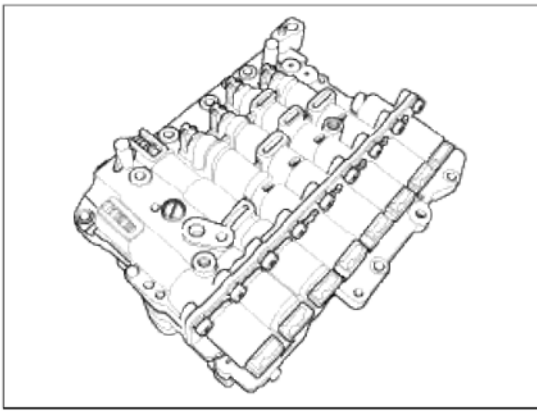
The gasket of the drain plug use new one.

2. Fill the oil about 5 liters through eyebolt.

3. Check the oil level. (Refer to "Hydraulic system (Fluid)" in this group)

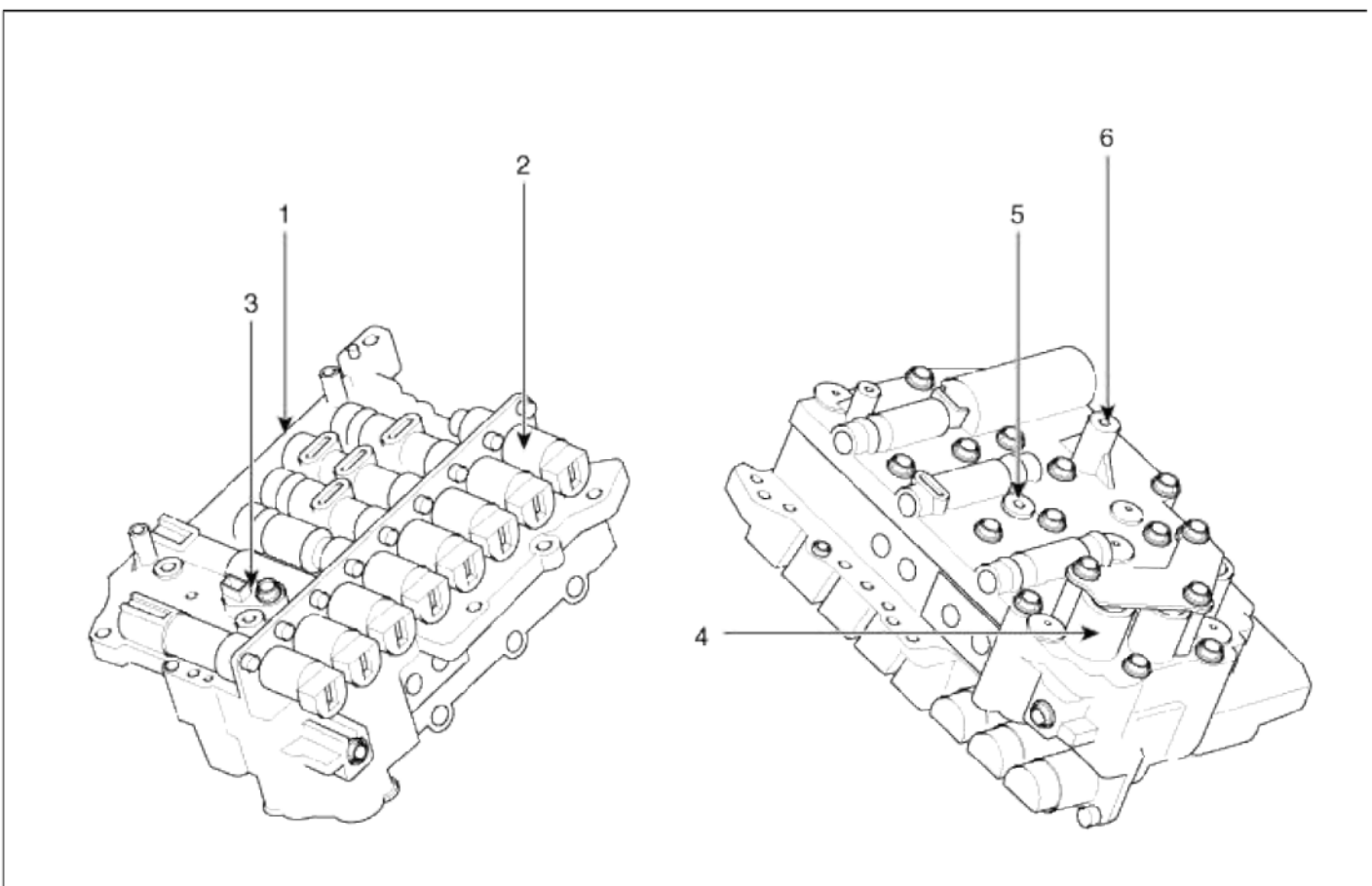
Automatic Transaxle System > Hydraulic System > Valve Body > Description and Operation**Description**

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

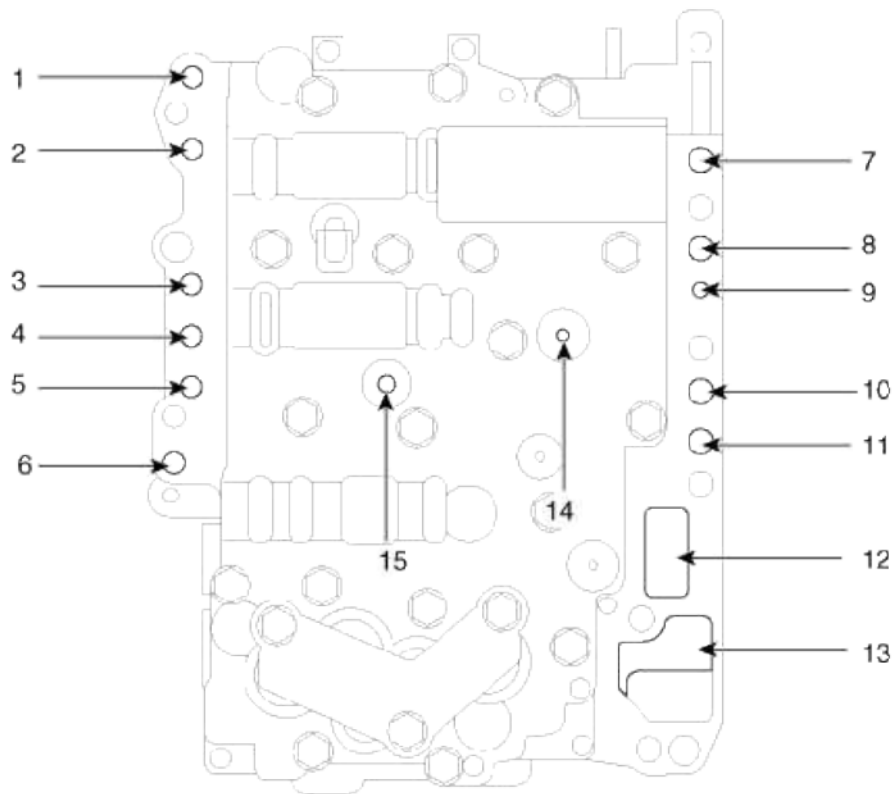
Components Location



1. PCV adjust screw
2. Solenoid valve
3. Oil temperature sensor

4. Accumulator
5. Low & reverse brake(LR/B)
pressure flow hole
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

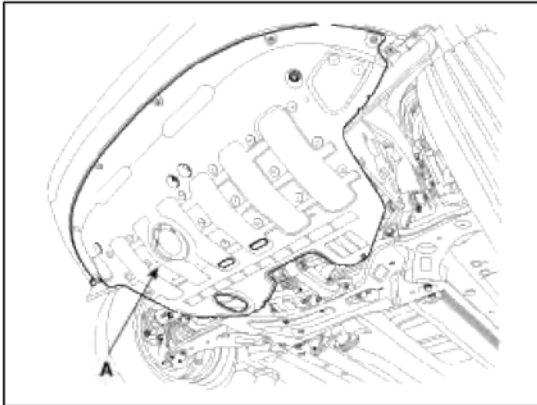
Removal

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

2. Remove the under cover (A).

Tightening torque:

19.6 ~ 24.5 N.m (2.0 ~ 2.5 kgf.m, 14.5 ~ 18.1 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 body cover (A) and eyebolt (B).

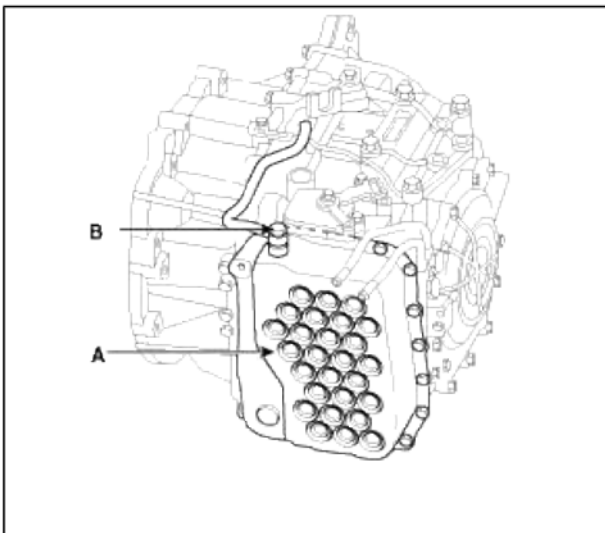
Tightening torque:

(A) 13.8 ~ 14.7 N.m (1.3 ~ 1.5 kgf.m, 9.4 ~ 10.8 lb-ft)

(B) 34.3 ~ 44.1 N.m (3.5 ~ 4.5 kgf.m, 25.3 ~ 32.6 lb-ft)

CAUTION

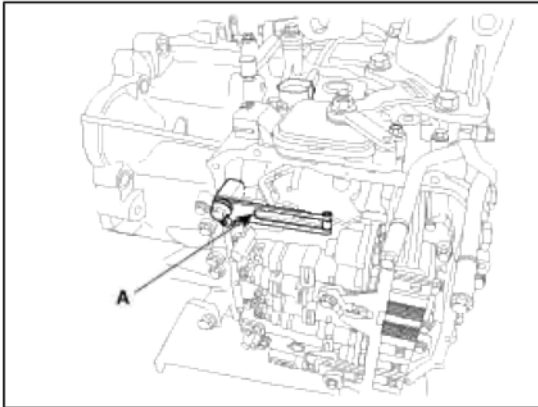
Always replace the gasket of the eyebolt use new one whenever loosening eyebolt.



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

Tightening torque:

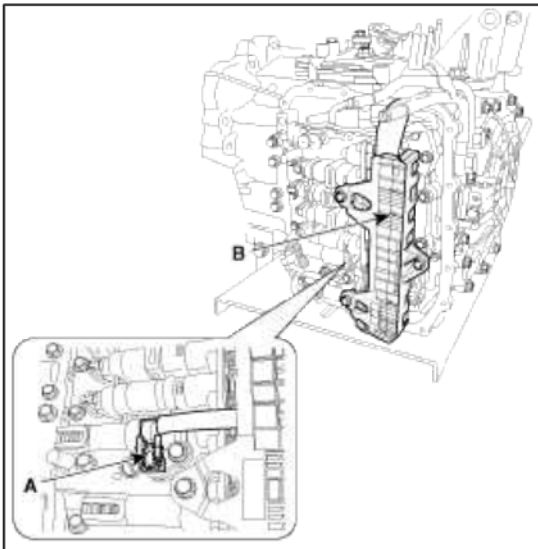
24.5 ~ 35.3 N.m (2.5 ~ 3.6 kgf.m, 18.1 ~ 26.0 lb-ft)



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

Tightening torque:

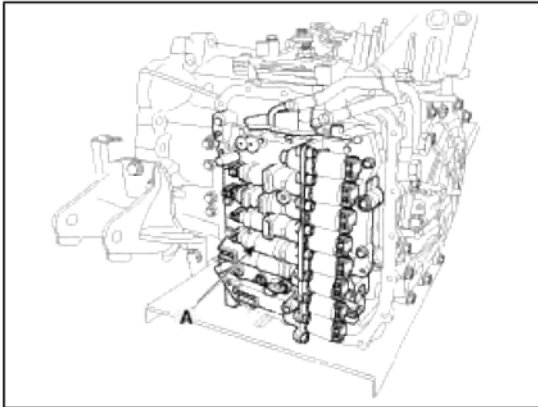
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



7. Remove the valve body assembly (A).

Tightening torque:

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



Installation

1. Installation is the reverse of removal.

CAUTION

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

NOTE

- Continue to apply liquid gasket at application points at the valve body cover with Ø2.5mm (0.0984in.) thickness.

Liquid gasket Part name :

Threebond 1281B or LOCTITE FMD-546

- 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)

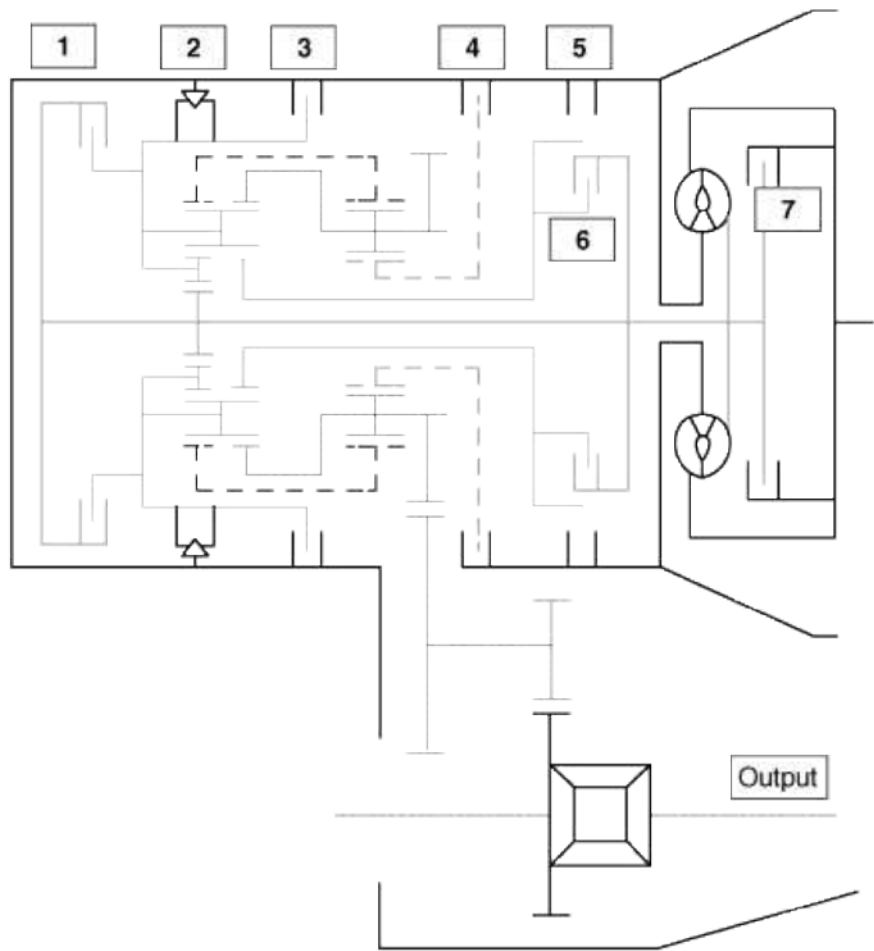
Automatic Transaxle System > Clutch & Brake > Description and Operation

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

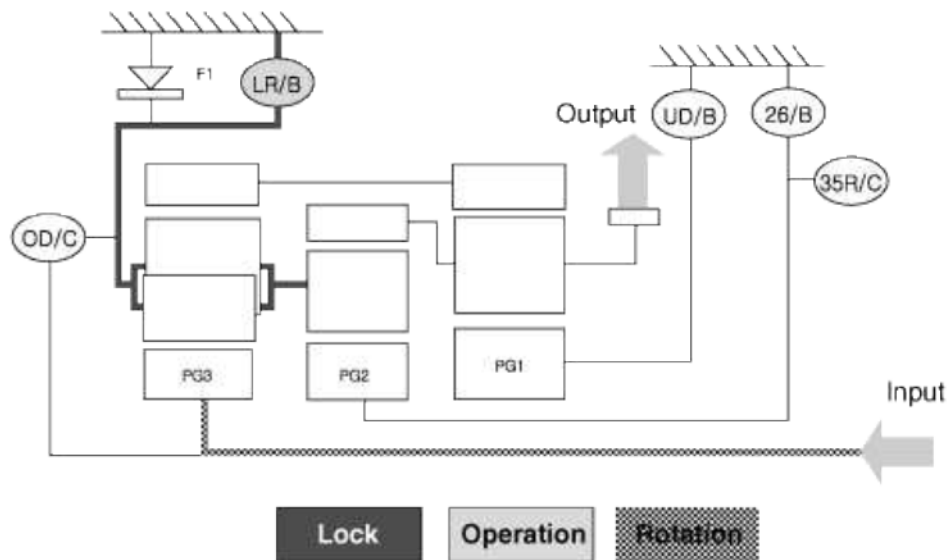


1. Overdrive clutch (OD/C)	5. 26 brake(26/B)
2. One way clutch (OWC)	6. 35R clutch (35R/C)
3. Low & Reverse brake (LR/B)	7. Damper clutch (D/C)
4. Underdrive brake (UD/B)	

Automatic Transaxle System > Clutch & Brake > Flow Diagram

Power Flow Chart

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



Direction of Rotation

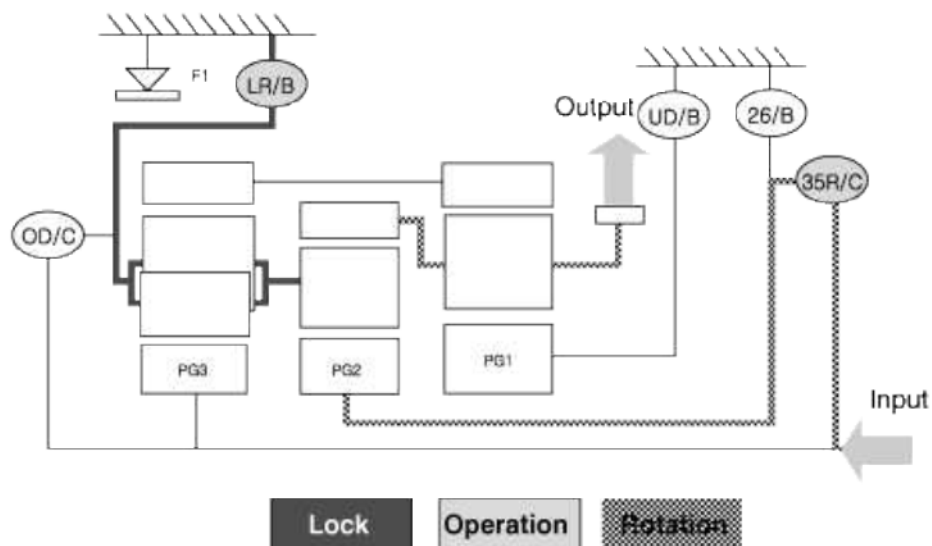
Lower & Reverse Brake (LR/B) Activation → Overdrive (O/D) Hub Lock → Mid & Rear P/C Lock

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

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

Input shaft rotation → 35R Clutch Rotation

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



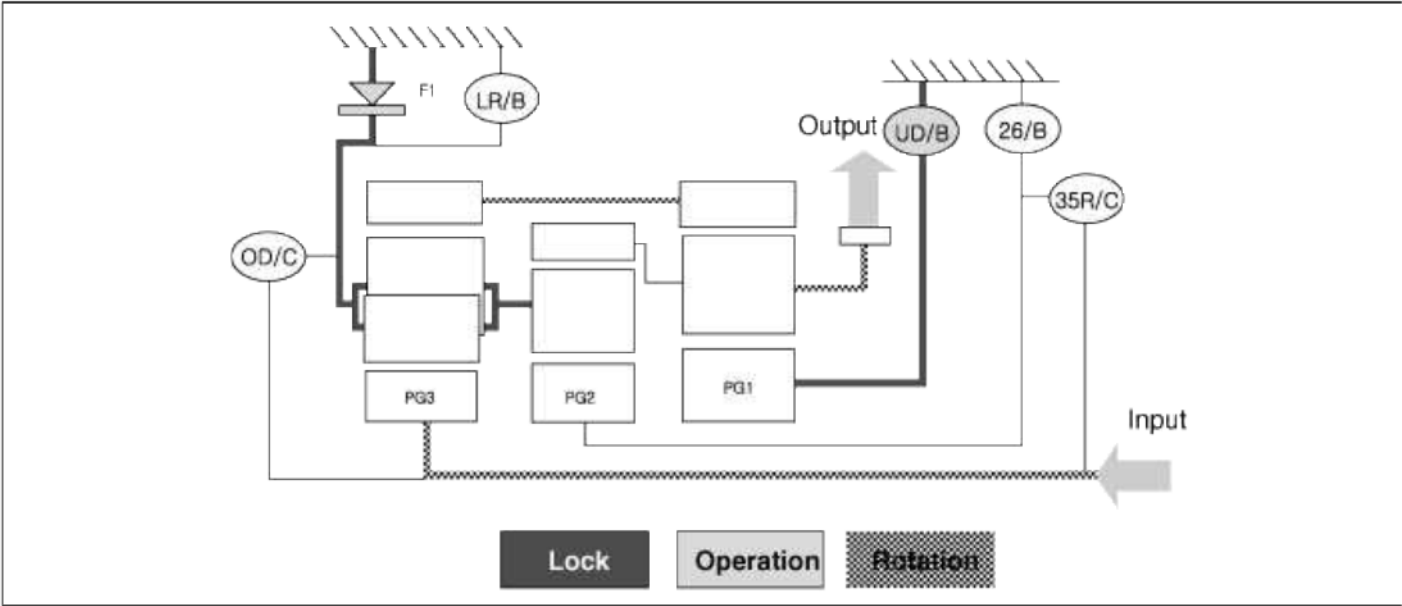
Power Delivery Route

Middle carrier locked and middle sun gear in rotation

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

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

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



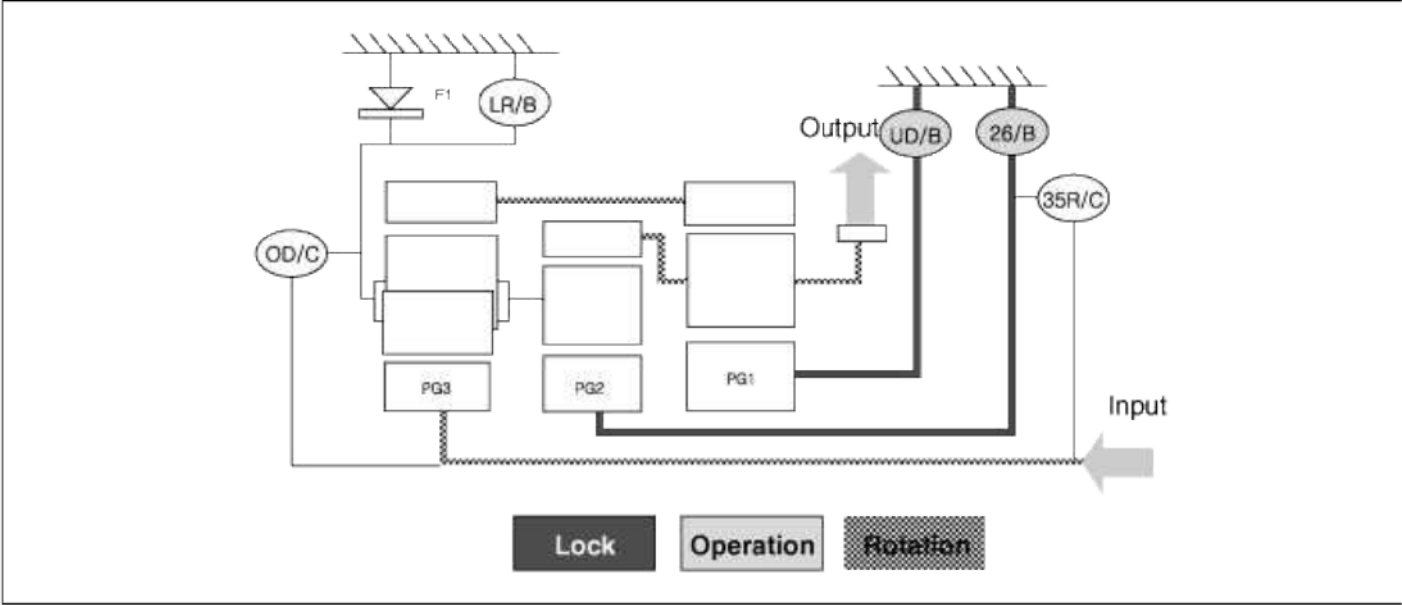
Power Delivery Route

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

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

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

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



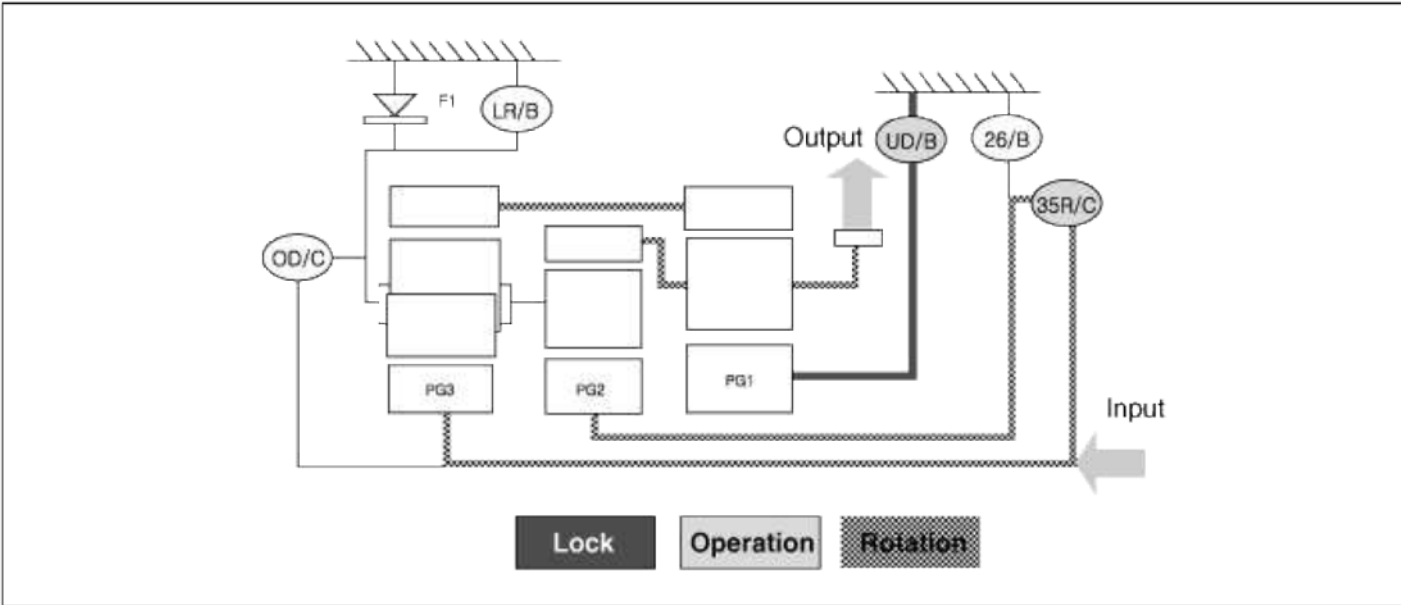
Power Delivery Route

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

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

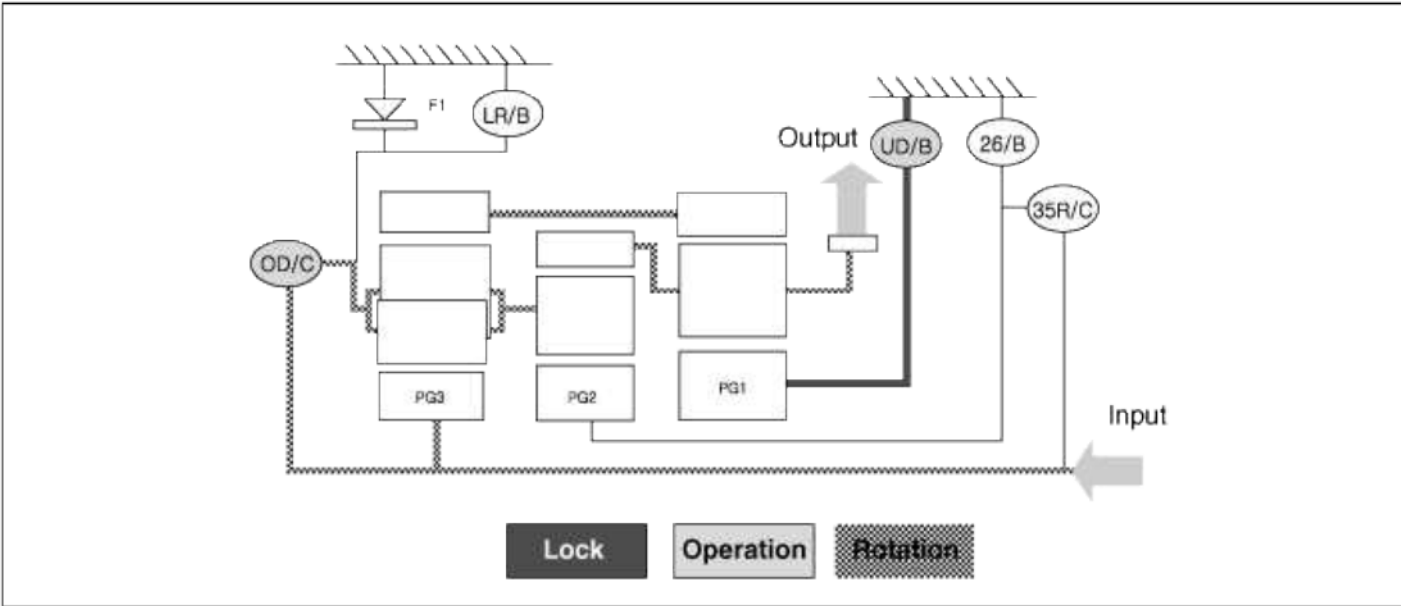
the middle annulus gear, to which the sun gear is attached, transfers to the middle and rear carriers, resulting in power equilibrium and power transfer to the front carrier.

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



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

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



Power Delivery Route
Front sun gear locked and rear carrier and rear sun gears in rotation
Activation of the overdrive clutch (OD/C) synchronizes the rear planetary gear's carrier and sun gears. The 1:1

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.

The diagram illustrates a three-stage shift register. An 'Input' arrow points into a register stage labeled '35R/C'. The output of this stage is connected to a register stage labeled '26/B'. The output of '26/B' is connected to a register stage labeled 'UD/B', which is also labeled 'Output' with an upward arrow. A feedback loop connects the output of 'UD/B' back to the input of '35R/C'. The register stages are represented by rectangles, and the feedback loop is indicated by a dashed line. Below the diagram, there is a legend with three boxes: 'Lock' (solid black), 'Operation' (solid grey), and 'Rotation' (hatched). The 'Operation' box is highlighted, indicating the current state of the system.

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

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.

The diagram illustrates a three-stage shift register circuit. It features three flip-flop stages labeled PG1, PG2, and PG3. The input signal enters from the right, passing through a 35R/C component, and is connected to the input of PG1. The output of PG1 is connected to the input of PG2, and the output of PG2 is connected to the input of PG3. The output of PG3 is connected to a feedback loop that passes through an OD/C component and is fed back into the input of PG1. Additionally, the output of PG3 is connected to a 26/B component, which is part of a larger output structure including a UD/B component and a 35R/C component. The circuit is powered by a supply voltage V1 and includes a feedback loop with a 35R/C component. A legend at the bottom indicates the states: Lock (solid black), Operation (solid grey), and Rotation (hatched).

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.

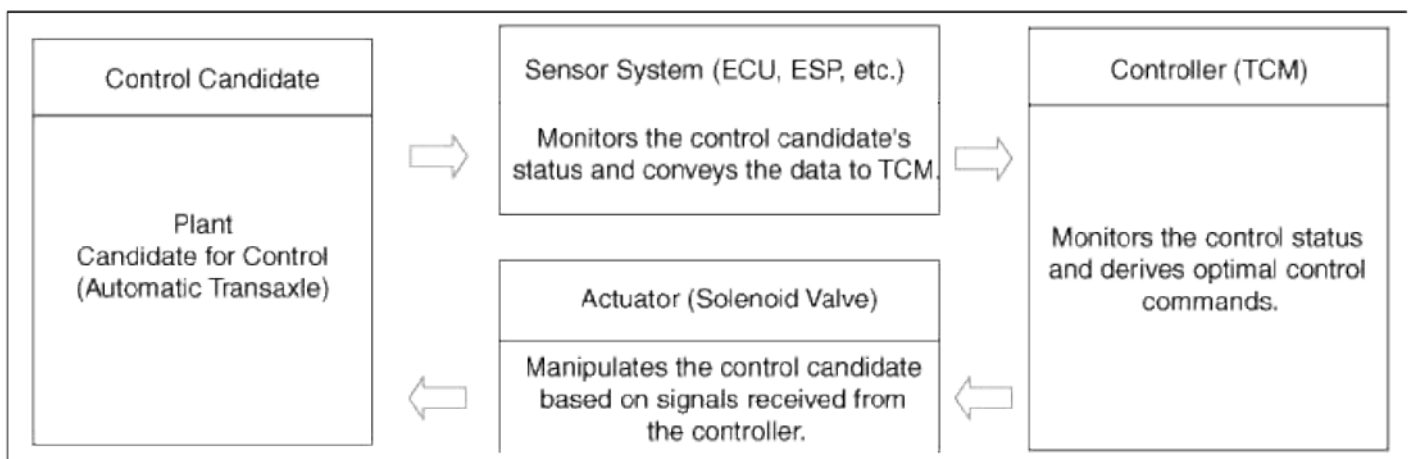
Here, the rear planetary gear maintains a 1:1 rotation ratio as it would when 4th or 5th gear is engaged; however, the front planetary gear remains unrestrained and the front sun gear rotates at a faster rate in the normal direction and at zero load.

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.

CAUTION

- Before removing or installing any part, read the diagnostic trouble codes and then disconnect the battery negative (-) terminal.
- Before disconnecting the cable from battery terminal, turn the ignition switch to OFF. Removal or connection of the battery cable during engine operation or while the ignition switch is ON could cause damage to the 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

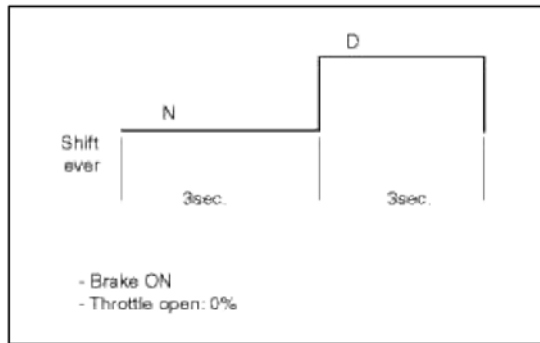
When shift shock is occurred or parts related with the transaxle are replaced, TCM learning should be performed. In the following case, TCM learning is required.

- 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.

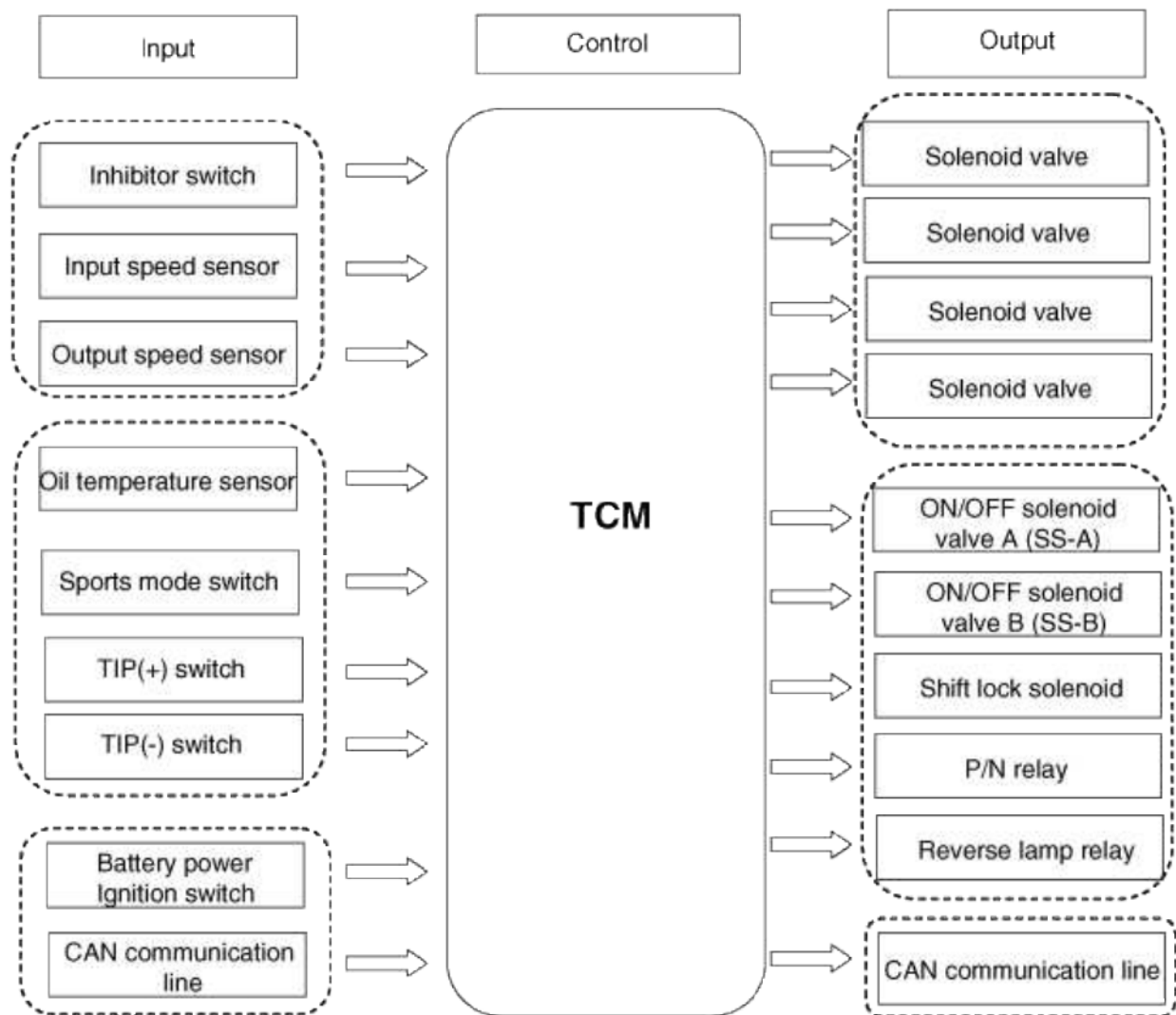


B. Driving learning

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%

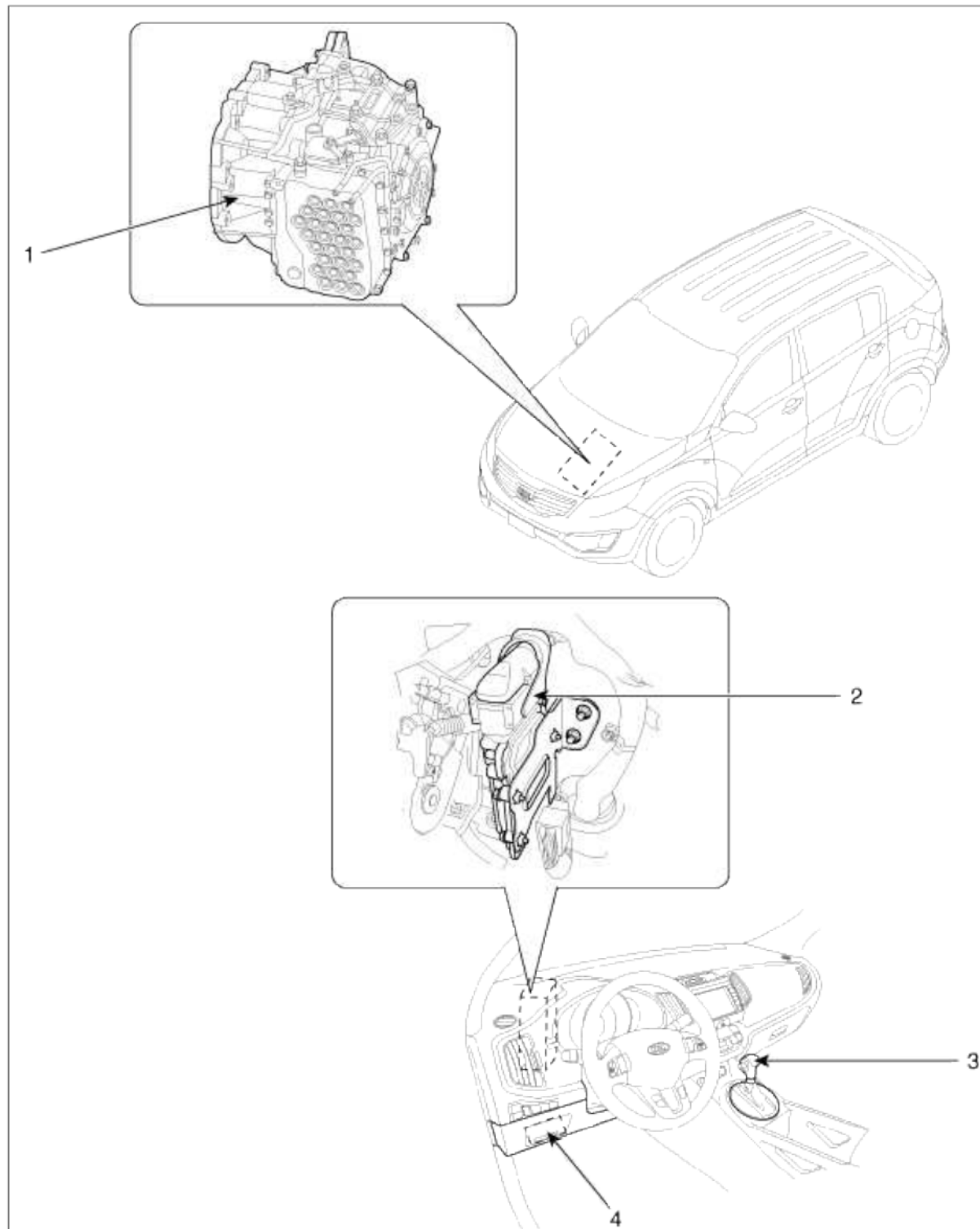
Automatic Transaxle System > Automatic Transaxle Control System > Schematic Diagrams

Circuit Diagram



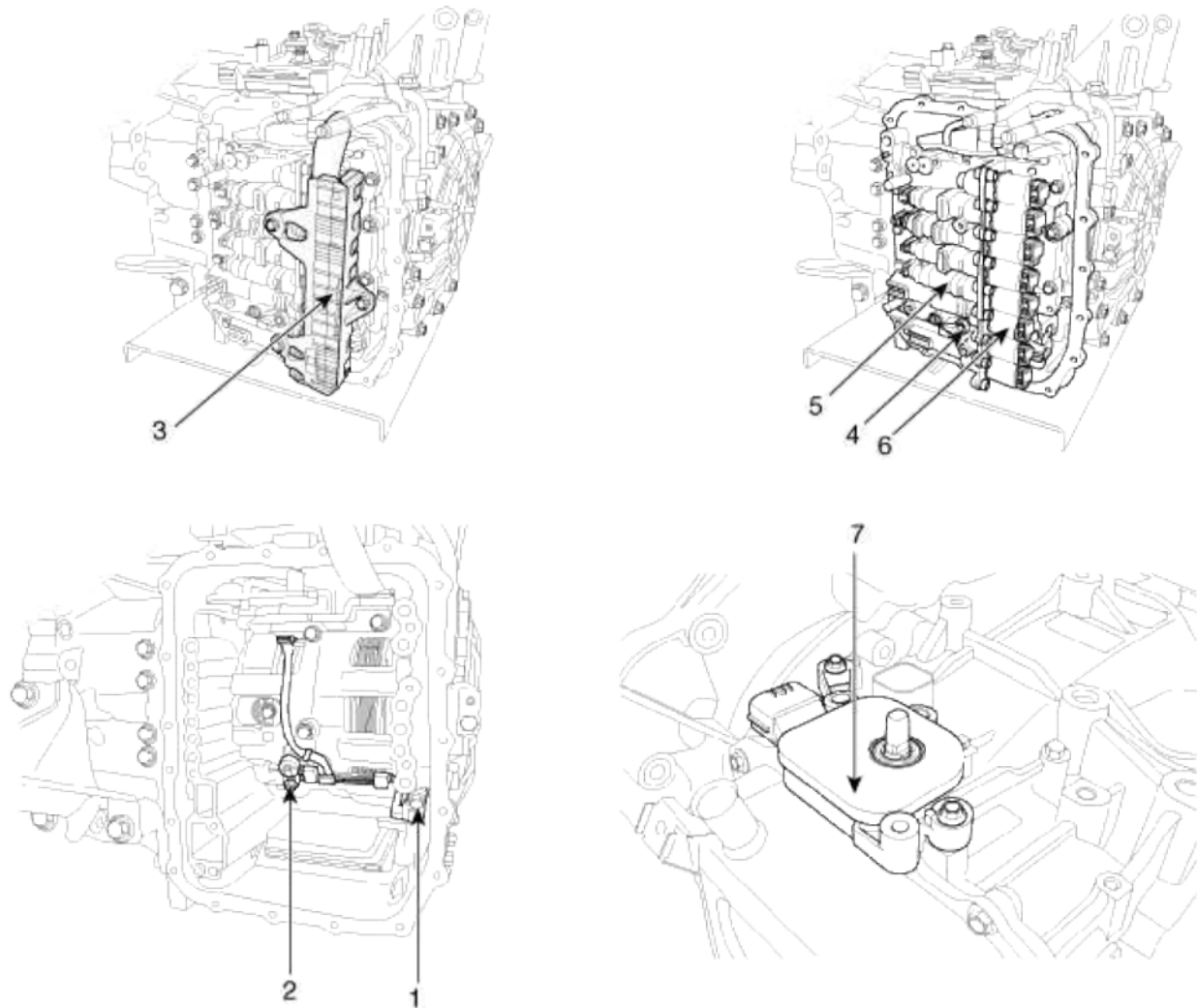
Automatic Transaxle System > Automatic Transaxle Control System > Components and Components Location

Components Location
[Vehicle Components]



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

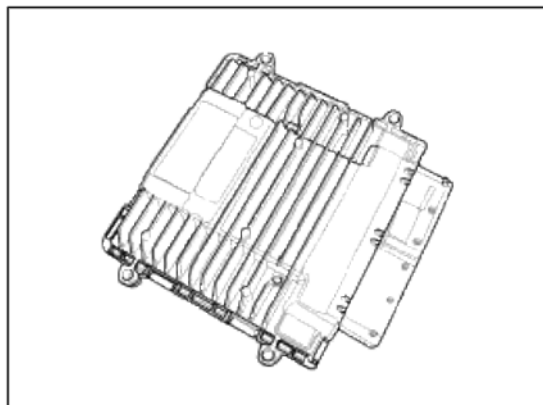
Description

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

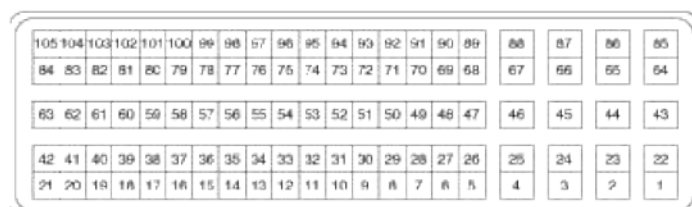
- Monitors the vehicle's operating conditions to determine the optimal gear setting.
- Performs a gear change if the current gear setting differs from the identified optimal gear setting.
- Determines the need for damper clutch (D/C) activation and engages the clutch accordingly.

- 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.

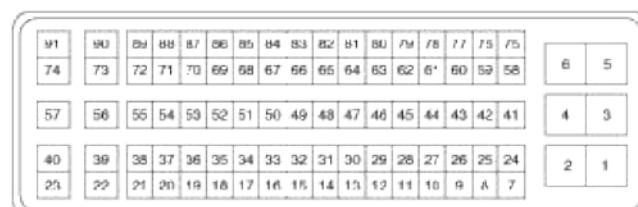


Automatic Transaxle System > Automatic Transaxle Control System > Transaxle Control Module (TCM) > Schematic Diagrams

1. TCM Connector and Terminal Function



Connector [CHG-AG]



Connector [CHG-BG]

2. TCM Terminal Function

Connector [CHG-AG]

Pin	Description	Pin	Description
1	-	54	-
2	Line pressure control solenoid valve (LINE_VFS)	55	-
3	Torque converter control solenoid valve (T/CON_VFS)	56	-
4	35R clutch control solenoid valve (35R/C_VFS)	57	-
5	-	58	-
6	-	59	-
7	Inhibitor switch signal "S1"	60	-
8	Inhibitor switch signal "S2"	61	-
9	Inhibitor switch signal "S3"	62	-
10	Inhibitor switch signal "S4"	63	-
11	-	64	-
12	-	65	Shift solenoid valve (SS-B)

13	-	66	Shift solenoid valve (SS-A)
14	-	67	Battery (B+)
15	-	68	-
16	-	69	Oil temperature sensor (+)
17	-	70	-
18	-	71	-
19	-	72	-
20	-	73	Output speed sensor signal
21	-	74	Sports mode up switch
22	-	75	-
23	Underdrive brake control solenoid valve (UD/B_VFS)	76	-
24	26 brake control solenoid valve (26/B_VFS)	77	-
25	Overdrive clutch control solenoid valve (OD/C_VFS)	78	-
26	-	79	-
27	-	80	-
28	-	81	-
29	-	82	-
30	-	83	-
31	-	84	-
32	-	85	-
33	-	86	Solenoid supply power 1
34	-	87	Solenoid supply power 2
35	-	88	Battery (B+)
36	-	89	-
37	-	90	Output speed sensor power
38	-	91	Input speed sensor power
39	-	92	-
40	-	93	-
41	-	94	Input speed sensor signal
42	-	95	Sports mode down switch
43	-	96	-
44	Ground (Power 1)	97	-
45	Ground (Power 2)	98	-
46	Shift lock solenoid	99	-

47	-	100	-
48	Oil temperature sensor (-)	101	-
49	-	102	-
50	-	103	-
51	-	104	-
52	Sports mode select switch	105	-
53	-		

TCM Terminal Input/ Output Signal

Connector [CHG-AG]

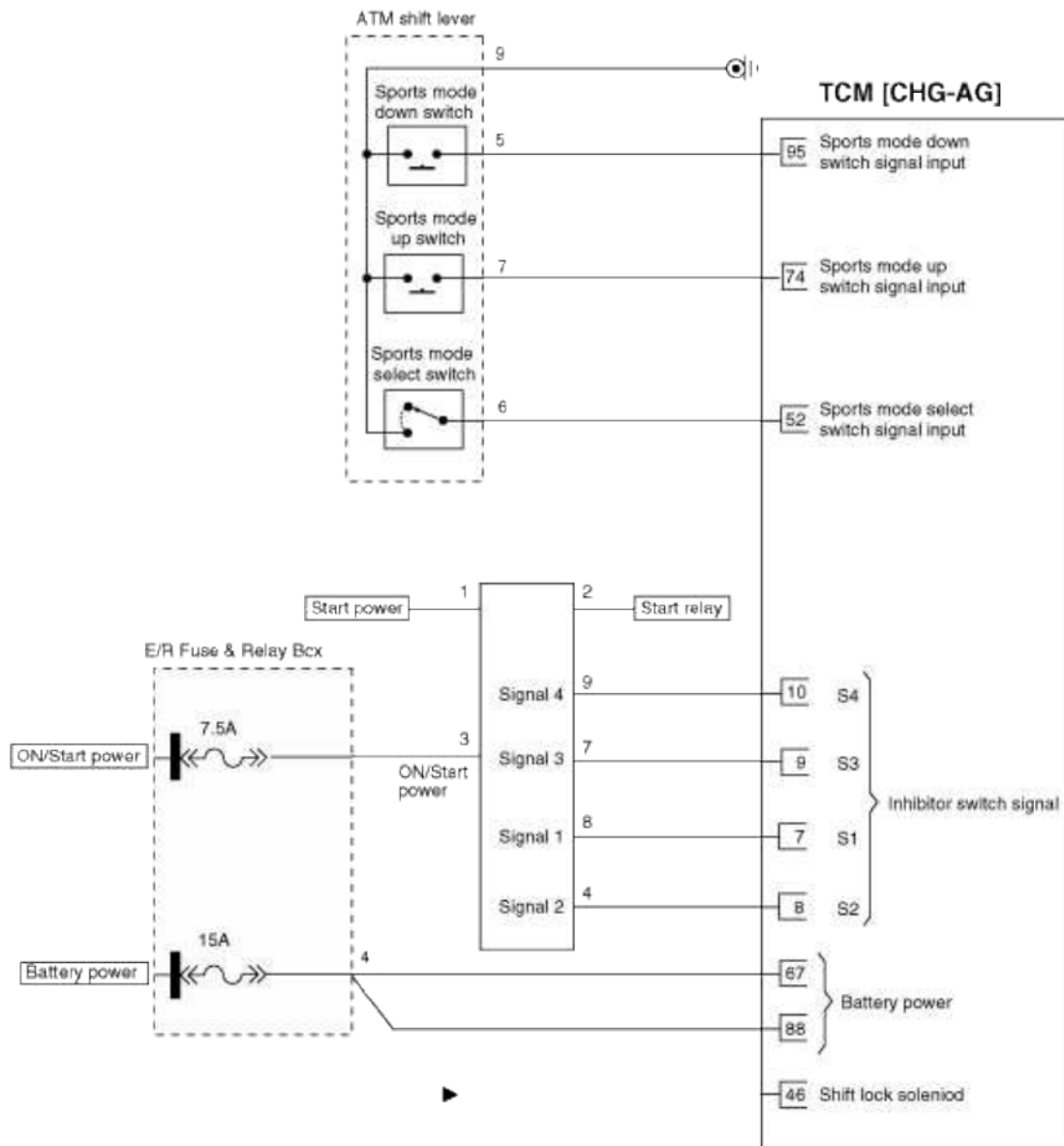
Pin	Description	Condition	Input/output value	
			Type	Level
1	-			
2	Line pressure control solenoid valve (LINE_VFS)		Output	0V/Battery voltage level 9V < Battery voltage level < 16V
3	Torque converter control solenoid valve (T/CON_VFS)		Output	0V/Battery voltage level 9V < Battery voltage level < 16V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

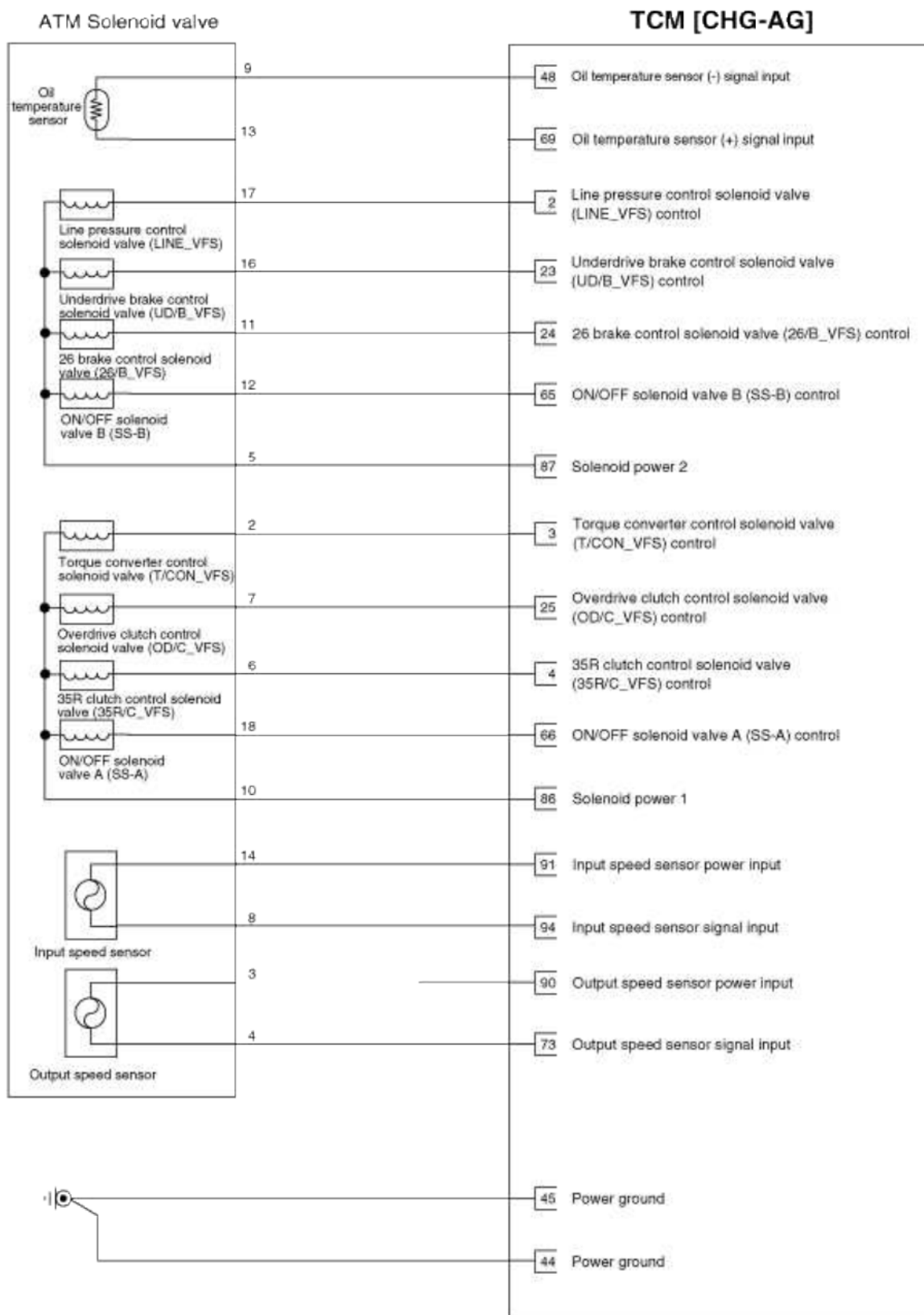
19	-			
20	-			
21	-			
22	-			
23	Underdrive brake control solenoid valve (UD/B_VFS)		Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
				Power supply : V_SOL2
24	26 brake control solenoid valve (26/B_VFS)		Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
				Power supply : V_SOL2
25	Overdrive clutch control solenoid valve (OD/C_VFS)		Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
				Power supply : V_SOL1
26	-			
27	-			
28	-			
29	-			
30	-			
31	-			
32	-			
33	-			
34	-			
35	-			
36	-			
37	-			
38	-			
39	-			
40	-			
41	-			
42	-			
43	-			
44	Ground (Power 1)		Ground	0V
45	Ground (Power 2)		Ground	0V
46	Shift lock solenoid	High	Output	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
47	-			

48	Oil temperature sensor (-)		Ground	0V
49	-			
50	-			
51	-			
52	Sports mode select switch	Sport mode	Input	0V/Battery voltage level
		Other		9V < Battery voltage level < 16V
53	-			
54	-			
55	-			
56	-			
57	-			
58	-			
59	-			
60	-			
61	-			
62	-			
63	-			
64	-			
65	Shift solenoid valve (SS-B)	High	Output	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
66	Shift solenoid valve (SS-A)	High	Output	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
67	Battery power (B+)	ON	Power	0V/Battery voltage level
		OFF		9V < Battery voltage level < 16V
68	-			
69	Oil temperature sensor (+)	ON	Input	0V/3.3V
		OFF		
70	-			
71	-			
72	-			
73	Output speed sensor signal	High	Input	0.7V/1.4V
		Low		
74	Sports mode up switch	Up ON	Input	0V/Battery voltage level
		Other		9V < Battery voltage level < 16V
75	-			
76	-			

77	-			
78	-			
79	-			
80	-			
81	-			
82	-			
83	-			
84	-			
85	-			
86	Solenoid supply power 1	ON	Power	0V/Battery voltage level
		OFF		9V < Battery voltage level < 16V
87	Solenoid supply power 2	ON	Power	0V/Battery voltage level
		OFF		9V < Battery voltage level < 16V
88	Battery power (B+)	ON	Power	0V/Battery voltage level
		OFF		9V < Battery voltage level < 16V
89	-			
90	Output speed sensor power	ON	Power	0V/7.5V
		OFF		
91	Input speed sensor power	ON	Power	0V/7.5V
		OFF		
92	-			
93	-			
94	Input speed sensor signal	High	Input	0.7V/1.4V
		Low		
95	Sports mode down switch	Down ON	Input	0V/Battery voltage level
		Other		9V < Battery voltage level < 16V
96	-			
97	-			
98	-			
99	-			
100	-			
101	-			
102	-			
103	-			
104	-			
105	-			

Circuit Diagram





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

Inspection

TCM Problem Inspection Procedure

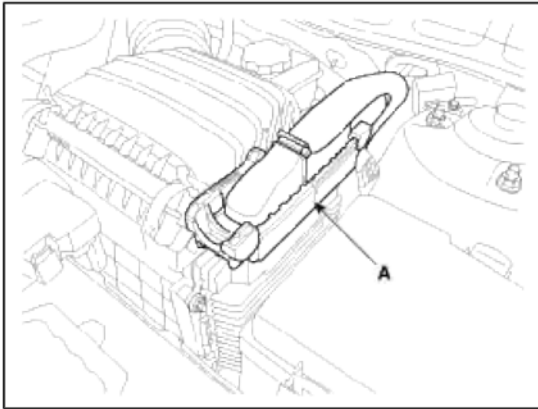
1. TEST TCM GROUND CIRCUIT: Measure resistance between TCM and chassis ground using the backside of TCM harness connector as TCM side check point. If the problem is found, repair it.

Specification: Below 1Ω

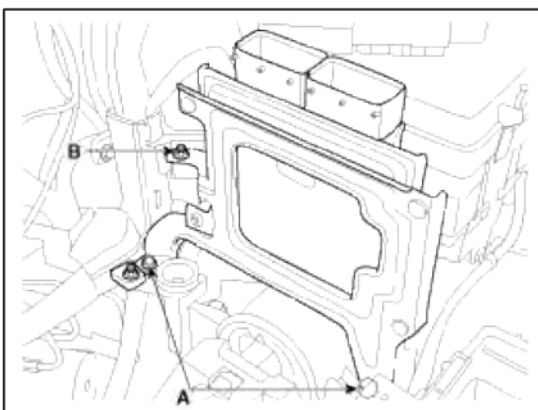
2. TEST TCM CONNECTOR: Disconnect the TCM connector and visually check the ground terminals on TCM side and harness side for bent pins or poor contact pressure. If the problem is found, repair it.
3. If problem is not found in Step 1 and 2, the TCM could be faulty. If so, make sure there were no DTC's 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

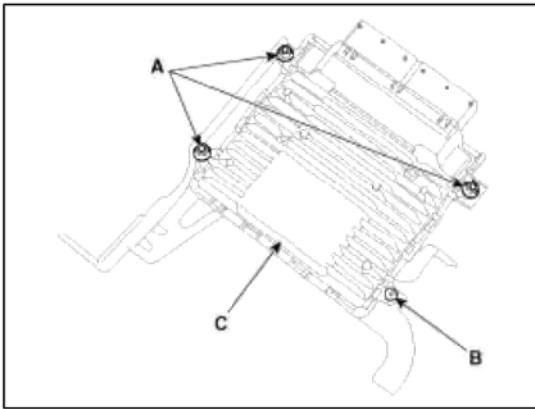
1. Turn ignition switch OFF and disconnect the negative (-) battery cable.
2. Disconnect the TCM Connector (A).



3. Remove the air cleaner assembly.
(Refer to "Intake And Exhaust System" in EM group)
4. Remove the mounting bolts (A) and nut (B), and then remove the TCM assembly (C).



5. Remove the installation nuts (A) and screw (B), and then remove the TCM (C) from the bracket.



Installation

1. Installation is reverse of removal.

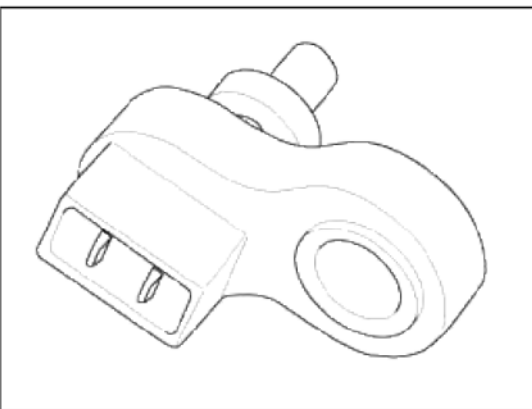
NOTE

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.

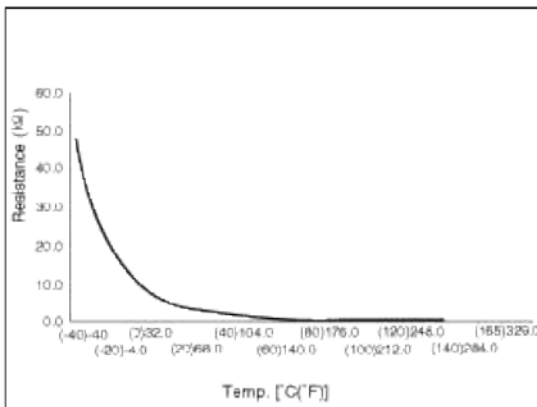


Automatic Transaxle System > Automatic Transaxle Control System > Transaxle Oil Temperature Sensor > Specifications

Specifications

Type: Negative Thermal Coefficient Type

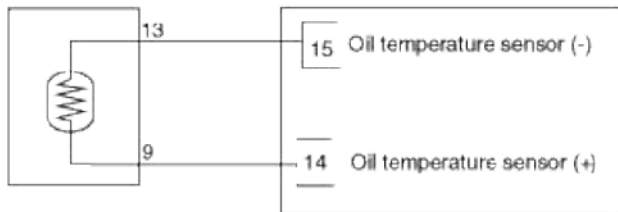
Temp. [(°C)°F]	Resistance (kΩ)
(-40)-40	48.1
(-20)-4.0	15.6
(0)32.0	5.88
(20)68.0	2.51
(40)104.0	1.11
(60)140.0	0.61
(80)176.0	0.32
(100)212.0	0.18
(120)248.0	0.10
(140)284.0	0.06
(150)302	0.05



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

Circuit Diagram

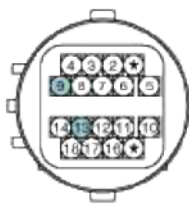
[Circuit Diagram]

Oil Temperature Sensor
[CRD04]

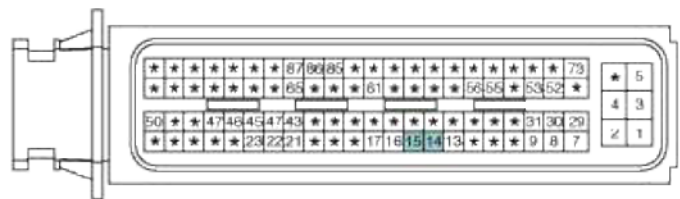
[Connection Information]

Terminal	Connected to	Function
13	TCM(15)	Oil temperature sensor (-)
9	TCM(14)	Oil temperature sensor (+)

[Harness Connector]



Solenoid Valve Connector [CRD04]



TCM Connector [CRD-T]

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

Inspection

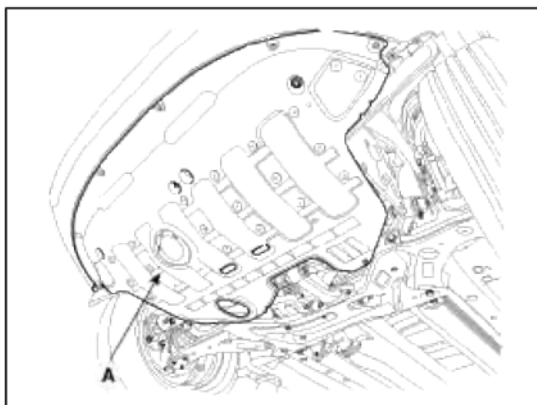
1. Turn ignition switch OFF.
2. Disconnect the oil temperature sensor connector.
3. Measure resistance between sensor signal terminal and sensor ground terminal.
4. Check that the resistance is within the specification.

Removal

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

Tightening torque:

19.6 ~ 24.5 N.m (2.0 ~ 2.5 kgf.m, 14.5 ~ 18.1 lb-ft)



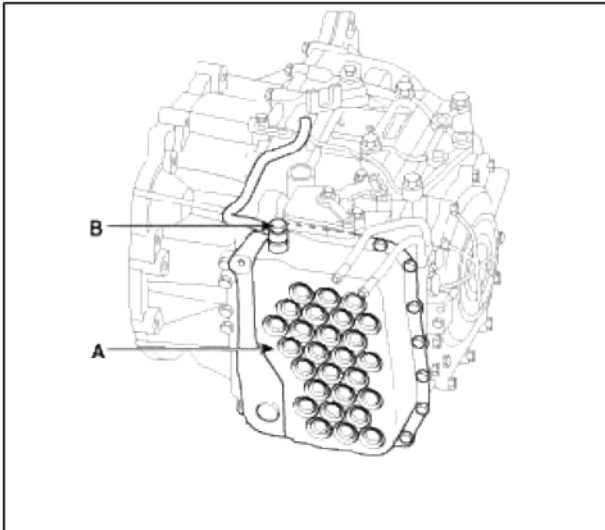
3. Replace new gasket and the plug after draining the automatic transaxle fluid by removing the drain plug. (Refer to "Hydraulic system (Fluid)" in this group)
4. Remove the valve body cover (A) and eyebolt (B).

Tightening torque:

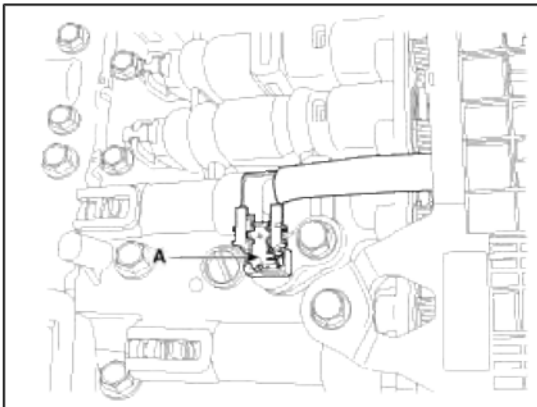
- (A) 13.8 ~ 14.7 N.m (1.3 ~ 1.5 kgf.m, 9.4 ~ 10.8 lb-ft)
(B) 34.3 ~ 44.1 N.m (3.5 ~ 4.5 kgf.m, 25.3 ~ 32.6 lb-ft)

CAUTION

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



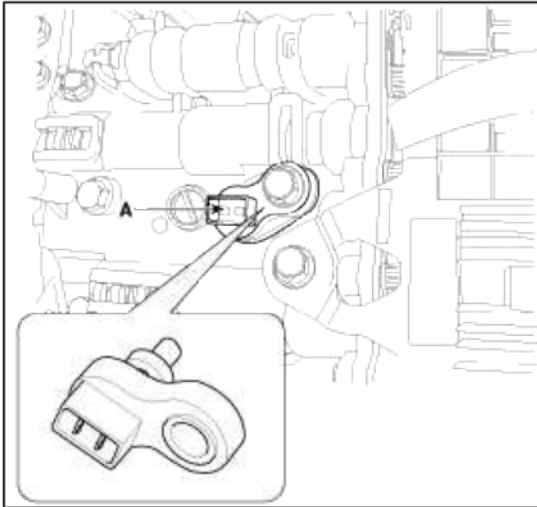
5. Disconnect the oil temperature sensor connector (A).



6. 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.

- Continue to apply liquid gasket at application points at the valve body cover with Ø2.5mm (0.0984in.) thickness.

Liquid gasket Part name :

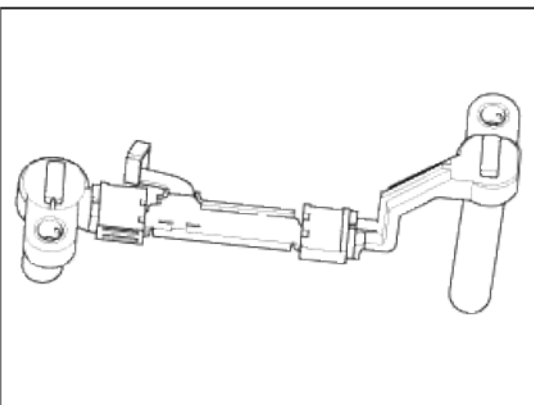
Threebond 1281B or LOCTITE FMD-546

- 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

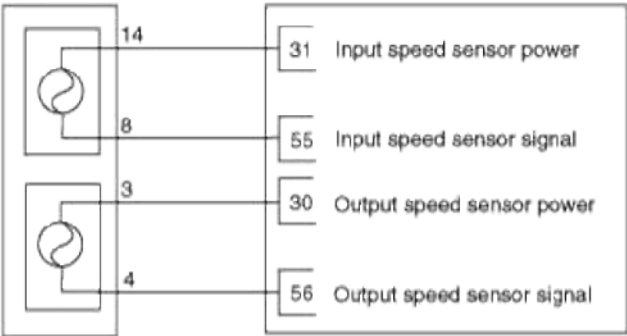
Operation condition [°C(°F)]		((-)-40~150)) -40~302
Air gap(mm)in.		(0.95~1.55)0.950~1.55
Output voltage(V)	High	1.18~1.68
	Low	0.59~0.84

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

Circuit Diagram

[Circuit Diagram]

Input & Output Speed Sensor [CRD04]



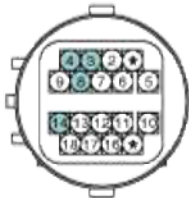
TCM[CRD-T]

31	Input speed sensor power
55	Input speed sensor signal
30	Output speed sensor power
56	Output speed sensor signal

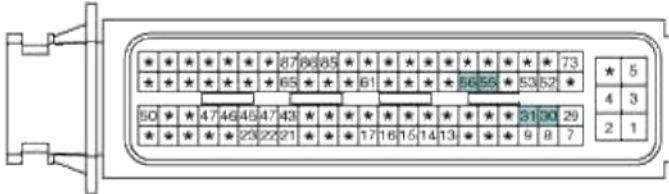
[Connection Information]

Terminal	Connected to	Function
14	TCM(31)	Input speed sensor power
8	TCM(55)	Input speed sensor signal
3	TCM(30)	Output speed sensor power
4	TCM(56)	Output speed sensor signal

[Harness Connector]



Solenoid Valve Connector[CRD04]



TCM Connector [CRD-T]

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

Signal Waveform

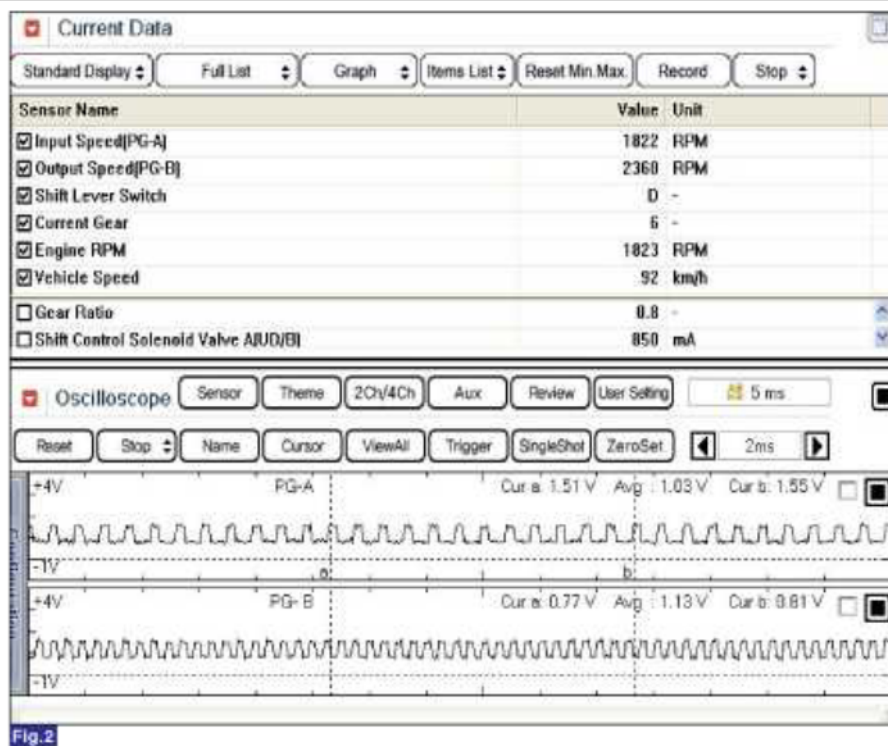
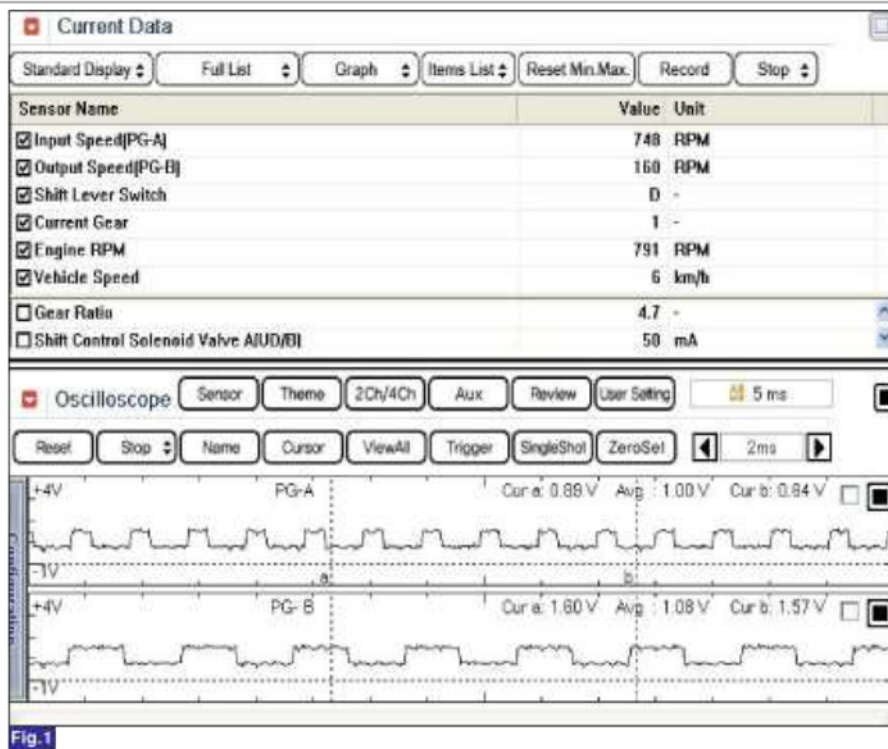


Fig 1) Input/Output speed sensor at low speed

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.

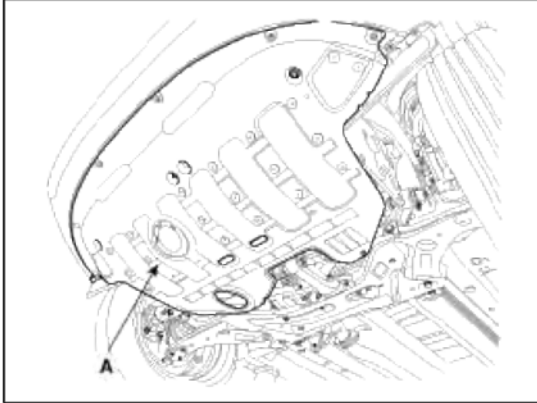
Specification: Refer to "Signal Wave Form" section.

Removal

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

Tightening torque:

19.6 ~ 24.5 N.m (2.0 ~ 2.5 kgf.m, 14.5 ~ 18.1 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 body cover (A) and eyebolt (B).

Tightening torque:

(A) 13.8 ~ 14.7 N.m (1.3 ~ 1.5 kgf.m, 9.4 ~ 10.8 lb-ft)

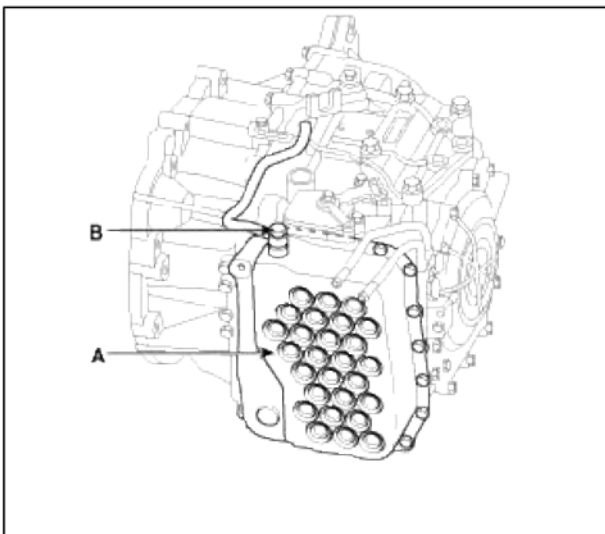
(B) 34.3 ~ 44.1 N.m (3.5 ~ 4.5 kgf.m, 25.3 ~ 32.6 lb-ft)

CAUTION

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

NOTE

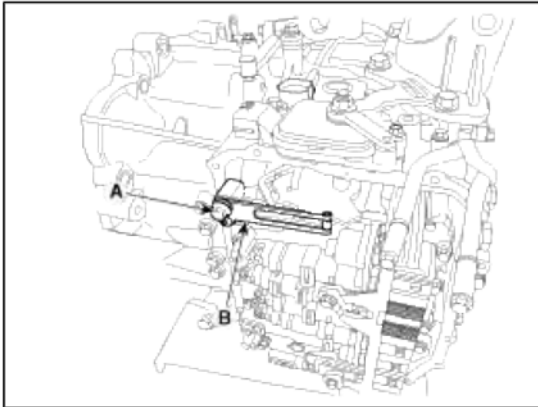
Remove installation bolts in the engine compartment first and then remove others under the vehicle.



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

Tightening torque:

24.5 ~ 35.3 N.m (2.5 ~ 3.6 kgf.m, 18.1 ~ 26.0 lb-ft)



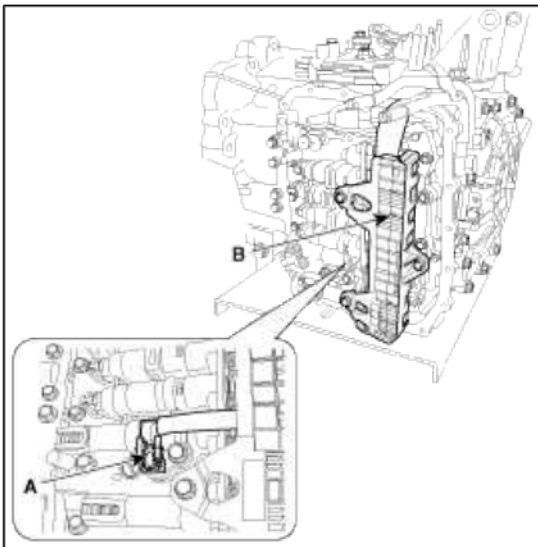
6. Remove the bolt (3ea) after disconnecting the solenoid valve connector (B) and the oil temperature sensor connector (A).

Tightening torque:

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

CAUTION

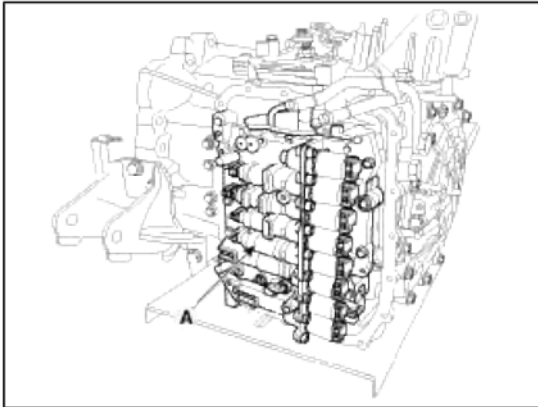
Be careful not to damage the harness lock connector.



7. 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)

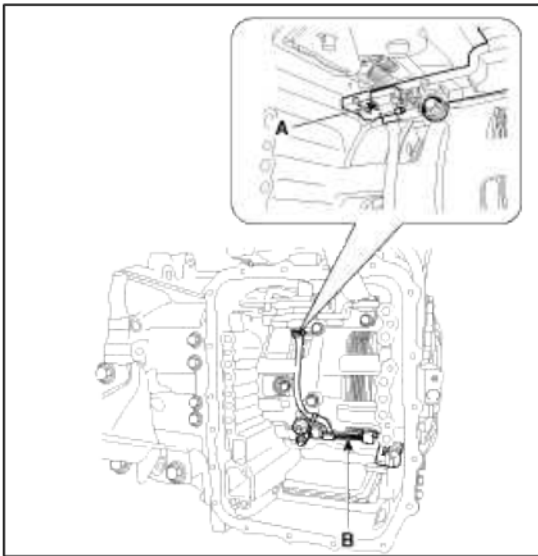


8. Disconnect the input & output speed sensor connector(A).

9. 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.

- Continue to apply liquid gasket at application points at the valve body cover with Ø2.5mm (0.0984in.) thickness.

Liquid gasket Part name :

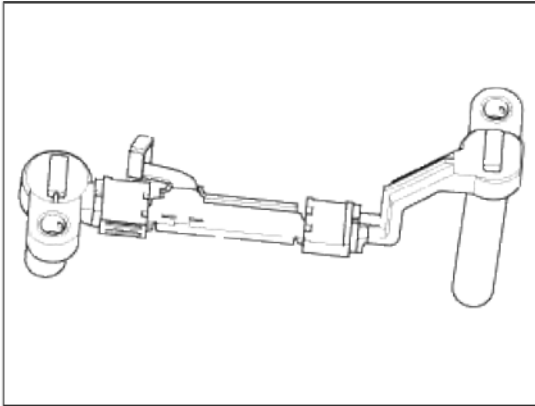
Threebond 1281B or LOCTITE FMD-546

- 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 [$^{\circ}\text{C}$ ($^{\circ}\text{F}$)]		((-40~150)) -40~302
Air gap(mm)in.		(0.55~1)0.0217~0.0394
Output voltage	High	1.18~1.68
	Low	0.59~0.84

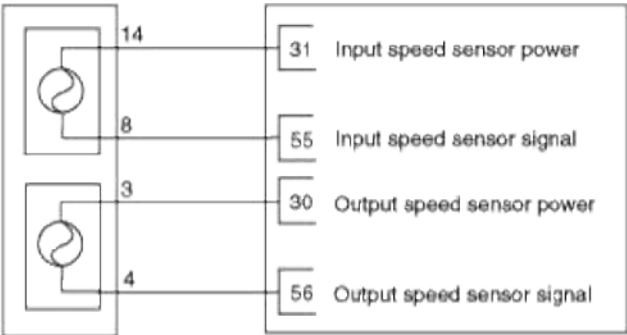
Automatic Transaxle System > Automatic Transaxle Control System > Output Speed Sensor > Schematic Diagrams

Circuit Diagram

[Circuit Diagram]

Input & Output
Speed Sensor
[CRD04]

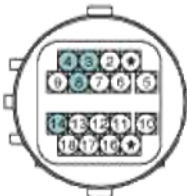
TCM[CRD-T]



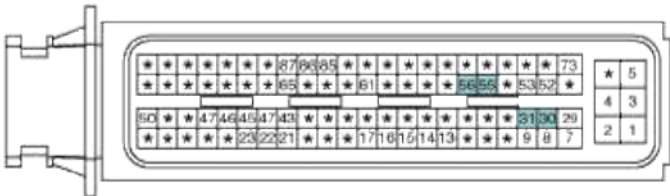
[Connection Information]

Terminal	Connected to	Function
14	TCM(31)	Input speed sensor power
8	TCM(55)	Input speed sensor signal
3	TCM(30)	Output speed sensor power
4	TCM(56)	Output speed sensor signal

[Harness Connector]



Solenoid Valve Connector[CRD04]



TCM Connector [CRD-T]

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

Signal Waveform

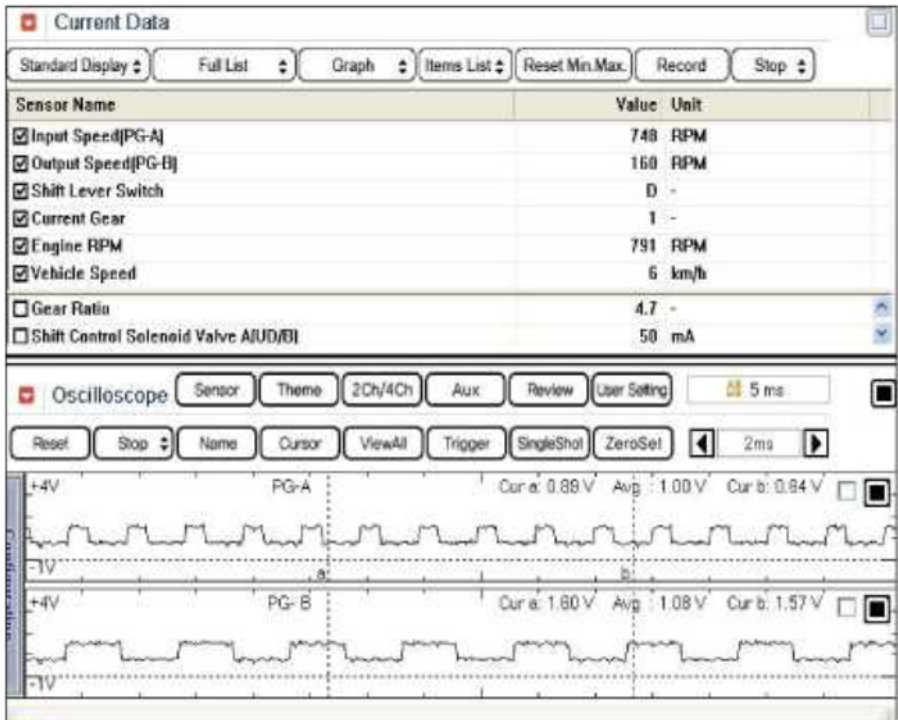


Fig.1

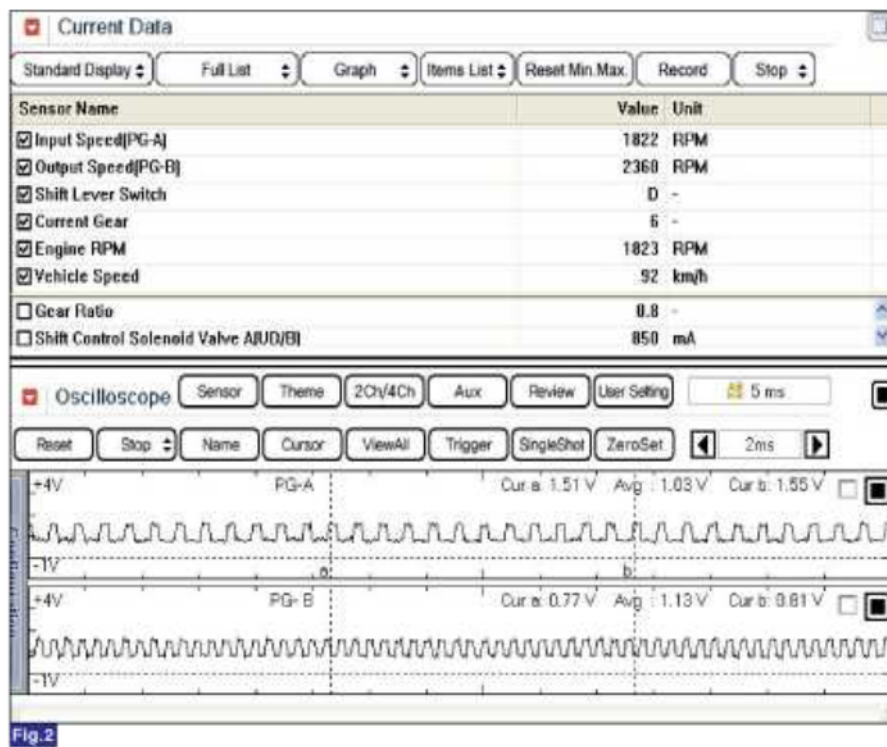


Fig 1) Input/Output speed sensor at low speed

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.

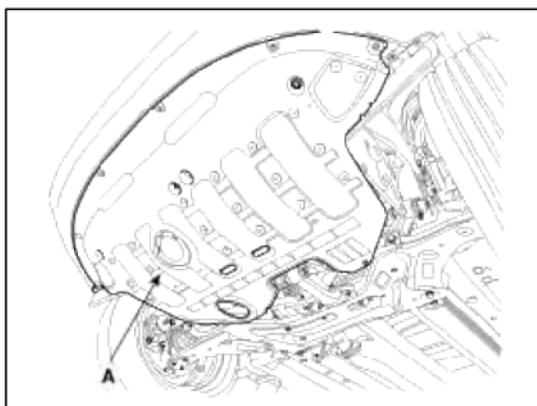
Specification: Refer to "Signal Wave Form" section.

Removal

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

Tightening torque:

19.6 ~ 24.5 N.m (2.0 ~ 2.5 kgf.m, 14.5 ~ 18.1 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 body cover (A) and eyebolt (B).

Tightening torque:

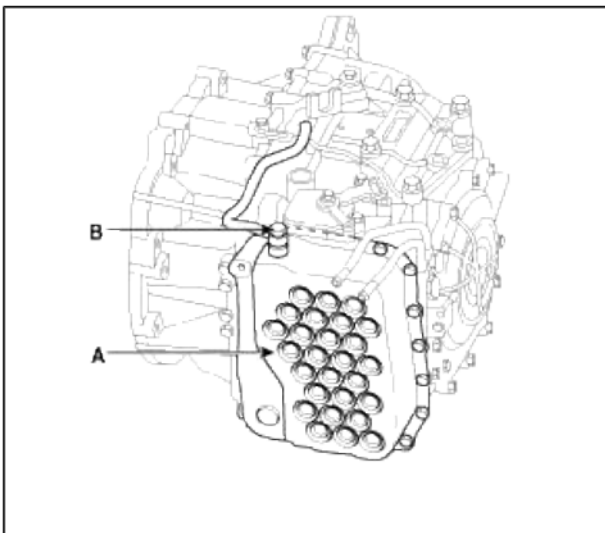
- (A) 13.8 ~ 14.7 N.m (1.3 ~ 1.5 kgf.m, 9.4 ~ 10.8 lb-ft)
 (B) 34.3 ~ 44.1 N.m (3.5 ~ 4.5 kgf.m, 25.3 ~ 32.6 lb-ft)

CAUTION

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

NOTE

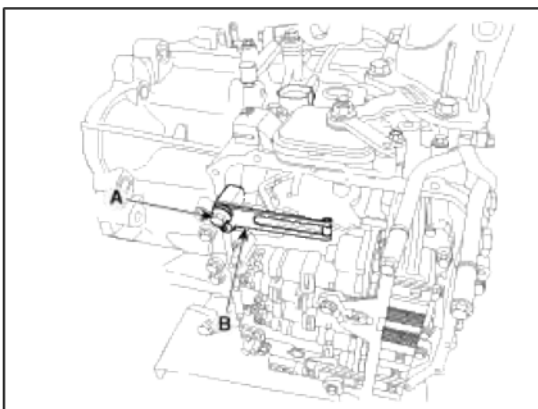
Remove installation bolts in the engine compartment first and then remove others under the vehicle.



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

Tightening torque:

- 24.5 ~ 35.3 N.m (2.5 ~ 3.6 kgf.m, 18.1 ~ 26.0 lb-ft)



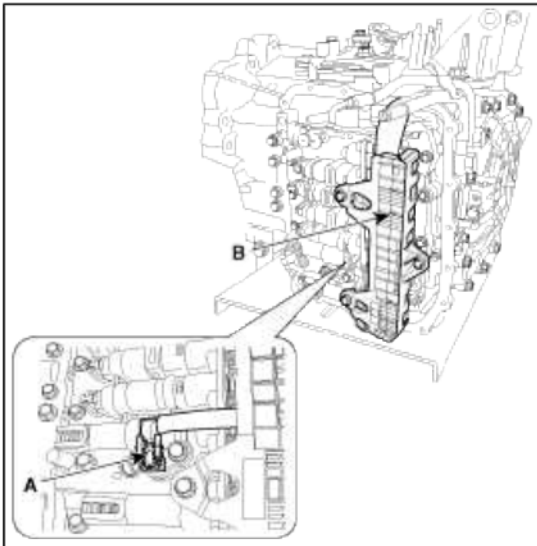
6. Remove the bolt (3ea) after disconnecting the solenoid valve connector (B) and the oil temperature sensor connector (A).

Tightening torque:

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

CAUTION

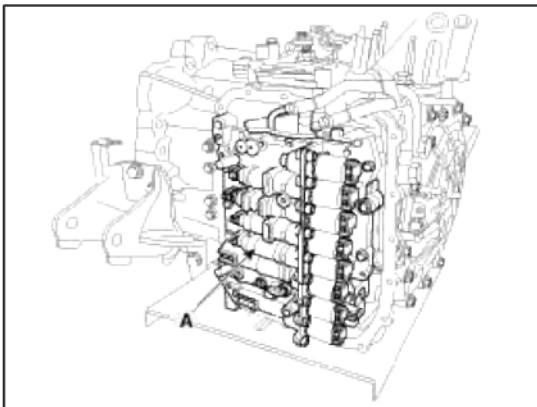
Be careful not to damage the harness lock connector.



7. 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)

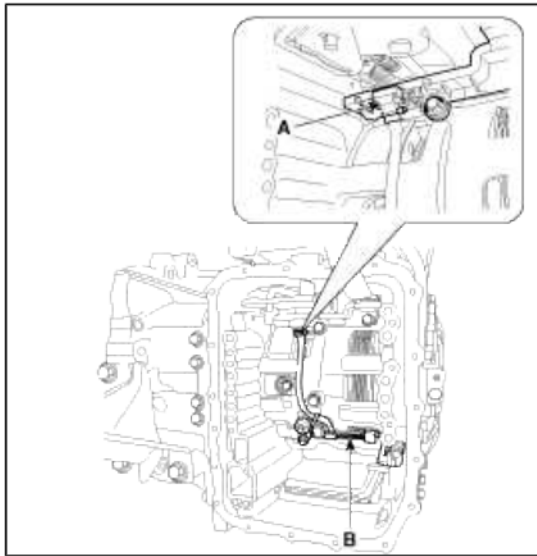


8. Disconnect the input & output speed sensor connector(A).

9. 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.

- Continue to apply liquid gasket at application points at the valve body cover with Ø2.5mm (0.0984in.) thickness.

Liquid gasket Part name :

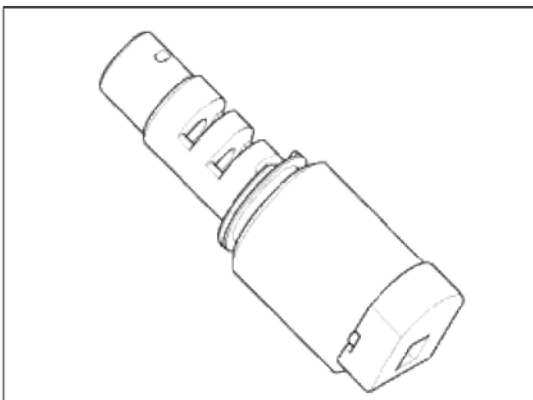
Threebond 1281B or LOCTITE FMD-546

- 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

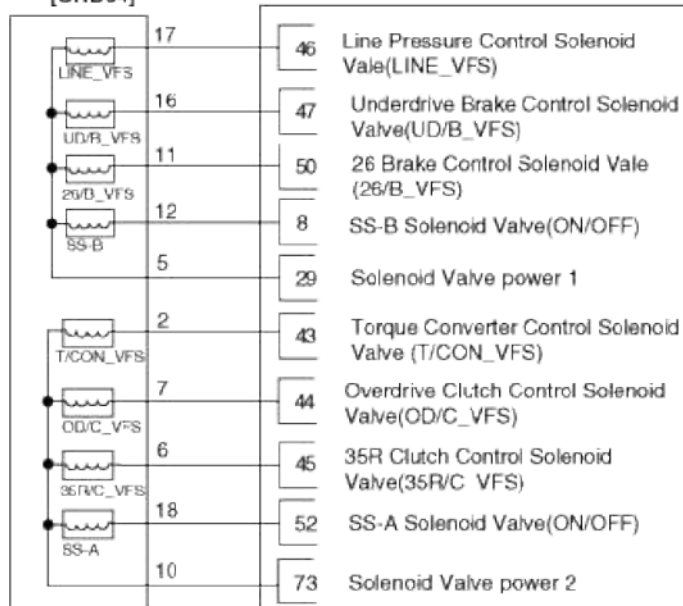
Control Pressure kpa(kgf/cm ² , psi)	9.81~500.14(0.1~5.1,1.42~72.54)
Current value(mA)	50~850
Internal resistance(Ω)	5.1

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

Circuit Diagram

[Circuit Diagram]

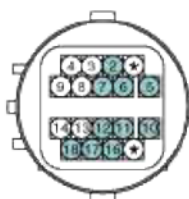
Solenoid Valve [CRD04]



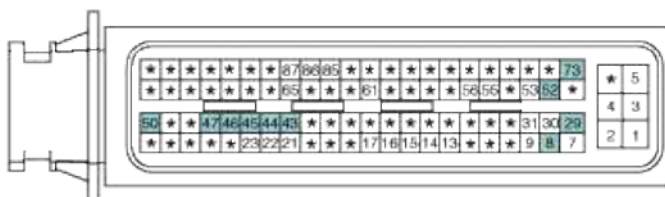
[Connection Information]

Terminal	Connected to	Function
*7	TCM(46)	Line Pressure Control Solenoid Valve (LINE_VFS)
*6	TCM(47)	Underdrive Brake Control Solenoid Valve(UD/B_VFS)
*1	TCM(50)	26 Brake Control Solenoid Valve(26/B_VFS)
*2	TCM(8)	SS-B Solenoid Valve(ON/OFF)
5	TCM(29)	Solenoid Valve power 1
2	TCM(43)	Torque Converter Control Solenoid Valve(T/CON_VFS)
7	TCM(44)	Overdrive Clutch Control Solenoid Valve(OD/C_VFS)
6	TCM(45)	35H Clutch Control Solenoid Valve(35H/C_VFS)
18	TCM(52)	SS-A Solenoid Valve(ON/OFF)
10	TCM(73)	Solenoid Valve power 2

[Harness Connector]



Solenoid Valve Connector [CRD04]



TCM Connector [CRD-T]

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 oil temperature sensor connector.
3. Measure resistance between sensor signal terminal and sensor ground terminal.
4. Check that the resistance is within the specification.

Removal

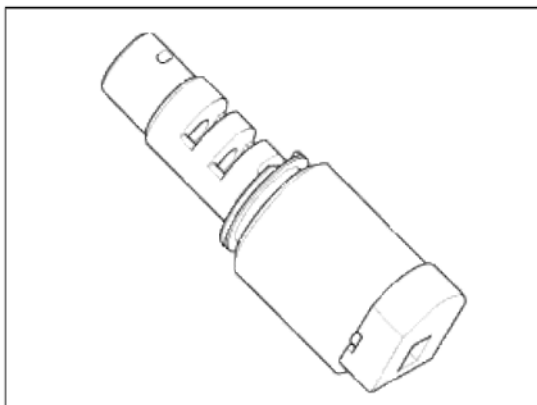
NOTE

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 > 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]

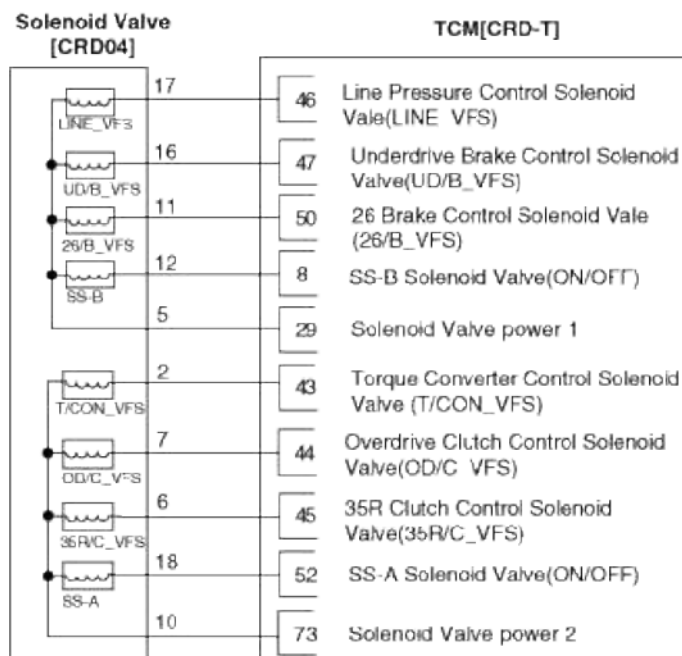
Control type : Normal low type

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

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

Circuit Diagram

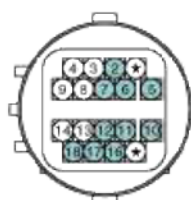
[Circuit Diagram]



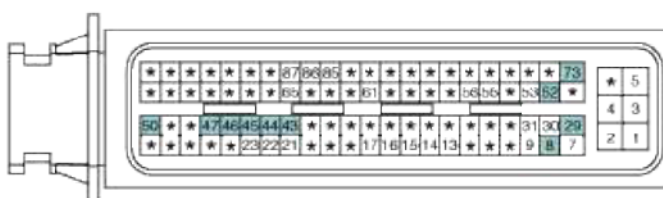
[Connection Information]

Terminal	Connected to	Function
*7	TCM(46)	Line Pressure Control Solenoid Valve (LINE_VFS)
*6	TCM(47)	Underdrive Brake Control Solenoid Valve(UD/B_VFS)
*1	TCM(50)	26 Brake Control Solenoid Valve(26/B_VFS)
*2	TCM(8)	SS-B Solenoid Valve(ON/OFF)
5	TCM(29)	Solenoid Valve power 1
2	TCM(43)	Torque Converter Control Solenoid Valve(T/CON_VFS)
7	TCM(44)	Overdrive Clutch Control Solenoid Valve(OD/C_VFS)
6	TCM(45)	35R Clutch Control Solenoid Valve(35R/C_VFS)
18	TCM(52)	SS-A Solenoid Valve(ON/OFF)
10	TCM(73)	Solenoid Valve power 2

[Harness Connector]



Solenoid Valve Connector [CRD04]



TCM Connector [CRD-T]

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 oil temperature sensor connector.
3. Measure resistance between sensor signal terminal and sensor ground terminal.
4. Check that the resistance is within the specification.

Removal

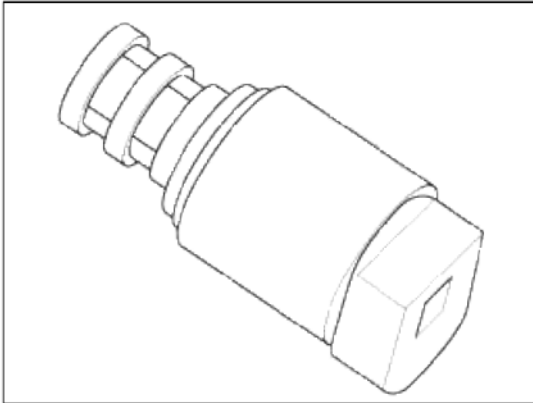
NOTE

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]

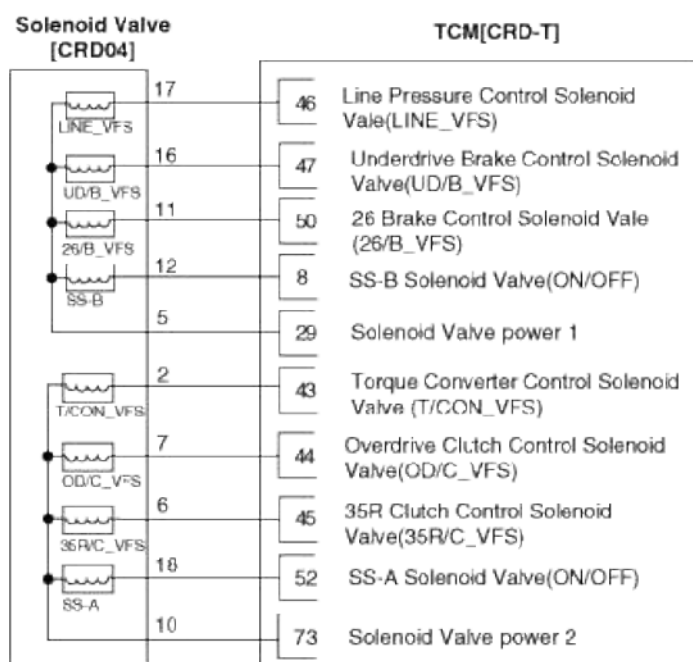
Control type : Normal low type

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

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

Circuit Diagram

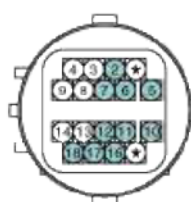
[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
*7	TCM(46)	Line Pressure Control Solenoid Valve (LINE_VFS)
*6	TCM(47)	Underdrive Brake Control Solenoid Valve(UD/B_VFS)
*1	TCM(50)	26 Brake Control Solenoid Valve(26/B_VFS)
*2	TCM(8)	SS-B Solenoid Valve(ON/OFF)
5	TCM(29)	Solenoid Valve power 1
2	TCM(43)	Torque Converter Control Solenoid Valve(T/CON_VFS)
7	TCM(44)	Overdrive Clutch Control Solenoid Valve(OD/C_VFS)
6	TCM(45)	35R Clutch Control Solenoid Valve(35R/C_VFS)
18	TCM(52)	SS-A Solenoid Valve(ON/OFF)
10	TCM(73)	Solenoid Valve power 2

[Harness Connector]



Solenoid Valve Connector [CRD04]



TCM Connector [CRD-T]

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

Inspection

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

Removal

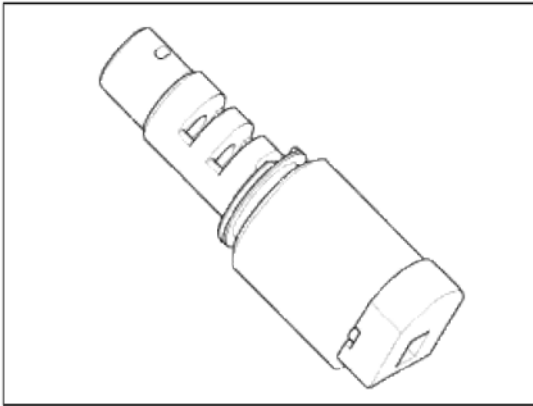
NOTE

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]

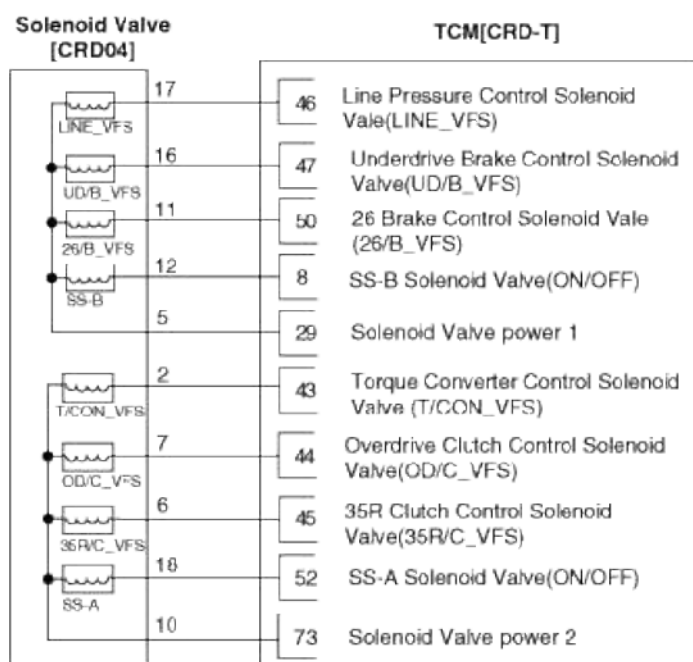
Control type : Normal low type

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

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

Circuit Diagram

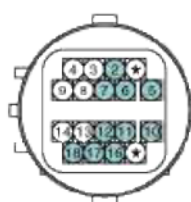
[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
*7	TCM(46)	Line Pressure Control Solenoid Valve (LINE_VFS)
*6	TCM(47)	Underdrive Brake Control Solenoid Valve(UD/B_VFS)
*1	TCM(50)	26 Brake Control Solenoid Valve(26/B_VFS)
*2	TCM(8)	SS-B Solenoid Valve(ON/OFF)
5	TCM(29)	Solenoid Valve power 1
2	TCM(43)	Torque Converter Control Solenoid Valve(T/CON_VFS)
7	TCM(44)	Overdrive Clutch Control Solenoid Valve(OD/C_VFS)
6	TCM(45)	35R Clutch Control Solenoid Valve(35R/C_VFS)
18	TCM(52)	SS-A Solenoid Valve(ON/OFF)
10	TCM(73)	Solenoid Valve power 2

[Harness Connector]



Solenoid Valve Connector [CRD04]



TCM Connector [CRD-T]

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 oil temperature sensor connector.
3. Measure resistance between sensor signal terminal and sensor ground terminal.
4. Check that the resistance is within the specification.

Removal

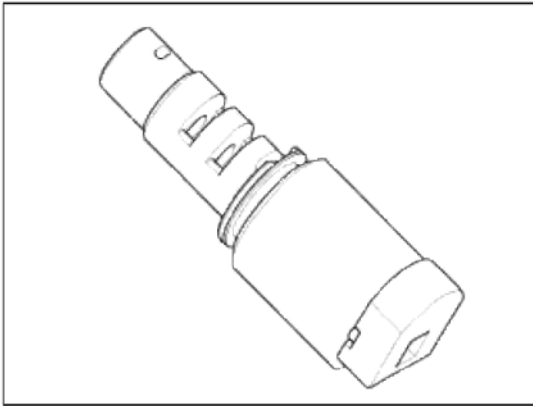
NOTE

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]

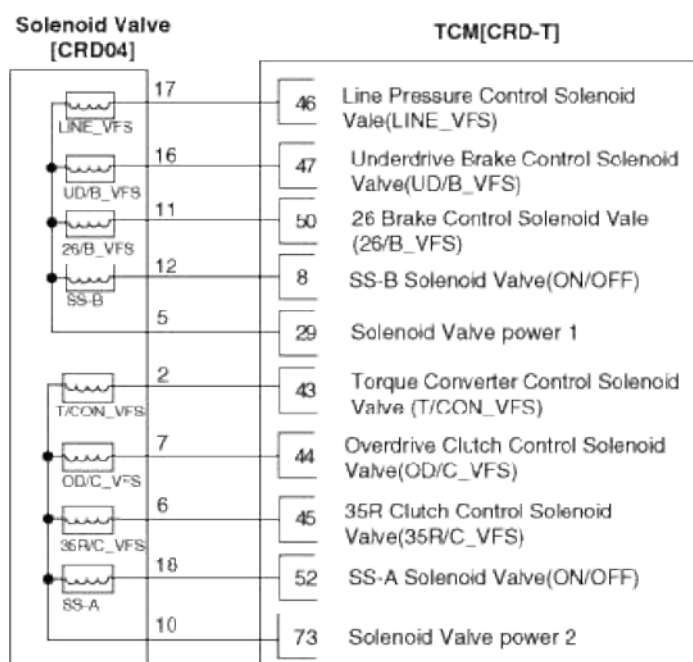
Control type : Normal low type

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

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

Circuit Diagram

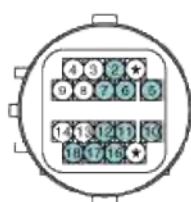
[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
*7	TCM(46)	Line Pressure Control Solenoid Valve (LINE_VFS)
*6	TCM(47)	Underdrive Brake Control Solenoid Valve(UD/B_VFS)
*1	TCM(50)	26 Brake Control Solenoid Valve(26/B_VFS)
*2	TCM(8)	SS-B Solenoid Valve(ON/OFF)
5	TCM(29)	Solenoid Valve power 1
2	TCM(43)	Torque Converter Control Solenoid Valve(T/CON_VFS)
7	TCM(44)	Overdrive Clutch Control Solenoid Valve(OD/C_VFS)
6	TCM(45)	35R Clutch Control Solenoid Valve(35R/C_VFS)
18	TCM(52)	SS-A Solenoid Valve(ON/OFF)
10	TCM(73)	Solenoid Valve power 2

[Harness Connector]



Solenoid Valve Connector [CRD04]



TCM Connector [CRD-T]

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 oil temperature sensor connector.
3. Measure resistance between sensor signal terminal and sensor ground terminal.
4. Check that the resistance is within the specification.

Removal

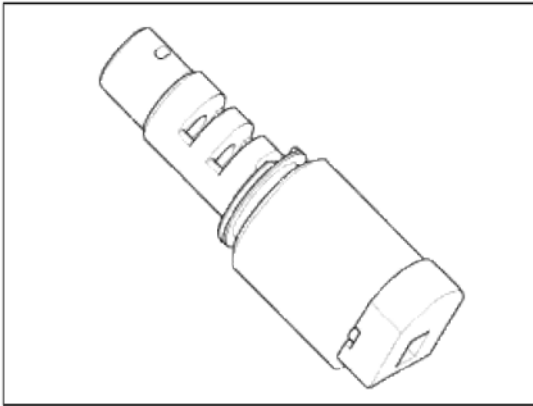
NOTE

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]

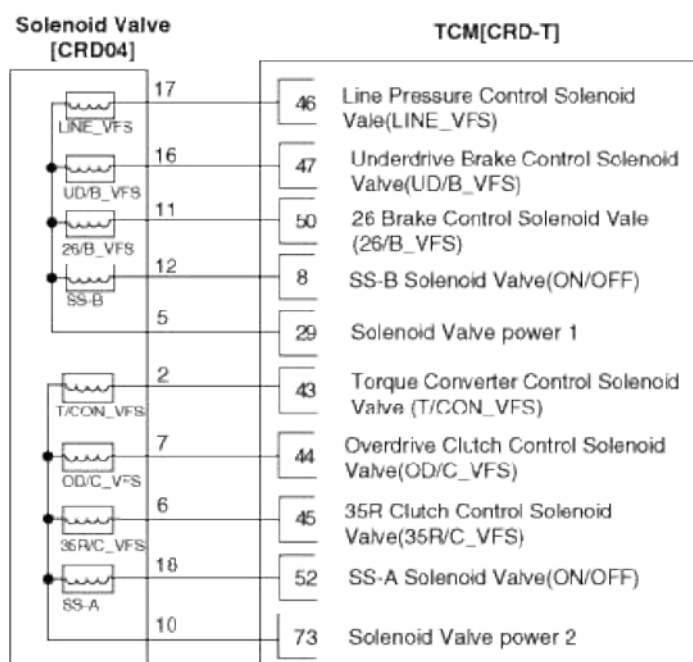
Control type : Normal low type

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

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

Circuit Diagram

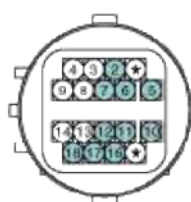
[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
*7	TCM(46)	Line Pressure Control Solenoid Valve (LINE_VFS)
*6	TCM(47)	Underdrive Brake Control Solenoid Valve(UD/B_VFS)
*1	TCM(50)	26 Brake Control Solenoid Valve(26/B_VFS)
*2	TCM(8)	SS-B Solenoid Valve(ON/OFF)
5	TCM(29)	Solenoid Valve power 1
2	TCM(43)	Torque Converter Control Solenoid Valve(T/CON_VFS)
7	TCM(44)	Overdrive Clutch Control Solenoid Valve(OD/C_VFS)
6	TCM(45)	35R Clutch Control Solenoid Valve(35R/C_VFS)
18	TCM(52)	SS-A Solenoid Valve(ON/OFF)
10	TCM(73)	Solenoid Valve power 2

[Harness Connector]



Solenoid Valve Connector [CRD04]



TCM Connector [CRD-T]

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 oil temperature sensor connector.
3. Measure resistance between sensor signal terminal and sensor ground terminal.
4. Check that the resistance is within the specification.

Removal

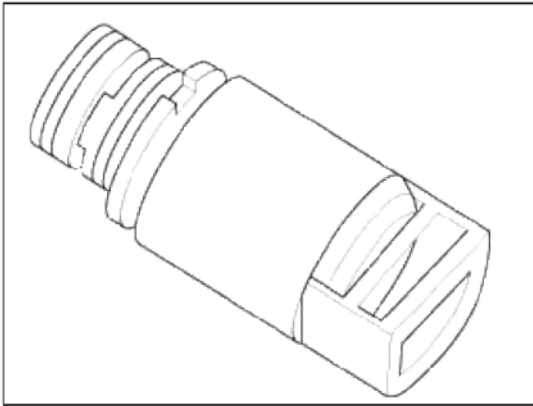
NOTE

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)

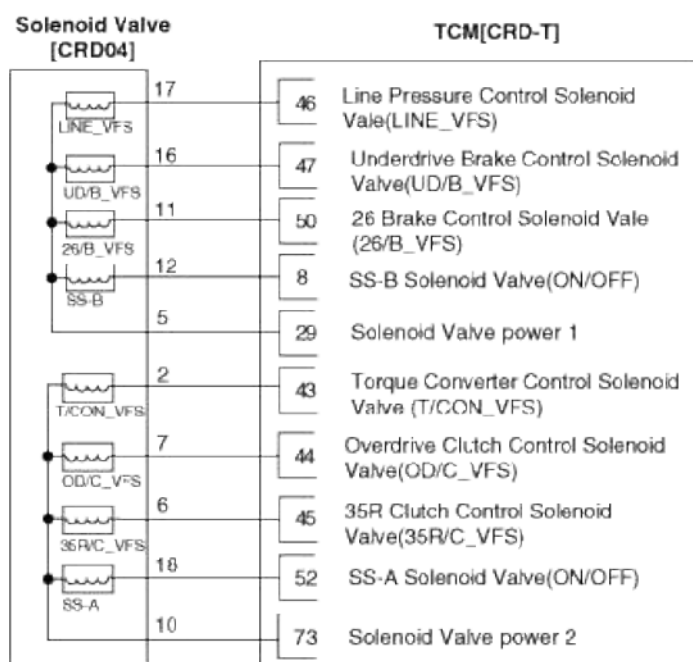
Control type : Normal low type

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

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

Circuit Diagram

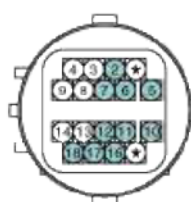
[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
*7	TCM(46)	Line Pressure Control Solenoid Valve (LINE_VFS)
*6	TCM(47)	Underdrive Brake Control Solenoid Valve(UD/B_VFS)
*1	TCM(50)	26 Brake Control Solenoid Valve(26/B_VFS)
*2	TCM(8)	SS-B Solenoid Valve(ON/OFF)
5	TCM(29)	Solenoid Valve power 1
2	TCM(43)	Torque Converter Control Solenoid Valve(T/CON_VFS)
7	TCM(44)	Overdrive Clutch Control Solenoid Valve(OD/C_VFS)
6	TCM(45)	35R Clutch Control Solenoid Valve(35R/C_VFS)
18	TCM(52)	SS-A Solenoid Valve(ON/OFF)
10	TCM(73)	Solenoid Valve power 2

[Harness Connector]



Solenoid Valve Connector [CRD04]



TCM Connector [CRD-T]

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

> Repair procedures

Inspection

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

Removal

NOTE

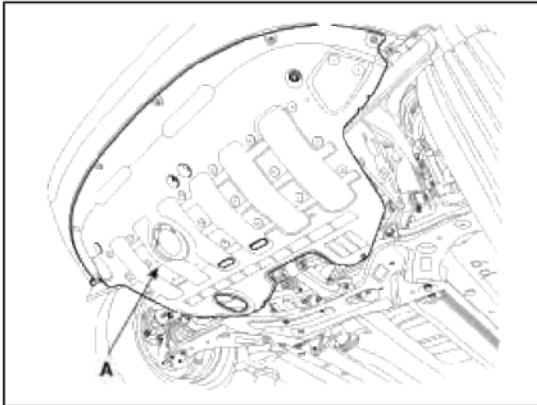
Replacing an on/off solenoid valve (SS-A, SS-B) does not require additional hydraulic pressure adjustment; however, the hydraulic pressure will need to be adjusted after replacing the VFS solenoid valve. If replacing the VFS solenoid valve; also replace the valve body assembly. (Refer to "Valve Body"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

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

2. Remove the under cover (A).

Tightening torque:

19.6 ~ 24.5 N.m (2.0 ~ 2.5 kgf.m, 14.5 ~ 18.1 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 body cover (A) and eyebolt (B).

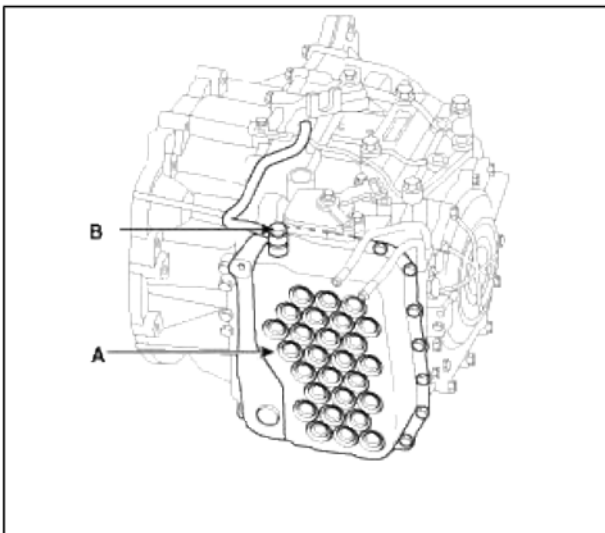
Tightening torque:

(A) 13.8 ~ 14.7 N.m (1.3 ~ 1.5 kgf.m, 9.4 ~ 10.8 lb-ft)

(B) 34.3 ~ 44.1 N.m (3.5 ~ 4.5 kgf.m, 25.3 ~ 32.6 lb-ft)

CAUTION

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



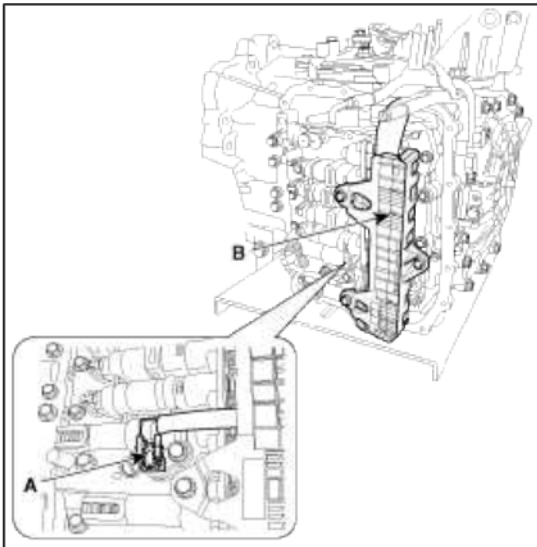
NOTE

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

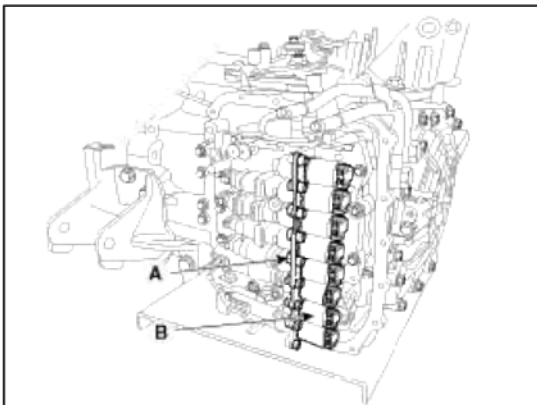
5. Remove the bolt (3ea) after disconnecting the solenoid valve connector (B) and the oil temperature sensor connector (A).

Tightening torque:

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



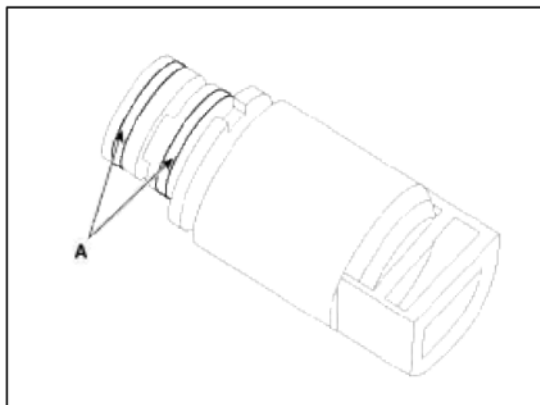
6. Remove the solenoid valve (B) after removing the solenoid support (A).

**Installation**

1. 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.



- Continue to apply liquid gasket at application points at the valve body cover with $\varnothing 2.5\text{mm}$ (0.0984in.) thickness.

Liquid gasket Part name :

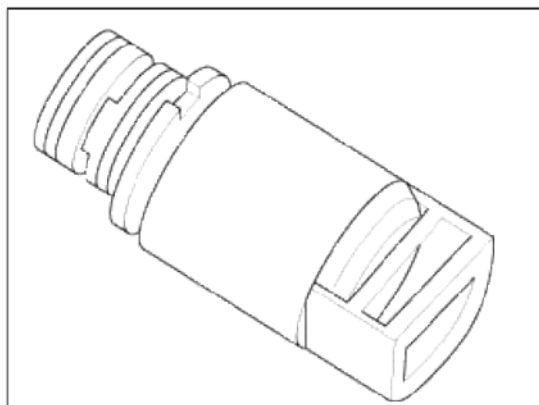
Threebond 1281B or LOCTITE FMD-546

- 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)

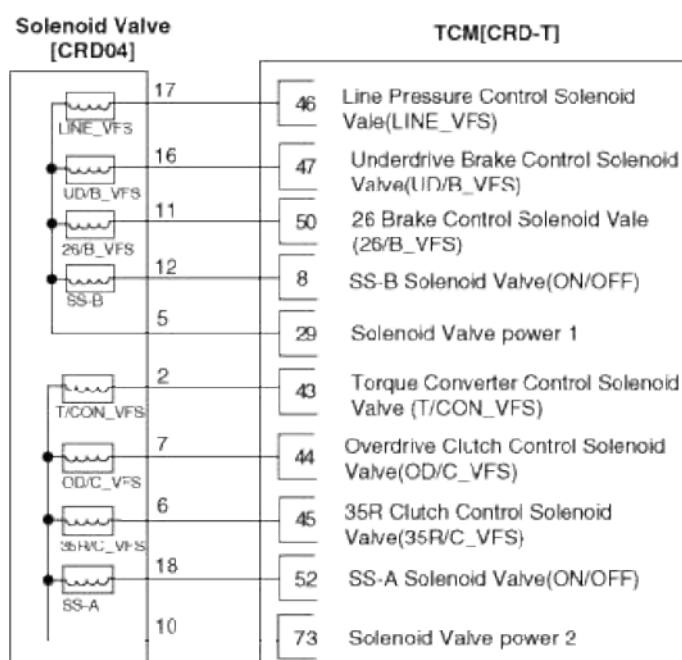
Control type : Normal low type

Control pressure kpa(kgf/cm ² , 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

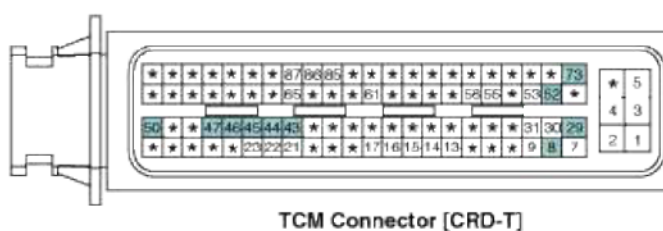
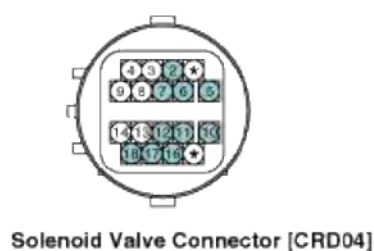
[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
*7	TCM(46)	Line Pressure Control Solenoid Valve (LINE_VFS)
*6	TCM(47)	Underdrive Brake Control Solenoid Valve (UD/B_VFS)
*1	TCM(50)	26 Brake Control Solenoid Valve (26/B_VFS)
*2	TCM(8)	SS-B Solenoid Valve (ON/OFF)
5	TCM(29)	Solenoid Valve power 1
2	TCM(43)	Torque Converter Control Solenoid Valve (T/CON_VFS)
7	TCM(44)	Overdrive Clutch Control Solenoid Valve (OD/C_VFS)
6	TCM(45)	35R Clutch Control Solenoid Valve (35R/C_VFS)
18	TCM(52)	SS-A Solenoid Valve (ON/OFF)
10	TCM(73)	Solenoid Valve power 2

[Harness Connector]



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

Inspection

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

Removal

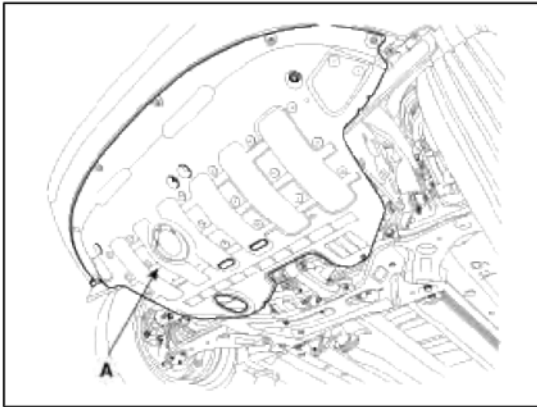
NOTE

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)

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

Tightening torque:

19.6 ~ 24.5 N.m (2.0 ~ 2.5 kgf.m, 14.5 ~ 18.1 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 body cover (A) and eyebolt (B).

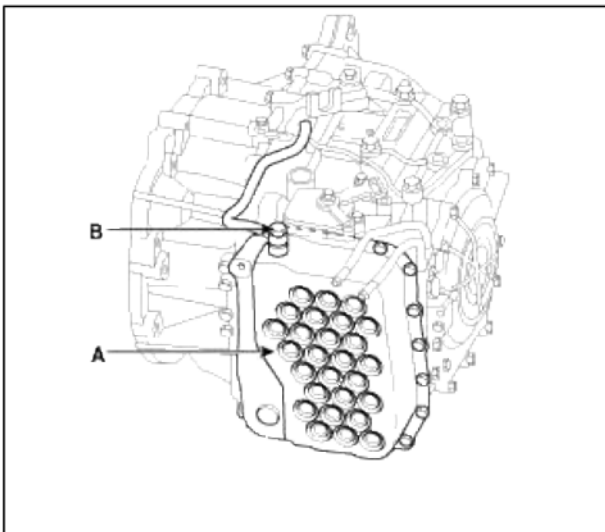
Tightening torque:

(A) 13.8 ~ 14.7 N.m (1.3 ~ 1.5 kgf.m, 9.4 ~ 10.8 lb-ft)

(B) 34.3 ~ 44.1 N.m (3.5 ~ 4.5 kgf.m, 25.3 ~ 32.6 lb-ft)

CAUTION

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

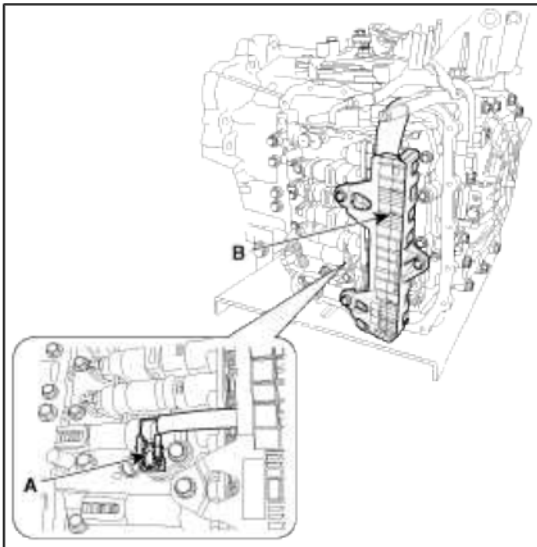
**NOTE**

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

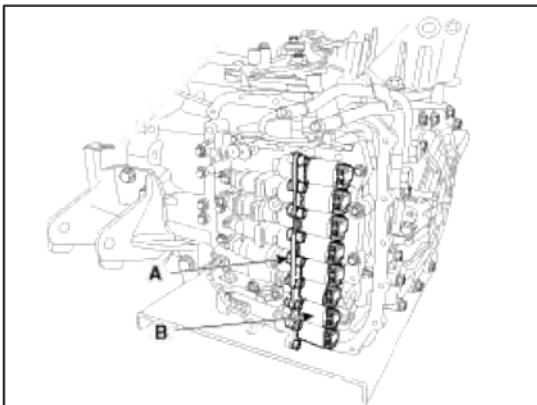
5. Remove the bolt (3ea) after disconnecting the solenoid valve connector (B) and the oil temperature sensor connector (A).

Tightening torque:

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



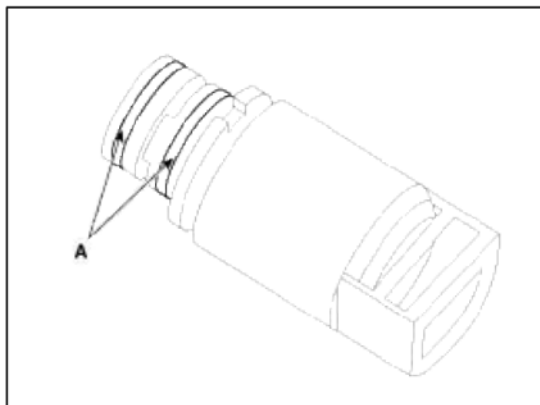
6. Remove the solenoid valve (B) after removing the solenoid support (A).

**Installation**

1. 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.



- Continue to apply liquid gasket at application points at the valve body cover with Ø2.5mm (0.0984in.) thickness.

Liquid gasket Part name :

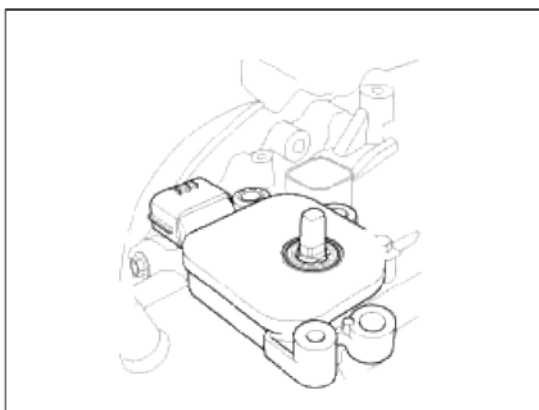
Threebond 1281B or LOCTITE FMD-546

- 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	Pin to Pin

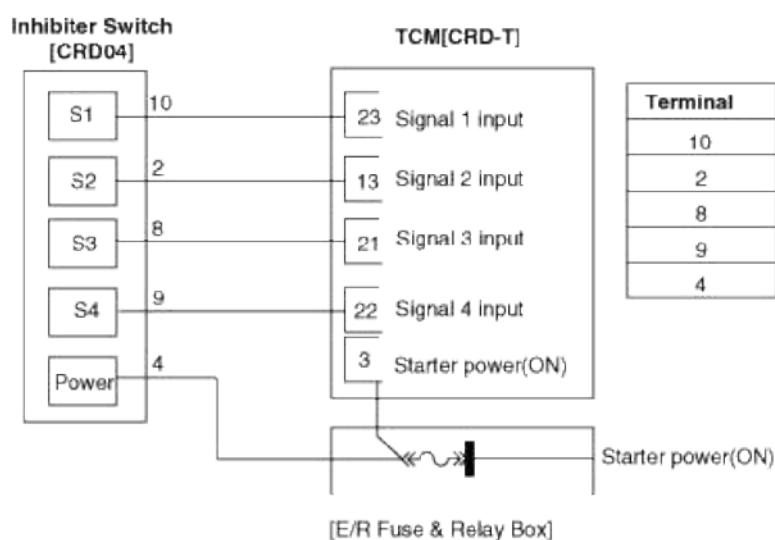
Signal Code Table

	P	P-R	R	R-N	N	N-D	D
S1	1	0	0	0	1	1	1
S2	0	0	0	1	1	0	0
S3	1	1	0	0	0	0	0
S4	1	1	1	1	1	1	0

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

Circuit Diagram

[Circuit Diagram]



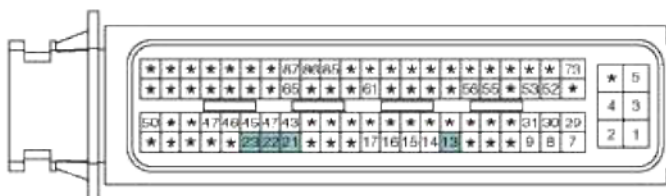
[Connection Information]

Terminal	Connected to	Function
10	TCM(23)	Signal 1 input
2	TCM(13)	Signal 2 input
8	TCM(21)	Signal 3 input
9	TCM(22)	Signal 4 input
4	E/R Fuse & Relay Box	Starter power(ON)

[Harness Connector]



Solenoid Valve Connector [CRD04]



TCM Connector [CRD-T]

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

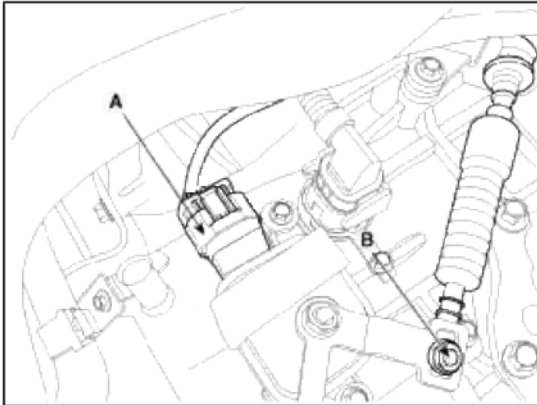
Removal

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).

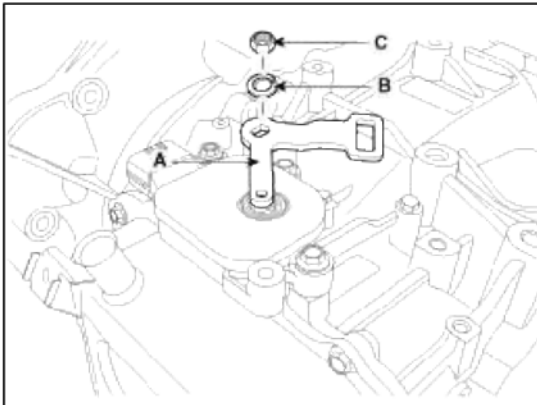
Tightening torque:

7.8 ~ 11.8 N.m (0.8 ~ 1.2 Kgf.m, 5.7 ~ 8.6 lb-ft)

5. Disconnect the inhibitor switch connector (A).



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

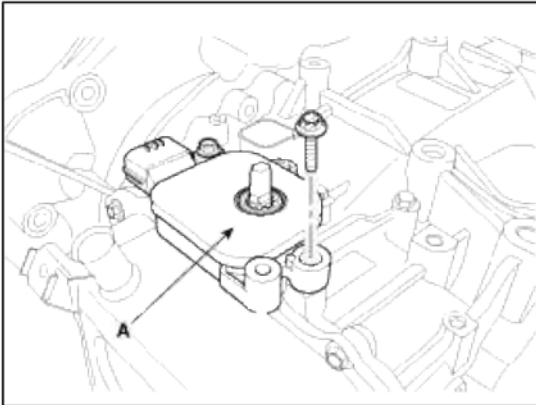
**CAUTION**

When installing, affix the manual control lever and the inhibitor switch with Ø5mm (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**

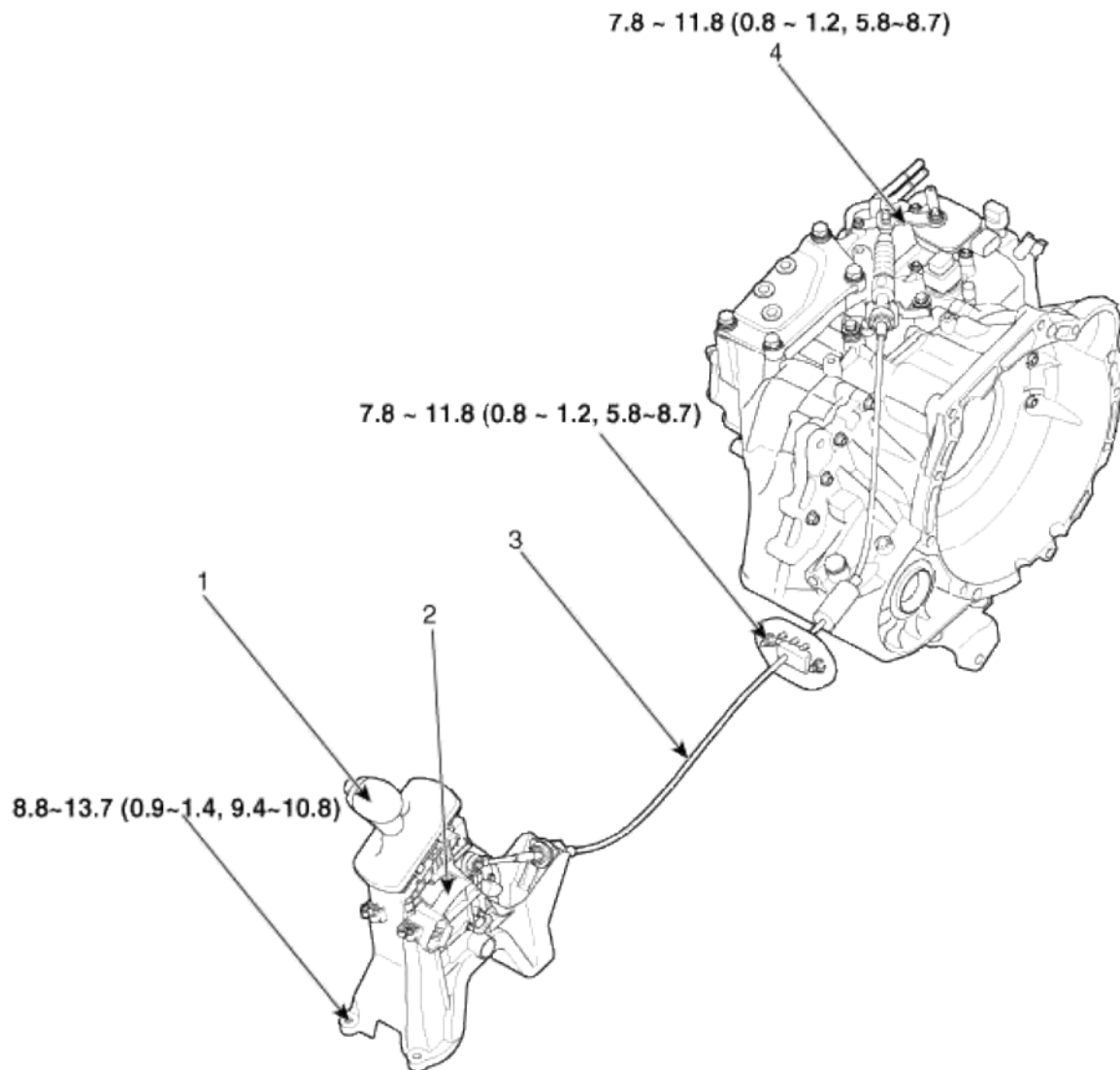
When installing, tighten the inhibitor assembly mounting bolt lightly, so that necessary adjustments can be made. Tighten to specifications.

Installation

1. Installation is the reverse of removal.

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

Components



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

1. Shift lever knob & boots assembly

2. Shift lever assembly

3. Control cable assembly

4. Manual control lever (T/M side)

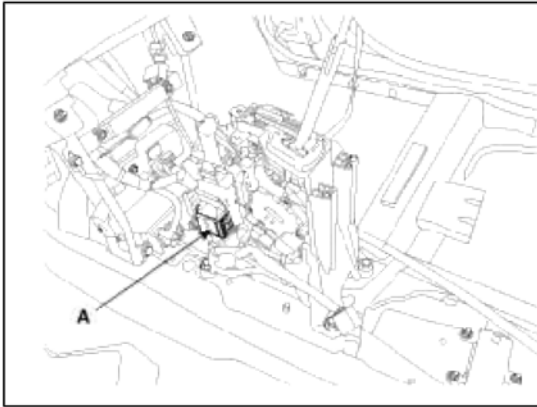
Automatic Transaxle System > Automatic Transaxle Control System > Shift Lever > Repair procedures

Removal

Shift Lever Assembly Replacement

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

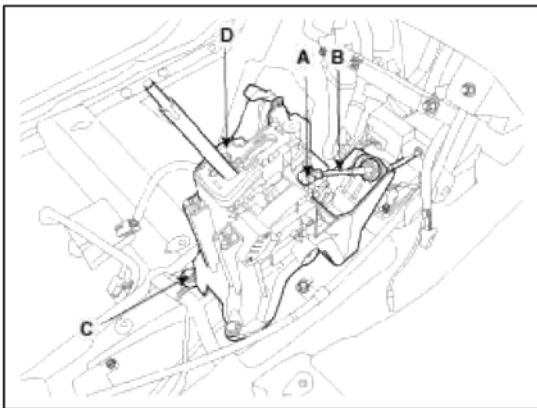
2. Disconnect sports mode connector (A).



3. Take off the clip (A) and then remove the shift cable (B).
4. Remove the shift lever assembly (D) by removing the bolts (C-4ea).

Tightening torque:

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



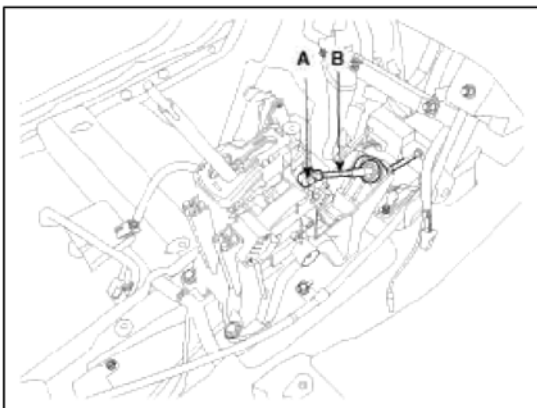
5. Installation is the reverse of removal.

NOTE

Make sure vehicle does not roll before setting room side shift lever and T/M side manual control lever to "N" position.

Control Cable Replacement

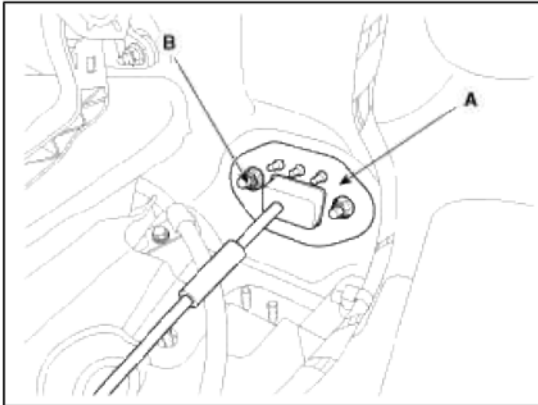
1. Remove the center console assembly. (Refer to "Interior(console)" in BD group.)
2. Take off the clip (A) and then remove the control cable (B).



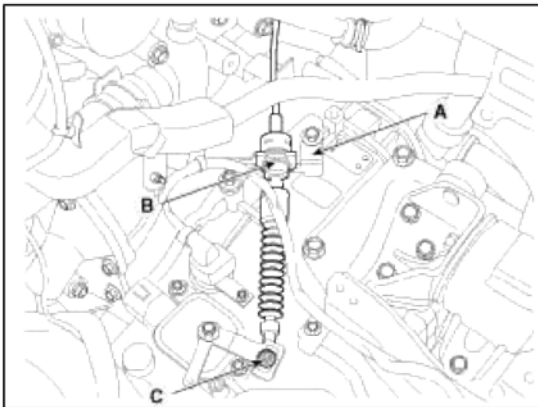
3. Remove the control cable assembly in the vehicle after removing the nuts (B) and the retainer (A).

Tightening torque:

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



4. Remove the nut (C).
5. Remove the cable (B) from the bracket (A) at transaxle assembly side (Refer to "Automatic Transaxle" in this group).



6. Remove the control cable inside of cab.

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.

Installation

1. Installation is the reverse of removal.

NOTE

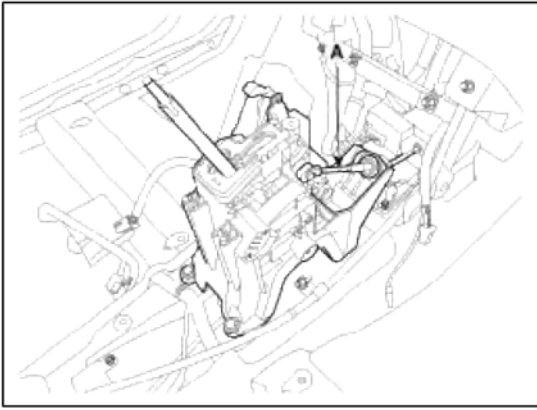
Make sure vehicle does not roll before setting room side shift lever and T/M side manual control lever to "N" position.

Adjustment

Adjusting method for T/M control cable

1. Make sure vehicle does not roll before setting room side shift lever and T/M side manual control lever to "N" position.

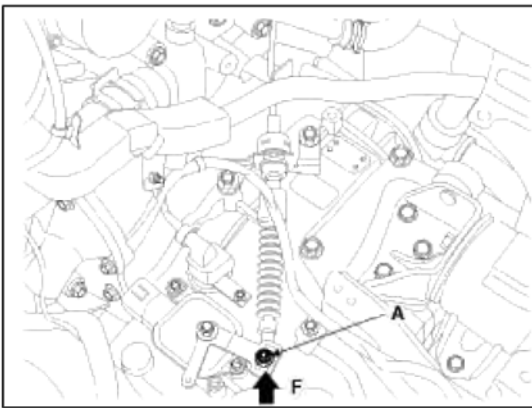
2. Connect room side shift lever and control cable (A).



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

Tightening torque:

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



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

