General Information

Specifications

Item		Specifications	
Transmission type		A6MF1	
Engine model		Gasoline 2.0	Gasoline 2.4
Torque converter type		3-element, 1-stage, 2-phase type	
Torque converter size		Ø236 mm (9.2913 in.)	
Oil pump system		Parachoid	
Friction elements		Clutch: 2EA	
		Brake: 3EA	
		OWC : 1EA	
Planetary gear		3EA	
Gear ration	1st	4.162	4.212
	2nd	2.575	2.637
	3rd	1.772	1.800
	4th	1.369	1.386
	5th	1.000	1.000
	6th	0.778	0.772
	Reverse	3.500	3.385
Final gear ratio		3.648	3.195
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.		(0.25~0.7)0.01~0.027
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	0.05

Inhibitor Switch

▷ Type: Combination of output signals from 4 terminals

▷ Specifications

Power supply (V)	12
Output type	Pin to Pin

Solenoid Valves

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

▷ Control type : Normal low type

Control Pressure kpa(kgf/㎠, 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/㎠, 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/㎠, 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/㎠, 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	△			△	●	
2				●	●	●
3		●		●		
4					●	
5		●	●			
6			●		●	●
L	●				●	
R	●	●	●			

● : Connected status

△ : 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	8.8~13.7	0.9~1.4	9.4~10.8
Inhibitor switch mounting bolt	9.8~11.8	1.0~1.2	7.2~8.7
Valve body cover mounting bolt	13.8~14.7	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

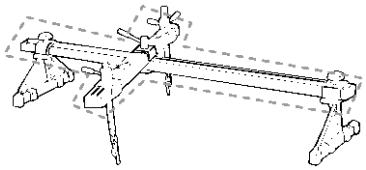
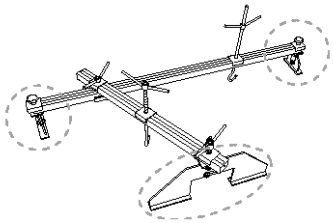
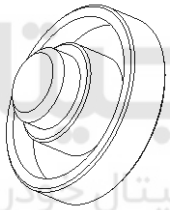
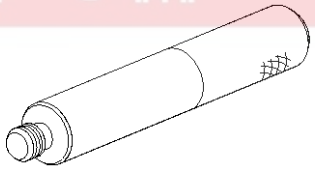
Lubricants

Item	Specified lubricant	Quantity
Transaxle fluid	SK ATF SP-IV, MICHANG ATF SP-IV, NOCA ATF SP-IV, Kia Genuine ATF SP-IV	7.1L (1.88 U.S gal., 7.50 U.S.qt., 6.24 Imp.qt.)

Sealant

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

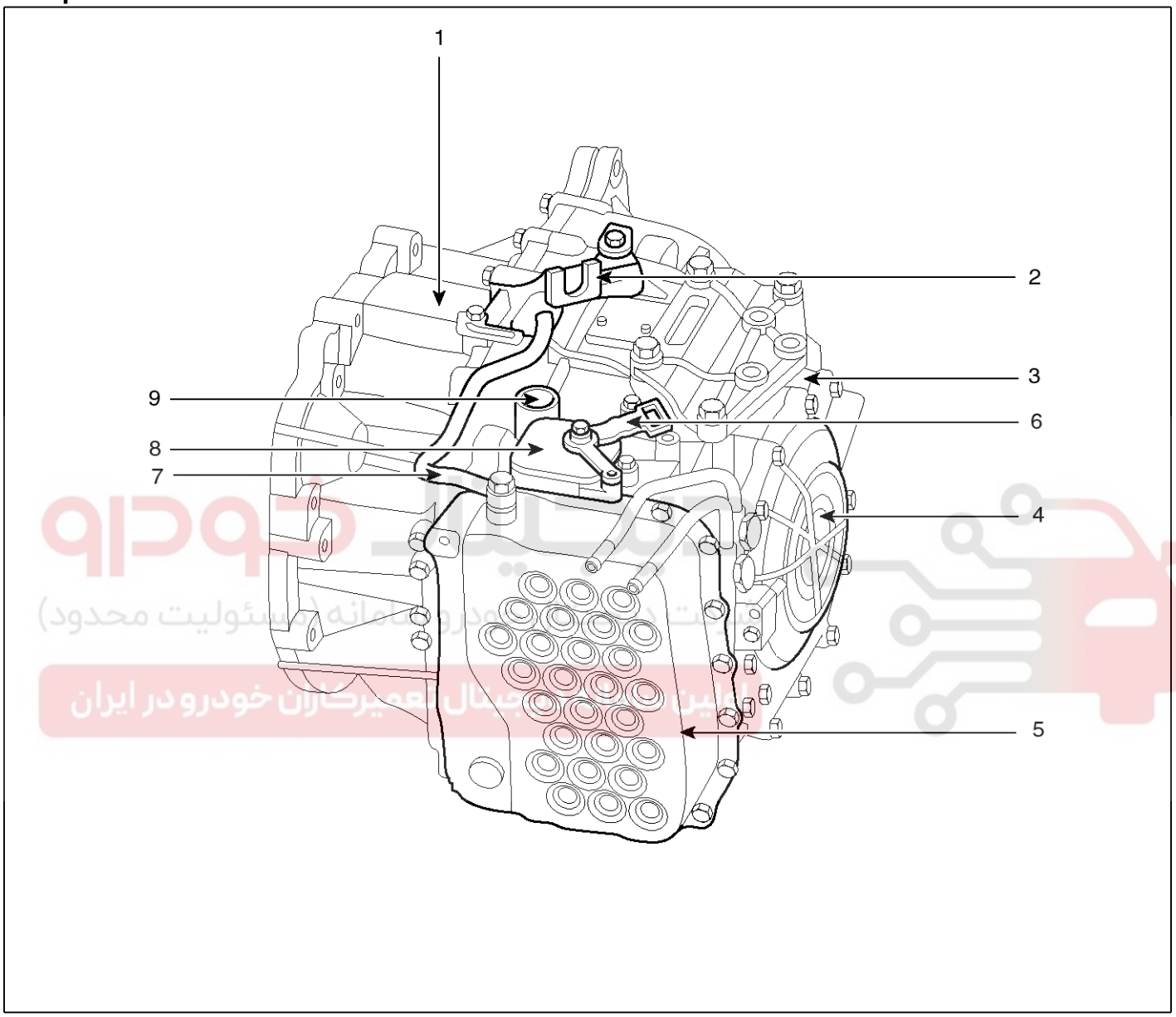
Special Service Tools

Tools (Number and name)	Illustration	Use
09200-38001 Engine support fixture (Beam)	 KKBF030A	Removal and installation of the transaxle. Except lower supporter, use beam only with n-ew engine support fixture supporter(SST No.:0 9200-2S000)
09200-2S000 Engine support fixture (Supporter)	 SXMAT9080D	Removal and installation of the transaxle. Use this supporter with the upper beam of the engine support fixture(SST No.:09200-38001)
09453-3L241 Oil seal installer	 S97AT9116D	Installation of transaxle case oil seal. [Using with handle (SST No.:09231-H1100)]
09231-H1100 Bar	 SLD766035D	Installation of transaxle case oil seal. [Using with oil seal installer (SST No.:09453-3 L241)]

Automatic Transaxle System

Automatic Transaxle

Components Location

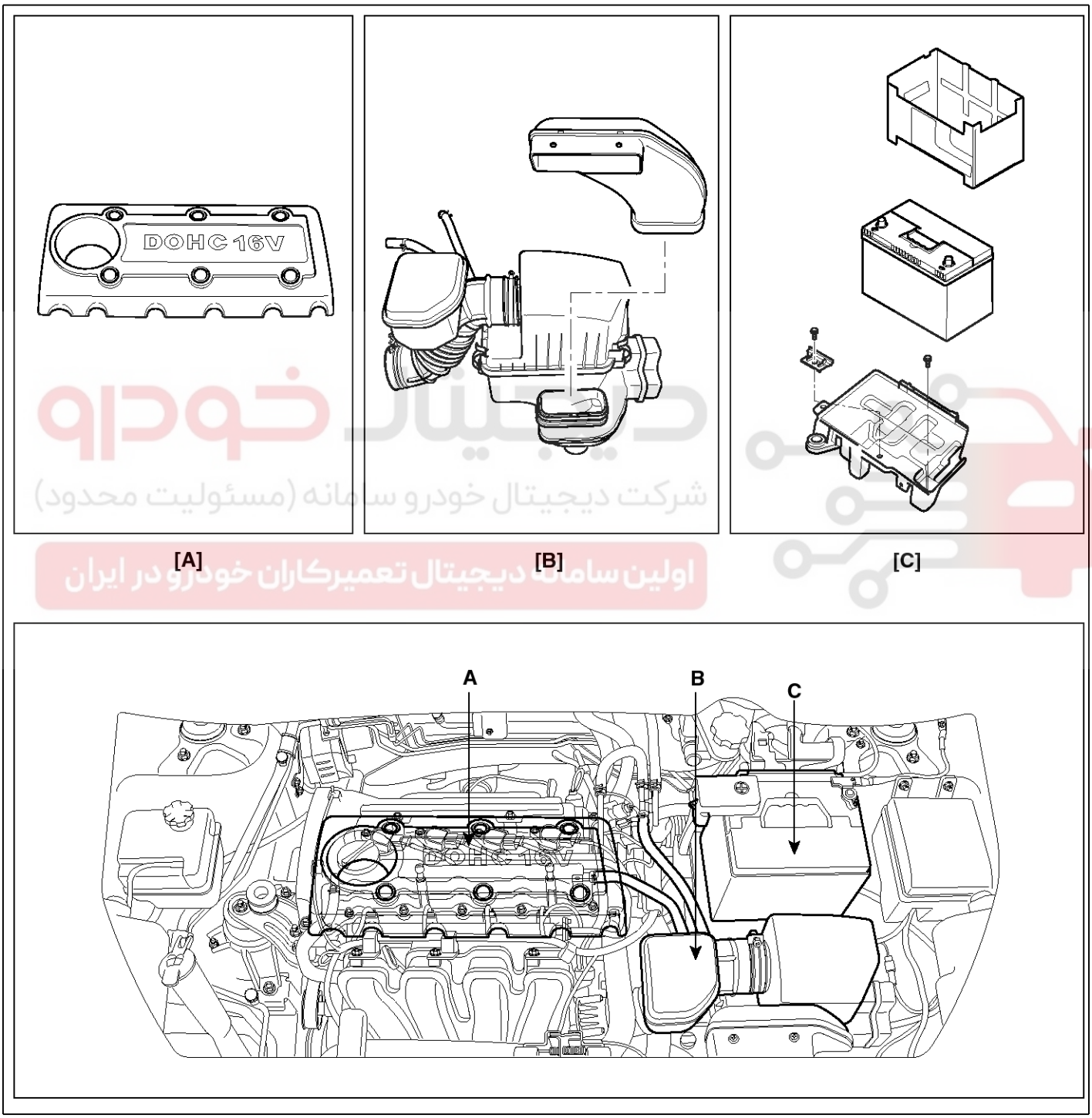


SYFAT0008D

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

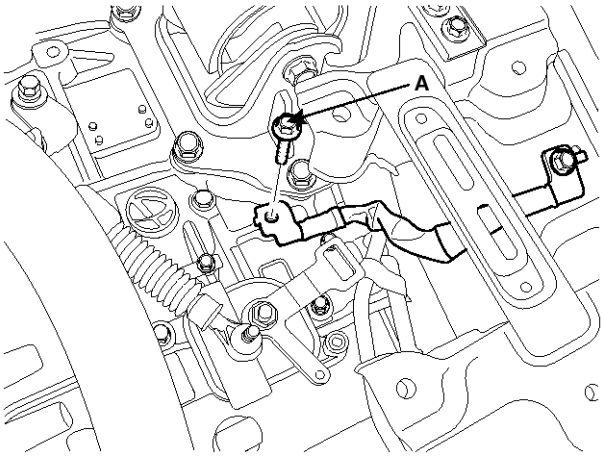
Removal

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



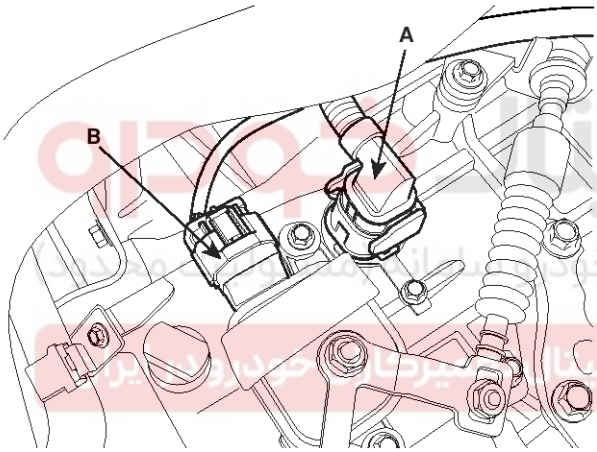
SSLAA0001D

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



SXMAT9003D

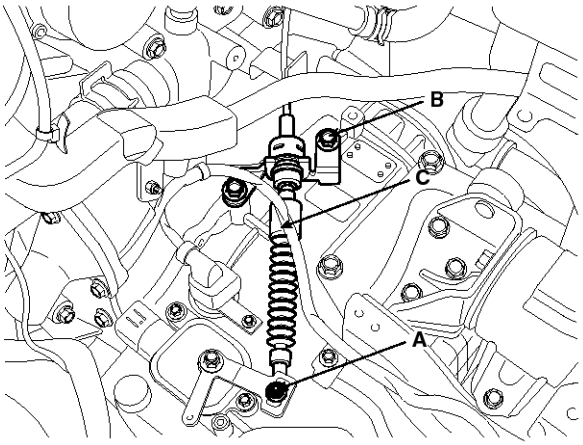
3. Dissconnect the solenoid valve connector (A) and inhibitor switch connector (B).



SVGAB0004D

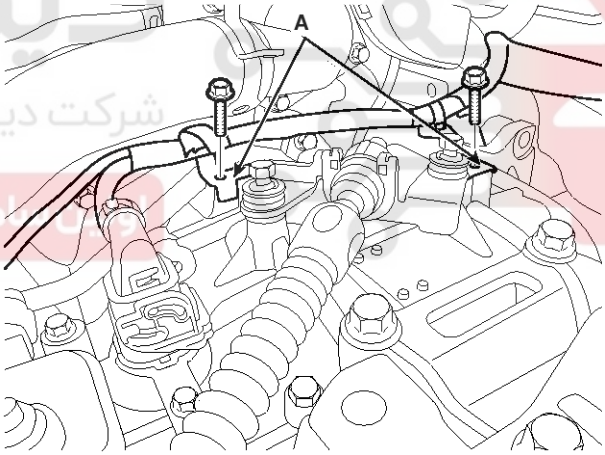
4. Remove the control cable (C) after removing the nut (A) and the bolt (B).

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



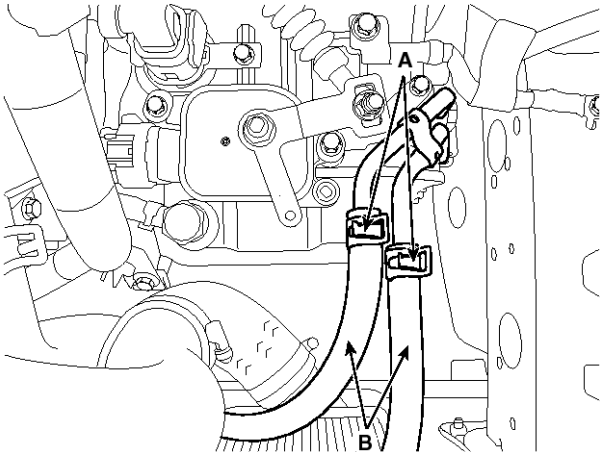
SLMAT0005D

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



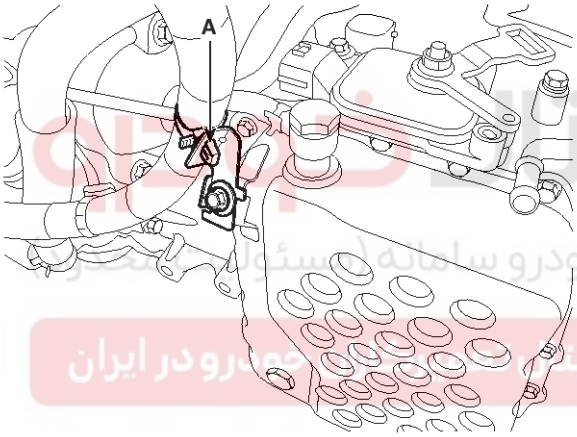
SSLAT0046D

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



SSLAT0042D

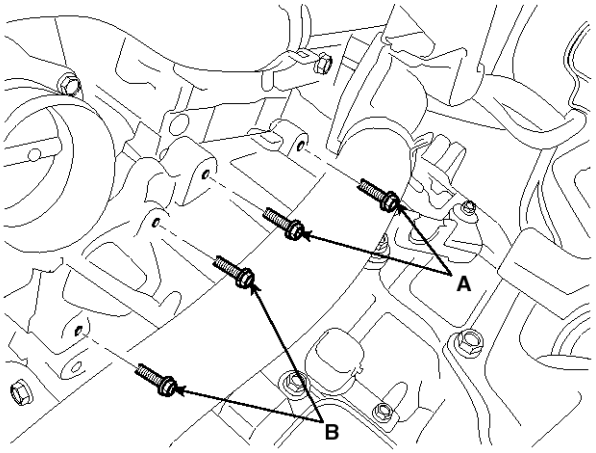
7. Remove the wiring bracket installation bolt (A).



SSLAT0041D

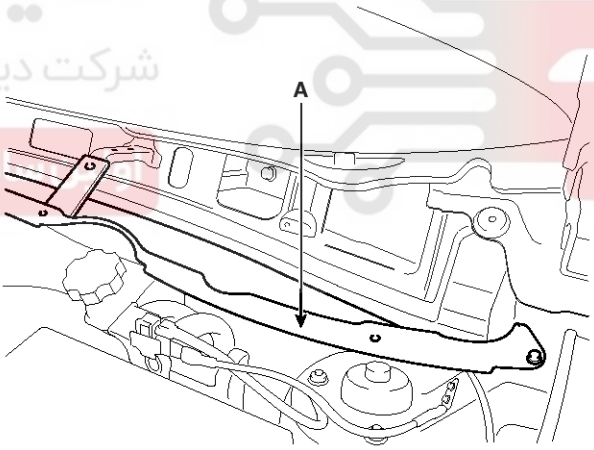
8. Remove the automatic transaxle upper mounting bolt (A-2ea) and the starter motor mounting bolt (B-2ea).

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



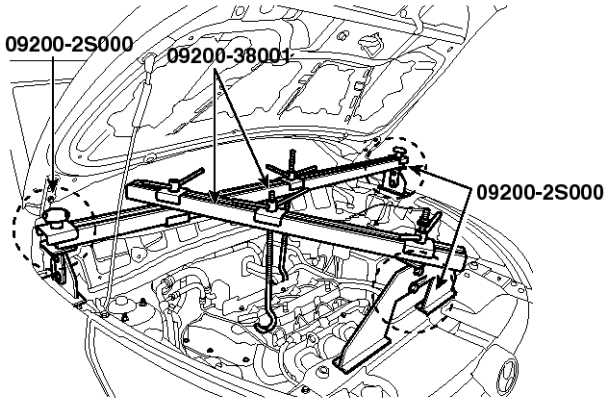
SYFAT0001D

9. Remove the cowl top cover or wiper motor. (Refer to "Windshield Wiper/Washer" in BE group.)
10. Remove the cowl complete assembly panel (A).



SLMAT0013D

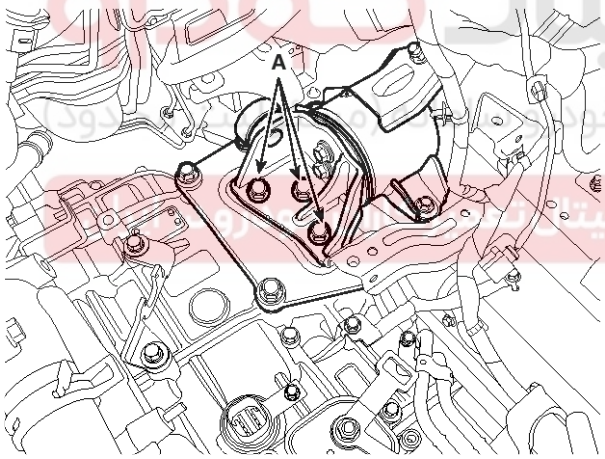
11. Using the engine support fixture (Support SST No.: 09200-2S000, Beam SST No.: 09200-38001), hold the engine and transaxle assembly safely.



SXMAT9082D

12. 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)

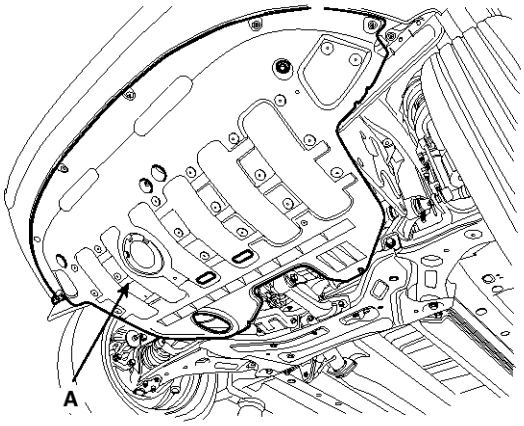


SLMAT0021D

13. Lift the vehicle with a jack.

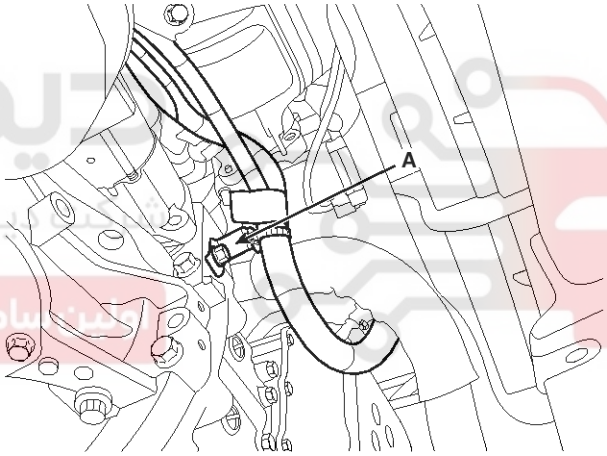
14. Remove the under cover (A).

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



SSLAT0021D

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



SSLAT0043D

16. Remove the following items;

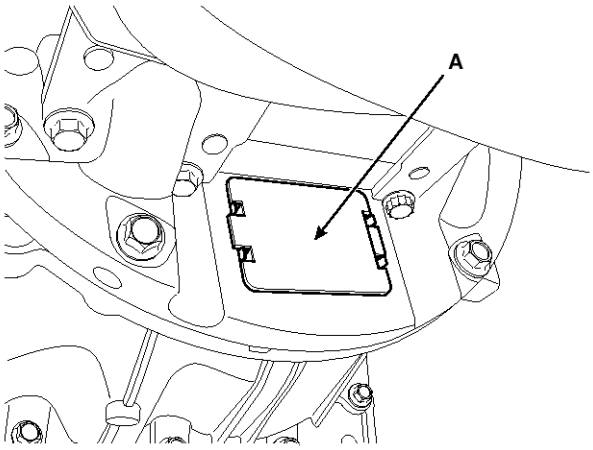
2WD

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

4WD

- Sub frame assembly. (Refer to "Front suspension system" in SS group.)
- Drive shaft assembly. (Refer to "Drive shaft assembly " in DS group.)
- Transfer assembly. (Refer to "Transfer assembly" in WD group)

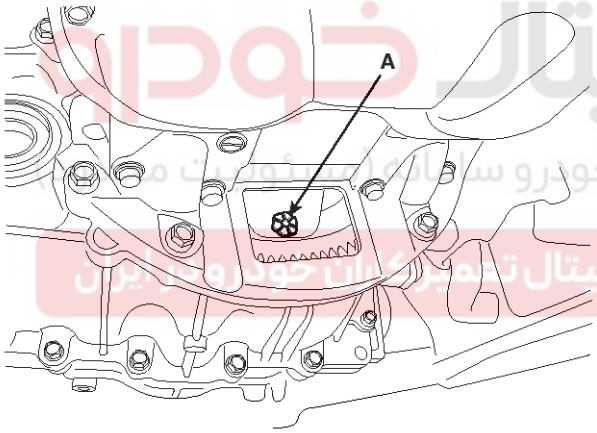
17. Remove the dust cover(A).



SYFAT0025D

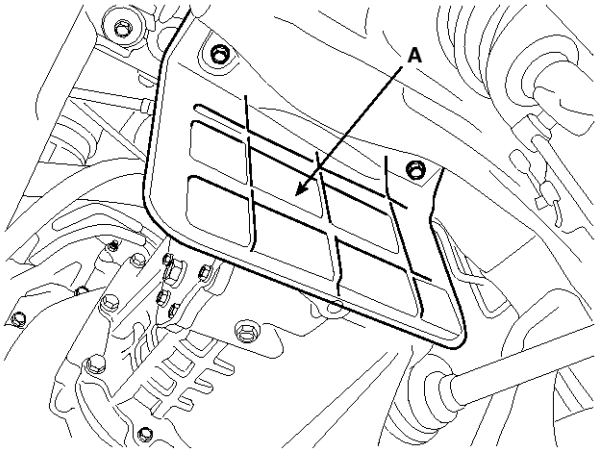
18. Remove the torque converter mounting bolt (A-4ea) with rotating the crankshaft.

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



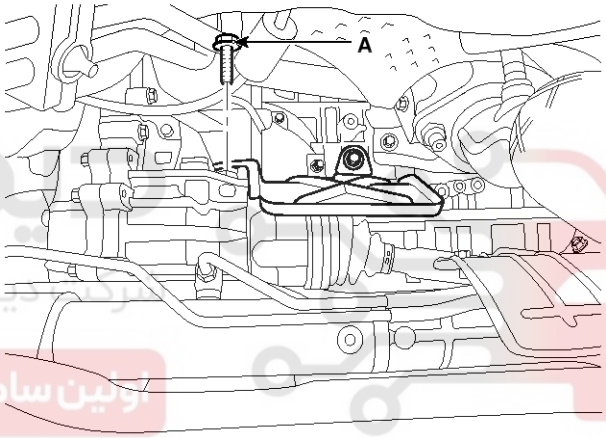
SYFAT0004D

19. Remove the side cover (A).



SSLAT0026D

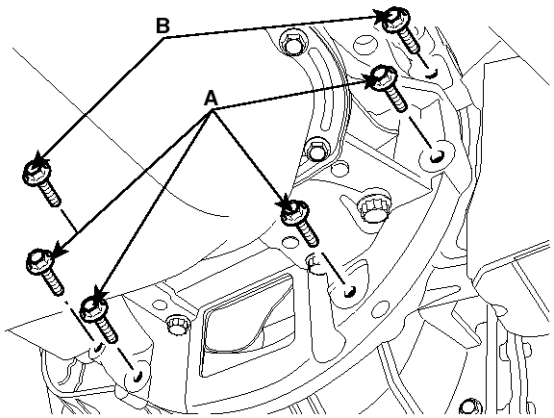
20. Remove the drive shaft cover mounting bolt (A).



SSLAT0044D

21. 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)



SYFAT0024D

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).

NOTICE
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 "automatic transaxle system" in this group.)*
- *After servicing the automatic transaxle or TCM, clear the diagnostic trouble codes (DTC) using the GDS tool.*

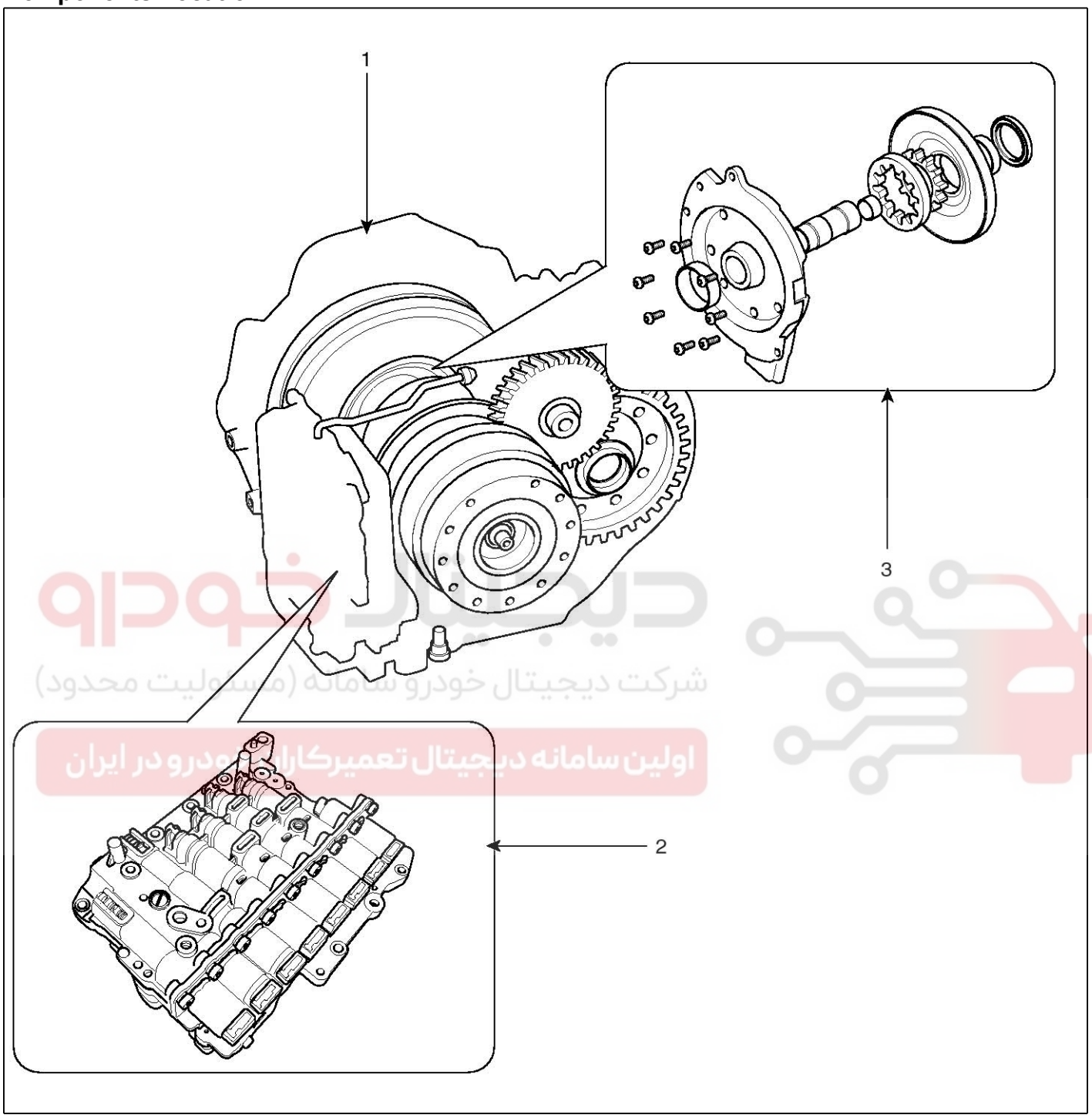
  Diagnostic trouble codes (DTC) cannot be cleared by disconnecting the battery.
- *When replacing the automatic transaxle and TCM, reset the diagnostic trouble code by using GDS.*
- *When deleting diagnostic trouble code, use the GDS as possible.*
- *When replacing the automatic transaxle, reset the automatic 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)*

Hydraulic System

Description

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

Components Location



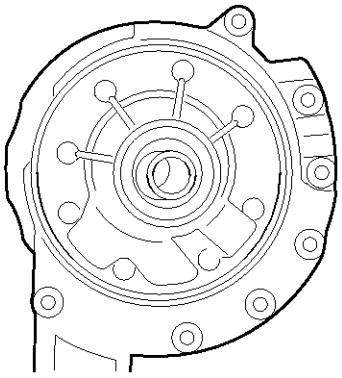
SSLAT0001D

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

Oil Pump

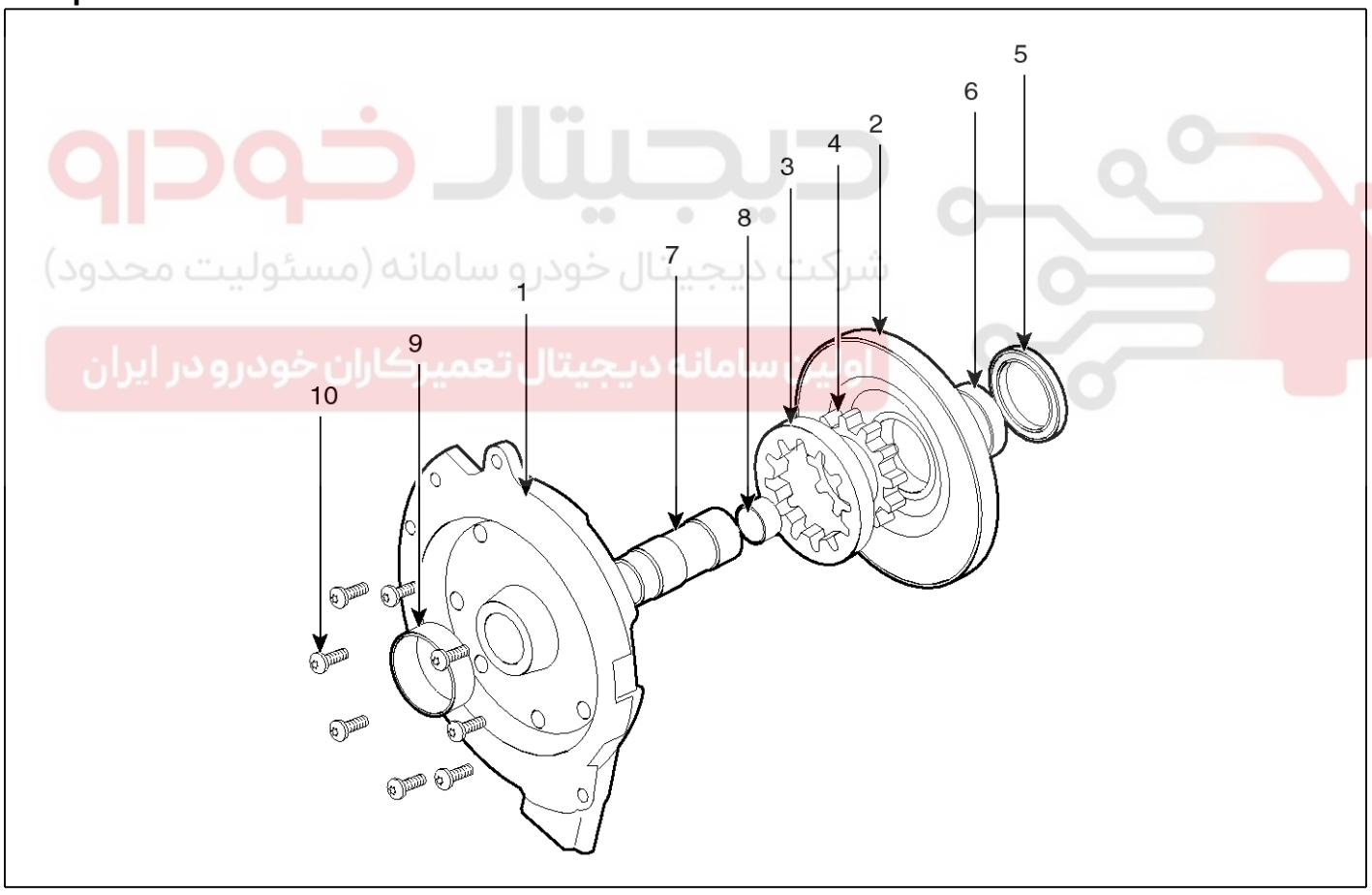
Description

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.



SSLAT0101D

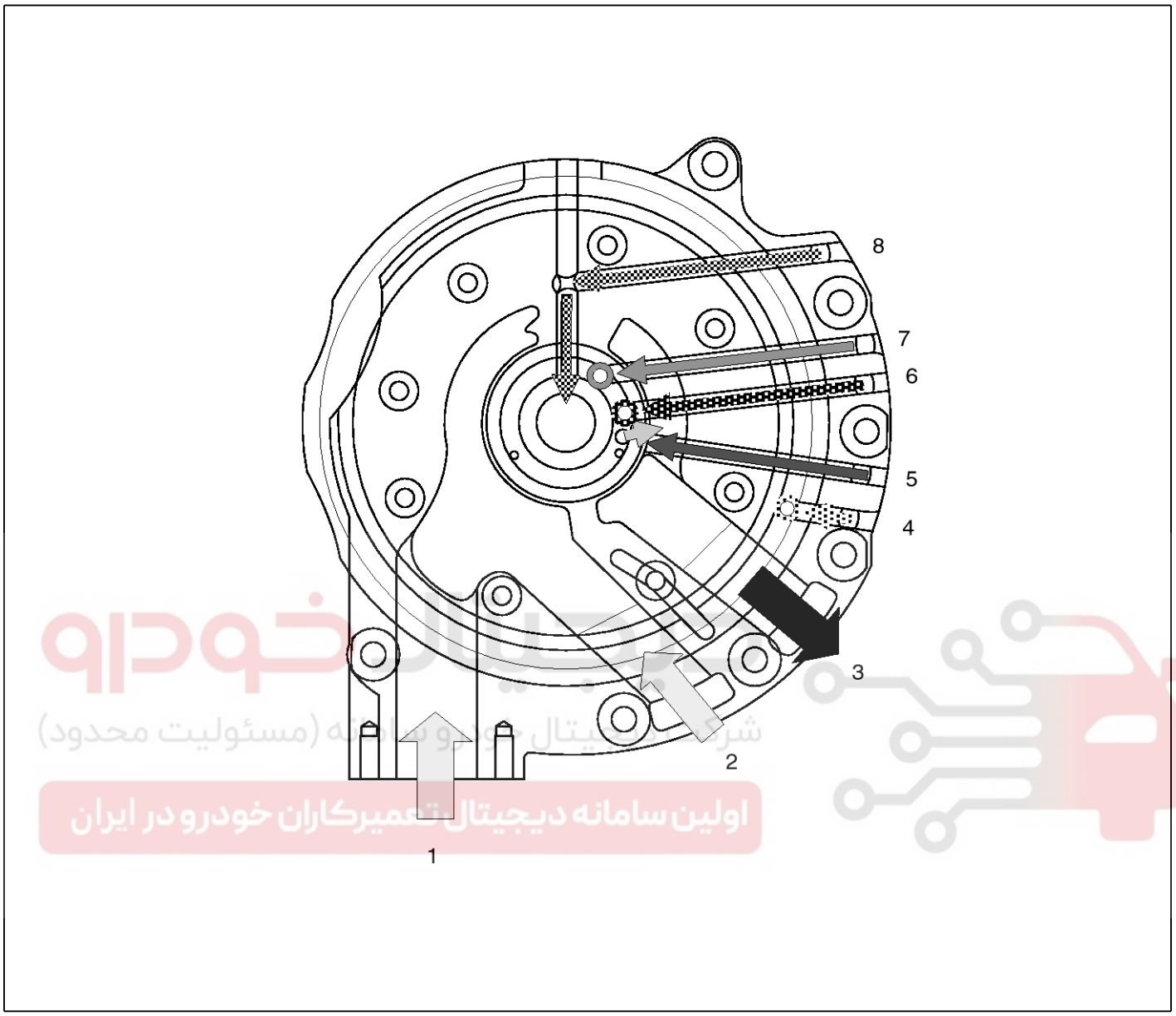
Components



SSLAT0002D

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

Oil Pump Operation Flow

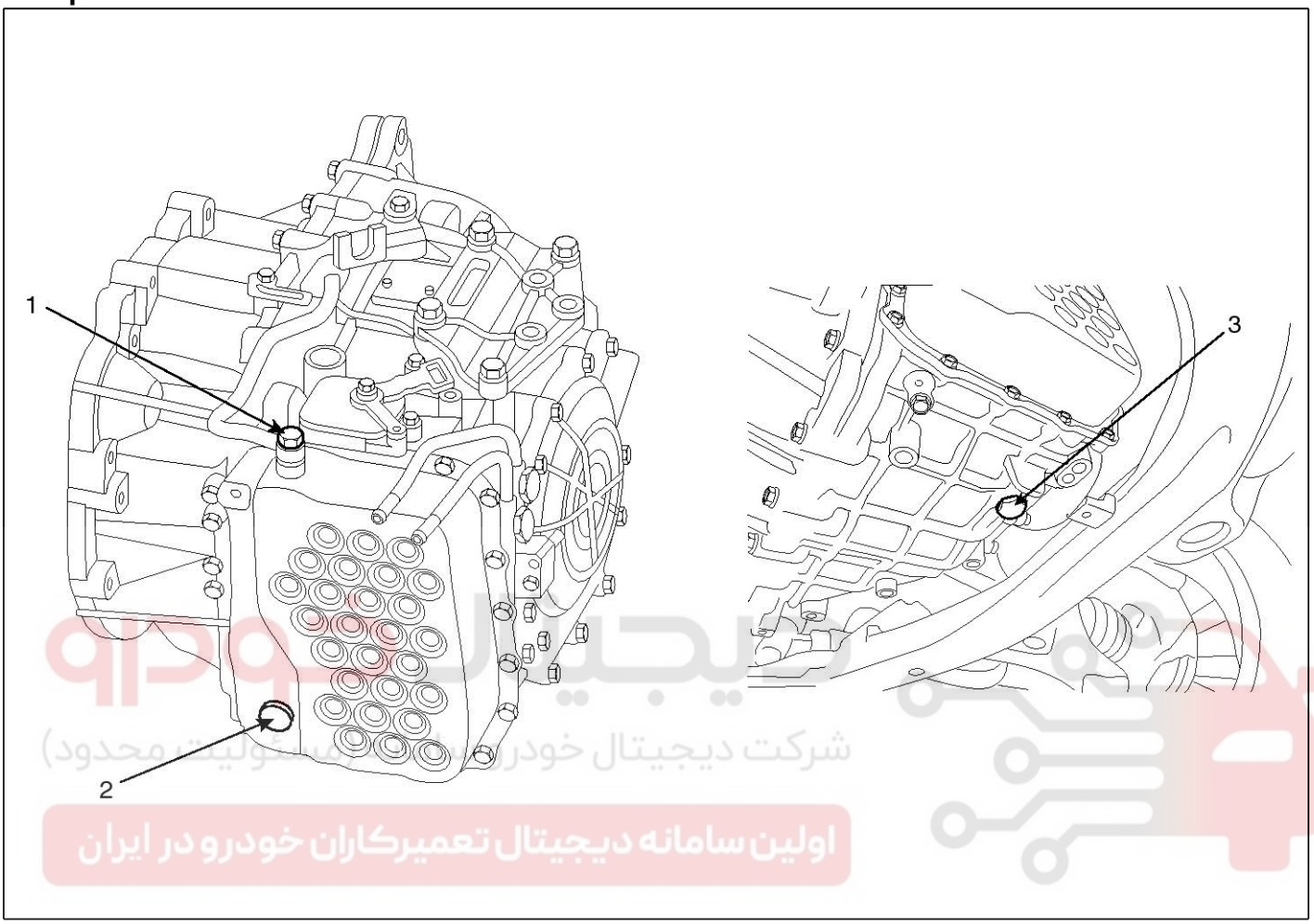


SSLAT0003D

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

Fluid

Components Location



SSLAT0102D

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

Service Adjustment Procedure

Oil level Check

NOTICE

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

CAUTION

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

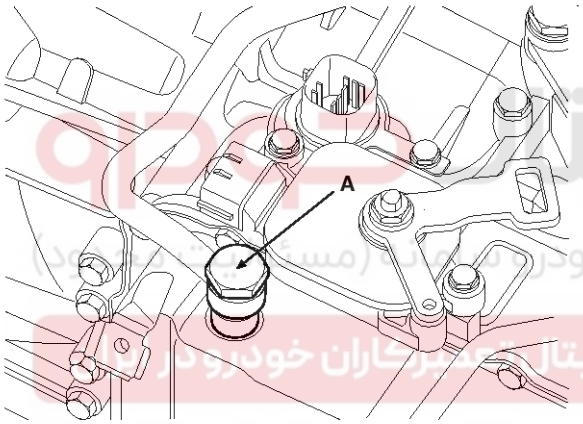
1. Remove the eyebolt (A).

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.



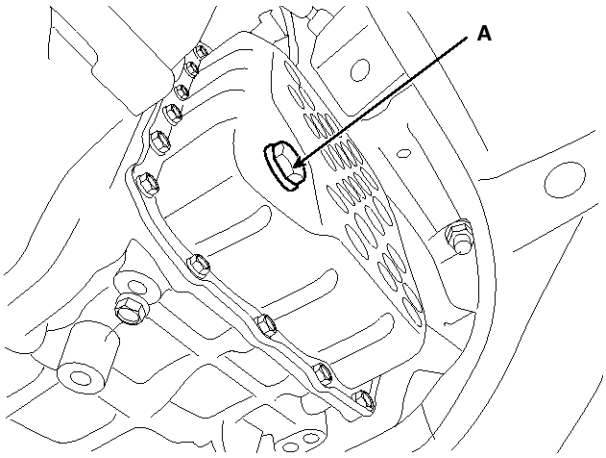
SLMAT0008D

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.



SVGAT0002D

CAUTION

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

7. If the oil flows out of the overflow plug in thin steady stream, the oil level is correct.

   Then finish the procedure and tighten the oil plug.

NOTICE

Oil level check (excess or shortage) method

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

CAUTION

If there is no damage at the automatic transaxle and the oil cooler, the oil cooler hose, transaxle case, valve body tightening state are normal, ATF must drip out after performing above 1 to 7 procedures. After performing 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

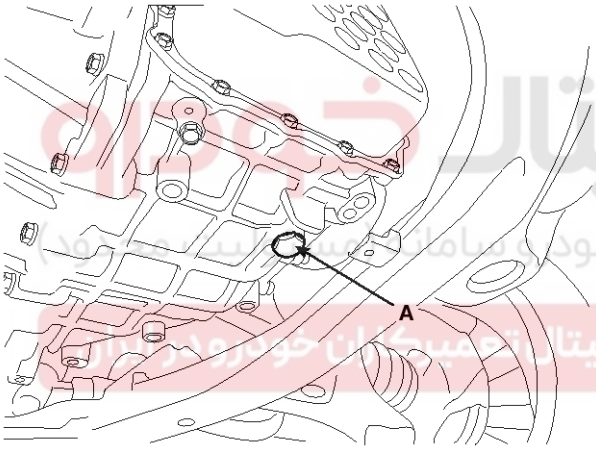
NOTICE

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.



SYFAT0003D

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

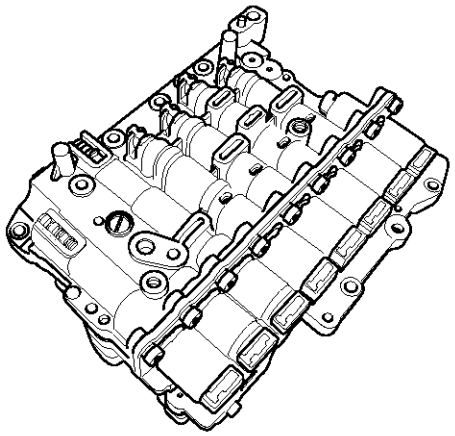
CAUTION
The gasket of the drain plug use new one.

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

Valve Body

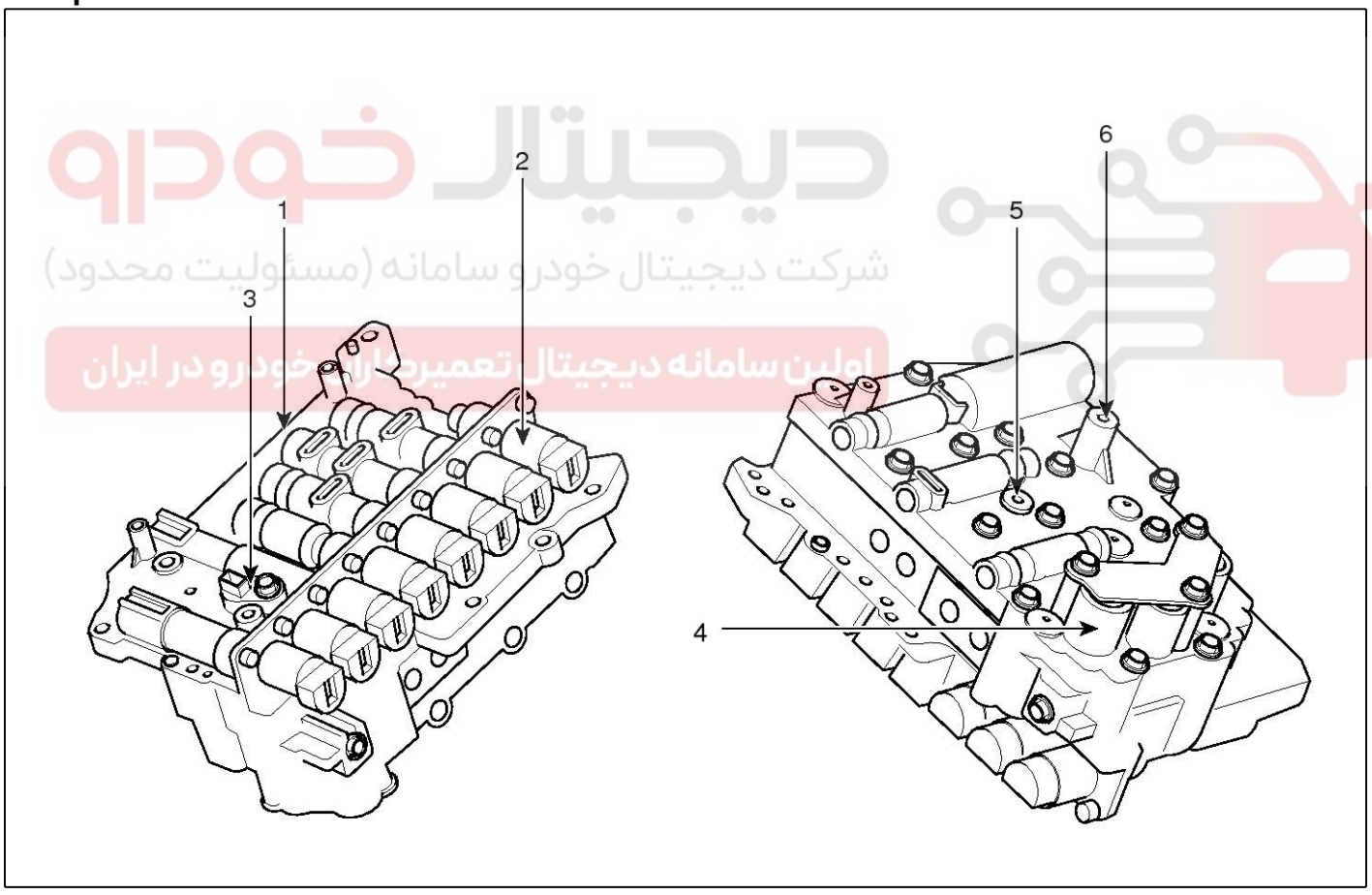
Description

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.



SSLAT0103D

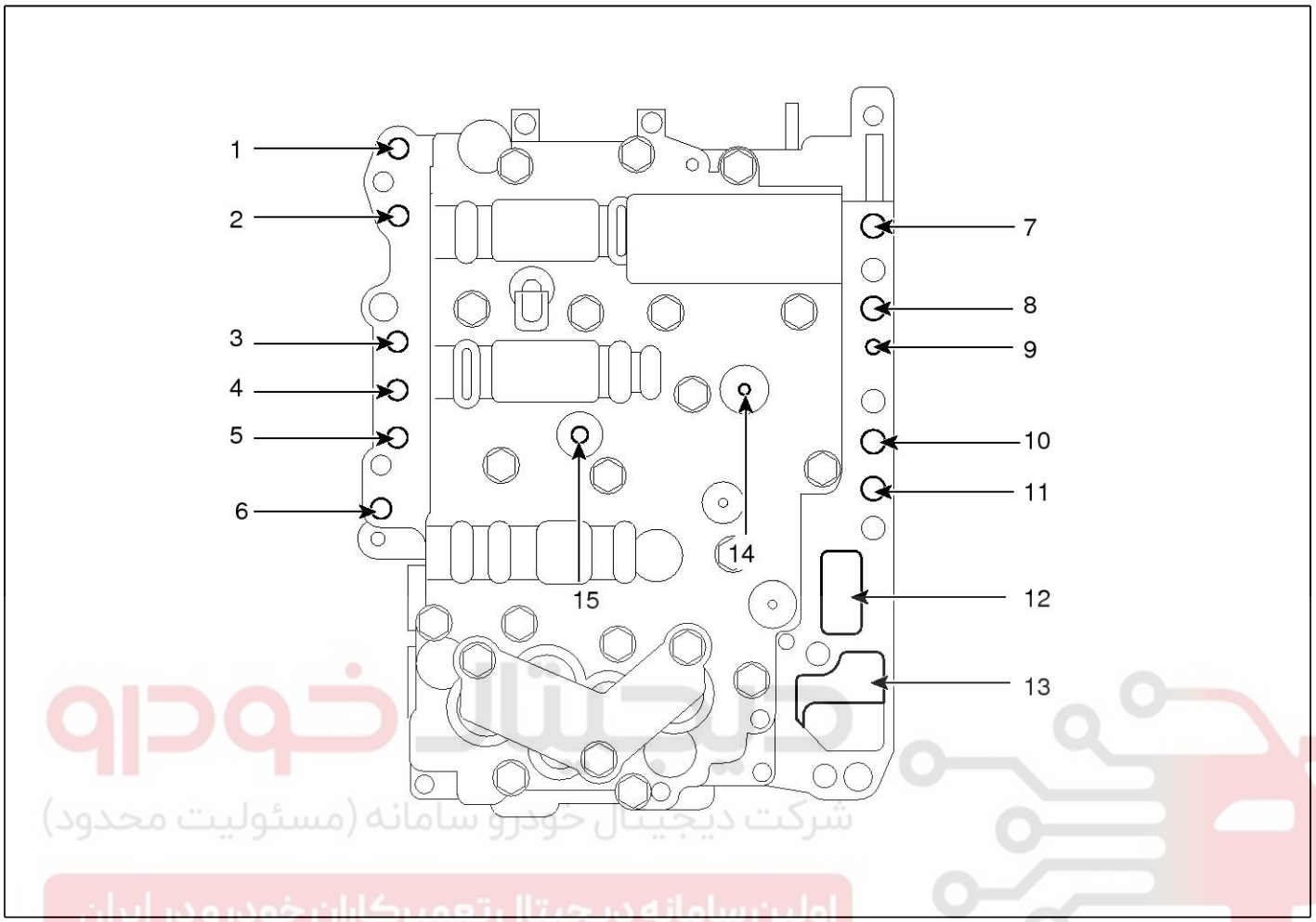
Components Location



SSLAT0004D

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



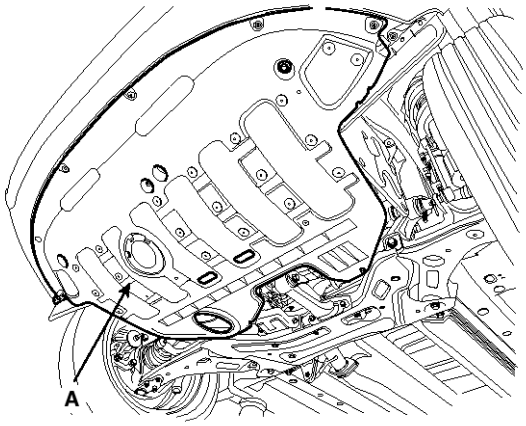
SSLAT0005D

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

Removal

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

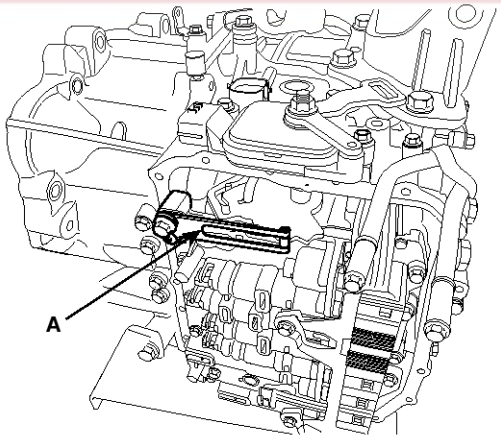
Tightening torque:
19.6 ~ 24.5 N.m (2.0 ~ 2.5 kgf.m, 14.5 ~ 18.1 lb-ft)



SSLAT0021D

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 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)

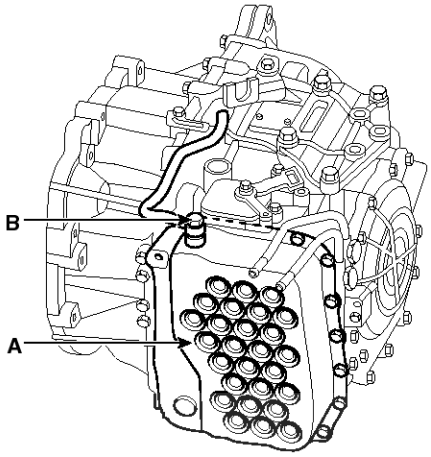


SLMAT0023D

5. Remove the valve body cover (A) and eyebolt (B).

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

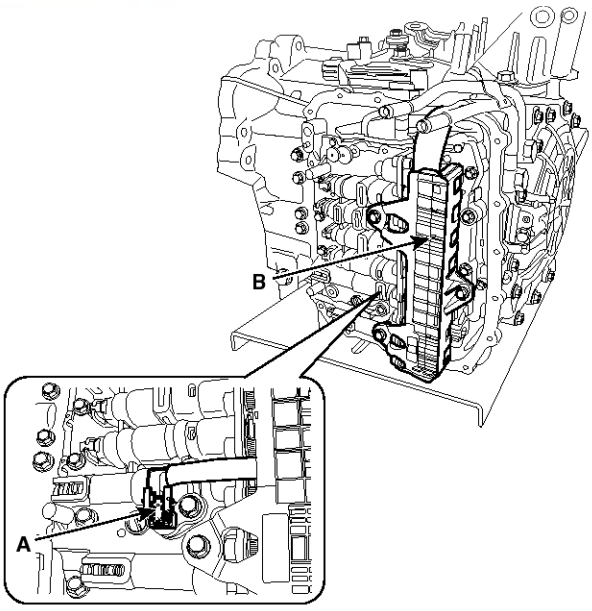
⚠CAUTION
Always replace the gasket of the eyebolt use new one whenever loosening eyebolt.



SSLAT1111N

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

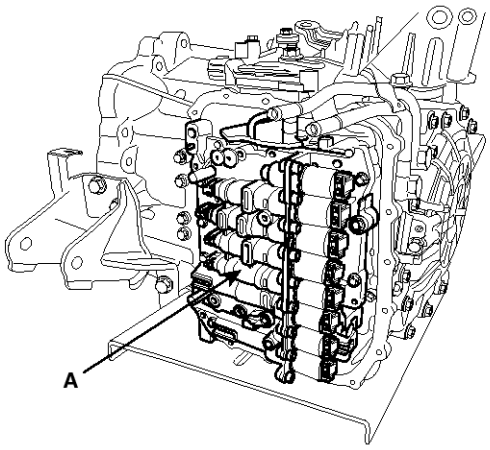
Tightening torque:
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



SLMAT0024D

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)



SCMAT0008L

Installation

1. Installation is the reverse of removal.

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

NOTICE
- *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

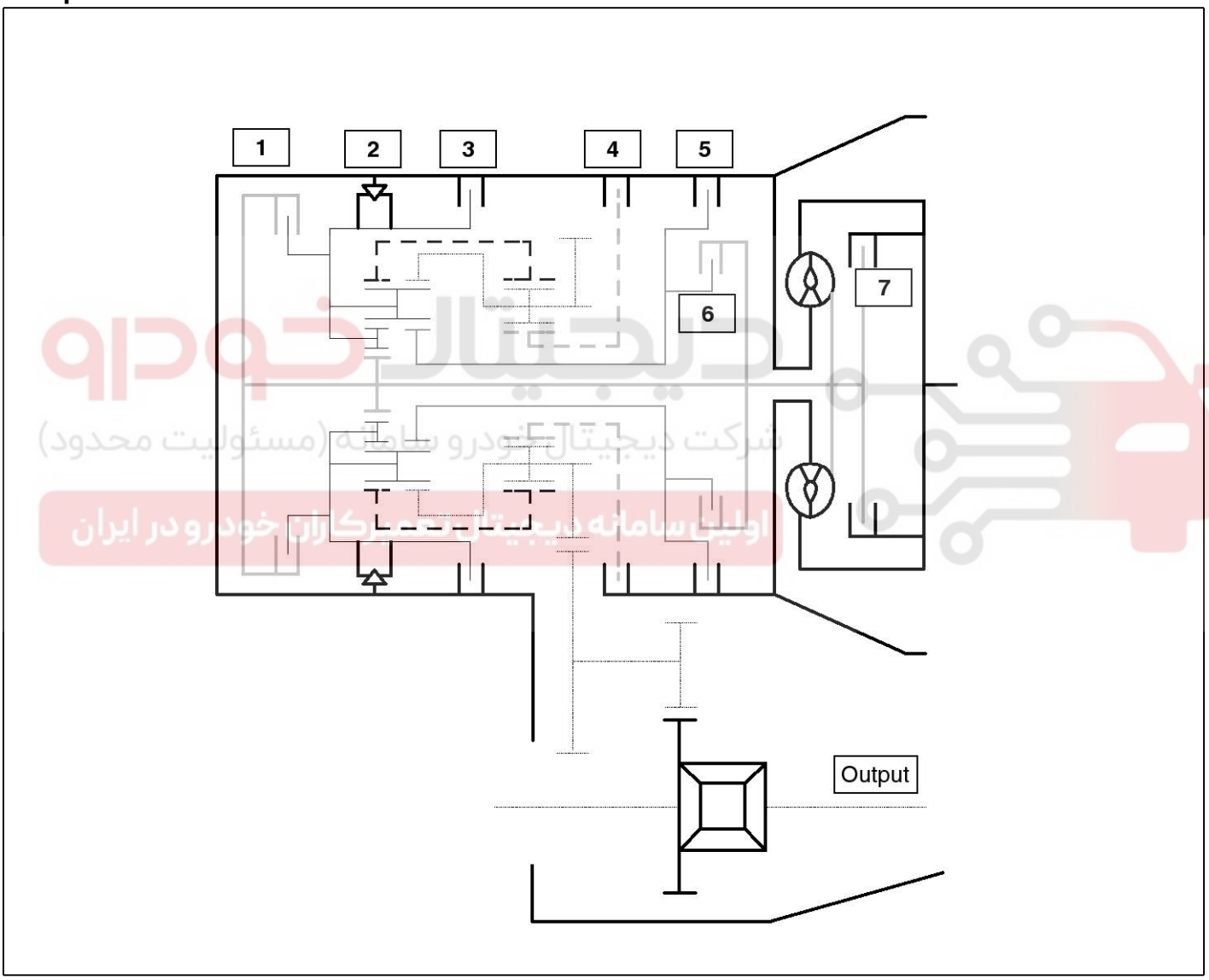
- *Adding automatic transaxle fluid. (Refer to "automatic transaxle system" in this group.)*
- *Perform TCM learning after replacing the valve body to prevent slow transaxle response, jerky acceleration and jerky startup. (Refer to "Automatic transaxle control system (Repair procedures)" in this group)*

Clutch & Brake

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.

Components Location

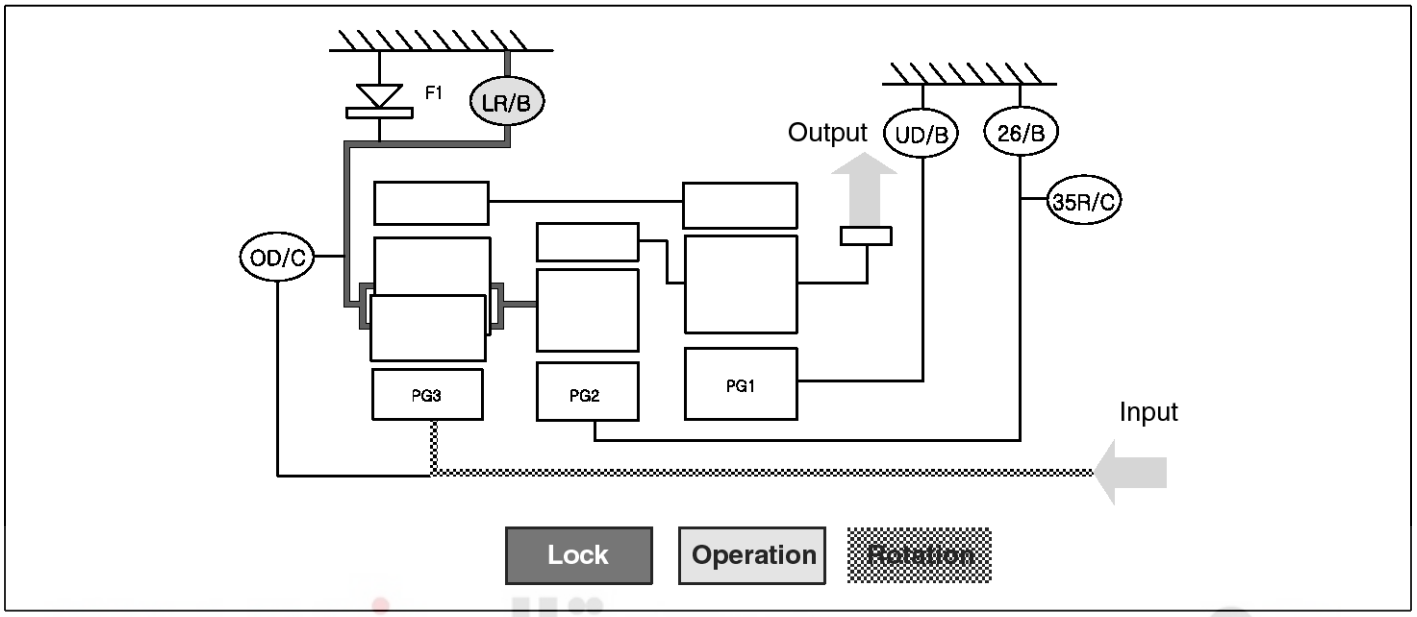


SSLAT1006N

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

Power Flow Chart

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



SSLAT1007N

▣ Direction of Rotation

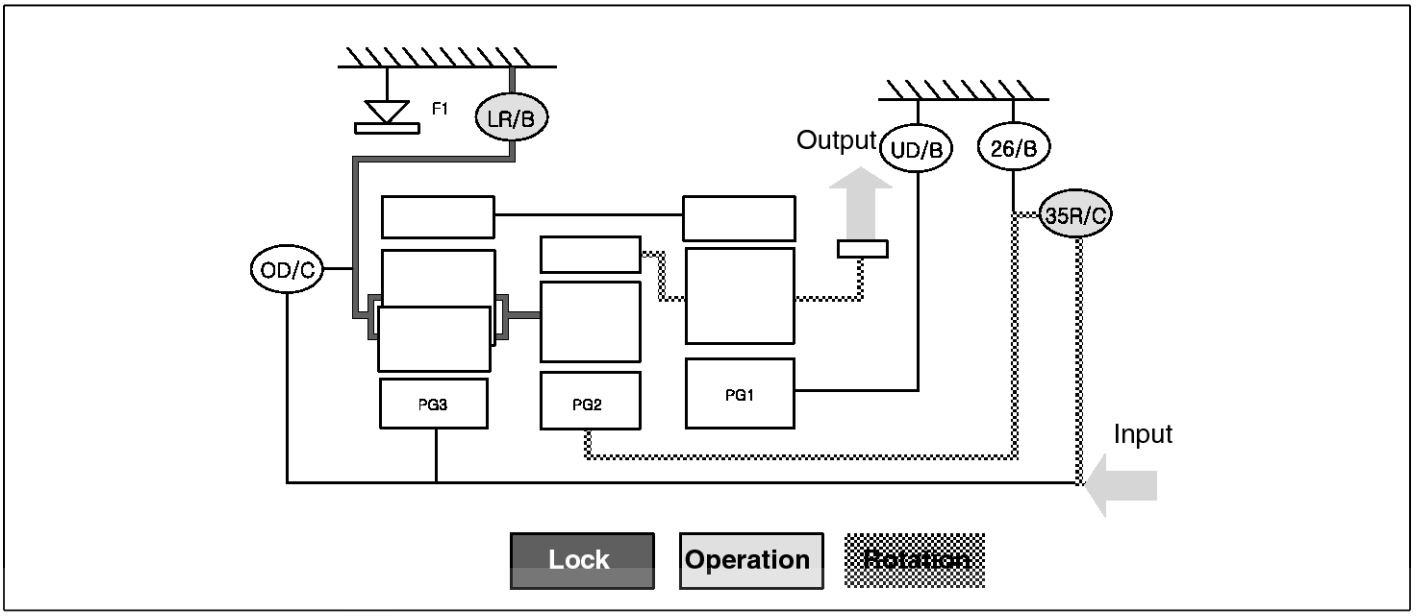
▶Lower & Reverse Brake (LR/B) Activation → Overdrive (O/D) Hub Lock → Mid & Rear P/C Lock

▶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

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



SSLAT1008N

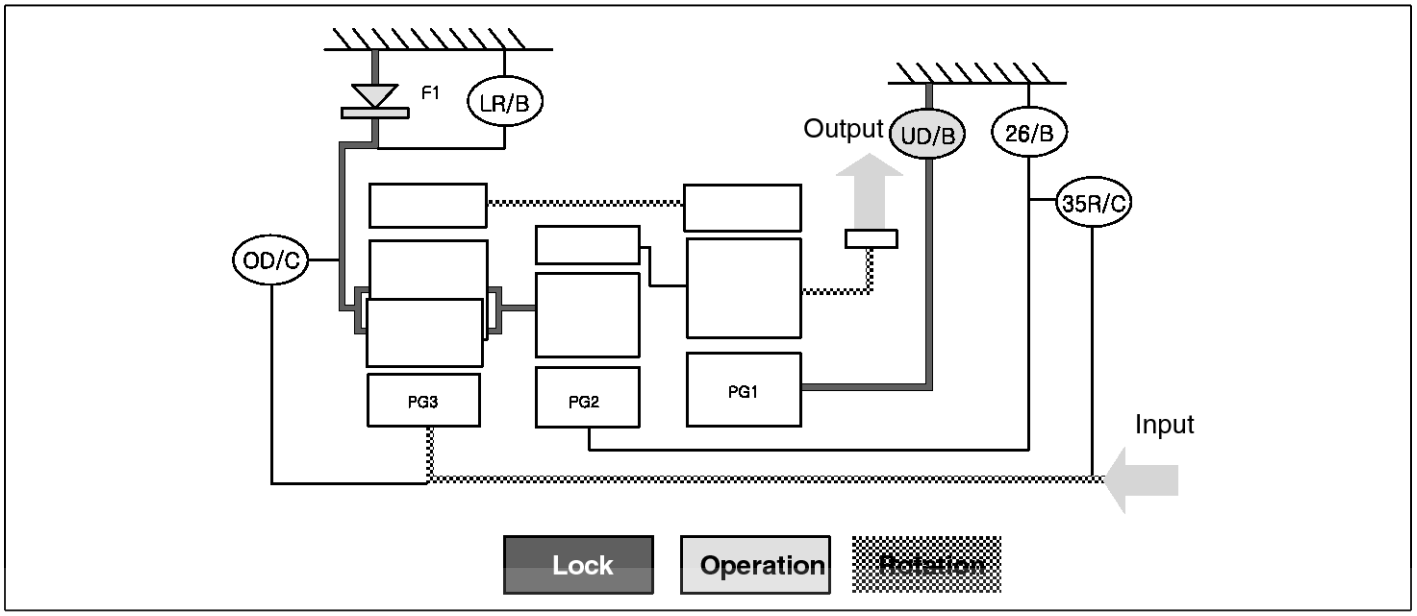
▣ Power Delivery Route

▶ 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
	●	(○)				●



SSLAT1009N

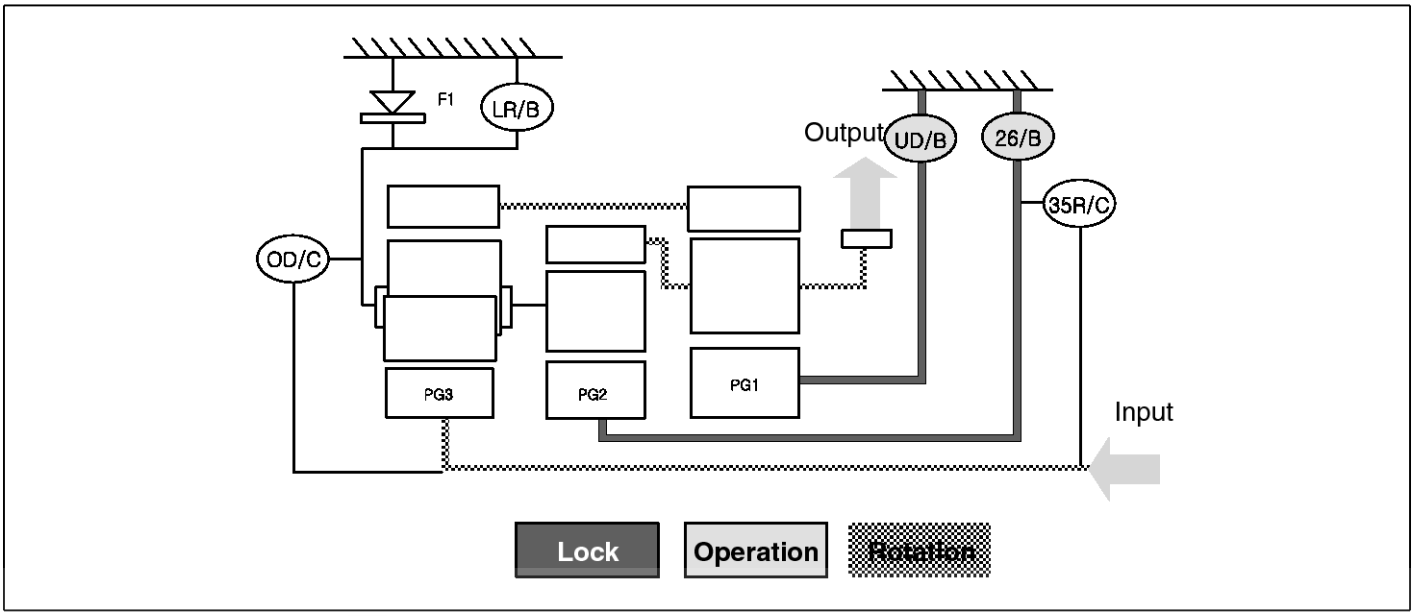
▣ Power Delivery Route

▶ 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
	●		●			



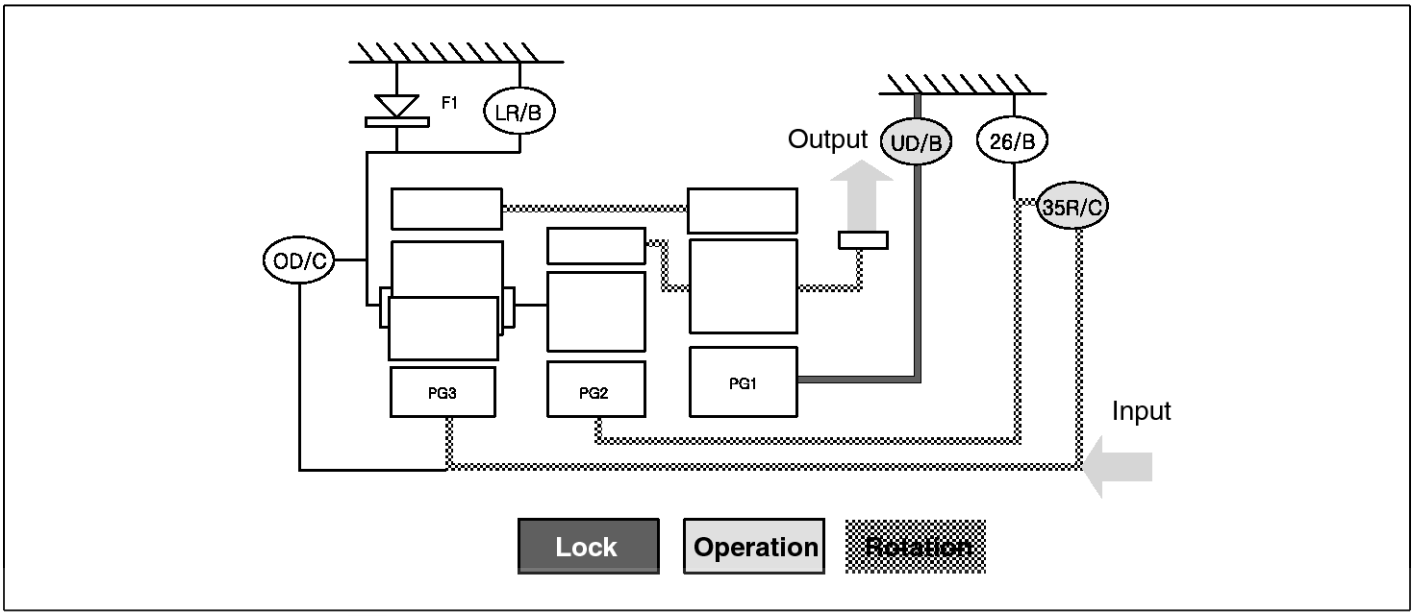
SSLAT1010N

▣ Power Delivery Route

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

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

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



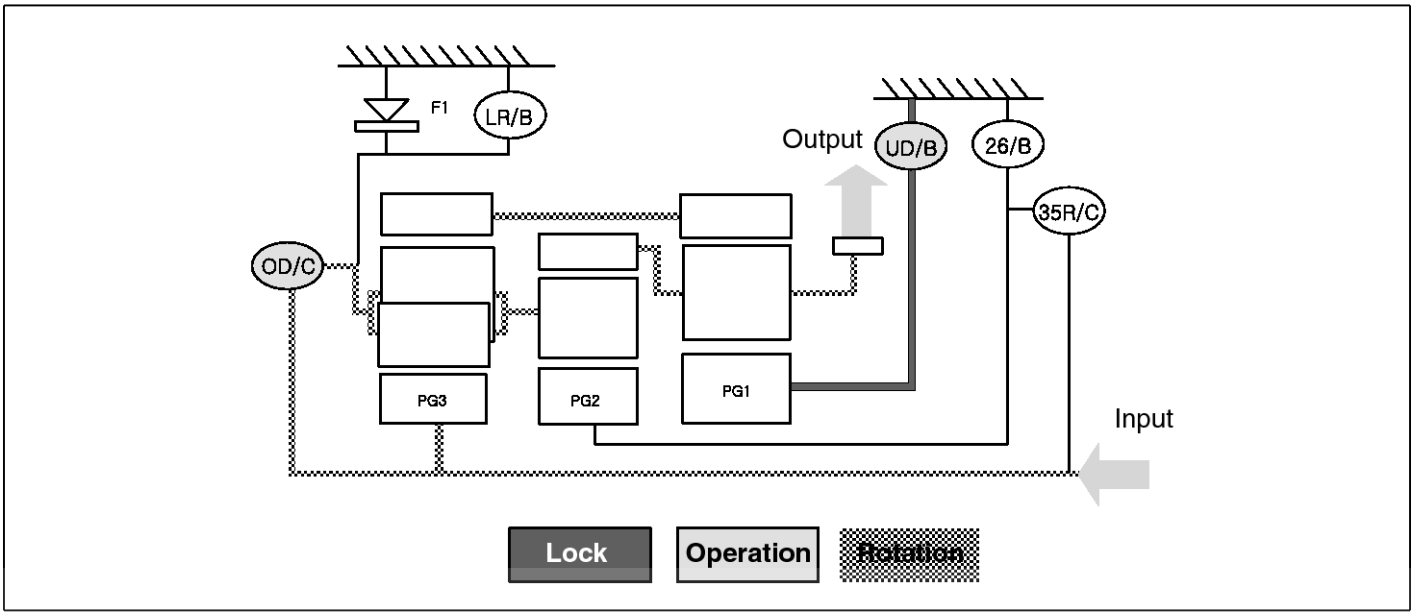
SSLAT1011N

▣ 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	●				●	



SSLAT1012N

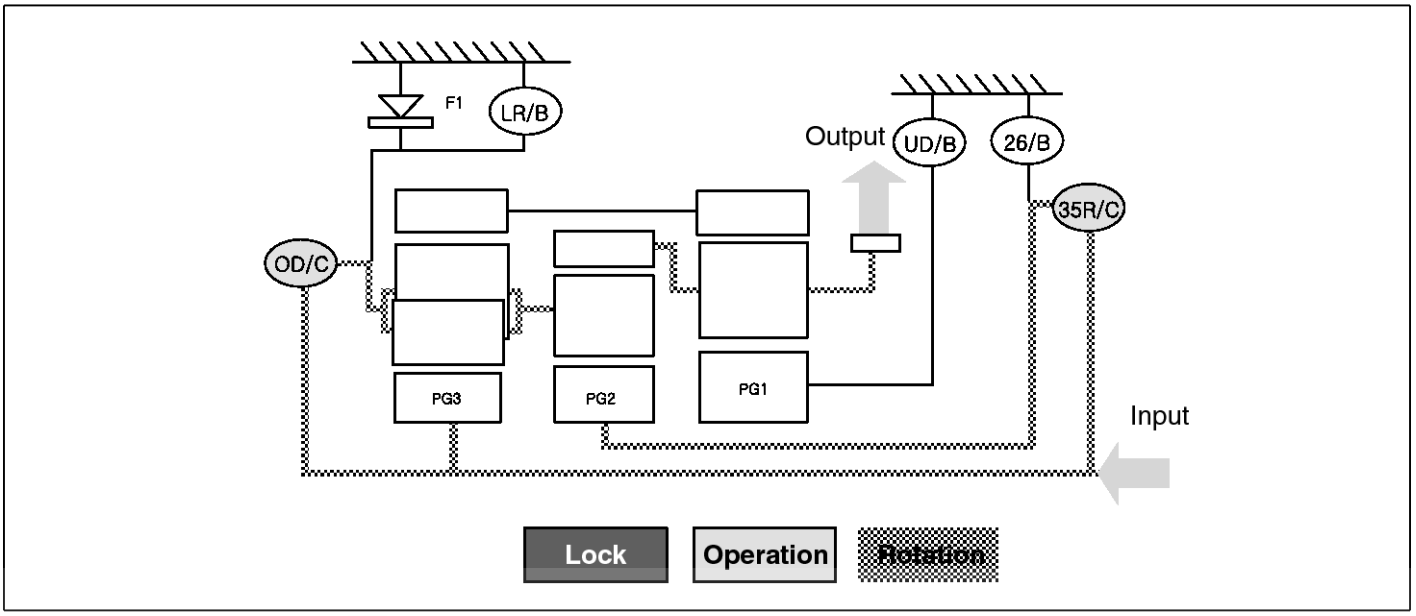
▣ Power Delivery Route

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

▶ Activation of the overdrive clutch (OD/C) synchronizes the rear planetary gear's carrier and sun gears. The 1:1 rotation ratio passes through the rear and front annulus gears and reaches the front planetary gear's front carrier, to which the sun gear is attached.

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

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



SSLAT1013N

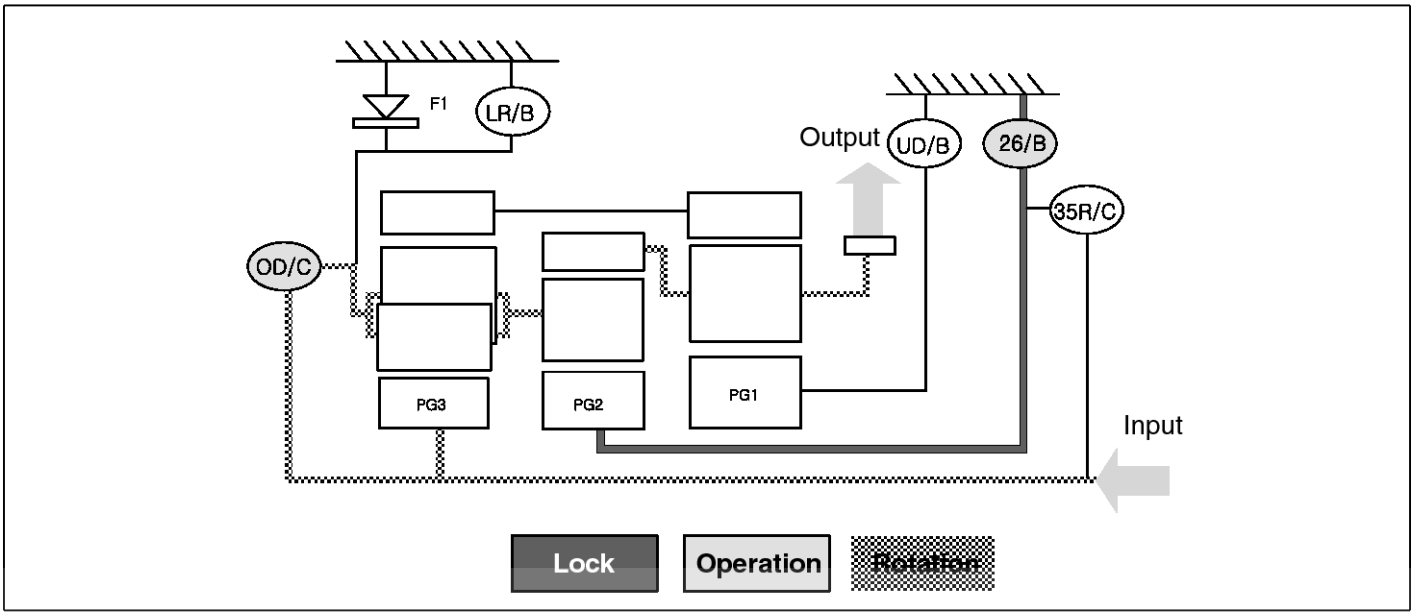
▣ Power Delivery Route

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

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

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

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



SSLAT1014N

▣ 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.

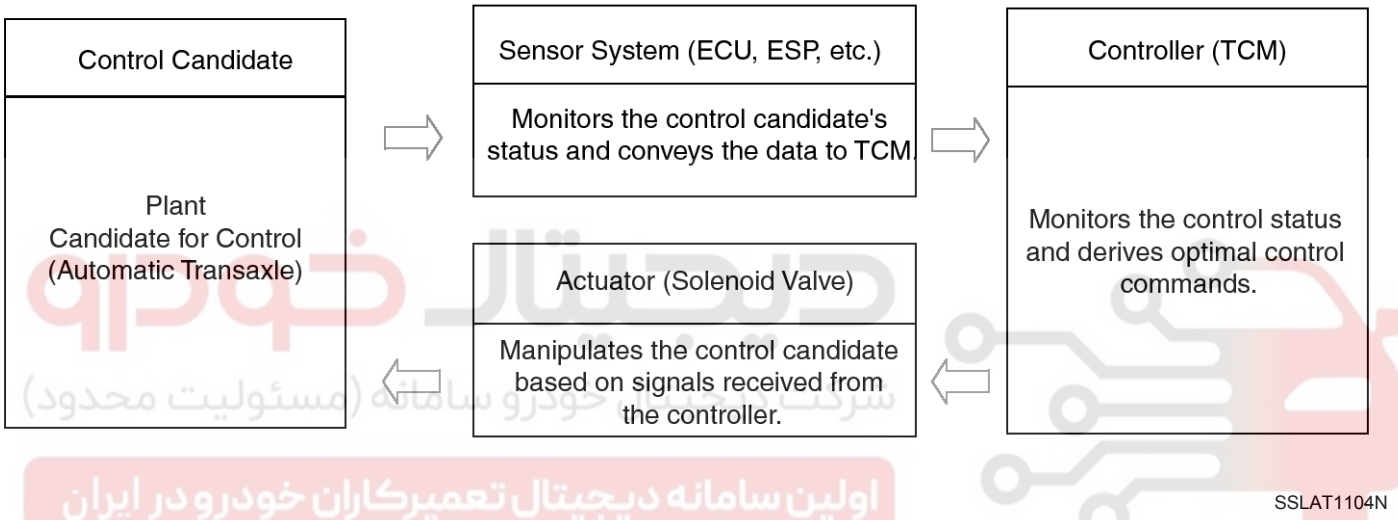
▶ Here, the rear planetary gear maintains a 1:1 rotation ratio as it would when 4th or 5th gear is engaged; however, the front planetary gear remains unrestrained and the front sun gear rotates at a faster rate in the normal direction and at zero load.

Automatic Transaxle Control System

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.**
- **Wchecking 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 "automatic transaxle system" 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.**

Adjustment

TCM Learning

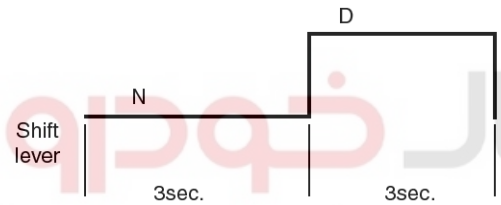
When shift shock is occurred or parts related with the transaxle are replaced, TCM learning should be performed.

In the following case, TCM learning is required.

- Transaxle assembly replacement
- TCM replacement
- TCM upgrading

1. TCM learning condition
   - ATF temperature: 60~115°C (140~239°F)
2. TCM learning procedure
   A. Stop learning

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



- Brake ON
- Throttle open: 0%

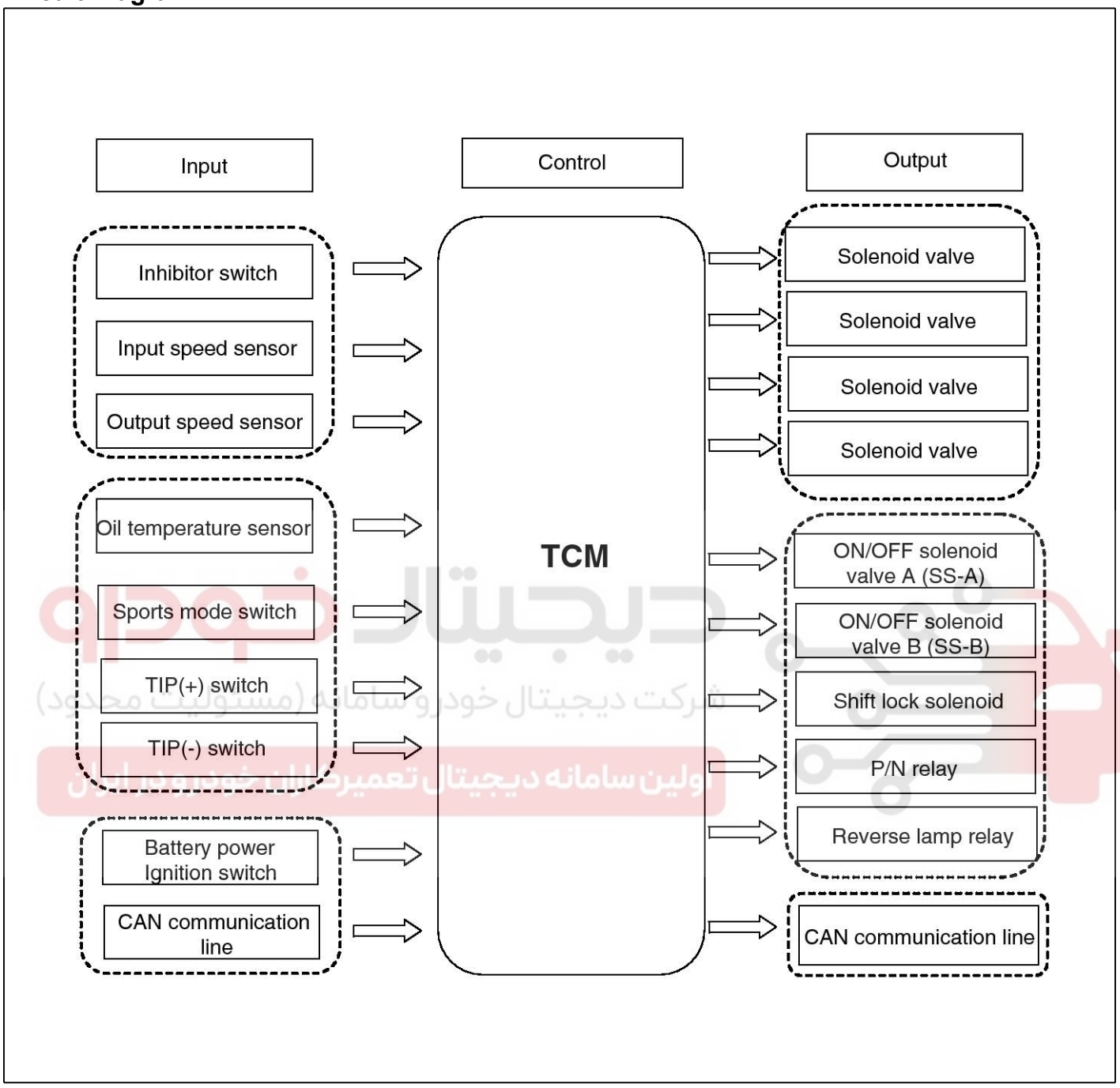
SVQAT0090L

   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 : 15~30%

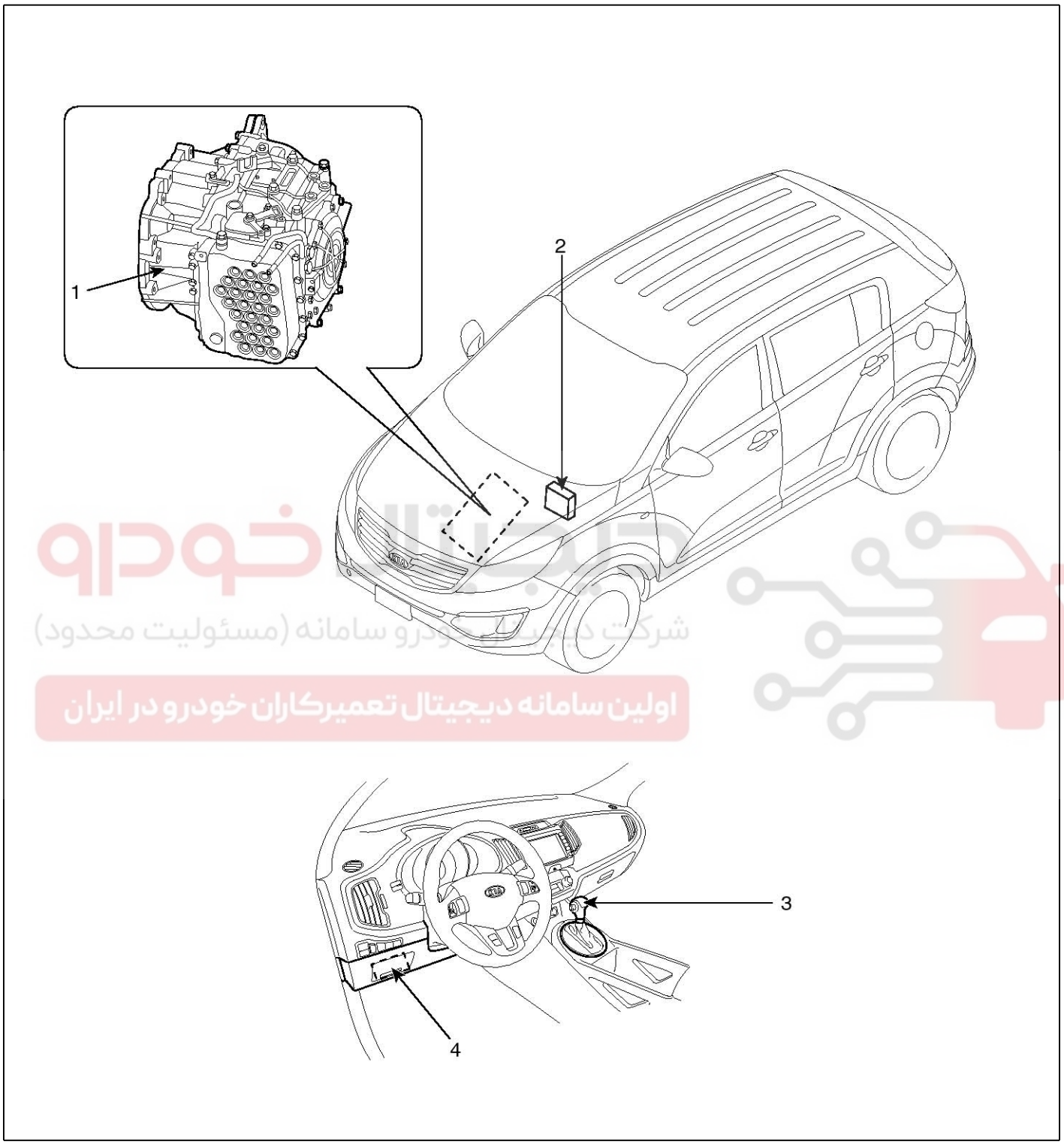
Circuit Diagram



SSLAT1106N

Components Location

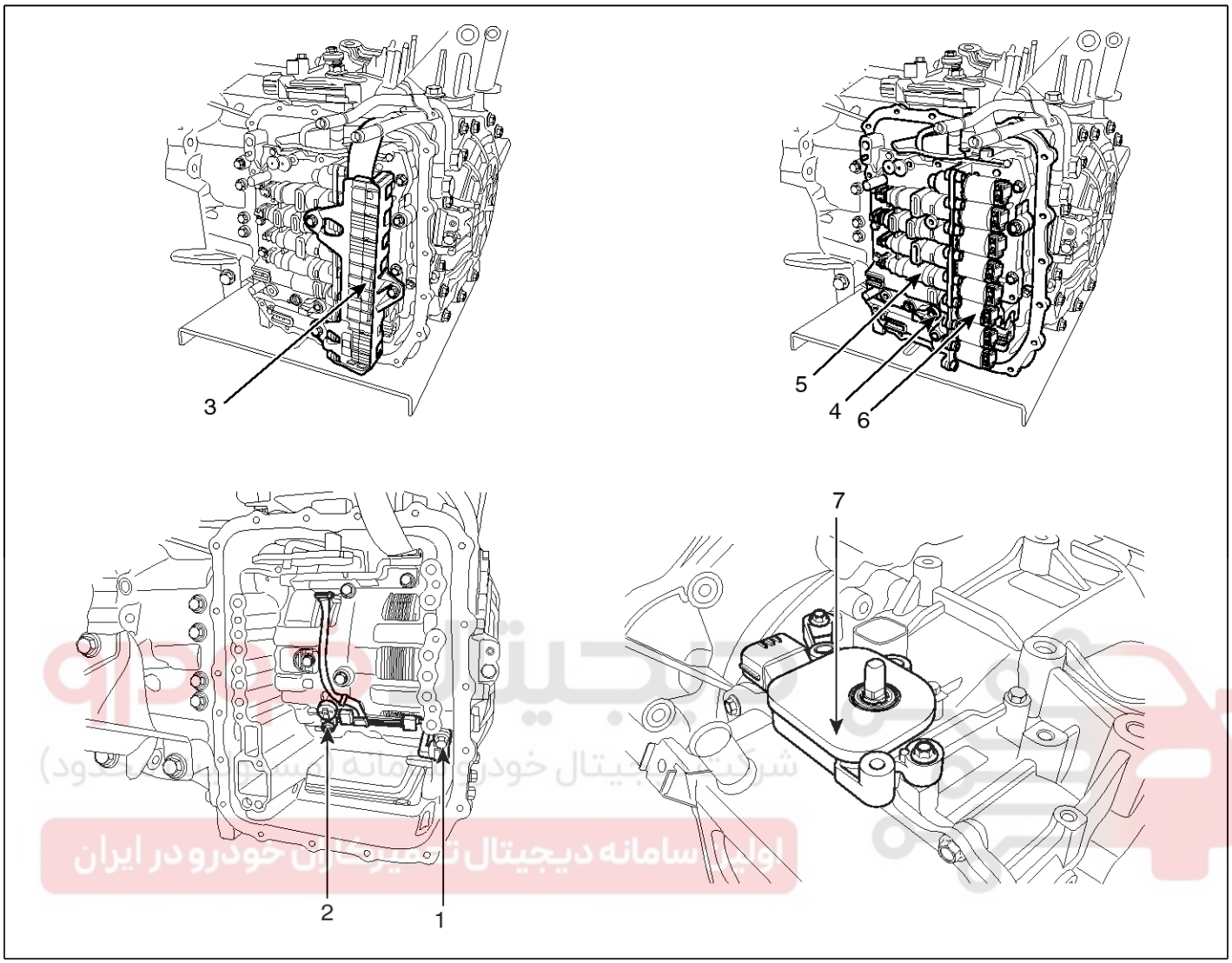
[Vehicle Components]



SSLAA0022D

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

[Transaxle Components]



SLMAT0026D

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

Transaxle Control Module (TCM)

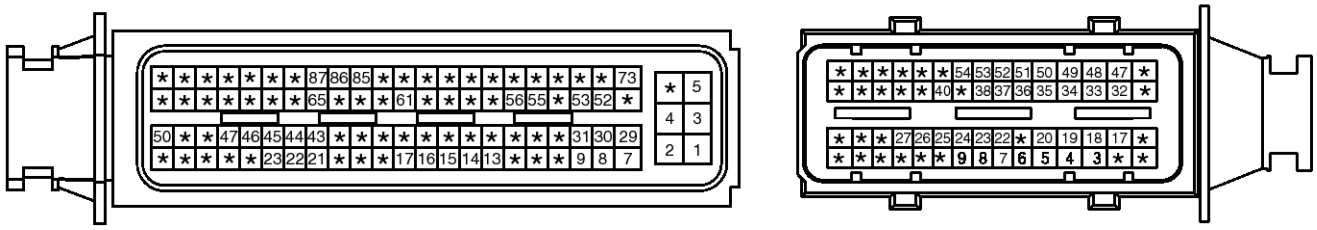
Description

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.

TCM connector and terminal function



Connector [CHG-K] Connector [CHG-A]

SSLAA1130N

TCM Terminal Function

Connector [CHG-A]

Pin	Description	Pin	Description
1	-	31	-
2	-	32	ON/OFF solenoid valve B(SS-B)
3	Line pressure control solenoid valve (LINE_VFS)	33	ON/OFF solenoid valve A (SS-A)
4	Torque converter control solenoid valve (T/CON_VFS)	34	Ground (Power 1)
5	35R clutch control solenoid valve (35R/C_VFS)	35	Ground (Power 2)
6	Input speed sensor power	36	Sports mode down switch
7	Output speed sensor power	37	Sports mode up switch
8	Input speed sensor signal	38	Sports mode Select switch
9	Output speed sensor signal	39	-
10	-	40	Inhibitor switch signal "S1"
11	-	41	-
12	-	42	-
13	-	43	-
14	-	44	-
15	-	45	-
16	-	46	-
17	Underdrive brake control solenoid valve (UD/B_VFS)	47	Solenoid supply power 1
18	26 brake control solenoid valve (26/B_VFS)	48	Solenoid supply power 2
19	Shift lock solenoid	49	TCM Input power 1 (For solenoid)
20	Overdrive clutch control solenoid valve (OD/C_VFS)	50	TCM Input power 2 (For solenoid)
21	-	51	Reserved
22	Rear lamp relay	52	Reserved
23	-	53	Oil temperature sensor (-)
24	Start relay	54	Oil temperature sensor (+)
25	Inhibitor switch signal "S2"	55	-

Pin	Description	Pin	Description
26	Inhibitor switch signal "S3"	56	-
27	Inhibitor switch signal "S4"	57	-
28	-	58	-
29	-	59	-
30	-	60	-

Connector [CHG-K]

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

TCM Terminal input/ output signal

Connector [CHG-A]

Pin	Description	Condition	Input/output value	
			Type	Level
1	-			
2	-			
3	Line pressure control solenoid valve (LIN-E_VFS)		Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
4	Torque converter control solenoid valve (T/CON_VFS)		Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
5	35R clutch control solenoid valve (35R/C_ VFS)		Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
6	Input speed sensor power	ON	Power	0V/7.5V
		OFF		
7	Output speed sensor power	ON	Power	0V/7.5V
		OFF		
8	Input speed sensor signal	High	Input	0.7V/1.4V
		Low		
9	Output speed sensor signal	High	Input	0.7V/1.4V
		Low		
10	-			
11	-			
12	-			
13	-			

Pin	Description	Condition	Input/output value	
			Type	Level
14	-			
15	-			
16	-			
17	Underdrive brake control solenoid valve (UD/B_VFS)		Output	0V/Battery voltage level 9V < Battery voltage level < 16V Power supply : V_SOL2
18	26 brake control solenoid valve (26/B_VFS)		Output	0V/Battery voltage level 9V < Battery voltage level < 16V Power supply : V_SOL2
19	Shift lock solenoid	High	Output	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
20	Overdrive clutch control solenoid valve (OD/C_VFS)		Output	0V/Battery voltage level 9V < Battery voltage level < 16V Power supply : V_SOL1
21	-			
22	Rear lamp relay	R ON	Output	0V/Battery voltage level
		Other		9V < Battery voltage level < 16V
23	-			
24	Start relay	High	Output	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
25	Inhibitor switch signal "S2"	High	Input	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
26	Inhibitor switch signal "S3"	High	Input	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
27	Inhibitor switch signal "S4"	High	Input	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
28	-			
29	-			
30	-			
31	-			
32	ON/OFF solenoid valve B(SS-B)	High	Output	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
33	ON/OFF solenoid valve A (SS-A)	High	Output	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V

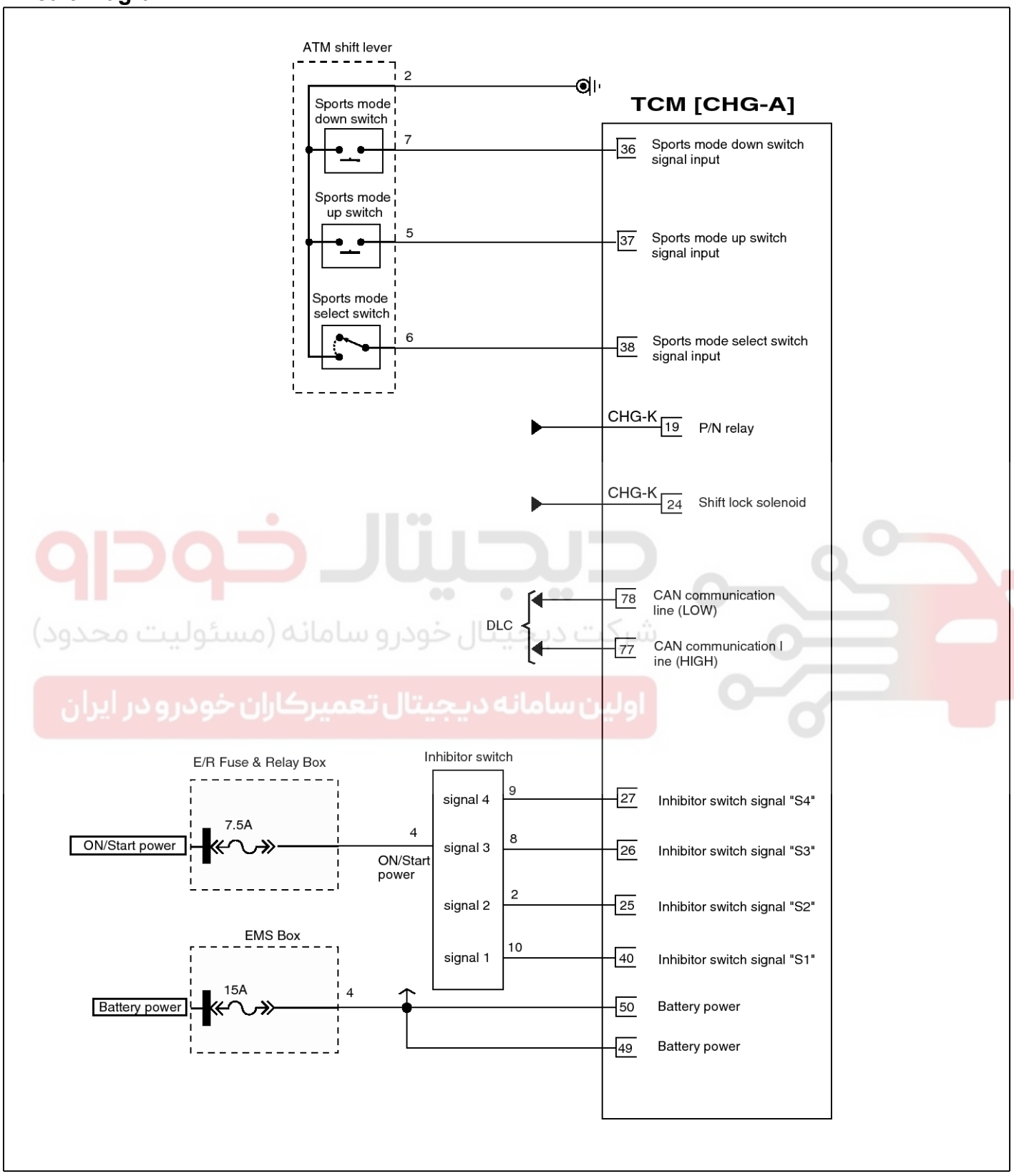
Pin	Description	Condition	Input/output value	
			Type	Level
34	Ground (Power 1)		Ground	0V
35	Ground (Power 2)		Ground	0V
36	Sports mode down switch	Down ON	Input	0V/Battery voltage level
		Other		9V < Battery voltage level < 16V
37	Sports mode up switch	Up ON	Input	0V/Battery voltage level
		Other		9V < Battery voltage level < 16V
38	Sports mode select switch	Sport mode	Input	0V/Battery voltage level
		Other		9V < Battery voltage level < 16V
39	-			
40	Inhibitor switch signal "S1"	High	Input	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
41	-			
42	-			
43	-			
44	-			
45	-			
46	-			
47	Solenoid supply power 1	ON	Power	0V/Battery voltage level
		OFF		9V < Battery voltage level < 16V
48	Solenoid supply power 2	ON	Power	0V/Battery voltage level
		OFF		9V < Battery voltage level < 16V
49	TCM Input power 1		Power	Battery voltage level
	(For solenoid)			9V < Battery voltage level < 16V
50	TCM Input power 2		Power	Battery voltage level
	(For solenoid)			9V < Battery voltage level < 16V
51	-			
52	-			
53	Oil temperature sensor (-)		Ground	0V
54	Oil temperature sensor (+)	ON	Input	0V/3.3V
		OFF		
55	-			
56	-			
57	-			

Pin	Description	Condition	Input/output value	
			Type	Level
58	-			
59	-			
60	-			

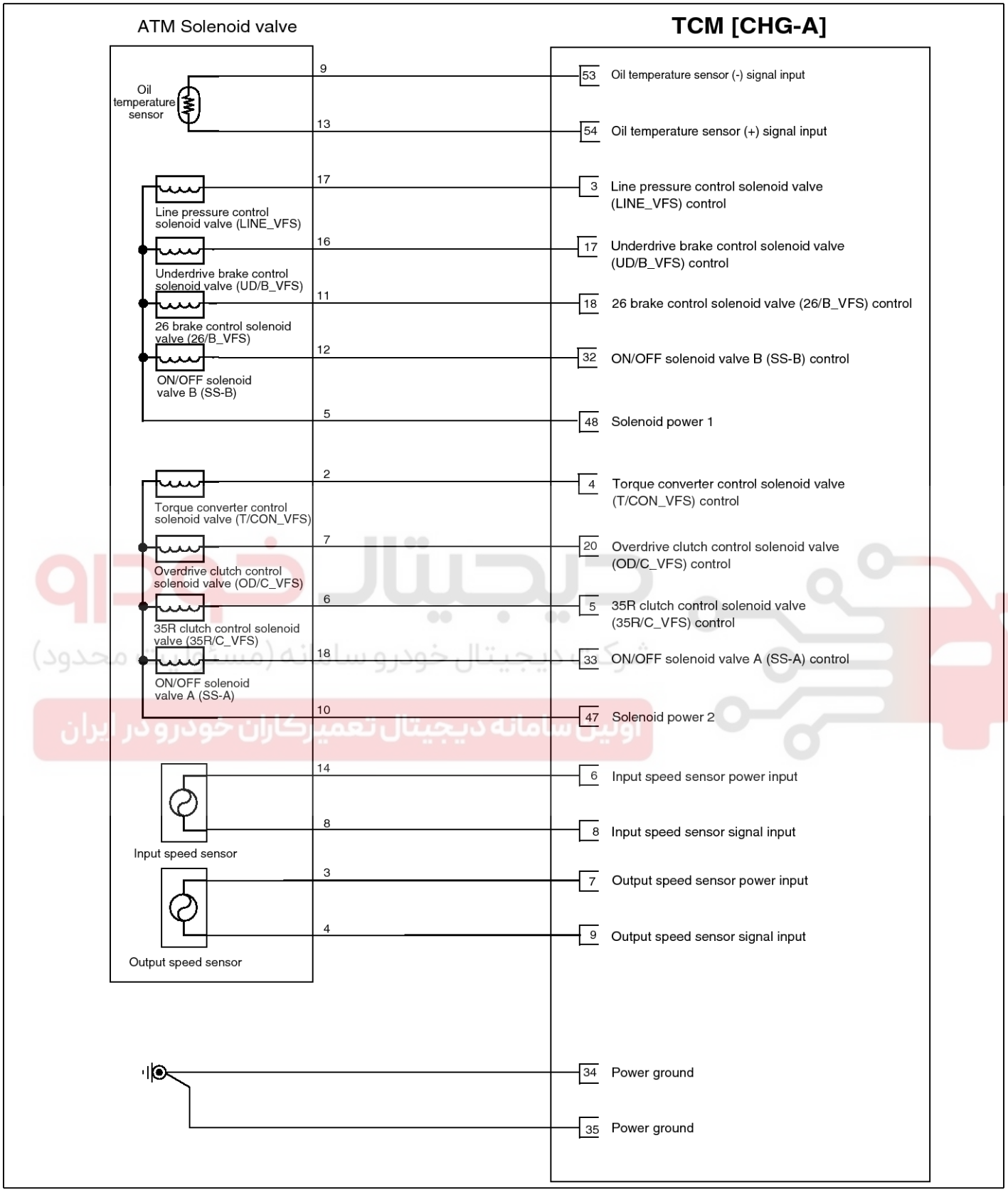
Connector [CHG-K]

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

Circuit Diagram



SSLAA1107N



SSLAA1108N

Inspection

TCM Problem Inspection Procedure

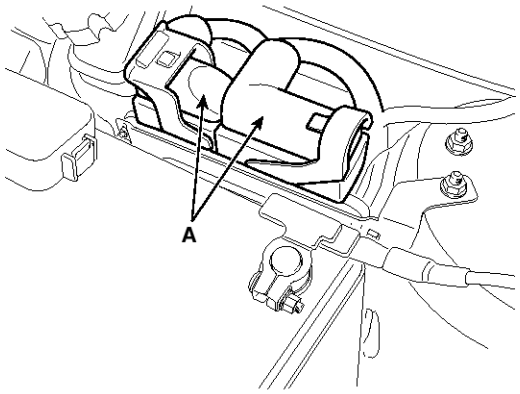
1. TEST TCM GROUND CIRCUIT: Measure resistance between TCM and chassis ground using the backside of TCM harness connector as TCM side check point. If the problem is found, repair it.

Specification: Below 1Ω

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

Replacement

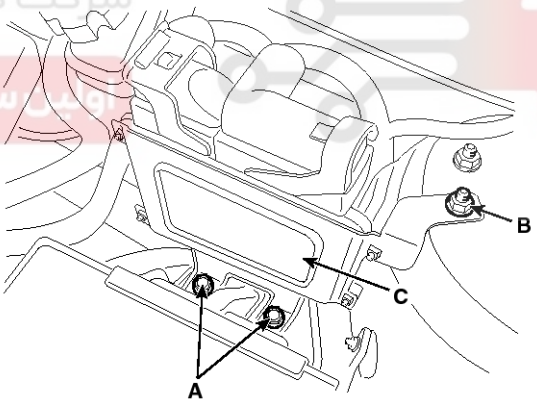
1. Turn ignition switch OFF.
2. Disconnect the negative (-) battery cable.
3. Disconnect the TCM connector (A).



SLMAT0040D

4. Remove the TCM (C) after removing the mounting bolts (A) and nut (B).

TCM installation bolt/nut :
(A) 21.6~32.4 N.m (2.2 ~ 2.3 kgf.m, 15.9~23.9 lb-ft)
(B) 9.8~14.7 N.m (1.0 ~ 2.5 kgf.m, 7.2~10.8 lb-ft



SLMAT0041D

Installation

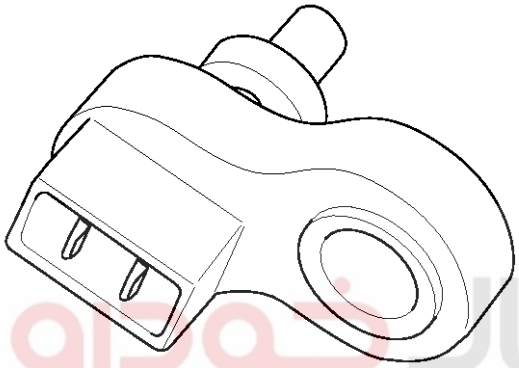
1. Installation is reverse of removal.

NOTICE
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).

Transaxle Oil Temperature Sensor

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.

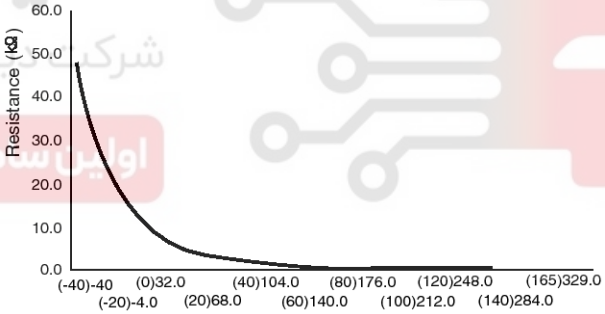


SSLAT0109D

Specifications

▷ Type: Negative Thermal Coefficient Type

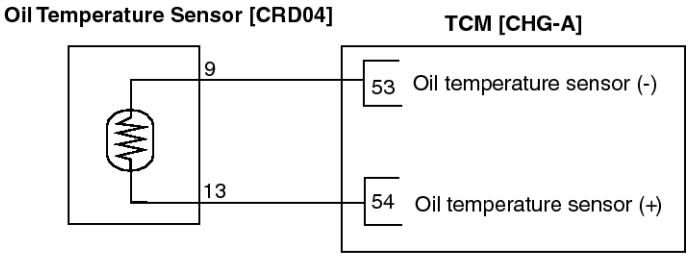
Temp.[(˚C)˚F]	Resistance (kΩ)
(-40)-40	48.1
(-20)-4.0	15.6
(0)32.0	5.88
(20)68.0	2.51
(40)104.0	1.11
(60)140.0	0.61
(80)176.0	0.32
(100)212.0	0.18
(120)248.0	0.10
(140)284.0	0.06
(150)302	0.05



SSLAT1110N

Circuit Diagram

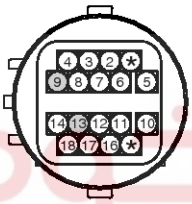
[Circuit Diagram]

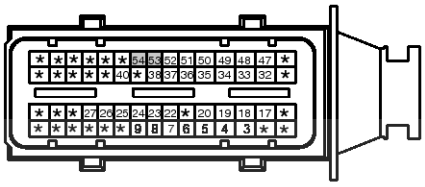


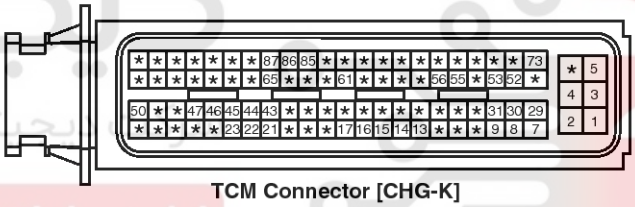
[Connection Information]

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

[Harness Connector]







SSLAA1120N

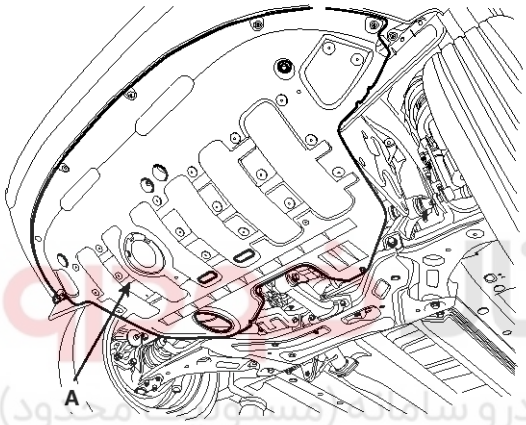
Inspection

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)

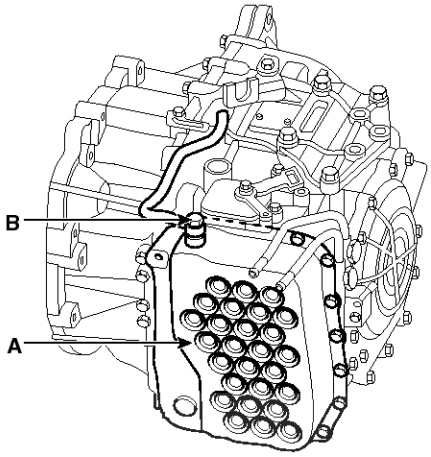


SSLAT0021D

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).

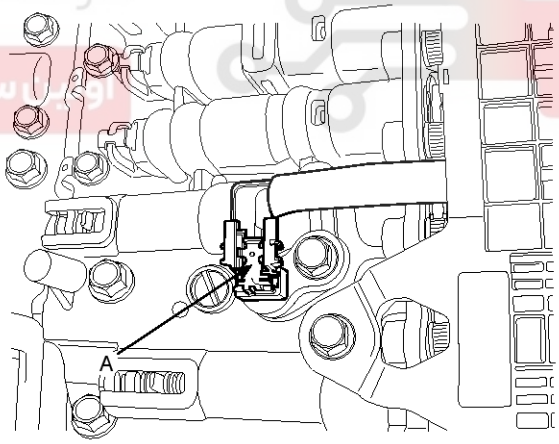
Tightening torque:
(A) 13.8~14.7N.m (1.3~1.5kgf.m, 9.4~10.8lb-ft)
(B) 34.3~44.1N.m(3.5~4.5kgf.m, 25.3~32.6lb-ft)

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



SSLAT1111N

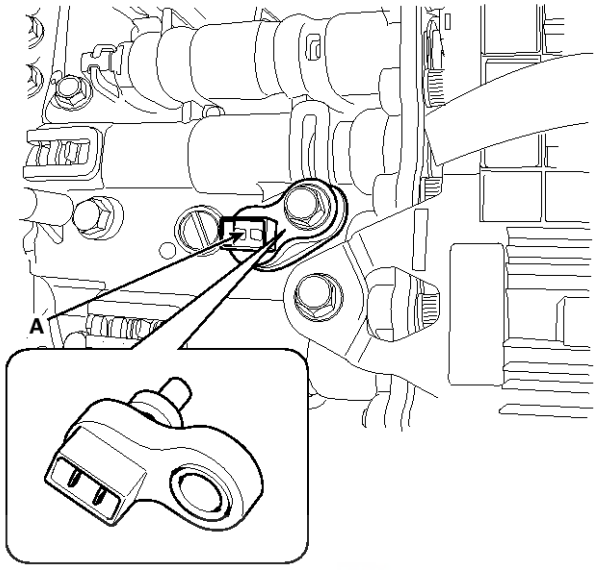
5. Disconnect the oil temperature sensor connector (A).



SCMAT0012L

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)



SCMAT0013L

Installation

1. Installation is the reverse of removal.

NOTICE

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.*

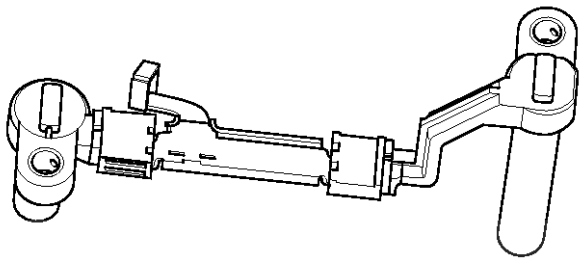
Liquid gasket Part name :
Threebond 1281B or LOCTITE FMD-546

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

Input Speed Sensor

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.



SSLAT0016D

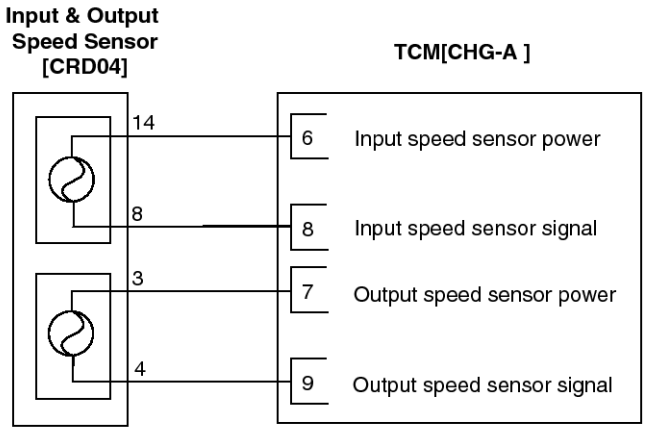
Specifications

▷ Type: Hall effect sensor

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

Circuit Diagram

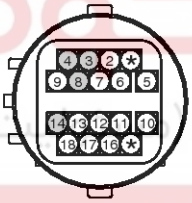
[Circuit Diagram]

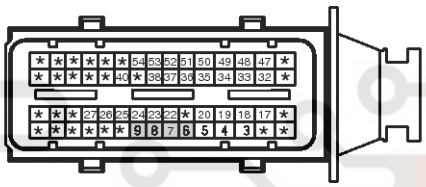


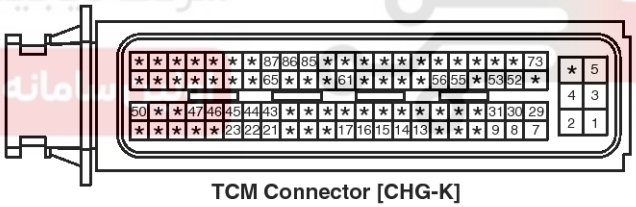
[Connection Information]

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

[Harness Connector]







SSLAA1121N

Signal Waveform

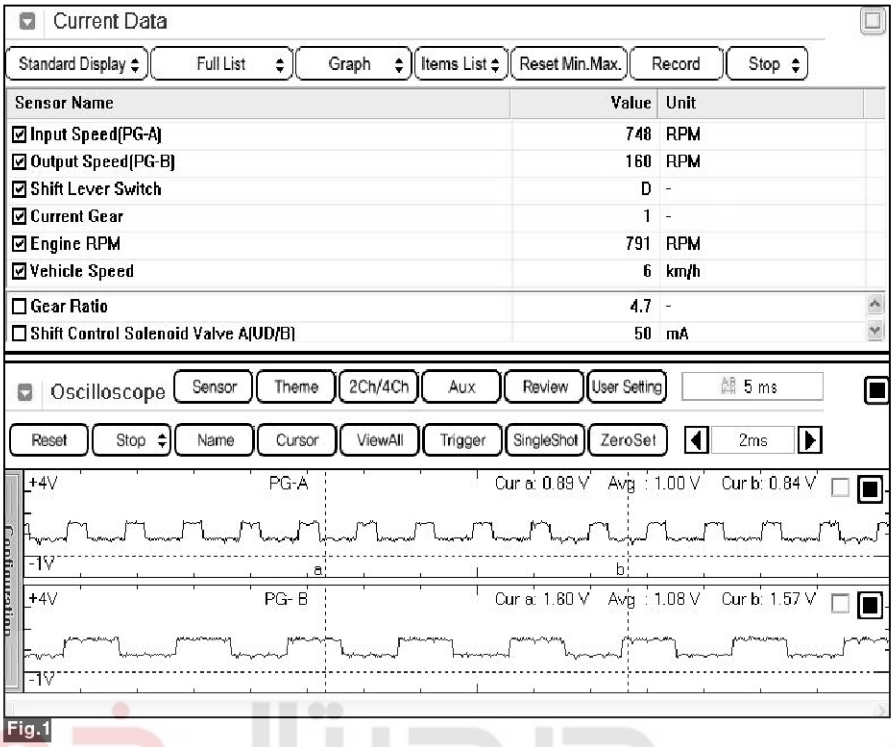


Fig.1

SSLAA1002N

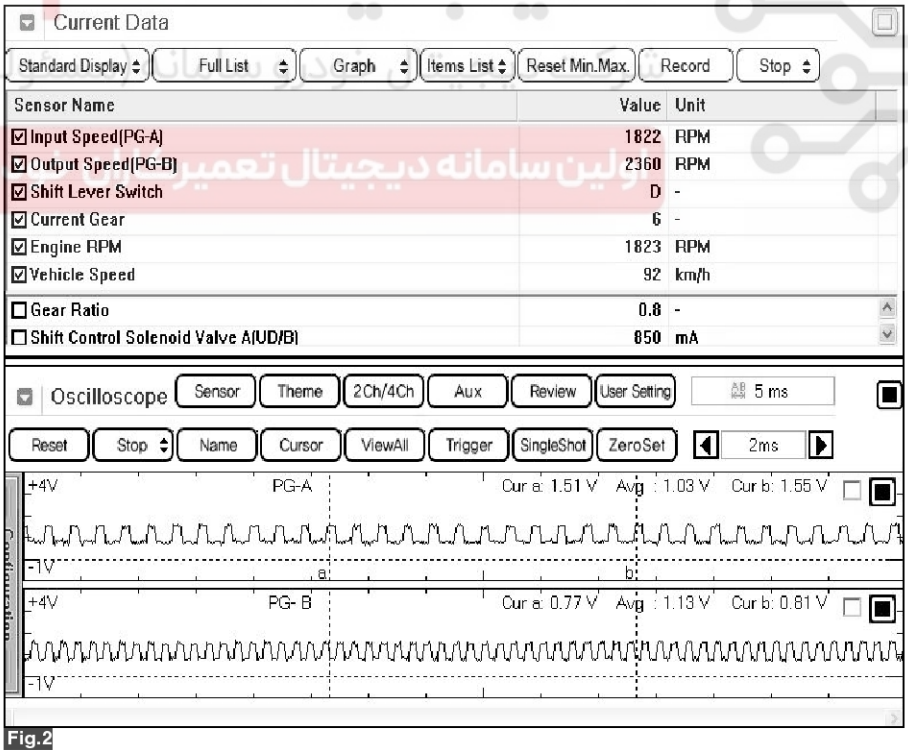


Fig.2

SSLAA1003N

Fig 1) Input/Output speed sensor at low speed

Fig 2) Input/Output speed sensor at high speed

Inspection

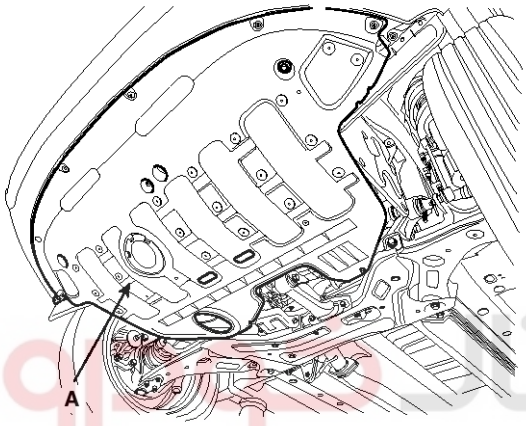
1. Check signal waveform of Input & output speed sensor using the GDS.

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)



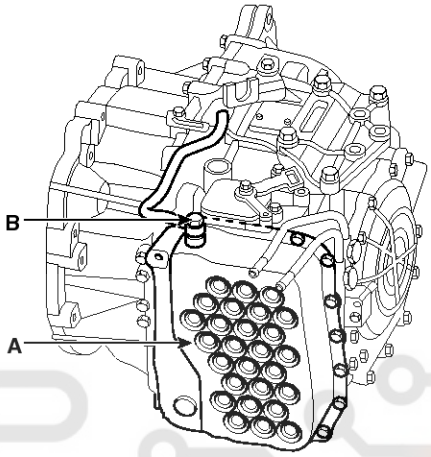
SSLAT0021D

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

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

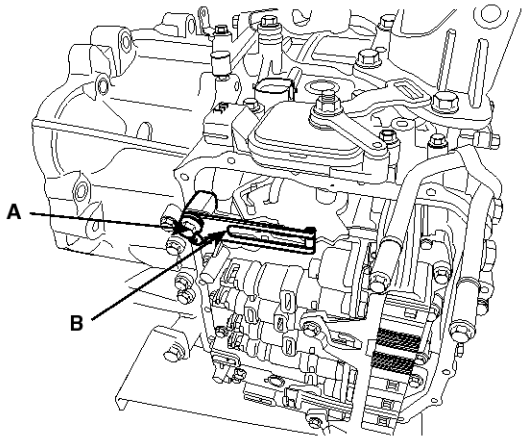
NOTICE
Remove installation bolts in the engine compartment first andthen remove others under the vehicle.



SSLAT1111N

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)

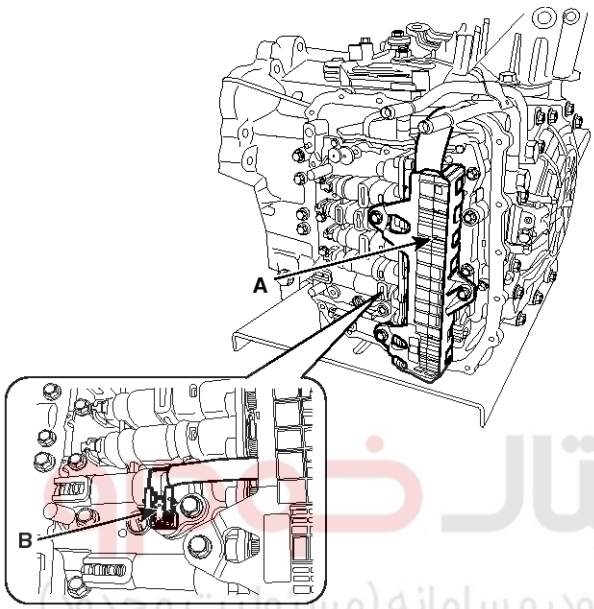


SVGAA0006D

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

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

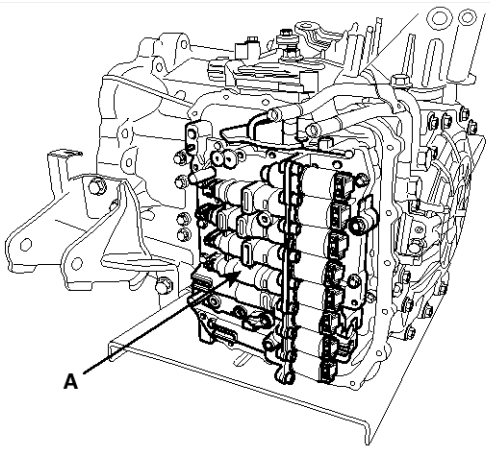
CAUTION
Be careful not to damage the harness lock connector.



SSLAT1112N

7. Remove the valve body assembly (A).

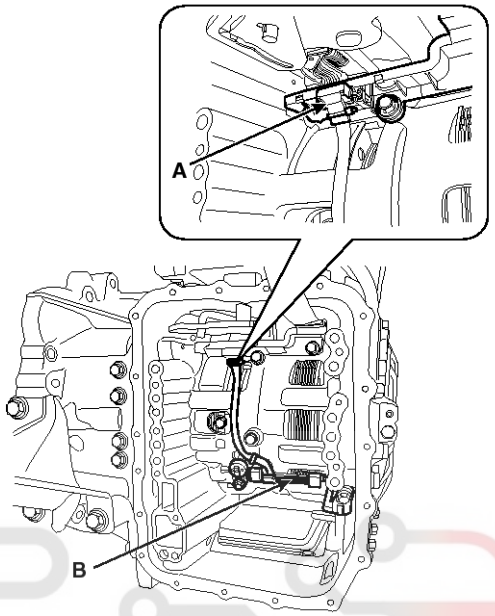
Tightening torque:
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



SCMAT0008L

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)



SCMAT0011L

Installation

1. Installation is the reverse of removal.

NOTICE

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.*

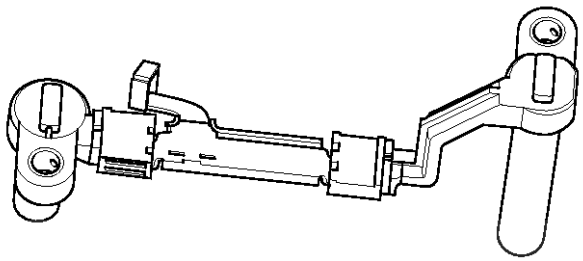
Liquid gasket Part name :
Threebond 1281B or LOCTITE FMD-546

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

Output Speed Sensor

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.



SSLAT0016D

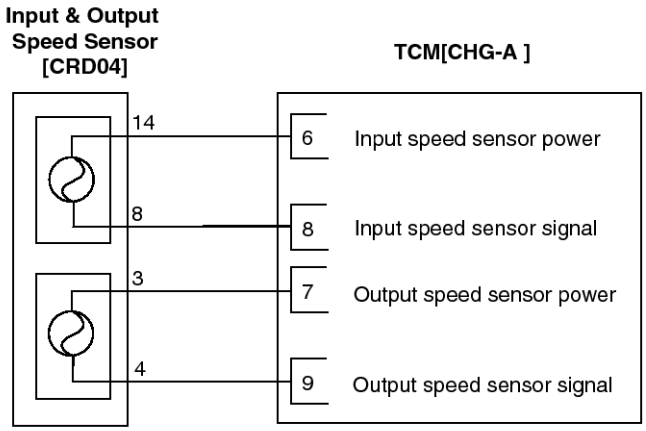
Specifications

▷ Type: Hall effect sensor

Operation condition [˚C(˚F)]		((-)40~150)) -40~302
Air gap(mm)in.		(0.25~0.7)0.01~0.027
Output voltage	High	1.18~1.68
	Low	0.59~0.84

Circuit Diagram

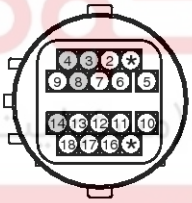
[Circuit Diagram]

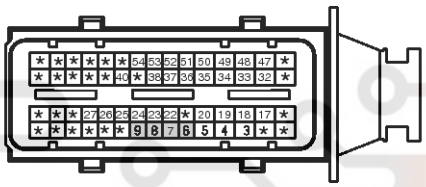


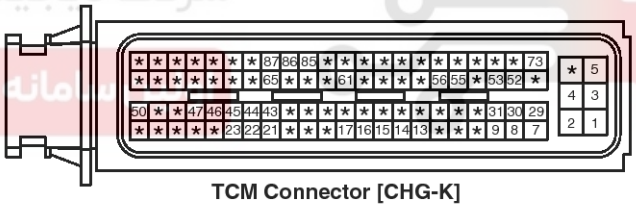
[Connection Information]

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

[Harness Connector]







SSLAA1121N

Signal Waveform

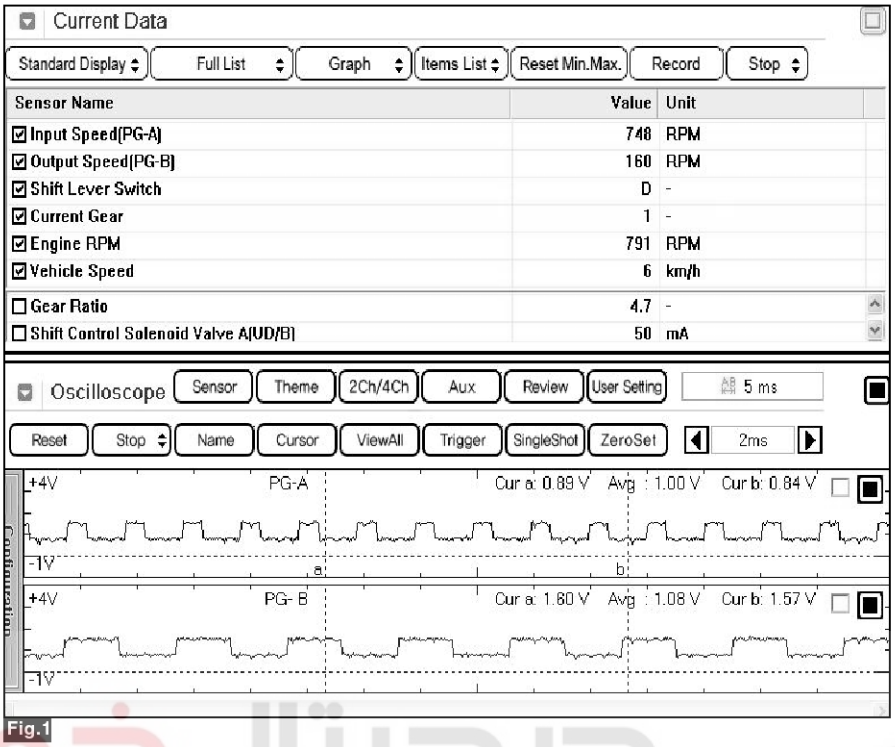


Fig.1

SSLAA1002N

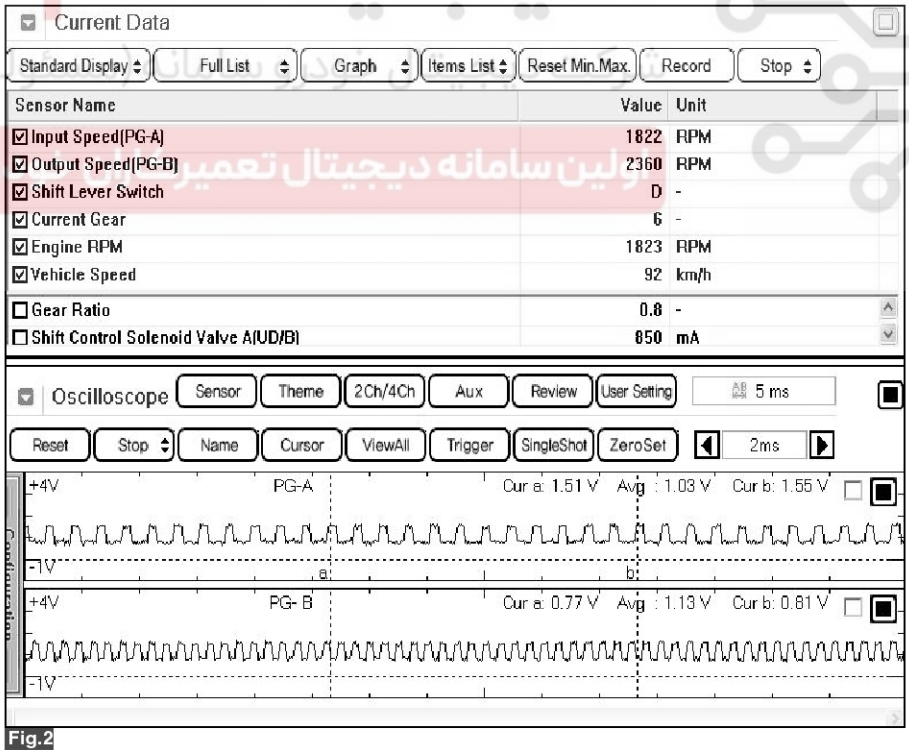


Fig.2

SSLAA1003N

Fig 1) Input/Output speed sensor at low speed

Fig 2) Input/Output speed sensor at high speed

Inspection

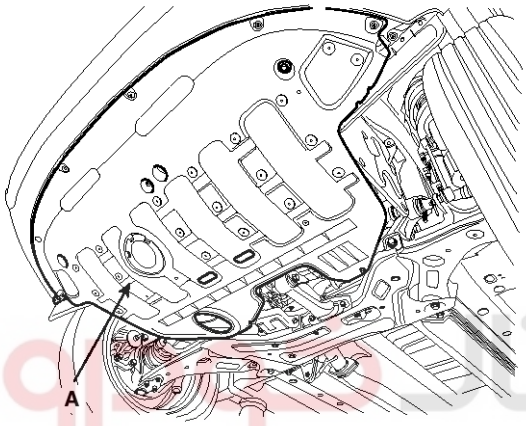
1. Check signal waveform of Input & output speed sensor using the GDS.

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)



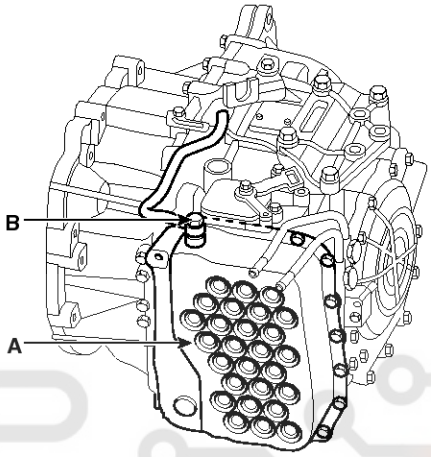
SSLAT0021D

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

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

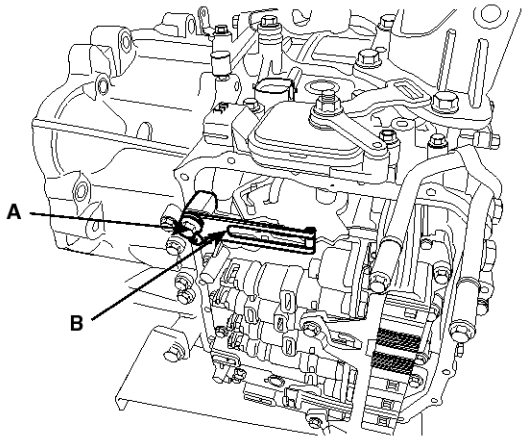
NOTICE
Remove installation bolts in the engine compartment first andthen remove others under the vehicle.



SSLAT1111N

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)

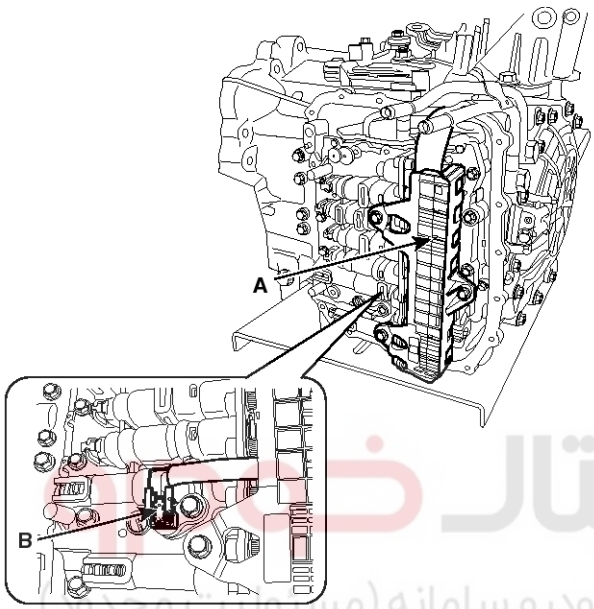


SVGAA0006D

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

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

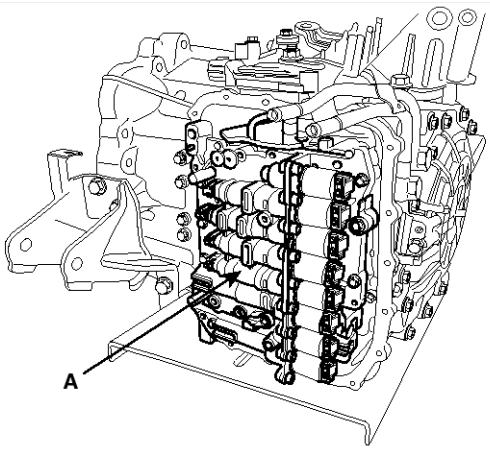
CAUTION
Be careful not to damage the harness lock connector.



SSLAT1112N

7. Remove the valve body assembly (A).

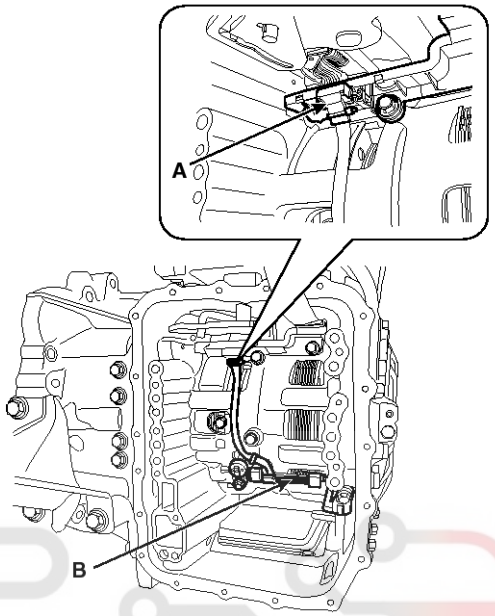
Tightening torque:
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



SCMAT0008L

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)



SCMAT0011L

Installation

1. Installation is the reverse of removal.

NOTICE
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.*

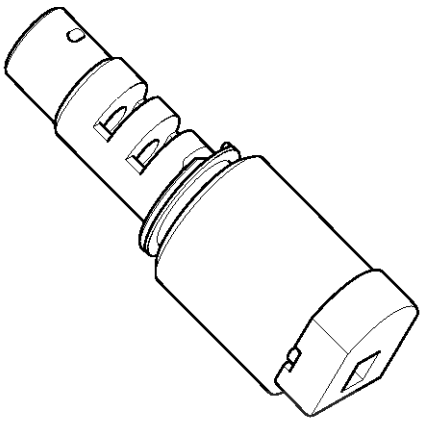
Liquid gasket Part name :
Threebond 1281B or LOCTITE FMD-546

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

Torque Converter Control Solenoid Valve (T/CON_VFS)

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.



SSLAT0018D

Specifications

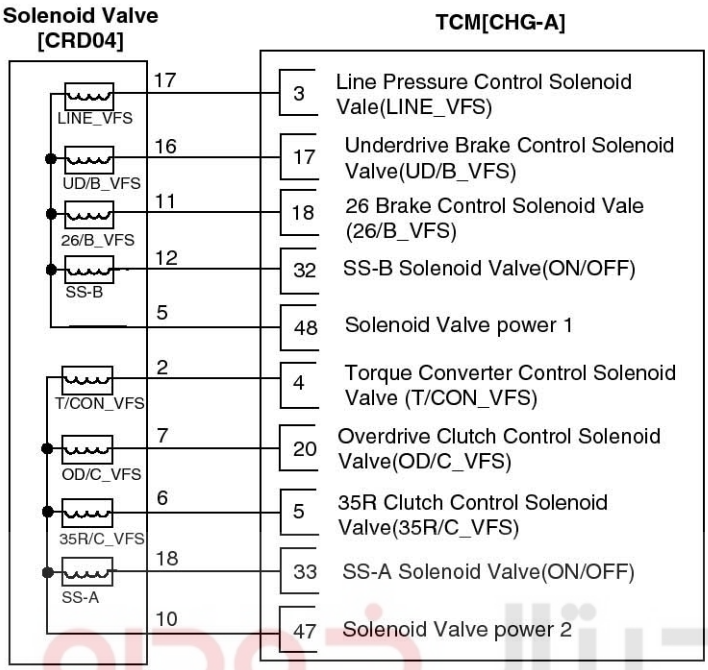
Direct control VFS[T/CON]

▷ Control type : Normal low type

Control Pressure kpa(kgf/㎠, psi)	9.81~500.14(0.1~5.1,1.42~72.54)
Current value(mA)	50~850
Internal resistance(Ω)	5.1

Circuit Diagram

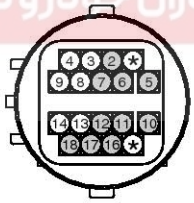
[Circuit Diagram]



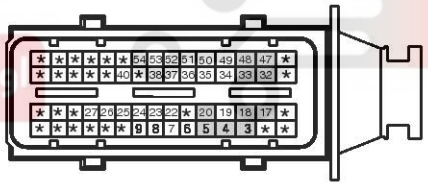
[Connection Information]

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

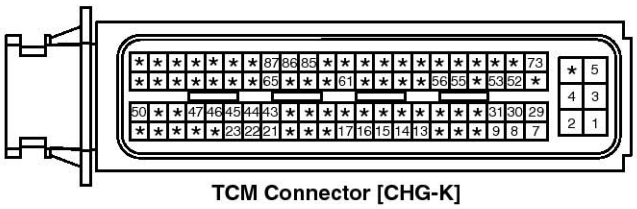
[Harness Connector]



Solenoid Valve Connector [CRD04]



TCM Connector [CHG-A]



TCM Connector [CHG-K]

SSLAA1124N

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

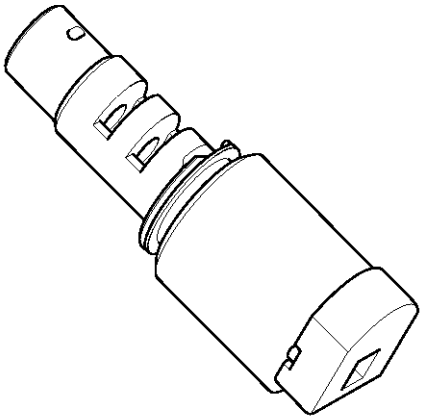
NOTICE

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)

26 Brake Control Solenoid Valve(26/B_VFS)

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.



SSLAT0018D

Specifications

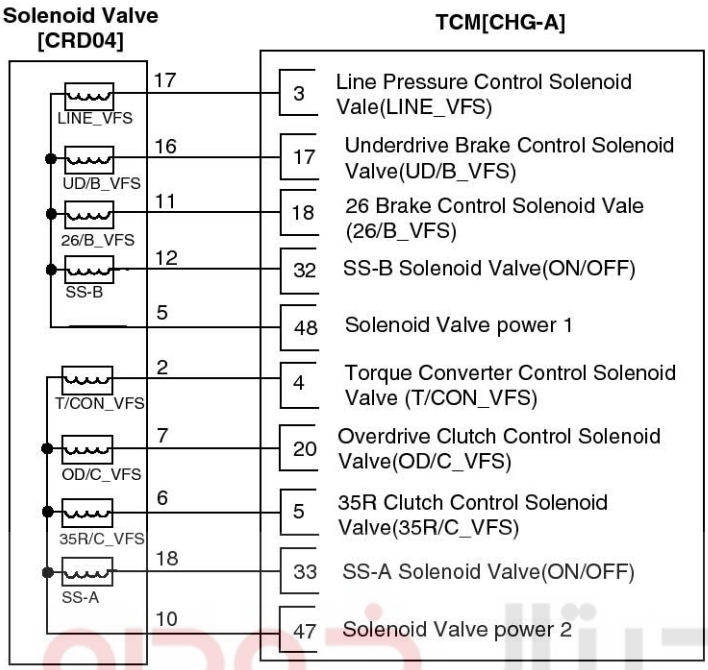
Direct control VFS[26/B]

▷ Control type : Normal low type

Control Pressure kpa(kgf/㎠, psi)	9.81~500.14(0.1~5.1, 1.42~72.54)
Current value(mA)	50~850
Internal resistance(Ω)	5.1

Circuit Diagram

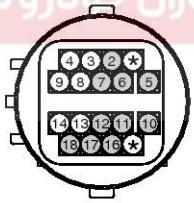
[Circuit Diagram]



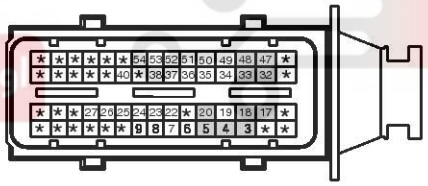
[Connection Information]

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

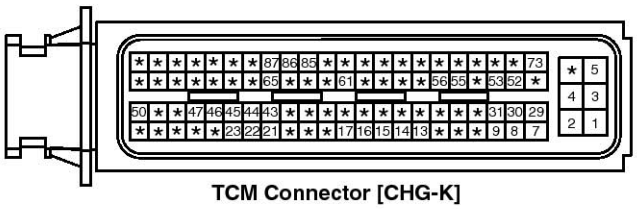
[Harness Connector]



Solenoid Valve Connector [CRD04]



TCM Connector [CHG-A]



TCM Connector [CHG-K]

SSLAA1124N

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

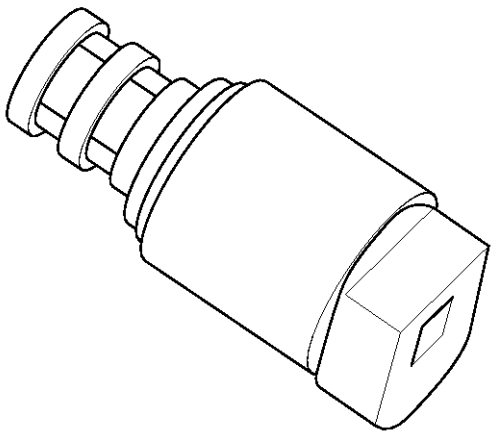
NOTICE

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)

Line Pressure Control Solenoid Valve

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.



SSLAT0019D

Specifications

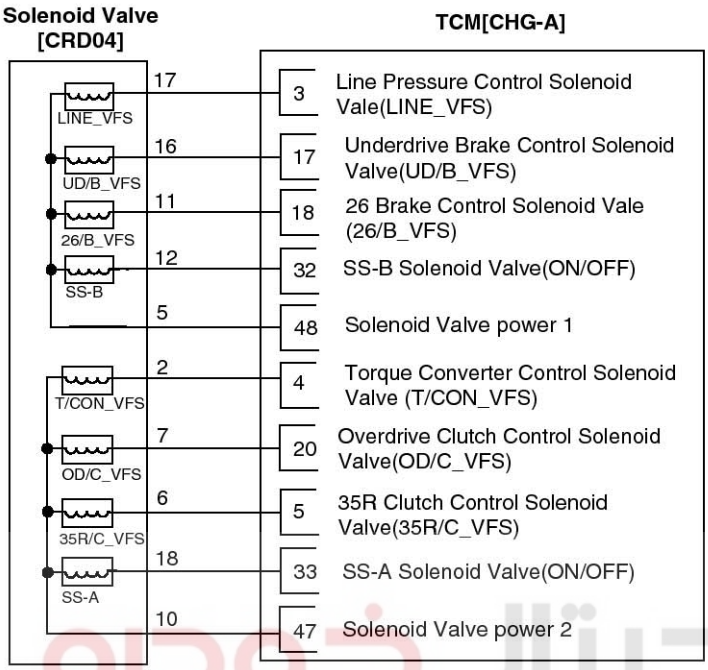
Direct control VFS[LINE Pressure]

▷ Control type : Normal low type

Control Pressure kpa(kgf/㎠, psi)	500.14~9.81(5.1~0.1,72.54~1.42)
Current value(mA)	50~850
Internal resistance(Ω)	5.1

Circuit Diagram

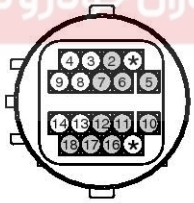
[Circuit Diagram]



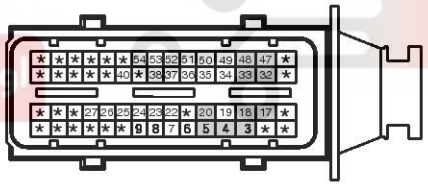
[Connection Information]

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

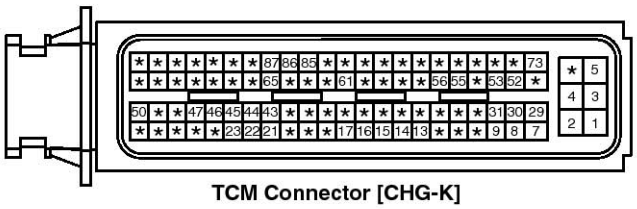
[Harness Connector]



Solenoid Valve Connector [CRD04]



TCM Connector [CHG-A]



TCM Connector [CHG-K]

SSLAA1124N

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

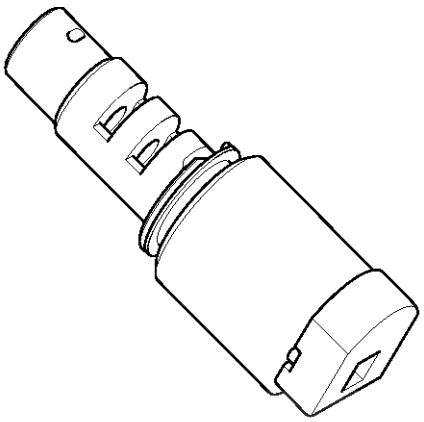
NOTICE

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)

35R Clutch Control Solenoid Valve(35R/C_VFS)

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.



SSLAT0018D

Specifications

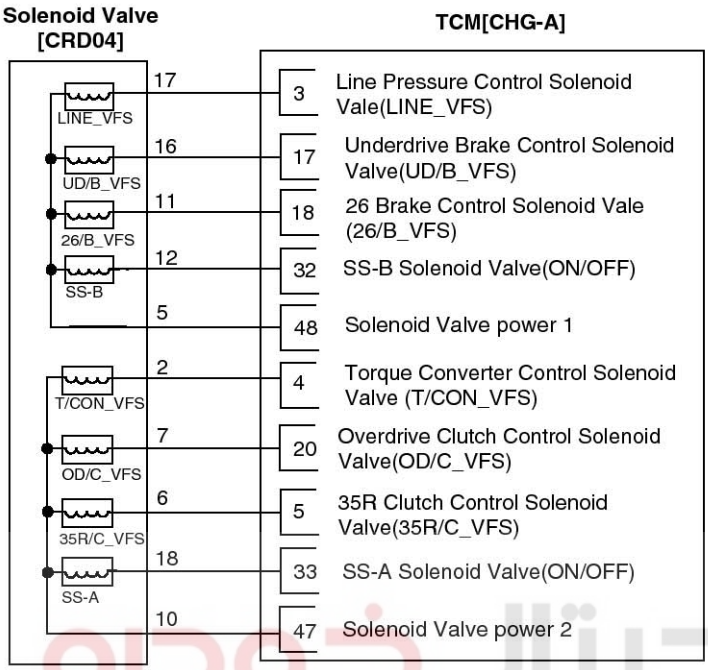
Direct control VFS[35R/C]

▷ Control type : Normal low type

Control Pressure kpa(kgf/㎠, psi)	500.14~9.81(5.1~0.1,72.54~1.42)
Current value(mA)	50~850
Internal resistance(Ω)	5.1

Circuit Diagram

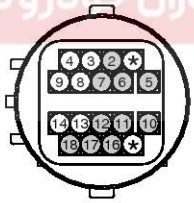
[Circuit Diagram]



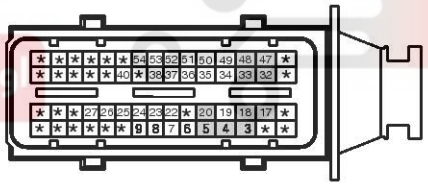
[Connection Information]

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

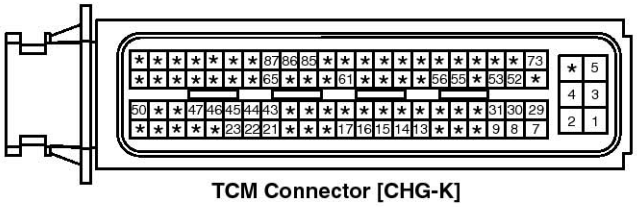
[Harness Connector]



Solenoid Valve Connector [CRD04]



TCM Connector [CHG-A]



TCM Connector [CHG-K]

SSLAA1124N

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

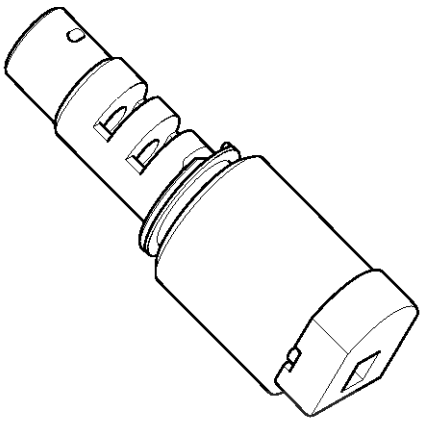
NOTICE

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)

Underdrive Brake Control Solenoid Valve(UD/B_VFS)

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.



SSLAT0018D

Specifications

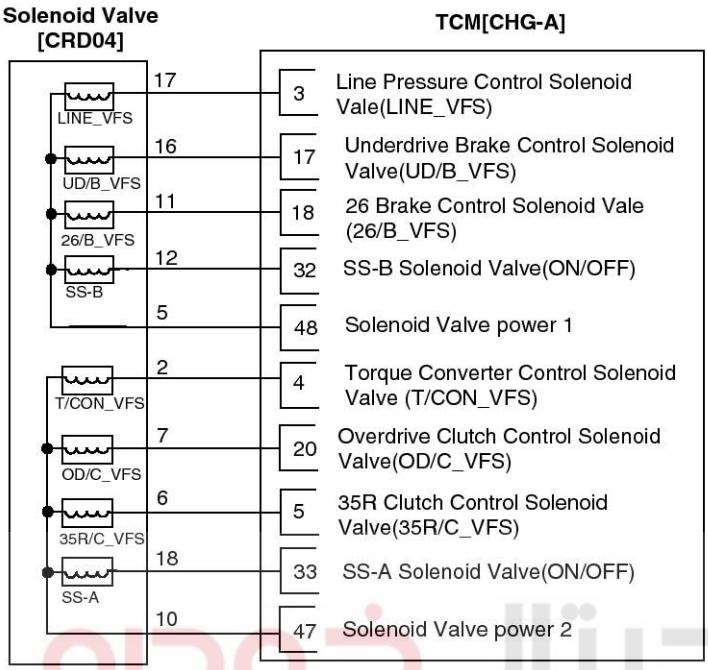
Direct control VFS[35R/C]

▷ Control type : Normal low type

Control Pressure kpa(kgf/㎠, psi)	500.14~9.81(5.1~0.1,72.54~1.42)
Current value(mA)	50~850
Internal resistance(Ω)	5.1

Circuit Diagram

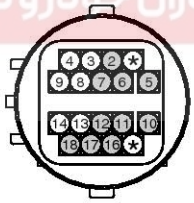
[Circuit Diagram]



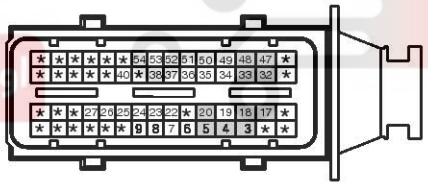
[Connection Information]

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

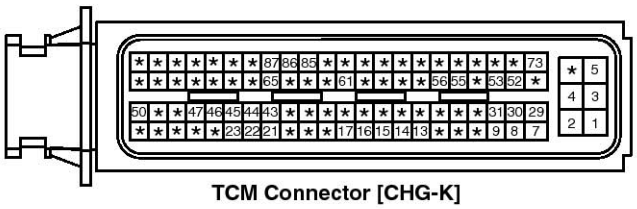
[Harness Connector]



Solenoid Valve Connector [CRD04]



TCM Connector [CHG-A]



TCM Connector [CHG-K]

SSLAA1124N

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

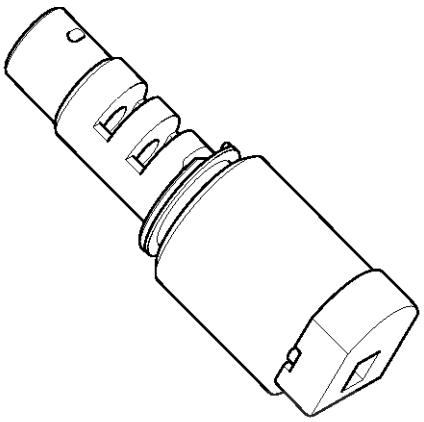
NOTICE

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)

Overdrive Clutch Control Solenoid Valve(OD/C_VFS)

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.



SSLAT0018D

Specifications

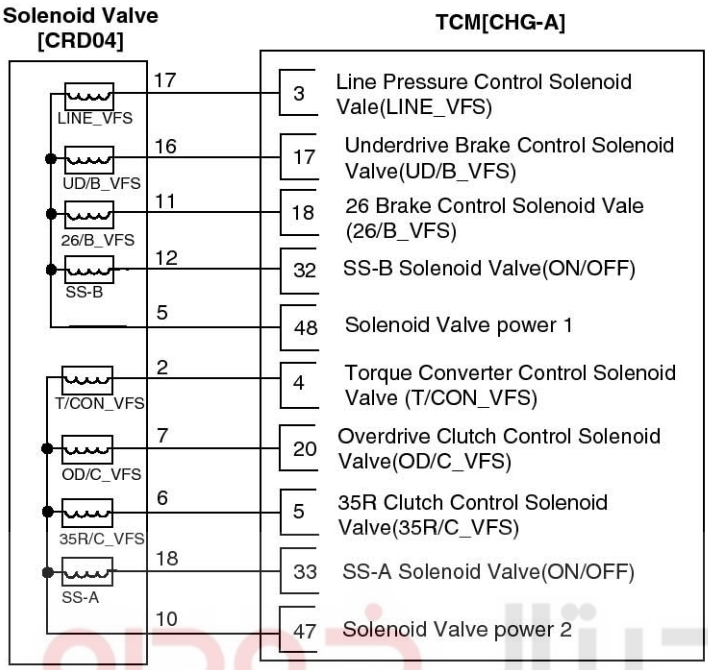
Direct control VFS[35R/C]

▷ Control type : Normal low type

Control Pressure kpa(kgf/㎠, psi)	500.14~9.81(5.1~0.1,72.54~1.42)
Current value(mA)	50~850
Internal resistance(Ω)	5.1

Circuit Diagram

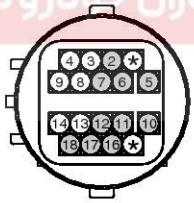
[Circuit Diagram]



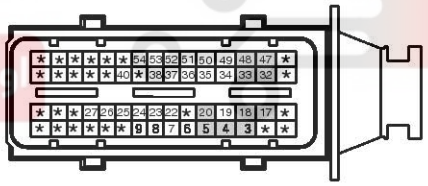
[Connection Information]

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

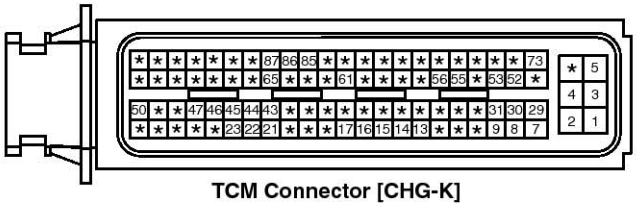
[Harness Connector]



Solenoid Valve Connector [CRD04]



TCM Connector [CHG-A]



TCM Connector [CHG-K]

SSLAA1124N

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

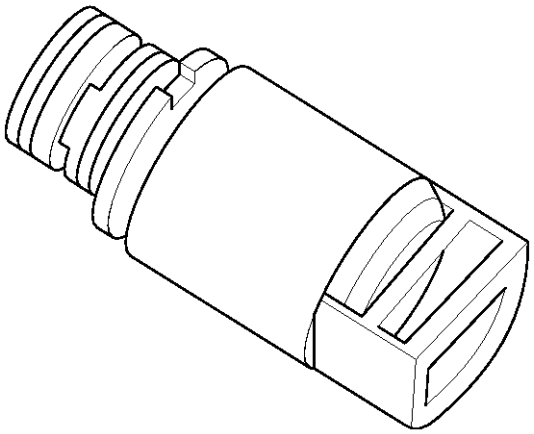
NOTICE

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)

SS-A Solenoid Valve(ON/OFF)

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.



SSLAT0020D

Specifications

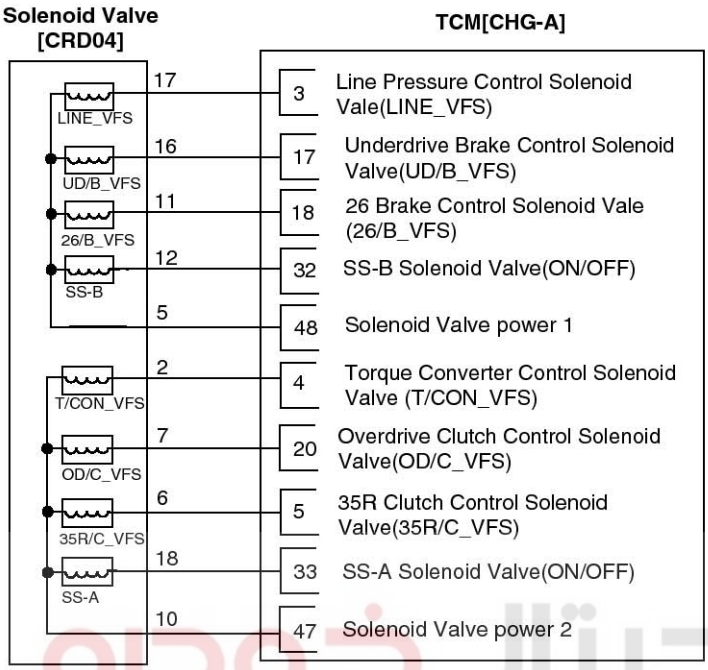
ON/OFF Solenoid Valve(SS-A, SS-B)

▷ Control type : Normal low type

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

Circuit Diagram

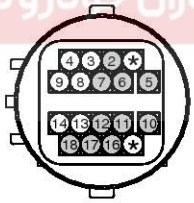
[Circuit Diagram]



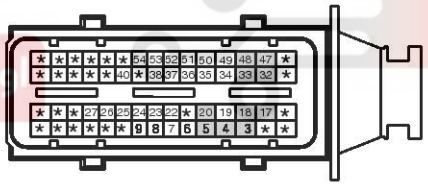
[Connection Information]

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

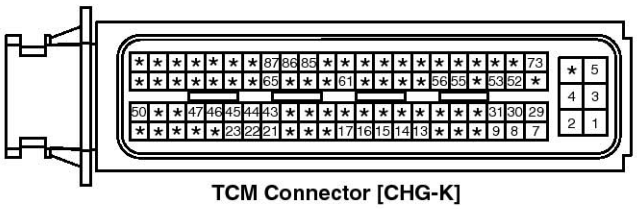
[Harness Connector]



Solenoid Valve Connector [CRD04]



TCM Connector [CHG-A]



TCM Connector [CHG-K]

SSLAA1124N

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.

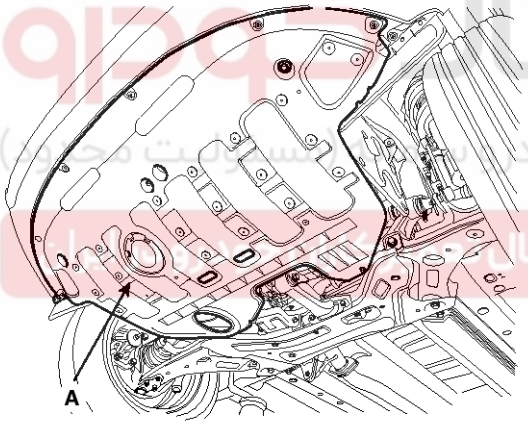
Removal

NOTICE

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)



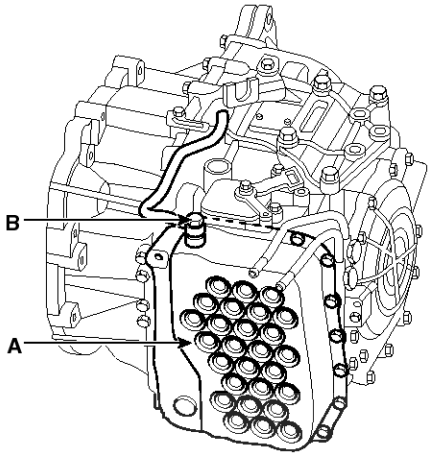
SSLAT0021D

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.



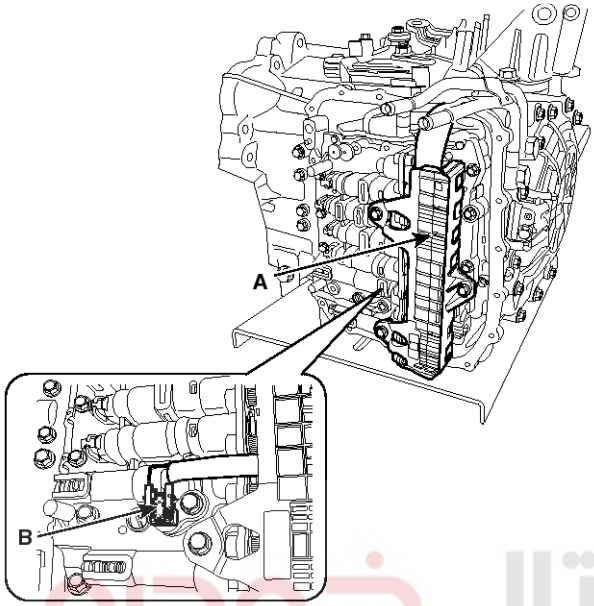
SSLAT1111N

NOTICE

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

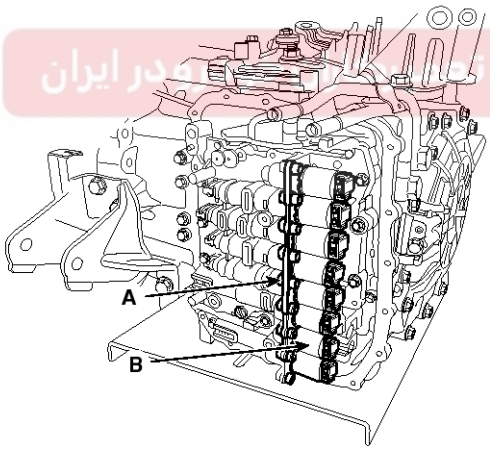
5. Remove the bolt (3ea) after disconnecting the solenoid valve connector (A) and the oil temperature sensor connector (B).

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



SSLAT1112N

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



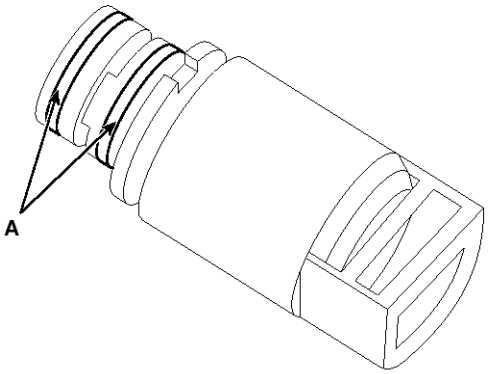
SSLAT0112D

Installation

1. Installation is the reverse of removal.

NOTICE

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



SSLAT0113D

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

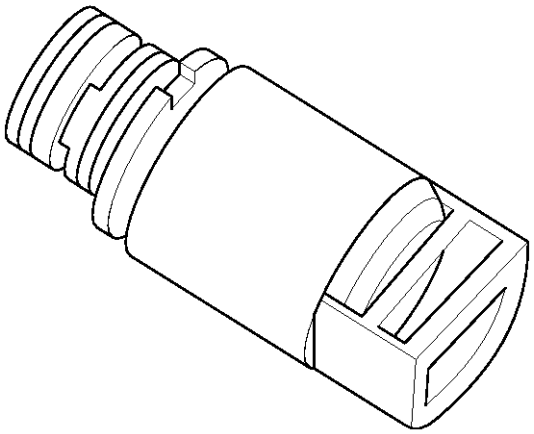
Liquid gasket Part name :
Threebond 1281B or LOCTITE FMD-546

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

SS-B Solenoid Valve(ON/OFF)

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.



SSLAT0020D

Specifications

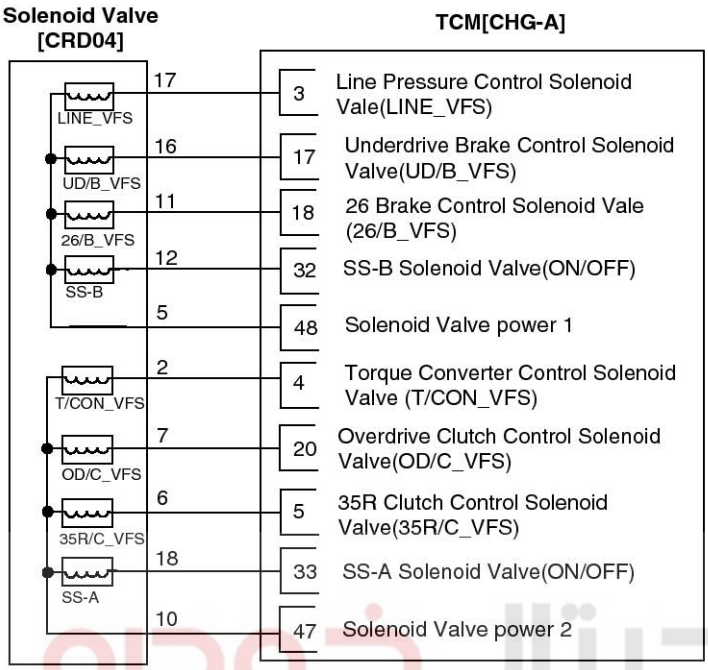
ON/OFF Solenoid Valve(SS-A, SS-B)

▷ Control type : Normal low type

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

Circuit Diagram

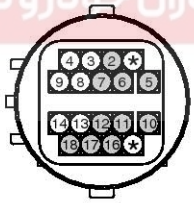
[Circuit Diagram]



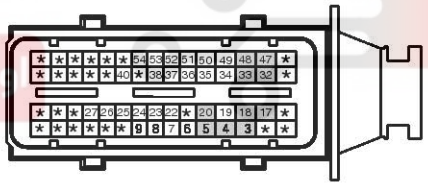
[Connection Information]

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

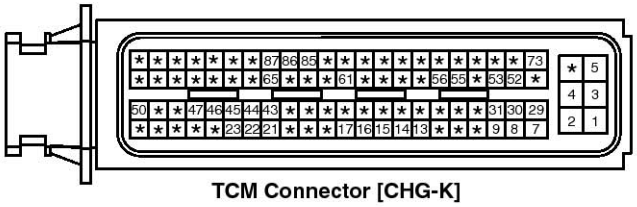
[Harness Connector]



Solenoid Valve Connector [CRD04]



TCM Connector [CHG-A]



TCM Connector [CHG-K]

SSLAA1124N

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.

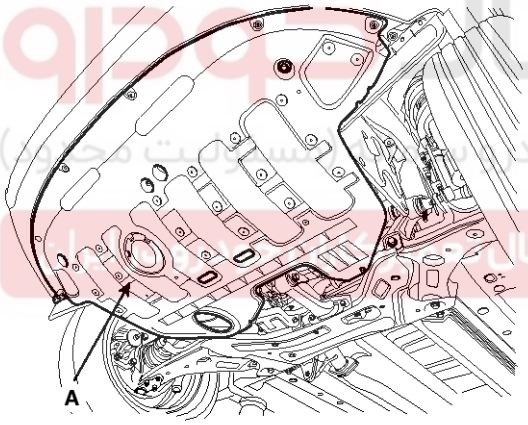
Removal

NOTICE

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)



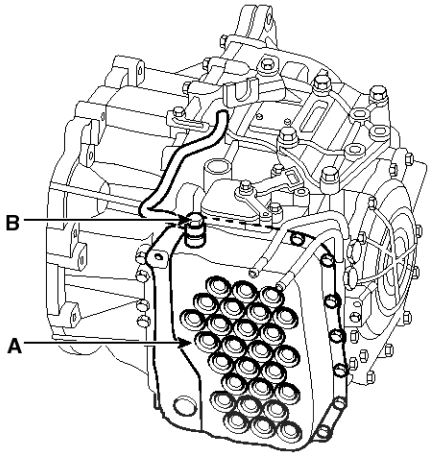
SSLAT0021D

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.



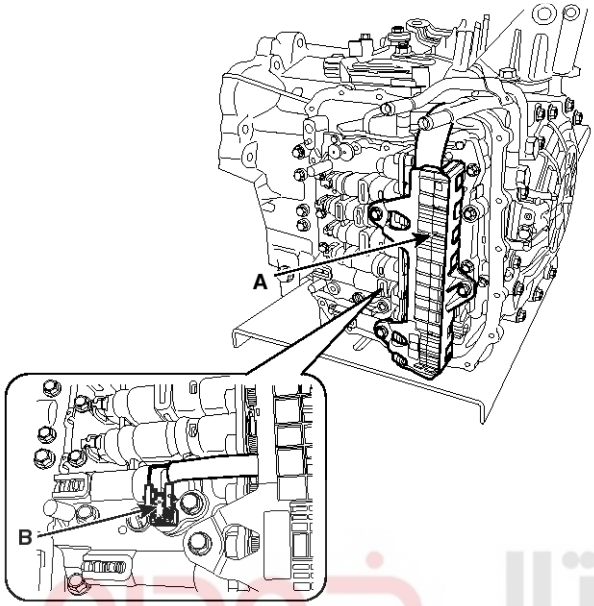
SSLAT1111N

NOTICE

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

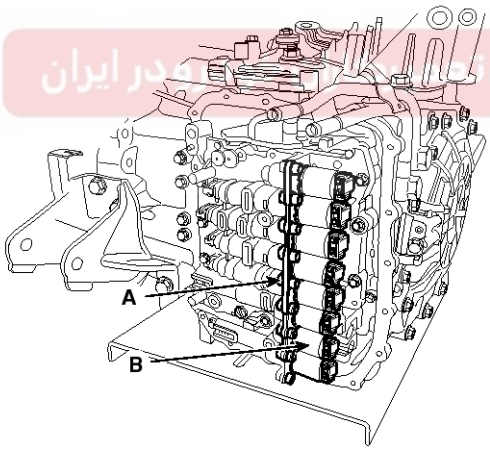
5. Remove the bolt (3ea) after disconnecting the solenoid valve connector (A) and the oil temperature sensor connector (B).

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



SSLAT1112N

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



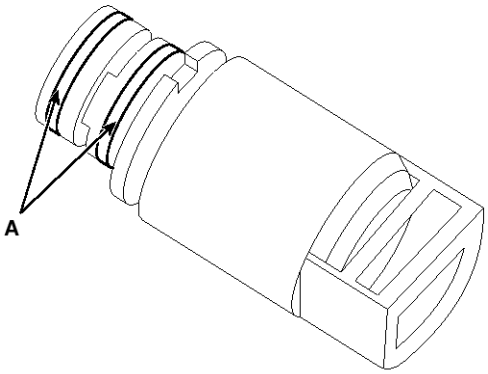
SSLAT0112D

Installation

1. Installation is the reverse of removal.

NOTICE

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



SSLAT0113D

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

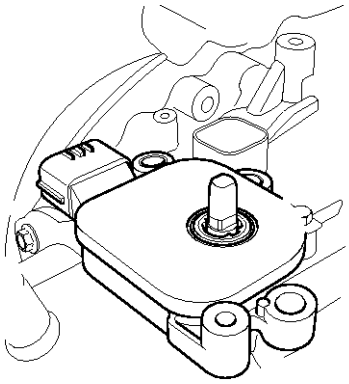
Liquid gasket Part name :
Threebond 1281B or LOCTITE FMD-546

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

Inhibitor Switch

Description

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



SSLAT1113N

Specifications

▷ Type: Combination of output signals from 4 terminals

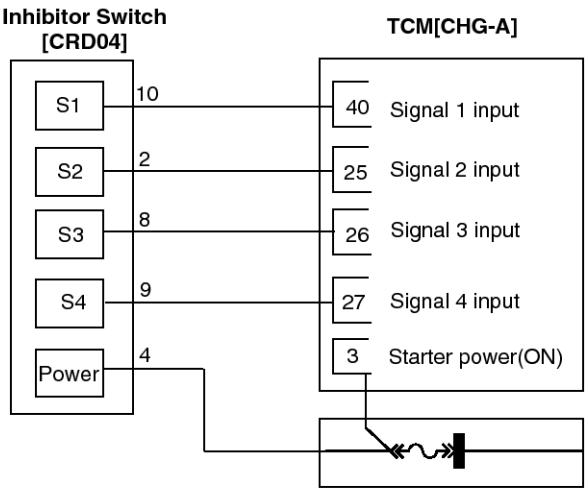
Power supply (V)	12
Output type	Pin to Pin

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

Circuit Diagram

[Circuit Diagram]

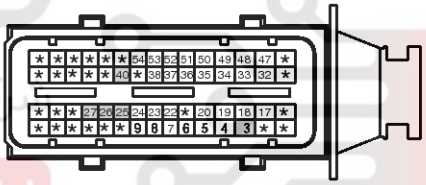


[Connection Information]

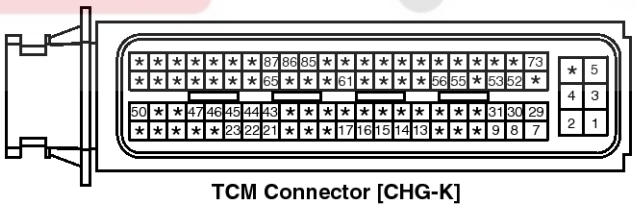
Terminal	Connected to	Function
10	TCM CHG-A (40)	Signal 1 input
2	TCM CHG-A (25)	Signal 2 input
8	TCM CHG-A (26)	Signal 3 input
9	TCM CHG-A (27)	Signal 4 input
4	E/R Fuse & Relay Box	Starter power(ON)

[Harness Connector]

Solenoid Valve Connector [CRD04]



TCM Connector [CHG-A]

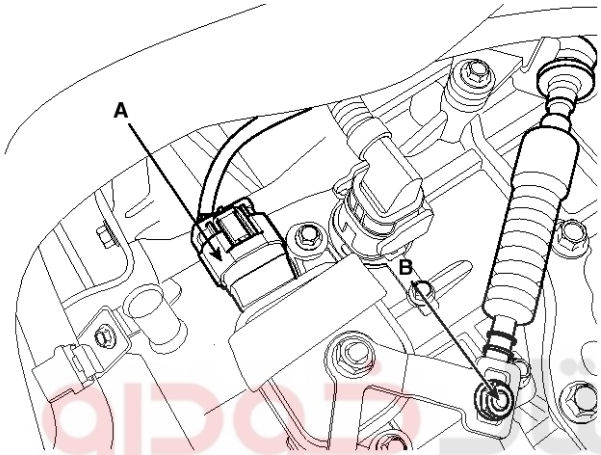


TCM Connector [CHG-K]

SSLAA1123N

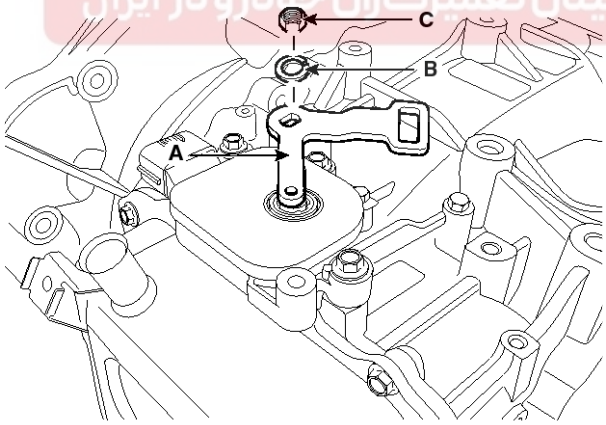
Removal

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).
5. Disconnect the inhibitor switch connector (A).



SLMAT0008N

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



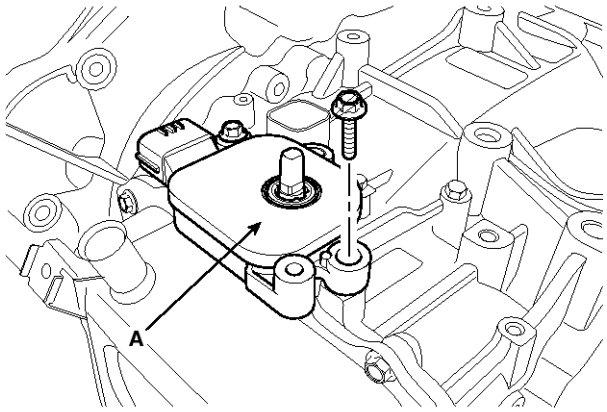
SSLAT1115N

⚠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)



SSLAT1116N

⚠CAUTION

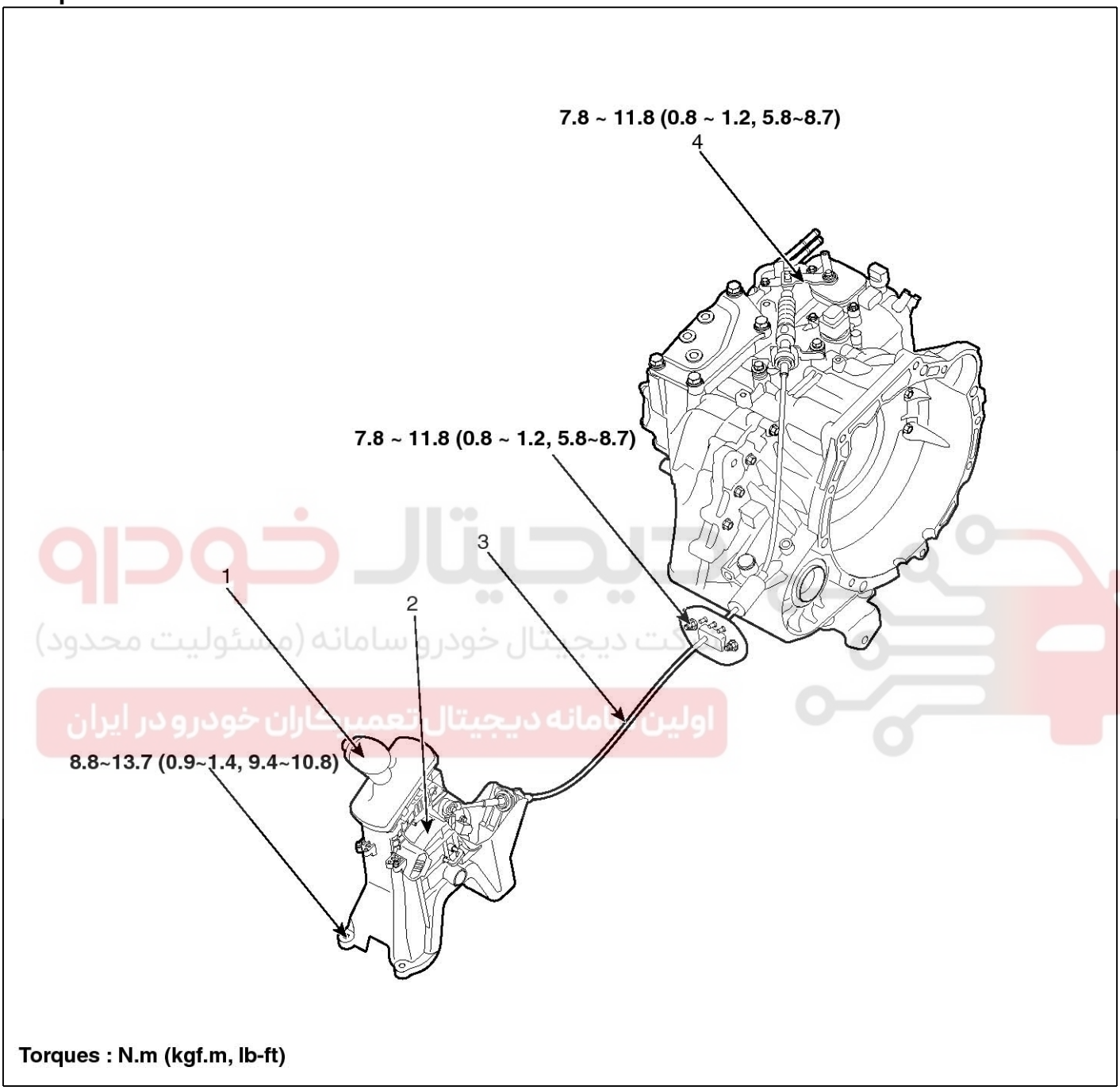
When installing, tighten the inhibitor assembly mounting bolt lightly, so that necessary adjustments can be made. Tighten to specifications.

Installation

1. Installation is the reverse of removal.

Shift Lever

Components



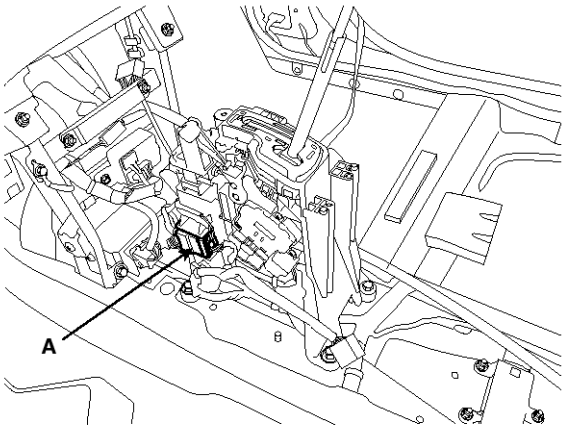
SSLAT1017N

1. Shift lever knob & boots assembly
2. Shift lever assembly
3. Control cable assembly
4. Manual control lever (T/M side)

Removal

Shift Lever Assembly Replacement

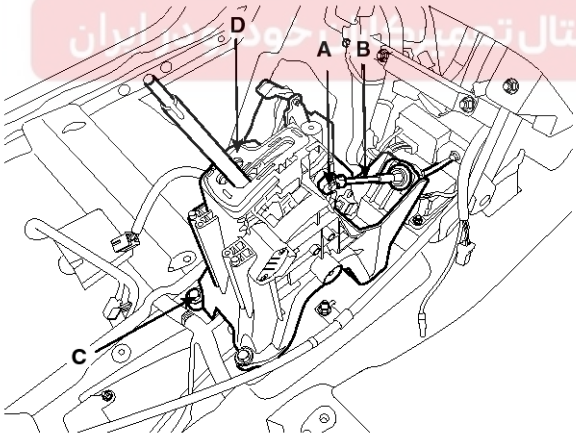
1. Remove the center console assembly. (Refer to "Interior(console)" in BD group.)
2. Disconnect sports mode connector (A).



SSLAT0030D

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)



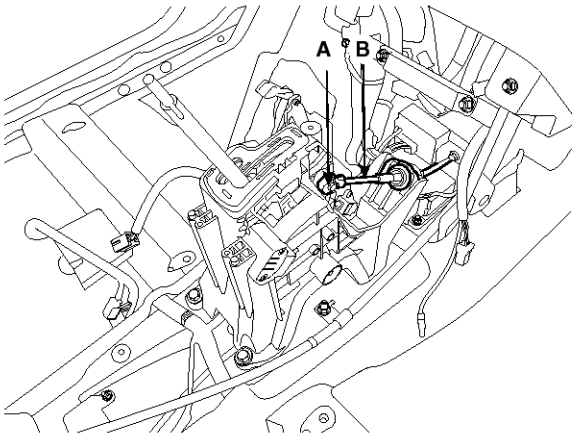
SSLAT0031D

5. Installation is the reverse of removal.

NOTICE
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

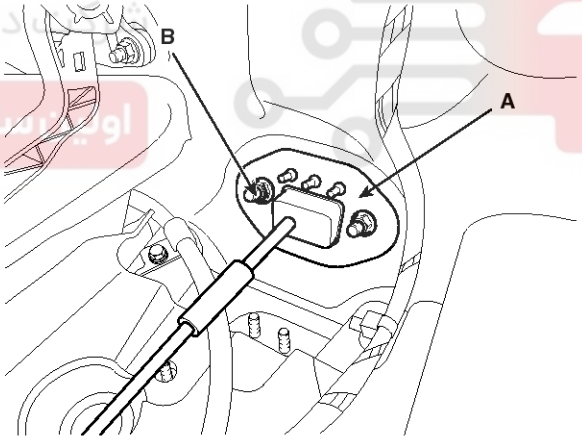
1. Remove the center console assembly. (Refer to "Interior(console)" in BD group.)
2. Take off the clip (A) and then remove the control cable (B).



SSLAT0034D

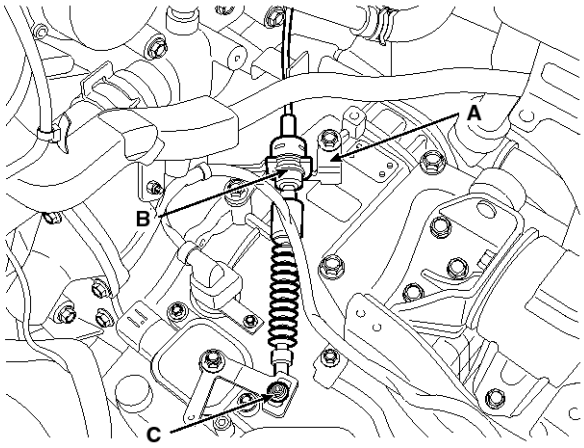
3. Remove the control cable assembly in the vehicle after removing the nuts (B) and the retainer (A).

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



SSLAT0032D

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).



SSLAT1004L

6. Remove the control cable inside of cab.

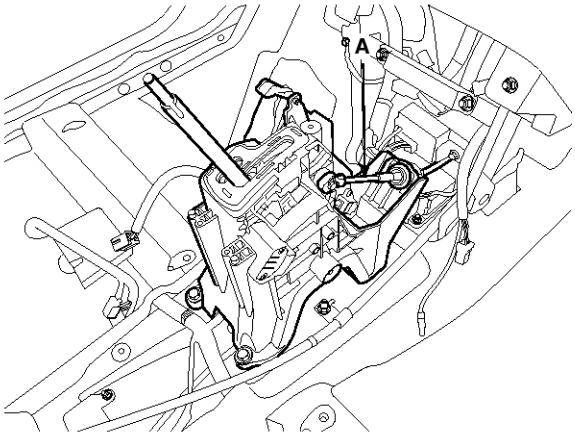
Inspection

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.

Adjustment

Adjusting method for T/M control cable

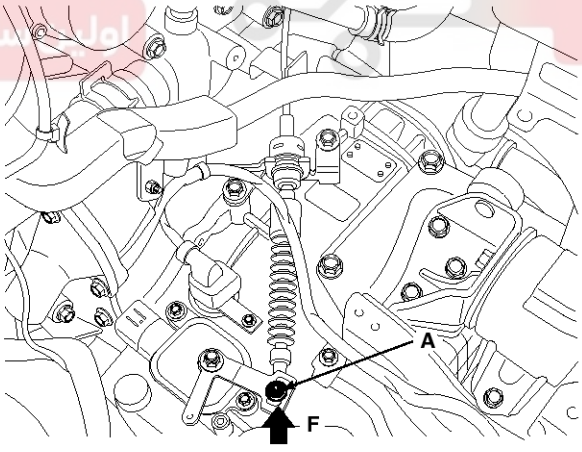
1. Make sure vehicle does not roll before setting room side shift lever and T/M side manual control lever to "N" position.
2. Connect room side shift lever and control cable (A).



SSLAT1005L

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)



SLMAT0028D

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.