General Information

Specifications

Transaxle model		A4CF2
Engine model		Gasoline 2.0L
T/con		3 elements 2 phases 1 stage
T/con size (Φ)		236
O/PUMP type		Parachoid
T/M CASE type		Separated
Friction elements		Clutch: 3EA
		Brake: 2EA
		OWC : 1EA
Planetary gear		2EA
Gear ratio	1st	2.919
	2nd	1.551
	3rd	1.000
	4th	0.713
	Reverse	2.480
Final gear ratio		3.681
Fluid pressure balance piston		2EA
Stall speed		2,000~2,700 rpm
Accumulator		4EA
Solenoid valve		6EA (PWM:5EA, VFS:1EA)
Shift lever position		7 range (P,R,N,D,3,2,L)
Oil filter		1EA

Tightening Torques

Item	N.m	kgf.m	lb-ft
Control cable bracket	19~23	1.9~2.3	14~17
Input speed sensor	10~12	1.0~1.2	7~8
Output speed sensor	10~12	1.0~1.2	7~8
Manual control lever	17~21	1.0~2.1	13~15
Inhibitor switch	10~12	1.0~1.2	7~8
Oil pan	10~12	1.0~1.2	7~8
Valve body mounting bolt	10~12	1.0~1.2	7~8
Oil drain plug	35~45	3.5~4.5	25~32
Pressure check plug	8~10	0.8~1.0	6~7
Transaxle mounting sub bracket bolt	60~80	6.0~8.0	43~58

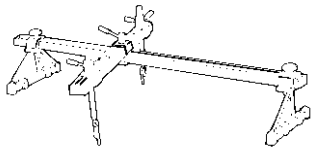
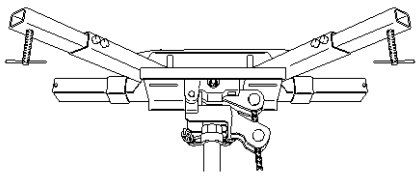
Lubricants

Item	Specified lubricant	Quantity
Transaxle fluid liter (US qt, Imp.qt)	GENUINE DIAMOND ATF SP-III or SK ATF SP -III	6.6 (6.9, 5.81)

Sealant

Item	Specified sealant
Rear cover Torque converter housing Oil pan	LOCTITE FMD-546

Special Service Tools

Tool (Number and name)	Illustration	Use
09200-38001 Engine support fixture	 AKGF020A	Removal and installation of the transaxle.
09624-38000 Crossmember supporter	 EKBF005A	Supporting of the crossmember.

Automatic Transaxle System

Description

The new small sized automatic transaxle (A4CF2) is for gasoline 2.0 engine.
The transaxle (A4CF2) is improved on the durability, fuel consumption and efficiency by the new main features as followed.

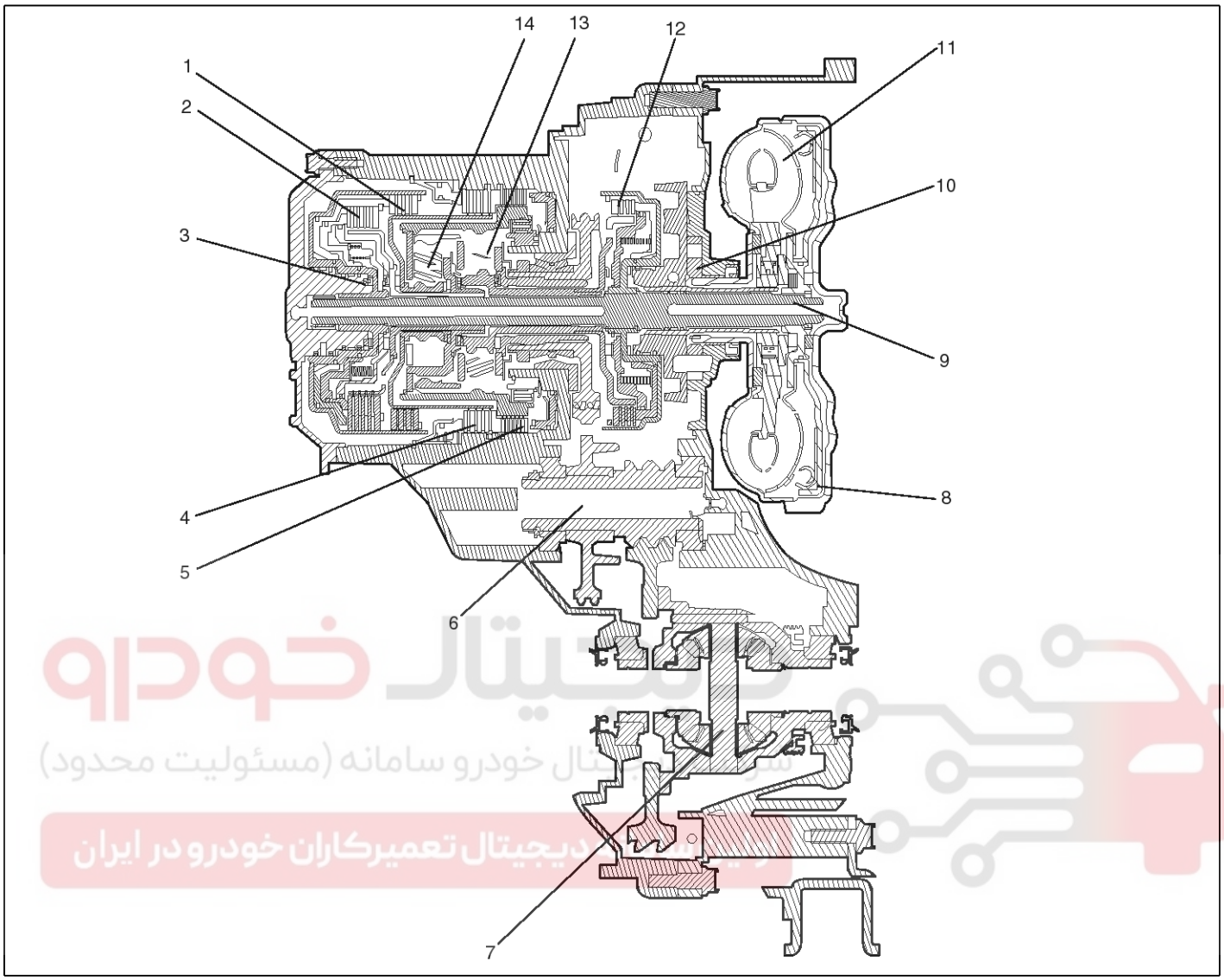
The new main features

1. The hydraulic centrifugal oil pressure balance piston.
2. The full line pressure variable control system.
3. The long travel damper clutch.
4. The disc type return spring.
5. The ultra flat torque converter.

Functions

Item	Contents
Components	The full line pressure variable control operates in the valve body to improve the fuel consumption.
	The long travel damper clutch is applied to the torque converter to improve the engine revolution change reduction capability and the fuel consumption. (17~20˚)
	The oil pump of the trochocentric type is changed to parachoid type to improve the processing and the capacity efficiency at the low RPM range.
	The disc type return spring is applied to the low & reverse brake to improve the durability and reduce the length.
	The hydraulic centrifugal oil pressure balance piston is applied to the inside of clutch to improve the durability and the shift control capability.
	The low noise gear and the gear teeth face grinding are applied to the transfer driven gear to improve the noise and the durability.
Electronic control system	The oil pressure value set by TCM is coupled with the engine torque so that the stable shift feeling can be improved.
	The engine torque reduction control operates effectively to improve the shift feeling and the durability.
	It can be the skip shift of 1↔3 and 2↔4 when shifting.
	The reverse clutch, not L/R brake is controlled when controlling the N→R shift so that the N→R shift feeling can be improved.
	The range of the damper clutch direct control expands to improve the fuel consumption.
	The current control chip is installed into the TCM to regulate the solenoid control current and control the oil pressure securely according to the change of the temperature and voltage.
	The FPC(Flexible Printed Circuit) harness is composed of the thin and flat copper in the insulating film like electric wire.
	The tachometer is operated by the change of the frequency forwarded from the TCM to the instrument cluster, not vehicle speed sensor.

Transaxle Structure



SFDAT9001N

1. Reverse clutch
2. Overdrive clutch
3. Rear cover
4. Second brake
5. Low and reverse brake
6. Output shaft
7. Differential
8. Damper clutch
9. Input shaft
10. Oil pump assembly
11. Torque converter assembly
12. Underdrive clutch
13. Output planetary carrier
14. Overdrive planetary carrier

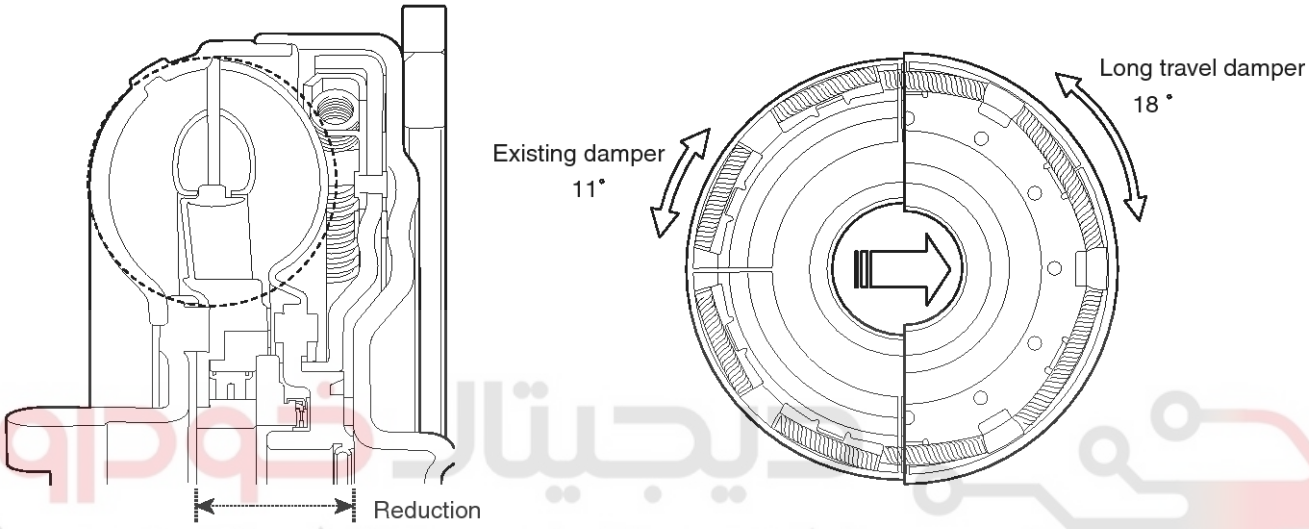
Mechanical system

Function

Torque Converter

The torque converter, as the power plant which delivers the power of engine to the automatic transaxle, consists of 3 elements, 2 phases and 1 stage type.

- The flowing section form of the torque converter changes the round type to the flat type to reduce the length of the torque converter.
- The maximum operating degree of the damper clutch installed inside the transaxle increases from 11˚ to 18˚ to improve the engine revolution change reduction capability and the fuel consumption.



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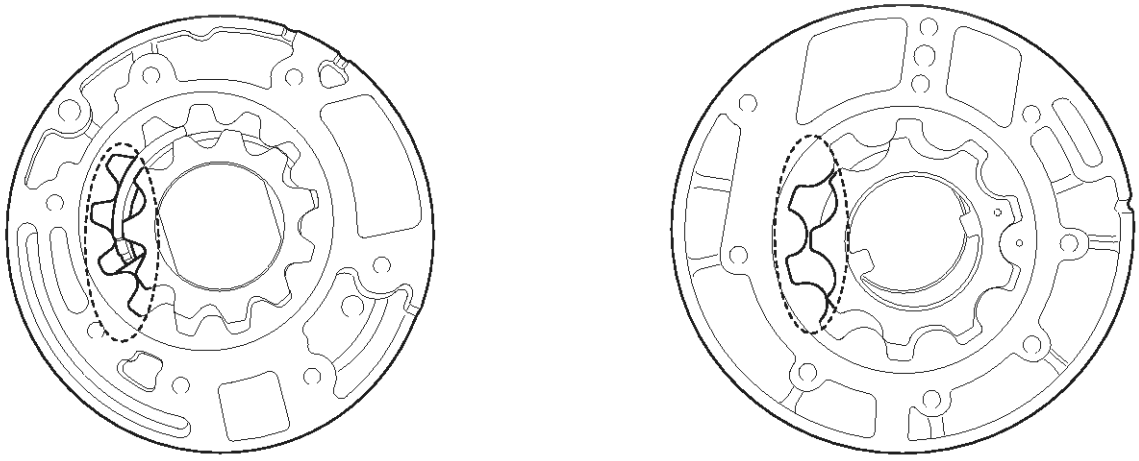
Oil Pump

The oil pump is made of the aluminum (the reaction shaft support) to loose the weight and selects the parachoid type to improve the processing and the capacity efficiency at the low RPM range.



<Trocoid> <Pharacoid>

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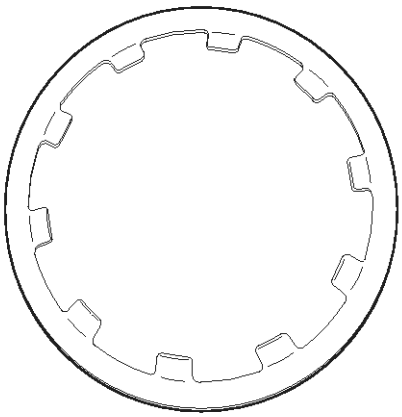
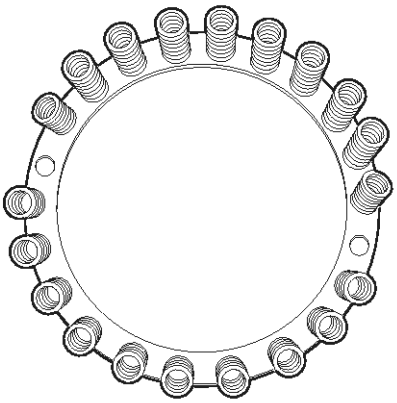
Brakes

The automatic transaxle (A4CF2) uses the low and reverse brake and the second brake. The low and reverse brake is fixed by the low and reverse annulus gear and overdrive planetary carrier.

- The disc type return spring is applied to the low and reverse brake and it minimizes the slip of the friction material from the uniform spring operation power to improve the durability and reduce the length.

The reverse sun gear is held on the transaxle case by the second brake.





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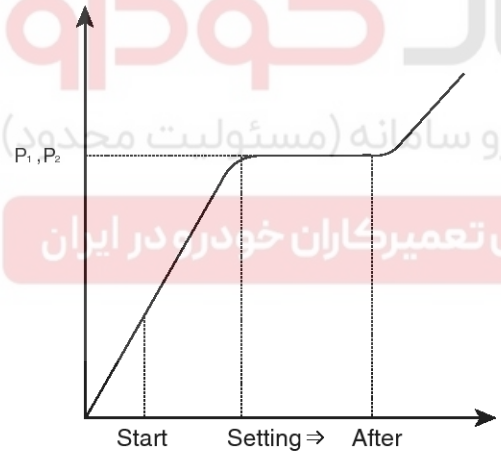
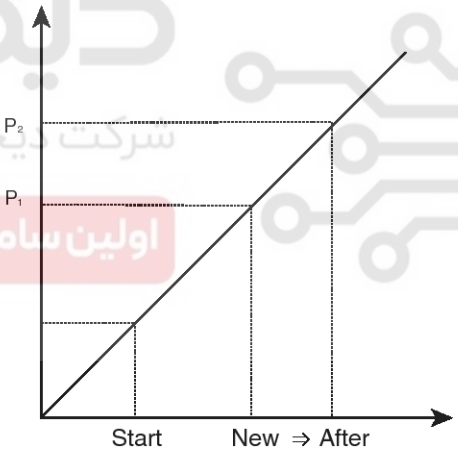


<Disc type return spring>



<Coil type return spring>

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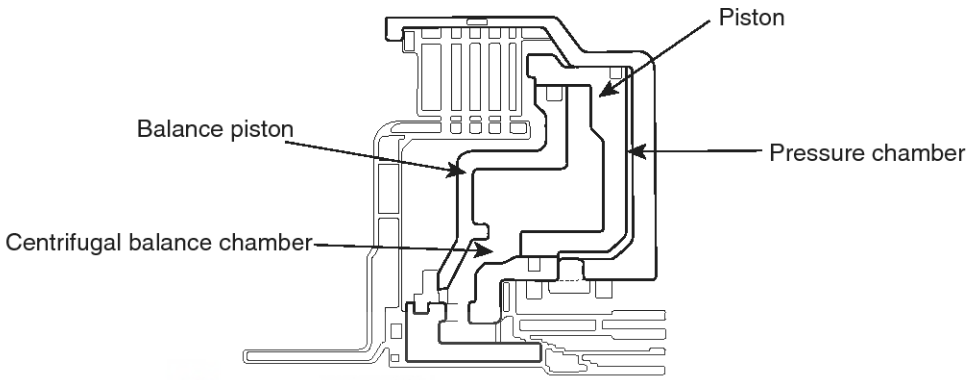
Clutch

The multiple clutches and the one way clutch are used as the transaxle device.
The retainer of each clutch is composed of the precision sheet metal parts to realize the productivity and the light weight .
The hydraulic centrifugal oil pressure balance device places inside the clutch assembly.
Generally the oil remained in the piston oil pressure chamber pushes the piston by the centrifugal force. But to prevent t he piston from being pushed, the oil filled in between the piston and the return spring retainer occurs the centrifugal force and both of the power is offset so that the piston don't move. In result, it improves the durability and the shift control ability.



<Centrifugal balance device>

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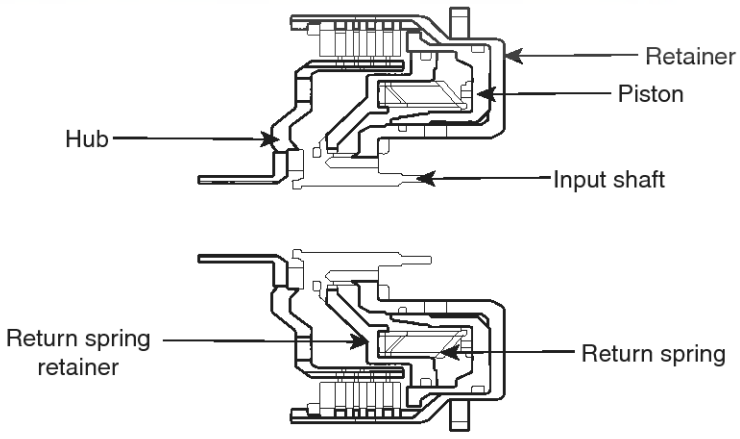
1. Underdrive Clutch

The driving force of input shaft is delivered to the underdrive sun gear.
The operating oil pressure in the underdrive clutch components operates between the piston and the retainer and pushes the piston to the clutch discs to deliver the driving force from the retainer to the hub.



<Underdrive clutch>

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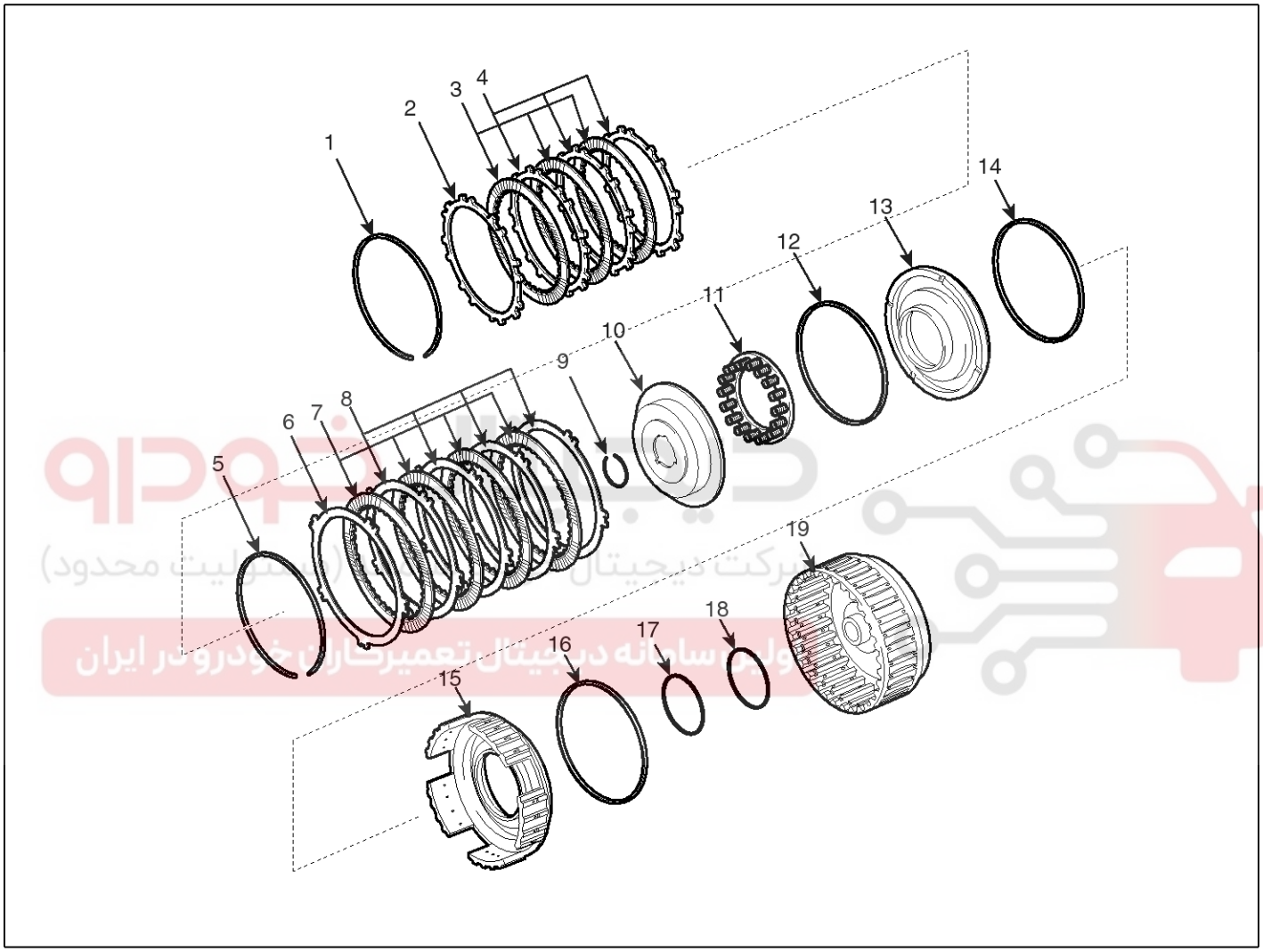
2. Reverse clutch and overdrive clutch

The reverse clutch delivers the driving force of input shaft to the reverse sun gear.
The overdrive clutch delivers the driving force of input shaft to the overdrive planetary carrier and the low and reverse a-nnulus gear.
The operating oil pressure of the reverse clutch operates between the reverse clutch retainer and reverse clutch piston and it has the whole overdrive clutch moved to deliver through the hub splines.

Structure Of The Reverse And The Overdrive Clutch



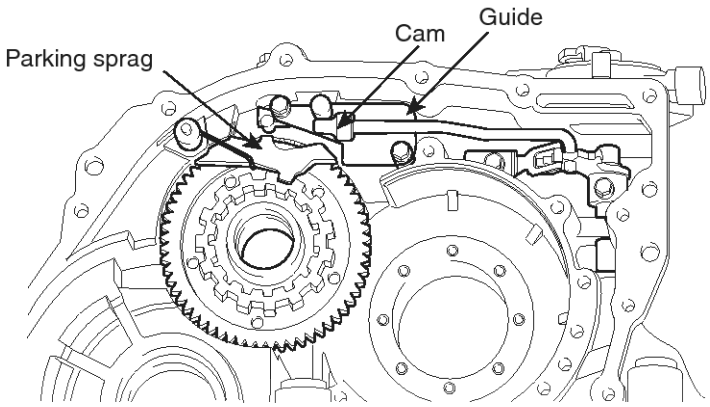
SFDAT9002N

1. Snap ring
2. Clutch reaction plate
3. Clutch disc
4. Clutch plate
5. Snap ring
6. Clutch reaction plate
7. Clutch disc
8. Clutch plate
9. Snap ring
10. Spring retainer
11. Return spring
12. D-ring
13. Overdrive clutch piston
14. D-ring
15. Reverse clutch piston
16. D-ring
17. D-ring
18. D-ring
19. Reverse clutch retainer

Parking System

The parking system for A4CF2 model is the cam type.

The roller type installed to the existing new generation AT needs the support to move the roller when operating the parking system and is so complicated. But the cam type for A4CF2 model doesn't need the support and the structure is simply. It only needs the guide to prevent from moving the cam idly.



<Parking system>

BKGF003D

Operation

Hydraulic Control System

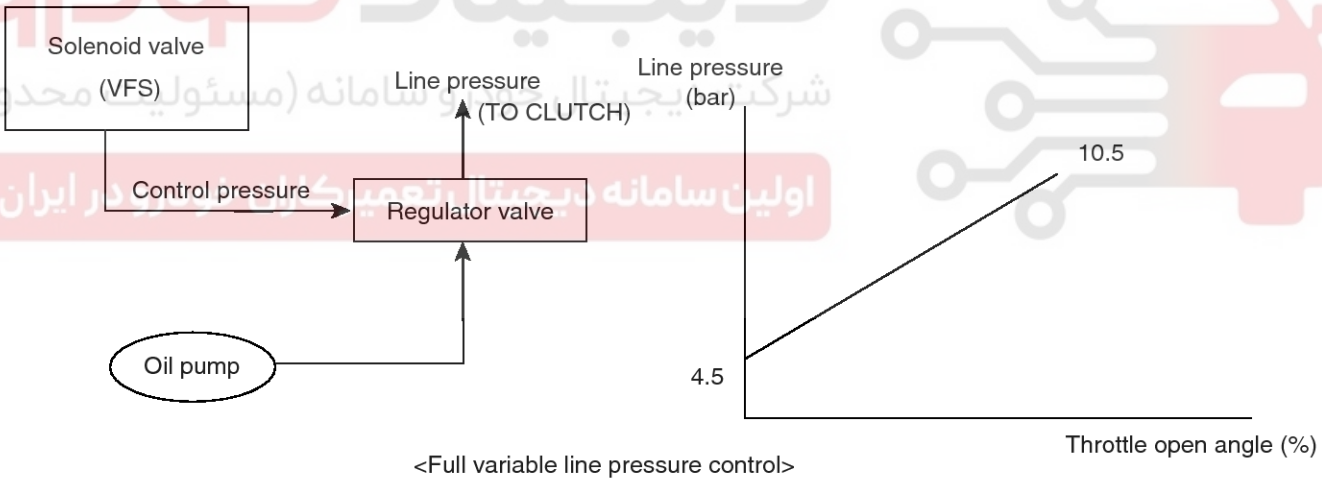
Main Features

The VFS (Variable Force Solenoid) installed in the valve body is applied to transaxle(A4CF2). VFS varies the line pressure from 4.5bar to 10.5bar according to throttle open angle and shift range to improve the fuel consumption and shift ability.

And the reducing valve which is installed in the valve body makes the solenoid control pressure using the reducing pressure instead of the line pressure like the HIVEC transaxle.

The material of spool valve in the valve body is changed from the steel to aluminum to reduce the oil leakage by the thermal expansion between the valve body and spool valve at the high temperature.

The switch valve, the solenoid valve and the fail safe valve are operated to drive the vehicle at the 3rd speed and reverse even thought the malfunction of the electronic control parts occur.



<Full variable line pressure control>

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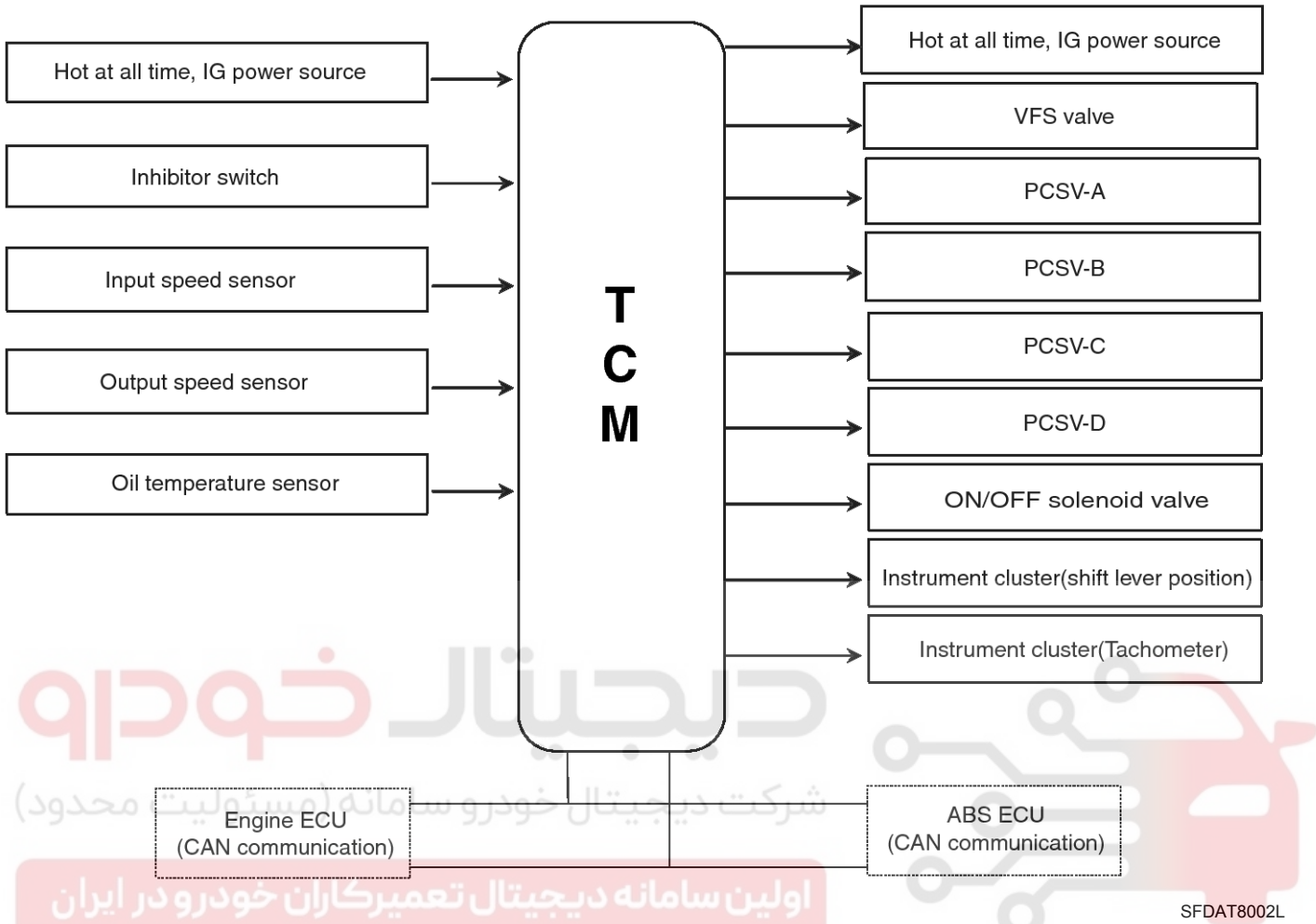
Electronic Control System

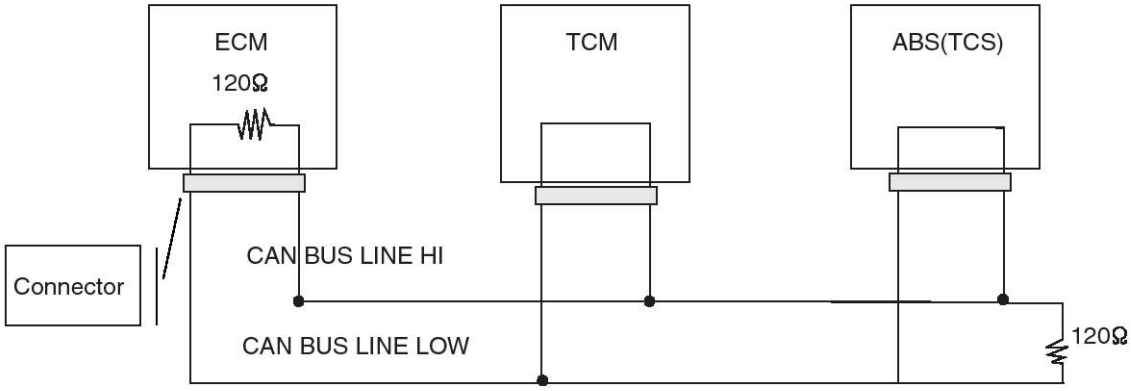


Sensor And Actuator Function

Item	Function
Input speed sensor	Detect the input shaft rpm(TURBINE RPM) at the OD/RVS retainer
Output speed sensor	Detect the output shaft rpm(T/F DRIVEN GEAR RPM) at the T/F driven gear
Engine rpm signal	Receive the engine rpm via CAN communication with ECM
Fluid temperature sensor	Detect the temperature of ATF through the thermistor
Brake switch	Detect the brake operation at the contact switch of the brake pedal
ON/OFF solenoid valve (SC-SV-A)	Control the hydraulic passage for the shift control
VFS solenoid valve	Change the line pressure from 4.5 bar to 10.5 bar according to throttle open angle and s-hift ranges
PCSV-A(SCSV-B)	Control the OD or L/R hydraulic pressure to the pressure control valve for shift control
PCSV-B(SCSV-C)	Control the 2/4 or REV hydraulic pressure to the pressure control valve for shift control
PCSV-C(SCSV-D)	Control the UD hydraulic pressure to the pressure control valve for shift control
PCSV-D(TCC)	Control the hydraulic pressure for the damper clutch control
Cluster	Send the signal of the current position of shift lever and vehicle speed

CAN Communication

Layout



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ECM- TCM CAN Communication error management

No.	Item	Error management
1	Engine rpm	3,000 RPM
2	Engine torque	80%
3	Vehicle speed	0 km/h
4	A/C Switch	OFF
5	Engine coolant temperature	70°C
6	TPS	50%
7	Shift range hold signal	OFF

Basic Inspection Adjustment

Transaxle Fluid Level

Inspection

1. Drive the vehicle until the fluid reaches normal operating temperature [70~80˚C(158~176˚F)].
2. Place the vehicle on a level surface.
3. Move the gear selector lever through all gear positions. This will fill the torque converter with trans fluid. Set the selector lever to the "N" (Neutral) position.
4. Before removing the oil level gauge, wipe all contaminants from around the oil level gauge. Then take out the oil level gauge and check the condition of the fluid.

   NOTICE

   If the fluid smells as if it is burning, it means that the fluid has been contaminated by fine particles from the bushes and friction materials, a transmission overhaul may be necessary.
5. Check that the fluid level is in the "HOT" mark on the oil level gauge. If fluid level is low, add automatic transaxle fluid until the level reaches the "HOT" mark.

Automatic transaxle fluid :
DIAMOND ATF SP-III, SK ATF SP-III
Automatic transaxle fluid capacity:
6.6liter(6.9 US qt, 5.81Imp.qt)

NOTICE

Low fluid level can cause a variety of abnormal conditions because it allows the pump to take in air along with fluid. Air trapped in the hydraulic system forms bubbles, which are compressible. Therefore, pressures will be erratic, causing delayed shifting, slipping clutches and brakes, etc. Improper filling can also raise fluid level too high. When the transaxle has too much fluid, gears churn up foam and cause the same conditions which occur with low fluid level, resulting in accelerated deterioration of automatic transaxle fluid. In either case, air bubbles can cause overheating, and fluid oxidation, which can interfere with normal valve, clutch, and brake operation. Foaming can also result in fluid escaping from the transaxle vent where it may be mistaken for a leak.

6. Insert the oil level gauge securely.

   NOTICE

   When new, automatic transmission fluid should be red, The red dve is added so the assembly plant can identify it as transmission fluid and distinguish it from engine oil or antifreeze. The red dve, which is not an indicator of fluid quality, is not permanent. As the vehicle is driven the transmission fluid will begin to look darker. The color may eventually appear light brown.

Replacement

If you have a fluid changer, use this changer to replace the fluid. If you do not have a fluid replace the fluid by the following procedure.

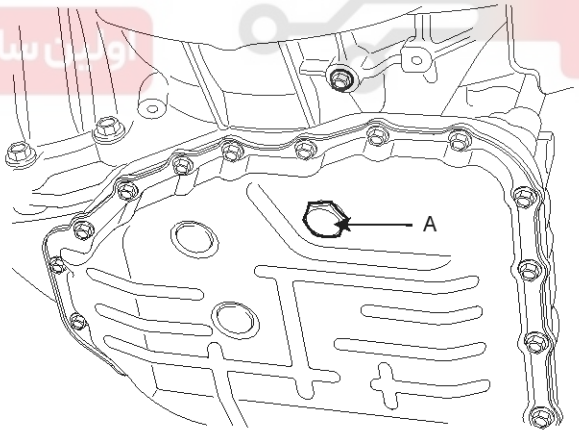
1. Disconnect the hose, which connects the transmission and the oil cooler (inside the radiator).
2. Start the engine and let the fluid drain out.

Running conditions : "N" range with engine idling

CAUTION

The engine should be stopped within one minute after it is started. If the fluid has all drained out before then, the engine should be stopped at that point.

3. Remove the drain plug(A) from the bottom of the transmission case to drain the fluid.



AKGF032W

4. Install the drain plug via the gasket, and tighten it the specified torque.

Tightening torque :
40~50 N.m (4.0~5.0kgf.m, 28.9~36.2lb-ft)

5. Pour the new fluid in through the oil filler tube.

CAUTION
Stop pouring if the full volume of fluid cannot be poured in.

6. Repeat the procedure in step (2).

NOTICE
Check the old fluid for contamination. If it has been contaminated, repeat the steps (5) and (6).

7. Pour the new fluid in through the oil filler tube.
8. Reconnect the hose, which was disconnected in step (1) above, and firmly replace the oil level gauge.

   (In case of this "replace", this means after wiping off any dirt around the oil level gauge, insert it into the filler tube.)
9. Start the engine and run it at idle for 1~2 minutes.
10. Move the select lever through all positions, and then move it to the "N" or "P" position.
11. Drive the vehicle until the fluid temperature rises to the normal temperature (70~80°C(158~176°F)), and then check the fluid level again. The fluid level must be at the HOT mark.
12. Firmly insert the oil level gauge into the oil filler tube.

Torque Converter Stall Test

This test measures the maximum engine speed when the select lever is at the "D" or "R" position and the torque converter stalls to test the operation of the torque converter, starter motor and one-way clutch operation and the holding performance of the clutches and brakes in the transmission.

CAUTION
Do not let anybody stand in front of or behind the vehicle while this test is being carried out.

1. Check the automatic transmission fluid level and temperature and the engine coolant temperature.
   - Fluid level : At the HOT mark on the oil level gauge
   - Fluid temperature : 80~100°C (176~212°F)
   - Engine coolant temperature : 80~100°C (176~212°F)
2. Check both rear wheels (left and right).
3. Pull the parking brake lever on, with the brake pedal fully depressed.
4. Start the engine.

5. Move the select lever to the "D" position, fully depress the accelerator pedal and take a reading of the maximum engine speed at this time.

⚠CAUTION

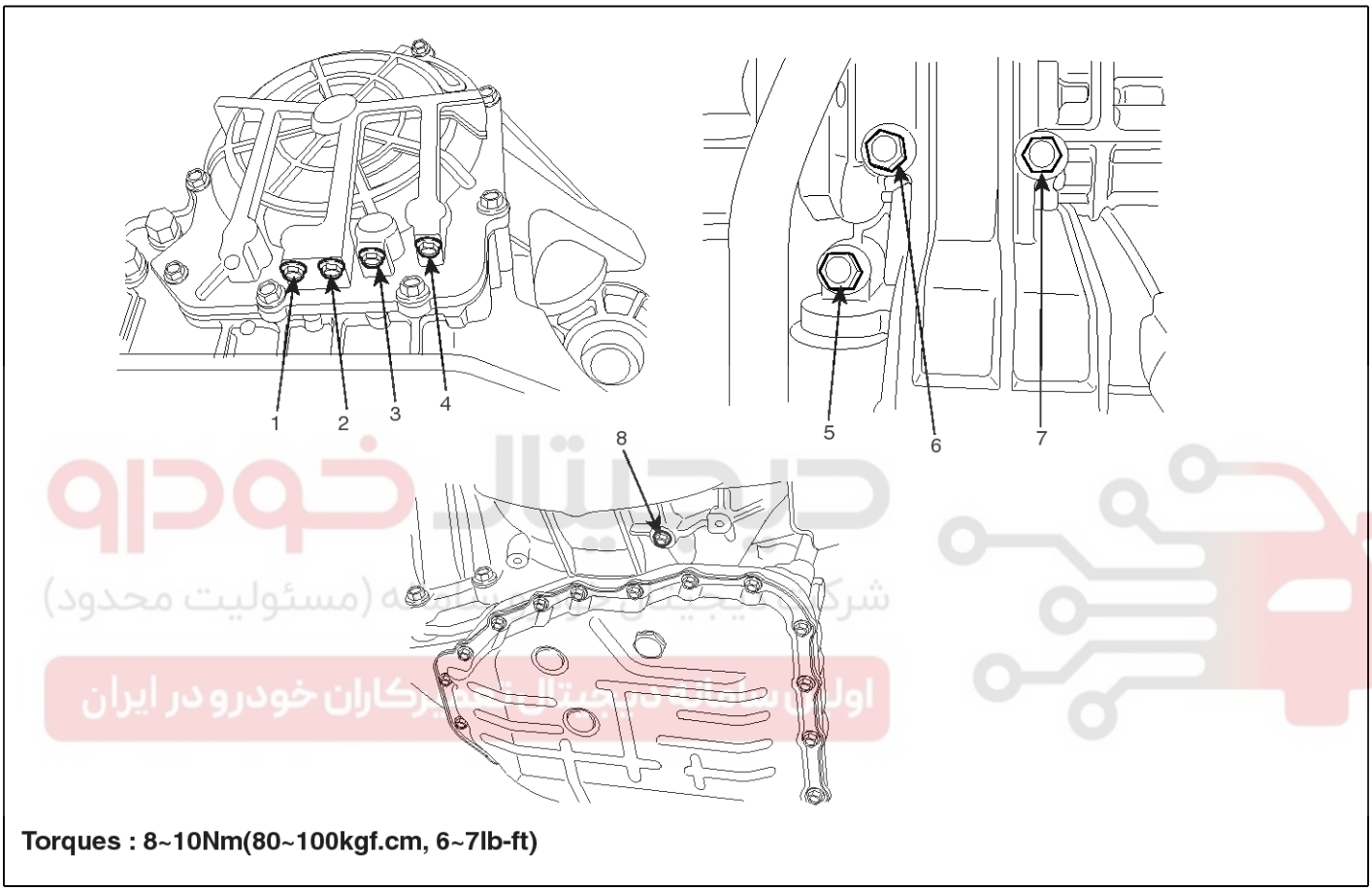
- **The throttle should not be left fully open for any more than 5 seconds.**
- **If carrying out the stall test two or more times, move the select lever to the "N" position and run the engine at 1,000 r/min to let the automatic transaxle fluid cool down before carrying out subsequent tests.**
- **Move the select lever to the "R" position and carry out the same test again.**

Stall rpm : 2,000~2,700 RPM

Range	Condition	Passable cause
R range slip	Reverse	REV in D range normal L/R in D range abnormal
D1 rang slip	D range 1st/ Sports mode 1st	L/R in reverse range abnormal UD in reverse range normal
D3 range slip	3rd gear hold	OD in 3rd gear slip (1st and 2nd gear normal)
Forwarding, reverse slip	D range, R range	Torque converter Oil pump, Manual valve in the valve Driving device abnormal

Hydraulic Pressure Test

1. Warm up the engine until the automatic transaxle fluid temperature is 80~100°C(176~212°F).
2. Jack up the vehicle so that the wheels are free to turn.
3. Connect the special tools(09452-21500, 09452-21000) oil pressure gauge to each pressure discharge port.
4. Measure the hydraulic pressure at each port under the conditions given in the standard hydraulic pressure table, and check that the measured values are within the standard value ranges.
5. If a value is outside the standard range, correct the problem while referring to the hydraulic pressure test diagnosis table.
   a. Bottom side



Torques : 8~10Nm(80~100kgf.cm, 6~7lb-ft)

SFDAT9003N

1. RED pressure port
2. OD pressure port
3. 2/4 pressure port
4. REV pressure port
5. DA pressure port
6. UD pressure port
7. LR pressure port
8. DR pressure port

Standard Hydraulic Pressure Table

No.	Shift range position	Operation					Measuring	Oil pressure (kgf/㎠)				
		PCSV-A	PCSV-B	PCSV-C	PCSV-D	ON/OFF		LR	2-4(2ND)	UD	OD	REV
1	D	0	100	0	0	ON	LR	10.5±0.2	0	10.5±0.2	0	0
2	↑	50	↑	↑	↑	↑	↑	5.6±0.4	↑	↑	↑	↑
3	↑	75	↑	↑	↑	↑	↑	1.0±0.3	↑	↑	↑	↑
4	↑	100	↑	↑	↑	↑	↑	0	↑	↑	↑	↑
5	↑	↑	0	↑	100	OFF	2-4(2ND)	0	10.5±0.2	↑	↑	↑
6	↑	↑	50	↑	↑	↑	↑	↑	5.3±0.4	↑	↑	↑
7	↑	↑	75	↑	↑	↑	↑	↑	0.9±0.3	↑	↑	↑
8	↑	↑	100	↑	↑	↑	↑	↑	0	↑	↑	↑
9	↑	0	↑	↑	↑	↑	OD	↑	↑	↑	10.5±0.2	↑
10	↑	50	↑	↑	↑	↑	↑	↑	↑	↑	5.6±0.4	↑
11	↑	75	↑	↑	↑	↑	↑	↑	↑	↑	1.0±0.3	↑
12	↑	100	↑	↑	↑	↑	↑	↑	↑	↑	0	↑
13	↑	↑	↑	0	0	↑	UD	↑	↑	10.5±0.2	↑	↑
14	↑	↑	↑	50	↑	↑	↑	↑	↑	5.8±0.4	↑	↑
15	↑	↑	↑	75	↑	↑	↑	↑	↑	1.0±0.3	↑	↑
16	↑	0	↑	100	↑	↑	↑	↑	↑	0	↑	↑
17	R	↑	0	↑	↑	ON	REV	17.7±0.8	↑	↑	↑	17.7±0.8
18	↑	↑	50	↑	↑	↑	↑	↑	↑	↑	↑	8.7±0.8
19	↑	↑	75	↑	↑	↑	↑	↑	↑	↑	↑	0.9±0.5
20	↑	↑	100	↑	↑	↑	↑	↑	↑	↑	↑	0

[Measure condition]
- Oil pump revolution : 2500rpm
- LPCSV Duty ratio : 0%

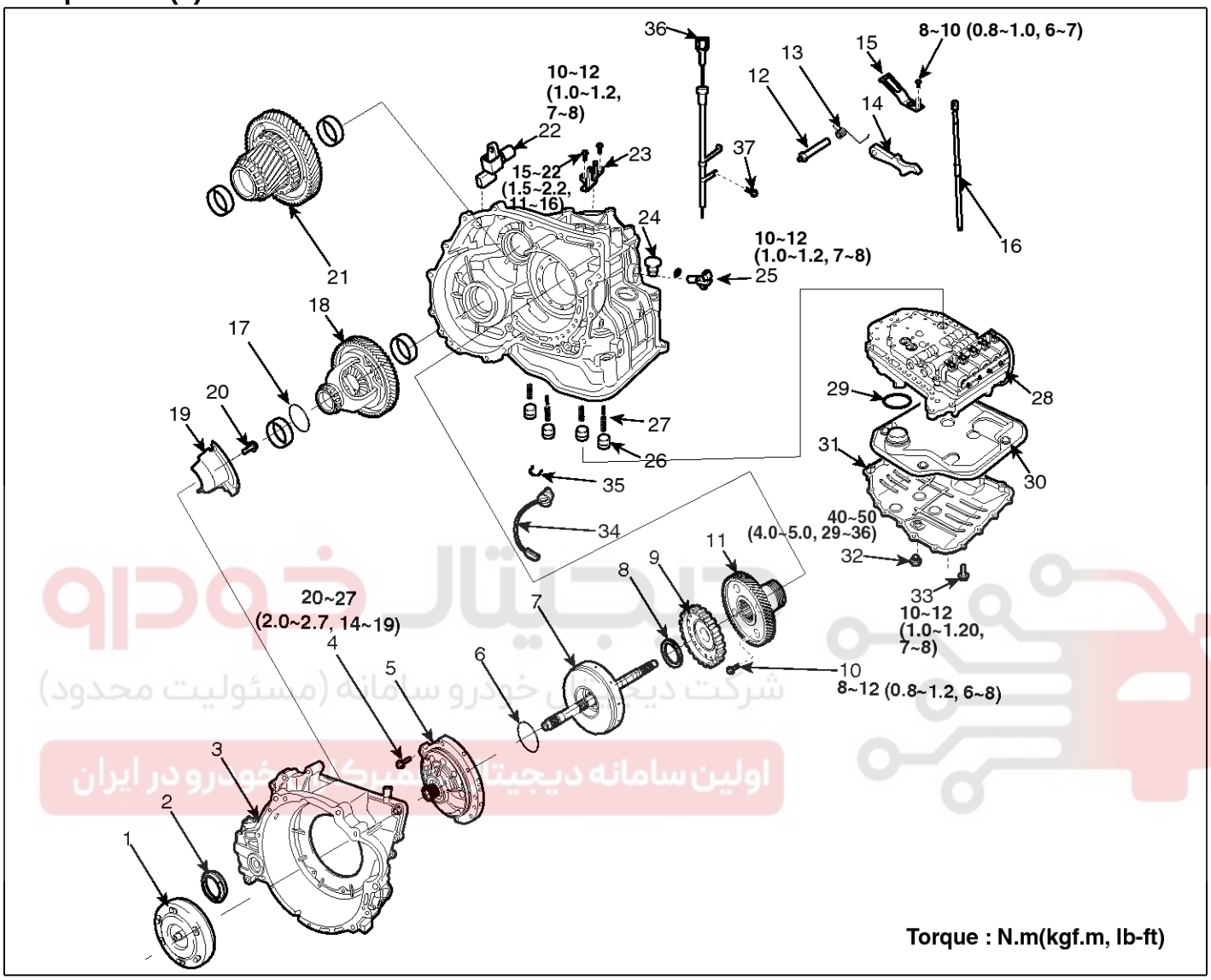
Note) The oil pressure values of "0" marked on the above table must measure less than 0.1kgf/㎠ when testing.

※ The values are subject to change according to vehicle model or condition.

SHDAT6062L

Automatic Transaxle

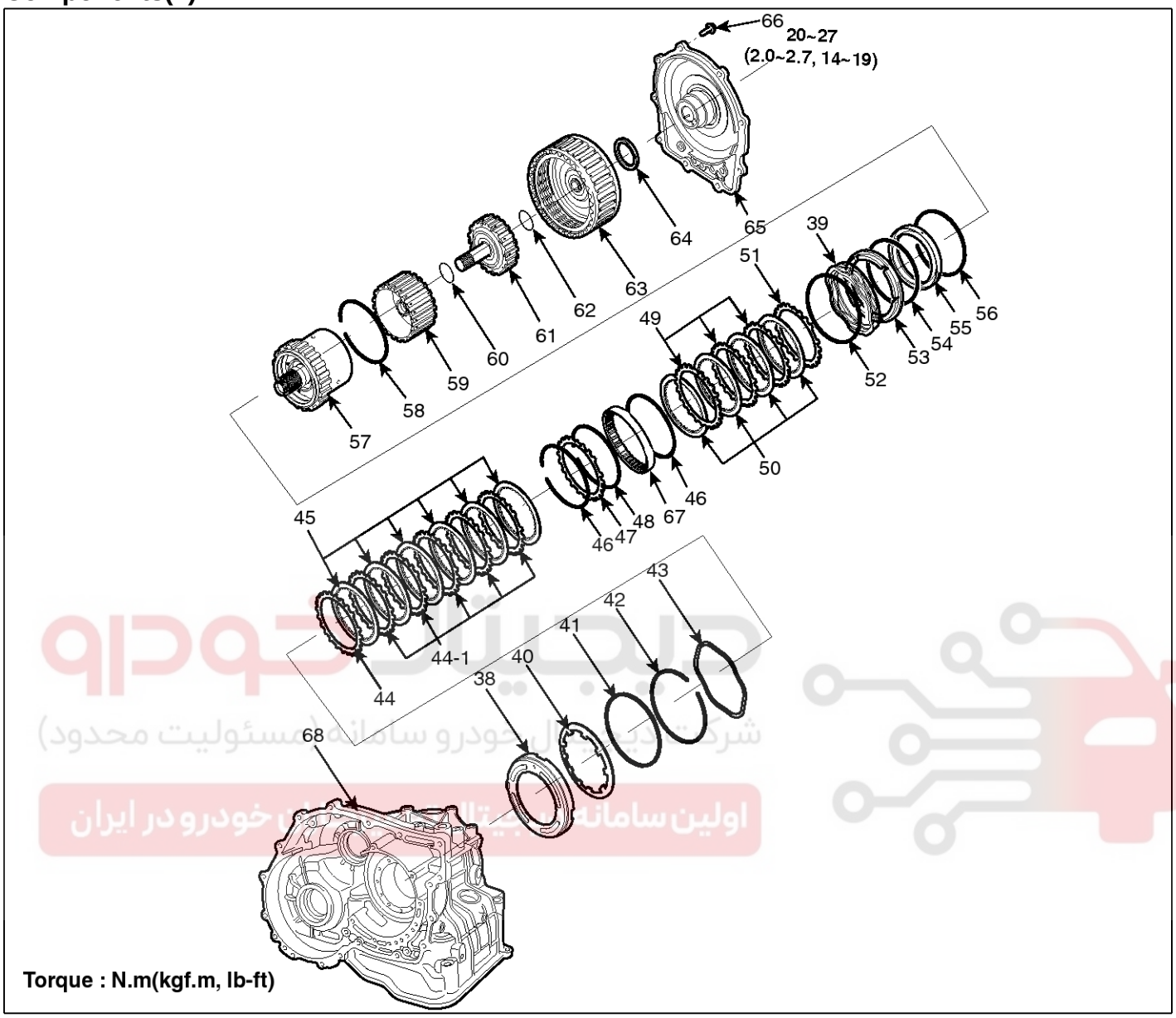
Components(1)



STDAT9002C

1. Torque converter
2. Differential oil seal
3. Converter housing
4. Oil pump bolt
5. Oil pump assembly
6. Thrust washer
7. Underdrive(U/D) clutch
8. Thrust bearing
9. Underdrive(U/D) clutch hub
10. Transfer drive gear mounting bolt
11. Transfer drive gear
12. Parking sprag shaft
13. Sprag spring
14. Parking sprag
15. Detent spring
16. Manual control shaft
17. Spacer
18. Differential
19. Oil separate
20. Oil separate mounting bolt
21. Transfer driven gear
22. Output shaft speed sensor
23. Shift cable bracket
24. Plug
25. Input shaft speed sensor
26. Accumulator piston
27. Coil spring
28. Valve body assembly
29. O-ring
30. Oil filter
31. Oil pan
32. Drain plug
33. Valve body cover bolt
34. Valve body connector
35. Valve body connector mounting clip
36. Oil level gauge
37. Oil level gauge bracket bolt

Components(2)

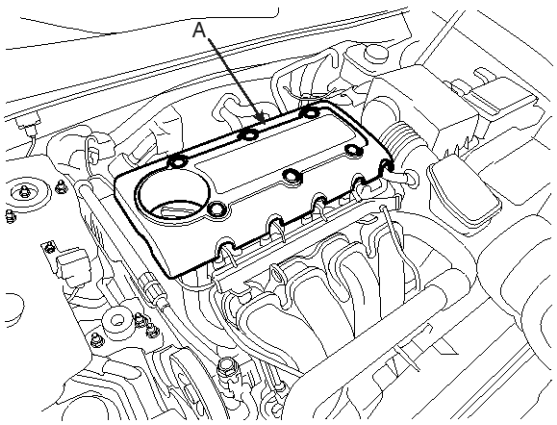


STDAA9001C

38. Low & reverse brake piston
39. 2ND brake return spring
40. Low & reverse brake return spring
41. Low & reverse brake spring retainer
42. Snap ring
43. Wave spring
44. Low & reverse pressure plate
44-1. Low & reverse brake plate
45. Low & reverse brake disc
46. Snap ring
47. Reaction plate
48. Snap ring
49. 2ND brake plate
50. 2ND brake disc
51. 2ND brake pressure plate
52. D-ring
53. 2ND brake piston
54. D-ring
55. 2ND brake retainer
56. Snap ring
57. Low & reverse planetary gear set
58. Snap ring
59. Reverse sun gear
60. Thrust bearing
61. Overdrive(O/D) hub
62. Thrust bearing
63. Reverse & Overdrive(O/D) clutch
64. Thrust bearing
65. Rear cover
66. Rear cover bolt
67. One way clutch inner race
68. Transmission case

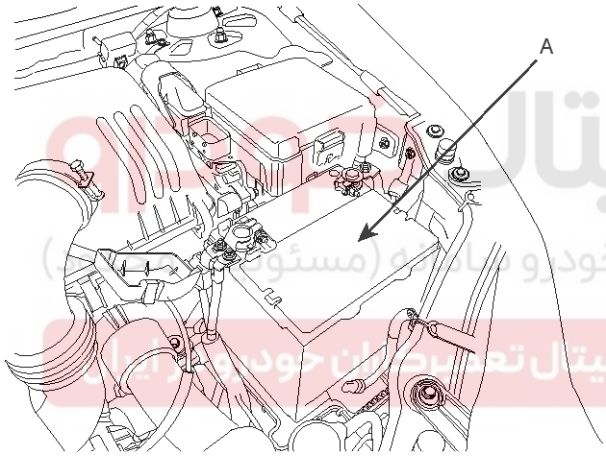
Removal

1. Remove the engine cover (A).



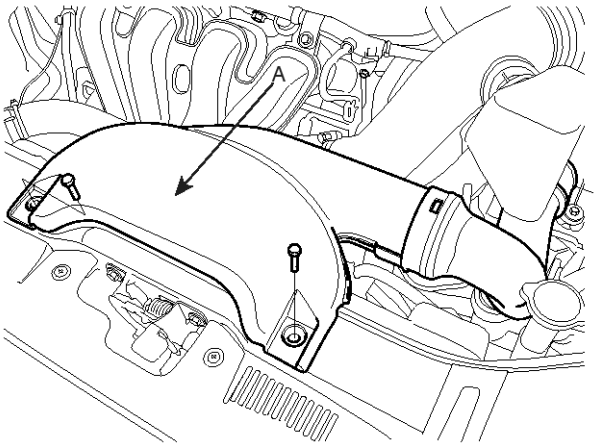
SMGMT9002D

2. Remove the battery (A).



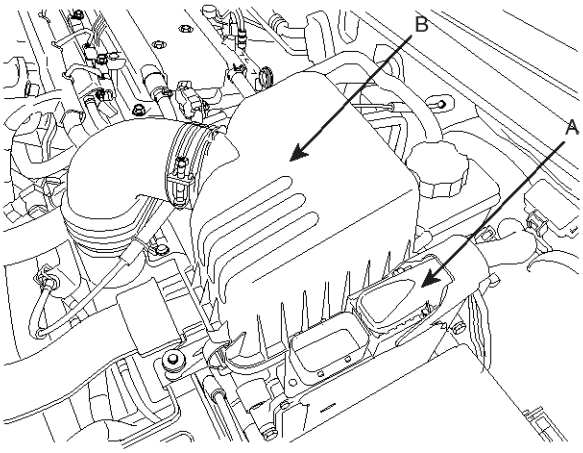
STDMT9002D

3. Disconnect the air duct (A).



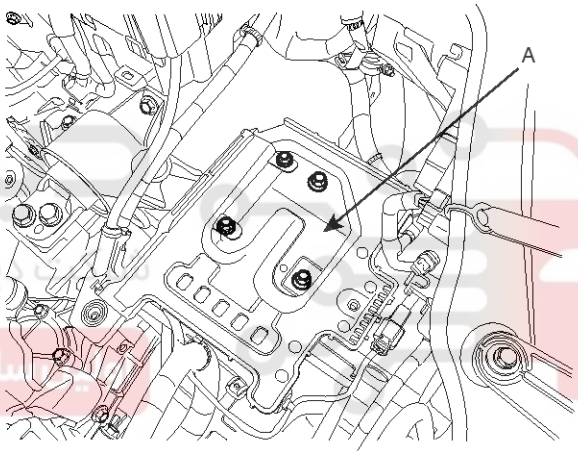
STDAT9001L

4. After disconnecting ECU connector (A), remove the air cleaner assembly (B).



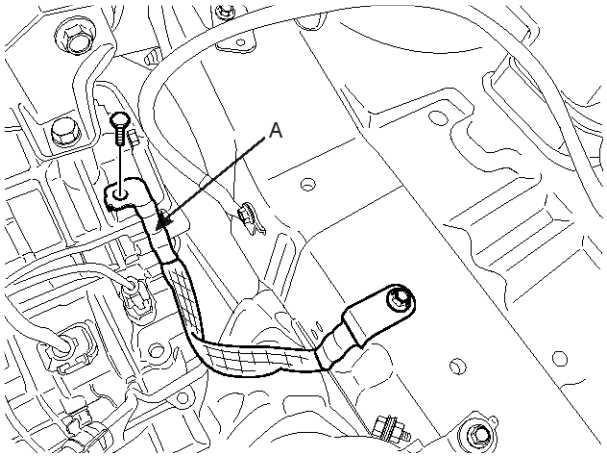
STDMT9003D

5. Remove the battery tray (A).



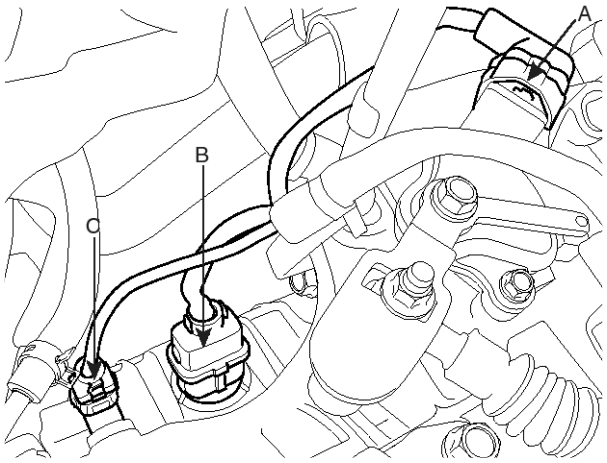
STDMT9004D

6. Remove the ground cable from transaxle (A).



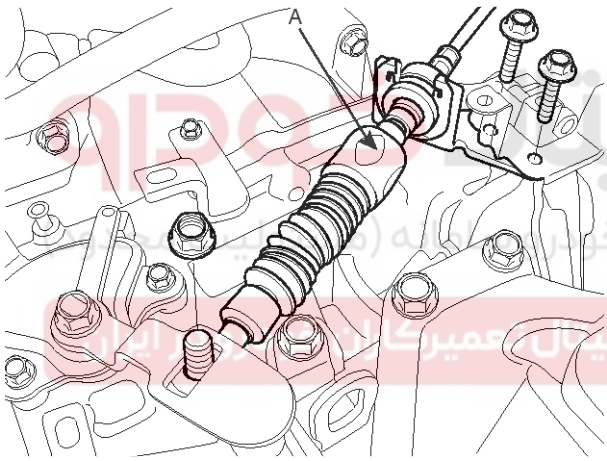
SLDAT7006D

7. Disconnect the inhibiter switch connector (A), solenoid valve connector (B) and the input speed sensor connector (C).



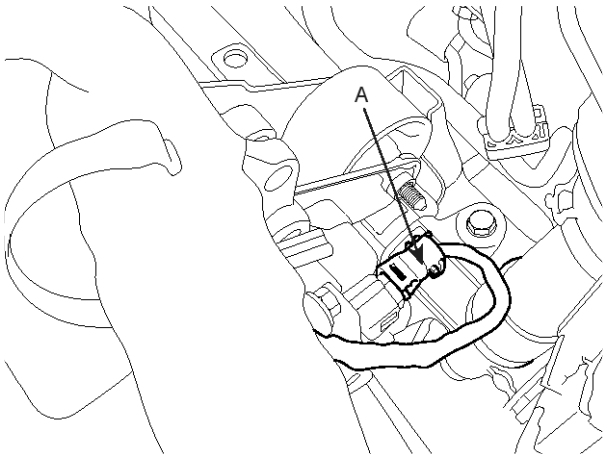
SHDAT6008D

8. Remove the shift cable assembly (A).



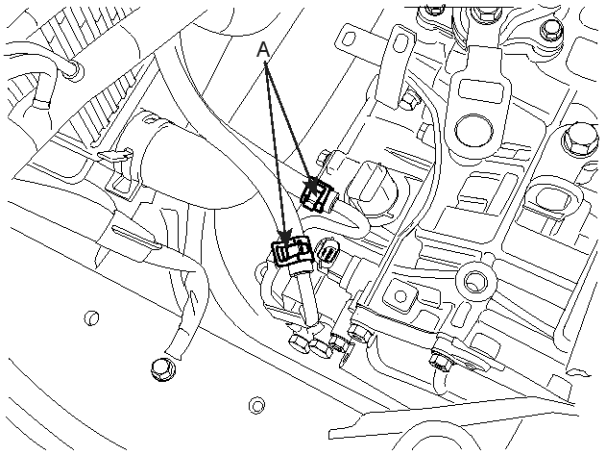
SHDAT6010D

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



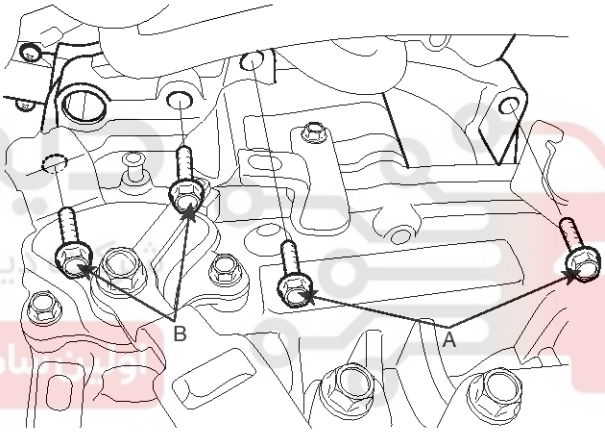
SHDAT6009D

10. Remove the oil cooler hoses (A).



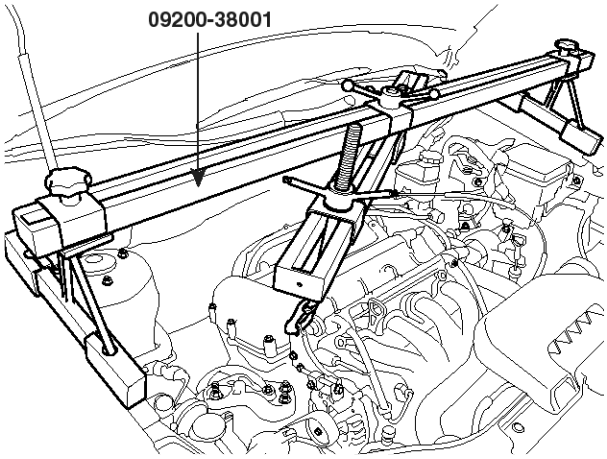
STDAA9001D

11. Remove the transaxle upper mounting bolts (A-2ea) and the starter motor mounting bolts (B-2ea).



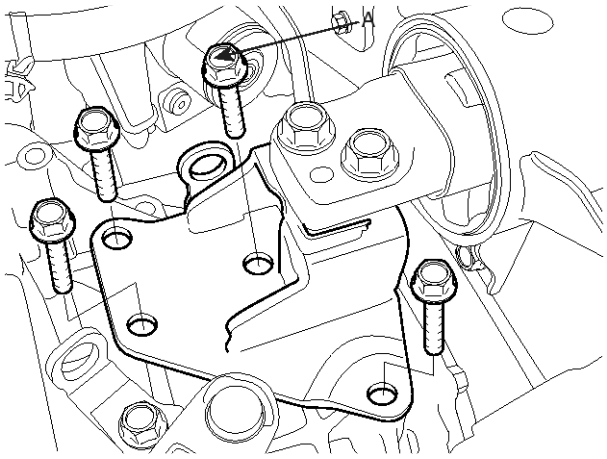
SHDAT6013D

12. Install the special tools (09200-38001), the engine support fixture and the adapter on the engine assembly.



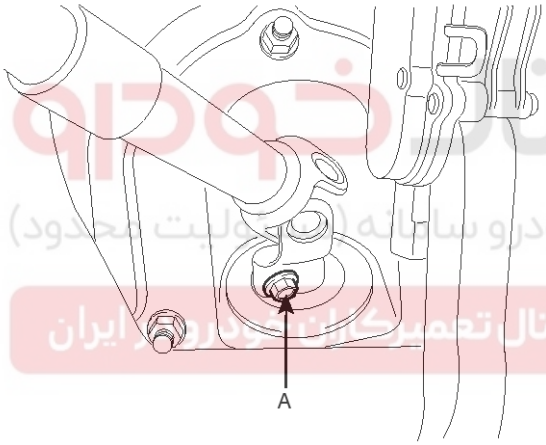
SHDAT6012D

13. Remove the transaxle mounting support bracket bolts(A-4ea).



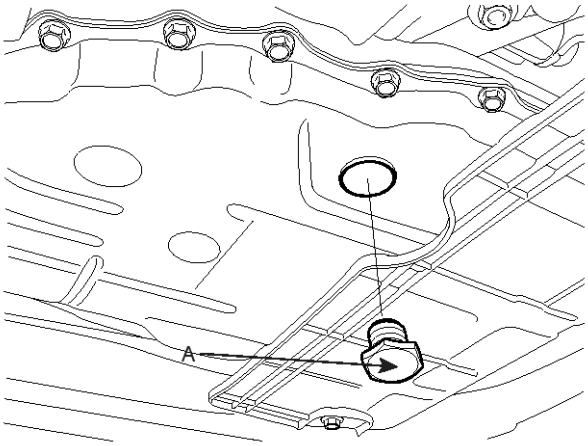
STDAT9007L

14. Remove the steering joint assembly bolt (A). (refer to Steering column/shaft in ST group)



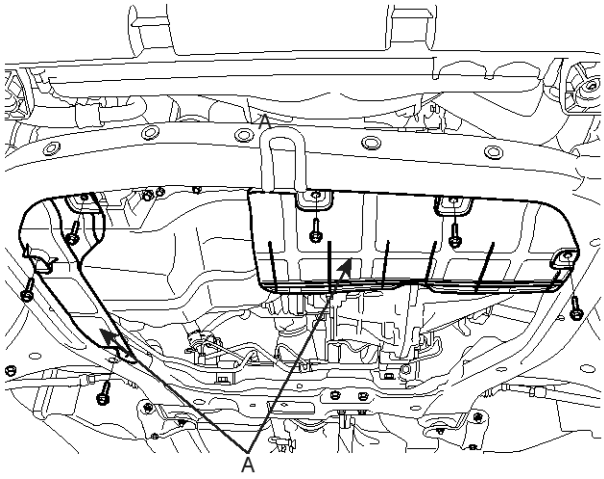
AKGF032S

15. Drain the transaxle fluid by removing the oil drain plug(A).



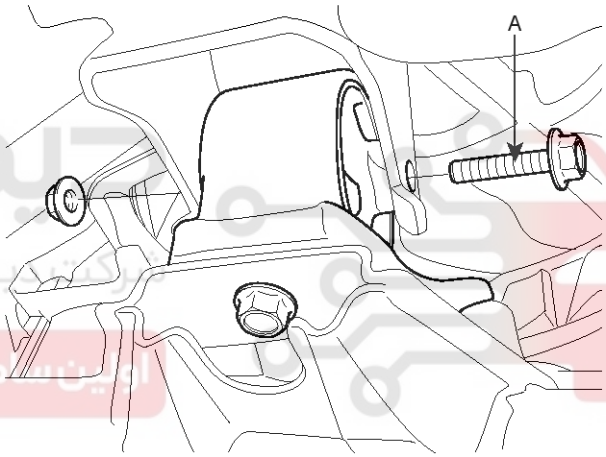
STDAT9006L

16. Remove the under cover (A).

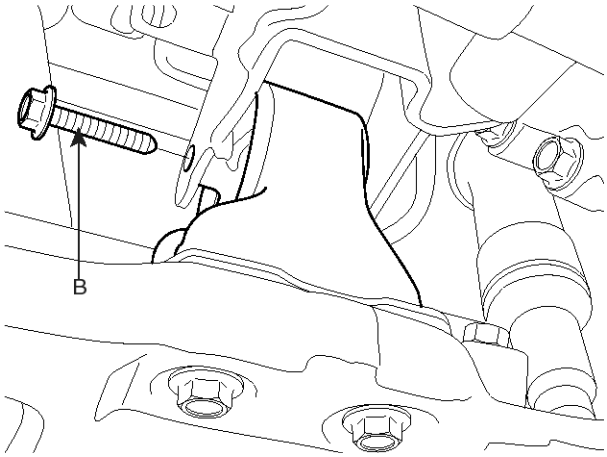


STDAT9002L

17. Remove the front and rear roll stopper mounting bolt (A,B).

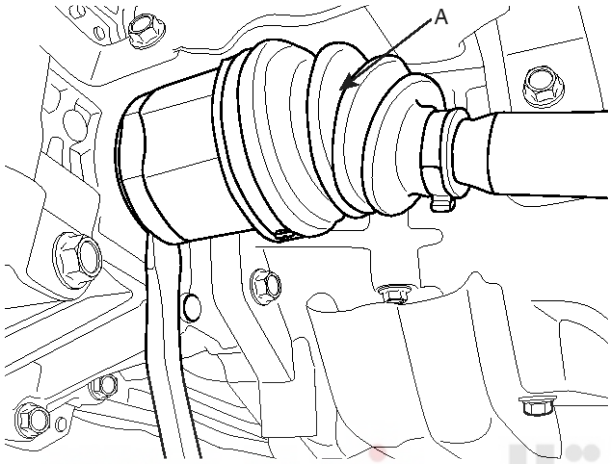


SHDAT6017D

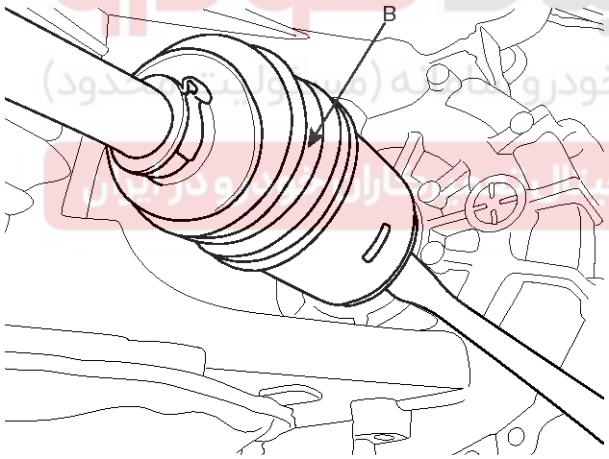


SHDAT6018D

18. Remove the front wheels and tires. (refer to removal in SS group)
19. Remove the side cover in the driver's side.
20. Remove the lower arm ball joint mounting nut, the stabilizer link mounting nut, and the tie rod end mounting nut from the front knuckles. (refer to Front suspension system in SS group)
21. Disconnect the drive shafts (A,B) from the transaxle.

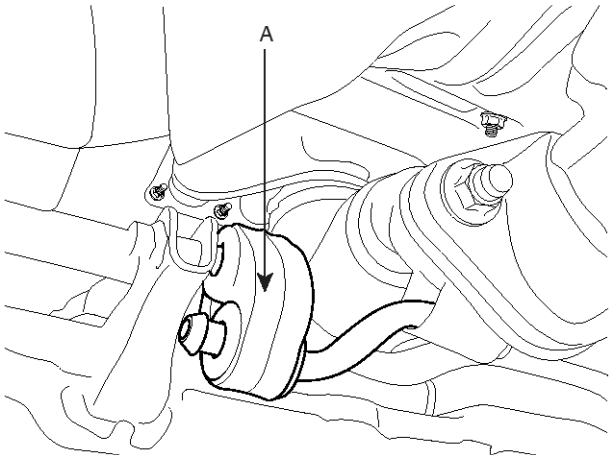


SHDAT6020D



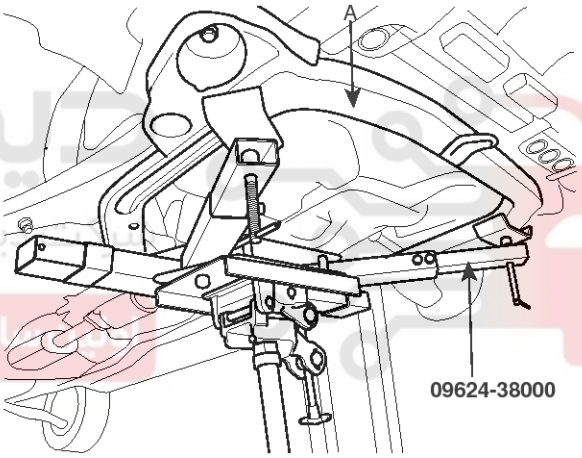
SHDAT6021D

22. Remove the muffler hanger rubber (A).



SHDAT6019D

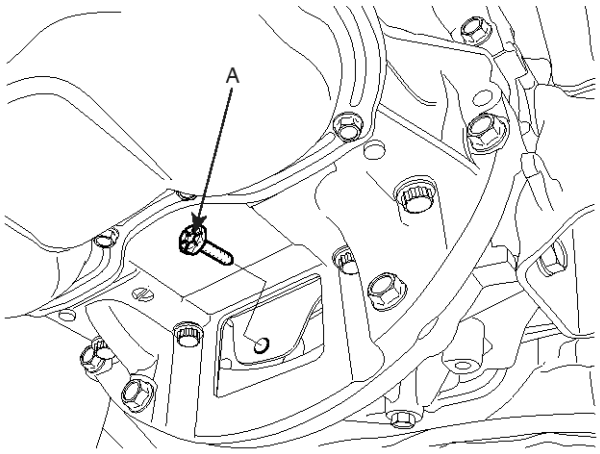
23. Supporting the sub frame with a jack and the special tool (09624-38000), remove the mounting bolts. (see SS group)



SHDAT6051D

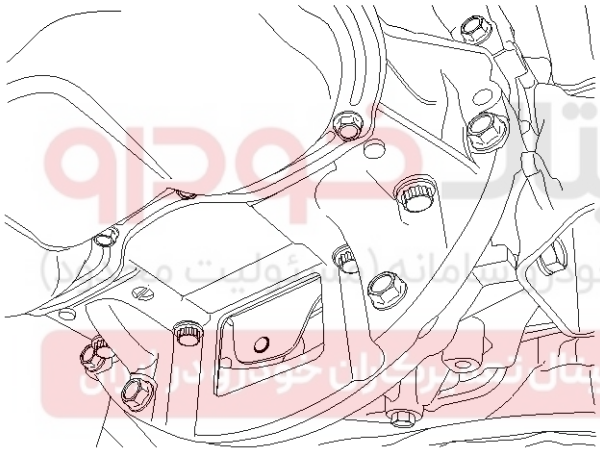
24. Remove the torque converter cover .

25. Remove the torque converter assembly mounting bolts (A-4ea).



STDAT9009L

26. Remove the transaxle lower mounting bolts.



STDAT9010L

27. Lowering the jack slowly, remove the transaxle.

⚠CAUTION
When removing the transaxle assembly, be careful not to damage any surrounding parts or body components.

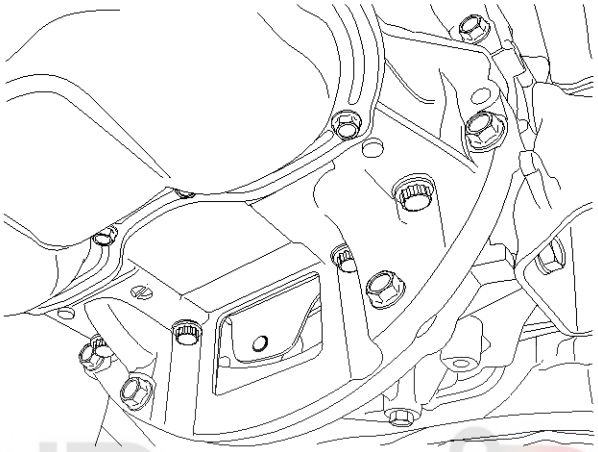
Installation

1. Lowering the vehicle or lifting up a jack, install the transmission assembly.

⚠CAUTION
Be careful not to damage tubes, hoses or wire.

2. Install the transaxle lower mounting bolts.

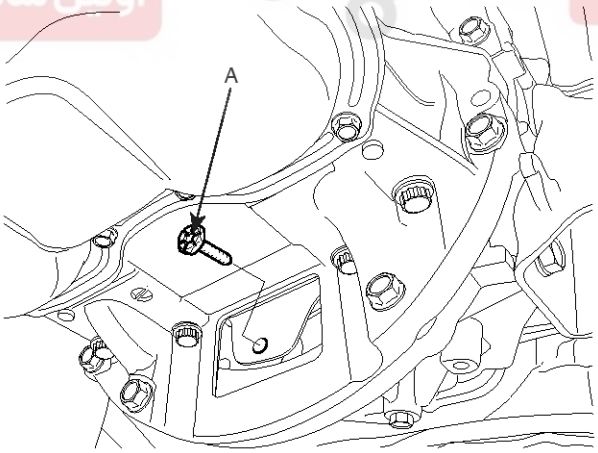
Tightening torque :
43~49N.m (4.3~4.9kgf.m, 31.1~35.4lb-ft)



STDAT9010L

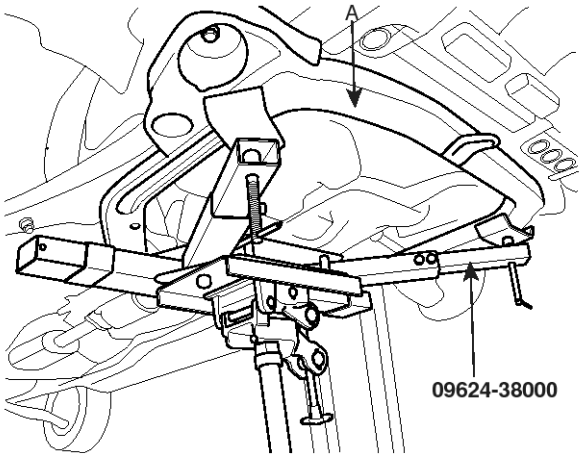
3. Install the torque converter assembly mounting bolts (A-4ea).

Tightening torque :
46~53N.m (4.6~5.3kgf.m, 33.3~38.3lb-ft)



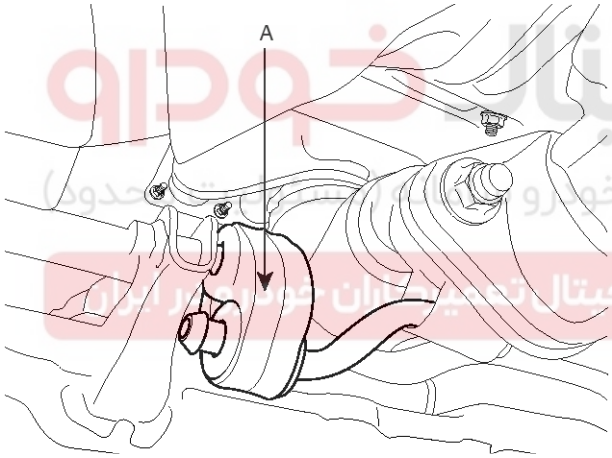
STDAT9009L

4. Install the torque converter cover.
5. Supporting the sub frame with a jack and the special tool (09624-38000), install the mounting bolts. (see SS group).



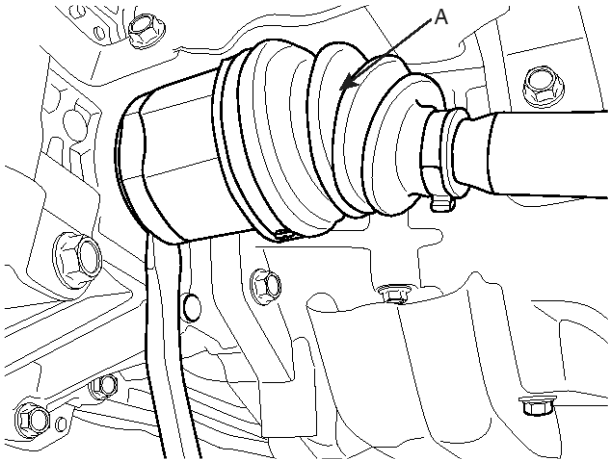
SHDAT6051D

6. Install the muffler hanger rubber (A).

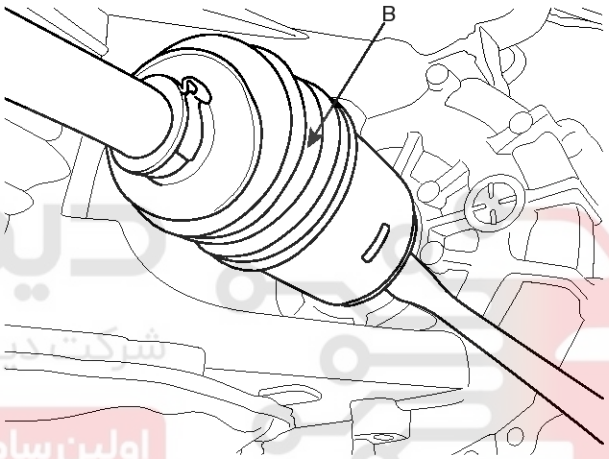


SHDAT6019D

7. Disconnect the drive shafts (A,B) from the transaxle



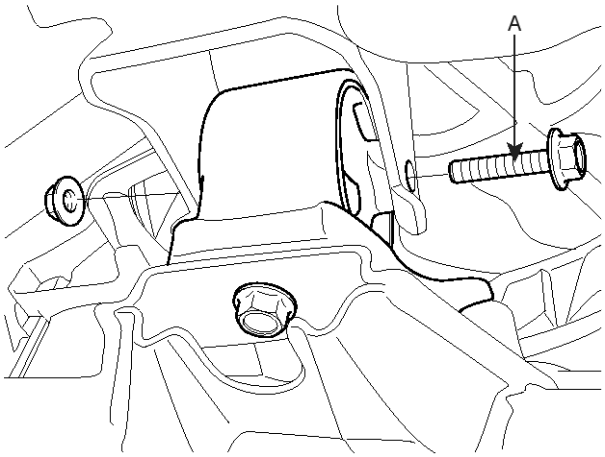
SHDAT6020D



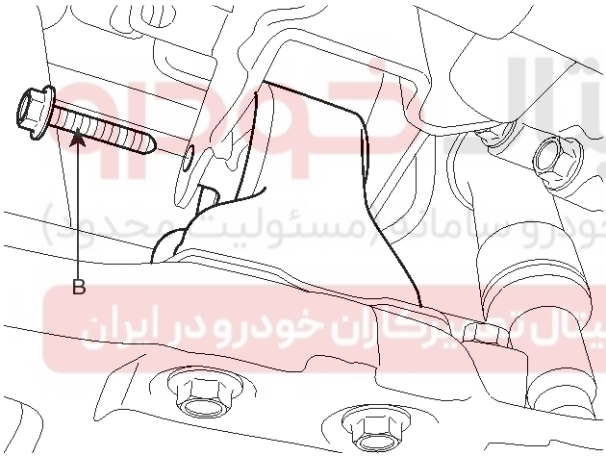
SHDAT6021D

8. Install the front and rear roll stopper mounting bolts (A,B).

Tightening torque :
50~65N.m (5~6.5kgf.m, 36.2~47.0lb-ft)

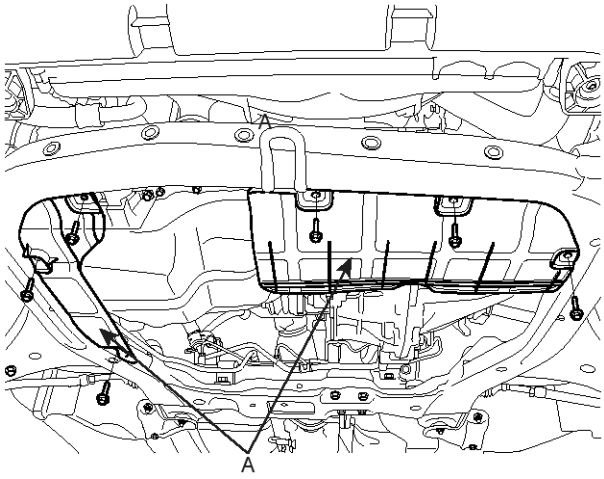


SHDAT6017D



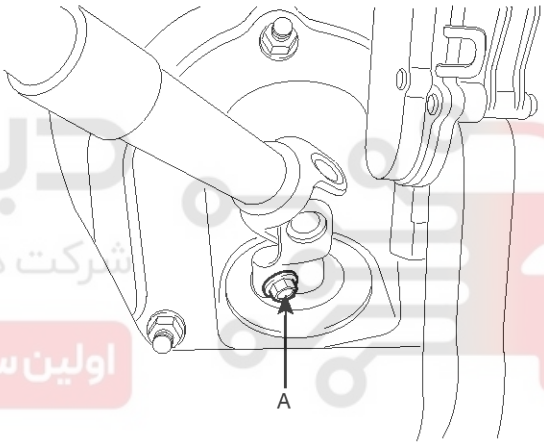
SHDAT6018D

9. Install the lower arm ball joint mounting nut, the stabilizer link mounting nut, and the tie rod end mounting nut to the front knuckles. (refer to Front suspension system in SS group)
10. Install the side cover in the driver's side.
11. Install the front wheels and tires. (refer to removal in SS group)
12. Install the under cover (A).



STDAT9002L

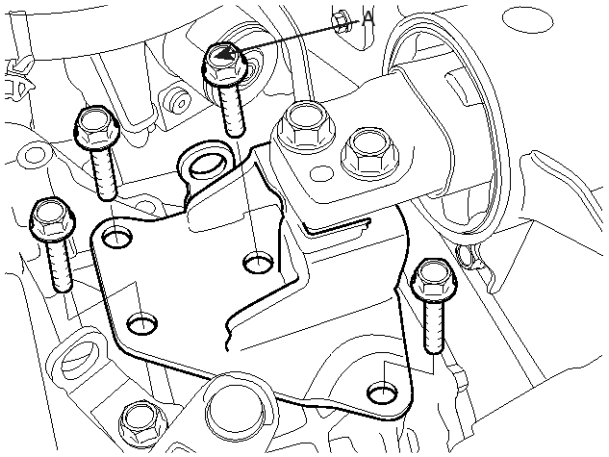
13. Install the steering joint assembly bolt (A). (refer to Steering column/shaft in ST group)



AKGF032S

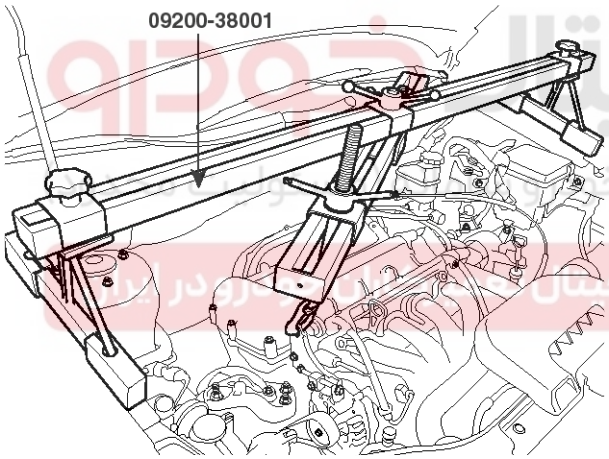
14. Install the transaxle mounting support bracket bolts(A-4ea).

Tightening torque :
90~110N.m (9.0~11.0kgf.m, 65.1~76.6lb-ft)



STDAT9007L

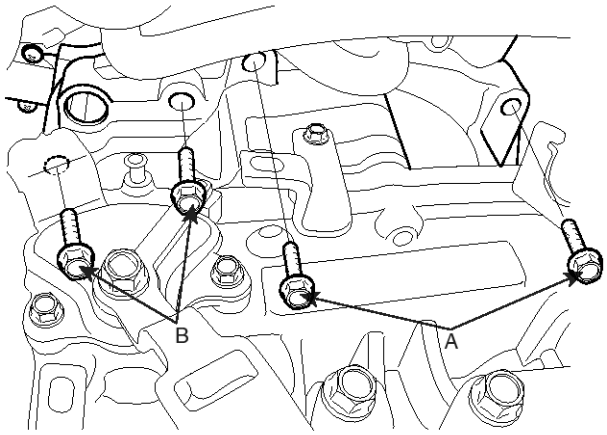
15. Remove the special tool (09200-38001).



SHDAT6012D

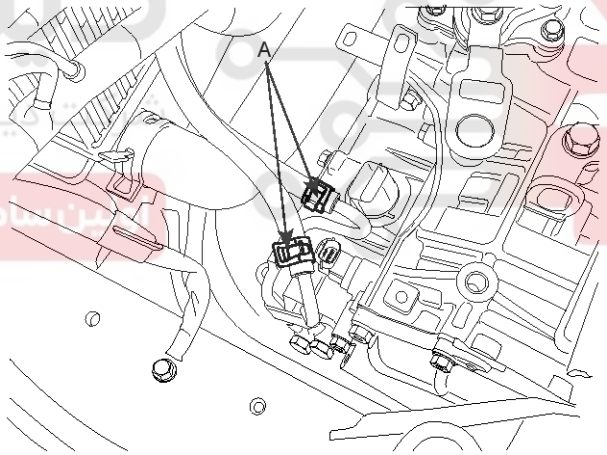
16. Install the transaxle upper mounting bolts (A-2ea) the starter motor mounting bolts (B-2ea).

Tightening torque :
[A]60~80N.m (6.0~8.0kgf.m, 43.4~57.7lb-ft)
[B]43~55N.m (4.3~5.5kgf.m, 31.1~39.8lb-ft)



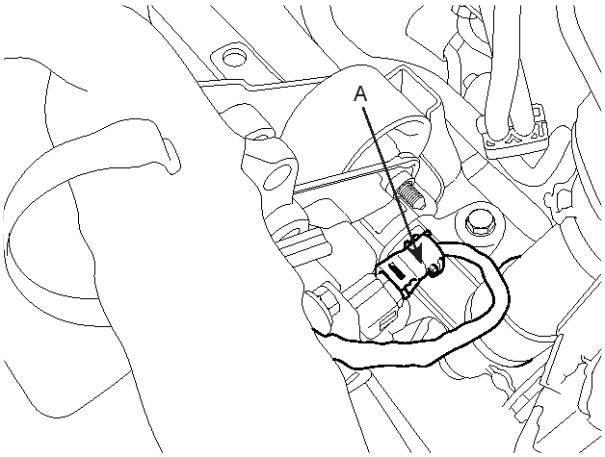
SHDAT6013D

17. Connect the transaxle oil cooler hoses (A) to the tubes by fastening the clamps.



STDAA9001D

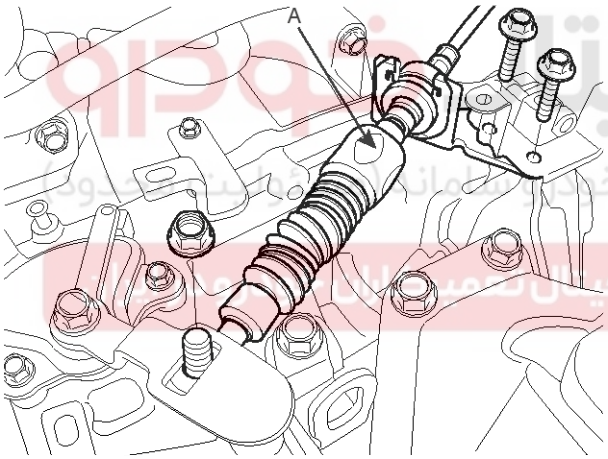
18. Install the output speed sensor connector (A).



SHDAT6009D

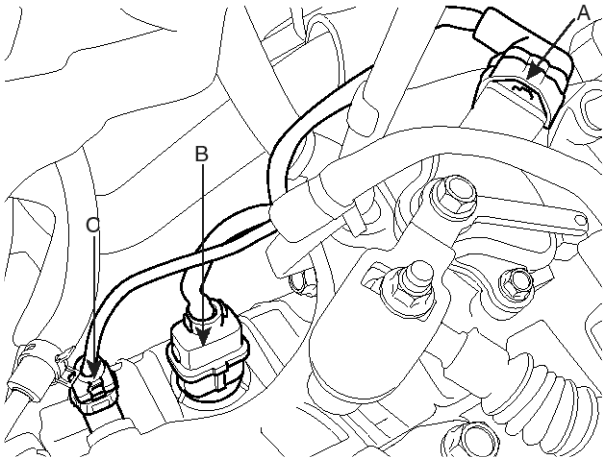
19. Install the shift cable assembly (A).

Tightening torque :
Bracket bolts : 15~22N.m (1.5~2.2kgf.m, 10.8~15.9lb-ft)
Nut : 10~14N.m (1.0~1.4kgf.m, 7.2~10.1lb-ft)



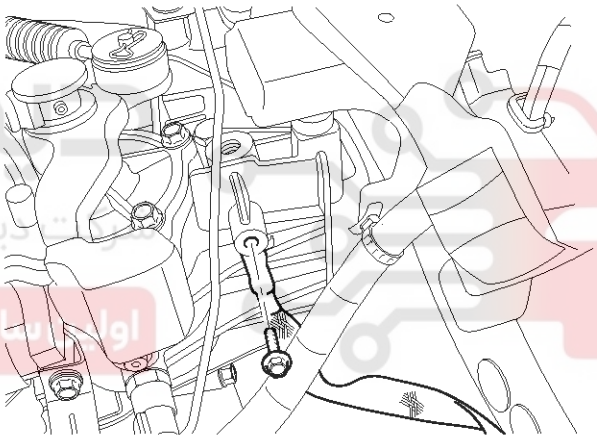
SHDAT6010D

20. Connect the inhibiter switch connector (A), solenoid valve connector (B) and the input speed sensor connector (C).



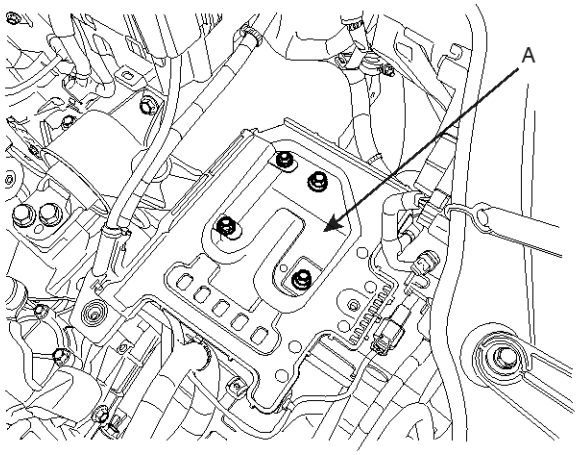
SHDAT6008D

21. Install the ground cable to transaxle.



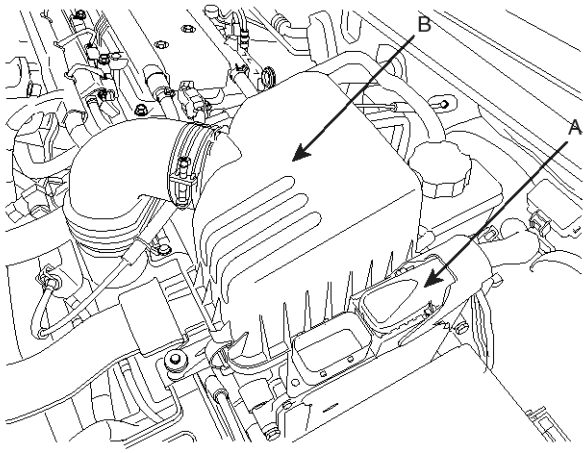
SPBMB9007L

22. Install the battery tray (A).



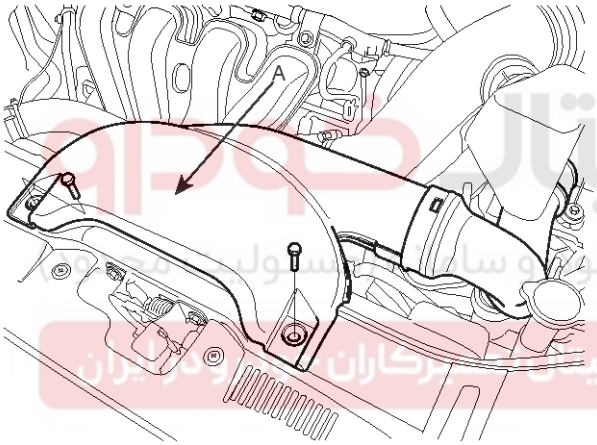
STDMT9004D

23. After installing the air cleaner assembly (B), connect ECU connector (A).



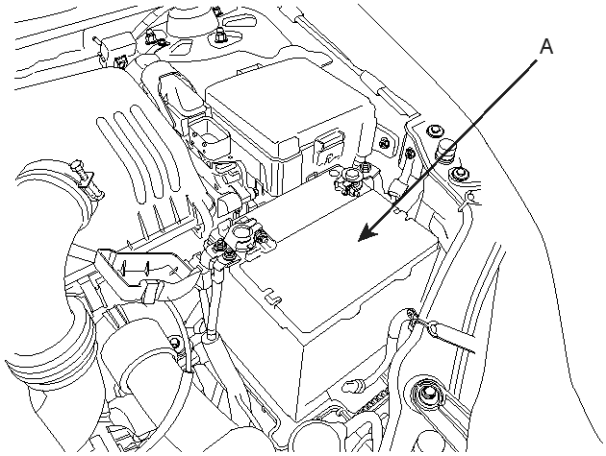
STDMT9003D

24. Connect the air duct (A).



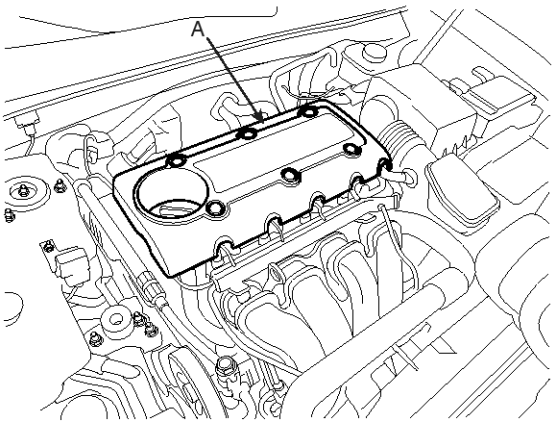
STDAT9001L

25. Install the battery(A).



STDMT9002D

26. Install the engine cover(A).



SMGMT9002D

27. After completing the installation perform the following procedure;

- Adjust the shift cable. (Refer to "automatic transaxle control system" in this group.)
- Refill the transaxle fluid. (Refer to "automatic transaxle system" in this group.)
- Clean the battery posts and cable terminals with sandpaper and grease them to prevent corrosion before installing.

NOTICE

When replacing the automatic transaxle, reset the automatic transaxle's values by using the High- Scan Pro.

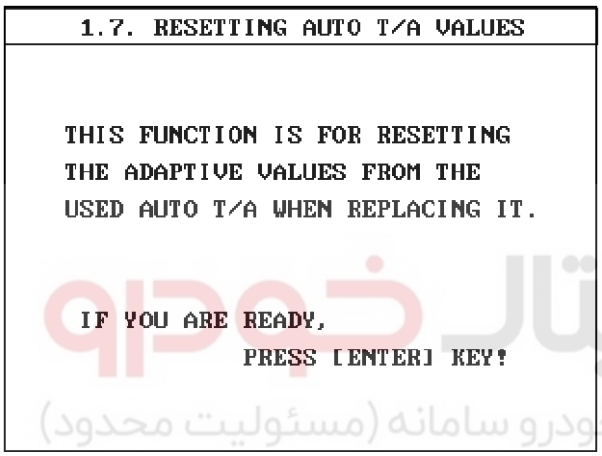
a. *Connect the Hi-Scan Pro connector to the data link connector under the crash pad and power cable to the cigar jack under the center facia.*

b. *Turn the ignition switch on and power on the Hi-Scan Pro.*

c. *Select the vehicle's name.*

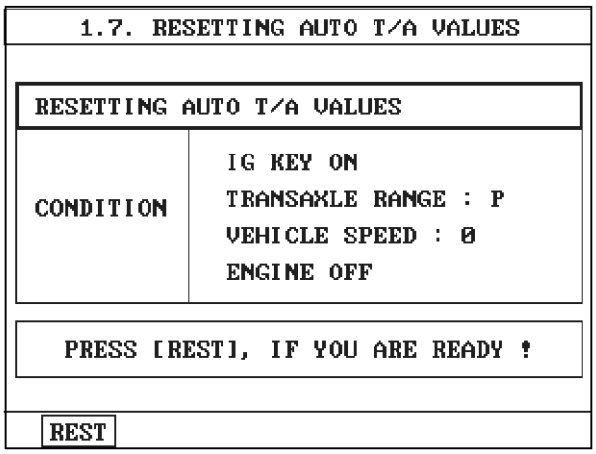
d. *Select 'AUTOMATIC TRANSAXLE'.*

e. *Select 'RESETTING AUTO T/A VALUES' and perform the procedure*



SCMAT6512L

f. *Perform the procedure by pressing F1 (REST).*

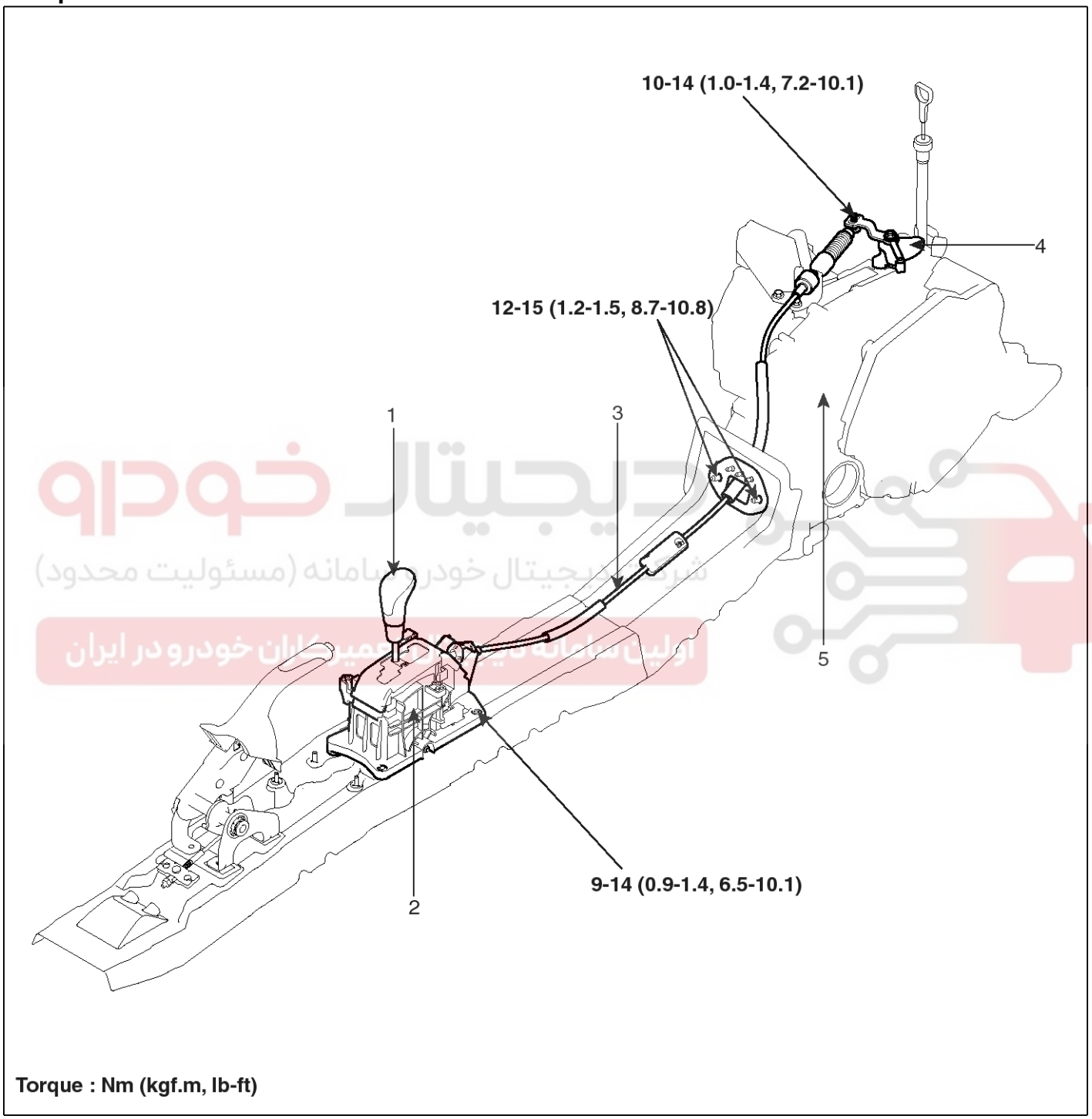


SCMAT6513L

Automatic Transaxle Control System

Shift Lever

Components

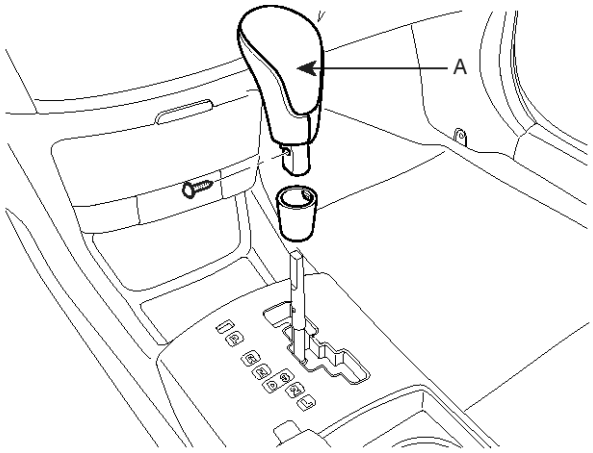


STDAA9001L

1. Shift lever knob
2. Shift lever assembly
3. Control cable assembly
4. Manual lever assembly
5. Automatic transaxle assembly

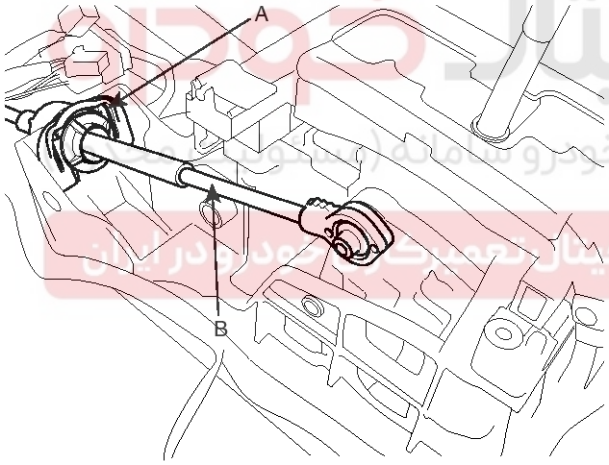
Removal

1. Remove the shift lever knob (A).



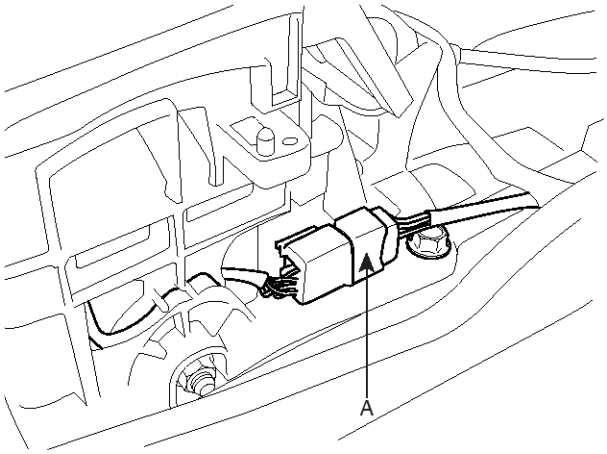
SEDAT7002L

2. Remove the center console. (refer to Console in BD group)
3. Remove the shift cable assembly (B) by removing the clamp (A).



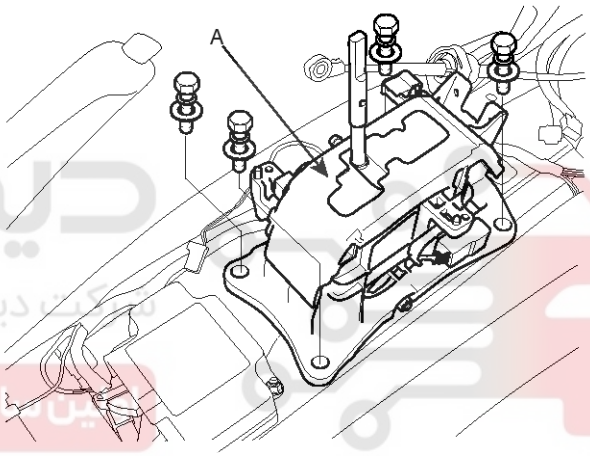
SHDAT6104D

4. Disconnect the interlock switch connector (A).



SHDAT6105D

5. Remove the shift lever assembly (A).

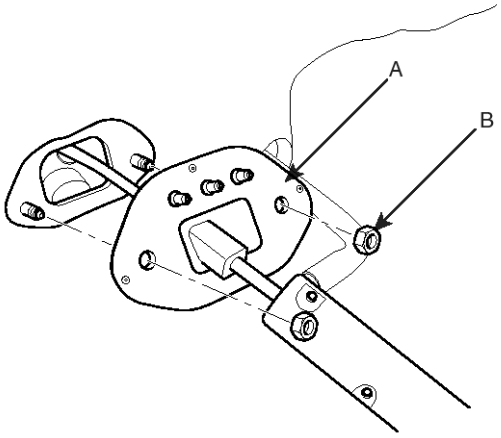


SHDAT6106D

6. Remove the retainer (A) and nuts (B).

NOTICE

In case, remove the crush pad and cowl cross bar. (refer to Crush pad in BD group and Heater unit in HA group)



SHDAT6108D

7. Remove the shift cable assembly from the transaxle (refer to Automatic transaxle's removal).
8. Remove the shift cable assembly.

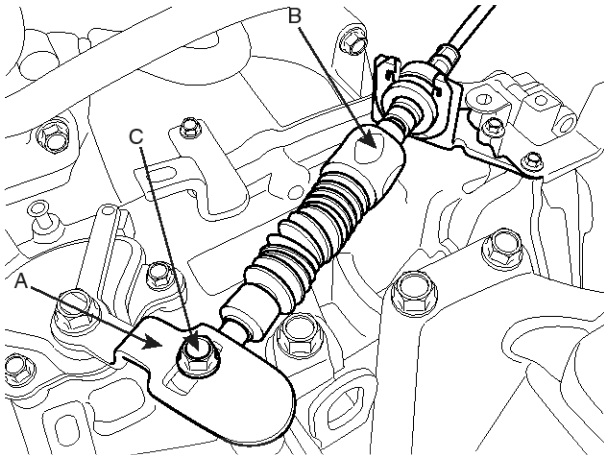
Inspection

1. Check the shift cable for proper operation and for damage.
2. Check the boots for damage.
3. Check the boots for wear, abrasion, sticking, restricted movement or damage.
4. Check for the weak or damaged spring.

Adjustment

Adjusting the shift cable

1. Set the room side lever and the manual lever (A) to "N" position.
2. Push the shift cable (B) lightly to "F" direction shown to eliminate the free play.



SFDAT8007D

3. Tighten the adjusting nut (C).

Tightening torque :
10~14N.m (1.0~1.4kgf.m, 7.2~10.1lb-ft)

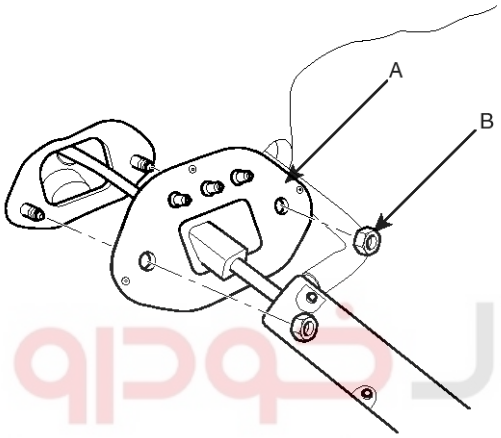
4. Check that this part operates surely at each range of the manual lever corresponding to each position of the room lever.

Installation

1. After placing the manual lever in N position, install the shift cable to the transaxle. (refer to Automatic Transaxle Installation)
2. Install the retainer (A) and nuts (B).

Tightening torque :
12~15N.m (1.2~1.5kgf.m, 8.7~10.8lb-ft)

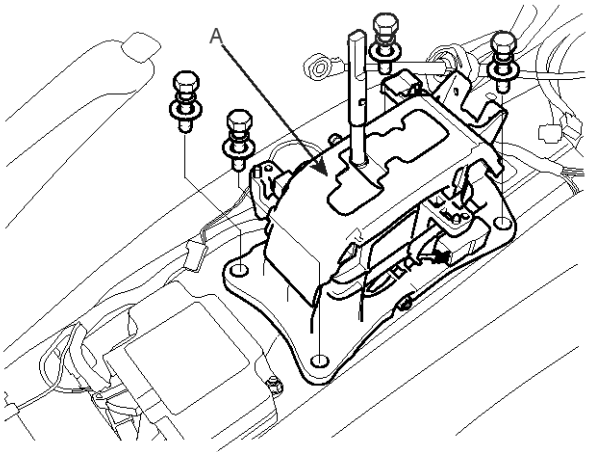
NOTICE
In case, install the crush pad and cowl cross bar. (refer to Crush pad in BD group and Heater unit in HA group)



SHDAT6108D

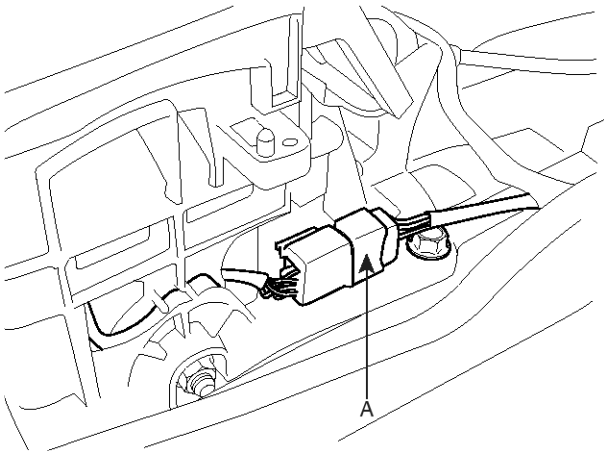
3. Install the shift lever assembly (A).

Tightening torque :
9~14N.m (0.9~1.4kgf.m, 6.5~10.1lb-ft)



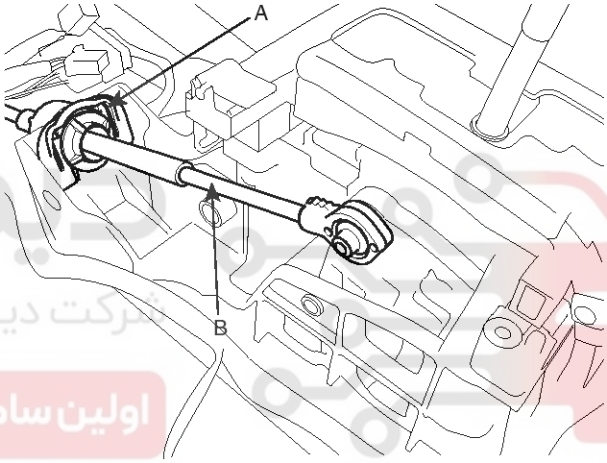
SHDAT6106D

4. Connect the interlock switch connector (A).



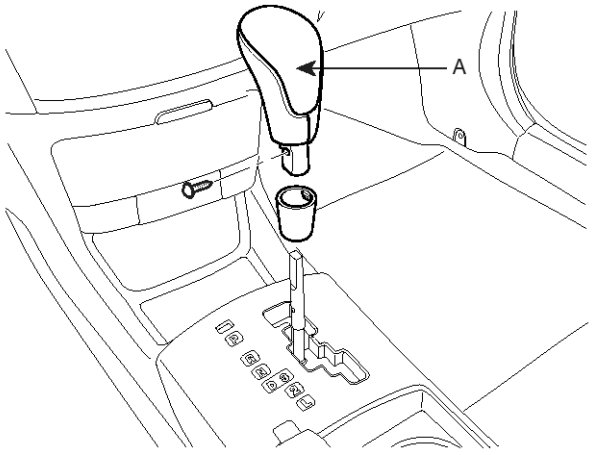
SHDAT6105D

5. Install the shift cable assembly (B) by installing the clamp (A).



SHDAT6104D

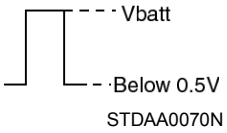
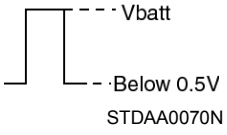
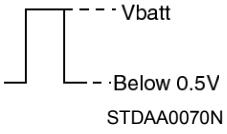
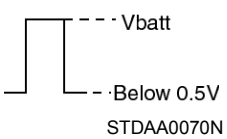
6. Install the center console. (refer to Console in BD group)
7. Install the shift lever knob (A).

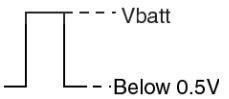
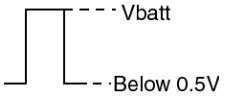
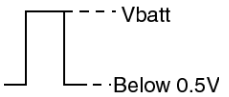


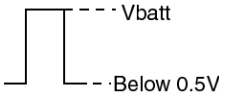
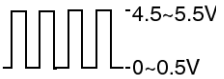
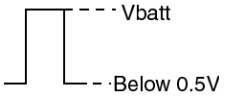
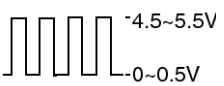
SEDAT7002L

Transaxle Control Module (TCM)

TCM Terminal Input/Output Signal

Pin No.	Signal Description	Condition	Input, Output Value		Test Result
			Type	Level	
A3	Variable Force Solenoid (Linear Solenoid)		Output / PWM	signal: 3.0 < Iscb < 5.0A supply: V_VFS	
A4	Solenoid valve OD		Output / PWM	signal: 3.0 < Iscb < 5.0A supply: V_SOL	
A5	Solenoid valve LR		Output / PWM	signal: 3.0 < Iscb < 5.0A supply: V_SOL	
A6	OverDrive Lamp		Reserved (Not Used)		
A7	Spare Input		Reserved (Not Used)		
A8	Cruise control lamp signal	Lamp ON	Input / static signal	Vlow < 1.8V Vhigh > 4.2V	12.37 V (Vbatt Level)
		Lamp OFF			0.2 V
A9	Inhibitor switch D	D ON	Input / static signal	Vlow < 1.8V Vhigh > 4.2V Active : high	12.37 V (Vbatt Level)
		Others			0.2 V
A10	Inhibitor switch 3 or Sports mode select switch	3 ON	Input / static signal	Vlow < 1.8V Vhigh > 4.2V Active : high	12.37 V (Vbatt Level)
		Others			0.2 V
A11	Inhibitor switch 2 or Sports Up switch	2 ON	Input / static signal	Vlow < 1.8V Vhigh > 4.2V Active : high	12.37 V (Vbatt Level)
		Others			0.2 V
A12	Inhibitor switch L or Sports Down switch	L ON	Input / static signal	Vlow < 1.8V Vhigh > 4.2V Active : high	12.37 V (Vbatt Level)
		Others			0.2 V
A17	Solenoid valve DCC		Output / PWM	signal: 8.0 < Iscb < 11.0A supply: V_SOL	

Pin No.	Signal Description	Condition	Input, Output Value		Test Result
			Type	Level	
A18	Power supply for VFS	ON	Power		12.4V (Vbatt Level)
		OFF			0.3V
A20	TCU ground		Ground	-0.3V ~ +0.5V	
A21	Spare output		Reserved (Not Used)		
A22	OD Off Request from Auto-Cruise		Reserved (Not Used)		
A23	Hold switch input	Hold ON	Input / static signal	Vlow < 1.8V Vhigh > 4.2V	12.37 V (Vbatt Level)
		Hold OFF			0.2 V
A24	Inhibitor switch N	N ON	Input / static signal	Vlow < 1.8V Vhigh > 4.2V Active : high	12.37 V (Vbatt Level)
		Others			0.2 V
A25	Inhibitor switch R	R ON	Input / static signal	Vlow < 1.8V Vhigh > 4.2V Active : high	12.37 V (Vbatt Level)
		Others			0.2 V
A26	Inhibitor switch P	P ON	Input / static signal	Vlow < 1.8V Vhigh > 4.2V Active : high	12.37 V (Vbatt Level)
		Others			0.2 V
A27	Spare input		Reserved (Not Used)		
A32	Solenoid valve 2ND		Output / PWM	signal: 3.0 < Iscb < 5.0A supply: V_SOL	
A33	Solenoid valve UD		Output / PWM	signal: 3.0 < Iscb < 5.0A supply: V_SOL	
A34	TCU ground		Ground	-0.3V ~ +0.5V	
A35	TCU ground		Ground	-0.3V ~ +0.5V	
A36	Gear Info to Trip computer		Output / PWM	50 Hz	

Pin No.	Signal Description	Condition	Input, Output Value		Test Result
			Type	Level	
A37	Auto-Cruise Release Request	ON	Output / static signal	12.37 V (Vbatt Level)	 STDAA0070N
		OFF		0.2 V	
A38	Input speed PG-A	No signal: 2068rpm	pulse	Vlow < 1.8V Vhigh > 4.2V	 STDAA0071N
A39	Output speed PG_B sensor ground		Ground	-0.3V ~ +0.5V	
A40	A/T Fluid temp sensor (Oil Temp sensor)		analog	V = -0.3~VB	
A47	Power supply for Solenoid valves 1	ON	Power		12.4V (Vbatt Level)
		OFF			0.3V
A48	Power supply for Solenoid valves 2	ON	Power		12.4V (Vbatt Level)
		OFF			0.3V
A49	Battery voltage supply for V_SOL1/2	IGK_ON	Power		12.4V (Vbatt Level)
		IGK_OFF			0.3V
A50	Battery voltage supply for V_SOL1/2	IGK_ON	Power		12.4V (Vbatt Level)
		IGK_OFF			0.3V
A51	Vehicle speed output to Cluster		pulse	1.0 < Icl < 2.0A	 STDAA0070N
A52	Break pedal switch	Brake ON	sens	Vlow < 1.0V Vhigh > 6V	12.37 V (Vbatt Level)
		Brake OFF			0.2 V
A53	Input speed PG_A sensor ground		Ground	-0.3V ~ +0.5V	
A54	Ouput speed PG-B	No signal: 2068rpm	pulse	Vlow < 1.8V Vhigh > 4.2V	 STDAA0071N
A55	ATF sensor ground (Oil Temp sensor ground)		Ground	-0.3V ~ +0.5V	
A56	Spare input		Reserved (Not Used)		