

AT-2

Automatic Transaxle System

General Information

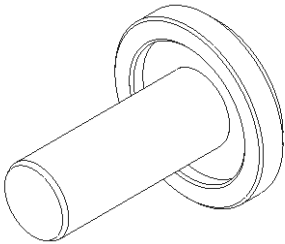
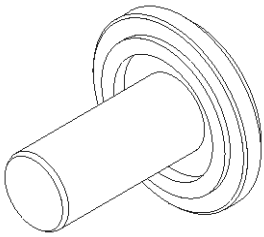
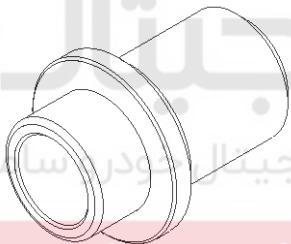
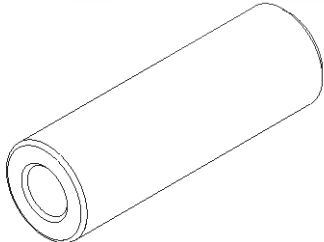
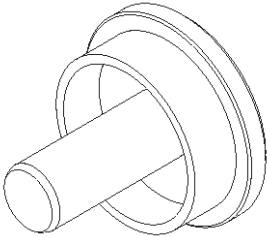
Specifications

Transmission type		F21	
Engine model		Diesel 3.0L	Gasoline 3.8L
Driving system		2WD (4WD option)	
Stall toque ratio		1.96	
Stall revolution (rpm)		2279	
Oil pump system		Trochoid pump (Engine drive)	
Gear ratio	1st	4.148	
	2nd	2.370	
	3rd	1.556	
	4th	1.155	
	5th	0.859	
	6th	0.686	
	Reverse	3.394	
	Counter	0.906	0.980
	Differential	3.533	
Clutch	C1	1 flange, 7 disks, 7 plates	
	C2	1 flange, 4 disks, 4 plates	
	C3	1 flange, 4 disks, 4 plates	
Brake	B1	1 band	
	B2	2 flanges, 7 disks, 6 plates	
One-way clutch	F1	Roller type	
Solenoid	3-way	2 solenoids [S1,S2]	
	Linear	6 Solenoids [SLC1,SLC2,SLC3,SLB1,SLT,SLU]	
Line pressure (Idling)	D	372~432 kPa	
	R	580~695 kPa	
Transmission oil (ATF)		TFF ATF T-IV JWS 3309, Mobil ATF 3309, 3309 US ATF	

General Information

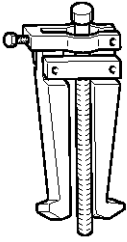
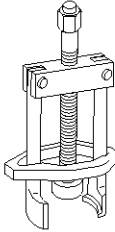
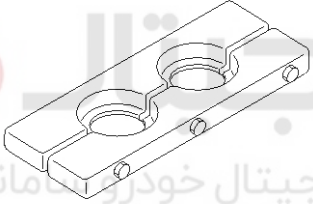
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Special Service Tools

Number and Name	Illustration	Use
09452-3J000 Oil seal installer	 SENAT7105D	Installing oil seal (Transmission housing side) (2WD)
09452-3J100 Oil seal installer	 SENAT7106D	Installing oil seal (Transmission case side)
09453-3J000 Oil seal installer	 SENAT7107D	Installing oil seal (Oil pump)
09459-3J000 Oil seal installer	 SENAT7108D	Installing oil seal (Manual shaft)
09473-3J000 Oil seal installer	 SENAT7109D	Installing oil seal (Transmission housing side) (4WD)

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Number and Name	Illustration	Use
09455-32200 Oil seal puller	 <p>UMQG010A</p>	Removing oil seal
09455-21000 Bearing & gear puller	 <p>UMQG010B</p>	Removing taper roller bearing
09432-33200 Plate	 <p>D3233200</p>	Supporting when removing oil seal

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Description

F21 Features

1. Easy-to-install FF 6-speed automatic transaxle

The F21 is a compact, lightweight, next-generation electronically controlled FF 6-speed automatic transaxle that employs a Ravigneaux-type planetary gear. It employs a high-precision clutch hydraulic control system for smooth, highly responsive gear shift feel.

2. Adoption of centrifugal hydraulic pressure cancel clutch

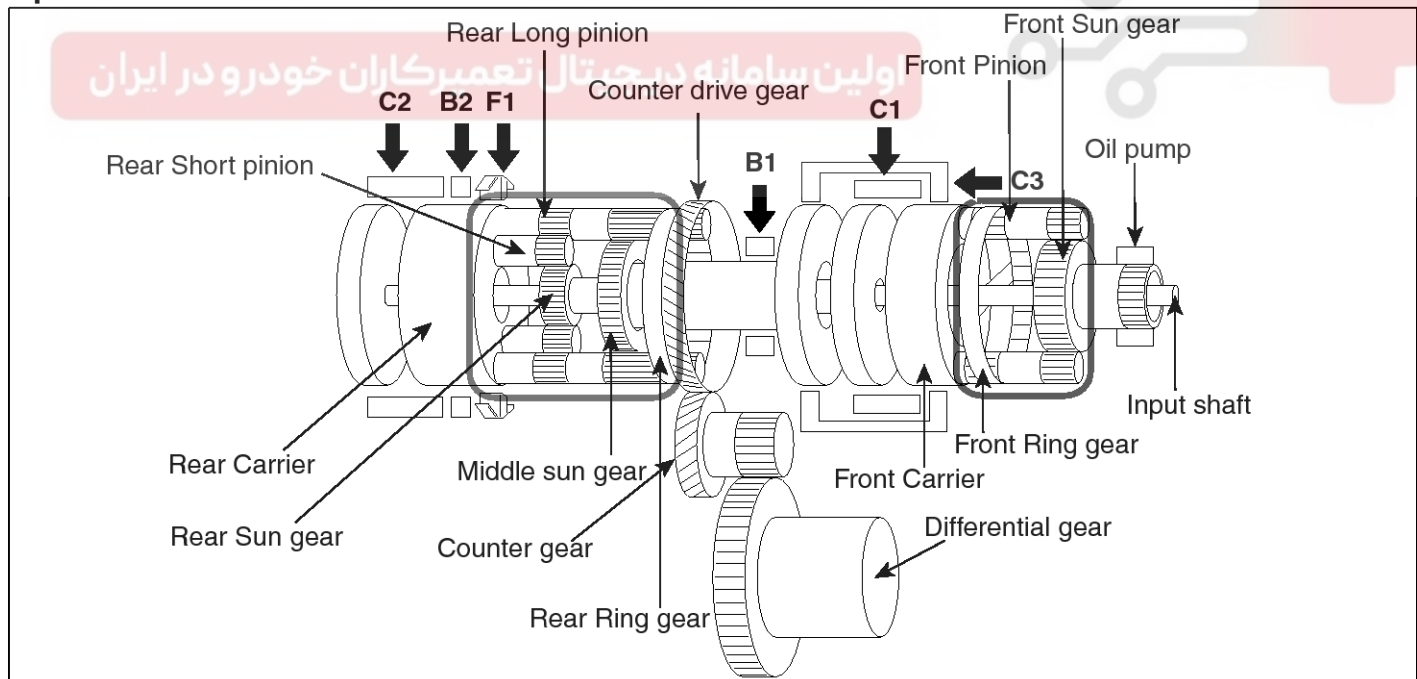
When the rotation of the clutch increases, centrifugal force operations on the oil inside the clutch, hydraulic pressure increases, and the timing of clutch engagement becomes earlier. This causes a difference in rotation between the input shaft and the output shaft, and shift shock may occur. To solve this, an additional chamber has been provided opposite the piston hydraulic pressure chamber. This causes centrifugal hydraulic pressure to operate in the opposite direction with the same force as the piston, counteracting the pressure of the piston hydraulic pressure chamber.

3. Adoption of integrated position sensor with TCU

The adoption of the integrated oil cooler has the following advantages:

- 1) It allows the number of parts to be decreased (the wire harness can be simplified).
- 2) Reliability is enhanced because there is no harness circuit between the TCU and shift position sensor.

Operation



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List Of Operating Components

Clutch/Brake		Operation
C1	C1 Clutch	Connects front planetary carrier to rear planetary rear sun gear
C2	C2 Clutch	Connects intermediate shaft to rear planetary carrier
C3	C3 Clutch	Connects front planetary carrier to rear planetary middle sun gear
B1	B1 Brake	Locks rear planetary middle sun gear
B2	B2 Brake	Locks rear planetary carrier
F1	One-way Clutch	Locks counterclockwise rotation of rear planetary carrier

Operation Of Components

Shift position		Solenoid (○ : ON, - : OFF)						Clutch			Brake		One-way clutch
		SLC1	SLC2	SLC3	SLB1	S1	S2	C1	C2	C3	B1	B2	F1
P		○	○	○	○	-	-	-	-	-	-	-	-
R	V<11	○	○	-	○	-	-	-	-	○		○	-
	V>11	○	○	○	○	○	○	-	-	-	-	-	-
N		○	○	○	○	-	-	-	-	-	-	-	-
D	1st	-	○	○	○	-	-	○	-	-	-	-	○
	E/G B	-	○	○	○	○	○	○	-	-	-	○	○
	2nd	-	○	○	-	-	-	○	-	-	○	-	-
	3rd	-	○	○	○	-	-	○	-	○	-	-	-
	4th	-	-	○	○	-	-	○	○	-	-	-	-
	5th	○	-	-	○	-	-	-	○	○	-	-	-
	6th	○	-	○	-	-	-	-	○	-	○	-	-

※ 1) Clutch, Brake, One-way clutch ; ○ : Operating, - : not operating

2) Lock up control : operating only in between 3th-6th

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Procedure Of Operating Each Gear

1. "D" -1st gear

- Power transmission pathway [Operating components: C1, F1]

Operating components:

C1, F1 (counterclockwise rotation is locked), B2 (ON when engine brake is operating)

Planetary gear unit	Input, Locked, Output
Front	Input: Ring gear, Locked: Sun gear, Output : Carrier
Rear	Input: Rear sun gear, Locked: Carrier, Output: Ring gear

- 1) Input shaft (rotates clockwise) [same revolutions as the torque converter's turbine runner]
- 2) Front planetary ring gear (rotates clockwise) [same revolutions as the input shaft]
- 3) Front planetary pinion gear (rotates clockwise on its axis, orbits clockwise)
[because the front planetary sun gear is locked by the oil pump, it is pressed against the front planetary ring gear and orbits the sun gear while rotating on its axis (because the front planetary ring gear has internal gears, the rotational direction does not change)]
- 4) Front planetary carrier (rotates clockwise)
[reduction: same revolution as the front planetary pinion gear orbit revolution]
- 5) C1-CLUTCH (rotates clockwise) [connects the front planetary carrier and the rear planetary sun gear]
- 6) Rear planetary sun gear (rotates clockwise) [same revolution as the front planetary carrier]
- 7) Rear planetary short pinion gear (rotates counterclockwise on its axis)
[the rear planetary carrier tries to rotate counterclockwise, but the counterclockwise rotation is locked by one-way clutch F1.]
- 8) Rear planetary long pinion gear (rotates clockwise on its axis)
[the rear planetary middle sun gear rotates counterclockwise (idling)]

- 9) Rear planetary ring gear (rotates clockwise) [the rear planetary ring gear is rotated by the rear planetary long pinion gear (because the rear planetary ring gear has internal gears, the rotational direction does not change)]

- 10) Counter drive gear (rotates clockwise) [because the rear planetary ring gear is installed on the counter drive gear, the rotational direction and the revolution are the same as the rear planetary ring gear]

- 11) Counter driven gear (rotates counterclockwise)

- 12) Differential ring gear (rotates clockwise)

- Engine brake

When the engine brake is operating, driving force is transmitted from the tires.

2. "D" -2nd gear

- Power transmission pathway [Operating components: C1, B1]

Planetary gear unit	Input, Locked, Output
Front	Input: Ring gear, Locked: Sun gear, Output: Carrier
Rear	Input: Rear Sun gear, Locked: Middle Sun gear, Output: Ring gear

- 1) Input shaft (rotates clockwise) [same revolutions as the torque converter's turbine runner]
- 2) Front planetary ring gear (rotates clockwise) [same revolution as the input shaft]
- 3) Front planetary pinion gear (rotates clockwise on its axis, orbits clockwise)
[because the front planetary sun gear is locked by the oil pump, it is pressed against the front planetary ring gear and orbits the sun gear while rotating on its axis (because the front planetary ring gear has internal gears, the rotational direction does not change)]
- 4) Front planetary carrier (rotates clockwise)
[reduction: same revolution as the front planetary pinion gear orbit revolution]
- 5) C1-CLUTCH (rotates clockwise) [connects the front planetary carrier and the rear planetary sun gear]
- 6) Rear planetary sun gear (rotates clockwise) [same revolution as the front planetary carrier]

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- 7) Rear planetary middle sun gear is locked by B1-BRAKE
 - 8) Rear planetary short pinion gear (rotates counterclockwise on its axis, orbits clockwise)
 - 9) Rear planetary long pinion gear (rotates clockwise on its axis, orbits clockwise)
 - 10) Rear planetary ring gear (rotates clockwise)
[the rear planetary ring gear is rotated by the rear planetary long pinion gear (because the rear planetary ring gear has internal gears, the rotational direction does not change)]
 - 11) Counter drive gear (rotates clockwise)
[because the rear planetary ring gear is installed on the counter drive gear, the rotational direction and the revolution are the same as the rear planetary ring gear]
 - 12) Counter driven gear (rotates counterclockwise)
 - 13) Differential ring gear (rotates clockwise)
3. "D"-3rd gear
- Power transmission pathway [Operating components: C1, C3]

Planetary gear unit	Input, Locked, Output
Front	Input: Ring gear, Locked: Sun gear, Output: Carrier
Rear	Input: Rear Sun gear, Middle Sun gear, Locked: -, Output: Ring gear

- 1) Input shaft (rotates clockwise) [same revolution as the torque converter's turbine runner]
- 2) Front planetary ring gear (rotates clockwise) [same revolution as the input shaft]
- 3) Front planetary pinion gear (rotates clockwise on its axis, orbits clockwise)
[because the front planetary sun gear is locked by the oil pump, it is pressed against the front planetary ring gear and orbits the sun gear while rotating on its axis (because the front planetary ring gear has internal gears, the rotational direction does not change)]
- 4) Front planetary carrier (rotates clockwise)
[reduction: same revolution as the front planetary pinion gear orbit revolution]
- 5) C1-CLUTCH (rotates clockwise) [connects the front planetary carrier and the rear planetary sun gear]

- 6) C3-CLUTCH (rotates clockwise) [connects the front planetary carrier and the rear planetary middle sun gear]
 - 7) Rear planetary gear assembly (rotates clockwise)
[because the rear planetary short pinion gear and the rear planetary long pinion gear are engaged, both the pinion gears are locked due to the difference in the rotational directions, and kinematic energy of the rear planetary sun gear and rear planetary middle sun gear is transmitted to the rear planetary ring gear]
 - 8) Rear planetary ring gear (rotates clockwise) [same revolution as the rear planetary carrier]
 - 9) Counter drive gear (rotates clockwise)
[because the rear planetary ring gear is installed on the counter drive gear, the rotational direction and the revolution are same as the rear planetary ring gear]
 - 10) Counter driven gear (rotates counterclockwise)
 - 11) Differential ring gear (rotates clockwise)
4. "D"-4th gear
- Power transmission pathway [Operating components: C1, C2]

Planetary gear unit	Input, Locked, Output
Front	Input: Ring gear, Locked: Sun gear, Output: Carrier
Rear	Input: Rear Sun gear, Carrier, Locked: -, Output: Ring gear

- 1) Input shaft (rotates clockwise) [same revolution as the torque converter's turbine runner]
- 2) Front planetary ring gear (rotates clockwise) [same revolution as the input shaft]
- 3) Front planetary pinion gear (rotates clockwise on its axis, orbits clockwise)
[because the front planetary sun gear is locked by the oil pump, it is pressed against the front planetary ring gear and orbits the sun gear while rotating on its axis (because the front planetary ring gear has internal gears, the rotational direction does not change)]
- 4) Front planetary carrier (rotates clockwise)
[reduction: same revolution as the front planetary pinion gear orbit revolution]
- 5) C1-CLUTCH (rotates clockwise) [connects the front planetary carrier and the rear planetary sun gear]

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- 6) Intermediate shaft (rotates clockwise) [same revolution as the input shaft]
 - 7) C2-CLUTCH (rotates clockwise) [same revolution as the intermediate shaft]
 - 8) Rear planetary carrier (rotates clockwise) [same revolution as the intermediate shaft]
 - 9) Rear planetary short pinion gear (rotates clockwise on its axis, orbits clockwise) [because the rear planetary carrier rotates faster than the rear planetary sun gear]
 - 10) Rear planetary long pinion gear (rotates counterclockwise on its axis, orbits clockwise)
 - 11) Rear planetary ring gear (rotates clockwise)
[because the rear planetary long pinion gear's rotation is subtracted from the rear planetary carrier revolution, the rear planetary ring gear revolution is slower than those of the rear planetary carrier]
 - 12) Counter drive gear (rotates clockwise)
[because the rear planetary ring gear is installed on the counter drive gear, the rotational direction and the revolution is the same as the rear planetary ring gear]
 - 13) Counter driven gear (rotates counterclockwise)
 - 14) Differential ring gear (rotates clockwise)
5. "D"-5th gear
- Power transmission pathway [Operating components: C2, C3]

Planetary gear unit	Input, Locked, Output
Front	Input: Ring gear, Locked: Sun gear, Output: Carrier
Rear	Input: Carrier, Middle Sun gear, Locked: - , Output: Ring gear

- 1) Input shaft (rotates clockwise) [same revolutions as torque converter's turbine runner]
- 2) Front planetary ring gear (rotates clockwise) [same revolution as the input shaft]
- 3) Front planetary pinion gear (rotates clockwise on its axis, orbits clockwise)
[because the front planetary sun gear is locked by the oil pump, it is pressed against the front planetary ring gear and orbits the sun gear while rotating on its axis (because the front planetary ring gear has internal gears, the rotational direction does not change)]
- 4) Front planetary carrier (rotates clockwise)

- [reduction: same revolution as the front planetary pinion gear orbit revolution]
- 5) C3-CLUTCH (rotates clockwise) [connects the front planetary carrier and the rear planetary middle sun gear]
 - 6) Rear planetary middle sun gear (rotates clockwise)
[same revolution as C3-CLUTCH (decelerates by the front planetary gear, so the revolutions are slower than the input shaft)]
 - 7) Intermediate shaft (rotates clockwise) [same revolution as the input shaft]
 - 8) C2-CLUTCH (rotates clockwise) [same revolution as the intermediate shaft]
 - 9) Rear planetary carrier (rotates clockwise) [same revolutions as intermediate shaft]
 - 10) Rear planetary long pinion gear (rotates clockwise on its axis, orbits clockwise)
[because the rear planetary carrier rotates faster than the rear planetary middle sun gear, the rear planetary middle pinion gear is pushed out by the speed difference, and orbits clockwise while rotating clockwise on its axis.]
 - 11) Rear planetary ring gear (rotates clockwise)
[because the rear planetary long pinion gear's rotation is added to the rear planetary carrier revolutions, rear planetary ring gear revolution is faster than those of the rear planetary carrier]
 - 12) Counter drive gear (rotates clockwise)
[because the rear planetary ring gear is installed on the counter drive gear, the rotational direction and revolution is the same as the rear planetary ring gear]
 - 13) Counter driven gear (rotates counterclockwise)
 - 14) Differential ring gear (rotates clockwise)

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6. "D"-6th gear

- Power transmission pathway [Operating components: B1, C2]

Planetary gear unit	Input, Locked, Output
Front	-
Rear	Input: Carrier, Locked: Middle Sun gear, Output: Ring gear

- 1) Input shaft (rotates clockwise) [same revolution as the torque converter's turbine runner]
- 2) Intermediate shaft (rotates clockwise) [same revolution as the torque converter's turbine runner]
- 3) B1-BRAKE [locks the rear planetary middle sun gear]
- 4) C2-CLUTCH [connects the intermediate shaft and the rear planetary carrier]
- 5) Rear planetary carrier (rotates clockwise) [same revolution as the intermediate shaft]
- 6) Rear planetary long pinion gear (rotates clockwise on its axis, orbits clockwise)
[because the rear planetary middle sun gear is locked, it is always in a speed increasing condition]
- 7) Rear planetary ring gear (rotates clockwise)
[because the rear planetary long pinion gear's rotation is added to the rear planetary carrier revolution, the rear planetary ring gear revolution is faster than those of the rear planetary carrier]
- 8) Counter drive gear (rotates clockwise)
[because the rear planetary ring gear is installed on the counter drive gear, the rotational [because the rear planetary ring gear is installed on the counter drive gear, the rotational
- 9) Counter driven gear (rotates counterclockwise)
- 10) Differential ring gear (rotates clockwise)

7. "R"-Reverse gear

- Power transmission pathway [Operating components: C3, B2]

Planetary gear unit	Input, Locked, Output
Front	Input: Ring gear, Locked: Sun gear, Output: Carrier
Rear	Input: Middle Sun gear, Locked: Carrier, Output: Ring gear

- 1) Input shaft (rotates clockwise) [same revolution as the torque converter's turbine runner]
- 2) Front planetary ring gear (rotates clockwise) [same revolution as the input shaft]
- 3) Front planetary pinion gear (rotates clockwise on its axis, orbits clockwise)
[because the front planetary sun gear is locked by the oil pump, it is pressed against the front planetary ring gear and orbits the sun gear while rotating on its axis (because the front planetary ring gear has internal gears, the rotational direction does not change)]
- 4) Front planetary carrier (rotates clockwise)
[reduction: same revolution as the front planetary pinion gear orbit revolution]
- 5) C3-CLUTCH (rotates clockwise) [connects the front planetary carrier and the rear planetary middle sun gear]
- 6) Rear planetary middle sun gear (rotates clockwise)
[same revolutions as the C3-CLUTCH (rotates slower than the input shaft)]
- 7) B2-BRAKE [locks the rear planetary carrier]
- 8) Rear planetary long pinion gear (rotates counterclockwise)
- 9) Rear planetary ring gear (rotates counterclockwise)
[the rear planetary ring gear is rotated by the rear planetary long pinion gear (because the rear planetary ring gear has internal gears, the rotational direction does not change)]
- 10) Counter drive gear (rotates counterclockwise)
[because the rear planetary ring gear is installed on the counter drive gear, the rotational direction and revolution are the same as the rear planetary ring gear]
- 11) Counter driven gear (rotates clockwise)
- 12) Differential ring gear (rotates counterclockwise)

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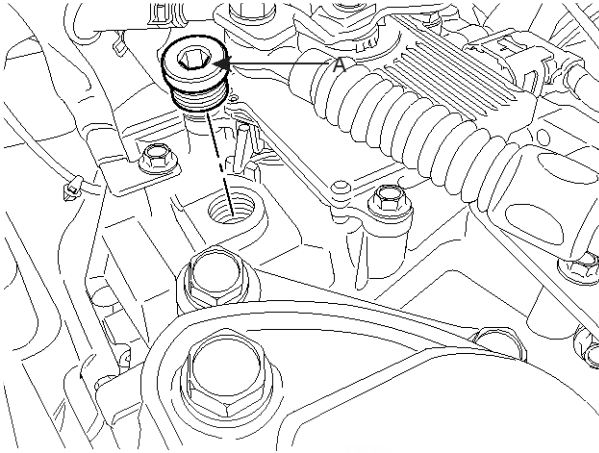
Inspection And Adjustment

Procedure Of ATF Level Comfirming

1. Remove the filler plug (A) and the O-ring by using Torx wrench(T55) then add 400cc of ATF from the oil filling hole.

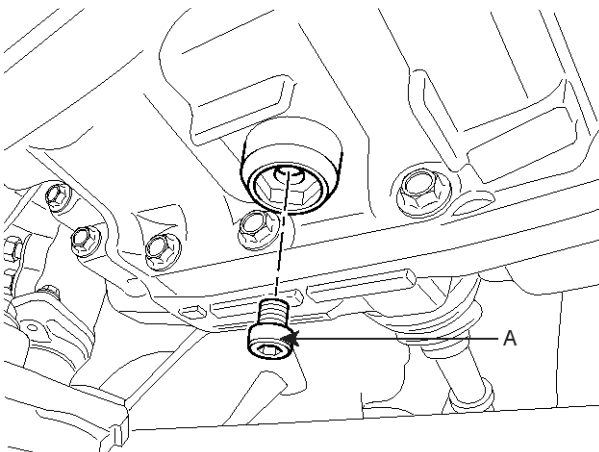
NOTICE

In case, remove the air cleaner assembly.



SENAT7061D

2. Start the engine.
3. Shift from "P" to "D", then from "D" to "P", keeping each shift position "N", "R" more than 2 seconds with foot braking.
4. Repeat 2 times above procedure "3".
5. Remove the overflow plug(A) and the O-ring by using Torx wrench(T40) when ATF temperature on CAN signal rises up to 50~60°C at stabilized idle speed condition.

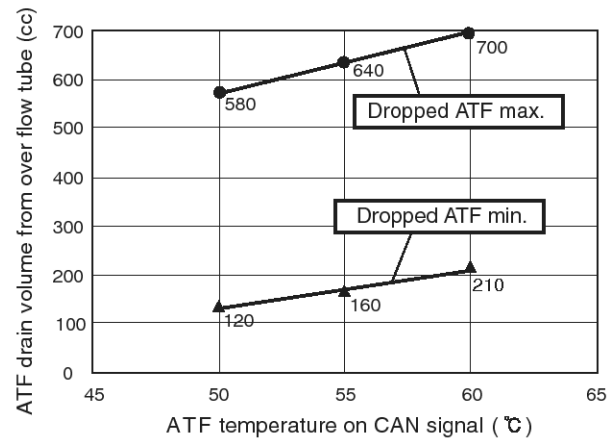


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6. Oil level is correct if ATF drain volume is in the range in the figure below.

CAUTION

Tolerance of ATF volume for vehicle side coller circuit is not considered.



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7. If the thin oil stream becomes drop by drop, fix the overflow plug with a new O-ring.

O-ring size: inner dia.-6.07mm, thickness-1.78mm

8. Tighten the overflow plug by using Torx(T40) wrench with the specified torque.

Tightening torque :

6-9 Nm(0.6-0.9 kgf.m, 4.3-6.5 lb-ft)

9. Fix the filler plug with a new O-ring.

O-ring size: inner dia.-15.41mm, thickness-2.21mm

10. Tighten the filler plug by using Torx(T55) wrench with the specified torque.

Tightening torque :

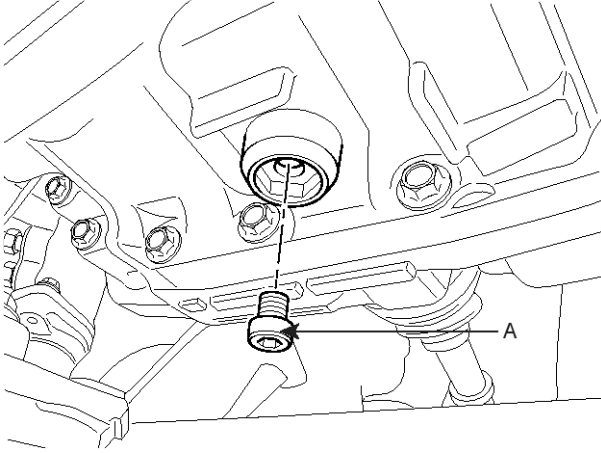
24-56 Nm(2.4-5.6 kgf.m, 17.4-40.5 lb-ft)

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Procedure of ATF level adjusting

1. Park the vehicle on a flat road and lock the tires.
2. Shift the shift lever to the "P" range.
3. Remove the overflow plug (A) and the O-ring by using a torx wrench (T40).

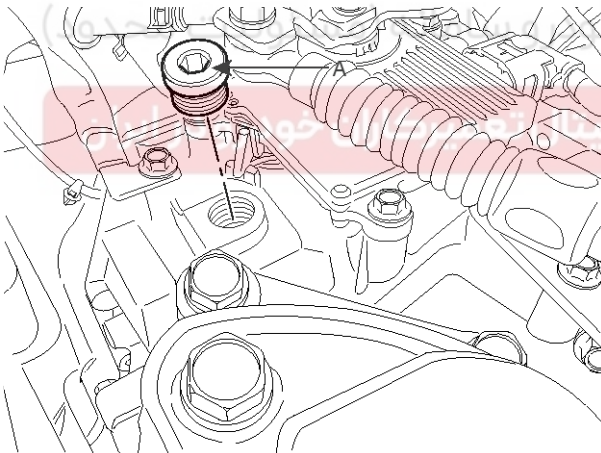


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4. Remove the filler plug (A) and the O-ring by using a torx wrench (T55).

NOTICE

In case, remove the air cleaner assembly.



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5. Check if ATF drops from the overflow hole. If ATF does not drop, add ATF until it drops.
6. Fix the overflow plug with the used O-ring by using Torx wrench (T40).
7. Add 600cc of ATF from the oil filling hole.
8. Coat the new O-ring with ATF, and install it to the filler plug.

O-ring size: inner dia.-15.41mm, thickness-2.21mm

9. Tighten the filler plug by using Torx(T55) wrench with the specified torque.

Tightening torque :

24-56 Nm(2.4-5.6 kgf.m, 17.4-40.5 lb-ft)

10. Start the engine.
11. Raise ATF temperature on CAN signal up to 50~60°C at stabilized idle speed condition.
12. Shift from "P" to "D", then from "D" to "P", keeping each shift position "N", "R" more than 2 seconds with foot braking.
13. Repeat 2 times above procedure "3".
14. Remove the overflow plug and the O-ring by using Torx wrench (T40).
15. Check if the thin oil stream becomes drop by drop when ATF temperature on CAN signal is at 50~60°C.
16. Coat the new O-ring with ATF, and install it to the overflow plug.

O-ring size: inner dia.-15.41mm, thickness-2.21mm

17. Tighten the overflow plug by using Torx(T40) wrench with the specified torque.

Tightening torque :

6-9 Nm(0.6-0.9 kgf.m, 4.3-6.5 lb-ft)

NOTICE

Be sure to wipe off spilled ATF completely after tightening the overflow plug.

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Oil Seal (Manual Valve Lever) Replacement

1. Remove the TCU. (refer to TCU's Removal)

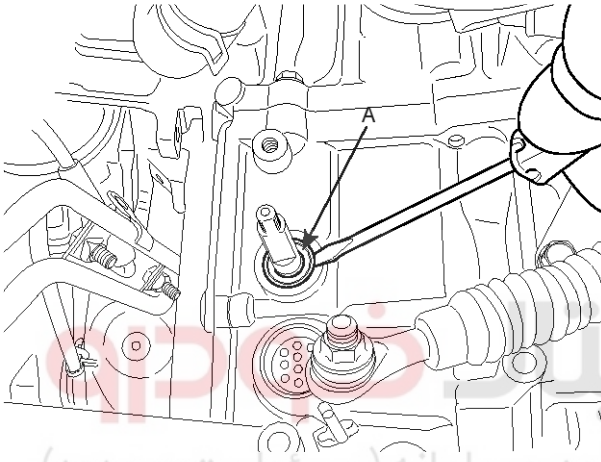
⚠CAUTION

Be careful not to damage the terminals.

2. Using a screwdriver, remove the oil seal (A).

⚠CAUTION

- Tape the screwdriver tip before use.
- Be careful not to damage the transmission case.
- Be careful not to damage the manual valve lever.



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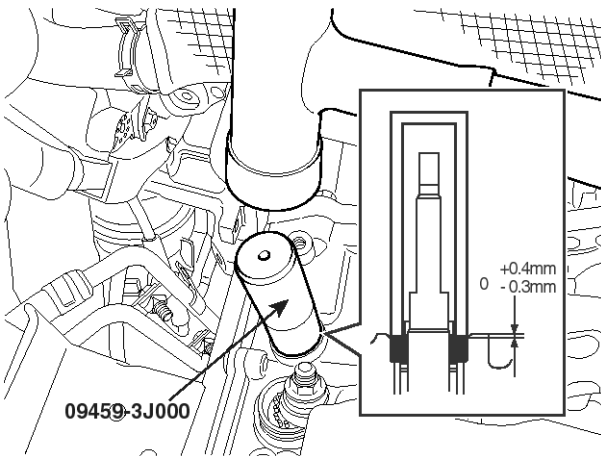
3. Using the special tool (09459-3J000) and a hammer, install the new oil seal to the T/A case.

Specification:

0+0.4/-0.3mm (From end of transmission case)

⚠CAUTION

Be careful not to damage the oil seal.



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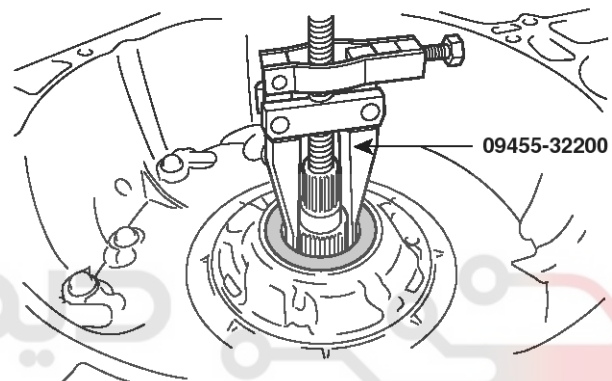
4. Install the TCU. (refer to TCU's Installation)

Oil Seal (Oil Pump) Replacement

1. Drain the ATF by removing the overflow plug and the filler plug.
2. Remove the transmission (refer to Automatic Transaxle's Removal)
3. Take off the torque converter assembly from the transmission.
4. Using the special tool (09455-32200), remove the oil seal (A) from the oil pump assembly.

⚠CAUTION

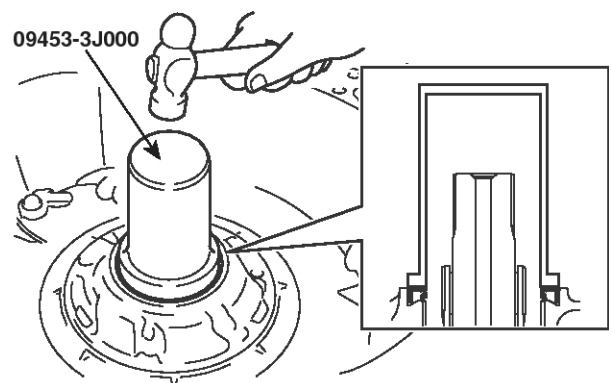
Be careful not to damage the bushing on the oil pump body.



SENAT7064D

5. Using the special tool (09453-3J000) and a hammer, install the new oil seal to the oil pump body.

Specification: 0±0.2 mm (From end of oil pump)



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- Using a screwdriver, position the drive gear on the oil pump assembly in the center. Then install the torque converter assembly on the transmission.

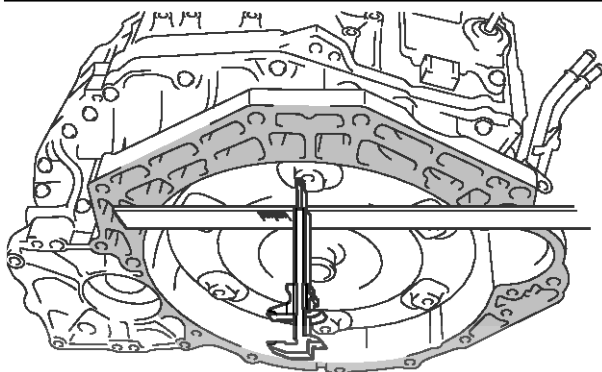
⚠ CAUTION

Be careful not to damage the oil seal.

- Check that the torque converter assembly is installed properly.

Specification:

16.7 mm (From end of transmission housing)



SENAT7066L

- Install the transmission. (refer to Automatic Transaxle's Installation)
- Refill the ATF. (refer to Procedure of Oil level adjusting)

Oil Seal (Transmission Case Side) Replacement

- Drain the ATF by removing the overflow plug and the filler plug.
- Disconnect the left drive shaft assembly. (refer to Driveshaft in DS group)
- Insert a screwdriver between the differential case and the oil seal lip and pry the screwdriver to remove the oil seal.

⚠ CAUTION

- Tape the screwdriver tip before use.
- Be careful not to damage the transmission case.
- Be careful not to damage the differential case.

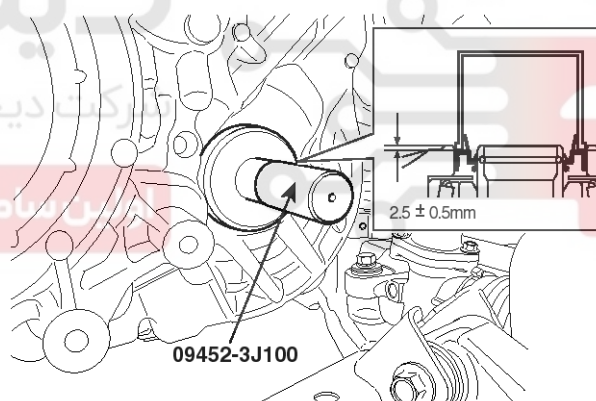
- Using the specified tool (09452-3J100) and a hammer, install the new oil seal to the T/A case.

Specification:

2.5±0.5 mm (From end of transmission case)

⚠ CAUTION

Be careful not to damage the oil seal.



SENAT7067D

- Connect the left drive shaft assembly. (refer to Driveshaft in DS group)
- Refill the ATF. (refer to Procedure of Oil level adjusting)

Automatic Transaxle System

AT-15

Oil Seal (Transmission Housing Side) Replacement

1. Drain the ATF by removing the overflow plug and the filler plug.
2. Disconnect the right drive shaft assembly. (refer to Driveshaft in DS group)
3. In case of 4WD, remove the transfer case assembly. (refer to Transfer case's Removal)
4. Insert a screwdriver between the differential case and the oil seal lip and pry the screwdriver to remove the oil seal.

⚠ CAUTION

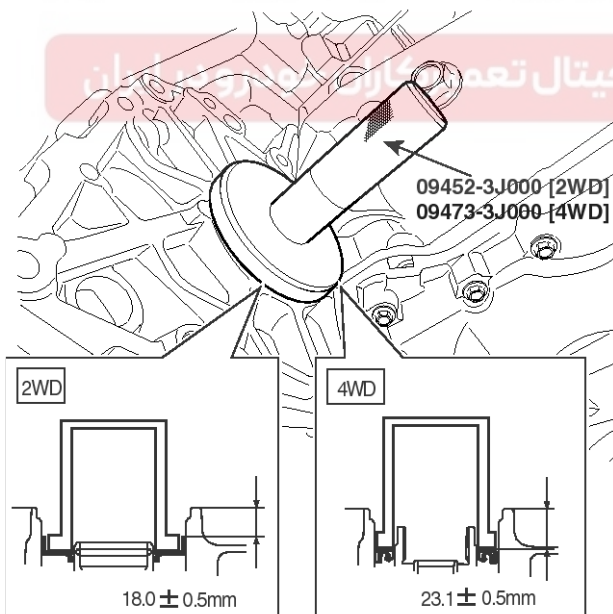
- Tape the screwdriver tip before use.
 - Be careful not to damage the transmission housing.
 - Be careful not to damage the differential case.
5. Using the specified tool (09452-3J000[2WD] or 09473-3J000[4WD]) and a hammer, install the new oil seal to the transmission housing.

Specification: (From end of transmission housing)

18.0±0.5mm (2WD), 23.1±0.5mm (4WD)

⚠ CAUTION

Be careful not to damage the oil seal.



SENAT7068D

6. In case of 4WD, install the transfer case assembly. (refer to Transfer case's Installation)
7. Connect the right drive shaft assembly. (refer to Driveshaft in DS group)
8. Refill the ATF. (refer to Procedure of Oil level adjusting)

AT-16

Automatic Transaxle System

Troubleshooting

How to perform N position learning

If the automatic transmission or the TCU is replaced, be sure to initialize the learned values and perform N position learning.

1. Stop the vehicle by shifting the shift lever to the P range and chock the tires. Turn the ignition switch to the ON position

CAUTION

Check that the vehicle is stationary before operation.

2. Release the shift lock, and shift the shift lever to the N range.
3. Check that the TCU N position mark is correct.
4. Check that the N position is correctly displayed on the special tester.

CAUTION

The command cannot be input unless the ignition switch is on, the shift lever is in the N range, the engine is stopped, and the vehicle speed is 0 km/h.

- **Input NG is indicated:** Check again that the N position mark is correct. If it is incorrect, adjust it.
 - **Input OK is indicated:** Turn the ignition switch off after releasing the shift lock and shift the shift lever to the P range. Turn the ignition switch on after 5 seconds.
5. Shift the shift lever from the P to the D position, then check that the indicator displays the correct position.
 - Display is correct: Check the trouble code.
 - Display is incorrect: Perform the initial learning.

How to perform initial learning

If the automatic transmission or the TCU are replaced, or the TCU software is overwritten, be sure to initialize the learned values and perform initial learning.

1. Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing a city drive. Check the ATF temperature using the special tester and make sure it is between 66 and 110°C. If the oil temperature is outside this range, work to bring it inside the range.

CAUTION

Do not attempt to raise the oil temperature by stalling the engine.

NOTICE

If the oil temperature is not between 66 and 110°C, initial learning cannot be performed. Before learning, check for shift shock or variable speed shock.

2. Garage shift learning

With the vehicle stationary, depress the brake and keep the shift lever in N for 3 seconds. Then, shift from N into D, and maintain this condition for 3 seconds. Repeat this procedure 5 times. Then repeat 5 times in the same way for R.

3. Gear shift control learning

In D, with the throttle opening angle between 25 and 35%, drive until 6th gear and a vehicle speed of 110 km/h or higher is reached. Then, release the accelerator pedal and coast, and bring the vehicle to a stop within 60 seconds. Repeat this procedure 10 times.

4. Check learning results

Check that variable speed shock and shift shock have decreased compared to the conditions before learning.

Inspection Chart For Diagnosis Trouble Codes (DTC)

No	DTC	Description	MIL
1	P0601	Internal Control Module Memory Check Sum Error	●
2	P0603	Internal Control Module Keep Alive Memory (KAM) Error	●
3	P0604	Internal Control Module Random Access Memory (RAM) Error	●
4	P0706	Transmission Range Sensor Electrical Failure	●
5	P0707	Transmission Range Sensor Circuit Low Input	●
6	P0708	Transmission Range Sensor Circuit High Input	●
7	P0711	Transmission Fluid Temperature Sensor "A" Circuit Range/Performance	●
8	P0712	Transmission Fluid Temperature Sensor "A" Circuit Low Input	●

Automatic Transaxle System

AT-17

No	DTC	Description	MIL
9	P0713	Transmission Fluid Temperature Sensor "A" Circuit High Input	●
10	P0717	Input/Turbine Speed Sensor "A" Circuit No Signal	●
11	P0722	Output Speed Sensor Circuit No Signal	●
12	P0729	Gear 6 Incorrect Ratio	●
13	P0730	Incorrect Gear Ratio	●
14	P0731	Gear 1 Incorrect Ratio	●
15	P0732	Gear 2 Incorrect Ratio	●
16	P0733	Gear 3 Incorrect Ratio	●
17	P0734	Gear 4 Incorrect Ratio	●
18	P0735	Gear 5 Incorrect Ratio	●
19	P0741	Torque Converter Clutch Circuit Performance or Stuck Off	●
20	P0742	Torque Converter Clutch Circuit Stuck On	●
21	P0780	Unusual Shifting	●
22	P0882	Battery Voltage Low Supply	-
23	P0883	Battery Voltage High Supply	-
24	P0942	Neutral Condition At D Range	●
25	P0961	SLT Liner Feedback Current Stick	●
26	P0962	SLT GND Short/Open	●
27	P0963	SLT +B Short	●
28	P0973	Solenoid NO.1 Circuit GND Short	●
29	P0974	Solenoid NO.1 Circuit +B Short/OPEN	●
30	P0976	S2 Solenoid GND Short	●
31	P0977	S2 Solenoid +B Short/OPEN	●
32	P0978	SLC1 Lineir Feedback Current Stick	●
33	P0979	SLC1 GND Short/Open	●
34	P0980	SLC1 +B Short	●
35	P0981	SLC2 Lineir Feedback Current Stick	●
36	P0982	SLC2 GND Short/Open	●
37	P0983	SLC2 +B Short	●
38	P0984	SLC3 Lineir Feedback Current Stick	●
39	P0985	SLC3 GND Short/Open	●
40	P0986	SLC3 +B Short	●
41	P0997	SLB1 Lineir Feedback Current Stick	●
42	P0998	SLB GND Short/Open	●
43	P0999	SLB +B Short	●

AT-18

Automatic Transaxle System

No	DTC	Description	MIL
44	P1750	Wheel Speed Sensor Signal (Left Front)	●
45	P1751	Wheel Speed Sensor Signal (Right Front)	●
46	P1752	Wheel Speed Sensor Signal (Left Rear)	●
47	P1753	Wheel Speed Sensor Signal (Right Rear)	●
48	P1760	Neutral Condition At R Range	-
49	P2762	SLU Lineir Feedback Current Stick	●
50	P2763	SLU GND Short/Open	●
51	P2764	SLU +B Short	●
52	U0001	High Speed CAN Communication Bus off	●
53	U0100	Lost Communication With ECM/PCM "A"	●
54	U0121	Lost Communication With Anti-Lock Brake System (ABS) Control Module	●
55	U0122	Lost Communication With Vehicle Dynamics Control Module	●

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

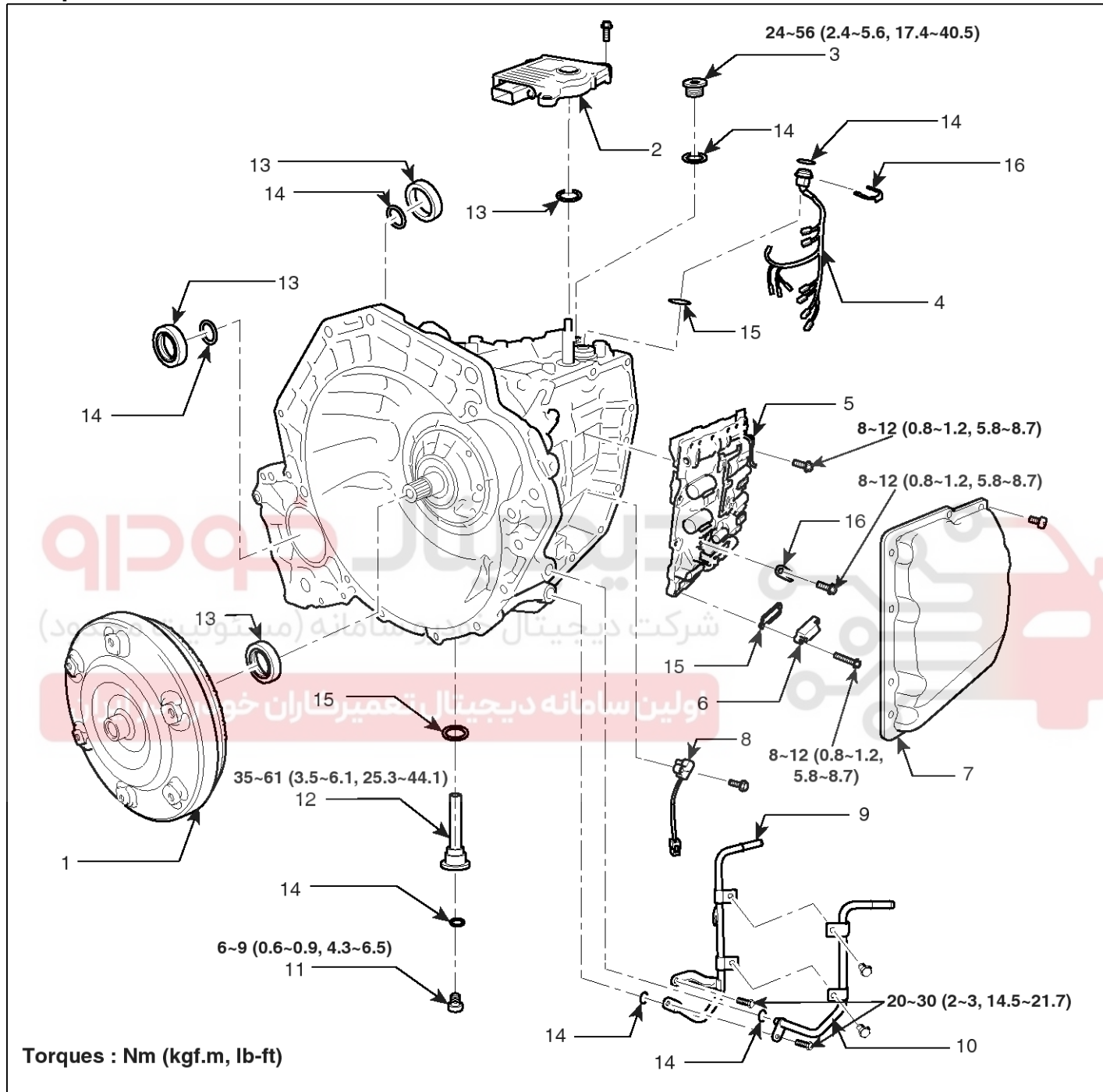


Automatic Transaxle System

AT-19

Automatic Transaxle

Components



SENAT9001N

1. Torque converter assembly
2. TCU
3. Filler plug
4. Wire
5. Valve body assembly
6. Suction cover

7. Side cover
8. Input shaft speed sensor
9. Oil cooler tube-Inlet
10. Oil cooler tube-Outlet
11. Overflow plug
12. Drain plug

13. Oil seal
14. O-ring
15. Gasket
16. Locking plate

AT-20

Automatic Transaxle System

Removal

⚠ CAUTION

Please pay attention to the following when installing or removing A/T.

● Electronic parts

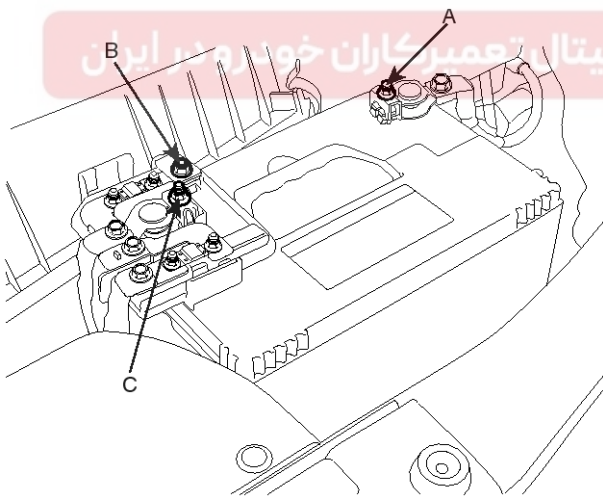
1. When replacing an electronic part, be sure to switch the ignition off and disconnect the battery from the negative (-) terminal before servicing the system.
2. When disconnecting a connector, pull out the connector after releasing a lock. [DO NOT PULL ON THE HARNESS.]
3. When connecting a connector, insert the connector until it is locked completely. (Make sure a click sound is made)
4. Do not jar electronic parts. If a part is dropped or shocked, replace it with a new one.

● Caution for handling ATF

1. Do not drain ATF while it is still hot. (Service the system after it cools down)
2. Be sure to use JWS-3309 (T-IV) type ATF.

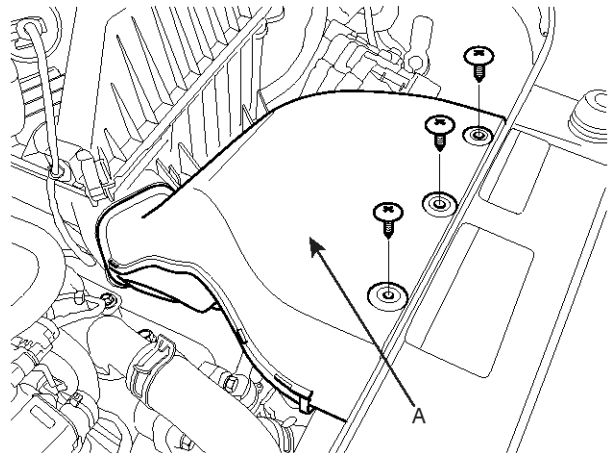
[Gasoline 3.8]

1. Remove the engine cover. (refer to Engine and Transaxle Assembly in EM group)
2. Remove the battery after removing the three nuts (A,B,C) in order.



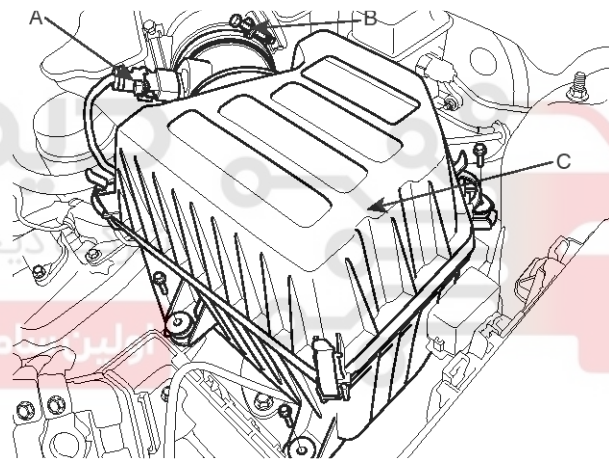
SENAT7056D

3. Remove the air duct (A).



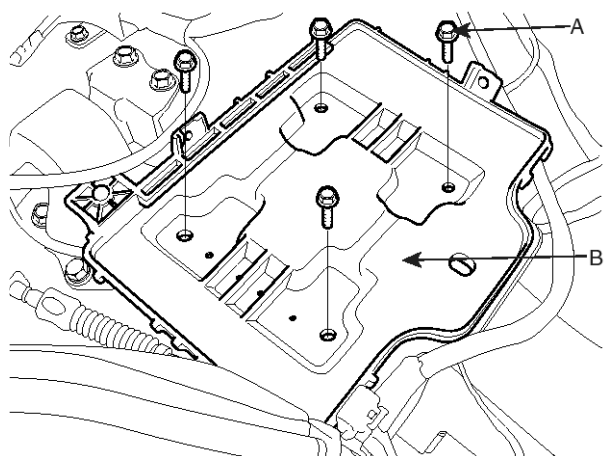
SENAT7001L

4. Remove the air cleaner assembly (C) by disconnecting the AFS(Air Flow Sensor) connector (A) and loosening the clamp (B).



SENAT7002L

5. Remove the battery tray (B) by removing the four bolts (A).

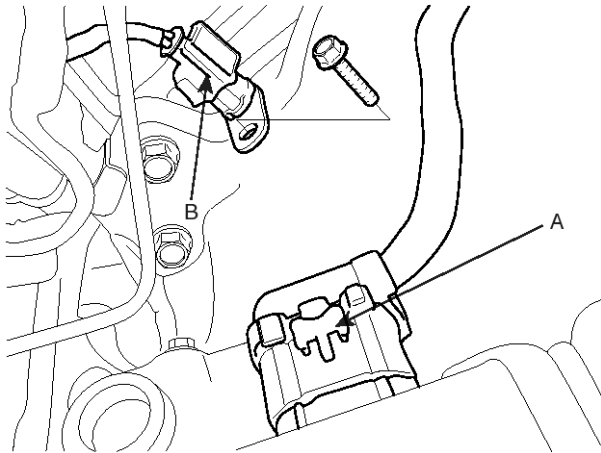


SENAT7003L

Automatic Transaxle System

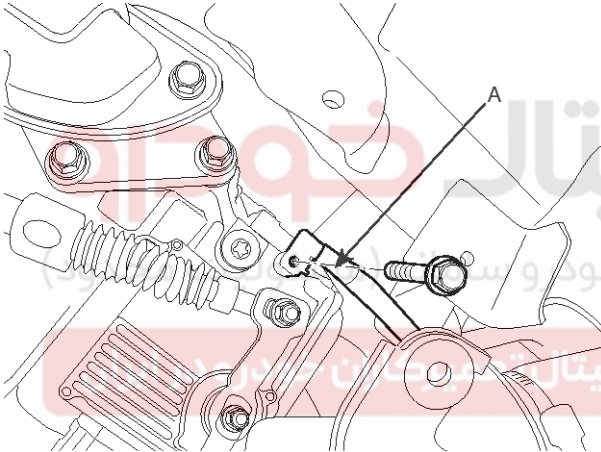
AT-21

6. Disconnect the TCU connector (A) and remove the CKP sensor (B).



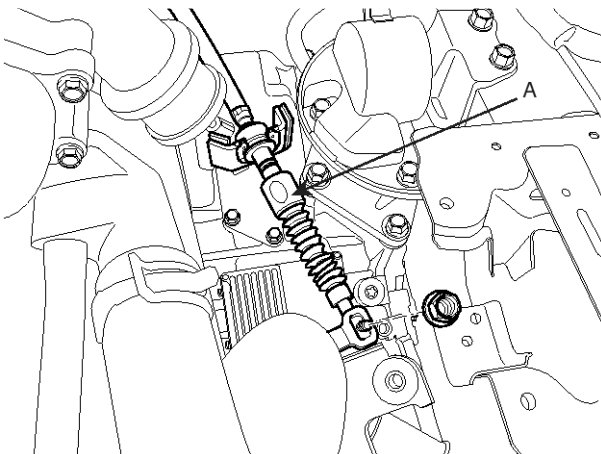
SENAT7006D

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



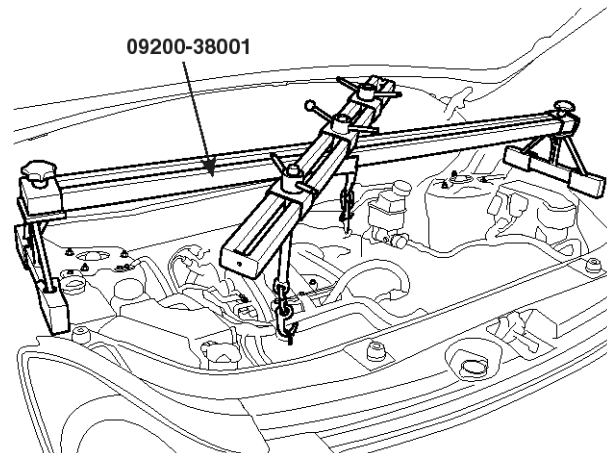
SENAT7007D

8. Remove the shift cable assembly (A).



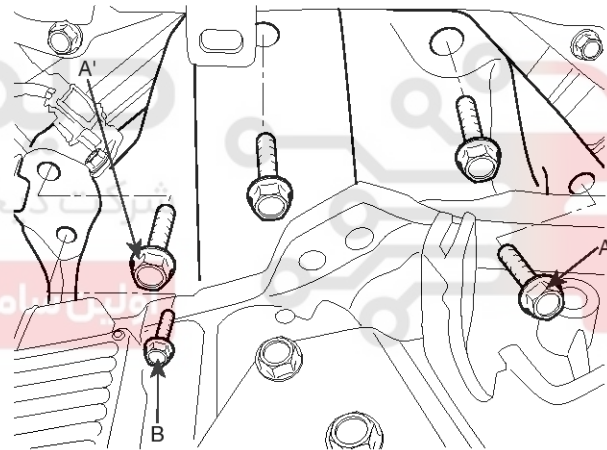
SENAT7008D

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



SENAT7006L

10. Remove the four transaxle upper mounting bolts (A) and the starter motor mounting bolt (B).

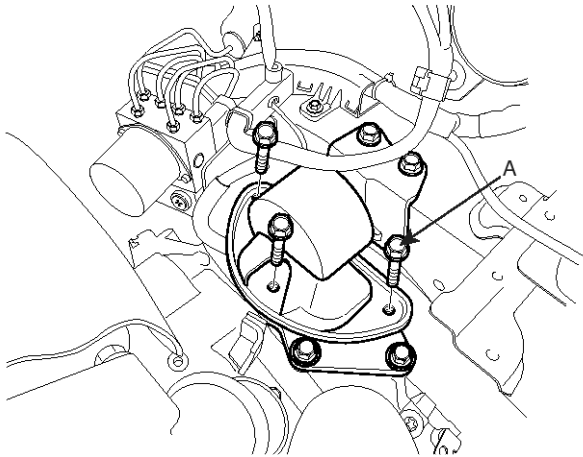


SENAT7005L

AT-22

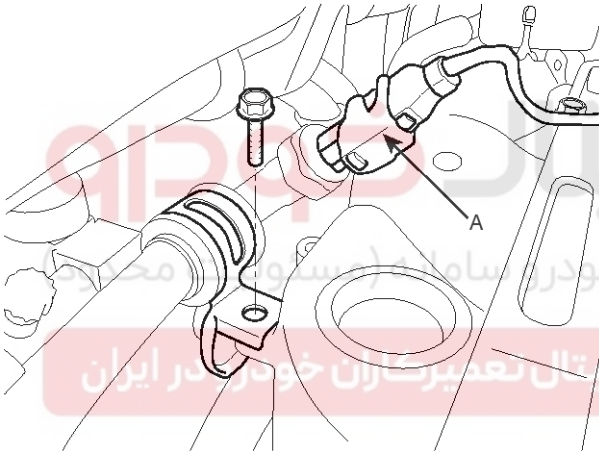
Automatic Transaxle System

11. After removing the three bolts (A), take the transaxle support bracket off.



SENAT7011D

12. Disconnect the power steering pressure sensor (A).

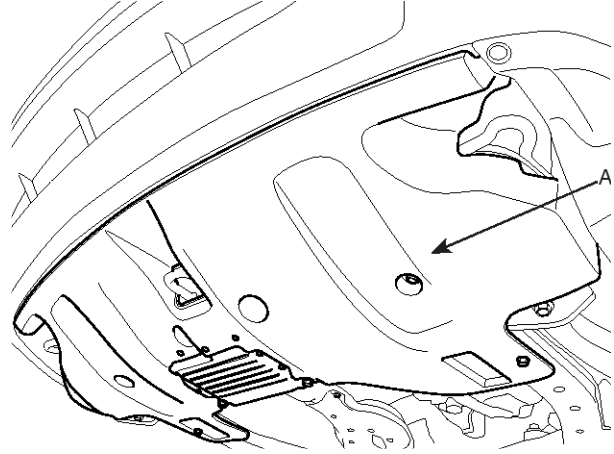


SENAT7007L

13. Remove the front wheels and tires. (refer to Driveshaft in DS group)

14. Lift up the vehicle.

15. Remove the under shield cover (A).

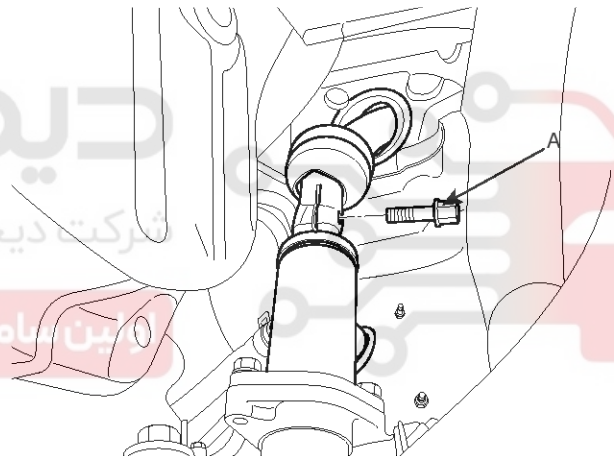


SENAT7008L

16. Remove the steering joint bolt (A).

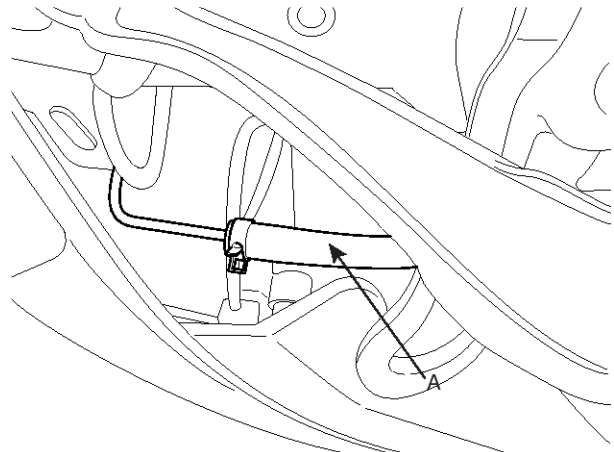
⚠ CAUTION

In case of EPS equipped, disconnect the EPS connector.



SENAT7017D

17. Drain the powersteering fluid through the return hose (A) by loosening the clamp.



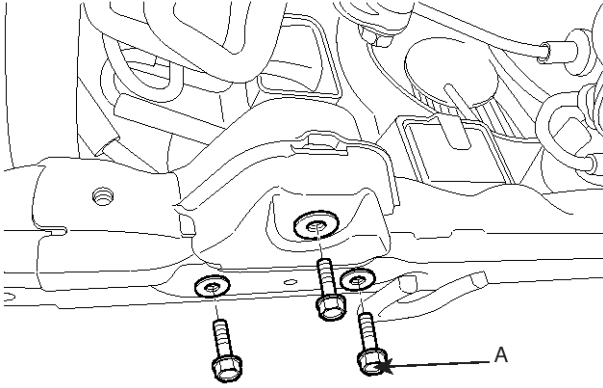
Automatic Transaxle System

AT-23

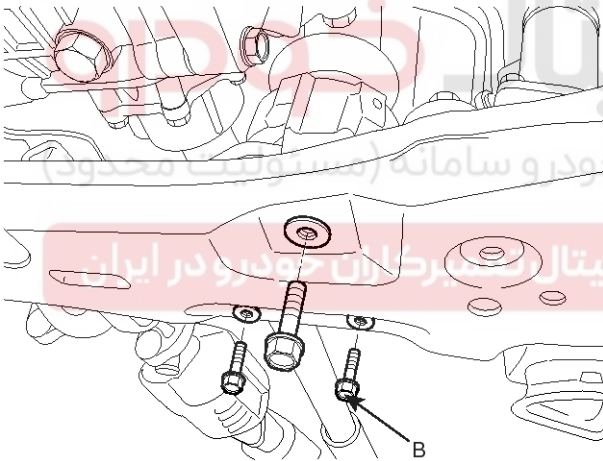
SENAT7014D

18. 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)

19. Remove the roll stopper mounting bolts (A, B).

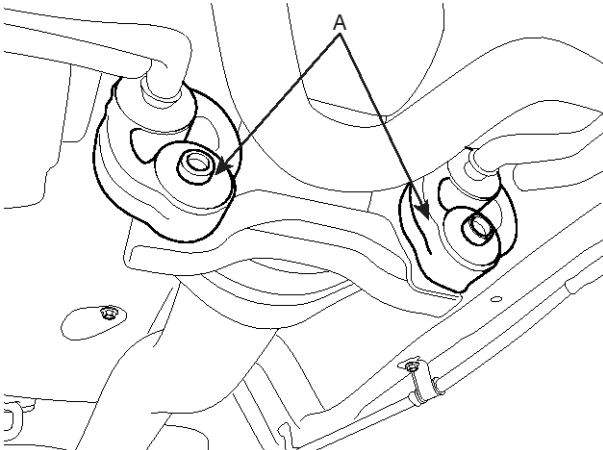


SENAT7015D



SENAT7016D

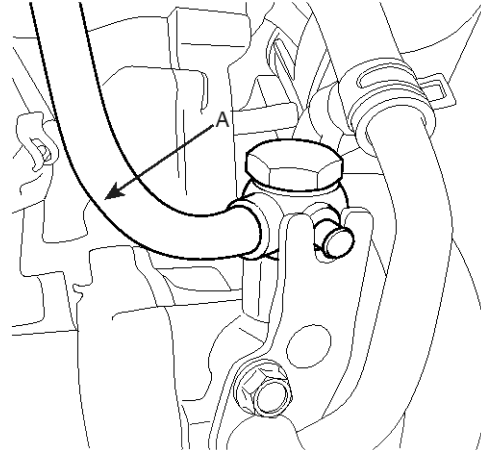
20. Remove the muffer hanger rubber (A).



SENAT7009L

21. Supporting the sub frame with a jack and the Special tool (09624-38000), remove the mounting bolts. (refer to Stabilizer in SS group)

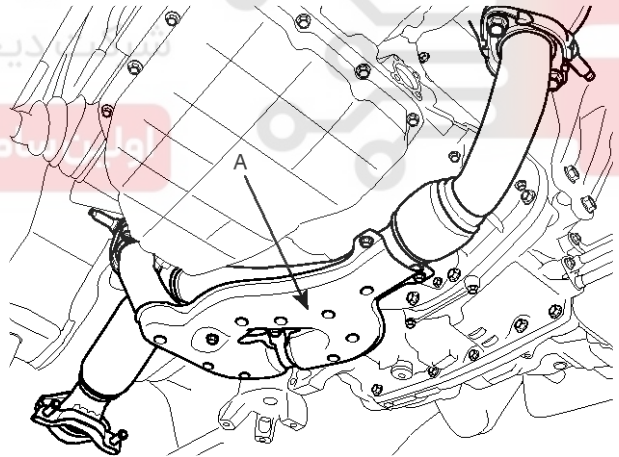
22. Remove the powersteering pressure tube (A) from the powersteering oil pump by removing the I-type bolt.



SENAT7010L

23. Remove the subframe.

24. Remove the front muffler (A).

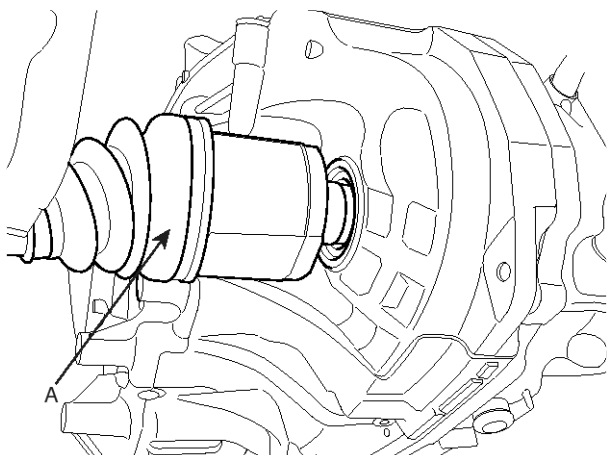


SENAT7011L

AT-24

Automatic Transaxle System

25. Disconnect the left driveshaft (A) from the transaxle.

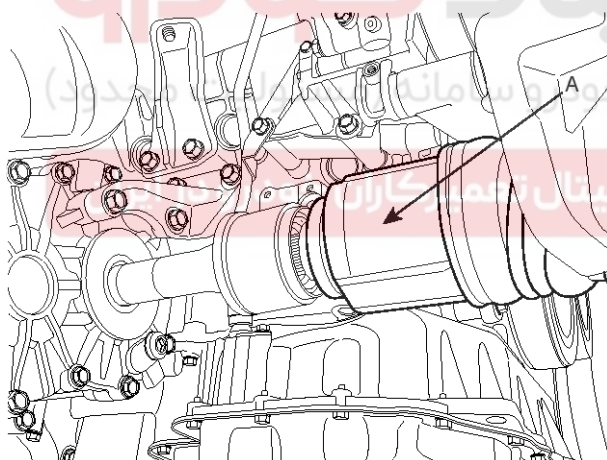


SENAT7019D

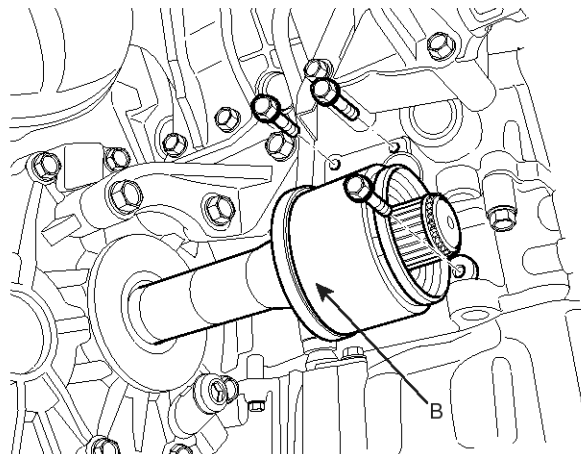
26. Disconnect the right driveshaft (A) from the inner shaft and remove the inner shaft (B) by removing the three mounting bolts.

NOTICE

In case of 2WD, remove the the inner shaft and the right driveshaft as an assembly after removing the inner shaft bracket bolt.



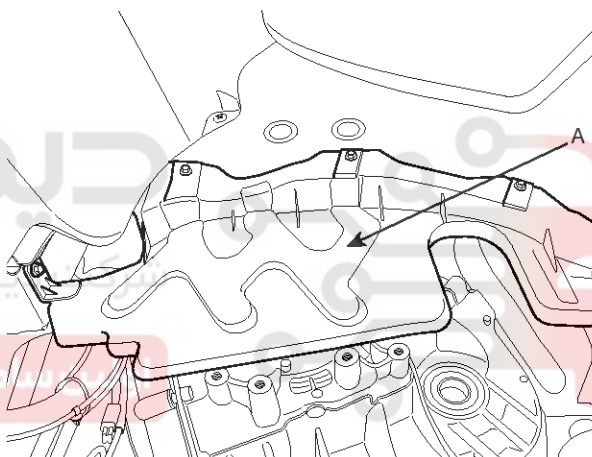
SENAT7020D



SENAT7021D

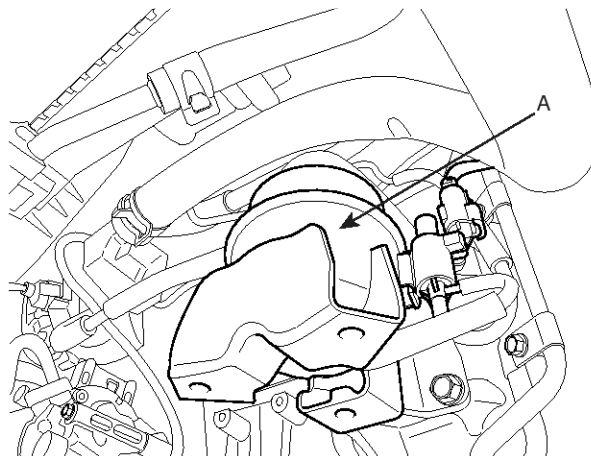
27. In case of 4WD, remove the transfer case assembly. (refer to Transfer case's Removal)

28. Remove the side mud cover (A).



SENAT7022D

29. After disconnecting the vacuum tube and the connector, remove the front roll mounting bracket assembly (A).

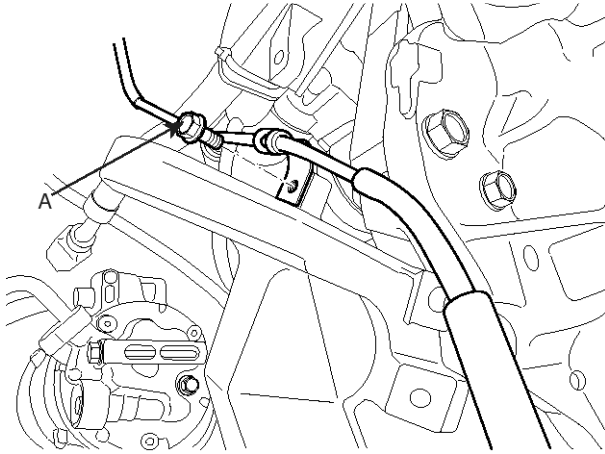


SENAT7024D

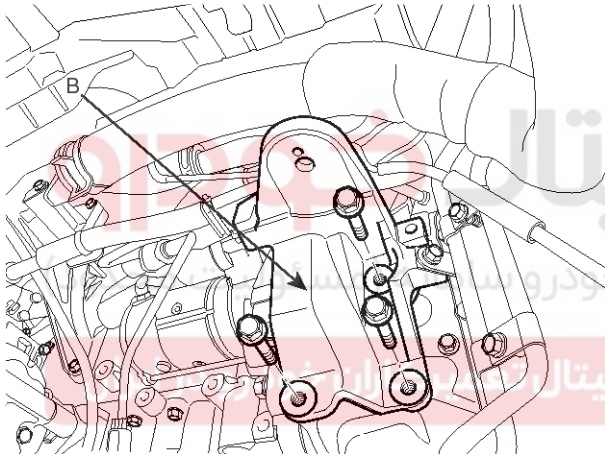
Automatic Transaxle System

AT-25

30. After removing the vacuum tube mounting bolt (A), remove the front mounting bracket (B) by removing the three bolts.

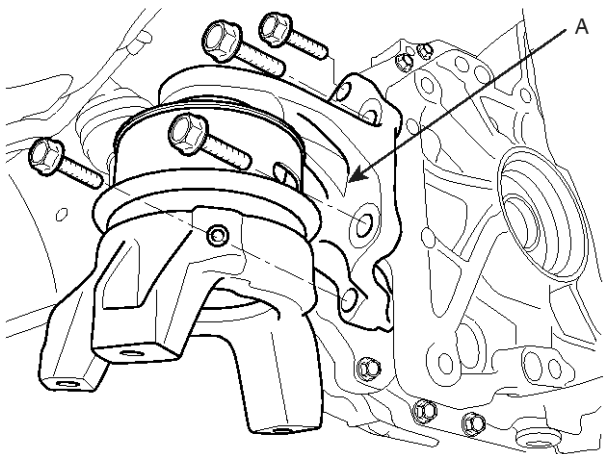


SENAT7027D



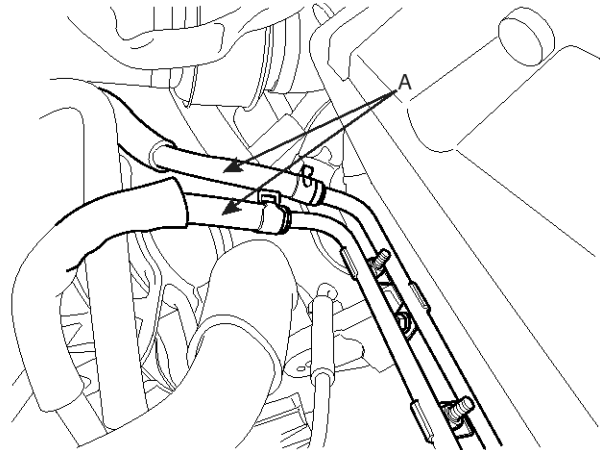
SENAT7025D

31. Remove the rear roll mounting bracket assembly (A) by removing the four bolts.



SENAT7015L

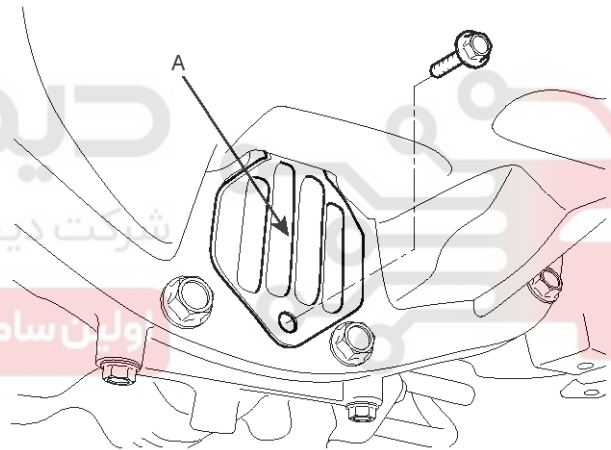
32. Remove the transaxle oil cooler hose (A).



SENAT7026D

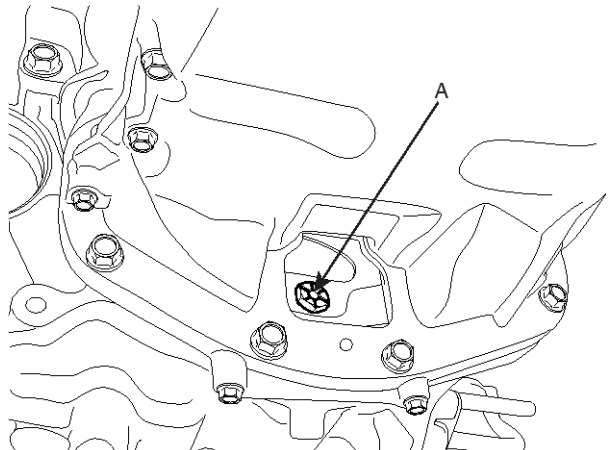
33. Remove the transaxle mounting bolt near the driveshaft hole from engine side.

34. Remove the dust cover (A).



SENAT7016L

35. Remove the six drive plate mounting bolts (A) by rotating the timing gear.

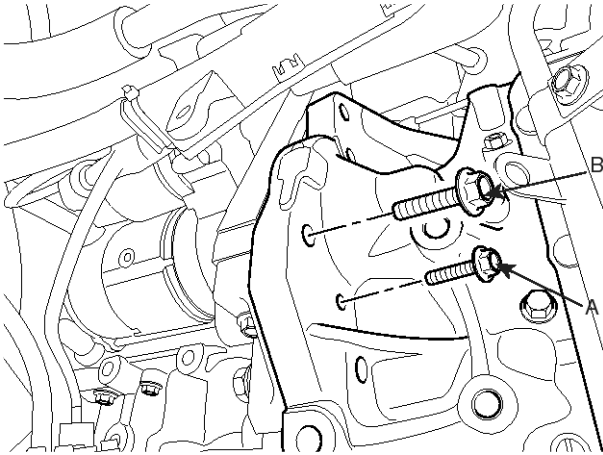


AT-26

Automatic Transaxle System

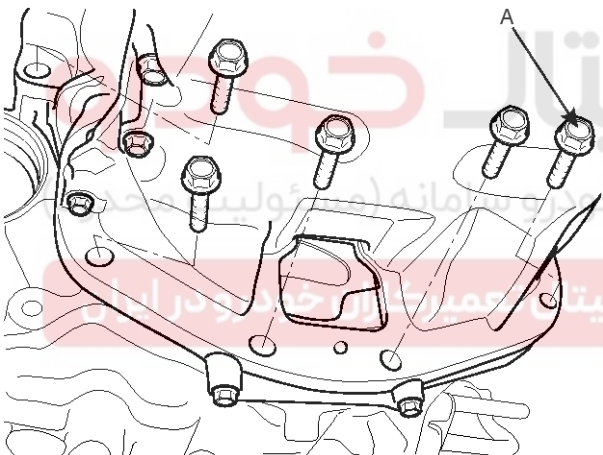
SENAT7017L

36. Remove the starter motor mounting bolt (A) and the transaxle mounting bolt (B).



SENAT7035D

37. Supporting the transaxle with a jack, remove the five transaxle lower mounting bolts (A).



SENAT7018L

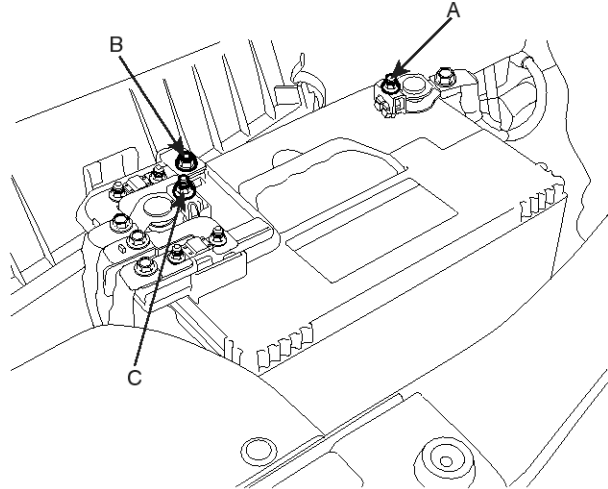
38. Lowering the jack slowly, remove the transaxle assembly.

CAUTION

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

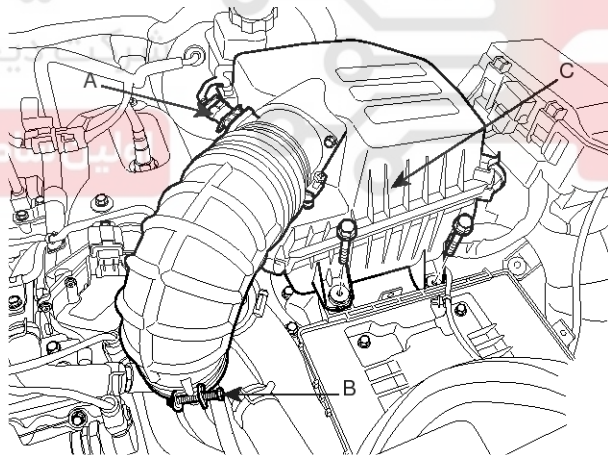
[Diesel 3.0]

1. Remove the engine cover. (refer to Engine and Transaxle Assembly in EM group)
2. Remove the battery after removing the three nuts (A,B,C) in order.



SENAT7056D

3. Remove the air cleaner assembly (C) by disconnecting the AFS (Air Flow Sensor) connector (A) and loosening the clamp (B).

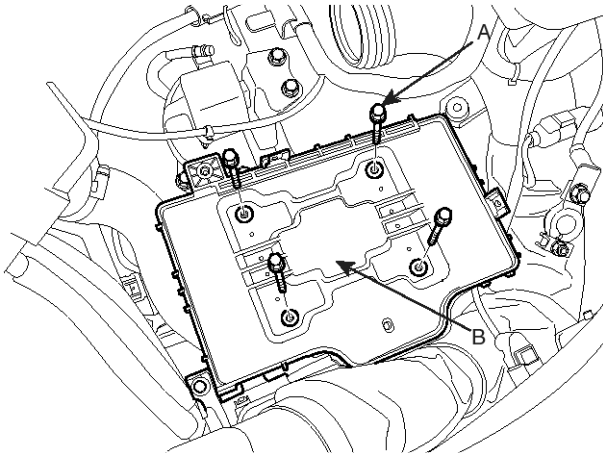


SENAT7002D

Automatic Transaxle System

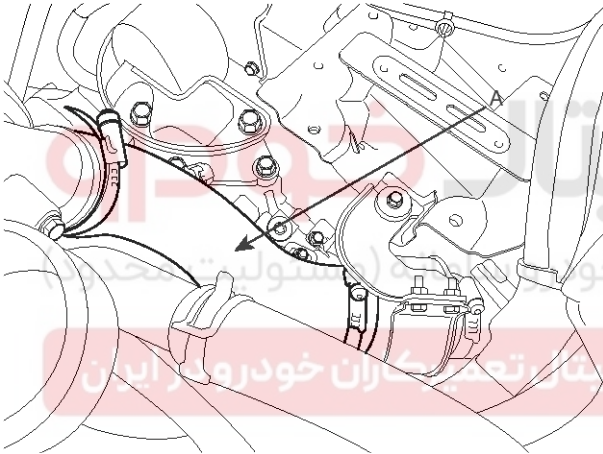
AT-27

4. Remove the battery tray (B) by removing the four bolts (A).



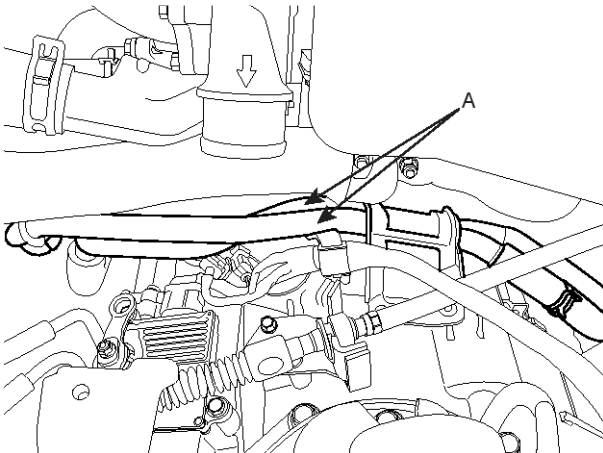
SENAT7003D

5. Disconnect the intercooler hose (A).



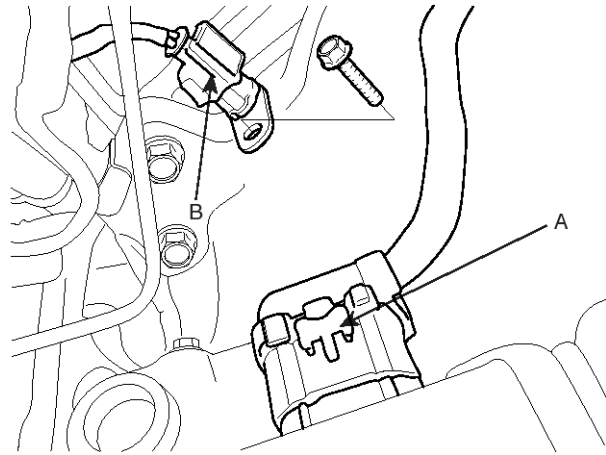
SENAT7004D

6. Remove the engine cooling lines (A).



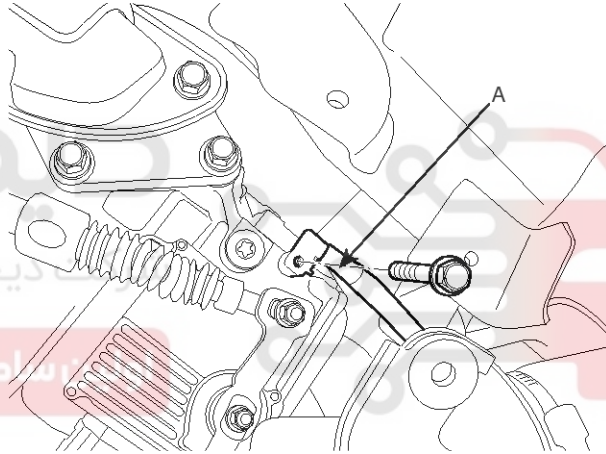
SENAT7005D

7. Disconnect the TCU connector (A) and remove the CKP sensor (B).



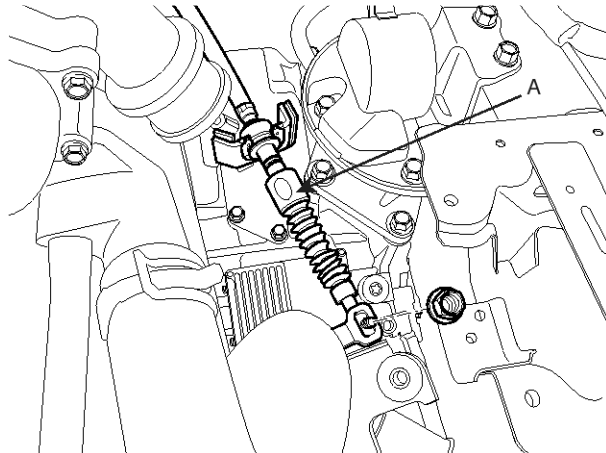
SENAT7006D

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



SENAT7007D

9. Remove the shift cable assembly (A).

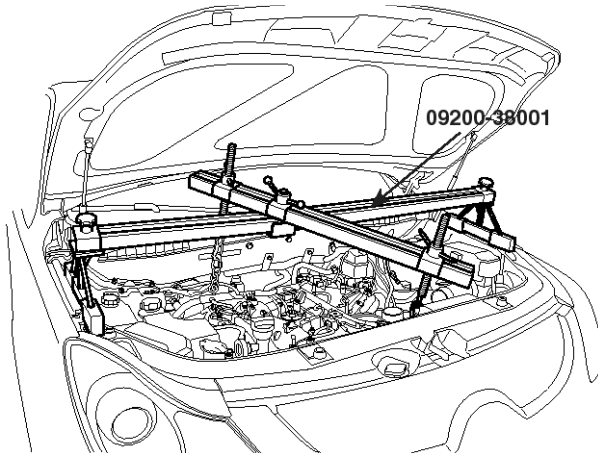


SENAT7008D

AT-28

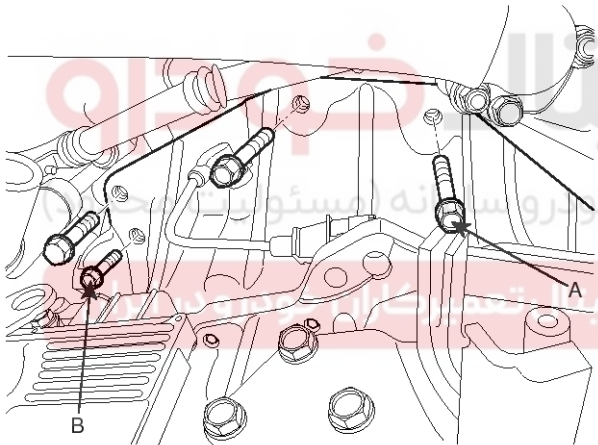
Automatic Transaxle System

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



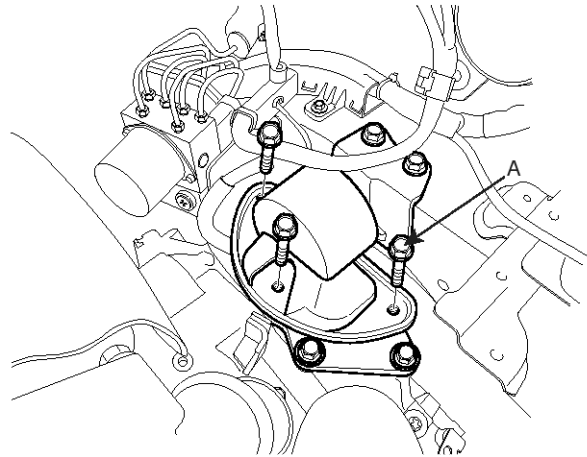
SENAT7010D

11. Remove the four transaxle upper mounting bolts (A) and the starter motor mounting bolt (B).



SENAT7009D

12. After removing the three bolts, take the transaxle support bracket (A) off.

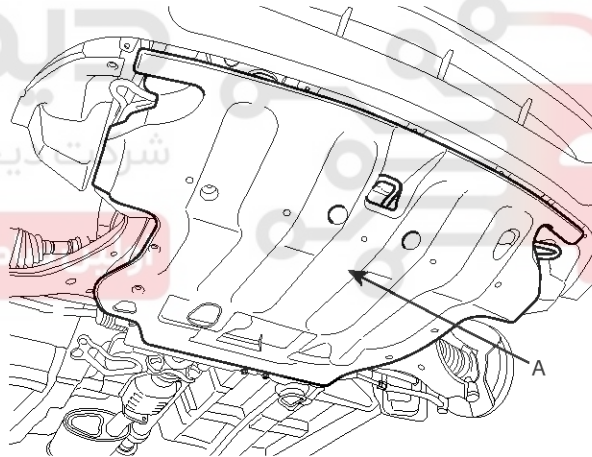


SENAT7011D

13. Remove the front wheels and tires. (refer to Driveshaft in DS group)

14. Lift up the vehicle.

15. Remove the under shield cover (A).



SENAT7013D

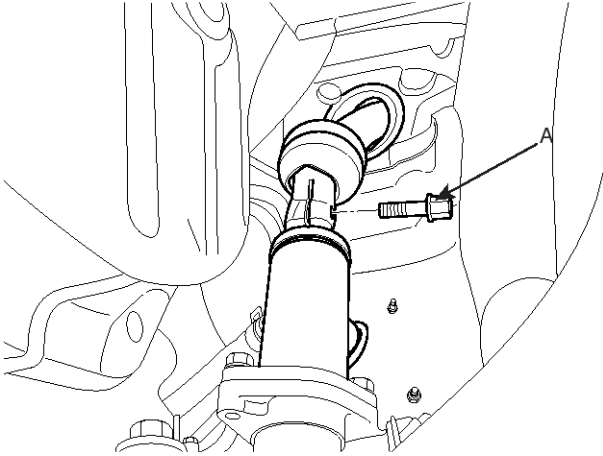
Automatic Transaxle System

AT-29

16. Remove the steering joint bolt (A).

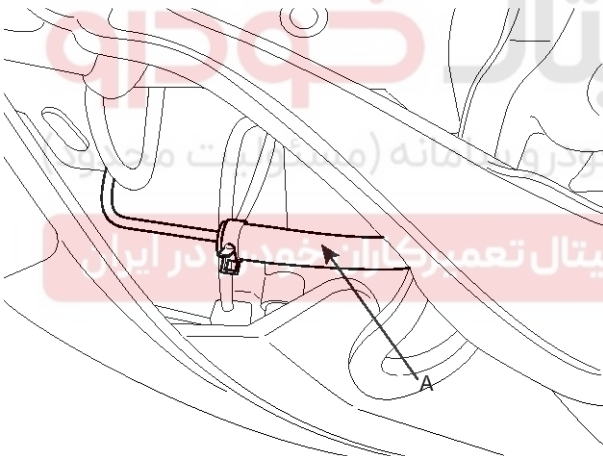
CAUTION

In case of EPS equipped, disconnect the EPS connector.



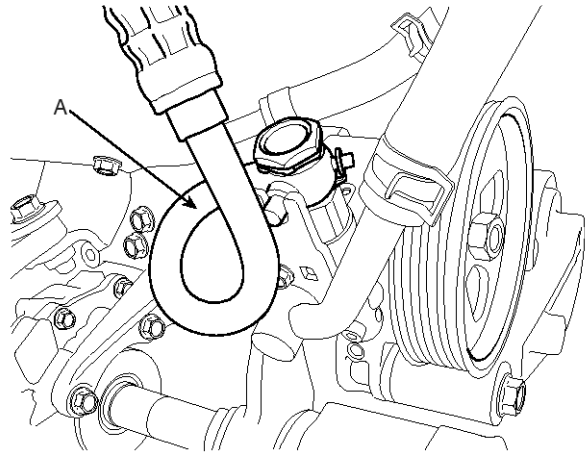
SENAT7017D

17. Drain the powersteering fluid through the return hose (A) by loosening the clamp.



SENAT7014D

18. Remove the powersteering pressure tube (A) from the powersteering oil pump by removing the I-type bolt.



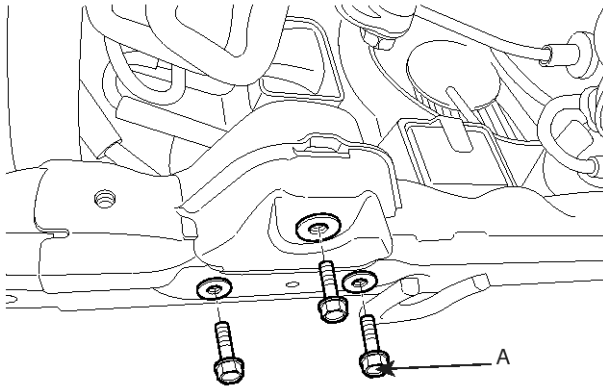
SENAT7012D

19. 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)

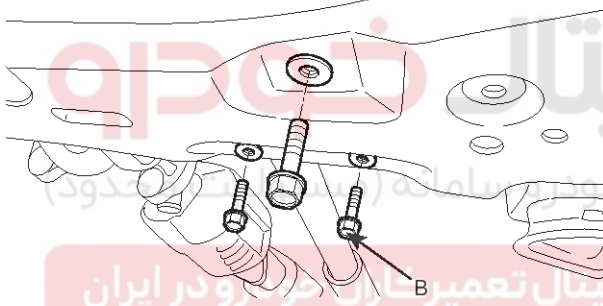
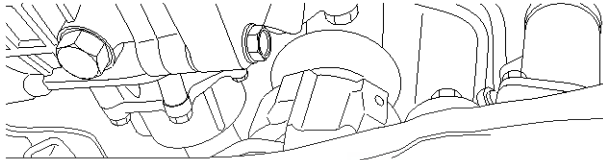
AT-30

Automatic Transaxle System

20. Remove the roll stopper mounting bolts (A, B).

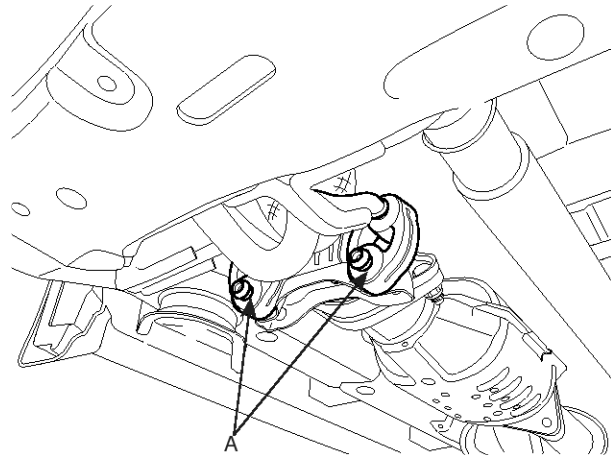


SENAT7015D



SENAT7016D

21. Remove the muffler hanger rubber (A).

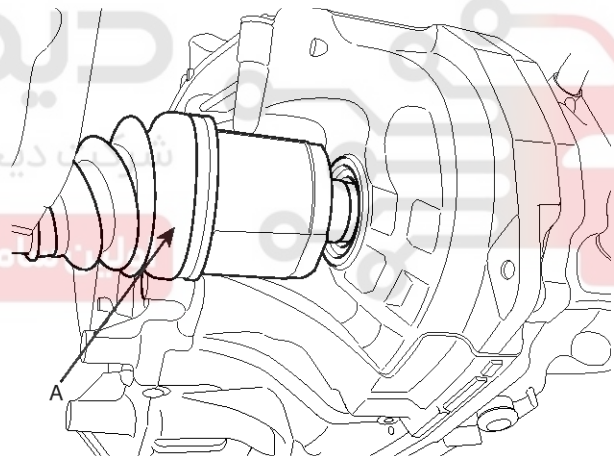


SENAT7018D

22. Supporting the sub frame with a jack and the Special tool (09624-38000), remove the mounting bolts.(refer to Stabilizer in SS group)

23. Remove the subframe.

24. Disconnect the left driveshaft (A) from the transaxle.



SENAT7019D

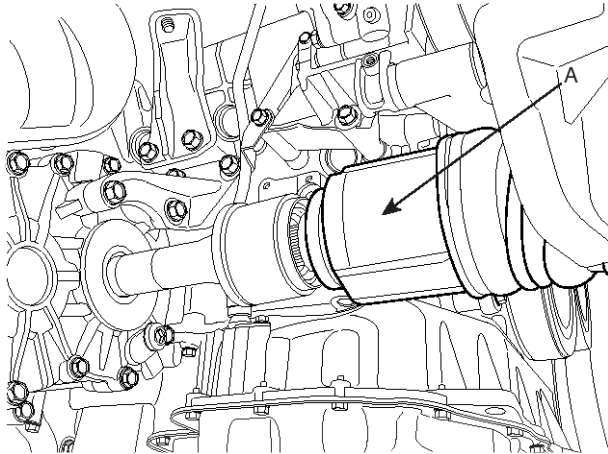
Automatic Transaxle System

AT-31

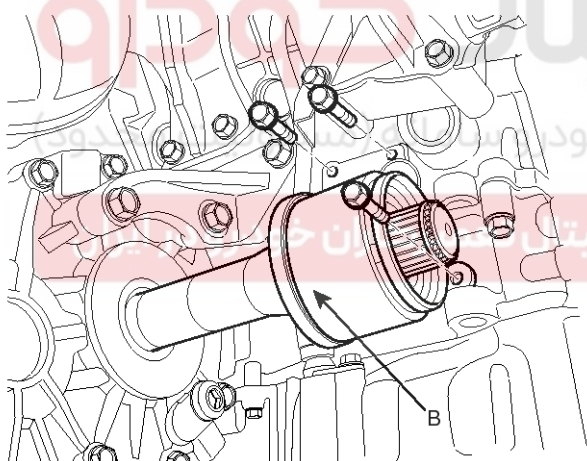
25. Disconnect the right driveshaft (A) from the inner shaft and remove the inner shaft (B) by removing the three mounting bolts.

NOTICE

In case of 2WD, remove the the inner shaft and the right driveshaft as an assembly after removing the inner shaft bracket bolt.



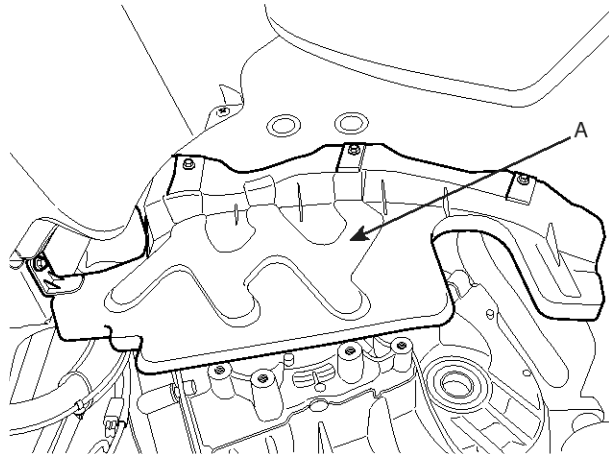
SENAT7020D



SENAT7021D

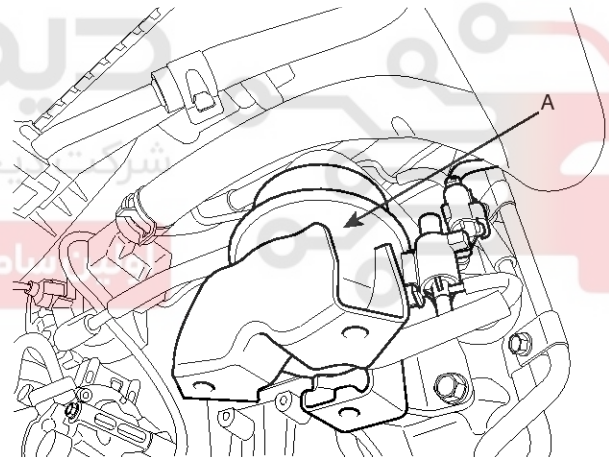
26. In case of 4WD, remove the transfer case assembly. (refer to Transfer case's Removal)

27. Remove the side mud cover (A).



SENAT7022D

28. After disconnecting the vacuum tube and the connector, remove the front roll mounting bracket assembly (A).

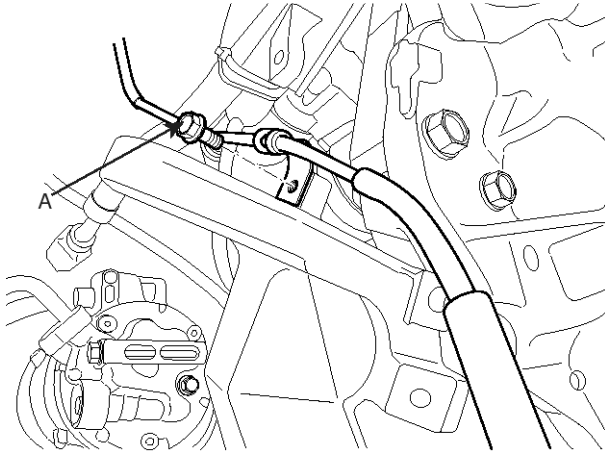


SENAT7024D

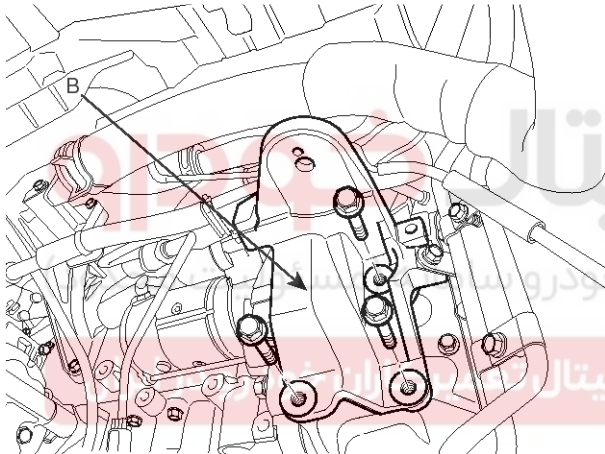
AT-32

Automatic Transaxle System

29. After removing the vacuum tube mounting bolt (A), remove the front mounting bracket (B) by removing the three bolts.

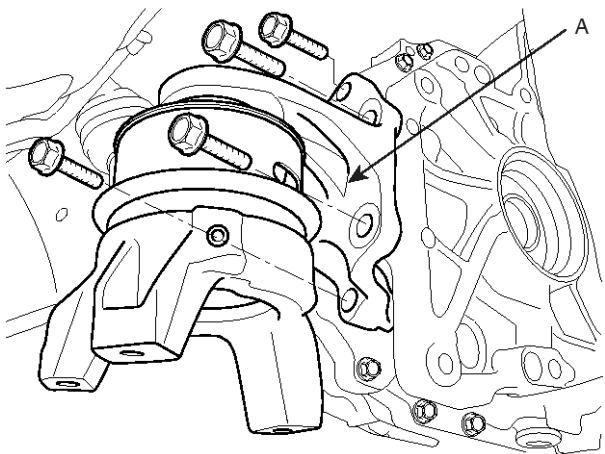


SENAT7027D



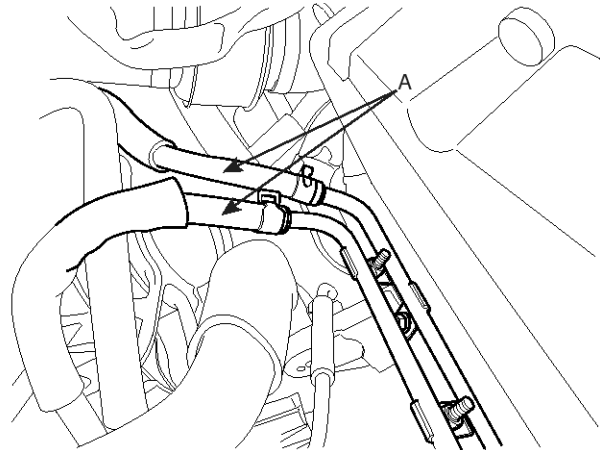
SENAT7025D

30. Remove the rear roll mounting bracket assembly (A) by removing the four bolts.



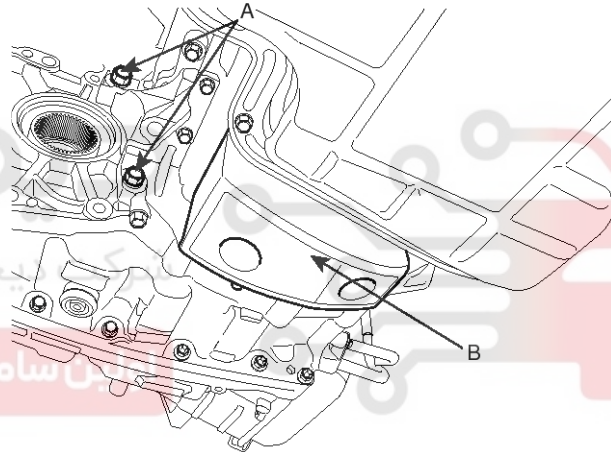
SENAT7015L

31. Remove the transaxle oil cooler hose (A).



SENAT7026D

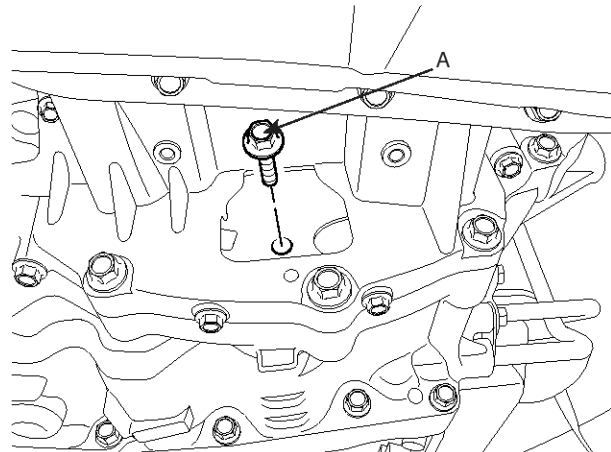
32. Remove the two transaxle mounting bolts (A) from engine side.



SENAT7033D

33. Remove the dust cover (B).

34. Remove the six drive plate mounting bolts (A) by rotating the timing gear.

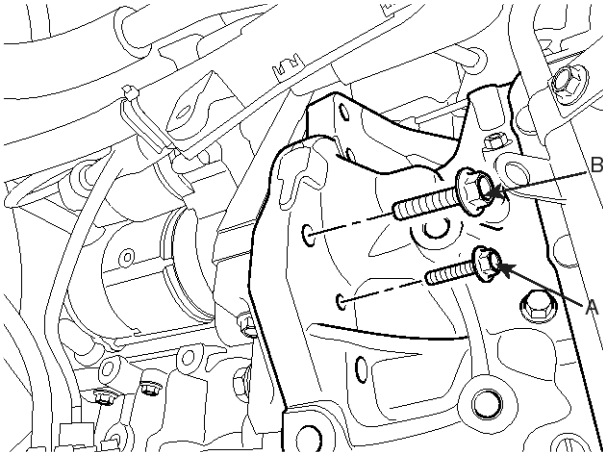


Automatic Transaxle System

AT-33

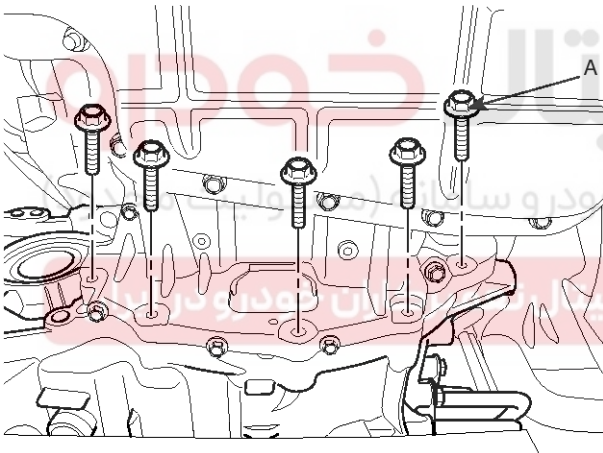
SENAT7034D

35. Remove the starter motor mounting bolt (A) and the transaxle upper mounting bolt (B).



SENAT7035D

36. Supporting the transaxle with a jack, remove the five transaxle lower mounting bolts (A).



SENAT7036D

37. Lowering the jack slowly, remove the transaxle assembly.

⚠ CAUTION

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

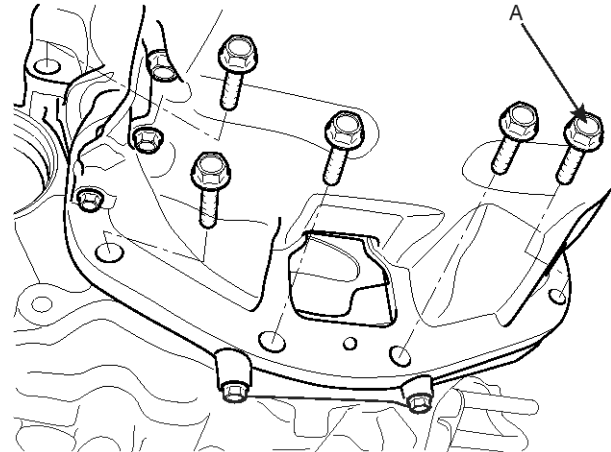
Installation

[Gasoline 3.8]

1. After fitting the transaxle assembly into the engine assembly by using a jack, install the five transaxle lower mounting bolts (A).

Tightening torque :

40-47 Nm (4.0-4.7 kgf.m, 28.9-34.0 lb-ft)



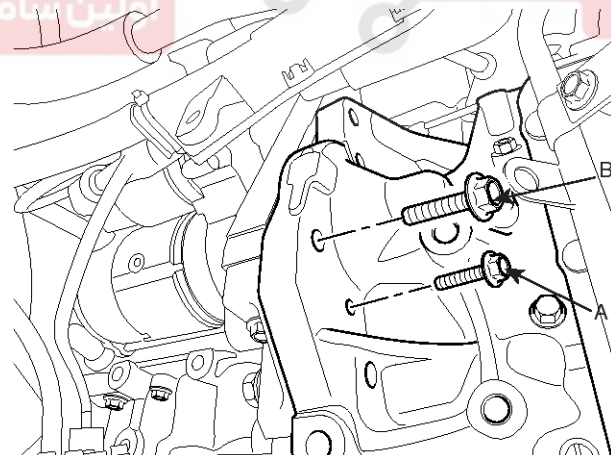
SENAT7018L

2. Install the starter motor mounting bolt (A) and the transaxle mounting bolt (B).

Tightening torque :

[A] : 33-50 Nm (3.3-5.0 kgf.m, 23.9-36.1 lb-ft)

[B] : 80-100 Nm (8-10 kgf.m, 57.9-72.3 lb-ft)



SENAT7035D

AT-34

Automatic Transaxle System

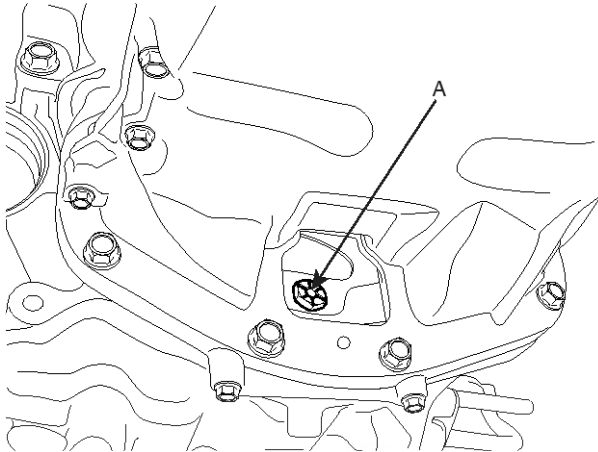
3. Install the six drive plate mounting bolts (A) by rotating the timing gear.

Tightening torque :

46-53 Nm (4.6-5.3 kgf.m, 33.3-38.3 lb-ft)

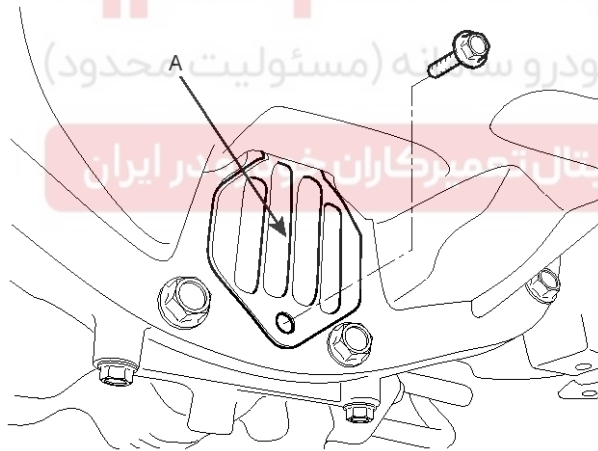
CAUTION

Be sure to tighten the bolts with the specified torque.



SENAT7017L

4. Install the dust cover (A).



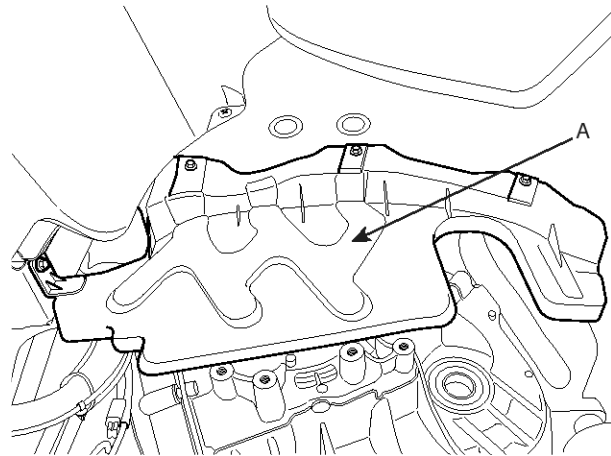
SENAT7016L

5. Install the transaxle mounting bolt near the driveshaft hole from engine side.

Tightening torque :

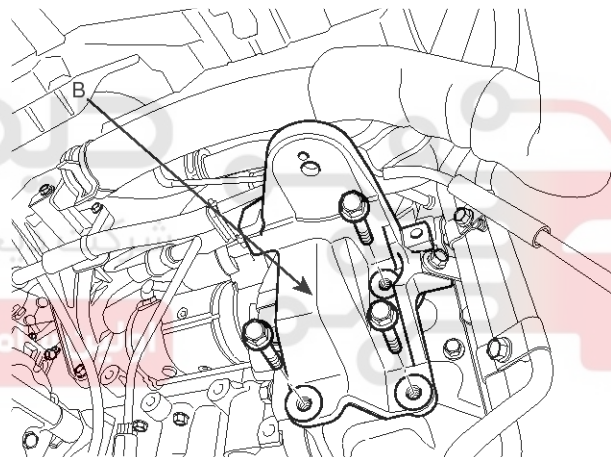
80-100 Nm (8-10 kgf.m, 57.9-72.3 lb-ft)

6. Install the side mud cover (A).

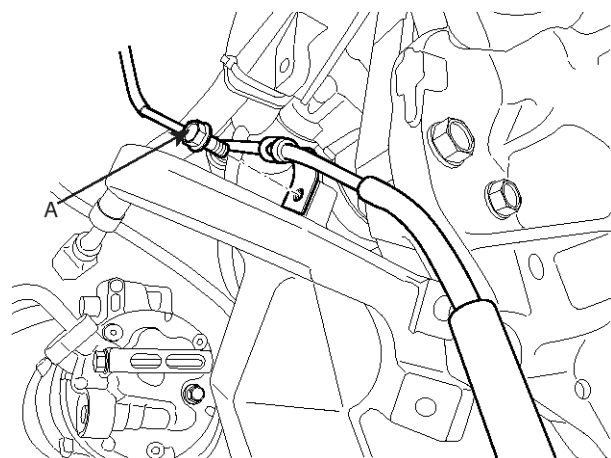


SENAT7022D

7. After installing the front mounting bracket (B) by removing the three bolts, install the vacuum tube mounting bolt (A).



SENAT7025D

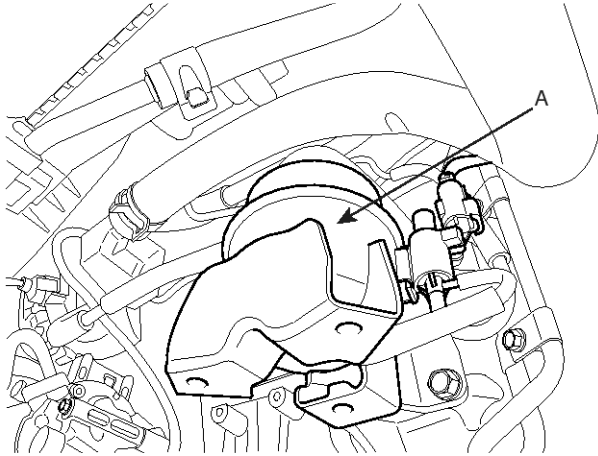


SENAT7027D

Automatic Transaxle System

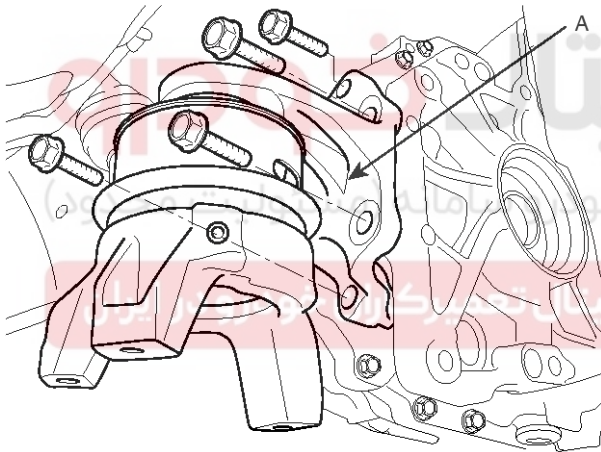
AT-35

8. After installing the front roll mounting bracket assembly (A), connect the vacuum tube and the connector.



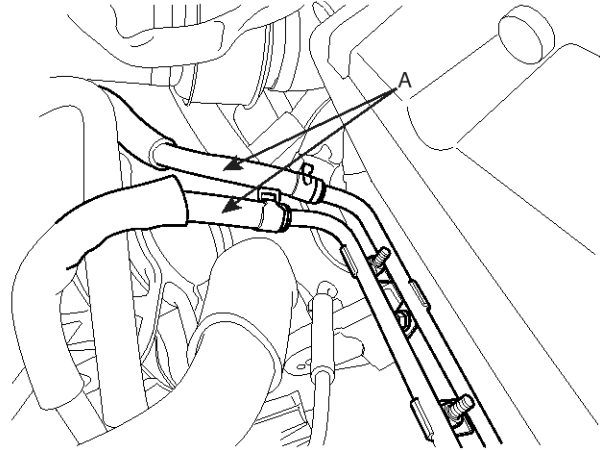
SENAT7024D

9. Install the rear roll mounting bracket assembly (A) by installing the four bolts.



SENAT7015L

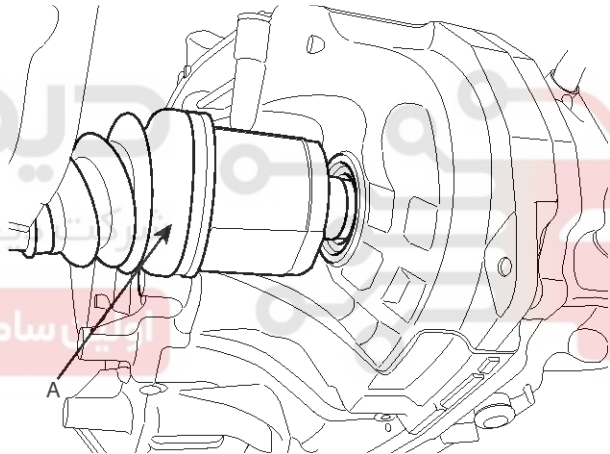
10. Install the transaxle oil cooler hose (A).



SENAT7026D

11. In case of 4WD, install the transfer case assembly. (refer to Transfer case's Installation)

12. Connect the left driveshaft (A) to the transaxle.



SENAT7019D

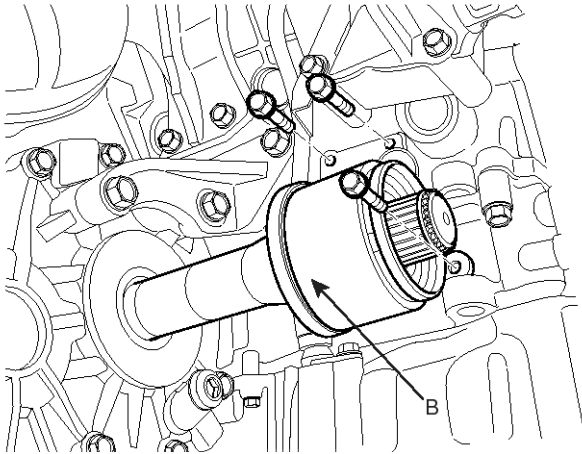
AT-36

Automatic Transaxle System

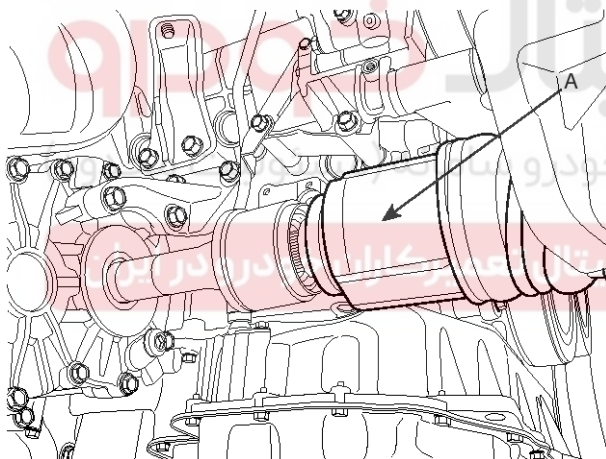
13. Install the inner shaft (B) by installing the three mounting bolts and connect the right driveshaft (A) into the inner shaft.

NOTICE

In case of 2WD, install the the inner shaft and the right driveshaft as an assembly.

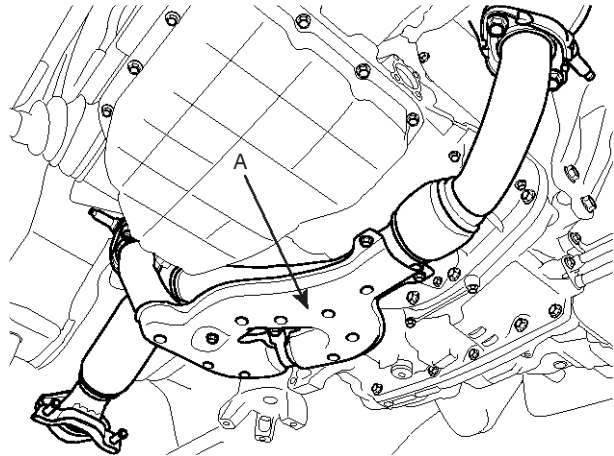


SENAT7021D



SENAT7020D

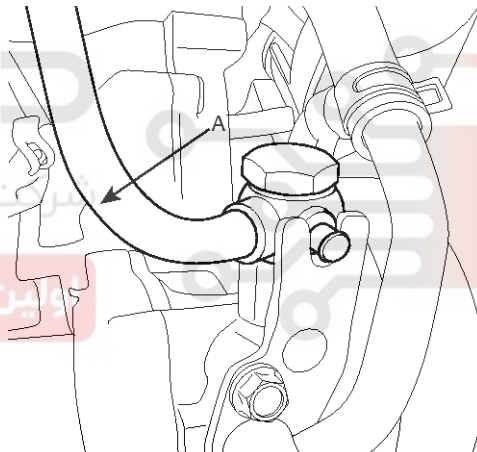
14. Install the front muffler (A).



SENAT7011L

15. Support the subframe with a jack and the Special tool (09624-38000).

16. Install the powersteering pressure tube (A) to the powersteering oil pump by installing the I-type bolt.



SENAT7010L

17. Install the mounting bolts.(refer to Stabilizer in SS group)

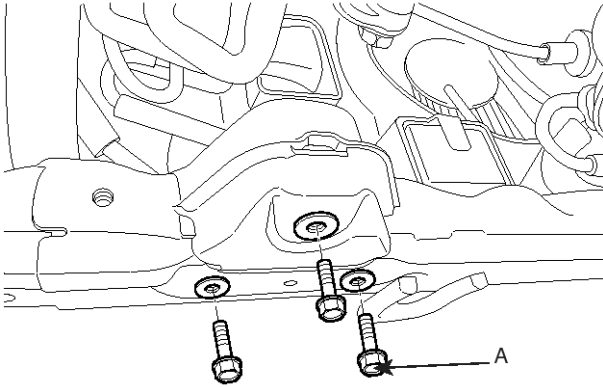
Automatic Transaxle System

AT-37

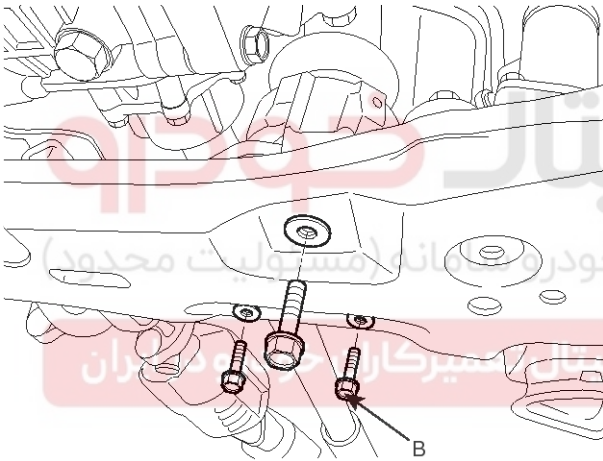
18. Install the roll stopper mounting bolts (A, B).

Tightening torque :

90-110 Nm (9-11 kgf.m, 65.1-79.5 lb-ft)

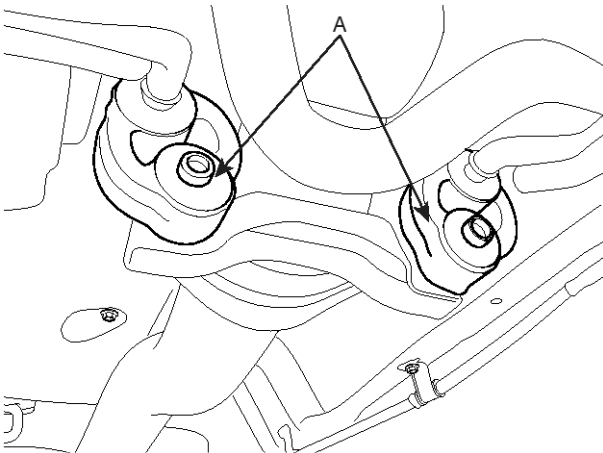


SENAT7015D



SENAT7016D

19. Install the muffler hanger rubber (A).



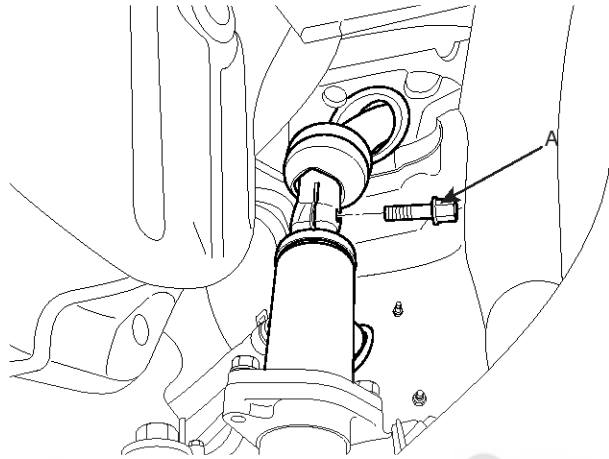
SENAT7009L

20. Install 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. Install the steering joint bolt (A).

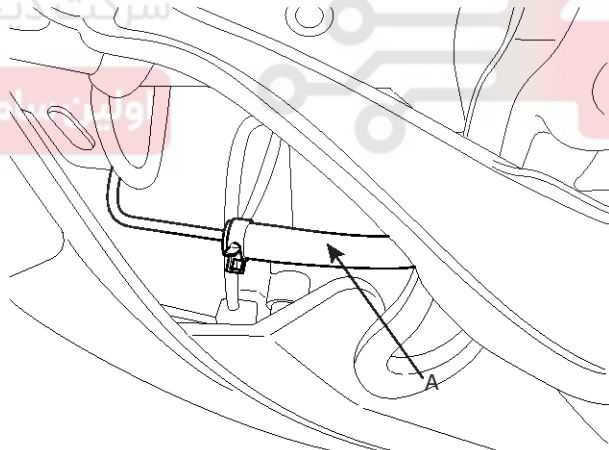
⚠ CAUTION

In case of EPS equipped, connect the EPS connector.



SENAT7017D

22. Connect the return hose (A) to the tube by tightening the clamp.

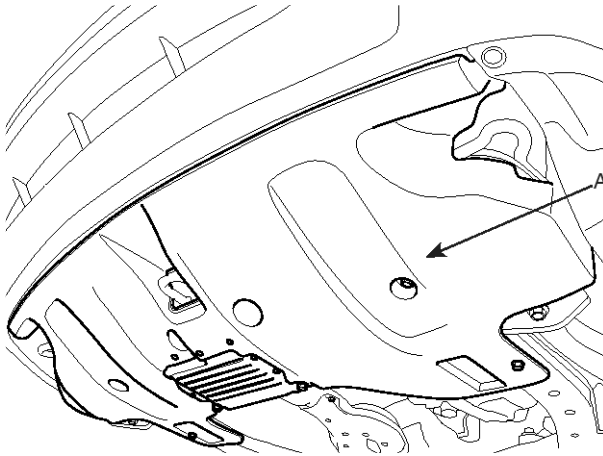


SENAT7014D

AT-38

Automatic Transaxle System

23. Install the under shield cover (A).

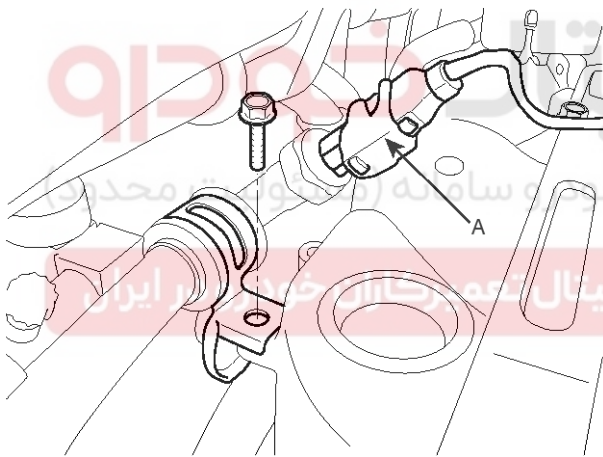


SENAT7008L

24. Lower the vehicle.

25. Install the front wheels and tires. (refer to Driveshaft in DS group)

26. Connect the power steering pressure sensor (A).

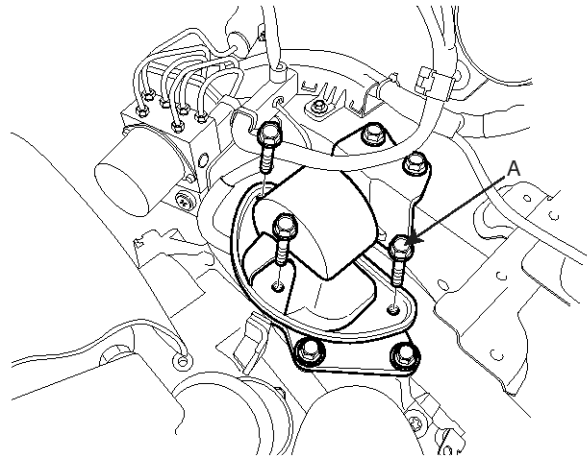


SENAT7007L

27. Install the transaxle support bracket bolts (A).

Tightening torque :

90-110 Nm (9-11 kgf.m, 65.1-79.5 lb-ft)



SENAT7011D

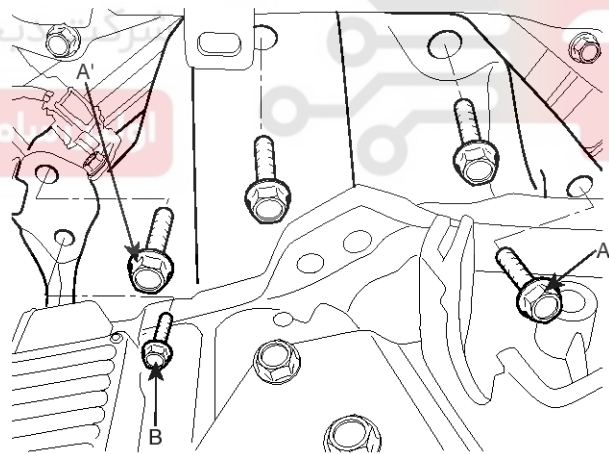
28. Install the four transaxle upper mounting bolts (A) and the starter motor mounting bolt (B).

Tightening torque :

[A] : 65-85 Nm (6.5-8.5 kgf.m, 47.0-61.5 lb-ft)

[A'] : 43-55 Nm (4.3-5.5 kgf.m, 31.1-39.8 lb-ft)

[B] : 43-55 Nm (4.3-5.5 kgf.m, 31.1-39.8 lb-ft)

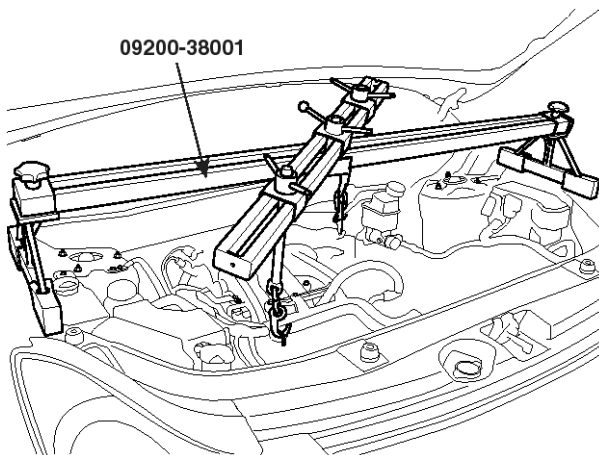


SENAT7005L

Automatic Transaxle System

AT-39

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



SENAT7006L

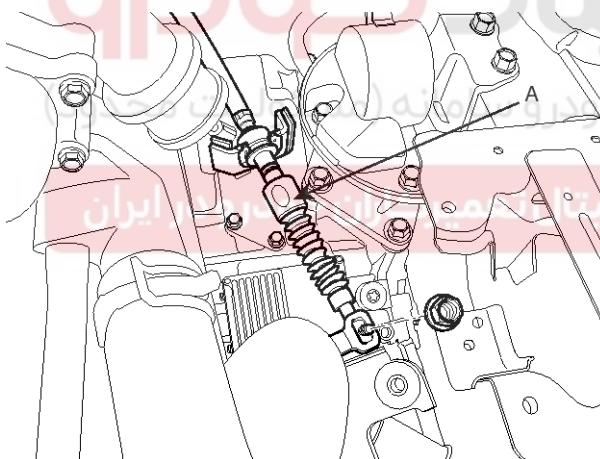
30.Install the shift cable assembly (A).

Tightening torque :

9-14Nm (0.9-1.4kgf.m, 6.5-10.1lb-ft)

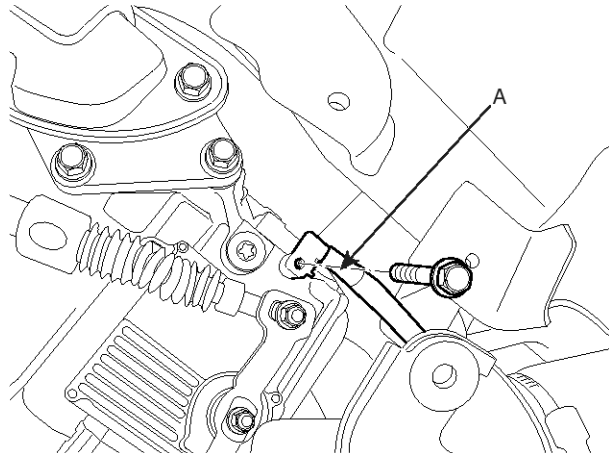
NOTICE

Adjust the shift cable referring to Shift lever's Adjustment section.



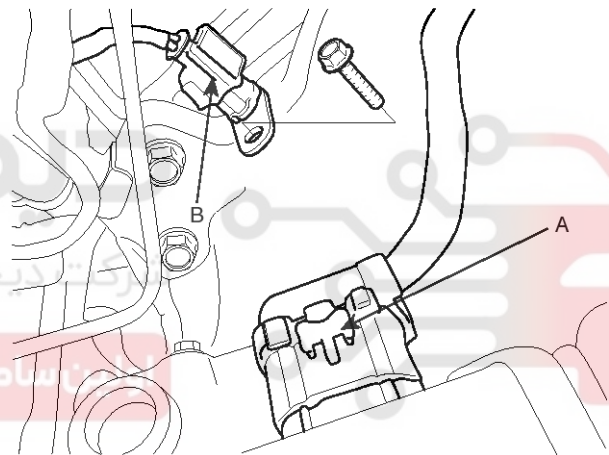
SENAT7008D

31.Install the ground cable (A) to transaxle.



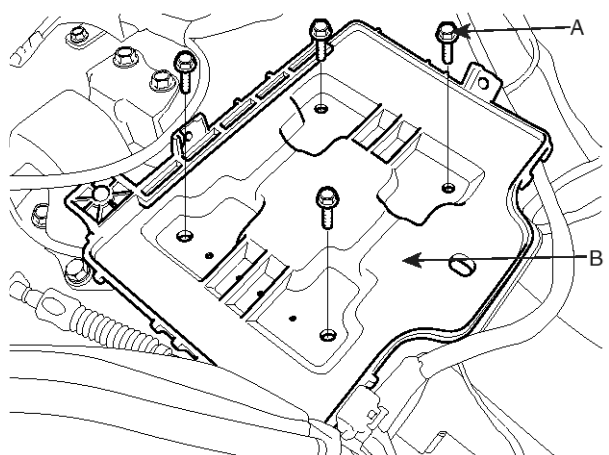
SENAT7007D

32.Connect the TCU connector (A) and install the CKP sensor (B).



SENAT7006D

33.Install the battery tray (B) by installing the four bolts (A).

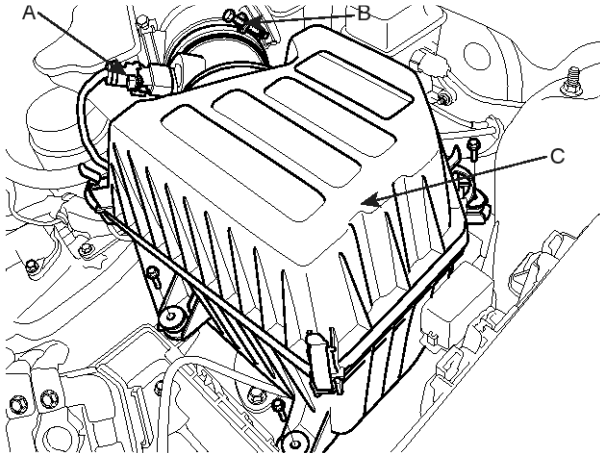


SENAT7003L

AT-40

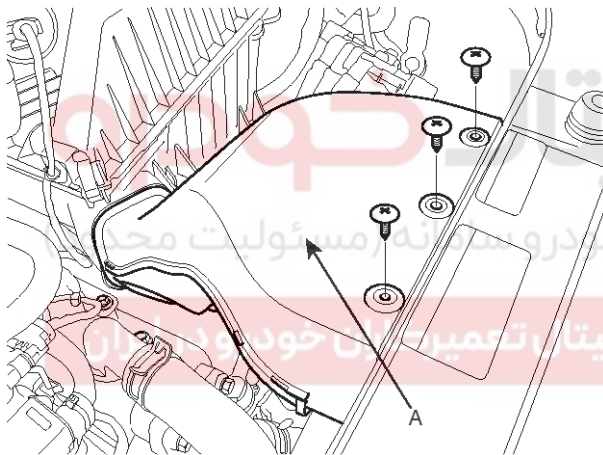
Automatic Transaxle System

34. Installing the air cleaner assembly (C) by connecting the AFS(Air Flow Sensor) connector (A) and tightening the clamp (B).



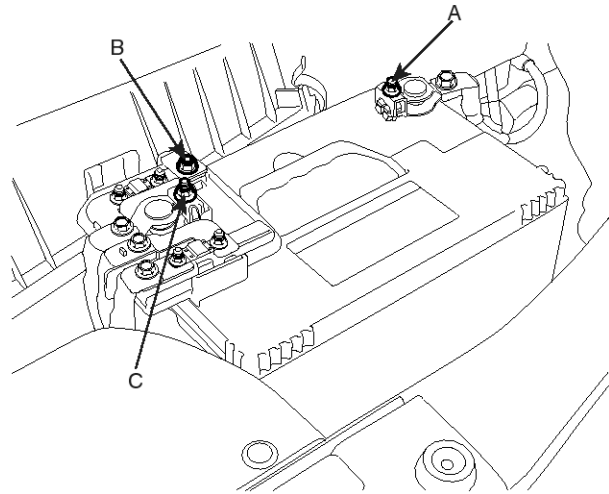
SENAT7002L

35. Install the air duct (A).



SENAT7001L

36. Install the battery after installing the three nuts (A,B,C) in order.



SENAT7056D

37. Install the engine cover. (refer to Engine and Transaxle Assembly in EM group)
38. Refill the automatic transaxle fluid. (refer to Inspection and Adjustment)
39. Refill the powersteering fluid. (refer to Power Steering Gear Box in ST group)
40. When replacing the automatic transaxle assembly, after initializing the TCU, perform N position learning and initial learning. (refer to Troubleshooting's 'How to perform N position learning' and 'How to perform initial learning')

Automatic Transaxle System

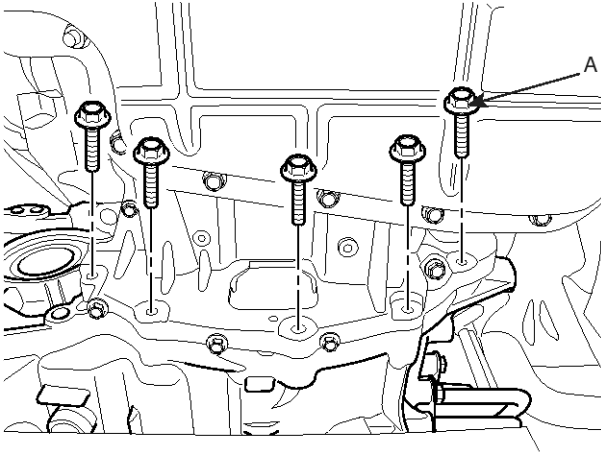
AT-41

[Diesel 3.0]

1. After fitting the transaxle assembly into the engine assembly by using a jack, install the five transaxle lower mounting bolts (A).

Tightening torque :

40-47 Nm (4.0-4.7 kgf.m, 28.9-34.0 lb-ft)



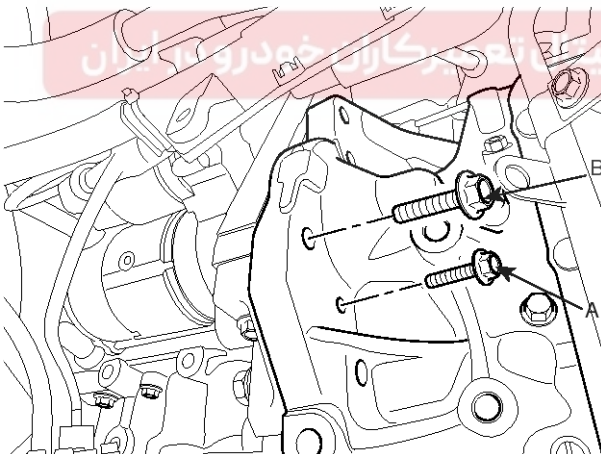
SENAT7036D

2. Install the starter motor mounting bolt (A) and the transaxle upper mounting bolt (B).

Tightening torque :

[A] 43-55 Nm (4.3-5.5 kgf.m, 31.1-39.8 lb-ft)

[B] 80-100 Nm (8-10 kgf.m, 57.9-72.3 lb-ft)



SENAT7035D

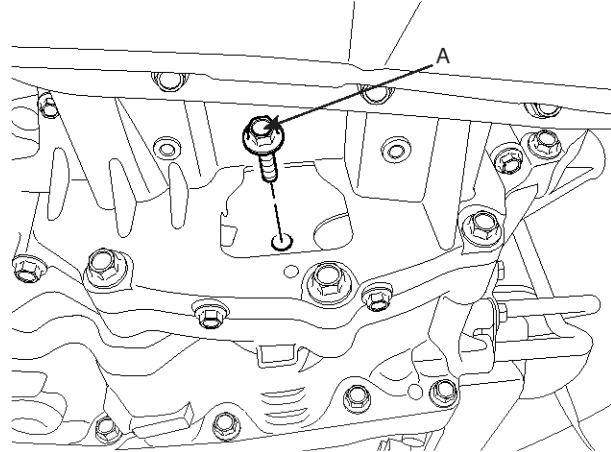
3. Install the six drive plate mounting bolts (A) by rotating the timing gear.

Tightening torque :

58-66 Nm (5.8-6.6 kgf.m, 41.9-47.7 lb-ft)

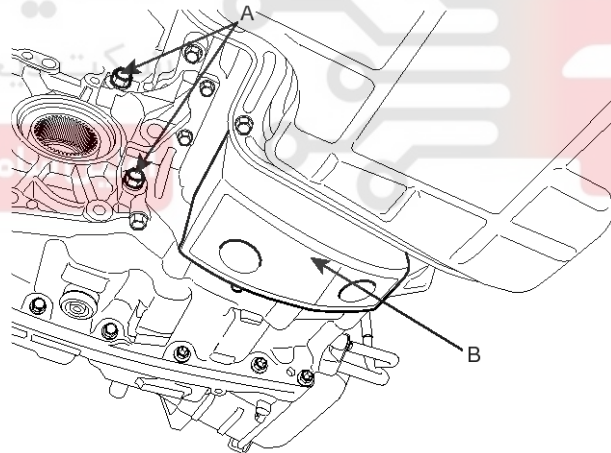
⚠ CAUTION

Be sure to tighten the bolts with the specified torque.



SENAT7034D

4. Install the dust cover (B).



SENAT7033D

5. Install the two transaxle mounting bolts (A) from engine side.

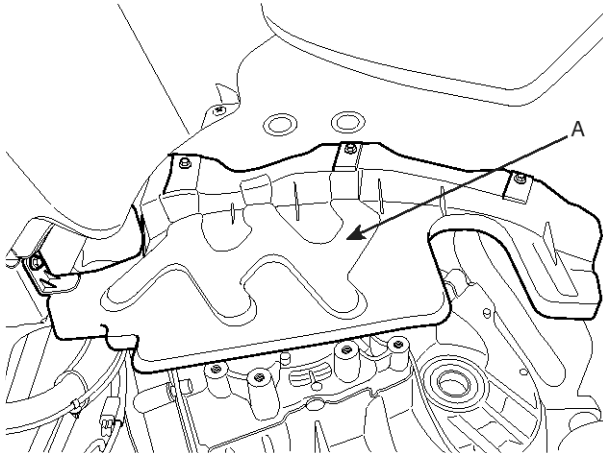
Tightening torque :

65-85 Nm (6.5-8.5 kgf.m, 47.0-61.5 lb-ft)

AT-42

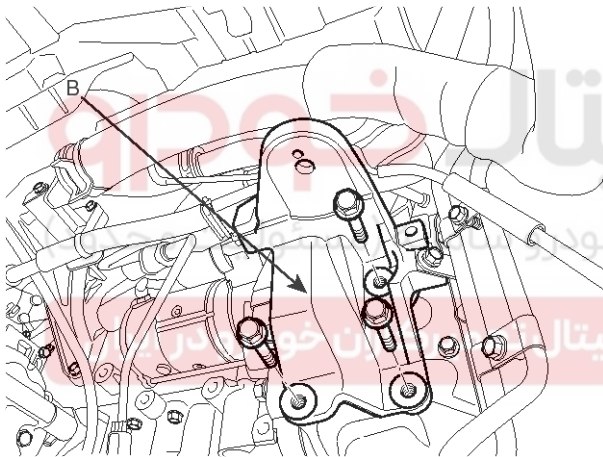
Automatic Transaxle System

6. Install the side mud cover (A).

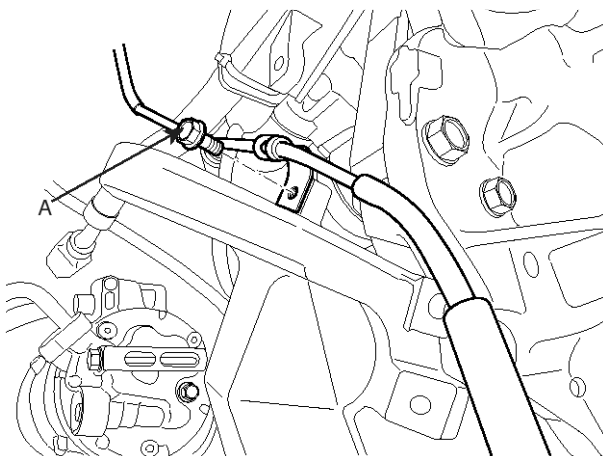


SENAT7022D

7. After installing the front mounting bracket (B) by removing the three bolts, install the vacuum tube mounting bolt (A).

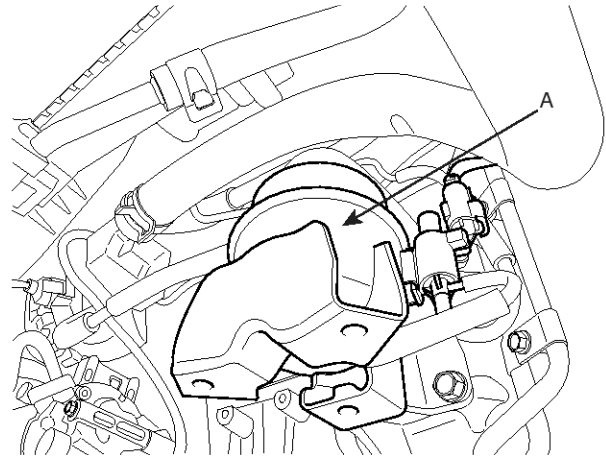


SENAT7025D



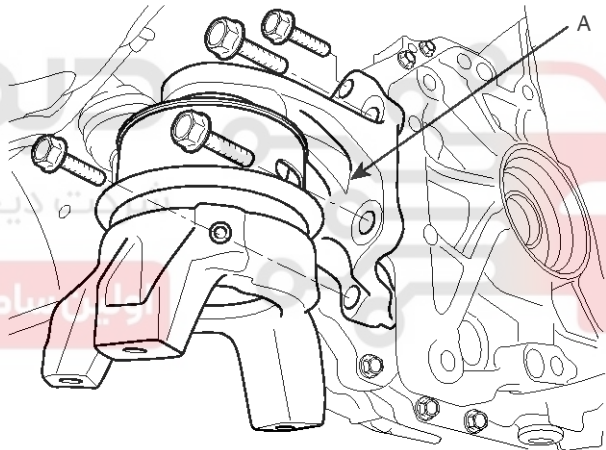
SENAT7027D

8. After installing the front roll mounting bracket assembly (A), connect the vacuum tube and the connector.



SENAT7024D

9. Install the rear roll mounting bracket assembly (A) by installing the four bolts.

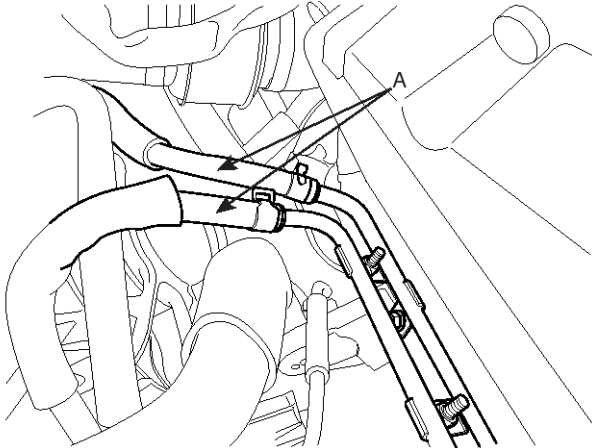


SENAT7015L

Automatic Transaxle System

AT-43

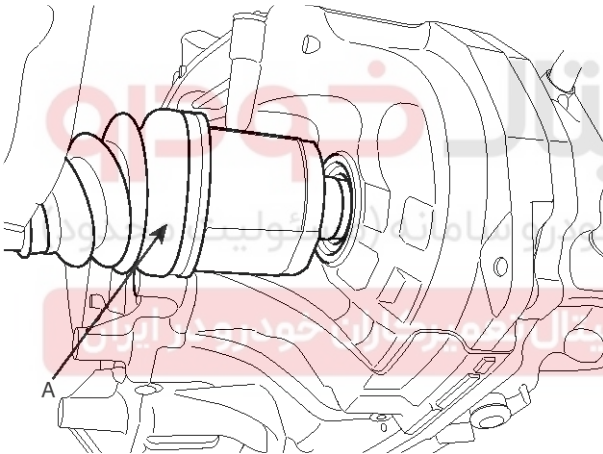
10. Install the transaxle oil cooler hose (A).



SENAT7026D

11. In case of 4WD, install the transfer case assembly.
(refer to Transfer case's Installation)

12. Connect the left driveshaft (A) to the transaxle.

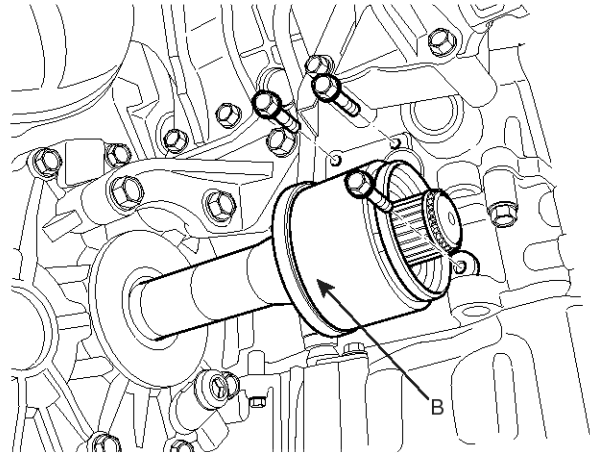


SENAT7019D

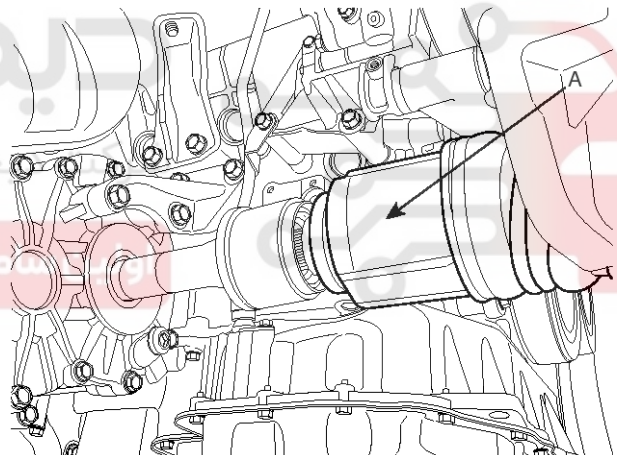
13. Install the inner shaft (B) by installing the three mounting bolts and connect the right driveshaft (A) into the inner shaft.

NOTICE

In case of 2WD, install the the inner shaft and the right driveshaft as an assembly.



SENAT7021D



SENAT7020D

14. Support the subframe with a jack and the Special tool (09624-38000).

15. Install the mounting bolts.(refer to Stabilizer in SS group)

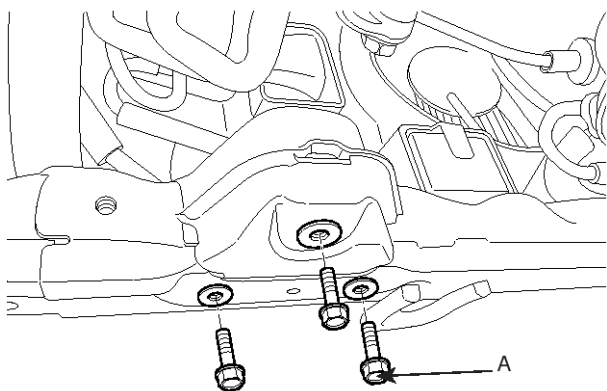
AT-44

Automatic Transaxle System

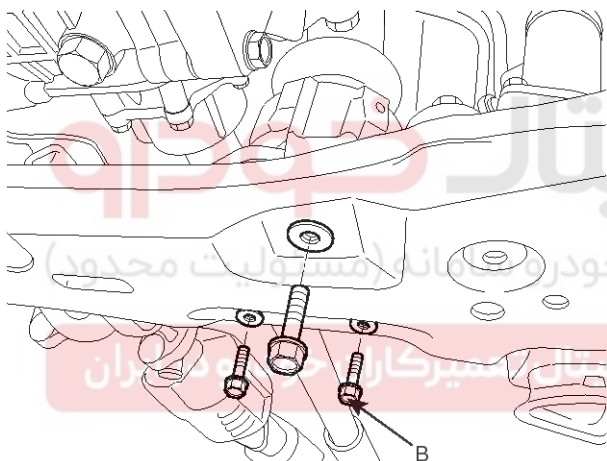
16. Install the roll stopper mounting bolts (A, B).

Tightening torque :

90-110 Nm (9-11 kgf.m, 65.1-79.5 lb-ft)

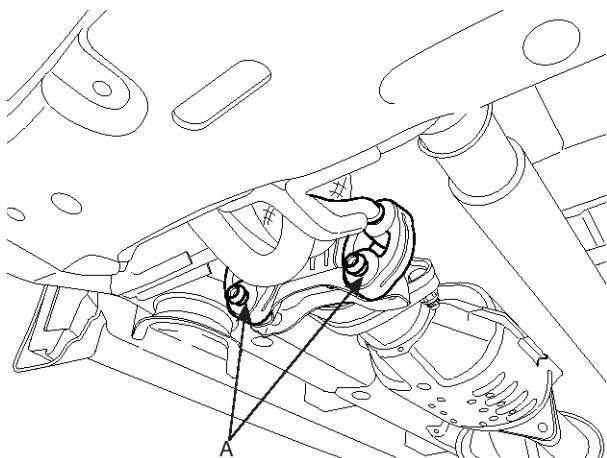


SENAT7015D



SENAT7016D

17. Install the muffler hanger rubber (A).



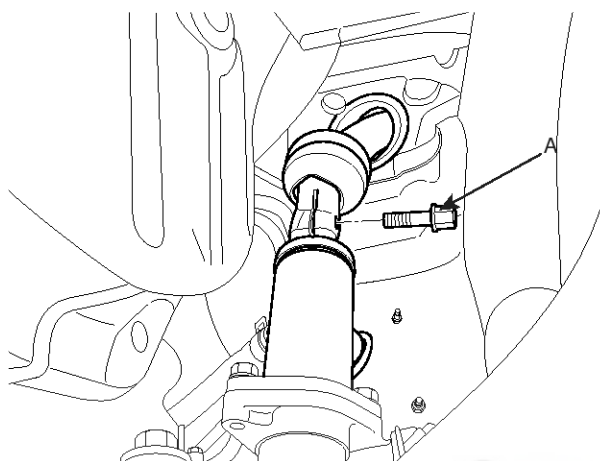
SENAT7018D

18. Install 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)

19. Install the steering joint bolt (A).

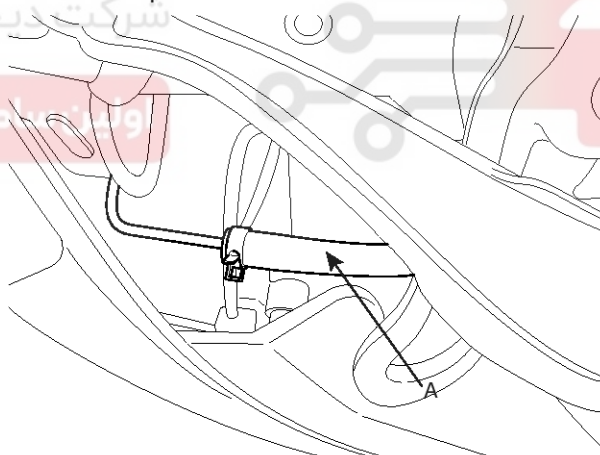
⚠ CAUTION

In case of EPS equipped, connect the EPS connector.



SENAT7017D

20. Connect the return hose (A) to the tube by tightening the clamp.

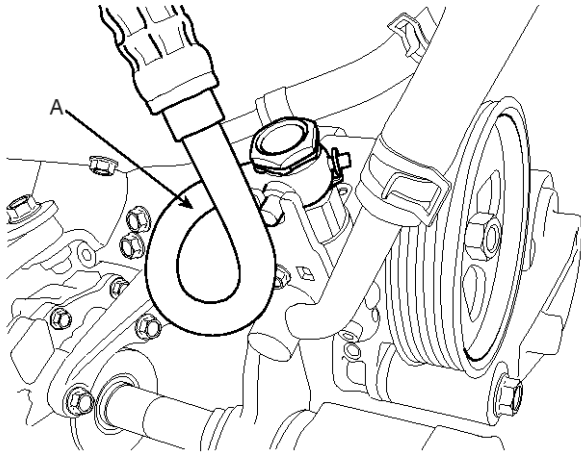


SENAT7014D

Automatic Transaxle System

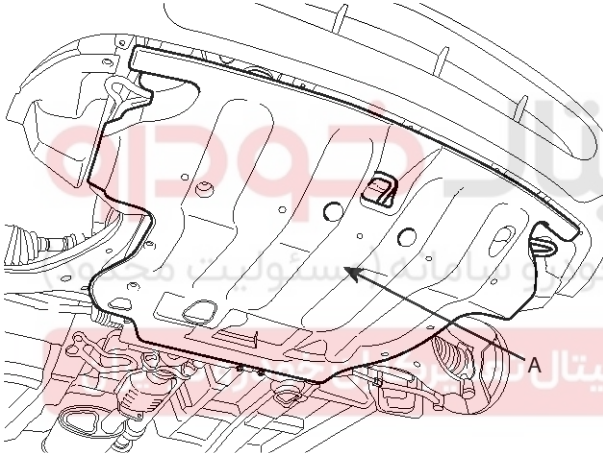
AT-45

21. Install the powersteering pressure tube (A) to the powersteering oil pump by installing the I-type bolt.



SENAT7012D

22. Install the under shield cover (A).



SENAT7013D

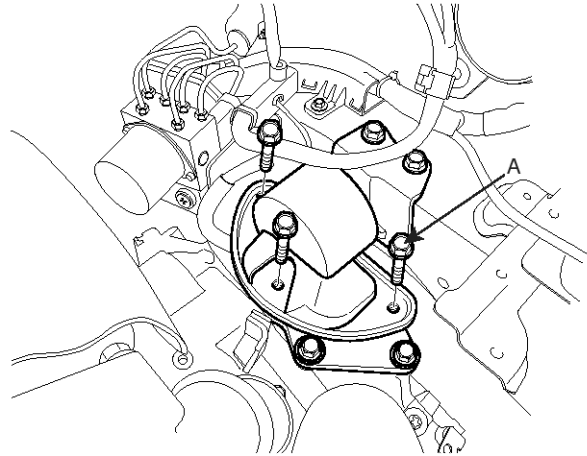
23. Lower the vehicle.

24. Install the front wheels and tires. (refer to Driveshaft in DS group)

25. Install the transaxle support bracket bolts (A).

Tightening torque :

90-110 Nm (9-11 kgf.m, 65.1-79.5 lb-ft)



SENAT7011D

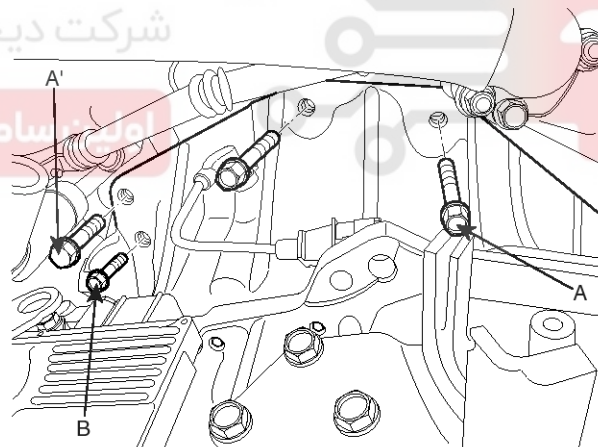
26. Install the four transaxle upper mounting bolts (A) and the starter motor mounting bolt (B).

Tightening torque :

[A] 80-100 Nm (8-10 kgf.m, 57.9-72.3 lb-ft)

[A'] 65-85 Nm (6.5-8.5 kgf.m, 47.0-61.5 lb-ft)

[B] 43-55 Nm (4.3-5.5 kgf.m, 31.1-39.8 lb-ft)

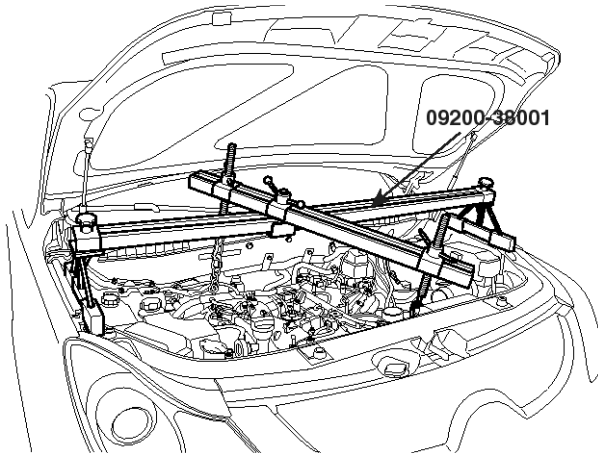


SENAT7039D

AT-46

Automatic Transaxle System

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



SENAT7010D

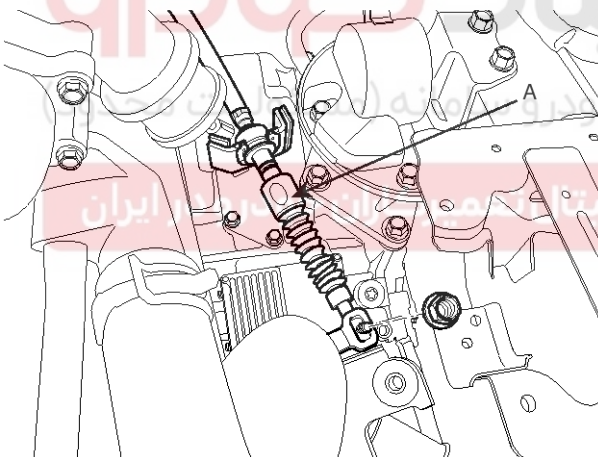
28. Install the shift cable assembly (A).

Tightening torque :

9-14Nm (0.9-1.4kgf.m, 6.5-10.1lb-ft)

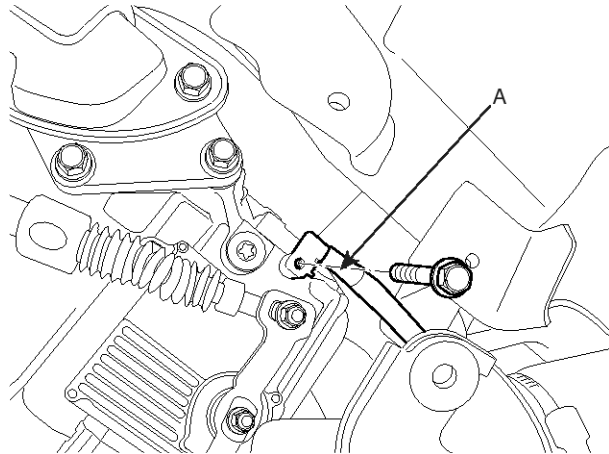
NOTICE

Adjust the shift cable referring to Shift lever's Adjustment section.



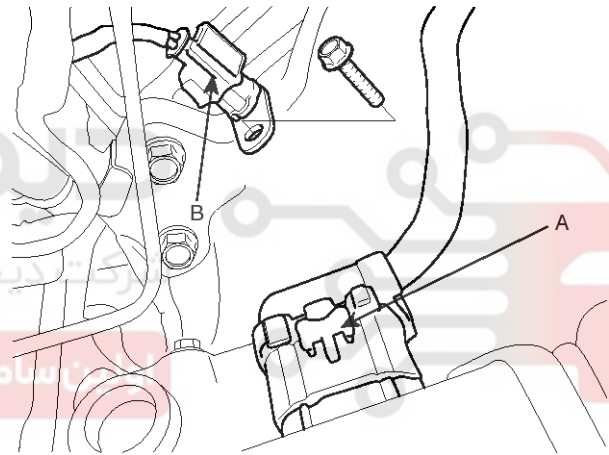
SENAT7008D

29. Install the ground cable (A) to transaxle.



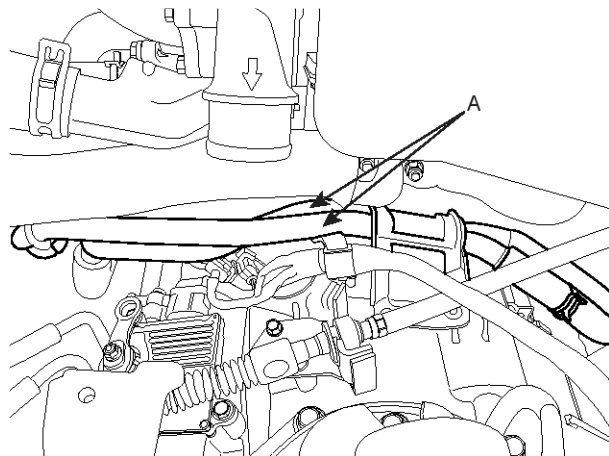
SENAT7007D

30. Connect the TCU connector (A) and install the CKP sensor (B).



SENAT7006D

31. Install the engine cooling lines (A).

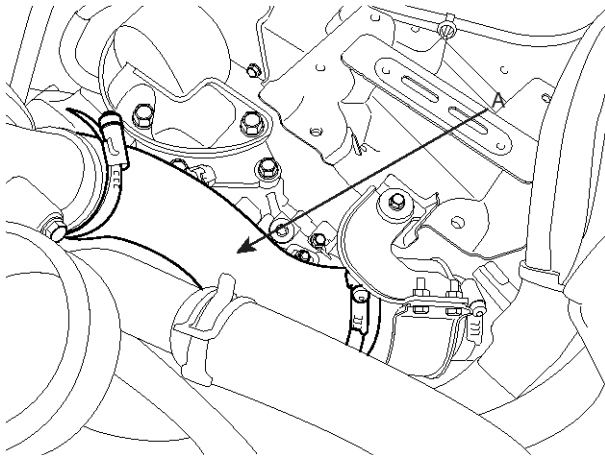


SENAT7005D

Automatic Transaxle System

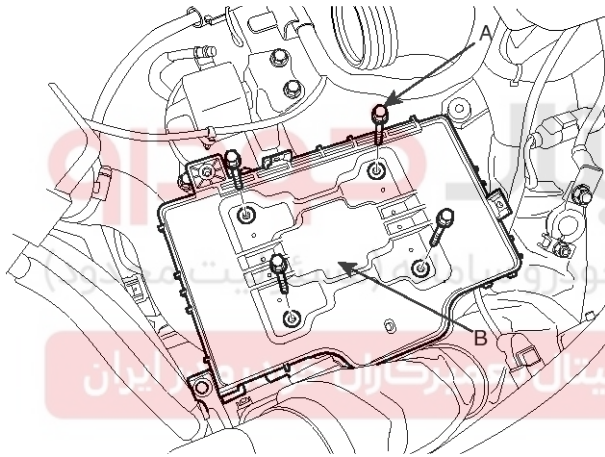
AT-47

32.Connect the intercooler hose (A).



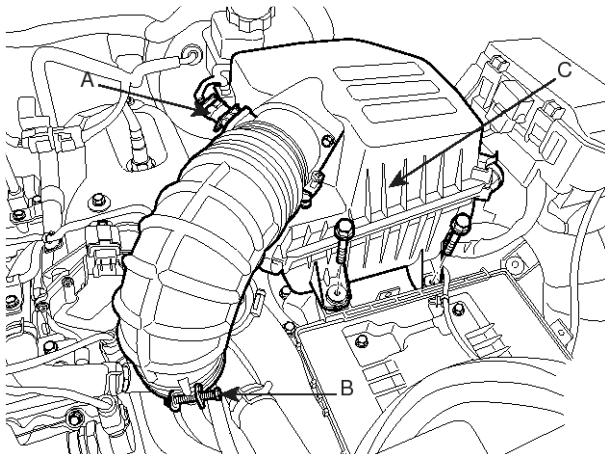
SENAT7004D

33.Install the battery tray (B) by installing the four bolts (A).



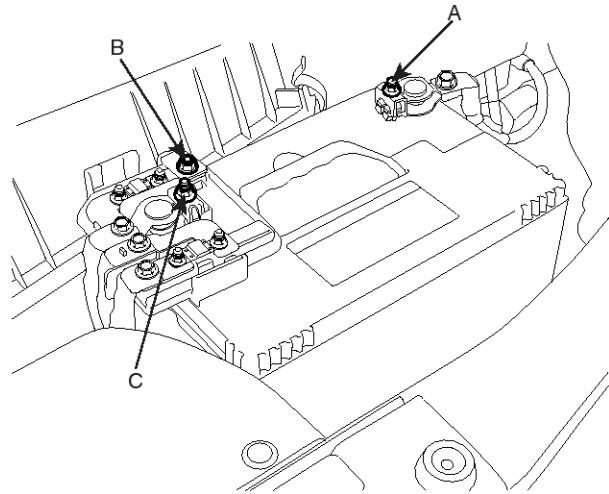
SENAT7003D

34. Installing the air cleaner assembly (C) by connecting the AFS(Air Flow Sensor) connector (A) and tightening the clamp (B).



SENAT7002D

35.Install the battery after installing the three nuts (A,B,C) in order.



SENAT7056D

36.Install the engine cover. (refer to Engine and Transaxle Assembly in EM group)

37.Refill the automatic transaxle fluid. (refer to Inspection and Adjustment)

38.Refill the powersteering fluid. (refer to Power Steering Gear Box in ST group)

39.When replacing the automatic transaxle assembly, after initializing the TCU, perform N position learning and initial learning. (refer to Troubleshooting's 'How to perform N position learning' and 'How to perform initial learning')

AT-48

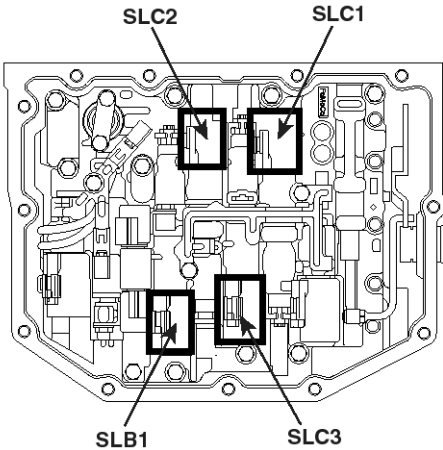
Automatic Transaxle System

Valve Body System

Solenoid valve

Description

Solenoid Location



SENAT7100D

Function Of Each Solenoid

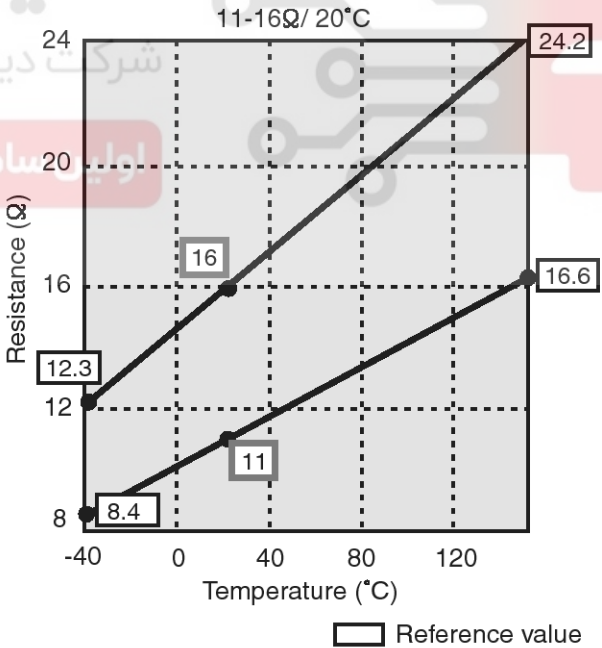
1. 3-way solenoids (S1,S2)
The 3-way solenoids (S1, S2) are installed on the front valve body. The solenoids turn ON and OFF in response to signals output from the TCU. According to the ON or OFF status of S1 or S2, the 1st gear engine brake operates or a gear shift occurs. As a fail-safe function, if any shift solenoid abnormality occurs, the TCU will disable the current to the solenoids.
2. Shift control solenoids (SLC1, SLC2, SLC3, SLB1)
The shift control solenoids (SLC1, SLC2, SLC3, SLB1) are installed on the front valve body. The solenoids linearly control hydraulic pressure in response to signals output from the TCU. Through this, it controls hydraulic pressure to the clutches (C1, C2, C3) and brake (B1) for smooth shifting. According to each shift control solenoid, the transaxle shifts from 1st gear into 6th gear and vice versa. As a fail-safe function, if any shift control solenoid occurs, the TCU will shut off the current to the solenoids.
3. Line pressure control solenoid (SLT)
The line pressure control solenoid (SLT) is installed on the front valve body. In accordance with the value decided in the TCU based on throttle opening signals and engine torque, line hydraulic pressure is controlled by linearly changing the comparable throttle pressure. Through this, The TCU controls hydraulic pressure to the clutch and brakes for

smooth shifting. As a fail-safe function, if any abnormality occurs in the line pressure control solenoid (SLT), then the TCU will shut off the current to the line pressure control solenoid. (The line pressure is maximized, If the line pressure control solenoid current is shut off when any abnormality of the SLT other than valve stuck occurs.)

4. Lock-up control solenoid (SLU)
The lock-up control solenoid (SLU) is installed on the front valve body. It linearly controls lock-up clutch hydraulic pressure based on engine rpm, throttle opening degree signals, input speed sensor (NIN) signals, and output speed sensor (SP) signals. This results in control of lock-up. As a fail-safe function, if any abnormality occurs in the lock-up control solenoid (SLU), then the TCU will shut off the current to the solenoid.

Specification Of Each Solenoid

3-way Solenoid (S1,S2)

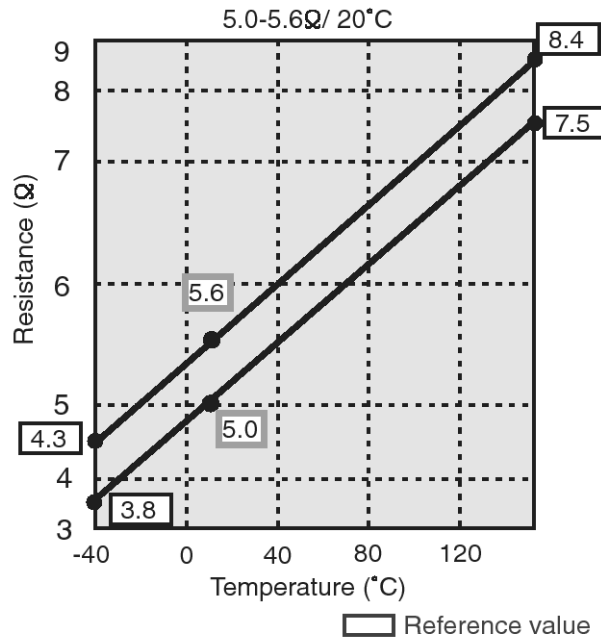


SENAT7101L

Valve Body System

AT-49

Shift Control Solenoid



Inspection

CAUTION

Do not apply impact to the solenoid.

Do not damage the terminals.

3-way solenoid (S1,S2)

1. Remove the side cover.
2. Remove the 3-way solenoid (S1, S2).

CAUTION

Do not apply impact to the solenoid.

3. With a tester, measure the resistance between the solenoid terminal and solenoid body.

SPEC: 11~15Ω (at 20°C [68°F])

4. Check that solenoid operates when connecting the battery positive terminal to the solenoid terminal and the battery negative terminal to the solenoid body.

Shift control solenoid (SLC1, SLC2, SLC3, SLB1)

1. Remove the side cover.
2. Remove the shift control solenoid. (SLC1,SLC2, SLC3, SLB1)

CAUTION

- The shift pressure control valve and the spring may be taken off when removing the solenoid.

- Do not apply impact to the solenoid.

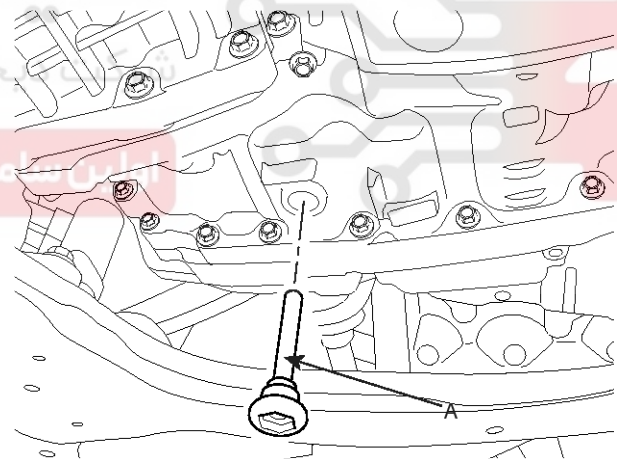
3. With a tester, measure the resistance between terminal 1 and terminal 2 of each solenoid.

SPEC: 5.0~5.6Ω (at 20°C [68°F])

4. Connect the battery positive terminal to each terminal 1 of the solenoid via a bulb (12-21W), and then check that each solenoid operates when connecting the battery negative terminal to terminal 2.

Removal

1. Drain the oil by removing the overflow plug and the O-ring using a torx wrench (T40), and the drain plug (A) and the gasket by using a hexagon wrench (17mm).



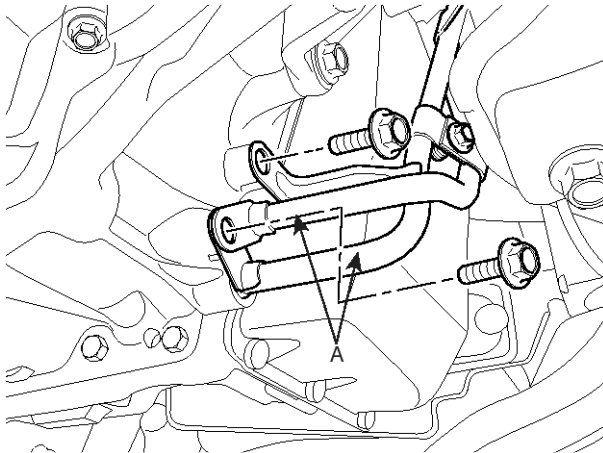
SENAT7072D

2. Disconnect the oil cooler hoses from the tubes.

AT-50

Automatic Transaxle System

3. Remove the 2 bolts to remove the oil cooler tubes (A) and the O-rings.

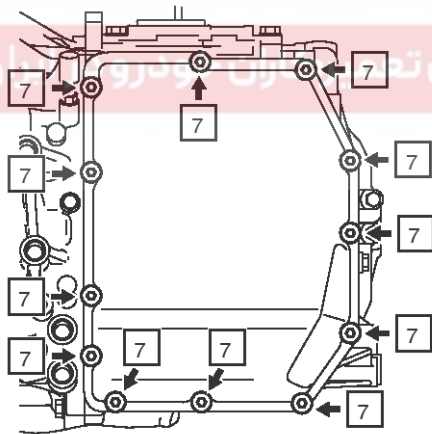


SENAT7073D

4. Using a torx wrench, remove the 12 seal bolts. Using a plastic hammer, tap the transaxle side cover to remove it.

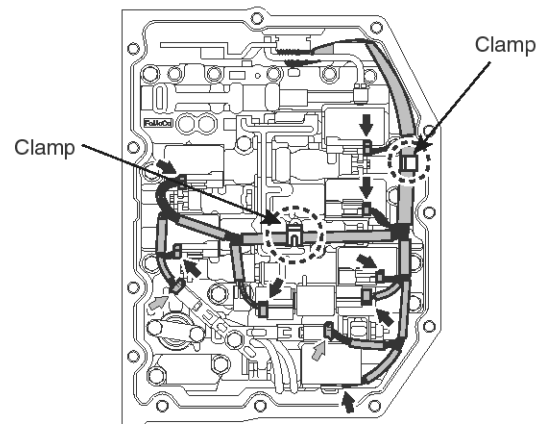
CAUTION

- Be careful not to damage the fitting surface of the transaxle case and the transaxle side cover.
- Be careful not to deform the transaxle side cover.



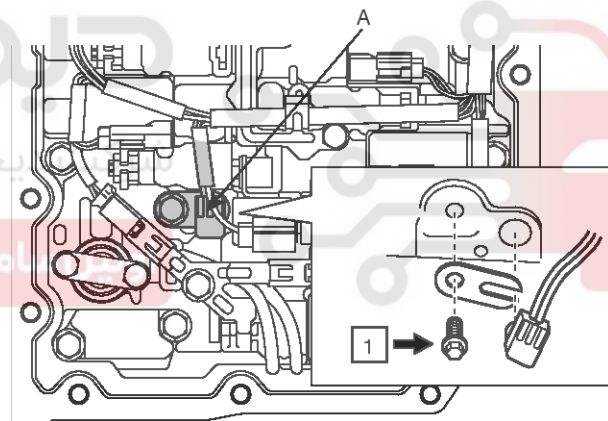
SENAT7074D

5. Disconnect the 8 solenoid connectors and the 2 speed sensor connectors. Disconnect the wire from the 2 clamps.



SENAT7088L

6. Remove the bolt and the lock plate, and pull out the oil temperature sensor (A) and the O-ring from the valve body assembly.



SENAT7075D

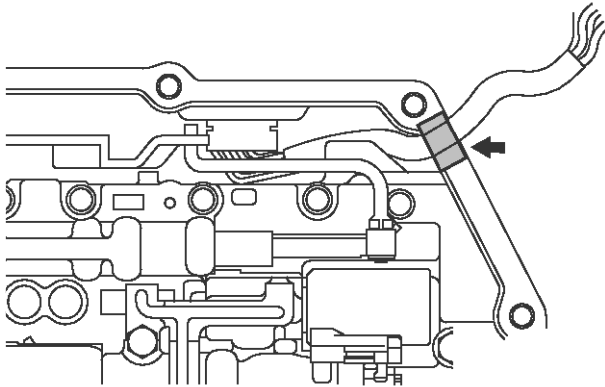
Valve Body System

AT-51

7. Fix the wire with tape to the transaxle case as shown in the figure.

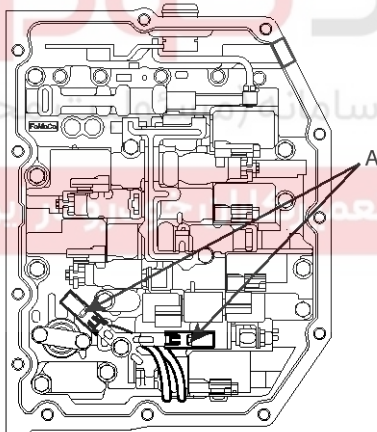
NOTICE

Be sure to secure the wire with tape so that it will not interfere with the valve body assembly.



SENAT7076D

8. Remove the 2 speed sensor wires (A) from the solenoid clamp.

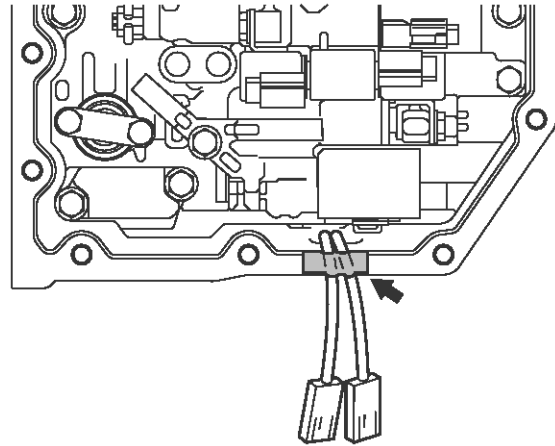


SENAT7071D

9. Fix the 2 speed sensor wires with tape to the transaxle case as shown in the figure.

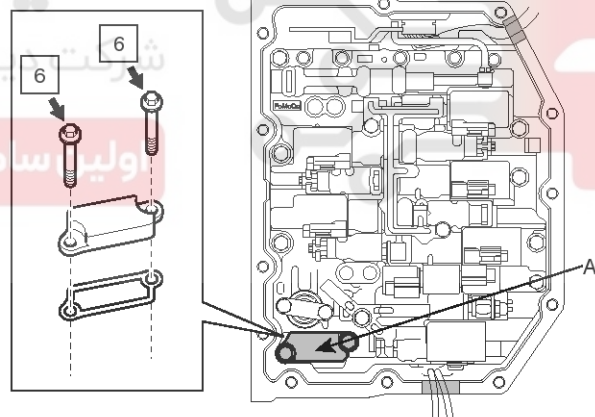
NOTICE

Be sure to secure the 2 speed sensor wires with tape so that they will not interfere with the valve body assembly.



SENAT7077D

10. Remove the 2 bolts to remove the suction cover (A) and the gasket.

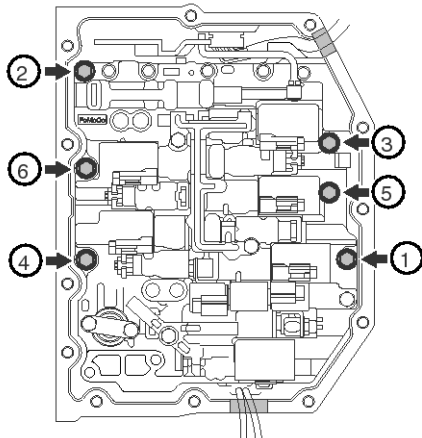


SENAT7078D

AT-52

Automatic Transaxle System

11. Remove the 6 bolts as shown in the figure.

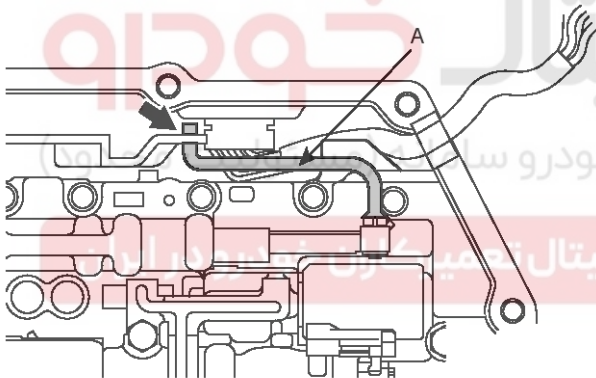


SENAT7079D

12. Disconnect the manual valve link (A) and remove the valve body assembly.

CAUTION

Be careful not to drop the valve body assembly.



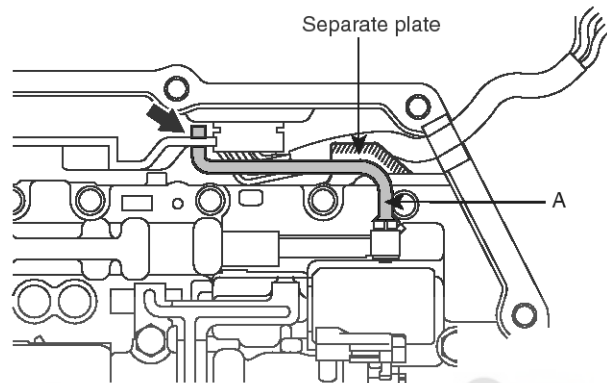
SENAT7080D

Installation

1. Connect the manual valve link (A) and install the valve body assembly.

CAUTION

- When installing the valve body assembly, be sure to put the wire in the open space of the separate plate in the valve body assembly.
- Do not pinch the wire between the separate plate and the valve body assembly.



SENAT7089L

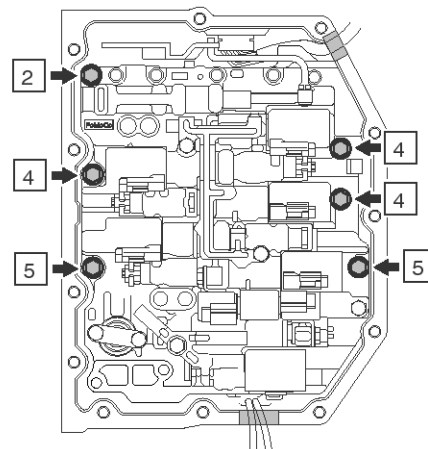
2. Temporarily install the valve body assembly with the 6 bolts.

Bolt size :

- (5) :M6x1.0x31mm
(4) :M6x1.0x21mm
(2) :M6x1.0x17mm

NOTICE

Aligning the bolt holes, temporarily tighten the 6 bolts by hand.



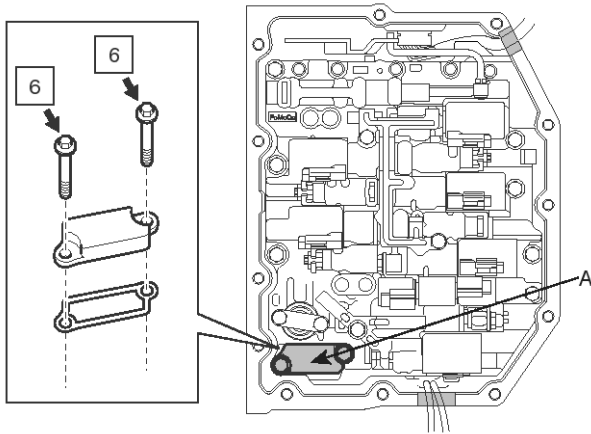
SENAT7090D

Valve Body System

AT-53

3. Temporarily install the suction cover (A) and a new gasket with the 2 bolts.

Bolt size (6) : M6x1.0x41mm

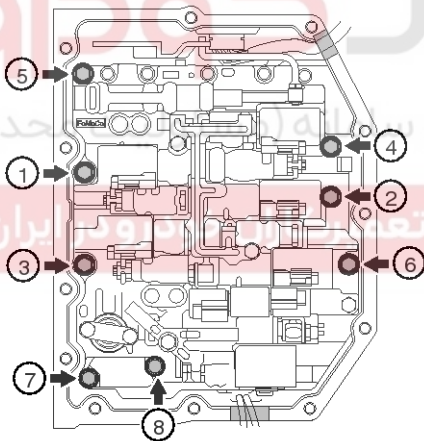


SENAT7078D

4. Tighten the 8 bolts in the order shown in the figure.

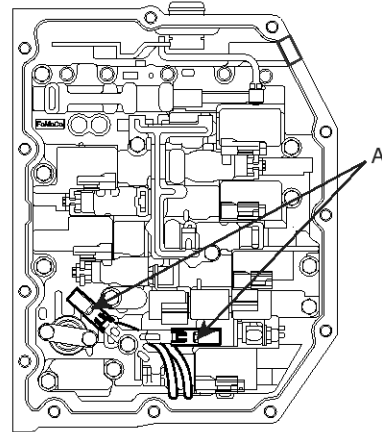
Tightening torque :

8-12 N.m (0.8-1.2 kgf.m, 5.8-8.7 lb-ft)



SENAT7091D

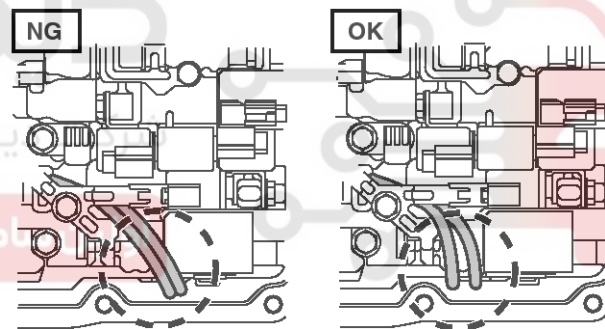
5. Install the connectors of the 2 speed sensor wires (A) to the solenoid clamp.



SENAT7071D

⚠ CAUTION

Install sensor as instructed as shown figure so that speed sensor wires cannot be stuck to solenoid.



SENAT7081L

6. Coat the new "O" ring with ATF, and install it to the oil temperature sensor.

O-ring size: inner dia.-11.57mm, thickness-1.98mm

AT-54

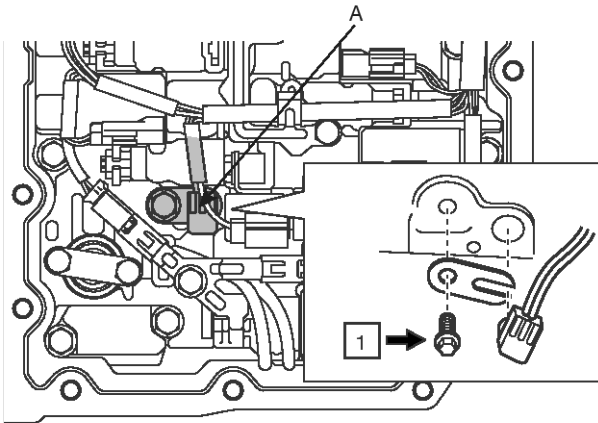
Automatic Transaxle System

7. Install the oil temperature sensor (A) with the lock plate and the bolt to the valve body assembly as shown in the figure.

Tightening torque :

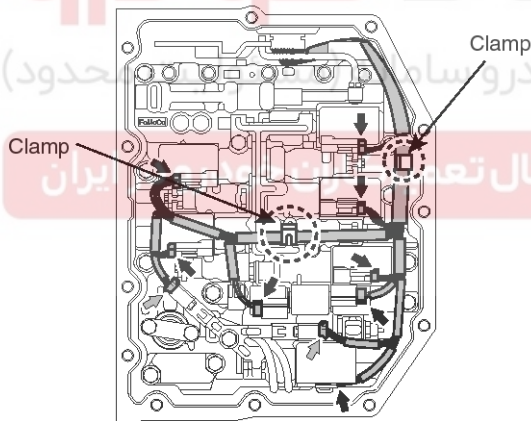
8-12 N.m (0.8-1.2 kgf.m, 5.8-8.7 lb-ft)

Bolt size (1) : M6x1.0x12mm



SENAT7075D

8. Connect the 8 solenoid connectors and the 2 speed sensor connectors, and the T/M wire to the 2 clamps.



SENAT7088L

9. Clean oil off the contact surface of the new transaxle side cover with the transaxle case.

NOTICE

Completely remove oil with white gasoline or similar products.

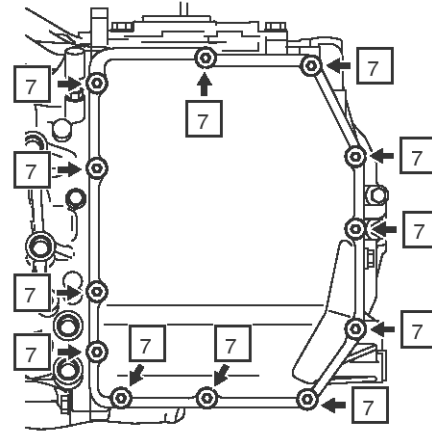
10. Apply sealant (FIPG) to the new transaxle side cover.

11. Install the transaxle side cover with 12 new seal bolts.

Tightening torque :

10-16 Nm (1.0-1.6kgf.m, 7.2-11.6 lb-ft)

Bolt size (7) : M8x1.25x15.5mm (Seal bolt)



SENAT7074D

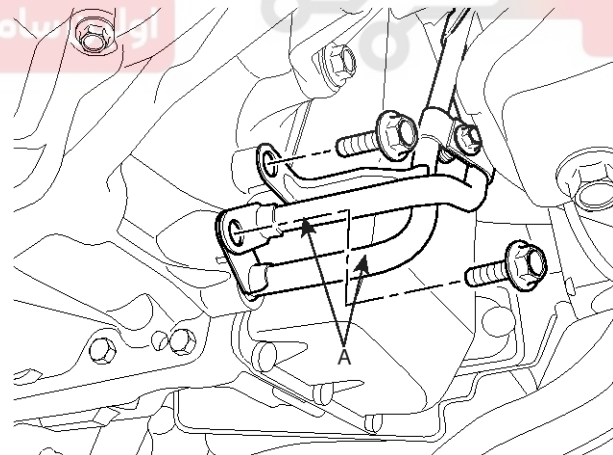
12. Coat the new O-rings with ATF, and install it to the oil cooler tubes (A). Install the oil cooler tubes with the 2 bolts.

O-ring size: inner dia.-11.6mm, thickness-2.35mm

Tightening torque :

20-30 Nm (2.0-3.0kgf.m, 14.5-21.7 lb-ft)

Bolt size (8) : M8x1.25x20mm



SENAT7073D

13. Connect the oil cooler hoses from the tubes.

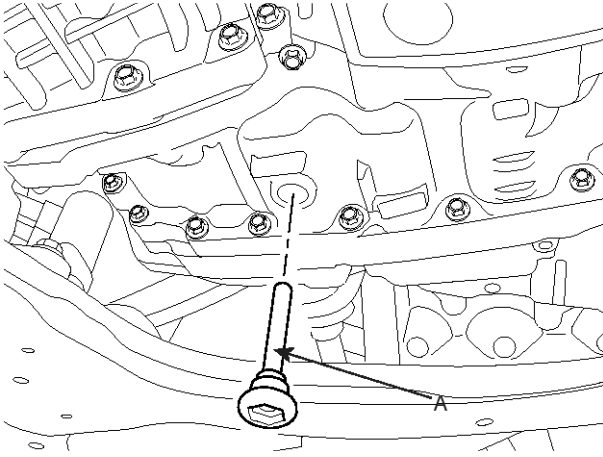
Valve Body System

AT-55

14. Install the drain plug (A) and the gasket by using a hexagon wrench (17mm).

Tightening torque :

35-61 Nm (3.5-6.1kgf.m, 25.3-44.1 lb-ft)



SENAT7072D

15. Refill the ATF. (refer to Procedure of Oil level adjusting)

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



AT-56

Automatic Transaxle System

Automatic Transaxle Control System

Visual Identification

Please pay attention to the following when installing or removing transaxle.

● Handling with care for electronic parts

1. When replacing an electronic part, be sure to switch the ignition off and disconnect the battery from the negative (-) terminal before servicing the system.
2. Do not jar electronic parts. If a part is dropped or shocked, replace it with a new one.

● Prevention of foreign substances

1. Be sure to remove dust, sand, etc. thoroughly from A/T when removing an associated part from it.
2. Protect the removed part from dust by covering it with a plastic bag, etc.
3. Perform the service procedures using plastic gloves, and do not use work gloves or a rag.

● Prevention of part damage

1. When separating an attached surface of the case, etc., tap with a plastic hammer to take the parts apart. [DO NOT PRY PARTS OFF WITH A SCREWDRIVER, ETC.]
2. Do not pull out the valve, etc. with excessive force.

● Cleaning of parts

1. All parts have to be thoroughly cleaned, dried by blown air and coated with the specified oil.
2. Do not clean aluminum parts and rubber parts with alkaline chemicals.
3. Do not clean rubber parts with washing oil (white gasoline).

● Caution for handling ATF

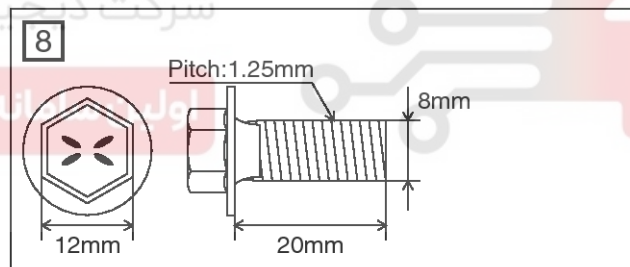
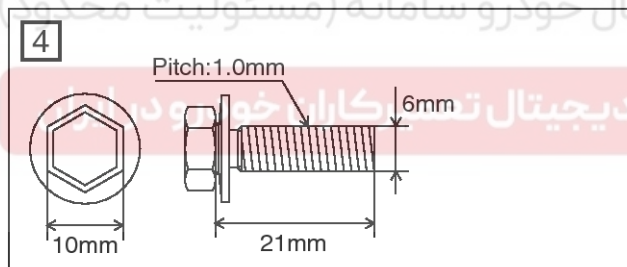
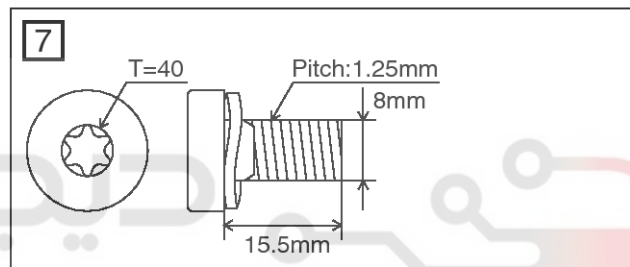
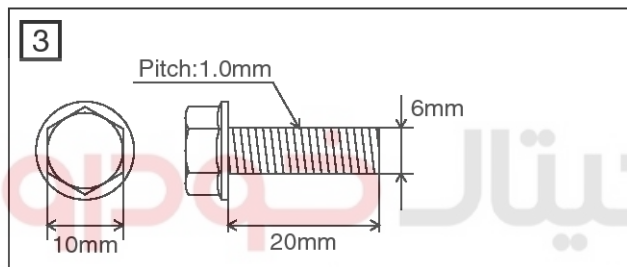
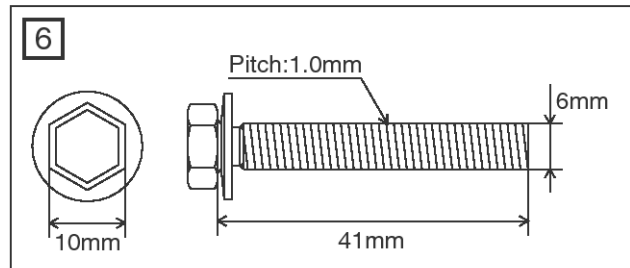
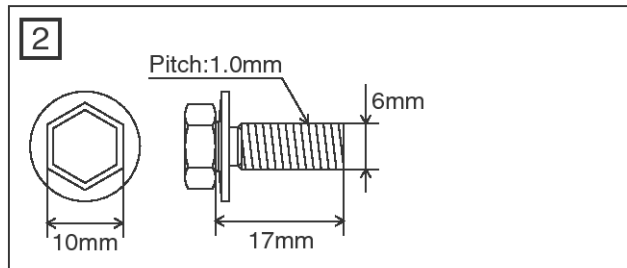
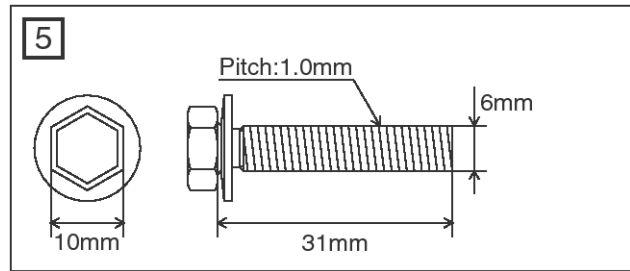
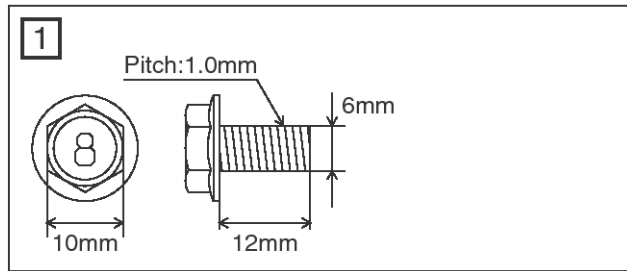
1. Do not drain ATF while it is still hot. (Service the system after it cools down.).
2. Be sure to use JWS-3309 (T-IV) type ATF.



Automatic Transaxle Control System

AT-57

Specification Of Bolts



SENAT7070L

AT-58

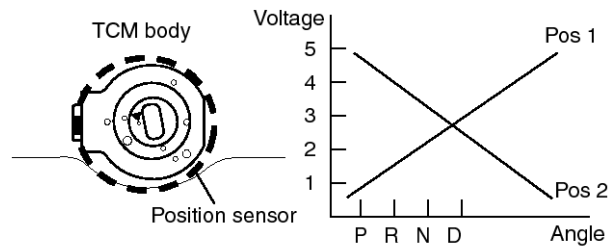
Automatic Transaxle System

Transaxle Control Module (TCM)

Description

Adoption of integrated position sensor with TCU

The shift position sensor is integrated in TCU. TCU indicates a shift position by reading a voltage difference between output voltages (Pos1, Pos2) from the shift position sensor.



SENAT7103L

Function Of TCU

1. Automatic gear shift control

In automatic gear shift control, based on each gear shift pattern, S1 and S2 turn on or off and SLC1, SLC2, SLC3, and SLB1 are operated linearly according to information that includes vehicle speed, Throttle valve opening degree, and brake signals.

2. Lock-up control

Based on rpm signals, signals from the engine control unit (engine rpm and throttle opening) and vehicle speed, smooth lock-up control is achieved through linear control of the lock-up control solenoid (SLU). (However, this assumes that JWS-3309 <T-IV> is used.)

3. Garage shift control

When the shift lever is moved from N to D or from N to R, after the engine is started, a shift control solenoid (SLC1, SLC3) is used for the oil pressure required by C1 clutch or C3 clutch and appropriately regulated oil pressure is supplied to the clutch, engaging smoothly without shock.

NOTICE

- When the engine is cold, the first piston stroke resistance increases, creating a time lag in shift operation. In order to reduce the time lag, control is not performed.
- By controlling the oil pressure according to the piston stroke, smooth engagement without shock becomes possible.

4. Reverse control

If the shift lever is moved from N to R while the vehicle is traveling and the transmission shifts into reverse, the wheels may be locked, which is extremely dangerous. In order to avoid this, TCU inhibits the transmission from shifting into reverse while traveling.

NOTICE

- Even when the shift lever is moved from N to R, the transmission does not shift into reverse if the vehicle speed is 11 km/h or more.
- When this control is activated, the C3 clutch is released without operating the shift control solenoid (SLC3) so that the transmission does not shift into reverse.
- Reverse control takes precedence over N-R shift control.

5. Self-diagnosis function

The TCU monitors the communication status of each sensor, electronic component and ECU including the engine control unit. If any malfunction should occur, the TCU functions to warn the driver and stores the malfunction as a diagnosis code.

6. Fail-safe

With the fail-safe function, if any malfunction should occur in the automatic transmission system, the TCU will output a control signal, and control will be performed to make traveling a minimum distance possible. If shift solenoid malfunction, the TCU will cancel the output of control signals to the solenoid. If this happens, automatic transmission gear shifting will be controlled by oil pressure circuits only and the gears will shift as shown in the chart below.

Shift position	Gear position
R	Reverse
D	3rd gear (5th gear in case of SLC1 failure)

7. Driver adaptive shift control


The F21 for HMC does not have a driving mode selection switch that allows drivers to select a mode themselves. The vehicle is ordinarily in economy mode. However, when specific conditions are met, the TCU selects a shifting pattern appropriate to driving conditions from all of the shifting patterns and switches automatically.

Automatic Transaxle Control System

AT-59

Mode	Description
ECONOMY	Used during normal driving. ECONOMY mode is basic shift schedule and the ideal shift schedule to be consistent with fuel economy and acceleration performance. This mode is normally selected where no other higher priority shift mode is activated. Full shift schedule map is available including lockup for this mode.
HIGH OIL TEMPERATURE (HOT)	This mode is protect the gearbox from the overheating. This mode is activated where the T/M oil temperature is too high, and will prevent the T/M oil temperature increasing by torque converter slipping. HOT shift schedule maps is available including lockup depending on the T/M oil temperature area for this mode.
MANUAL SHIFT MODE	The manual shift mode is activated where the driver put the shifter into manual gate. The gear position is manually changed according to the driver shift demand. The automatic down shift function in decelerating and automatic up shift function for engine over revolution protection are available. The allowable vehicle speed for up shifting at low vehicle speed and down shifting at high speed set be TCU parameters.
UP-SLOPE (US1,2)	The UP-SLOPE1,2 mode detect up hill road condition and change the shift map to powerful map to avoid busy shifting at up hill condition. When start condition of up slope mode is detected, shift map is changed upslope1 or upslope2 map depending on slope gradient if no higher priority mode is activated.
AUTO CRUISE CONTROL (ACC)	The AUTO CRUISE CONTROL detects "ACC ON" signal and use specific point to prevent shift hunting during ACC ON. When cruise control is ON, gears are fixed to perform smooth driving.
GEAR HOLD	The GEAR HOLD according to the request by ASR(TCS)/ESP in order to support the vehicle stability. This function can be activated in every shift mode except for MANUAL SHIFT MODE. When start condition is fulfilled, gear is held to current gear. The gear hold is performed after shift control finished if start condition is fulfilled during shifting.

Mode Priority On Current Implementation

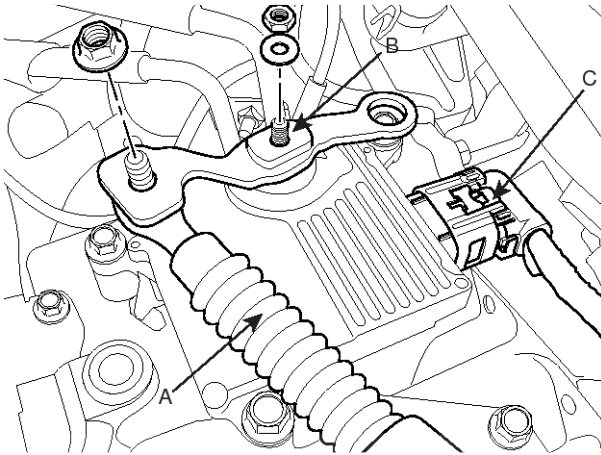
Mode priority	Shift mode
<div style="text-align: center;"> <p>High</p>  <p>Low</p> <p>SENAT7098L</p> </div>	MANUAL SHIFT MODE
	GEAR HOLD
	HOT
	UP-SLOPE 2
	UP-SLOPE 1
	AUTO CRUISE CONTROL
	ECONOMY

AT-60

Automatic Transaxle System

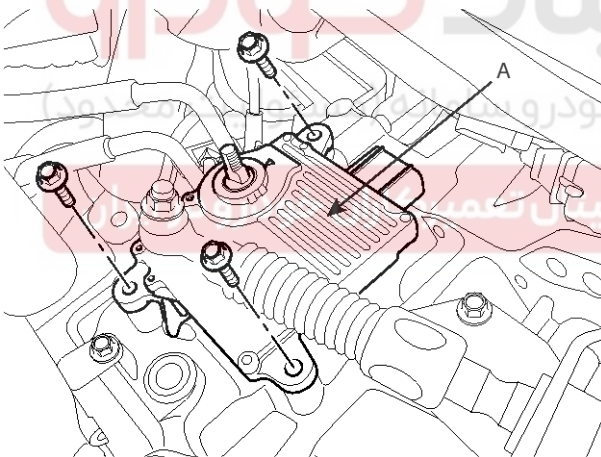
Removal

1. Disconnect the (-) terminal from the battery.
2. Remove the air cleaner assembly.
3. Remove the turbocharger tube. (diesel engine only)
4. Remove the shift cable (A), the manual lever (B), and the connector (C).



SENAT7085D

5. Remove the 3 bolts to remove the TCU (A).



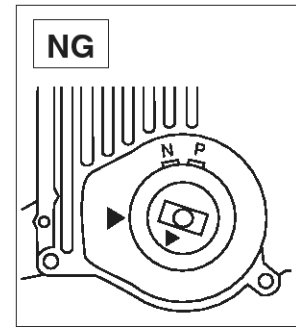
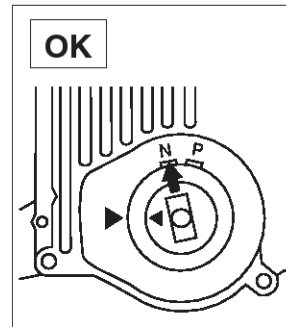
SENAT7086D

Installation

1. Check the condition of the connector pin of the A/T (foreign material, bent pins, broken pins etc.) and "O" ring after the TCU is removed.
2. Be sure to match the position of the TCU marking.

⚠ CAUTION

Do not turn more than 60 degrees from the marking.



SENAT7092L

3. Install the TCU (A) with the 3 bolts.

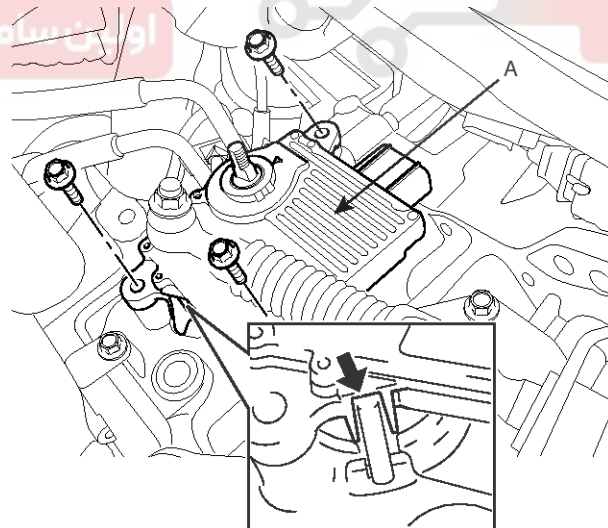
Tightening torque :

20-30 Nm (2.0-3.0kgf.m, 14.5-21.7 lb-ft)

Bolt size (8) : M8x1.25x20mm

⚠ NOTICE

Make sure the correct positions of the TCU and wire.

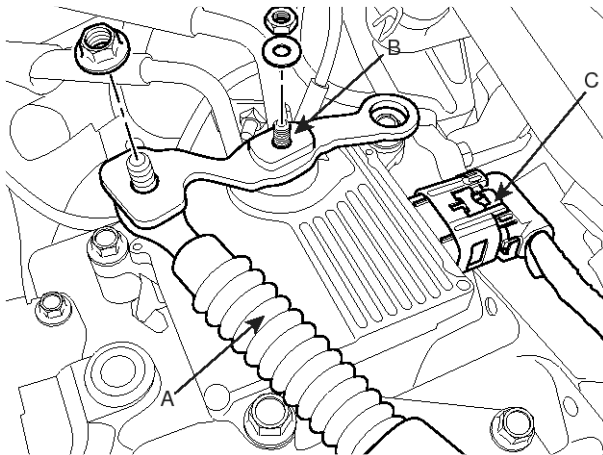


SENAT7095D

Automatic Transaxle Control System

AT-61

4. Install the shift cable (A), the manual lever (B), and the connector (C).



SENAT7085D

5. Install the turbocharger tube. (diesel engine only)
6. Install the air cleaner assembly.
7. Connect the (-) terminal to the battery.
8. Perform N position learning. (refer to Troubleshooting's 'How to perform N position learning')
9. Perform initial learning. (refer to Troubleshooting's 'How to perform initial learning')

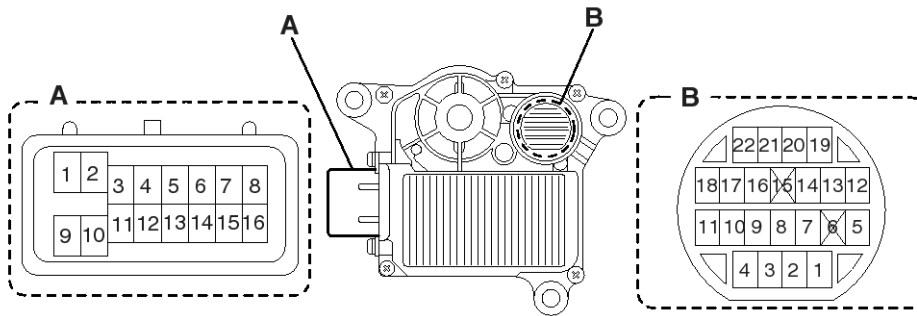


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AT-62

Automatic Transaxle System

Information Of TCU Connector



SENAT7084D

Ter- minal No.	Mark	Terminal Name	Term- inal No.	Mark	Terminal Name
A1	+B	Battery voltage	B4	SLUG	Lock-up control solenoid [SLU-]
A2	-	-	B5	S1	3-way solenoid [S1]
A3	TOP UP	Tiptronic input signal up	B6	-	-
A4	TIP DO- WN	Tiptronic input signal down	B7	OTG	Oil temperature sensor [OT-]
A5	STLK	Start lock output signal	B8	OT	Oil temperature sensor [OT+]
A6	CAN L	CAN communication L line (Low)	B9	SLU	Lock-up control solenoid [SLU+]
A7	TIP M	Tiptronic input signal Manual	B10	SLC1G	Shift control solenoid [SLC1-]
A8	-	-	B11	SLC1	Shift control solenoid [SLC1+]
A9	GND	TCU ground	B12	NIN+	Input speed sensor [NIN+]
A10	-	-	B13	NIN-	Input speed sensor [NIN-]
A11	IG	Ignition switch input signal	B14	SLC3	Shift control solenoid [SLC3+]
A12	-	-	B15	-	-
A13	RVS	Reverse lamp output signal	B16	SLB1G	Shift control solenoid [SLB1-]
A14	CAN H	CAN communication H line (High)	B17	SLC2	Shift control solenoid [SLC2+]
A15	-	-	B18	SLC2G	Shift control solenoid [SLC2-]
A16	SFL	Shift lock output signal	B19	SP+	Output speed sensor [SP+]
B1	SLTG	Line pressure control solenoid [SLT-]	B20	SP-	Output speed sensor [SP-]
B2	S2	3-way solenoid [S2]	B21	SLB1	Shift control solenoid [SLB1+]
B3	SLT	Line pressure control solenoid [SLT+]	B22	SLC3G	Shift control solenoid [SLC3-]

Automatic Transaxle Control System

AT-63

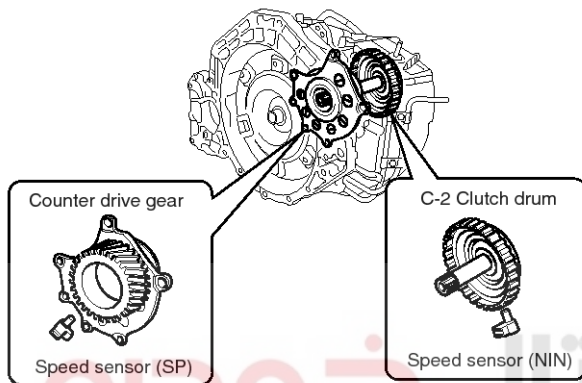
Input Speed Sensor

Description

The input speed sensor (NIN) is installed in the transaxle case.

This sensor detects the number of revolutions of the intermediate shaft's C2 drum as input shaft speed.

This signal is transmitted to the TCU. Based on those signals, the TCU controls engine torque, shift timing, and lock-up.



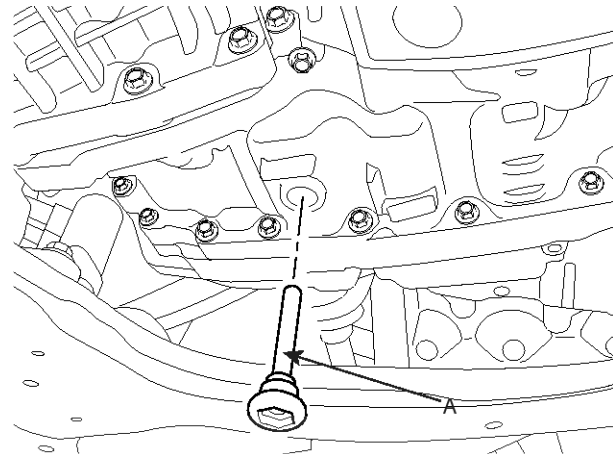
SENAT7082L

Specification

	Signal	Current
Input speed sensor	HIGH	12-16 mA
	LOW	4-8 mA

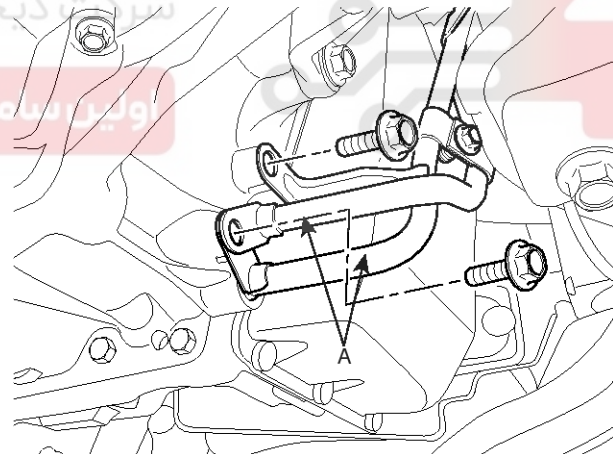
Removal

1. Drain the oil by removing the overflow plug and the O-ring using a torx wrench (T40), and the drain plug (A) and the gasket by using a hexagon wrench (17mm).



SENAT7072D

2. Disconnect the oil cooler hoses from the tubes.
3. Remove the 2 bolts to remove the oil cooler tubes (A) and the O-rings.



SENAT7073D

4. Remove the transaxle side cover and the valve body assembly. (refer to Solenoid valve's Removal)

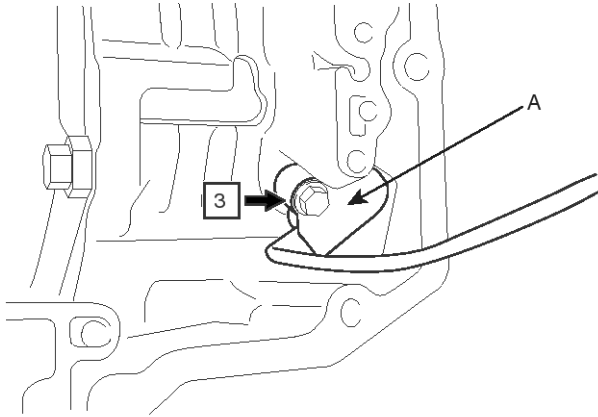
CAUTION

Be careful not to drop the valve body assembly.

AT-64

Automatic Transaxle System

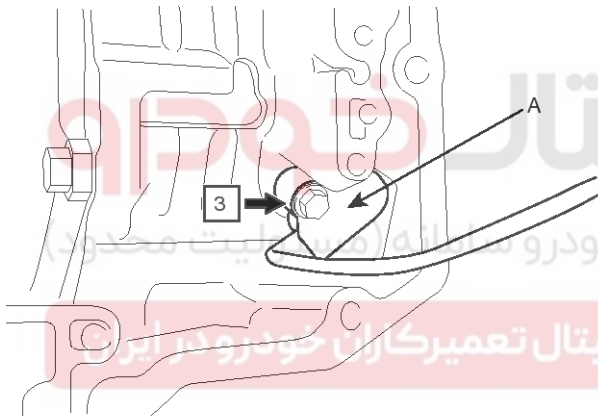
5. Remove the input speed sensor (A).



SENAT7083D

Installation

1. Install the input speed sensor (A).



SENAT7083D

2. Install the transaxle side cover and the valve body assembly. (refer to Solenoid valve's Installation)

CAUTION

Be careful not to drop the valve body assembly.

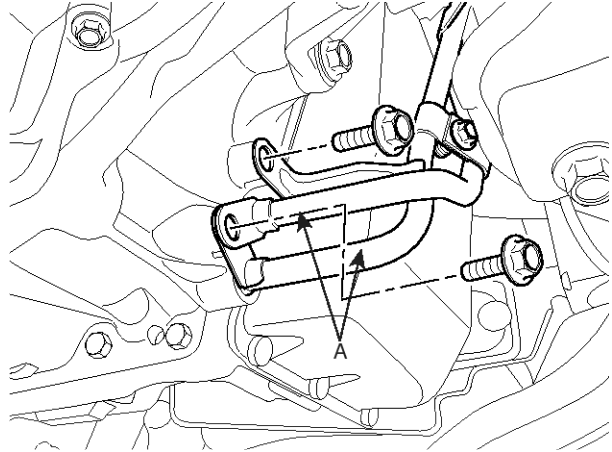
3. Coat the new O-rings with ATF, and install it to the oil cooler tubes (A). Install the oil cooler tubes with the 2 bolts.

O-ring size: inner dia.-11.6mm, thickness-2.35mm

Tightening torque :

20-30 Nm (2.0-3.0kgf.m, 14.5-21.7 lb-ft)

Bolt size (8) : M8x1.25x20mm

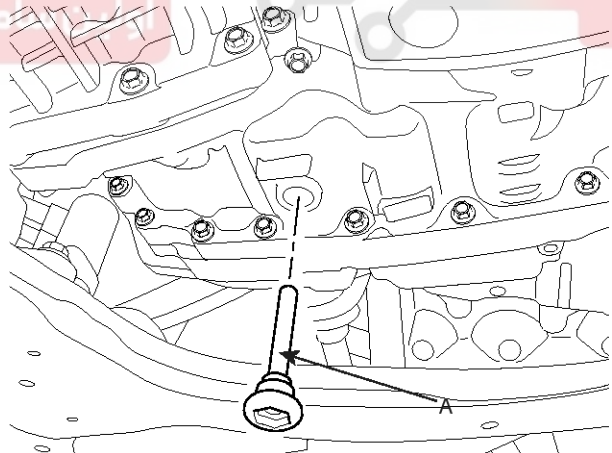


SENAT7073D

4. Connect the oil cooler hoses from the tubes.
5. Install the drain plug (A) and the gasket by using a hexagon wrench (17mm).

Tightening torque :

35-61 Nm (3.5-6.1kgf.m, 25.3-44.1 lb-ft)



SENAT7072D

6. Refill the ATF. (refer to Procedure of Oil level adjusting)

Automatic Transaxle Control System

AT-65

Inspection

⚠ CAUTION

- Do not damage the input speed sensor (NIN).
 - Do not damage the terminals.
1. Connecting terminal 2 to a battery positive terminal, connect the battery negative terminal to terminal 1 through resistance of 100Ω and ammeter.
 2. Measure current value when shaking metal shards (magnetic material) back and forth with a top of input speed sensor (NIN) (less than 5mm).

Specification [mA] :

12-16 (HIGH), 4-8 (LOW)

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



AT-66

Automatic Transaxle System

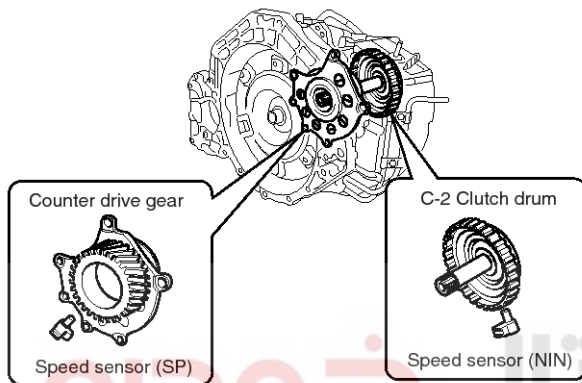
Output Speed Sensor

Description

The output speed sensor (SP) is installed in the transaxle case.

This sensor detects the number of revolutions of the counter drive gear as output shaft speed.

This signal is transmitted to the TCU. Based on those signals, the TCU controls engine torque, shift timing, and lock-up.



SENAT7082L

Specification

	Signal	Current
Output speed sensor	HIGH	12-16 mA
	LOW	4-8 mA

Inspection

NOTICE

Refer to Input speed sensor's Removal & Installation in order to inspect the output speed sensor (SP).

CAUTION

- Do not damage the output speed sensor (SP).
 - Do not damage the terminals.
1. Connecting terminal 2 to a battery positive terminal, connect the battery negative terminal to terminal 1 through resistance of 100Ω and ammeter.
 2. Measure currency value when shaking metal shards (magnetic material) back and forth with a top of output speed sensor (SP) (less than 5mm).

Specification [mA] :

12-16 (HIGH), 4-8 (LOW)

3. When the output speed sensor has failed, replace the automatic transaxle assembly.

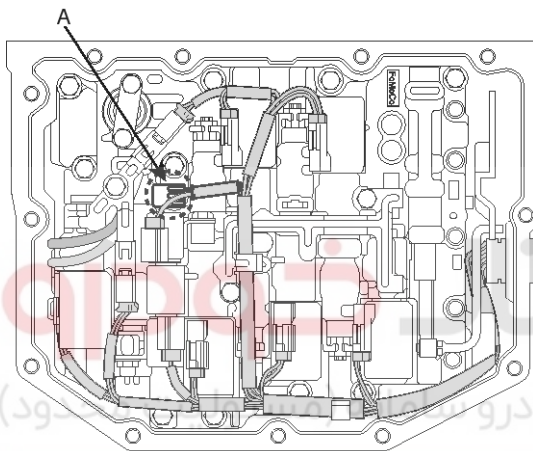
Automatic Transaxle Control System

AT-67

Transaxle Oil Temperature Sensor

Description

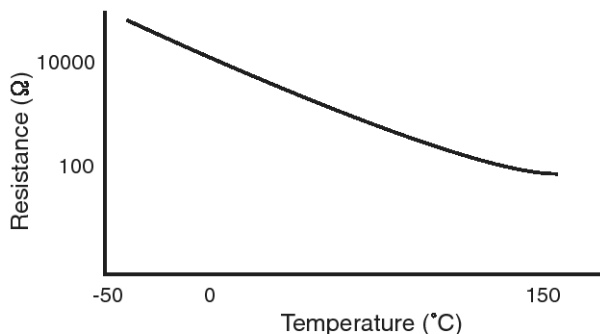
- The transmission wires are installed on the transaxle case as the grouped connectors of the oil temperature sensor, speed sensors, and solenoids.
- The oil temperature sensor (A), which is integrated with the transmission wires, is installed on the front valve body. It directly detects the oil temperature within the hydraulic pressure control circuit and transmits a signal based on that temperature to the TCU. In response to changes in oil temperature, the TCU controls gear shifting for smooth shifting across a wide range of temperatures.



SENAT7104D

Specification

	Signal	Specification
Oil temperature sensor	10°C	5.62-7.31kΩ
	25°C	3.5kΩ
	110°C	0.22-0.27kΩ



SENAT7096L

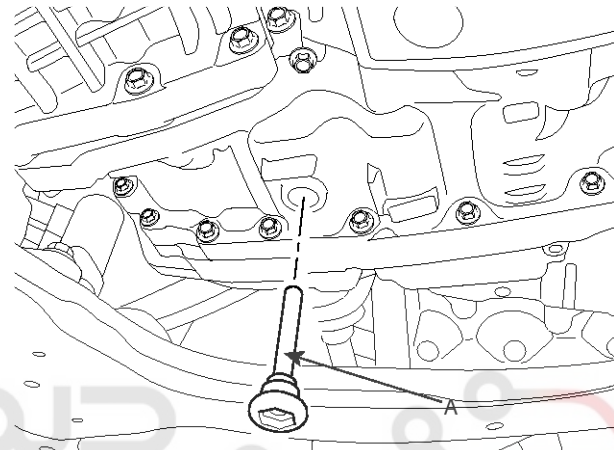
Removal

- Remove the TCU. (refer to TCM's Removal)

CAUTION

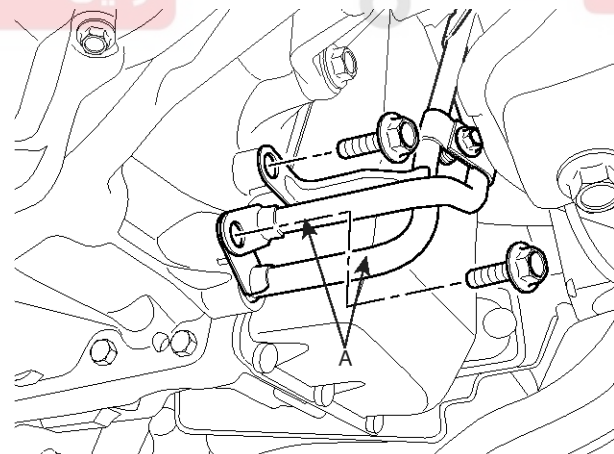
Do not touch the terminals.

- Drain the oil by removing the overflow plug and the O-ring using a torx wrench (T40), and the drain plug (A) and the gasket by using a hexagon wrench (17mm).



SENAT7072D

- Disconnect the oil cooler hoses from the tubes.
- Remove the 2 bolts to remove the oil cooler tubes (A) and the O-rings.



SENAT7073D

- Remove the transaxle side cover and the valve body assembly. (refer to Solenoid valve's Removal))

CAUTION

Be careful not to drop the valve body assembly.

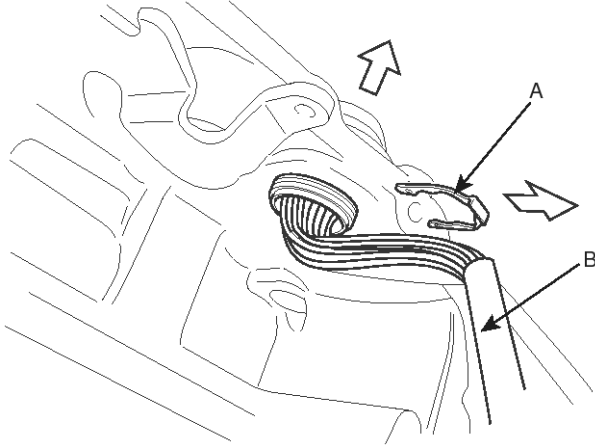
AT-68

Automatic Transaxle System

6. After removing the wire lock plate (A), remove the wire (B) from the transaxle case.

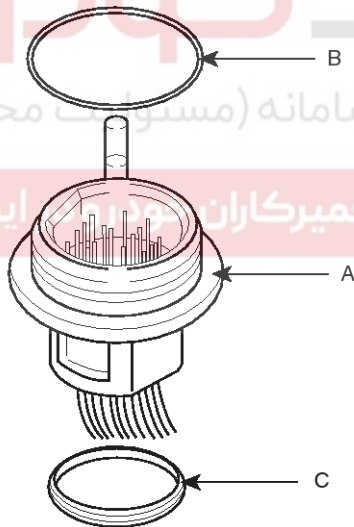
CAUTION

- Be careful not to damage the harness.
- Be careful not to pull the harness forcibly.



SENAT7087D

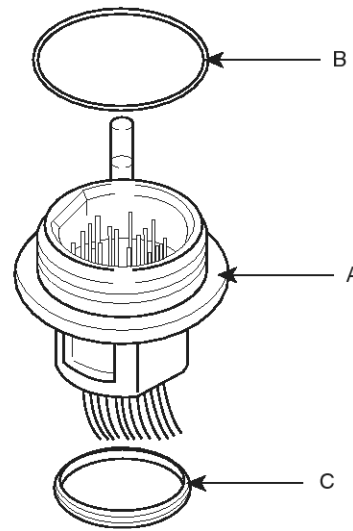
7. Remove the O-ring (B) and the gasket (C) from the wire (A).



SENAT7093D

Installation

1. After coating a new gasket (C) with ATF, install it to the wire (A).



SENAT7093D

2. Install a new O-ring (B) to the wire.

O-ring size: inner dia.-27.3mm, thickness-2.4mm

CAUTION

Do not coat ATF to the O-ring.

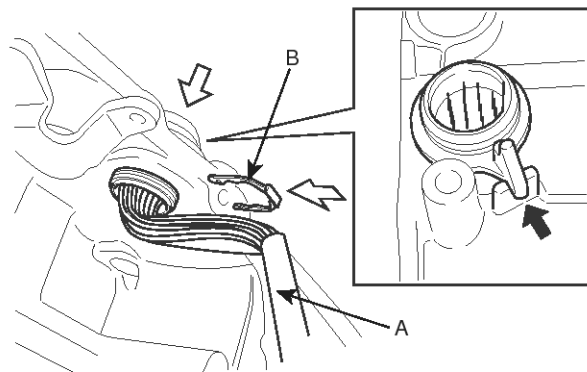
3. Install the wire (A) to the transaxle case.

CAUTION

- Be careful not to apply too much force to the wire.
- Be careful not to damage the T/M wire.

NOTICE

Install the wire to the transaxle case by engaging its claw.



SENAT7097D

Automatic Transaxle Control System

AT-69

4. Install a new wire lock plate (B).
5. Install the transaxle side cover and the valve body assembly. (refer to Solenoid valve's Installation)

⚠ CAUTION

Be careful not to drop the valve body assembly.

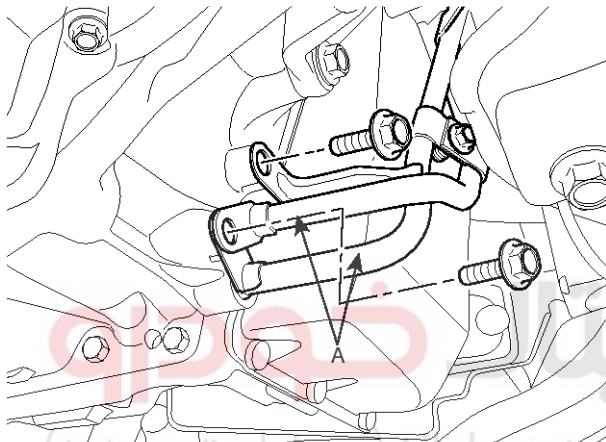
6. Coat the new O-rings with ATF, and install it to the oil cooler tubes (A). Install the oil cooler tubes with the 2 bolts.

O-ring size: inner dia.-11.6mm, thickness-2.35mm

Tightening torque :

20-30 Nm (2.0-3.0kgf.m, 14.5-21.7 lb-ft)

Bolt size (8) : M8x1.25x20mm

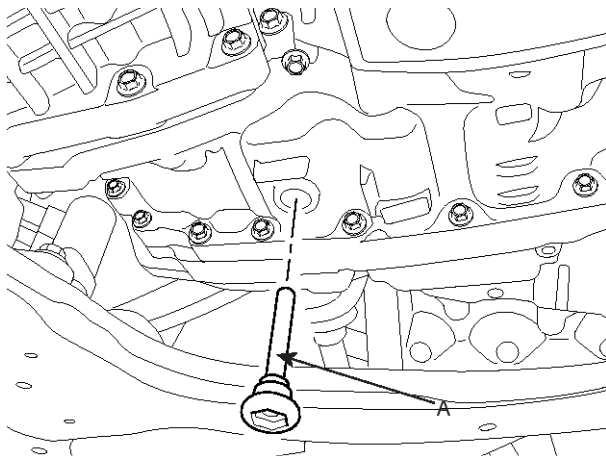


SENAT7073D

7. Connect the oil cooler hoses from the tubes.
8. Install the drain plug (A) and the gasket by using a hexagon wrench (17mm).

Tightening torque :

35-61 Nm (3.5-6.1kgf.m, 25.3-44.1 lb-ft)



SENAT7072D

Install the TCU. (refer to TCM's Installation)

Tightening torque :

20-30 Nm (2.0-3.0kgf.m, 14.5-21.7 lb-ft)

Bolt size (8) : M8x1.25x20mm

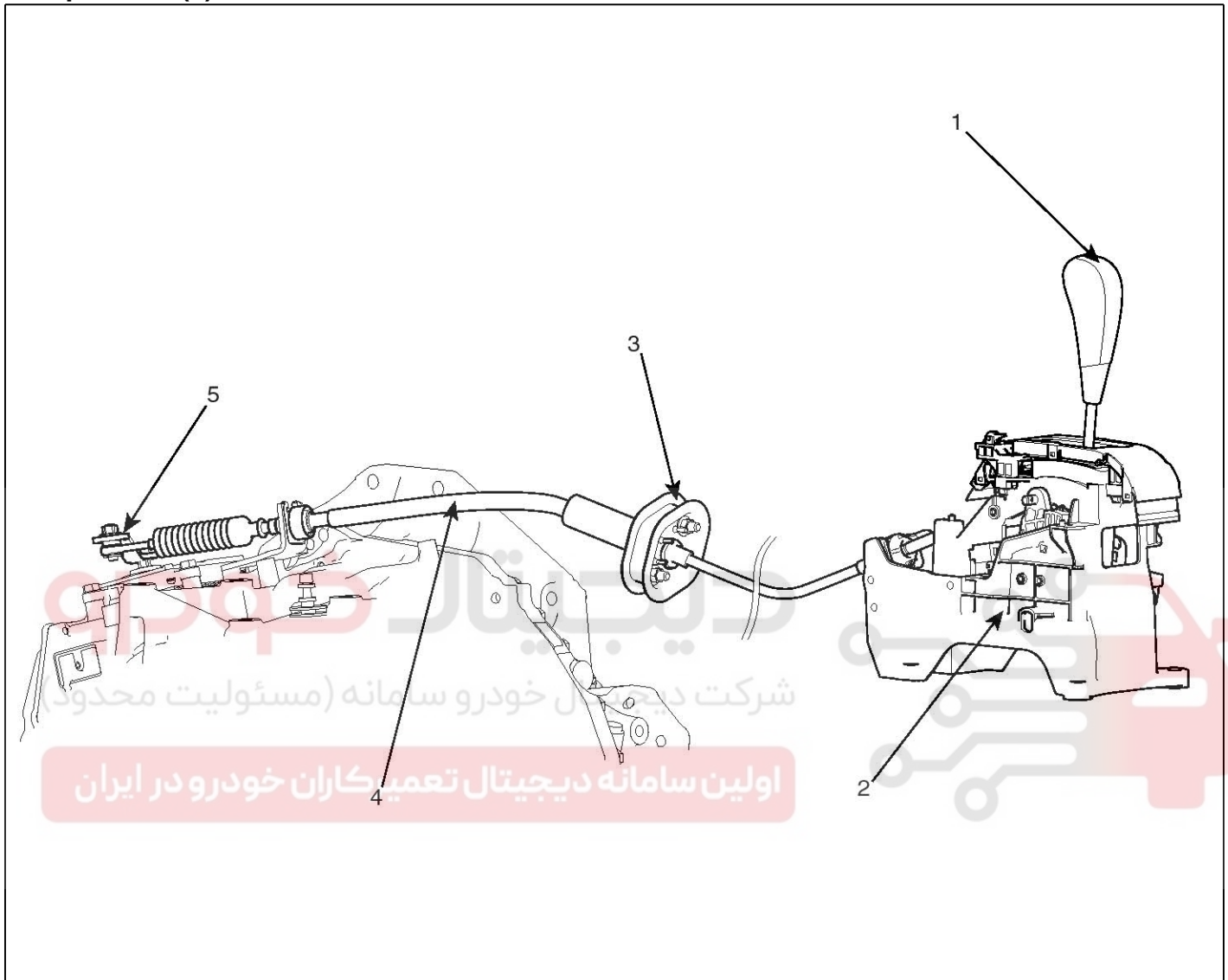
9. Refill the ATF. (refer to Procedure of Oil level adjusting)
10. Perform N position learning. (refer to Troubleshooting's 'How to perform N position learning')
11. Perform initial learning. (refer to Troubleshooting's 'How to perform initial learning')

AT-70

Automatic Transaxle System

Shift Lever

Components (1)



SENAT9002N

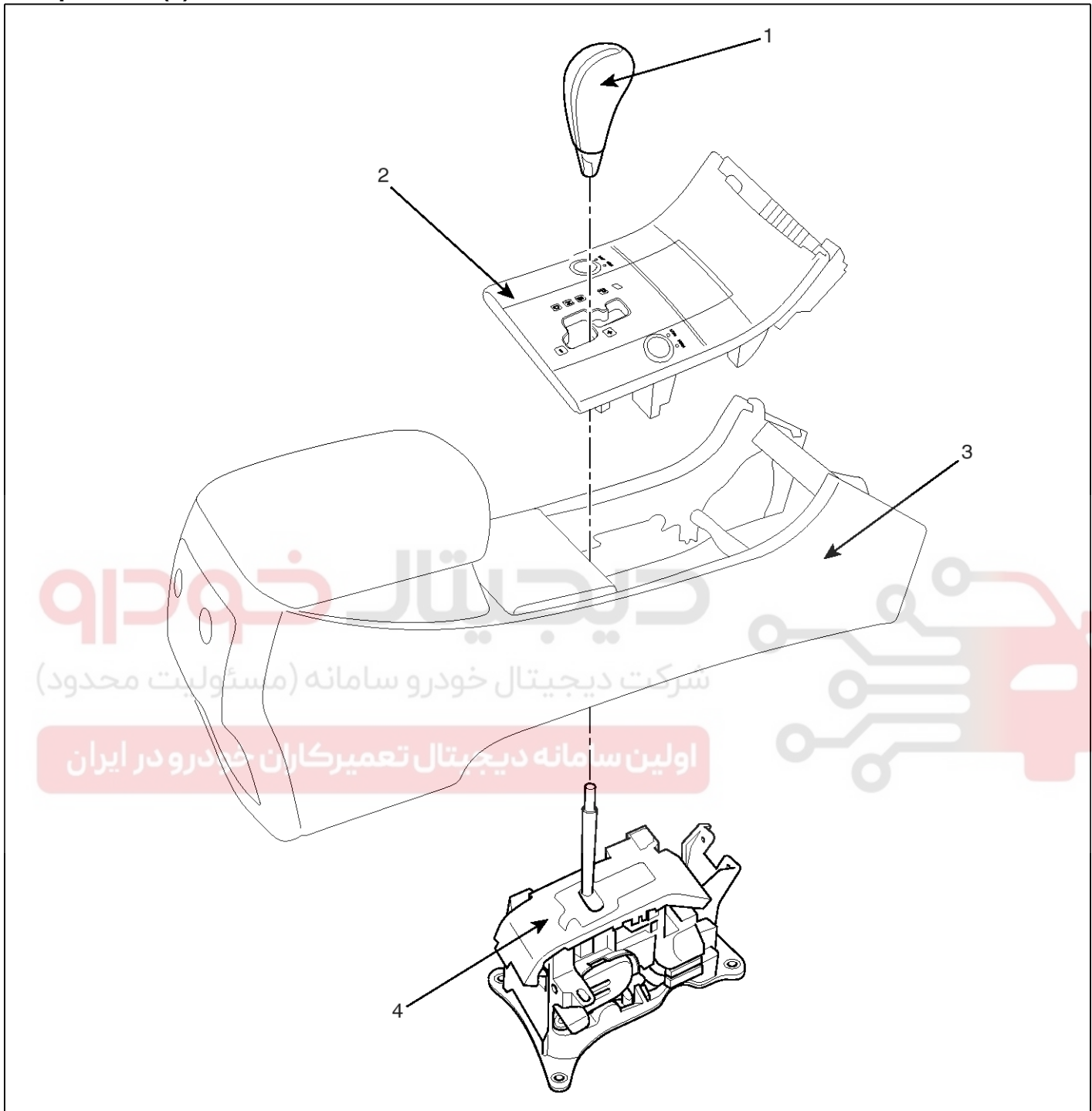
1. Shift lever knob
2. Shift lever assembly
3. Retainer

4. Shift cable assembly
5. Manual lever

Automatic Transaxle Control System

AT-71

Components (2)



SENAT9003N

1. Shift lever knob
2. Indicator assembly

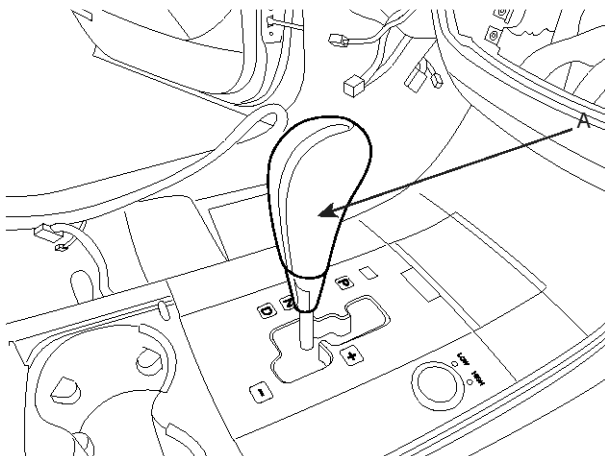
3. Center console
4. Shift lever assembly

AT-72

Automatic Transaxle System

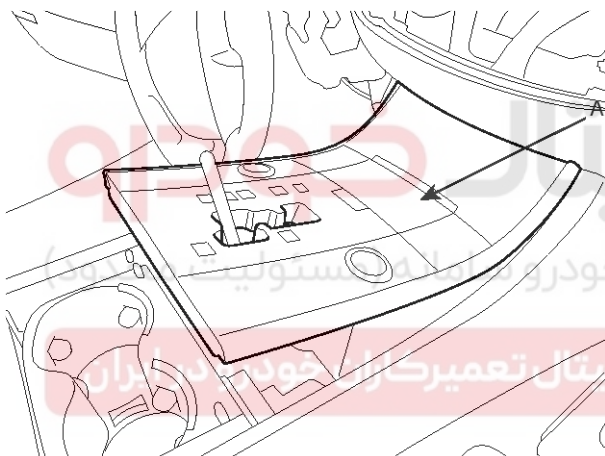
Removal

1. Remove the shift lever knob (A).



SENAT7042D

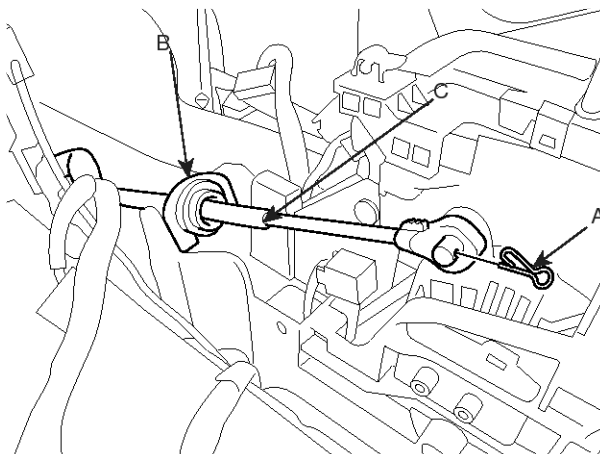
2. Remove the center console cover (A).



SENAT7043D

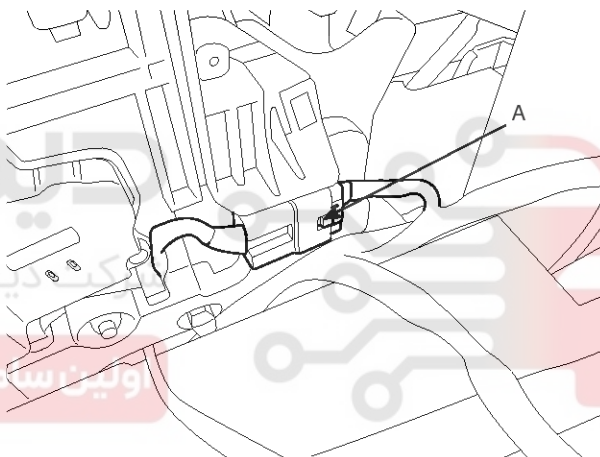
3. Remove the center console. (refer to Console in BD group)

4. Remove the shift cable assembly (C) by removing the clamp (A) and the snap pin (B).



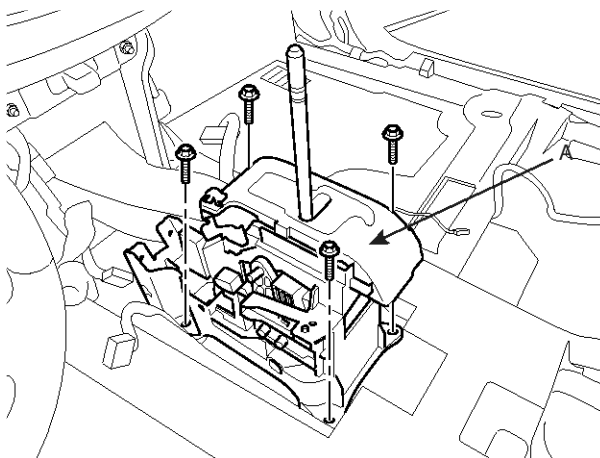
SENAT7044D

5. Disconnect the interlock switch connector (A).



SENAT7047D

6. Remove the shift lever assembly (A).

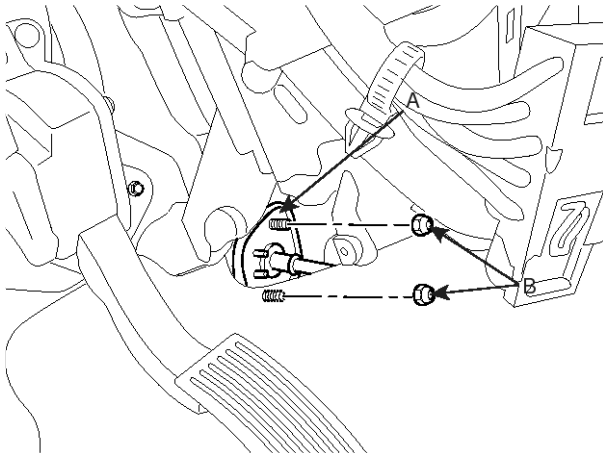


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7. Remove the retainer (A) and nuts (B).



SENAT7045D

NOTICE

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

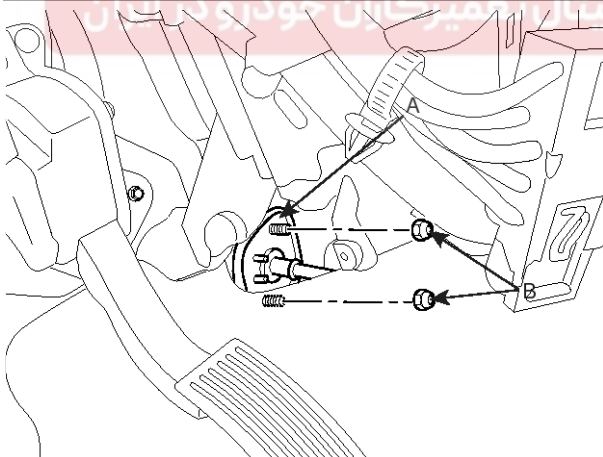
8. Remove the shift cable assembly from the transaxle. (refer to Automatic transaxle's removal)
9. Remove the shift cable assembly.

Installation

1. Install the retainer (A) and nuts (B).

Tightening torque :

12-15Nm (1.2-1.5kgf.m, 8.7-10.8lb-ft)



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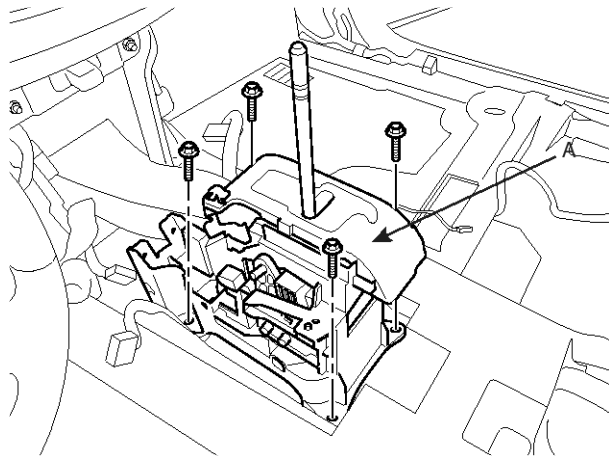
NOTICE

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

2. Install the shift lever assembly (A).

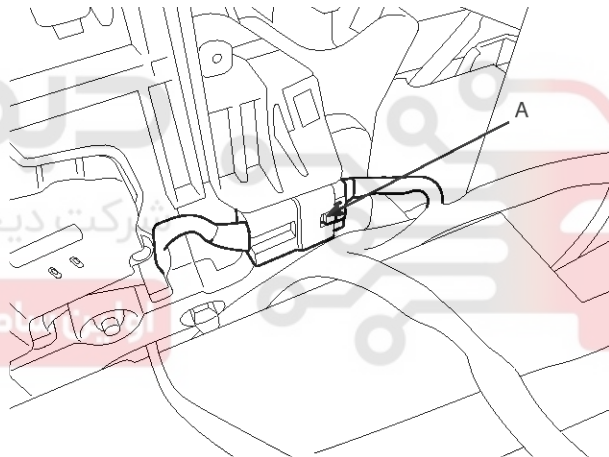
Tightening torque :

9-14Nm (0.9-1.4kgf.m, 6.5-10.1lb-ft)



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3. Connect the interlock switch connector (A).

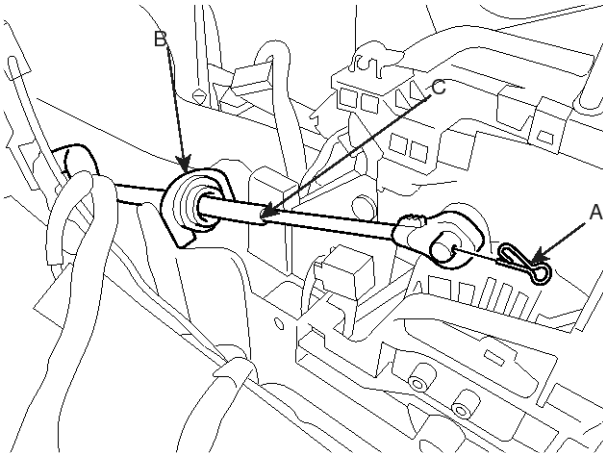


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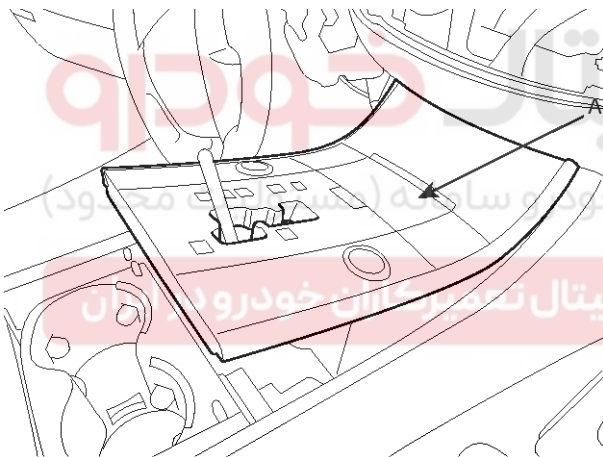
Automatic Transaxle System

4. Install the shift cable assembly (C) by installing the clamp (A) and the snap pin (B).



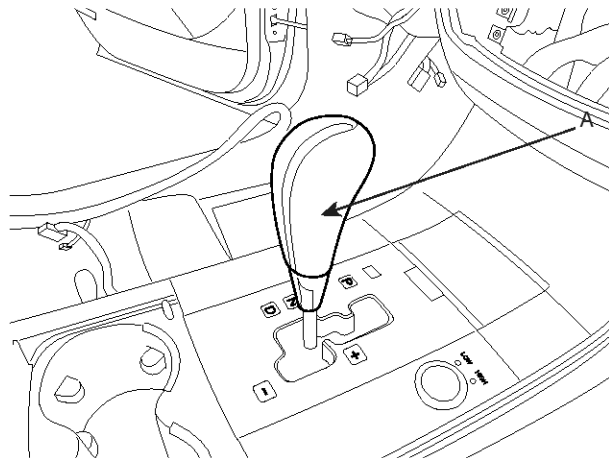
SENAT7044D

5. Install the center console. (refer to Console in BD group)
6. Install the center console cover (A).



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7. Install the shift lever knob (A).



SENAT7042D

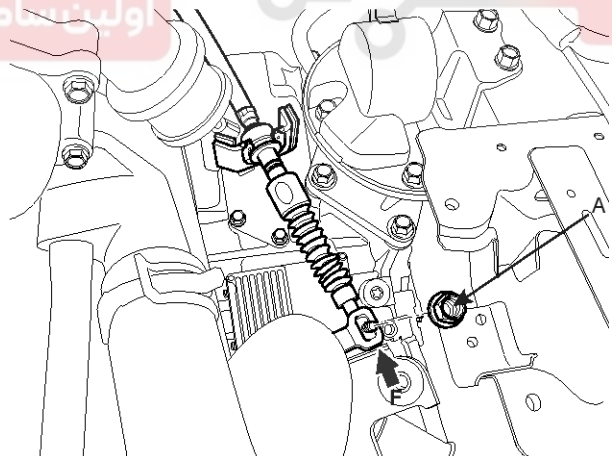
NOTICE

Before completing installation, adjust the shift cable referring to ADJUSTMENT section.

8. Install the shift cable assembly to transaxle. (refer to Automatic transaxle's installation)

Adjustment**Adjusting The Shift Cable**

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



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3. Tighten the adjusting nut (A).

Tightening torque :

10-14Nm (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.