GENESIS COUPE(BK) > 2013 > G 3.8 GDI > Automatic Transaxle System

Automatic Transaxle System > General Information > Specifications

Specifications

Item		Specifications
Transmission type		A8LR1
Engine model		Gasoline 3.8 GDI
Torque converter type		3-element, 1-stage, 2-phase type
Oil pump system		Internal gear type
Friction elements		Clutch: 4EA
		Brake: 2EA
		OWC : 1EA
Planetary gear		3EA
Gear ration	1st	3.964
	2nd	2.468
	3rd	1.61
	4th	1.176
	5th	1
	6th	0.832
	7th	0.652
	8th	0.565
	Reverse	2.273
Final gear ratio		4.181
Accumulator		6EA
Solenoid valve		9EA
Shift lever position		4 Range (P,R,N,D)
Oil filter		1EA

* VFS: Variable Force Solenoid

Sensors

Input Speed Sensor

Type: Hall effect sensor

Specifications

Operation condition (°C)°F		((-)40 ~ 150)) -40 ~ 302
Air gap(mm)in.		1.3(0.0512)
Output voltage (V)	High	1.4
	Low	0.7

Middle Speed Sensor

Type: Hall effect sensor

Specifications

Operation condition (°C)°F		((-)40 ~ 150)) -40 ~ 302
Air gap(mm)in.		1.3(0.0512)
Output voltage (V)	High	1.4
	Low	0.7

Output Speed Sensor

Type: Hall effect sensor

Specifications

Operation condition (°C)°F		((-)40 ~ 150)) -40 ~ 302
Air gap(mm)in.		1.3(0.0512)
Output voltage (V)	High	1.4
	Low	0.7

Oil Temperature Sensor

Type: Negative thermal coefficient type

Specifications

Temp.[(°C)°F]	**Resistance (kΩ)**
(-40)-40	139.5
(-20)-4.0	47.4
(0)32.0	18.6
(20)68.0	8.10
(40)104.0	3.80
(60)140.0	1.98
(80)176.0	1.08
(100)212.0	0.63
(120)248.0	0.38
(140)284.0	0.25
(150)302.0	0.16

Inhibitor Switch

Type: Combination of output signals from 4 terminals

Specifications

Power supply (V)	12
Output type	Pin to Pin

Solenoid Valves

Direct control VFS[UD/C, 27/B, 6/C]

Control type : Normal low type

Control Pressure kpa (kgf/cm², psi)	0 ~ 1569.06 (0 ~ 16,0 ~ 227.57)
Current value (mA)	0 ~ 1100
Internal resistance (Ω)	5.0 ~ 5.6

Direct control VFS[8LR/B]

Control type : Normal low type

Control Pressure kpa (kgf/cm², psi)	0 ~ 2108.42 (0 ~ 21.5 ~ 305.80)
Current value (mA)	0 ~ 1100
Internal resistance (Ω)	5.0 ~ 5.6

Direct control VFS[4&OD/C]

Control type : Normal high type

Control Pressure kpa (kgf/cm², psi)	0 ~ 1569.06 (0 ~ 16,0 ~ 227.57)
Current value (mA)	0 ~ 1100
Internal resistance (Ω)	5.0 ~ 5.6

Direct control VFS[35R/C]

Control Type : Normal high type

Control Pressure kpa (kgf/cm², psi)	0 ~ 2108.42 (0 ~ 21.5 ~ 305.80)
Current value (mA)	0 ~ 1100
Internal resistance(Ω)	5.0 ~ 5.6

Line Pressure Control VFS

Control type : Normal high type

Control Pressure kpa (kgf/cm², psi)	0 ~ 500.14 (0 ~ 5.1,0 ~ 72.54)
Current value (mA)	0 ~ 850
Internal resistance (Ω)	4.8 ~ 5.4

Damper Clutch Control VFS

Control type : Normal low type

Control Pressure kpa (kgf/cm², psi)	0 ~ 500.14 (0 ~ 5.1, 0 ~ 72.54)
Current value (mA)	0 ~ 850
Internal resistance (Ω)	4.8 ~ 5.4

ON/OFF Solenoid Valve

Control type : Normal low type

Control pressure kpa (kgf/cm², psi)	539.36 (5.5, 78.23)
Internal resistance (Ω)	10 ~ 11

Solenoid Valve Operation Table

	UD/C	4&OD/C	35R/C	27/B	8LR/B	6/C	ON/OFF
P		O		O			O
N		O	O		O		O
1	O	O	O				
2	O	O	O	O			
3	O	O					
4	O		O				
5							
6			O			O	
7			O	O			
8			O		O		
LOW	O	O	O		O		
REV		O			O		O

O : Connected status

Tightening Torques

Item	N.m	Kgf.m	lb-ft
TCM installation mounting bolt	9.8 ~ 11.8	1.0 ~ 1.2	7.2 ~ 8.7
Shift lever assembly bolt	8.8 ~ 13.7	0.9 ~ 1.4	6.5 ~ 10.1
Inhibitor switch mounting bolt	9.8 ~ 11.8	1.0 ~ 1.2	7.2 ~ 8.7
Oil drain plug	22.6 ~ 24.5	2.3 ~ 2.5	16.6 ~ 18.1
Oil check plug	22.6 ~ 24.5	2.3 ~ 2.5	16.6 ~ 18.1
Torque converter mounting bolt	45.1 ~ 52.0	4.6 ~ 5.3	33.3 ~ 38.3
Automatic transaxle upper mounting bolt (TM=>Eng)	63.7 ~ 83.4	6.5 ~ 8.5	47.0 ~ 61.5
	34.3 ~ 46.1	3.5 ~ 4.7	25.3 ~ 34.0
Automatic transaxle lower mounting bolt (Eng=>TM)	42.2 ~ 48.1	4.3 ~ 4.9	31.1 ~ 35.4
Stater motor mounting bolt	49.0 ~ 63.7	5.0 ~ 6.5	36.2 ~ 47.0
Stater motor mounting nut	42.2 ~ 53.9	4.3 ~ 5.5	31.1 ~ 39.8

Lubricants

Item	Specified lubricant	Quantity
Transaxle fluid	GS CALTEX ATF SP-IV-RR Hyundai Genuine ATF SP-IV-RR	9.6L (2.535 U.S gal., 10.14 U.S.qt., 8.45 Imp.qt.)

Automatic Transaxle System > Automatic Transaxle System > Repair procedures

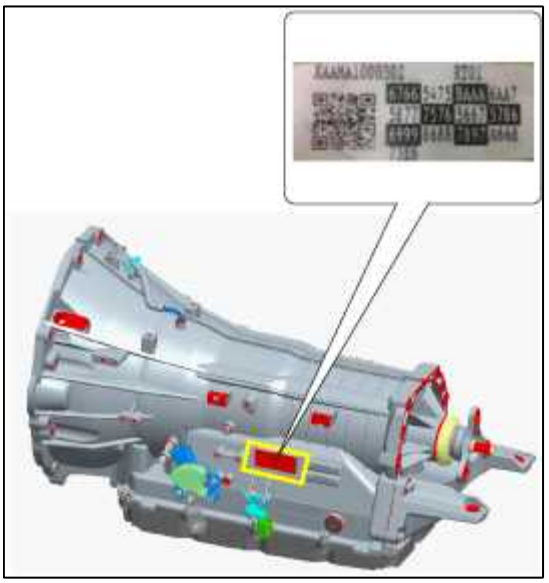
EOL Input

Description

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

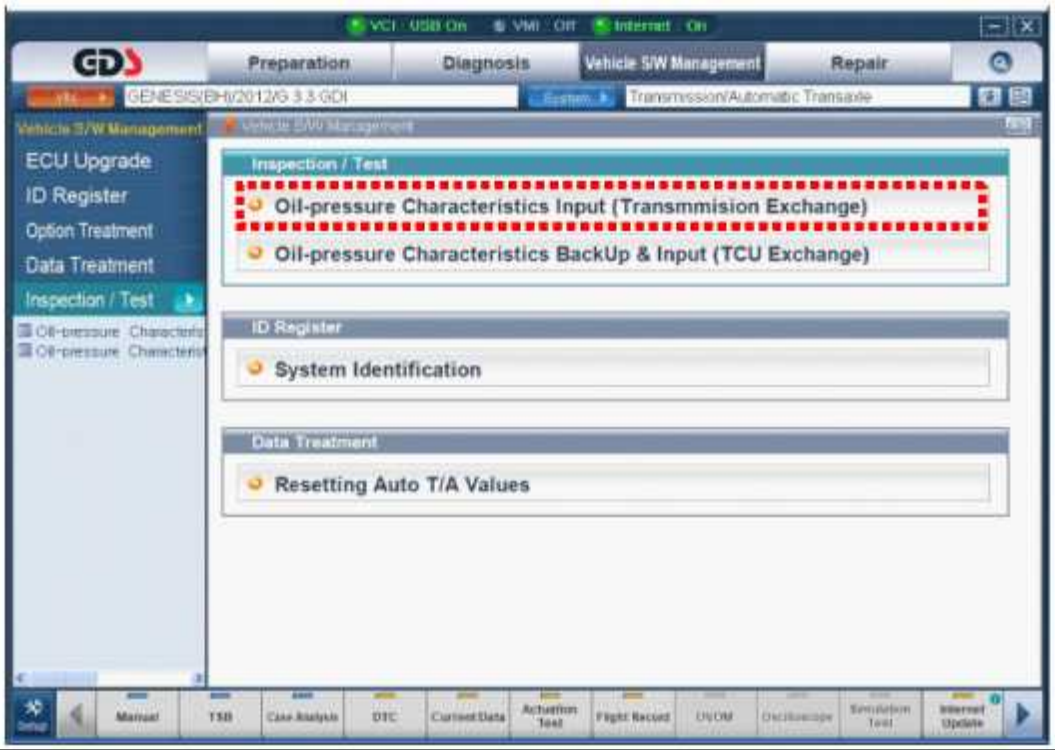
- Transaxle assembly replacement
- TCM replacement

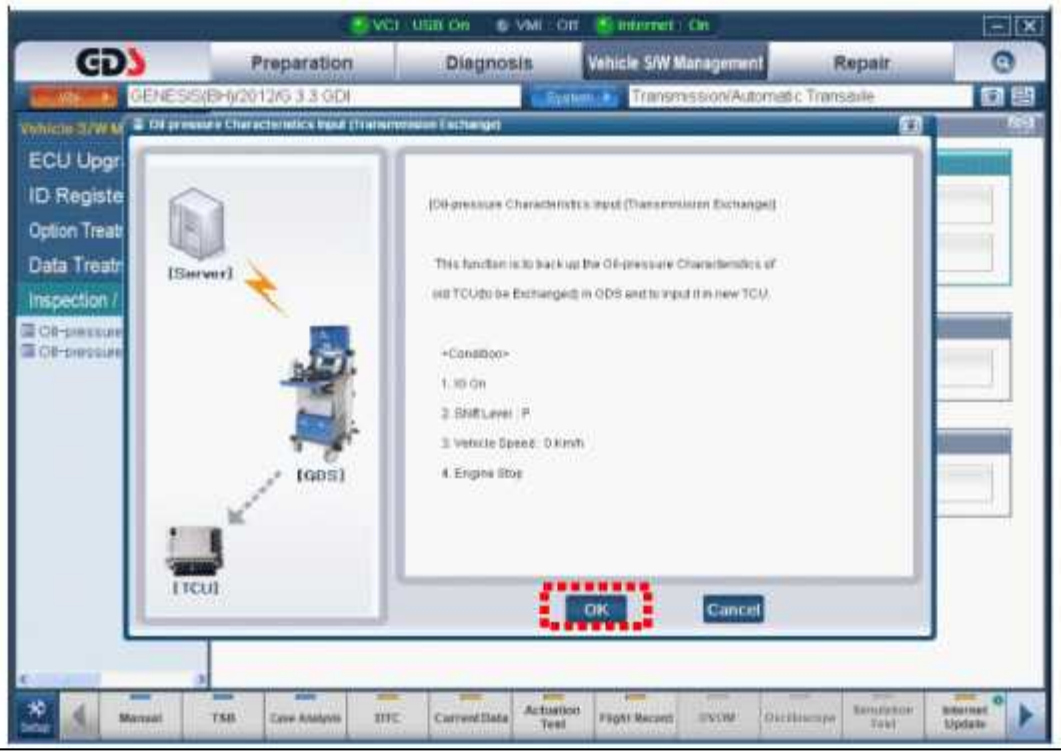
Bar code location



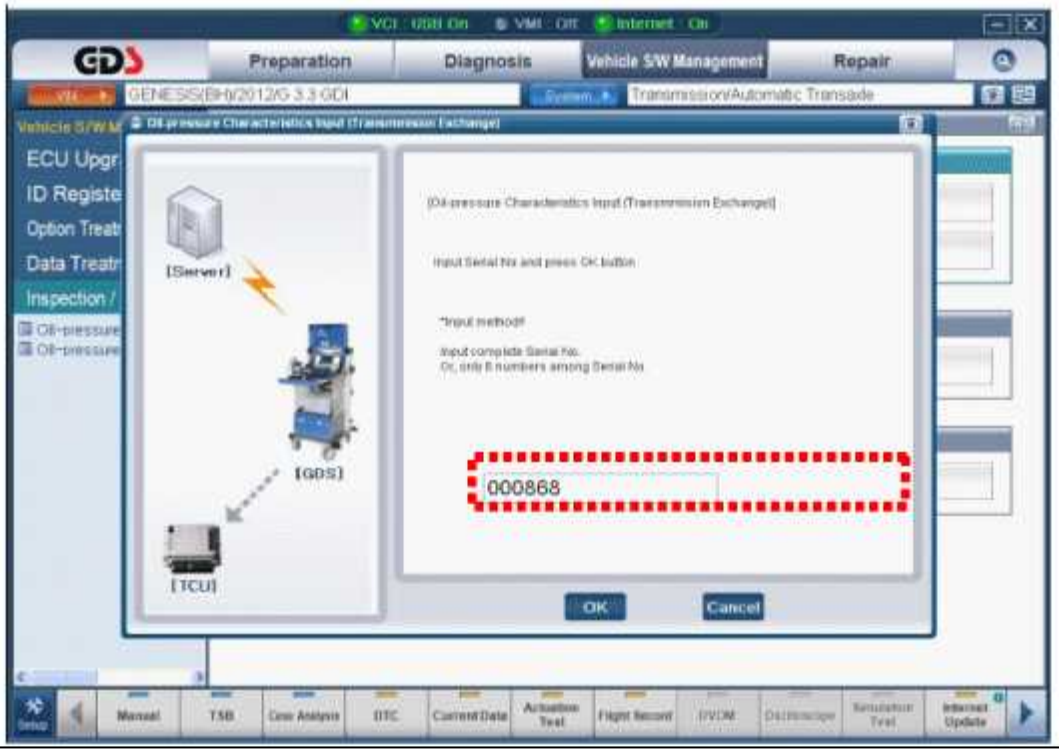
EOL Input procedure

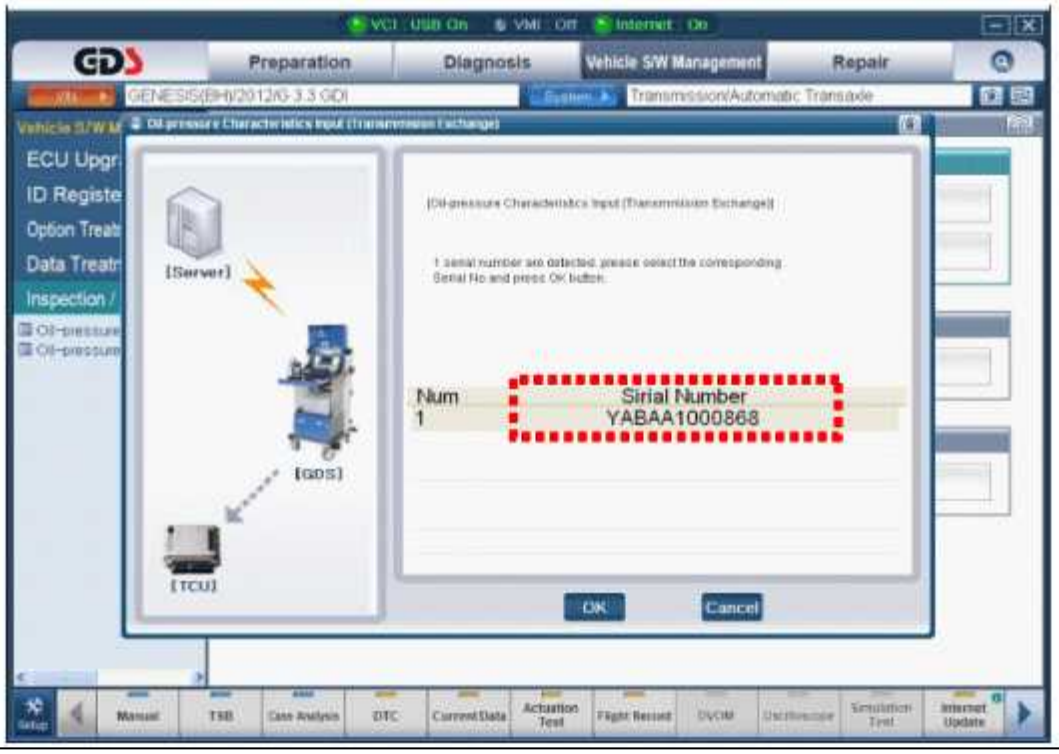
- Transaxle assembly replacement


Preparation
Diagnosis
Vehicle S/W Management
Repair
ECU Upgrade
ID Register
Option Treatment
Data Treatment
Inspection / Test
Oil-pressure Characteristics Input (Transmmision Exchange)
Oil-pressure Characteristics BackUp & Input (TCU Exchange)
System Identification
Resetting Auto T/A Values


Preparation
Diagnosis
Vehicle S/W Management
Repair
[Server]
[GDS]
[TCU]
OK
Cancel

Internet :On





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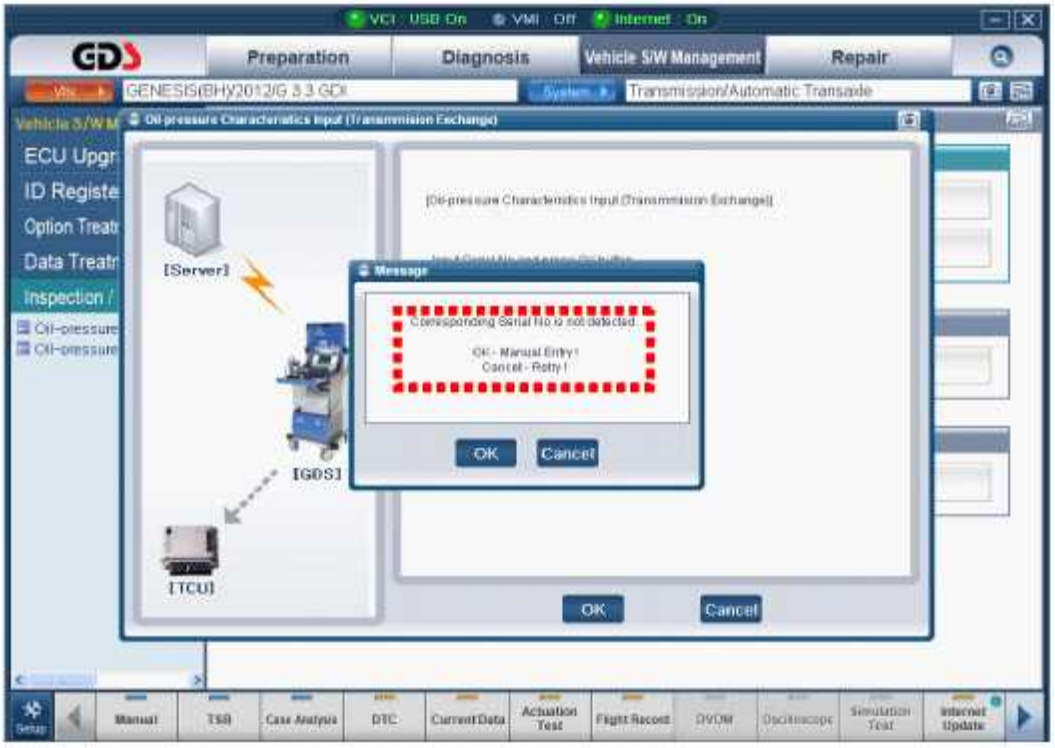
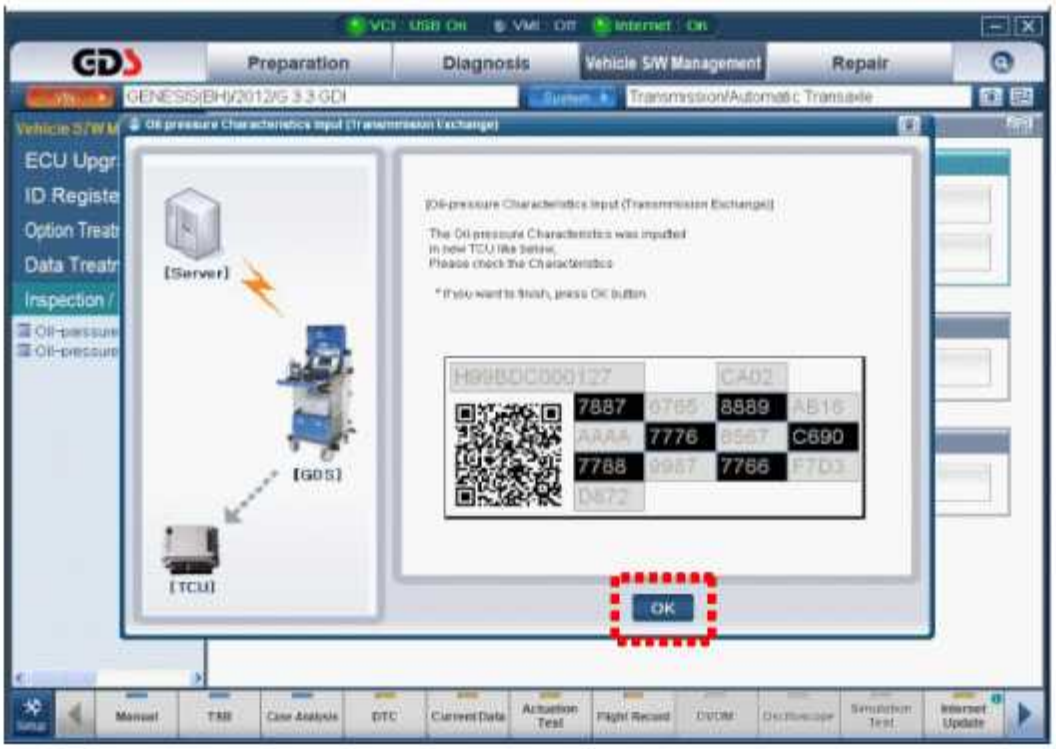
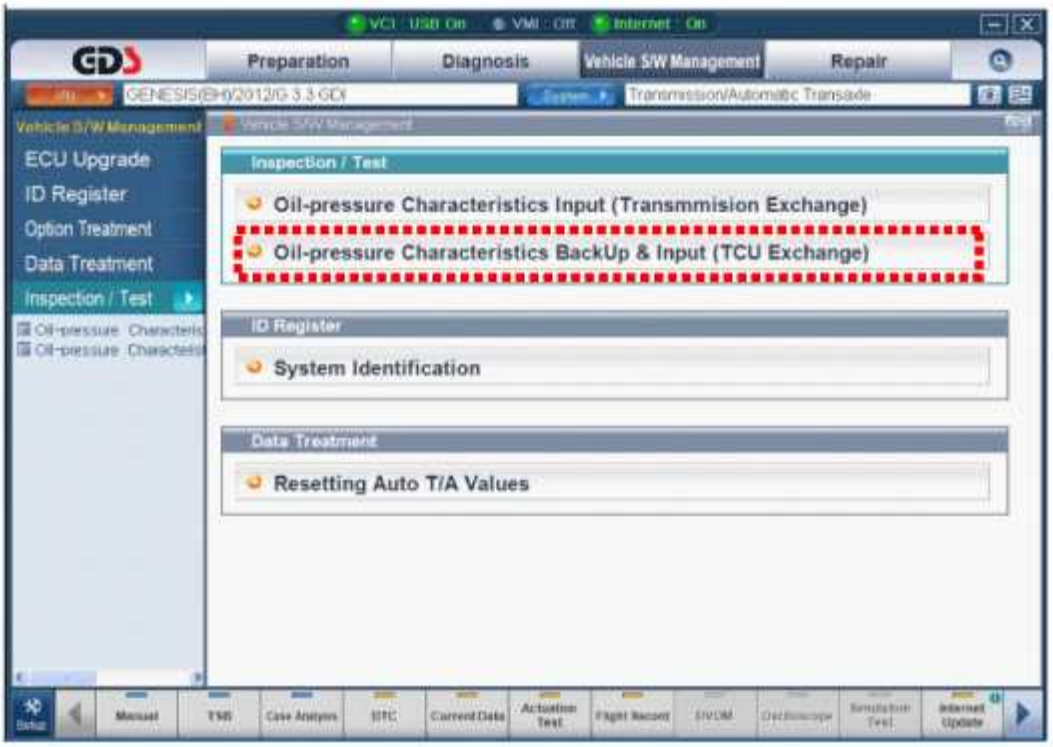
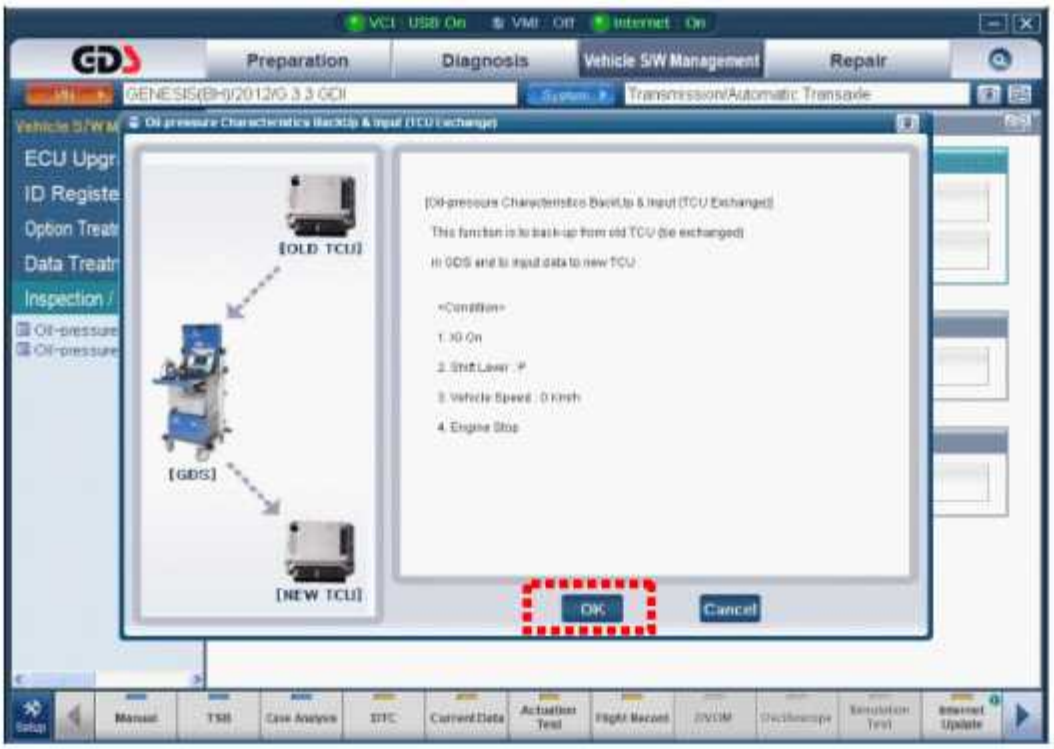
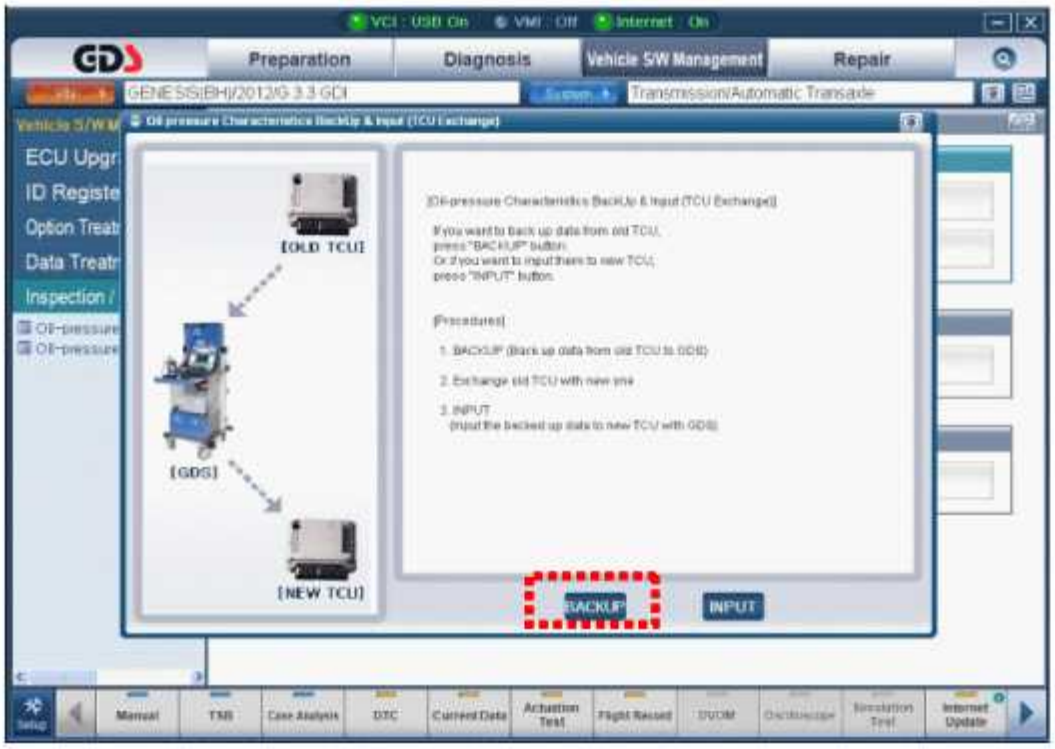


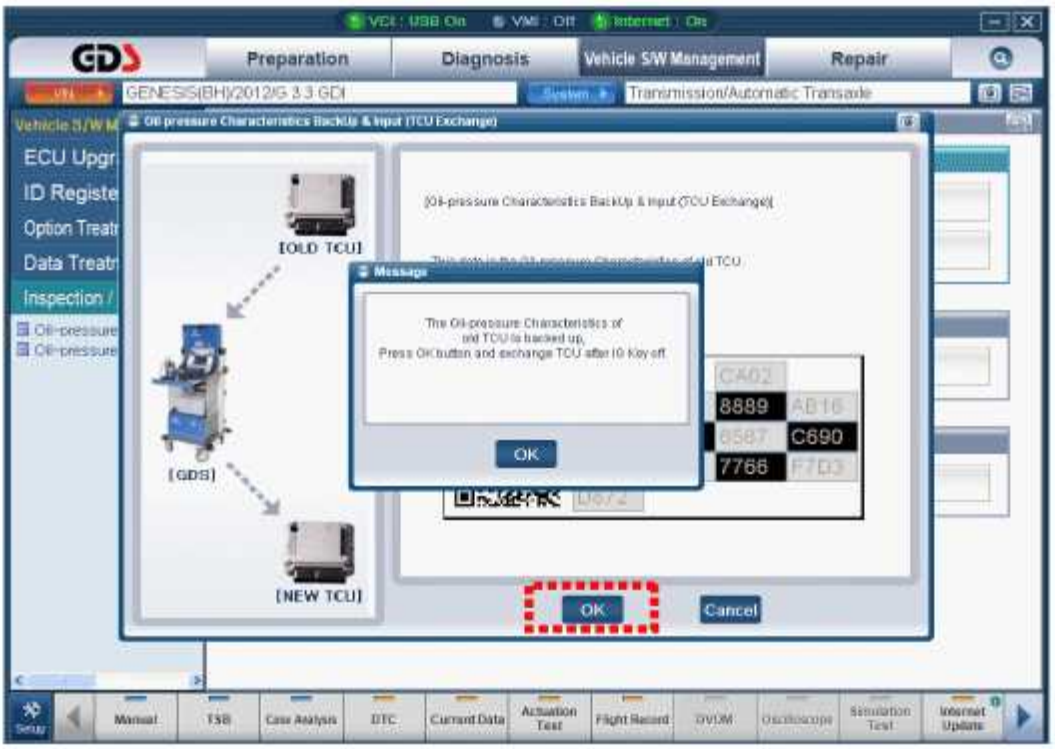


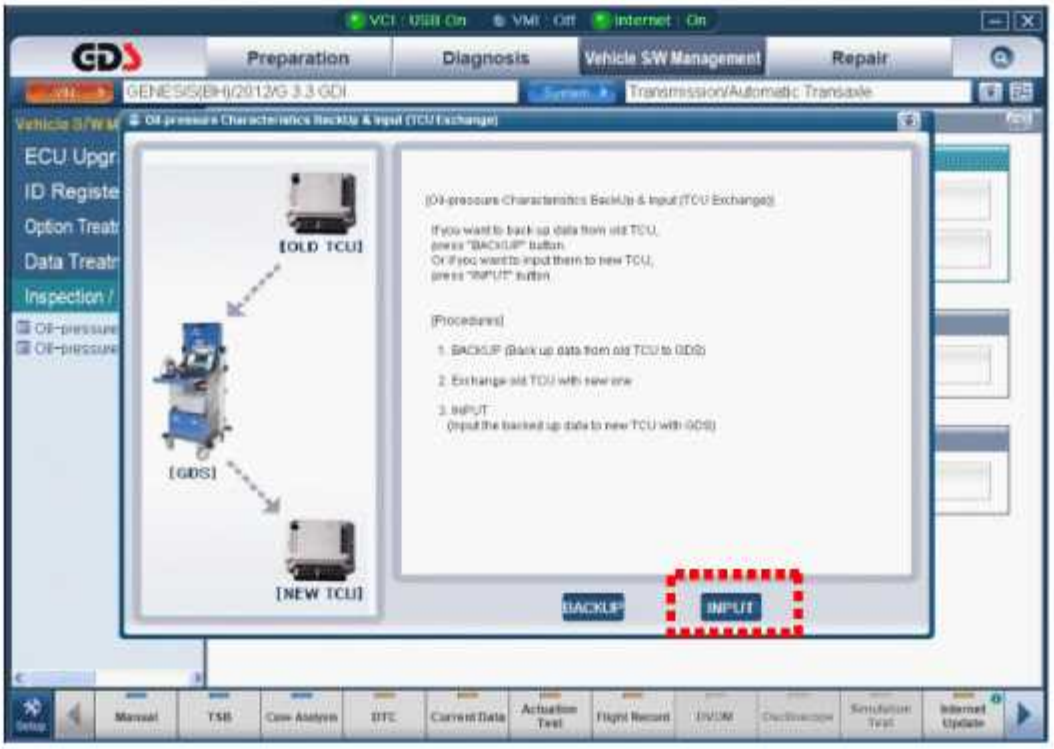
• TCM replacement

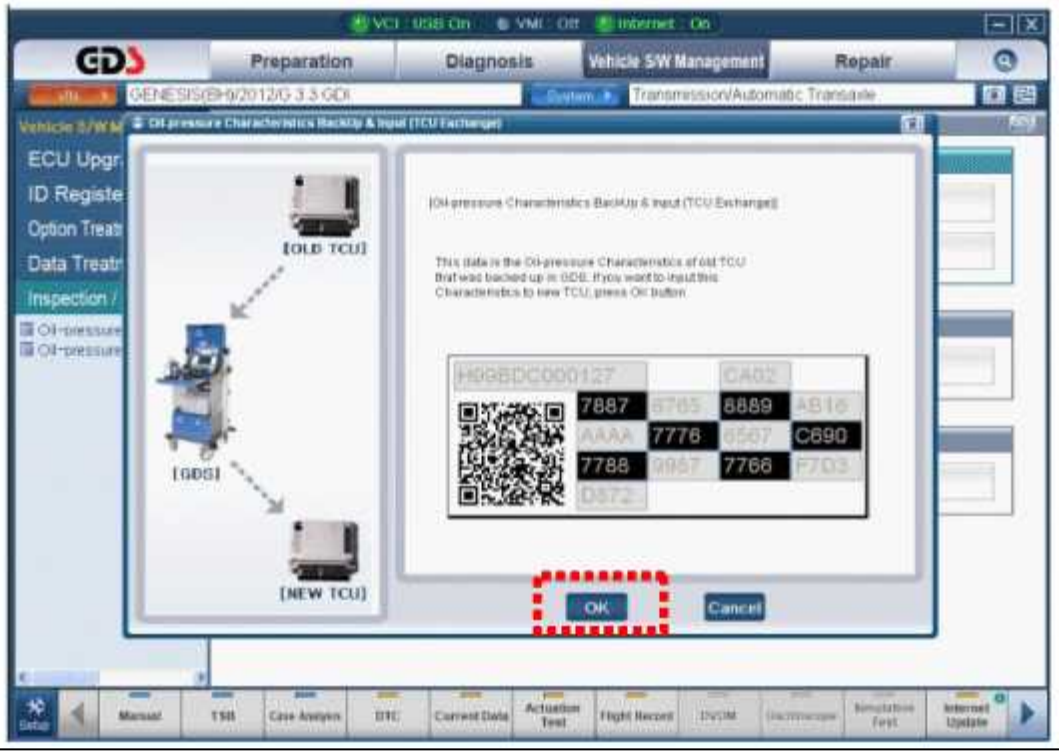

VCI : USB On
VMI : Off
Internet : On
Preparation
Diagnosis
Vehicle S/W Management
Repair
GENESIS(BH)/2012/G 3.3 GDI
Transmission/Automatic Transaxle
Vehicle S/W Management
ECU Upgrade
ID Register
Option Treatment
Data Treatment
Inspection / Test
Inspection / Test
Oil-pressure Characteristics Input (Transmmision Exchange)
Oil-pressure Characteristics BackUp & Input (TCU Exchange)
ID Register
System Identification
Data Treatment
Resetting Auto T/A Values

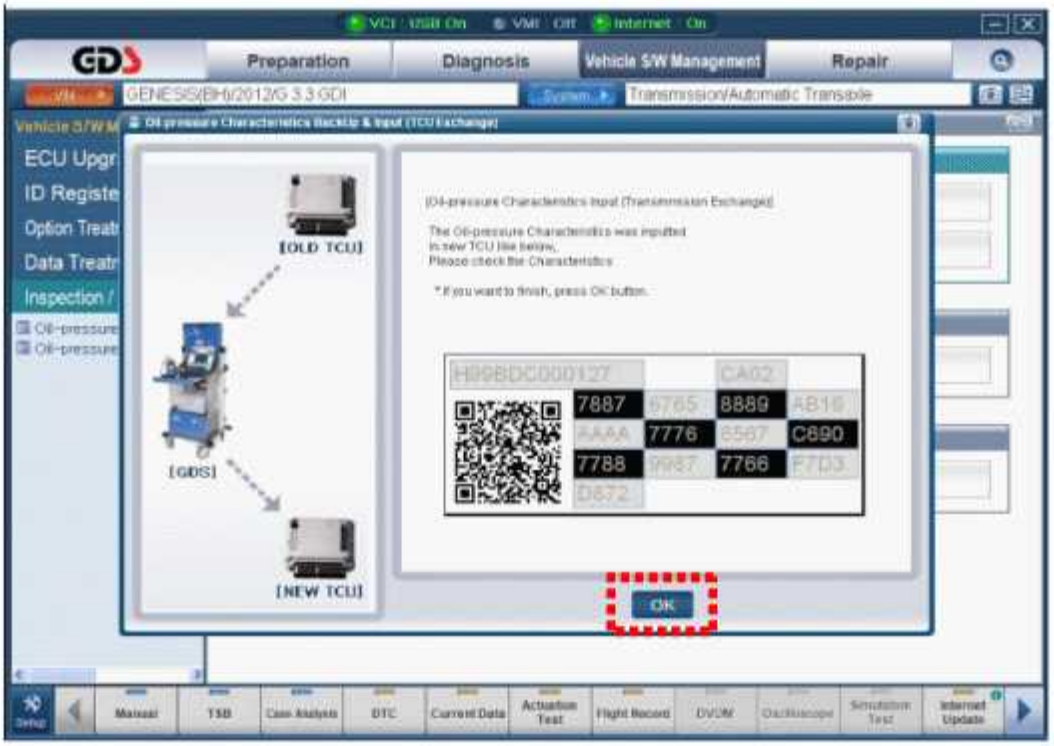

Preparation
Diagnosis
Vehicle S/W Management
Repair
[OLD TCU]
[GDS]
[NEW TCU]
OK
Cancel


VCI : USB On
VMI : Off
Internet : On
Preparation
Diagnosis
Vehicle S/W Management
Repair
GENESIS(BH)/2012/G 3.3 GDI
Transmission/Automatic Transaxle
Oil-pressure Characteristics Backup & Input (TCU Exchange)
ECU Upgr
ID Registe
Option Treat
Data Treatr
Inspection /
Oil-pressure
Oil-pressure
[OLD TCU]
[GDS]
[NEW TCU]
[Oil-pressure Characteristics BackUp & Input (TCU Exchange)]
If you want to back up data from old TCU,
press "BACKUP" button.
Or if you want to input them to new TCU,
press "INPUT" button.
[Procedures]
1. BACKUP (Back up data from old TCU to GDS)
2. Exchange old TCU with new one
3. INPUT
(Input the backed up data to new TCU with GDS)
BACKUP
INPUT
Manual
TSB
Case Analysis
DTC
Current Data
Actuation Test
Flight Record
DVOM
Oscilloscope
Simulation Test
Internet Update


VCI : USB On
VMI : Off
Internet : On
Preparation
Diagnosis
Vehicle S/W Management
Repair
GENESIS(BH)/2012/G 3.3 GDI
Transmission/Automatic Transaxle
Oil-pressure Characteristics Backup & Input (TCU Exchange)
ECU Upgr
ID Registe
Option Treat
Data Treatr
Inspection /
Oil-pressure
Oil-pressure
[OLD TCU]
[GDS]
[NEW TCU]
[Oil-pressure Characteristics BackUp & Input (TCU Exchange)]
Message
This Oil-pressure Characteristics of
old TCU is backed up.
Press OK button and exchange TCU after IG Key off.
OK
C402
8889
A016
C690
7766
F7D3
OK
Cancel
Manual
TSB
Case Analysis
DTC
Current Data
Actuation Test
Flight Record
DVOM
Oscilloscope
Simulation Test
Internet Update

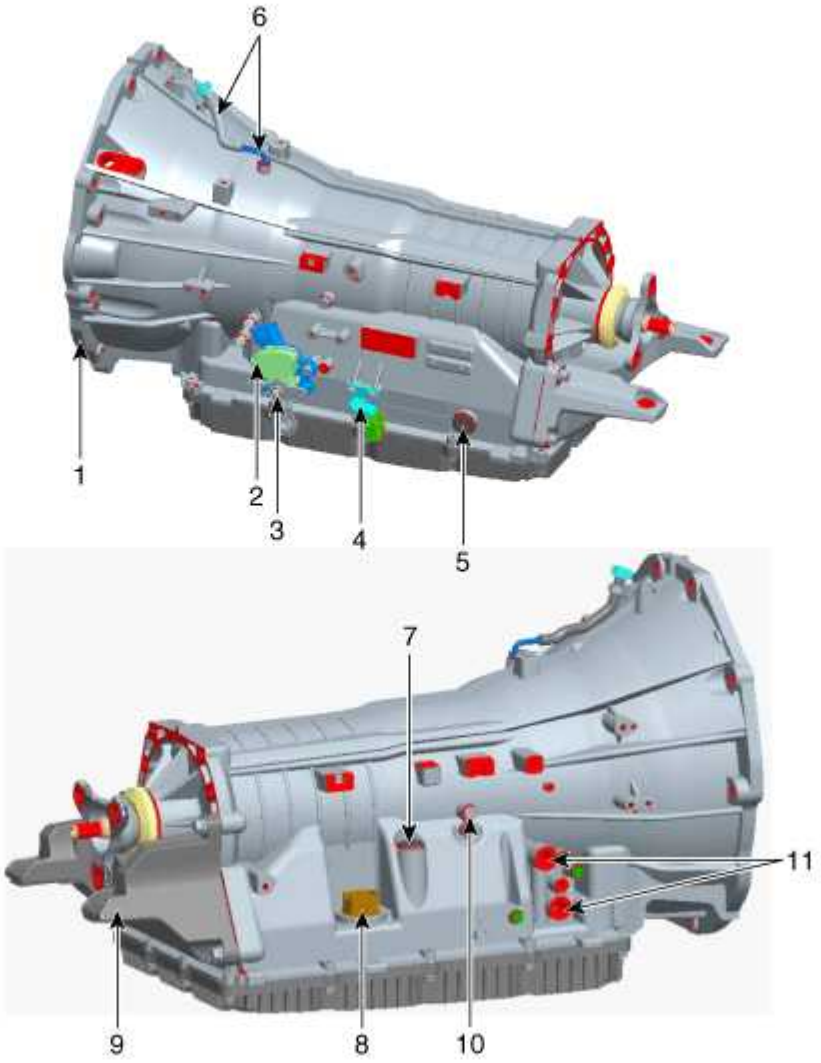






Automatic Transaxle System > Automatic Transaxle System > Automatic Transaxle > Components and Components Location

Components Location



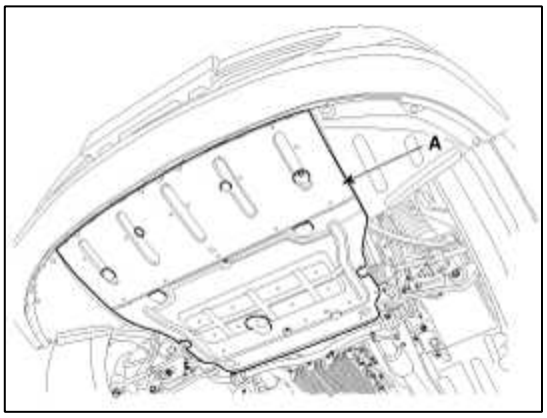
1. Automatic transmission case 2. Inhibitor switch 3. Manual control lever 4. Shift cable bracket 5. Oil injection hall 6. Air breather hose & pipe	7. Oil injection hall (in factory) 8. E Module connector 9. Support bracket 10. Check plug 11. Oil cooler port

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

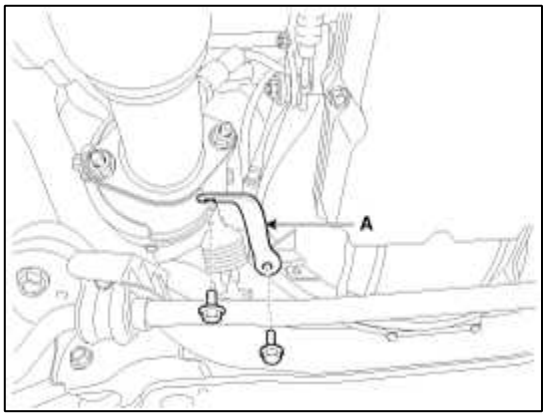
Removal

1. Disconnect (-) terminal from the battery.

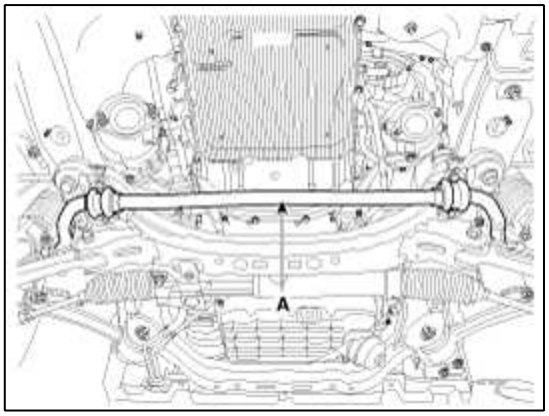
2. Remove the under cover (A).



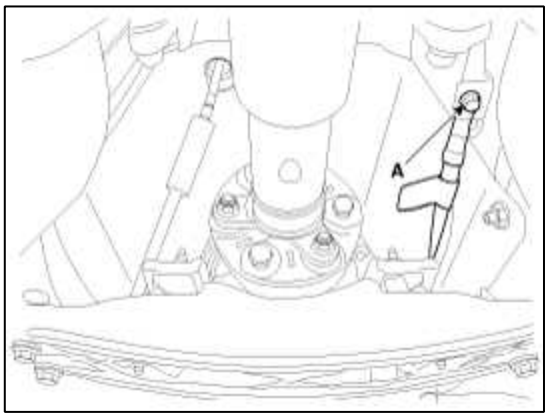
3. Remove the stay (A).



4. Remove the front stabilizer bar (A).
(Refer to "front suspension system"in SS group)



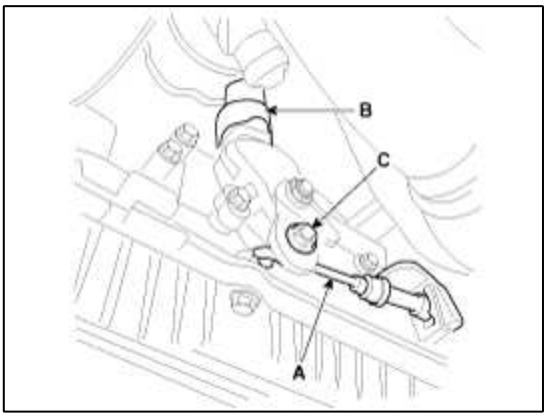
5. Disconnect the ground wire (A) by removing the bolt.



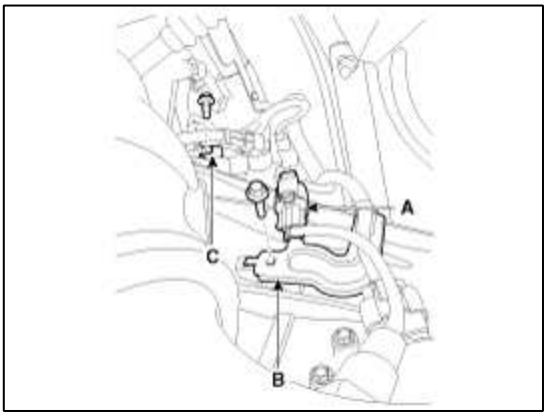
6. Remove the propellar shaft assembly.
(Refer to "Propellar shaft" in DS group)

7. Disconnect the inhibitor connector (B) and then remove the shift cable (A) by removing nut (C).

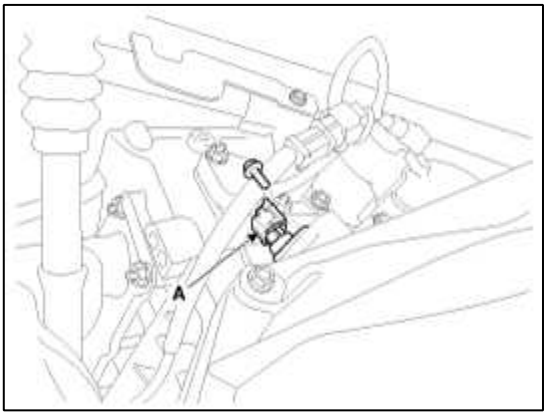
Tightening torque :
13.7 ~ 17.7 N.m (1.4 ~ 1.8 kgf.m, 10.1 ~ 13.0 lb-ft)



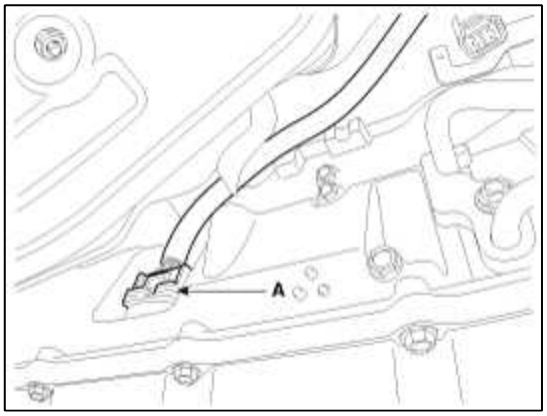
8. Disconnect the oxygen sensor (A) and then remove the wiring bracket (B,C).



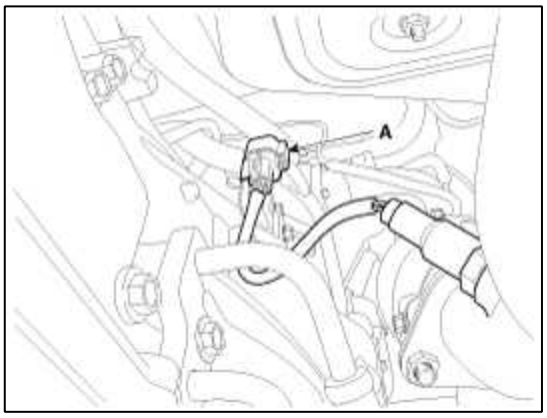
9. Remove the CKP sensor (A).



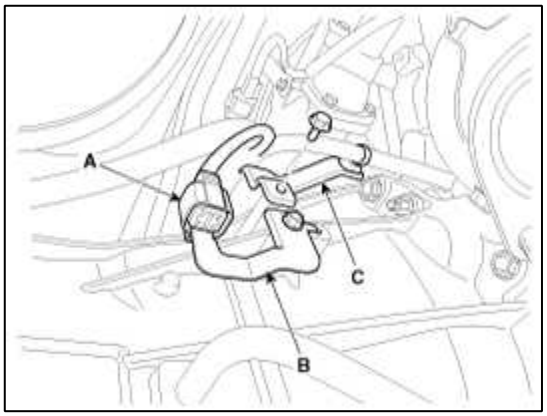
10. Disconnect the solenoid valve connector (A).



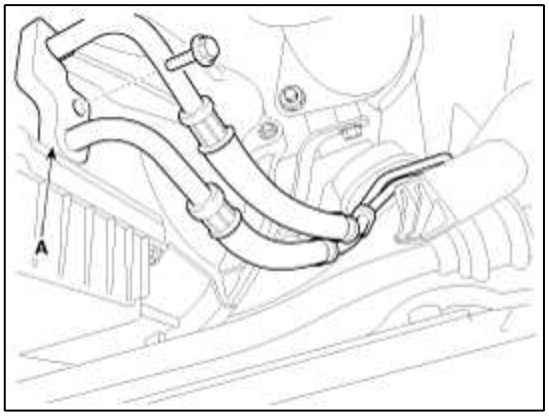
11. Disconnect the oxygen sensor (A).



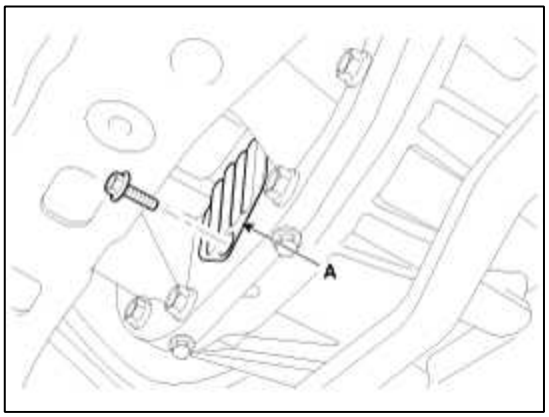
12. Remove the oxygen sensor (A) from the bracket (B) and then remove the bracket (C).



13. Remove the oil cooler tubes (A).

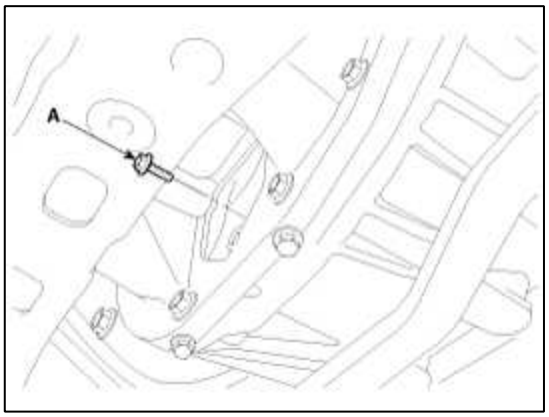


14. Remove the dust cover (A).



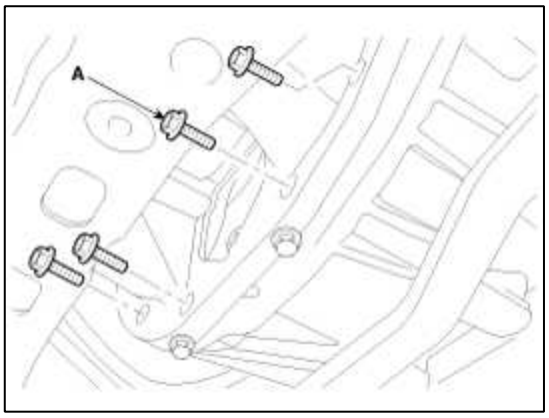
15. Remove the torque converter mounting bolts (A-6ea) by rotating the crank shaft.

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



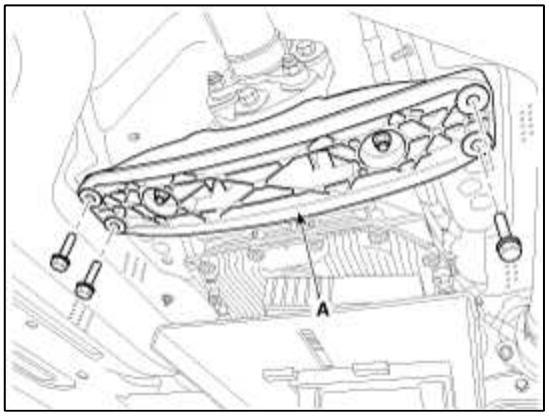
16. Using a jack support the transmission assembly.
17. Remove the mounting bolts (A-4ea) lower in the engine side.

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



18. Remove the cross member (A) by removing bolts.

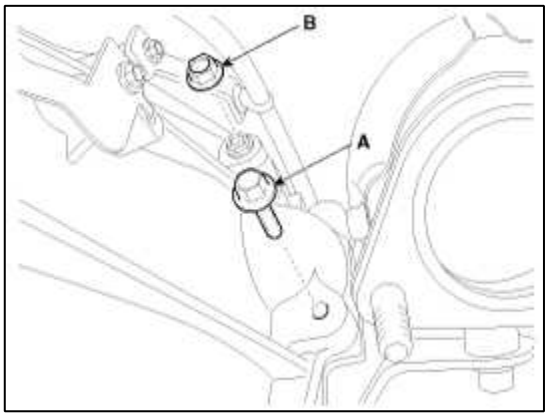
Tightening torque :
49.0 ~ 63.7 N.m (5.0 ~ 6.5 kgf.m, 36.2 ~ 47.0 lb-ft)



19. Remove the starter motor mounting bolts (A) and nut (B).

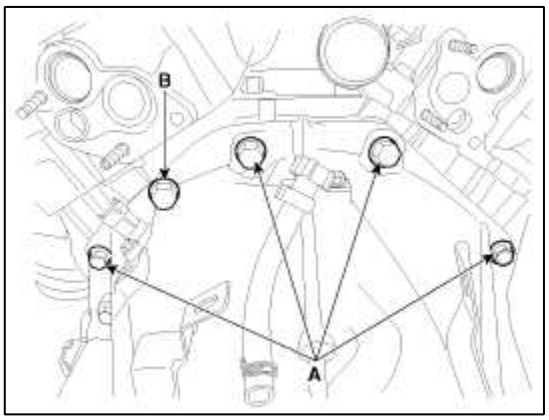
> NOTE
>
> Before removing one mounting bolt on the transmission side and the other bolt for the starter motor, remove the cross member and lower the transmission assembly.

Tightening torque :
(A) 50 ~ 65 N.m (5.0 ~ 6.5 kgf.m, 36.2 ~ 47.0 lb-ft)
(B) 42.2 ~ 53.9 N.m (4.3 ~ 5.5 kgf.m, 31.1 ~ 39.8 lb-ft)



20. Remove the mounting bolts (A-3 ea, B-1ea) on the transmission side.

Tightening torque:
[A] 65 ~ 85 N.m (6.5 ~ 8.5 kgf.m, 47.0 ~ 61.5 lb-ft)
[B] 35 ~ 47 N.m (3.5 ~ 4.7 kgf.m, 25.3 ~ 34.0 lb-ft)



21. Remove the tansmission assembly by lowering the supporting jack.

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

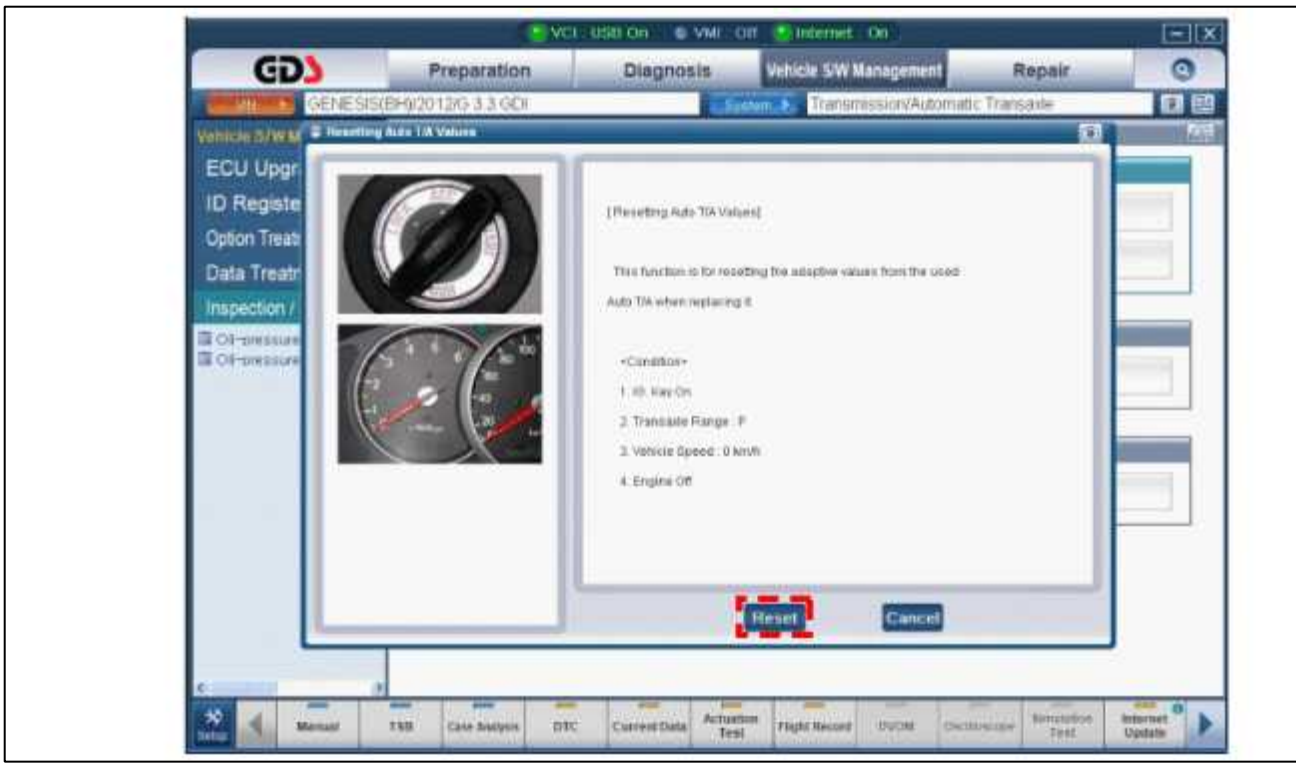
Installation

1. Installation is the reverse of removal.

NOTE

After replacement or reinstallation procedure of the automatic transmission assembly, perform the procedures b

- Adding automatic transmission fluid. (Refer to "automatic transmission system" in this group.)
- After servicing the automatic transmission or TCM, clear the diagnostic trouble codes (DTC) using the GDS
  Diagnostic trouble codes (DTC) cannot be cleared by disconnecting the battery.
  When deleting diagnostic trouble code, use the GDS.
- When replacing the automatic transmission, reset the automatic transmissions values by using the GDS.
- After exchanging automatic transmission, input the EOL(End of line).
  (Refer to "Repair procedures" in this group)
- Perform TCM learning after replacing the transmission to prevent slow transmission response, jerky accelera
  jerky startup. (Refer to "Automatic transmission control system (Repair procedures)" in this group)



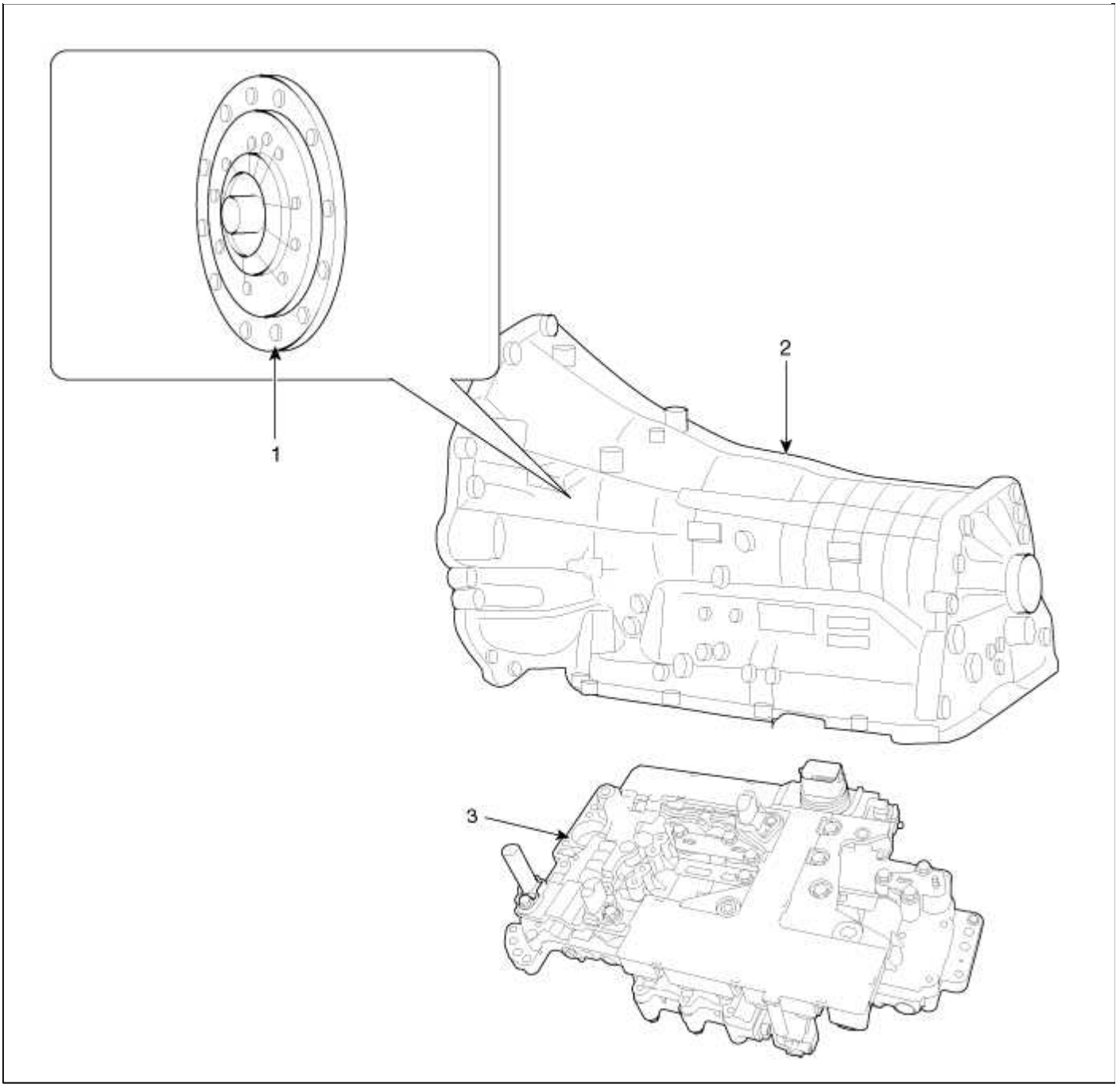
Automatic Transaxle System > Hydraulic System > Description and Operation

Description

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

Automatic Transaxle System > Hydraulic System > Components and Components Location

Components Location



1. Oil pump assembly 2. Automatic transmission	3. Valve body assembly 4. Oil pan

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

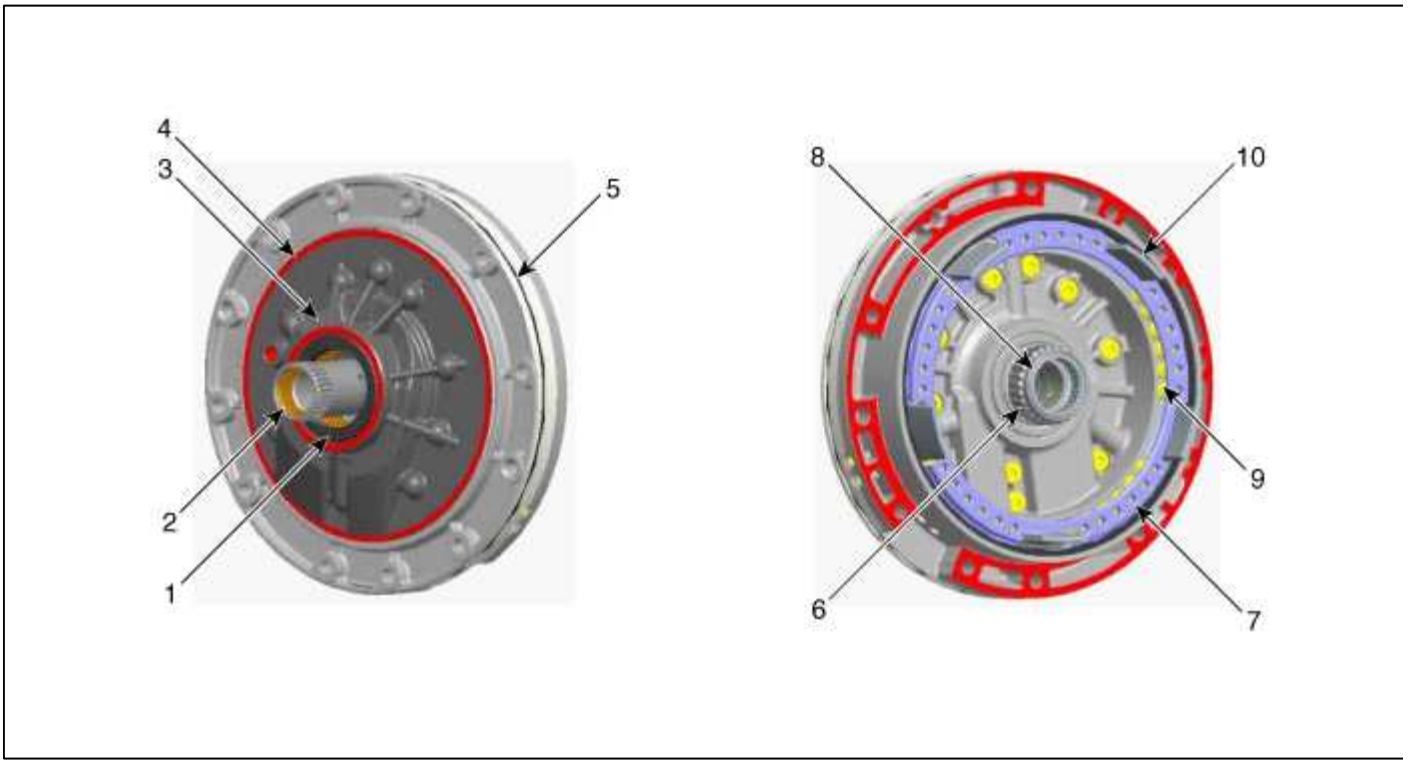
Description

The oil pump rotation builds the hydraulic pressure needed for the lubrication of the various parts of the automatice transmission and operation of the clutch and brakes.

The oil also circulates through the torque converter and the cooler.

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

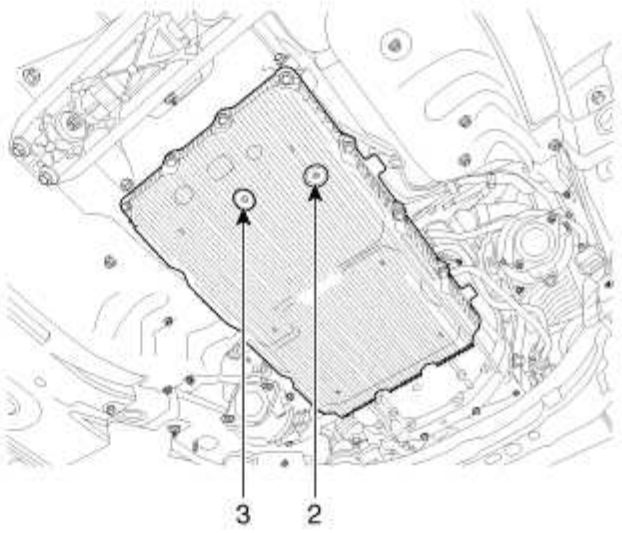
Components Location



1. Oil seal 2. Reaction shaft 3. Housing 4. Cover 5. O-Ring	6. Reaction shaft 7. Snap ring 8. Niddle bearing 9. 8LR/B return spring 10. 8LR/B piston

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

Components Location



1. Oil injection hole 2. Oil level plug	3. Oil drain piug

Automatic Transaxle System > Hydraulic System > Fluid > Repair procedures

Service Adjustment Procedure

Oil level Check

NOTE

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

CAUTION

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

1. Start the engine. (Don’t step on brake and accelerator simultaneously).
2. Confirm that the temperature of the A/T oil temperature sensor is 50~60°C(122~140°F) with the GDS.
3. Shift the shift lever slowly from "P" to"D" to "P" at idle. Repeat one time.
   Shift the select lever to "N".

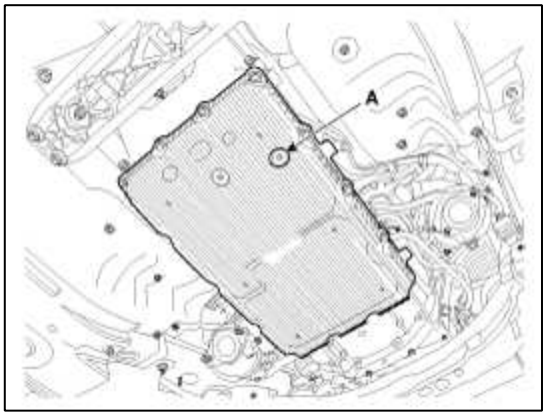
CAUTION

Keep on each speed position more than 2 sec.

4. Lift the vehicle, then remove the oil level plug (A) from the valve body cover.

CAUTION

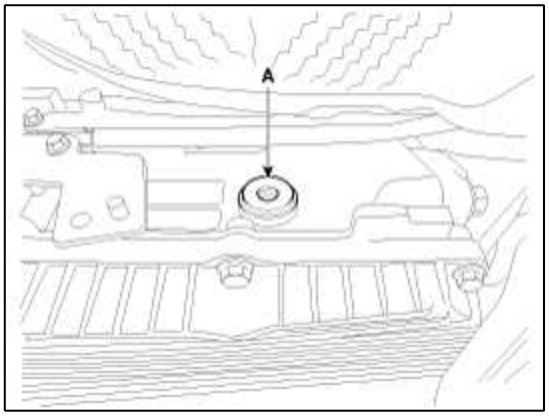
At this time, the vehicle must be at a level state.



5. If there is no oil drain or the amount of oil drain is very low (within 20cc).
Add ATF SP-IV-RR 650cc to the ATF injection hole (A).

CAUTION

If oil start to overflow from the oil level plug, you must stop adding oil.



6. If the oil flows out of the overflow plug in thin steady stream, the oil level is correct.
Then finish the procedure and tighten the oil plug.

NOTE

Oil level check (excess or shortage) method

- Excess: Drain quantity exceeds 500cc per mininute.(Let oil flow until oil stream becoms thin)
- Shortage: If there is no drain after adding 650cc of ATF.(Add more ATF oil until oil starts to drain)

CAUTION

If there is no damage at the automatic transaxle and the oil cooler, the oil cooler hose, transaxle case, valve body tightening state are normal, ATF must drip out after performing above 1 to 6 procedures. After performing above 1 to 6 procedures, if the oil doesn't drip out, inspect the automatic transaxle assembly.

CAUTION

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

Oil level check plug tightening torque:
22.6 ~ 24.5 N.m (2.3 ~ 2.5 kgf.m, 16.6 ~ 18.1 lb-ft)

7. After ATF level check or exchange, be sure to remove ATF of outside automatic transmission.
   (be especially sure to remove residual ATF between automatice transmission case and oil pan)
8. Put down the vehicle with the lift.

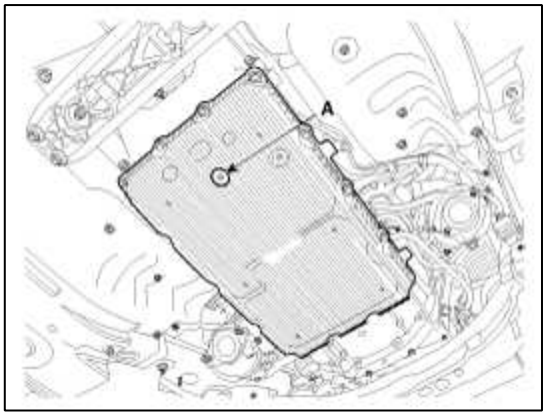
Replacement

NOTE

ATF of 8 speed automatic transaxle doesn't need to be replaced in normal usage. If the vehicle is used severely in business or personal use, replace ATF every 100,000 miles.
Severe usage is defined as
- Driving in rough road (Bumpy, Gravel, Snowy, Unpaved road, etc)
- Driving in mountain road, ascent/descent
- Repetition of short distance driving
- More than 50% operation in heavy city traffic during hot weather above 30°C(89.6°F) .
- Police, Taxi, Commercial type operation or trailer towing, etc

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

Drain plug tightening torque:
22.6 ~ 24.5 N.m (2.3 ~ 2.5 kgf.m, 16.6 ~ 18.1 lb-ft)



CAUTION

The gasket of the drain plug use new one.

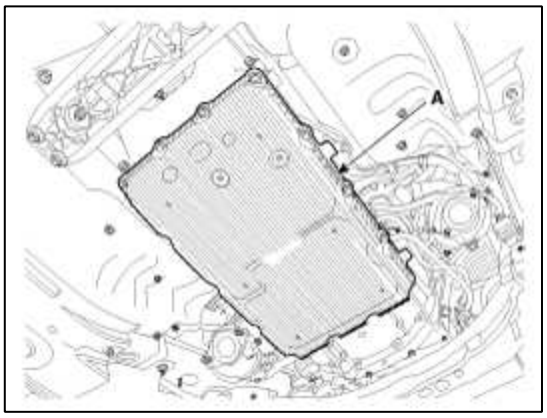
2. Fill the oil about 7.0 liters through oil injection hole.
3. Check the oil level.
   (Refer to "Hydraulic system (Fluid)" in this group)

Automatic Transaxle System > Hydraulic System > Oil Fillter > Repair procedures

Replacement

1. Draining ATF totally.

2. Remove the oil pan (A).



3. Must be replaced by new oil pan.

NOTE

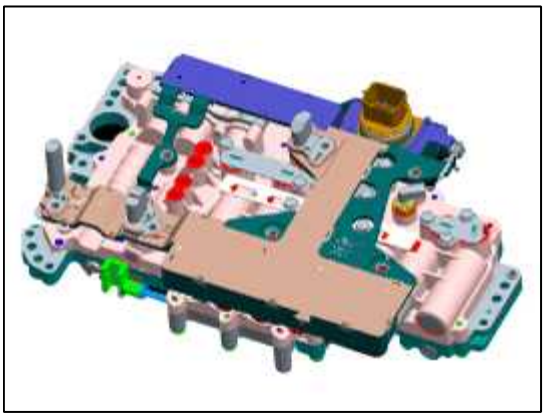
Not replaceable filters integrated oil pan.

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

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

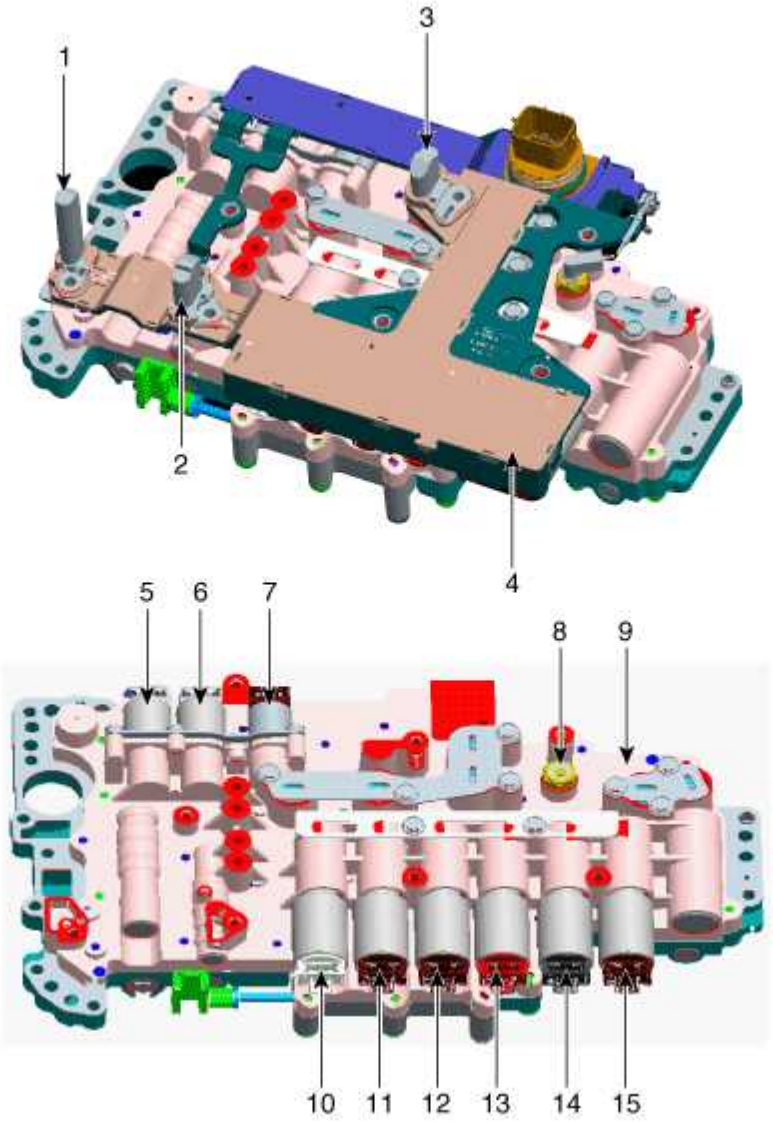
Description

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



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

Components Location



1. Input speed sensor	9. Valve body assembly
2. Middle speed sensor	10. 8LR/B control solenoid valve
3. Output speed sensor	11. 6/C control solenoid valve
4. E Module	12. 27/B control solenoid valve
5. Line presure control solenoid valve	13. 35R/C control solenoid valve
6. Demper clutch control solenoid valve	14. 4&OD/C control solenoid valve
7. ON/OFF solenoid valve	15. UD/C control solenoid valve
8. Presure switch	

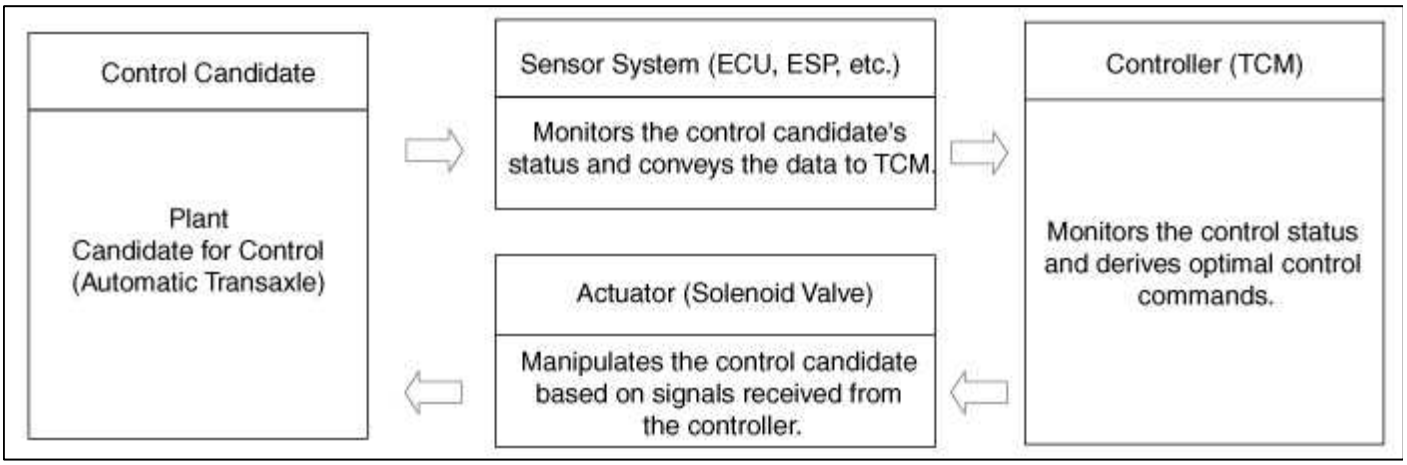
Automatic Transaxle System > Automatic Transaxle Control System > Description and Operation

Description

Automatic transaxle system relies on various measurement data to determine the current control status and extrapolate the necessary compensation values. These values are used to control the actuators and achieve the

desired control output. If a problem with the drivetrain, including the transaxle, has been identified, perform self-diagnosis and basic transaxle inspection (oil and fluid inspection) and then check the control system's components using the diagnosis tool.

Control System Composition



Fault Diagnosis

Features a fail-safe mechanism that prevents dangerous situations from developing in the event of a transaxle failure. The limp home mode engages if the transaxle malfunctions. In this mode, the transaxle operates at a minimal functionality level, making it possible for the vehicle to reach a service center.
Fail-Safe: Allows the vehicle to be driven safely in the event of a malfunction.
Limp Home: Maintains minimal functionality (*) in the event of a malfunction, making it possible for the vehicle to reach a service center.
(*) Minimal Functionality: Drive (fixed gear setting), Reverse, and Neutral

Self-diagnosis

TCM is in constant communication with the control system's components (sensors and solenoids). If an abnormal signal is received for longer than the predefined duration, TCM recognizes a fault, stores the fault code in memory, and then sends out a fault signal through the self-diagnosis terminal. Such fault codes are independently backed up and will not be cleared even if the ignition switch is turned off, the battery is disconnected, or the TCM connector is disconnected.

CAUTION

- Disconnecting a sensor or an actuator connector while the ignition switch is in the "On" position generates a diagnostic trouble code (DTC) and commits the code to memory. In such event, disconnecting the battery will not clear the fault diagnosis memory. The diagnosis tool must be used to clear the fault diagnosis memory.
- Before removing or installing any part, read the diagnostic trouble codes and then disconnect the battery negative (-) terminal.
- Before disconnecting the cable from battery terminal, turn the ignition switch to OFF. Removal or connection of the battery cable during engine operation or while the ignition switch is ON could cause damage to the TCM.
- When checking the generator for the charging state, do not disconnect the battery '+' terminal to prevent the ECM from damage due to the voltage.
- When charging the battery with the external charger, disconnect the vehicle side battery terminals to prevent damage to the TCM.

Checking Procedure (Self-diagnosis)

CAUTION

- When battery voltage is excessively low, diagnostic trouble codes can not be read. Be sure to check the battery for voltage and the charging system before starting the test.
- Diagnosis memory is erased if the battery or the TCM connector is disconnected. Do not disconnect the battery before the diagnostic trouble codes (DTC) are completely read and recorded.

Inspection Procedure (Using the GDS)

1. Turn OFF the ignition switch.
2. Connect the GDS to the data link connector on the lower crash pad.
3. Turn ON the ignition switch.
4. Use the GDS to check the diagnostic trouble code.
5. Repair the faulty part from the diagnosis chart.
6. Erase the diagnostic trouble code.
7. Disconnect the GDS.

CAUTION

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

Automatic Transaxle System > Automatic Transaxle Control System > Repair procedures

Adjustment

TCM Learning

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

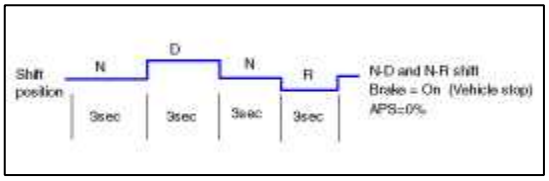
- Transaxle assembly replacement
- TCM replacement
- TCM upgrading

1. TCM learning condition
   A. ATF temperature: 30 ~ 95°C (86 ~ 203°F)

2. TCM learning procedure

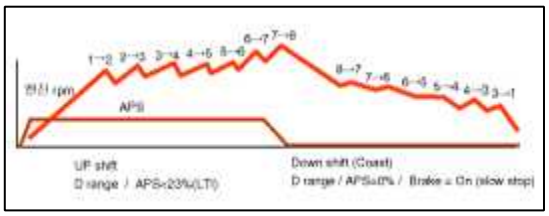
A. Stop learning

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



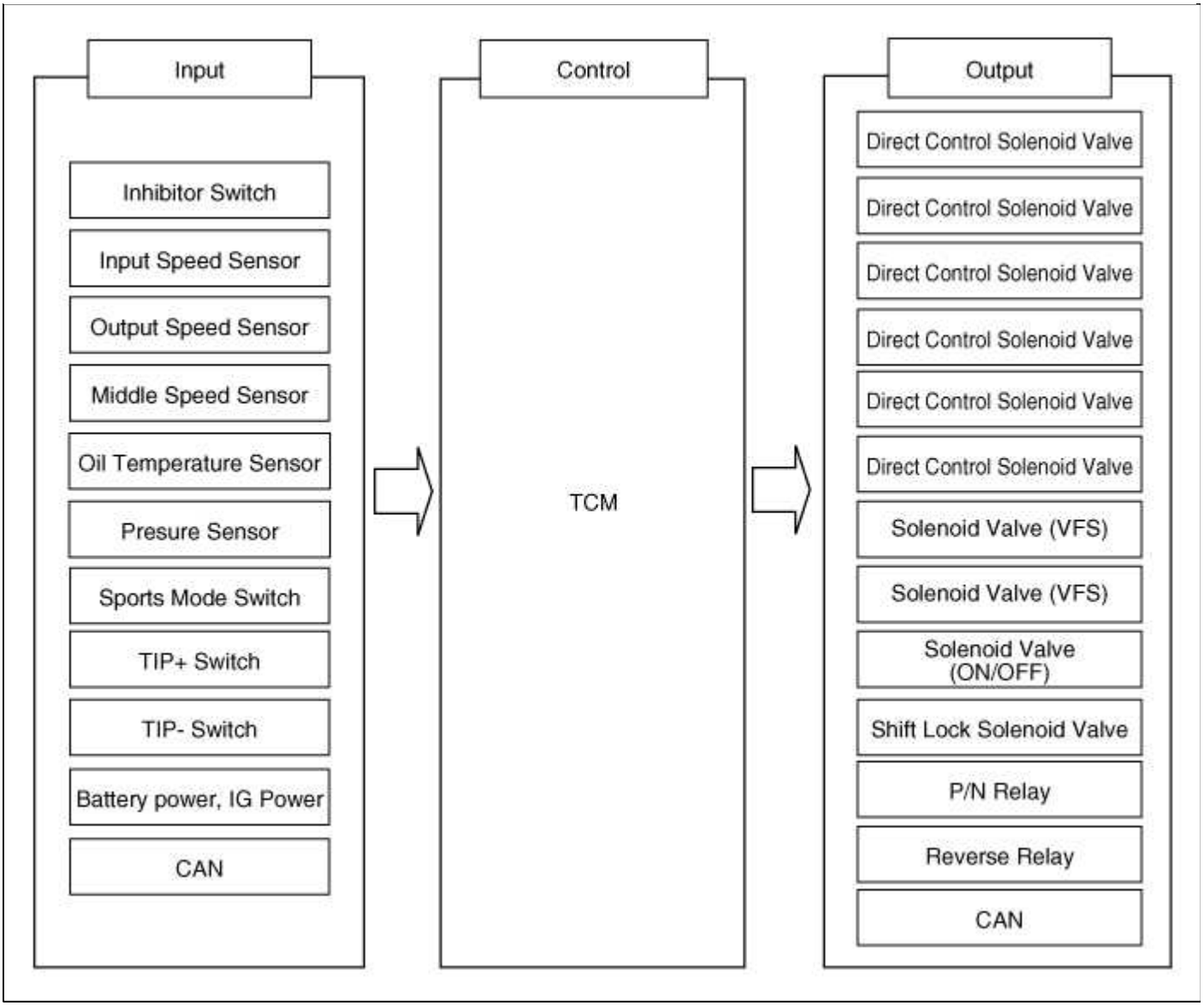
B. Driving learning

1. Drive the vehicle through all gears at D range. Drive from stop to 1st to 2nd to 3rd to 4th to 5th to 6th to 7th to 8th with keeping fixed throttle open.
2. Down shift from 8th to 7th, 7th to 6th, 6th to 5th, 5th to 4th, 4th to 3rd, 3rd to 2nd, 2nd to 1st.
3. Repeat the above driving pattern four times or more.
   Up-shift throttle open : 15 ~ 30%



Automatic Transaxle System > Automatic Transaxle Control System > Schematic Diagrams

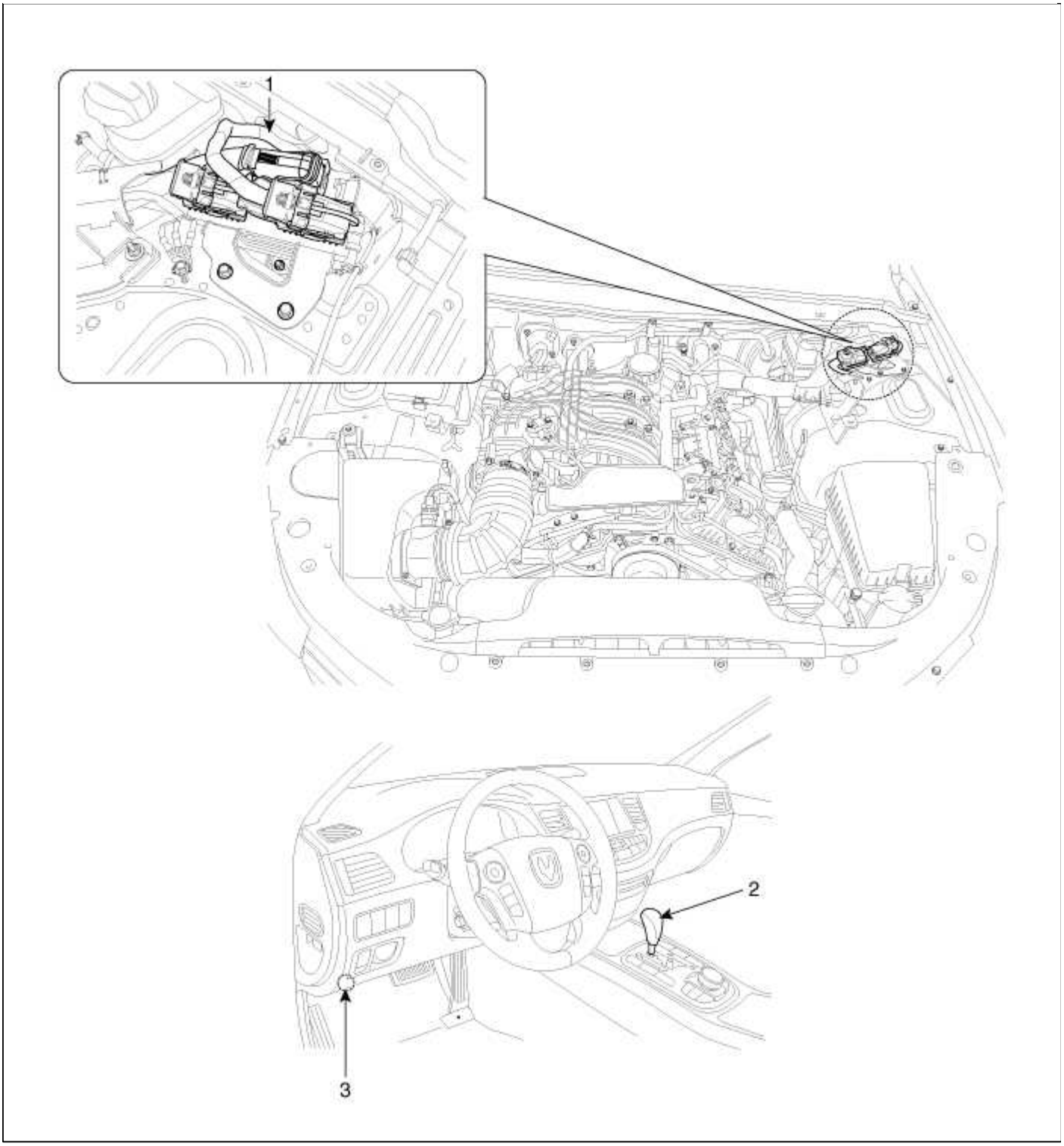
Circuit Diagram



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

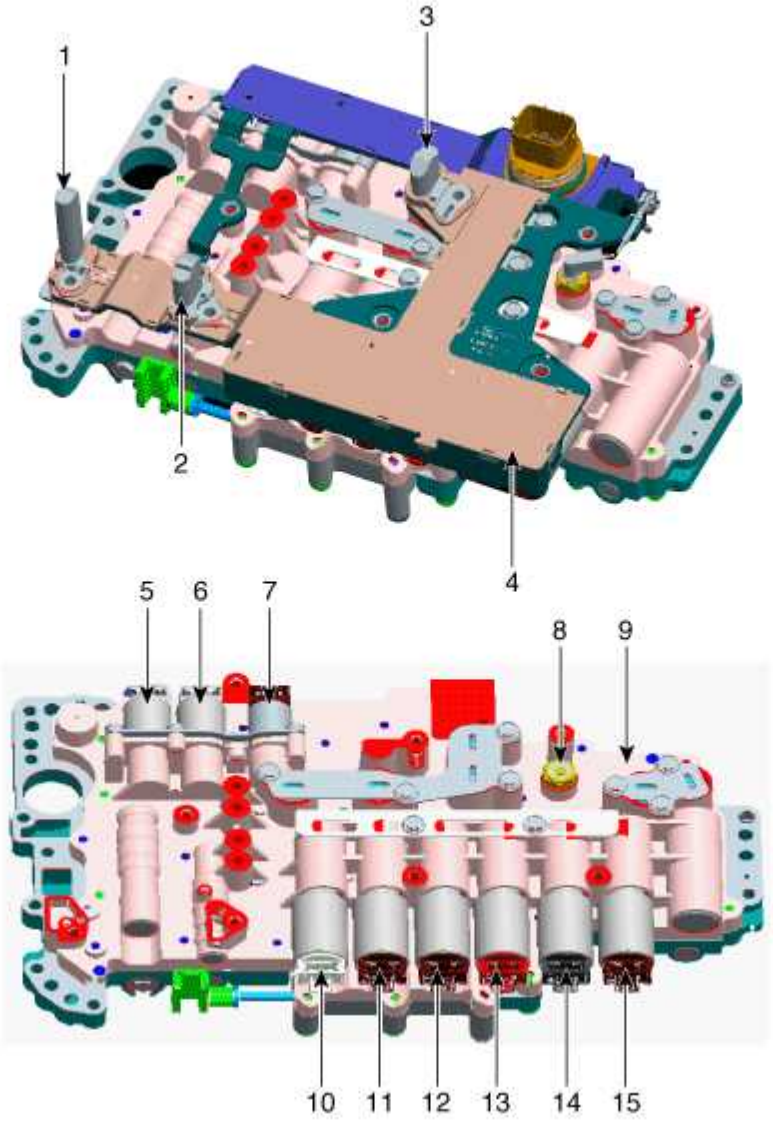
Components Location

[Vehicle Components]



1. Transmission Control Module(TCM) 2. Shift lever	3. Date Link Connector (DLC)

[Transmission Components]



1. Input speed sensor 2. Middle speed sensor 3. Output speed sensor 4. E Module assembly 5. Line presure control solenoid valve 6. Demper clutch control solenoid valve 7. ON/OFF solenoid valve 8. Presure switch	9. Valve body assembly 10. 8LR/B control solenoid valve 11. 6/C control solenoid valve 12. 27/B control solenoid valve 13. 35R/C control solenoid valve 14. 4&OD/C control solenoid valve 15. UD/C control solenoid valve

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

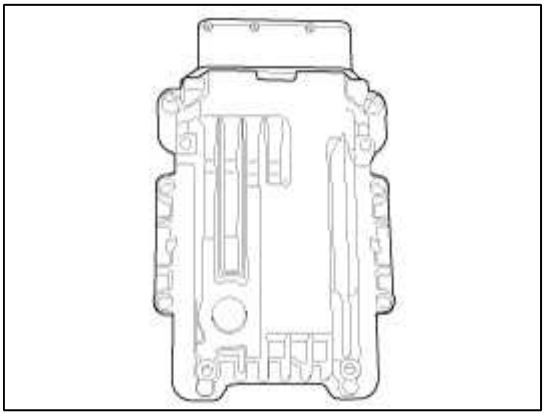
Description

Transaxle Control Module (TCM) is the automatic transaxle's brain. The module receives and processes signals from various sensors and implements a wide range of transaxle controls to ensure optimal driving conditions for the driver.

TCM is programmed for optimal response to any on-road situation. In the event of a transaxle failure or malfunction, TCM stores the fault information in memory so that the technician may reference the code and quickly repair the transaxle.

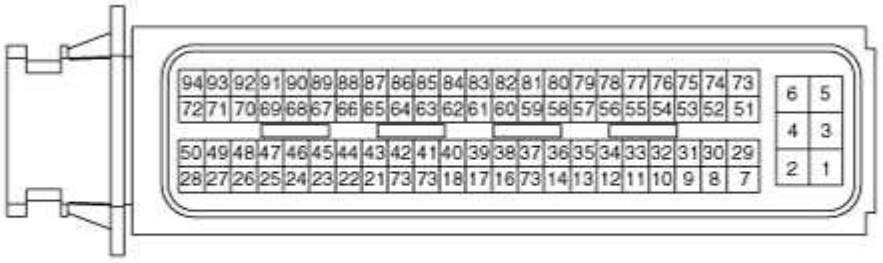
Functions

- Monitors the vehicle's operating conditions to determine the optimal gear setting.
- Performs a gear change if the current gear setting differs from the identified optimal gear setting.
- Determines the need for damper clutch (D/C) activation and engages the clutch accordingly.
- Calculates the optimal line pressure level by constantly monitoring the torque level and adjusts the pressure accordingly.
- Diagnoses the automatic transaxle for faults and failures.



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

1. TCM Connector and Terminal Function



CLG-TG

2. TCM Terminal Function

Connector [CLG-TG]

Pin	Description	Pin	Description
1	Battery power	48	-
2	Battery power	49	-
3	Power(IG 1)	50	27 Brake control solenoid valve
4	Ground	51	-
5	Ground	52	ON/OFF solenoid valve
6	Ground	53	-

7	-	54	Input speed sensor signal
8	-	55	Middle speed sensor signal
9	-	56	Output speed sensor signal
10	-	57	-
11	-	58	-
12	-	59	-
13	Inhibitor switch signal "S1"	60	-
14	Oil temperature sensor (+)	61	Sports mode select switch
15	-	62	-
16	Sports mode up switch	63	-
17	Sports mode down switch	64	-
18	Presure switch	65	CAN communication line (LOW)
19	-	66	-
20	-	67	-
21	Inhibitor switch signal "S2"	68	-
22	Inhibitor switch signal "S4"	69	-
23	Inhibitor switch signal "S3"	70	Solenoid supply power 2
24	-	71	-
25	-	72	-
26	-	73	Solenoid supply power(4&OD/C,35R/C,6/C,L/P)
27	-	74	-
28	-	75	-
29	Solenoid supply power(UD/C,27/B,8LR/B,D/C)	76	-
30	Input speed sensor power	77	-
31	Middle speed sensor power	78	-
32	-	79	-
33	-	80	-
34	-	81	-
35	-	82	-
36	-	83	-
37	-	84	-
38	Oil temperature sensor (-)	85	CCP CAN Low
39	-	86	CCP CAN High
40	-	87	CAN communication line (High)
41	35R Clutch control solenoid valve	88	-

42	8LR Brake control solenoid valve	89	-
43	Underdrive clutch control solenoid valve	90	-
44	6Speed clutch control solenoid valve	91	-
45	Line presure control solenoid valve	92	-
46	Damper clutch control solenoid valve	93	Output speed sensor power
47	4&OD Clutch control solenoid valve	94	-

3. TCM Terminal input/output signal

Pin	Description	Condition	Input/Output Value	
			Type	Level
1	Battery power	ON	Power	0V/Battery voltage level
2		OFF		9V < Battery voltage level < 16V
3	Power (IG 1)	ON	Input	Battery voltage level
		OFF		0V voltage level
4	Ground	-	Ground	0V(GND level)
5	Ground	-	Ground	0V(GND level)
6	Ground	-	Ground	0V(GND level)
7	-	ON	Output	About 1V
		OFF		Battery voltage level
8	-	-	Output	0V/Battery voltage level
				9V < Battery voltage level <16V
9	-	-	-	-
10	-	ON	Pulse input	About 9V~11V voltage level
		OFF		0V voltage level
11	-	-	-	-
12	-	-	-	-
13	Inhibitor switch signal "S1"	ON	Input	Battery voltage level
		OFF		0V(GND)
14	Oil temperature sensor (+)	-	Input	Maximum 5V voltage level
15	-	-	-	-
16	Sports mode up switch	ON	Input	0V(GND)
		OFF		Battery voltage level
17	Sports mode down switch	ON	Input	0V(GND)
		OFF		Battery voltage level
18	Presure switch	-	Input	0V/Battery voltage level

19	-	-	-	-
20	-	-	-	-
21	Inhibitor switch signal "S2"	ON	Input	Battery voltage level
		OFF		0V(GND)
22	Inhibitor switch signal "S4"	ON	Input	Battery voltage level
		OFF		0V(GND)
23	Inhibitor switch signal "S3"	ON	Input	Battery voltage level
		OFF		0V(GND)
24	-	-	-	-
25	-	-	-	-
26	-	-	Output	0V/Battery voltage level
				9V < Battery voltage level <16V
27	-	-	-	-
28	-	-	Output	0V/Battery voltage level
				9V < Battery voltage level <16V
29	Solenoid supply power (UD/C,27/B,8LR/B,D/C)	-	Power	Battery voltage level
				9V < Battery voltage level <16V
30	Input speed sensor power	ON	Output	About 9V voltage level
		OFF		0V
31	Middle speed sensor power	ON	Output	About 9V voltage level
		OFF		0V
32	-	-	-	-
33	-	-	-	-
34	-	-	-	-
35	-	-	-	-
36	-	-	-	-
37	-	-	-	-
38	Oil temperature sensor (-)	-	Input	Minimum 0V voltage level
39	-	-	-	-
40	-	-	-	-
41	35R Clutch control solenoid valve	-	Output	0V/Battery voltage level
				9V < Battery voltage level <16V

42	8LR Brake control solenoid valve	-	Output	0V/Battery voltage level 9V < Battery voltage level <16V
43	Underdrive clutch control solenoid valve	-	Output	0V/Battery voltage level 9V < Battery voltage level <16V
44	6Speed clutch control solenoid valve	-	Output	0V/Battery voltage level 9V < Battery voltage level <16V
45	Line presure control solenoid valve	-	Output	0V/Battery voltage level 9V < Battery voltage level <16V
46	Damper clutch control solenoid valve	-	Output	0V/Battery voltage level 9V < Battery voltage level <16V
47	4&OD Clutch control solenoid valve	-	Output	0V/Battery voltage level 9V < Battery voltage level <16V
48	-	-	-	-
49	-	-	-	-
50	27 Brake control solenoid valve	-	Output	0V/Battery voltage level 9V < Battery voltage level <16V
51	-	-	-	-
52	ON/OFF solenoid valve	-	Output	0V/Battery voltage level 9V < Battery voltage level <16V
53	-	ON	Output	0V
		OFF		Battery voltage level
54	Input speed sensor signal		Pulse input	Low : About 0.7V, High : 1.4V
	NTU1			Maximum/Minimum Frequency : 9kHz/0Hz
55	Middle speed sensor signal		PulseInput	Low : About 0.7V, High : 1.4V
	NTU2			Maximum/Minimum Frequency : 9kHz/0Hz
	Output speed sensor signal			Low : About 0.7V, High : 1.4V

56	NAB		PulseInput	Maximum/Minimum Frequency : 9kHz/0Hz
57	-	-	-	-
58	-	-	-	-
59	-	-	-	-
60	-	-	-	-
61	Sports mode select switch	Sports mode	Input	0V/Battery voltage level
		Other		9V < Battery voltage level <16V
62	-	-	-	-
63	-	-	-	-
64	-	-	-	-
65	CAN communication line (LOW)	-	-	-
66	-	-	-	-
67	-	-	-	-
68	-	-	-	-
69	-	-	-	-
70	Solenoid supply power 2	-	Power	Battery voltage level
				9V < Battery voltage level <16V
71		-	-	-
72		-	-	-
73	Solenoid supply power (4&OD/C,35R/C,6/C,L/P)	-	Power	Battery voltage level
				9V < Battery voltage level <16V
74		-	-	-
75		-	-	-
76		-	-	-
77		-	-	-
78		-	-	-
79		-	-	-
80		-	-	-
81		-	-	-
82		-	-	-
83		-	-	-
84		-	-	-

85		-	-	-
86		-	-	-
87	CAN communication line (High)	-	-	-
88				
89				
90				
91				
92		-	-	-
93	Output speed sensor power	ON	Output	About 9V voltage level
		OFF		0V
94				

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

Inspection

TCM Problem Inspection Procedure

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

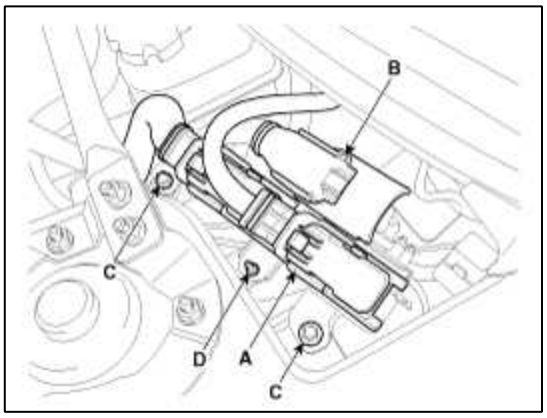
   Specification: Below 1Ω

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

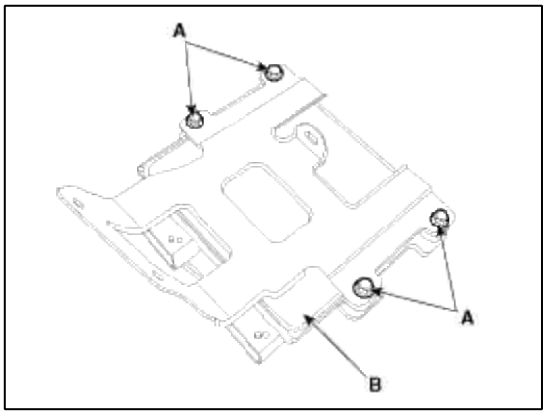
Removal

1. Turn ignition switch OFF and disconnect the negative (-) battery cable.
2. Remove the cover.
3. Disconnect the ECM connector (A) and TCM connector (B).

4. Remove the ECM & TCM bracket installation bolts (C) and nut (D).



5. Remove the TCM from bracket after remove the installation bolts (A).



Installation

1. Installation is reverse of removal.

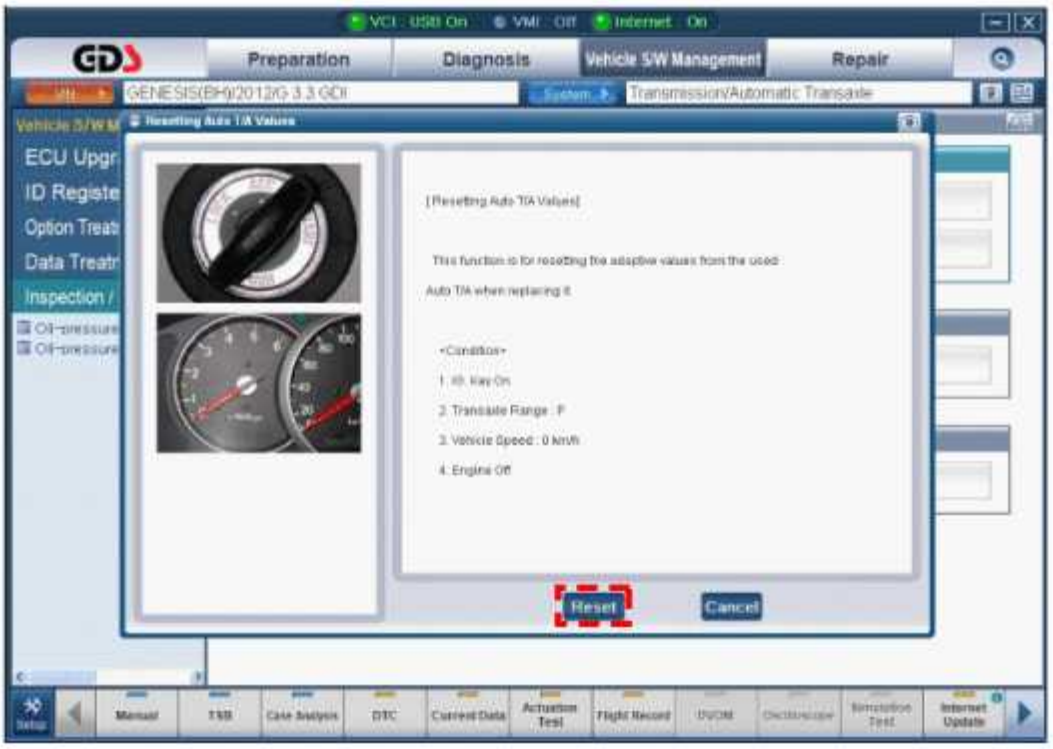
CAUTION

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

B. After exchanging TCM, input the EOL (End of line).
(Refer to "Repair procedures" in this group)

C. When replacing the TCM, reset the automatic transmissions values by using the GDS.

D. Perform TCM learning after replacing the TCM.

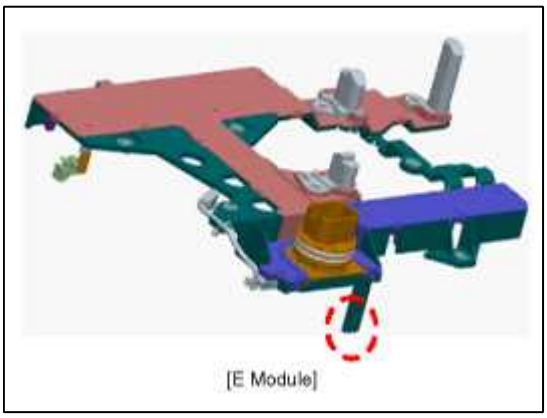


Automatic Transaxle System > Automatic Transaxle Control System > Transaxle Oil Temperature Sensor > Description and Operation

Description

Transaxle oil temperature sensor monitors the automatic transaxle fluid's temperature and conveys the readings to TCM.

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



[E Module]

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

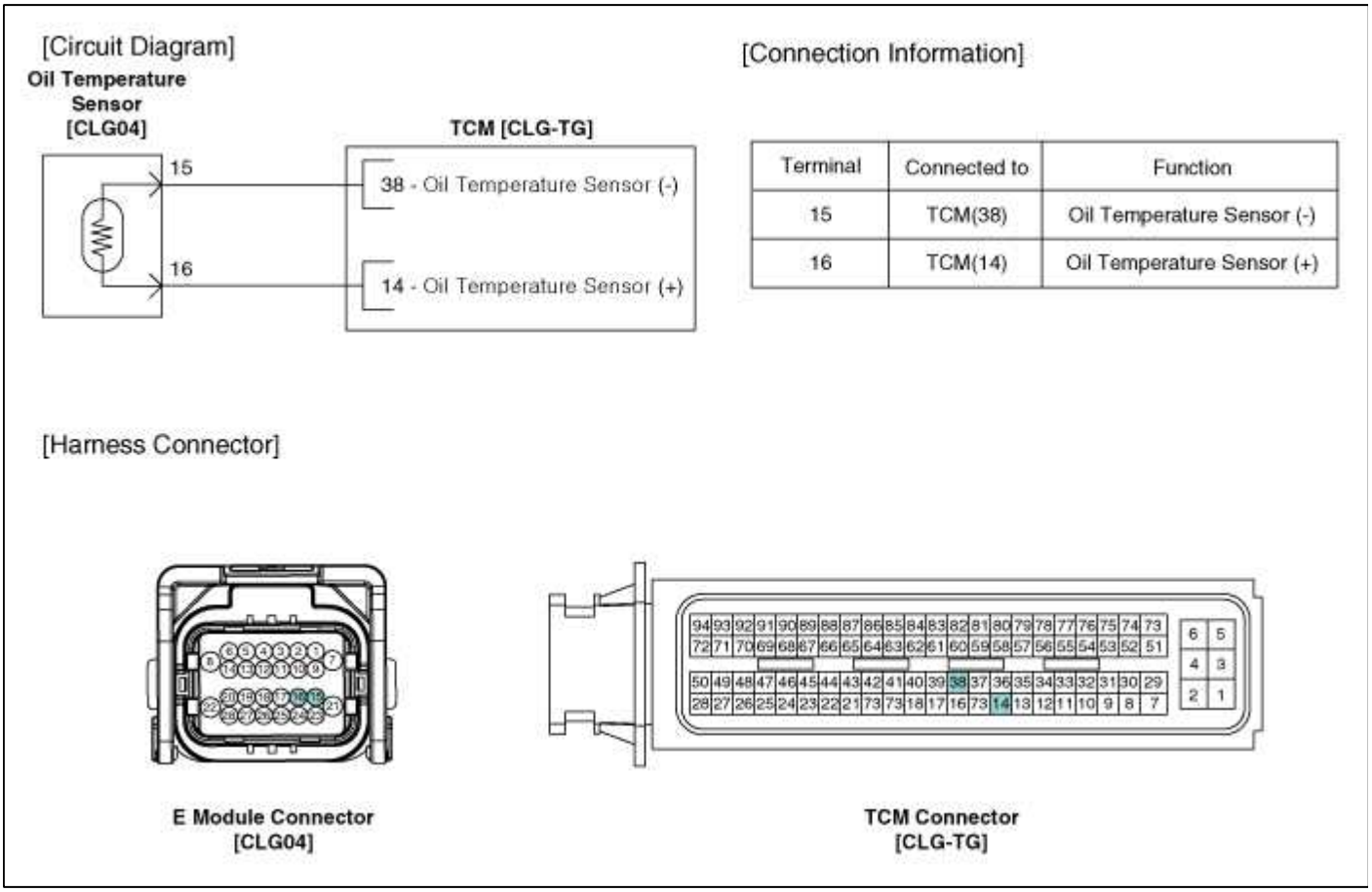
Specifications

Type: Negative Thermal Coefficient Type

Temp.[(°C)°F]	Resistance (kΩ)
(-40)-40	139.5
(-20)-4.0	47.4
(0)32.0	18.6
(20)68.0	8.1
(40)104.0	3.8
(60)140.0	1.98
(80)176.0	1.08
(100)212.0	0.63
(120)248.0	0.38
(140)284.0	0.25
(150)302.0	0.16

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

Circuit Diagram



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

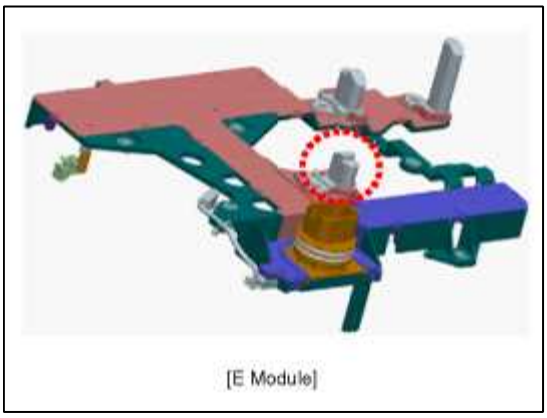
Inspection

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

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

Description

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



[E Module]

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

Specifications

Type: Hall effect sensor

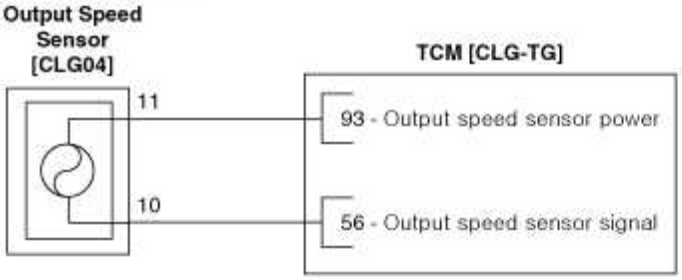
Specifications

Operation condition (°C)°F		((-)40~150)) -40~302
Air gap(mm)in.		1.3(0.0512)
Output voltage	High	1.4
	Low	0.7

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

Circuit Diagram

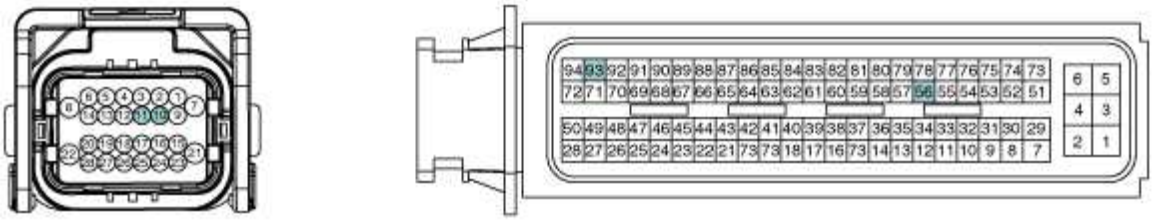
[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
11	TCM(93)	Output speed sensor power
10	TCM(56)	Output speed sensor signal

[Harness Connector]



E Module Connector [CLG04]

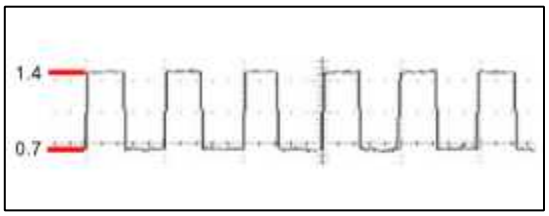
TCM Connector [CLG-TG]

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

Inspection

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

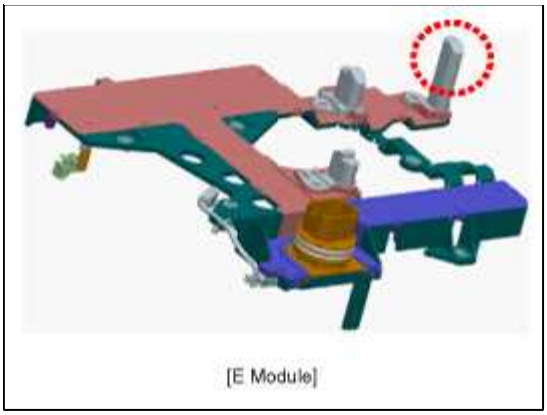
Specification: Refer to "Signal Wave Form" section.



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

Description

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



[E Module]

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

Specifications

Type: Hall effect sensor

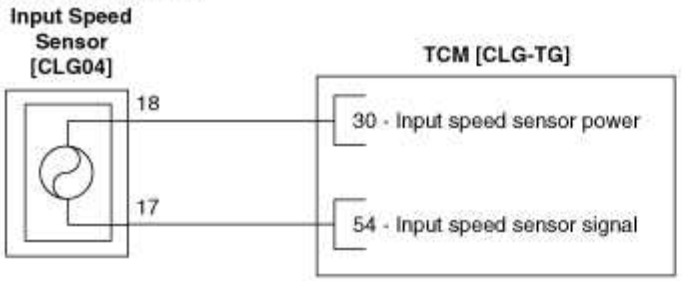
Specifications

Operation condition (°C)°F		((-)40~150)) -40~302
Air gap(mm)in.		1.3(0.0512)
Output voltage	High	1.4
	Low	0.7

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

Circuit Diagram

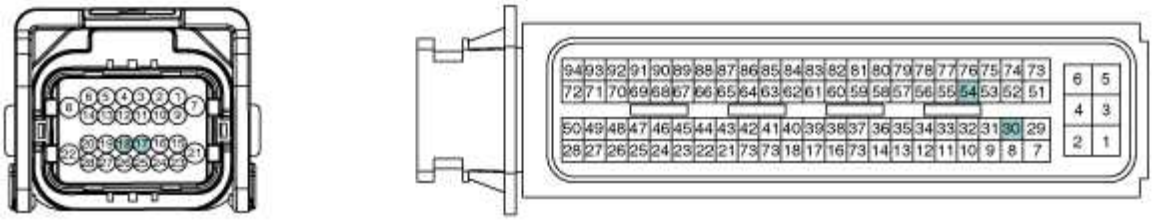
[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
18	TCM(30)	Input speed sensor power
17	TCM(54)	Input speed sensor signal

[Harness Connector]



E Module Connector [CLG04]

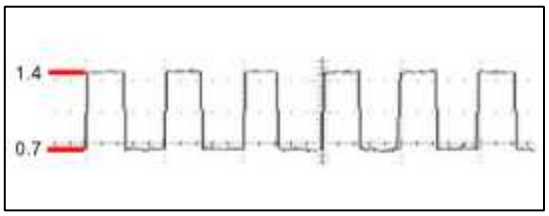
TCM Connector [CLG-TG]

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

Inspection

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

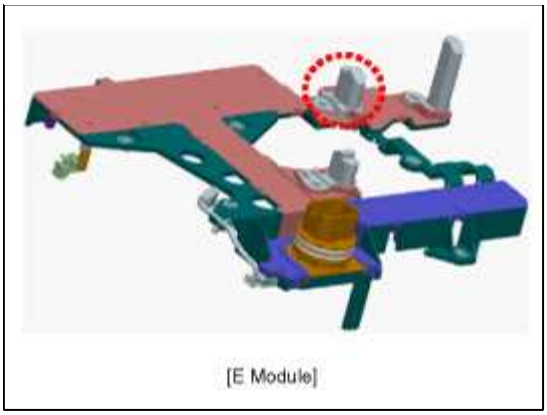
Specification: Refer to "Signal Wave Form" section.



Automatic Transaxle System > Automatic Transaxle Control System > Middle Speed Sensor > Description and Operation

Description

Middle speed sensor is a vital unit that measures the rate of rotation of the input shaft inside the transaxle and delivers the readings to the TCM.



[E Module]

Automatic Transaxle System > Automatic Transaxle Control System > Middle Speed Sensor > Specifications

Specifications

Type: Hall effect sensor

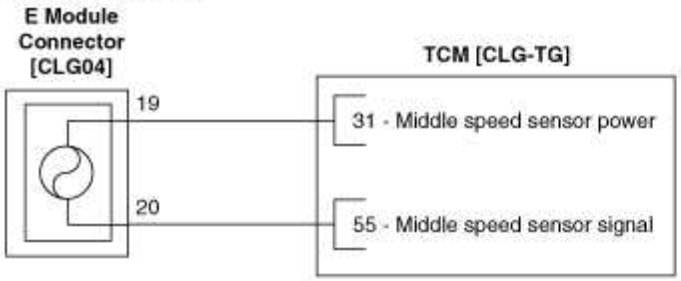
Specifications

Operation condition (°C)°F		((-)40~150)) -40~302
Air gap(mm)in.		1.3(0.0512)
Output voltage(V)	High	1.4
	Low	0.7

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

Circuit Diagram

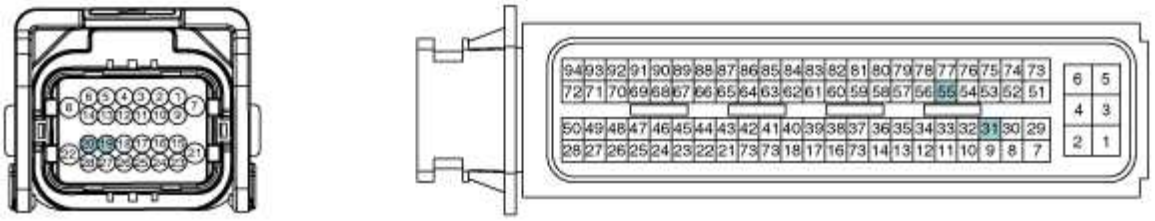
[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
19	TCM(31)	Middle speed sensor power
20	TCM(55)	Middle speed sensor signal

[Harness Connector]



E Module Connector [CLG04]

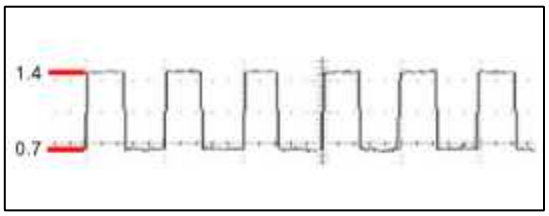
TCM Connector [CLG-TG]

Automatic Transaxle System > Automatic Transaxle Control System > Middle Speed Sensor > Repair procedures

Inspection

1. Check signal waveform of middle speed sensor using the GDS.

Specification: Refer to "Signal Wave Form" section.



Automatic Transaxle System > Automatic Transaxle Control System > Presure Switch > Description and Operation

Description

Presure switch is attached to the valve body. This check the production of hydraulic.

[Valve body assembly]

Automatic Transaxle System > Automatic Transaxle Control System > Presure Switch > Specifications

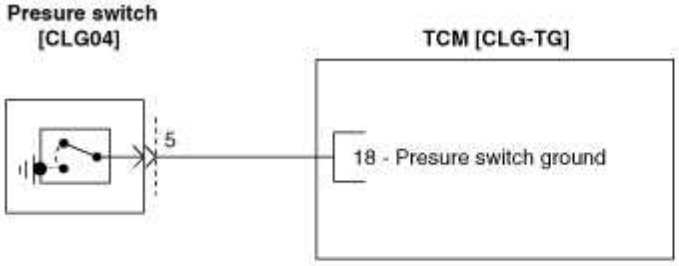
Specifications

	Specifications (20°C(68°F))
OFF => ON	146 ± 40 kPa
ON => OFF	50 kPa

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

Circuit Diagram

[Circuit Diagram]

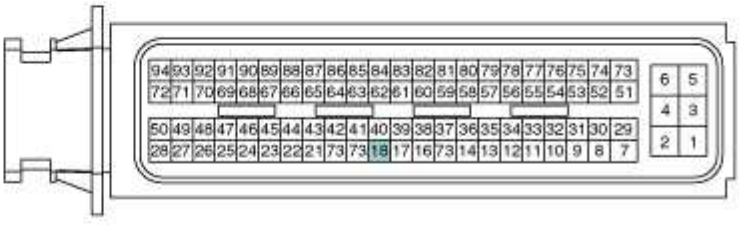


[Connection Information]

Terminal	Connected to	Function
19	TCM(18)	Presure switch ground

[Harness Connector]

E Module Connector
[CLG04]



TCM Connector
[CLG-TG]

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

Inspection

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

Automatic Transaxle System > Automatic Transaxle Control System > 6 Speed Clutch Control Solenoid Valve > Description and Operation

Description

6 Clutch control solenoid valve is attached to the valve body. This variable force solenoid valve directly controls the hydraulic pressure inside the 6 Clutch.

[Valve body assembly]

Automatic Transaxle System > Automatic Transaxle Control System > 6 Speed Clutch Control Solenoid Valve > Specifications

Specifications

Direct control VFS[6/C]

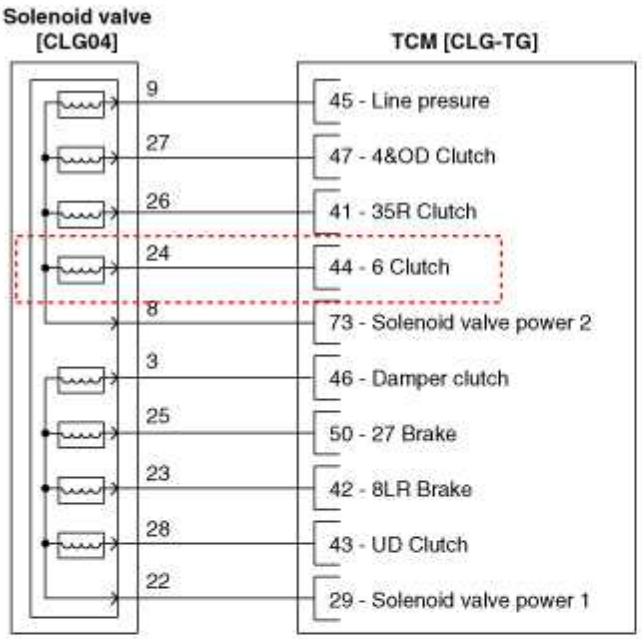
Control type : Normal low type

Control Pressure kpa (kgf/cm², psi)	0~1569.06 (0~16,0~227.57)
Current value(mA)	0~1100
Internal resistance(Ω)	5.0~5.6

Automatic Transaxle System > Automatic Transaxle Control System > 6 Speed Clutch Control Solenoid Valve > Schematic Diagrams

Circuit Diagram

[Circuit Diagram]

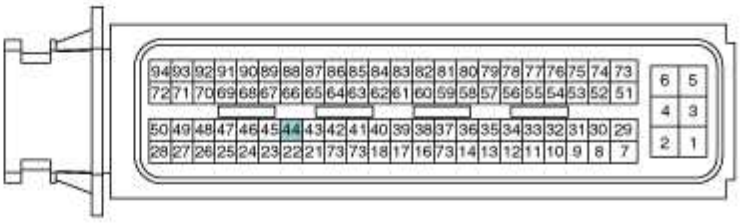


[Connection Information]

Terminal	Connected to	Function
9	TCM(45)	Line presure control
27	TCM(47)	4&OD Clutch control
26	TCM(41)	35R Clutch control
24	TCM(44)	6 Clutch control
8	TCM(73)	Solenoid valve power 2
3	TCM(46)	Damper clutch control
25	TCM(50)	27 Brake control
23	TCM(42)	8LR Brake control
28	TCM(43)	UD Clutch control
22	TCM(29)	Solenoid valve power 1

[Harness Connector]

E Module Connector
[CLG04]



TCM Connector
[CLG-TG]

Automatic Transaxle System > Automatic Transaxle Control System > 6 Speed Clutch Control Solenoid Valve > Repair procedures

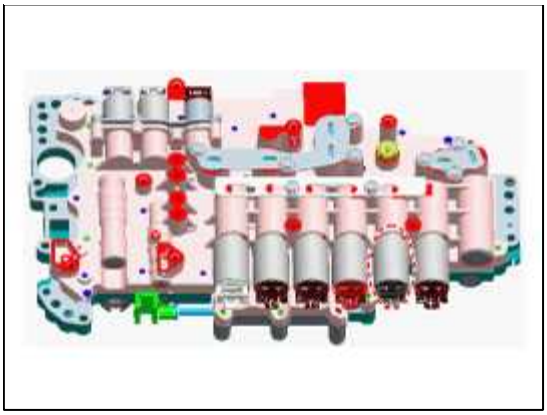
Inspection

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

Automatic Transaxle System > Automatic Transaxle Control System > 4&OD Clutch Control Solenoid Valve > Description and Operation

Description

4&OD Clutch control solenoid valve is attached to the valve body. This variable force solenoid valve directly controls the hydraulic pressure inside the 4&OD Clutch.



Automatic Transaxle System > Automatic Transaxle Control System > 4&OD Clutch Control Solenoid Valve > Specifications

Specifications

Direct control VFS[4&OD/C]

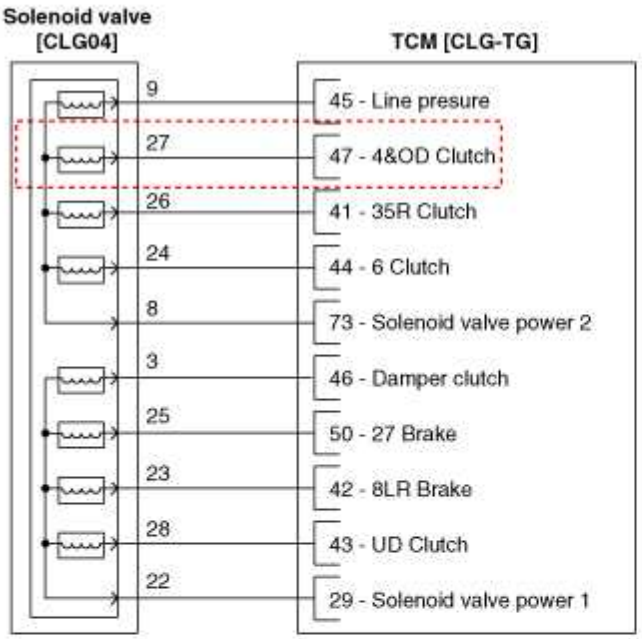
Control type : Normal low type

Control Pressure kpa (kgf/cm², psi)	0~1569.06 (0~16,0~227.57)
Current value(mA)	0~1100
Internal resistance(Ω)	5.0~5.6

Automatic Transaxle System > Automatic Transaxle Control System > 4&OD Clutch Control Solenoid Valve > Schematic Diagrams

Circuit Diagram

[Circuit Diagram]

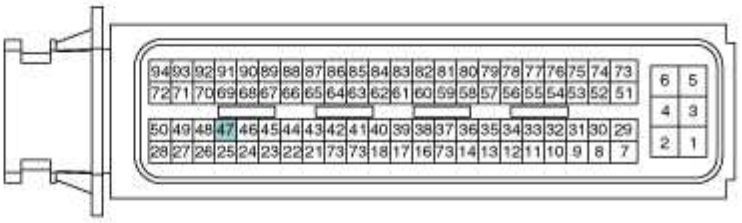


[Connection Information]

Terminal	Connected to	Function
9	TCM(45)	Line presure control
27	TCM(47)	4&OD Clutch control
26	TCM(41)	35R Clutch control
24	TCM(44)	6 Clutch control
8	TCM(73)	Solenoid valve power 2
3	TCM(46)	Damper clutch control
25	TCM(50)	27 Brake control
23	TCM(42)	8LR Brake control
28	TCM(43)	UD Clutch control
22	TCM(29)	Solenoid valve power 1

[Harness Connector]

E Module Connector
[CLG04]



TCM Connector
[CLG-TG]

Automatic Transaxle System > Automatic Transaxle Control System > 4&OD Clutch Control Solenoid Valve > Repair procedures

Inspection

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

Automatic Transaxle System > Automatic Transaxle Control System > 35R Clutch Control Solenoid Valve(35R/C_VFS) > Description and Operation

Description

35R Clutch control solenoid valve is attached to the valve body. This variable force solenoid valve directly controls the hydraulic pressure inside the 35R Clutch.

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

Specifications

Direct control VFS[35R/C]

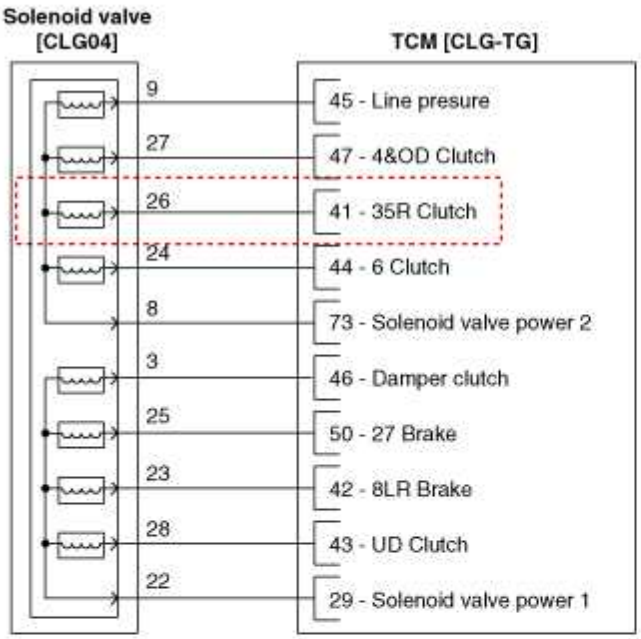
Control Type : Normal high type

Control Pressure kpa (kgf/cm², psi)	0~2108.42 (0~21.5~305.80)
Current value(mA)	0~1100
Internal resistance(Ω)	5.0~5.6

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

Circuit Diagram

[Circuit Diagram]

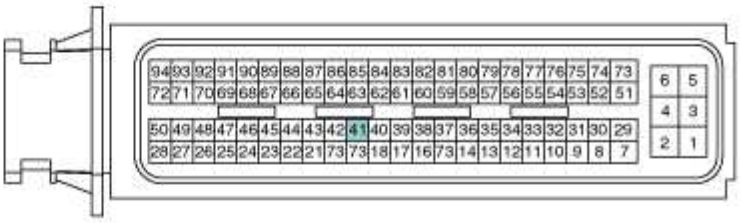


[Connection Information]

Terminal	Connected to	Function
9	TCM(45)	Line presure control
27	TCM(47)	4&OD Clutch control
26	TCM(41)	35R Clutch control
24	TCM(44)	6 Clutch control
8	TCM(73)	Solenoid valve power 2
3	TCM(46)	Damper clutch control
25	TCM(50)	27 Brake control
23	TCM(42)	8LR Brake control
28	TCM(43)	UD Clutch control
22	TCM(29)	Solenoid valve power 1

[Harness Connector]

E Module Connector
[CLG04]



TCM Connector
[CLG-TG]

Automatic Transaxle System > Automatic Transaxle Control System > 35R Clutch Control Solenoid Valve(35R/C_VFS) > Repair procedures

Inspection

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

Automatic Transaxle System > Automatic Transaxle Control System > 27 Brake Control Solenoid Valve > Description and Operation

Description

27 Brake control solenoid valve is attached to the valve body. This variable force solenoid valve directly controls the hydraulic pressure inside the 27 Brake.

Automatic Transaxle System > Automatic Transaxle Control System > 27 Brake Control Solenoid Valve > Specifications

Specifications

Direct control VFS[27/B]

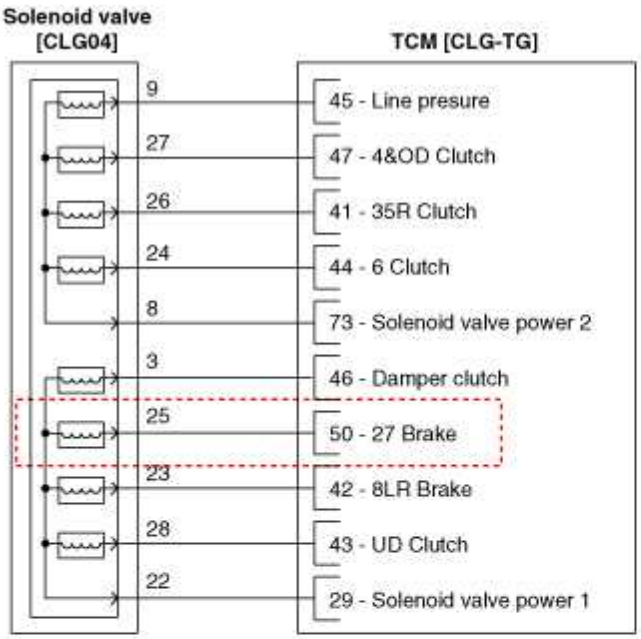
Control type : Normal low type

Control Pressure kpa (kgf/cm², psi)	0~1569.06 (0~16,0~227.57)
Current value(mA)	0~1100
Internal resistance(Ω)	5.0~5.6

Automatic Transaxle System > Automatic Transaxle Control System > 27 Brake Control Solenoid Valve > Schematic Diagrams

Circuit Diagram

[Circuit Diagram]

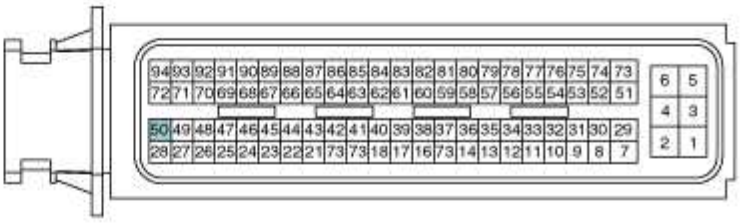


[Connection Information]

Terminal	Connected to	Function
9	TCM(45)	Line presure control
27	TCM(47)	4&OD Clutch control
26	TCM(41)	35R Clutch control
24	TCM(44)	6 Clutch control
8	TCM(73)	Solenoid valve power 2
3	TCM(46)	Damper clutch control
25	TCM(50)	27 Brake control
23	TCM(42)	8LR Brake control
28	TCM(43)	UD Clutch control
22	TCM(29)	Solenoid valve power 1

[Harness Connector]

E Module Connector
[CLG04]



TCM Connector
[CLG-TG]

Automatic Transaxle System > Automatic Transaxle Control System > 27 Brake Control Solenoid Valve > Repair procedures

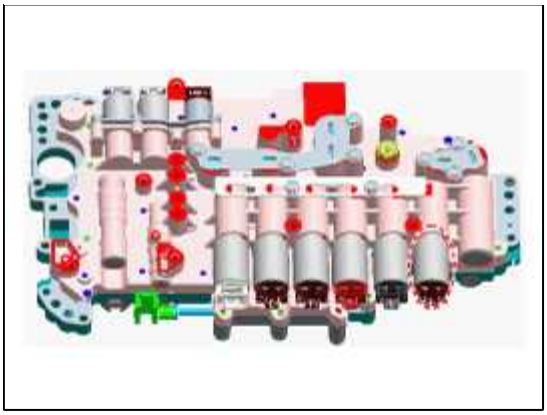
Inspection

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

Automatic Transaxle System > Automatic Transaxle Control System > Underdrive Brake Control Solenoid Valve(UD/B_VFS) > Description and Operation

Description

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



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

Specifications

Direct control VFS[UD/C]

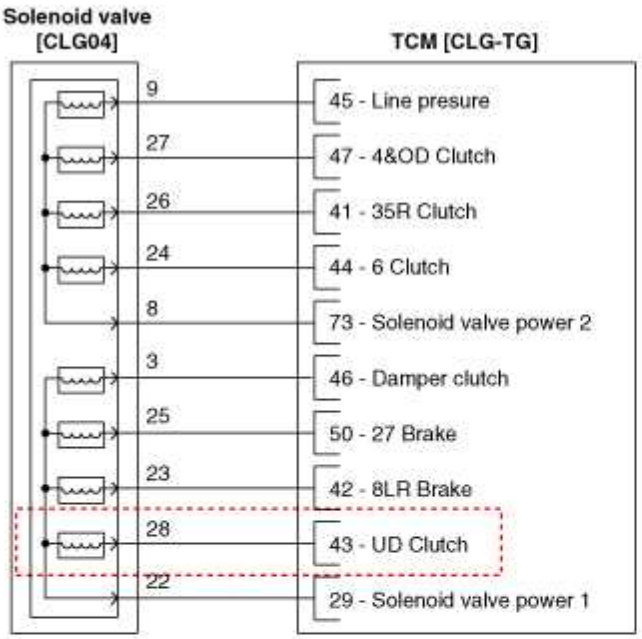
Control type : Normal low type

Control Pressure kpa (kgf/cm², psi)	0~1569.06 (0~16,0~227.57)
Current value(mA)	0~1100
Internal resistance(Ω)	5.0~5.6

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

Circuit Diagram

[Circuit Diagram]

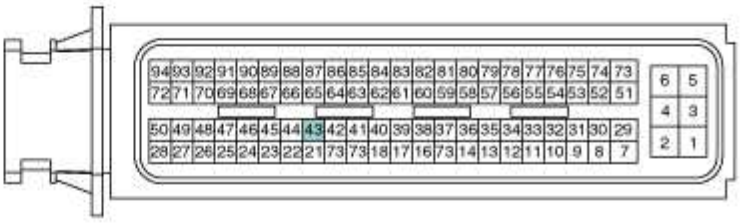


[Connection Information]

Terminal	Connected to	Function
9	TCM(45)	Line presure control
27	TCM(47)	4&OD Clutch control
26	TCM(41)	35R Clutch control
24	TCM(44)	6 Clutch control
8	TCM(73)	Solenoid valve power 2
3	TCM(46)	Damper clutch control
25	TCM(50)	27 Brake control
23	TCM(42)	8LR Brake control
28	TCM(43)	UD Clutch control
22	TCM(29)	Solenoid valve power 1

[Harness Connector]

E Module Connector
[CLG04]



TCM Connector
[CLG-TG]

Automatic Transaxle System > Automatic Transaxle Control System > Underdrive Brake Control Solenoid Valve(UD/B_VFS) > Repair procedures

Inspection

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

Automatic Transaxle System > Automatic Transaxle Control System > 8LR Brake Control Solenoid Valve > Description and Operation

Description

8LR Brake control solenoid valve is attached to the valve body. This variable force solenoid valve directly controls the hydraulic pressure inside the 8LR Brake.

Automatic Transaxle System > Automatic Transaxle Control System > 8LR Brake Control Solenoid Valve > Specifications

Specifications

Direct control VFS[8LR/B]

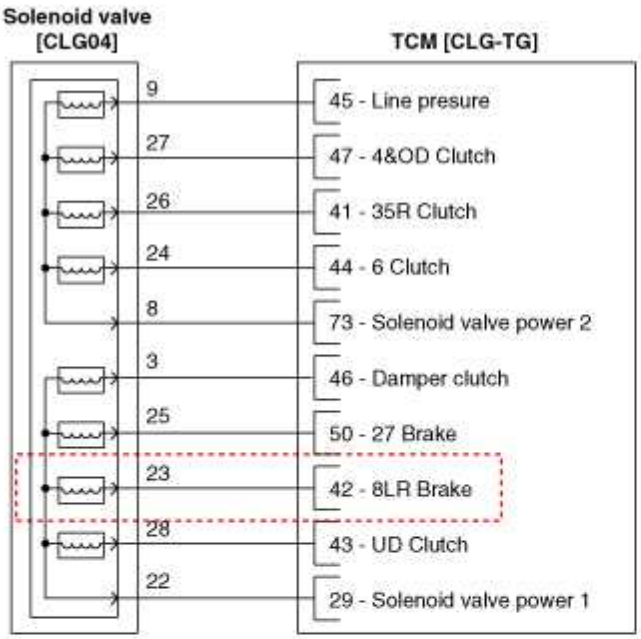
Control Type : Normal low type

Control Pressure kpa (kgf/cm², psi)	0~2108.42 (0~21.5~305.80)
Current value(mA)	0~1100
Internal resistance(Ω)	5.0~5.6

Automatic Transaxle System > Automatic Transaxle Control System > 8LR Brake Control Solenoid Valve > Schematic Diagrams

Circuit Diagram

[Circuit Diagram]

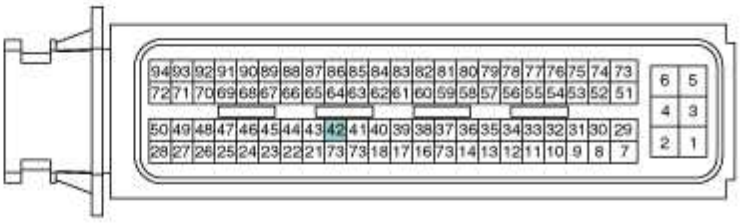


[Connection Information]

Terminal	Connected to	Function
9	TCM(45)	Line presure control
27	TCM(47)	4&OD Clutch control
26	TCM(41)	35R Clutch control
24	TCM(44)	6 Clutch control
8	TCM(73)	Solenoid valve power 2
3	TCM(46)	Damper clutch control
25	TCM(50)	27 Brake control
23	TCM(42)	8LR Brake control
28	TCM(43)	UD Clutch control
22	TCM(29)	Solenoid valve power 1

[Harness Connector]

E Module Connector
[CLG04]



TCM Connector
[CLG-TG]

Automatic Transaxle System > Automatic Transaxle Control System > 8LR Brake Control Solenoid Valve > Repair procedures

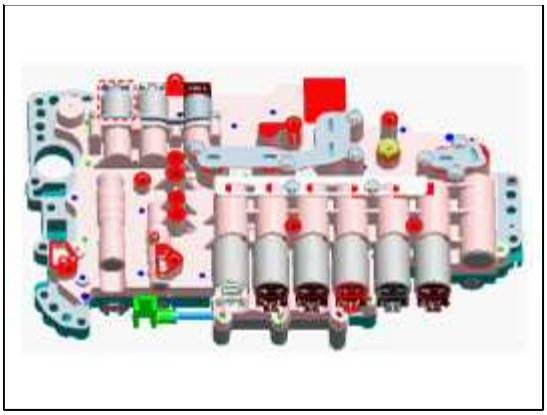
Inspection

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

Automatic Transaxle System > Automatic Transaxle Control System > Line Pressure Control Solenoid Vale > Description and Operation

Description

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



Automatic Transaxle System > Automatic Transaxle Control System > Line Pressure Control Solenoid Vale > Specifications

Specifications

Line Pressure Control VFS

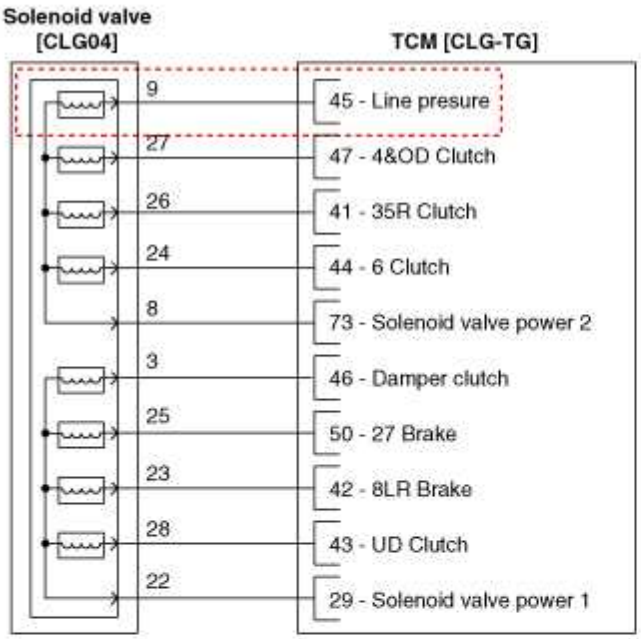
Control type : Normal high type

Control Pressure kpa (kgf/cm², psi)	0~500.14 (0~5.1,0~72.54)
Current value(mA)	0~850
Internal resistance(Ω)	4.8~5.4

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

Circuit Diagram

[Circuit Diagram]

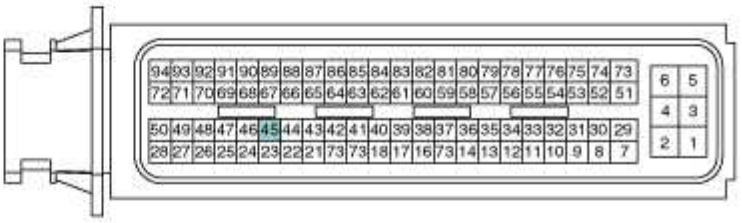


[Connection Information]

Terminal	Connected to	Function
9	TCM(45)	Line presure control
27	TCM(47)	4&OD Clutch control
26	TCM(41)	35R Clutch control
24	TCM(44)	6 Clutch control
8	TCM(73)	Solenoid valve power 2
3	TCM(46)	Damper clutch control
25	TCM(50)	27 Brake control
23	TCM(42)	8LR Brake control
28	TCM(43)	UD Clutch control
22	TCM(29)	Solenoid valve power 1

[Harness Connector]

E Module Connector
[CLG04]



TCM Connector
[CLG-TG]

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

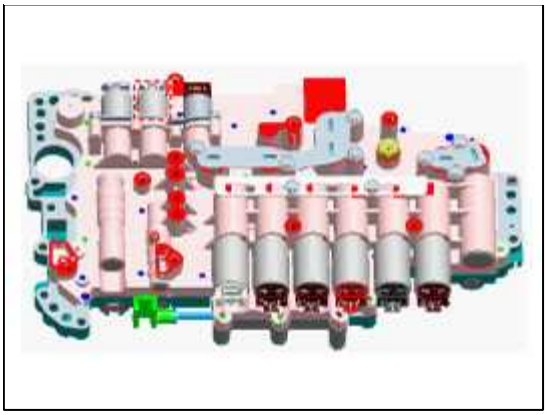
Inspection

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

Automatic Transaxle System > Automatic Transaxle Control System > Damper Clutch Control Solenoid Valve > Description and Operation

Description

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



Automatic Transaxle System > Automatic Transaxle Control System > Damper Clutch Control Solenoid Valve > Specifications

Specifications

Damper Clutch Control VFS

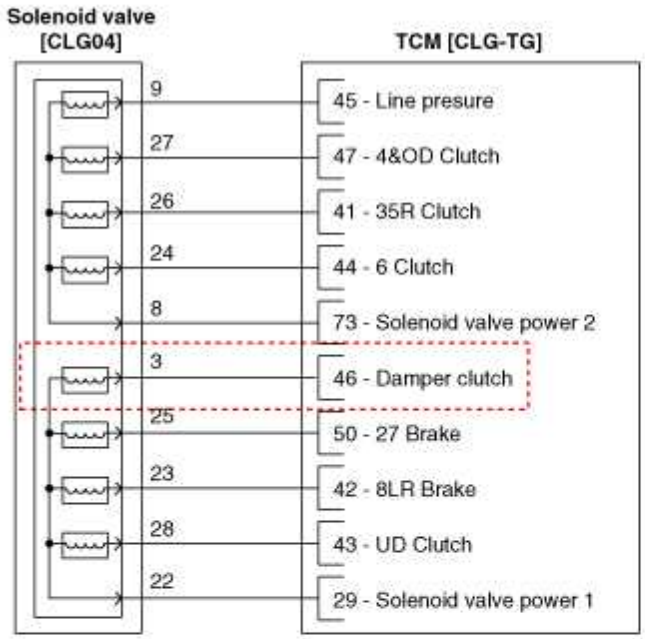
Control type : Normal low type

Control Pressure kpa (kgf/cm², psi)	0~500.14 (0~5.1,0~72.54)
Current value(mA)	0~850
Internal resistance(Ω)	4.8~5.4

Automatic Transaxle System > Automatic Transaxle Control System > Damper Clutch Control Solenoid Valve > Schematic Diagrams

Circuit Diagram

[Circuit Diagram]

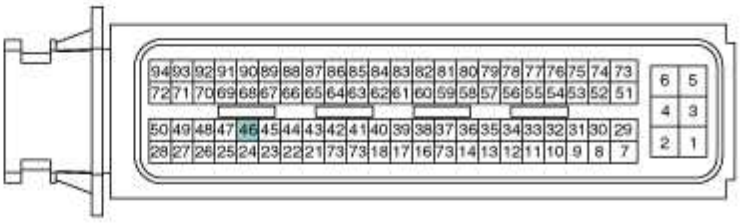


[Connection Information]

Terminal	Connected to	Function
9	TCM(45)	Line presure control
27	TCM(47)	4&OD Clutch control
26	TCM(41)	35R Clutch control
24	TCM(44)	6 Clutch control
8	TCM(73)	Solenoid valve power 2
3	TCM(46)	Damper clutch control
25	TCM(50)	27 Brake control
23	TCM(42)	8LR Brake control
28	TCM(43)	UD Clutch control
22	TCM(29)	Solenoid valve power 1

[Harness Connector]

E Module Connector
[CLG04]



TCM Connector
[CLG-TG]

Automatic Transaxle System > Automatic Transaxle Control System > Damper Clutch Control Solenoid Valve > Repair procedures

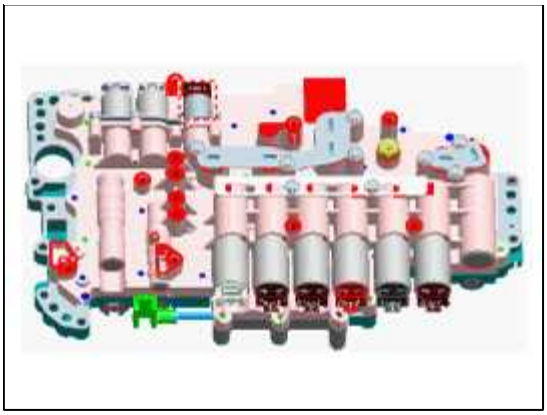
Inspection

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

Automatic Transaxle System > Automatic Transaxle Control System > ON/OFF Solenoid Valve > Description and Operation

Description

ON/OFF solenoid valve is attached to the valve body and is an on/off solenoid valve that is used to change gears.



Automatic Transaxle System > Automatic Transaxle Control System > ON/OFF Solenoid Valve > Specifications

Specifications

ON/OFF Solenoid Valve

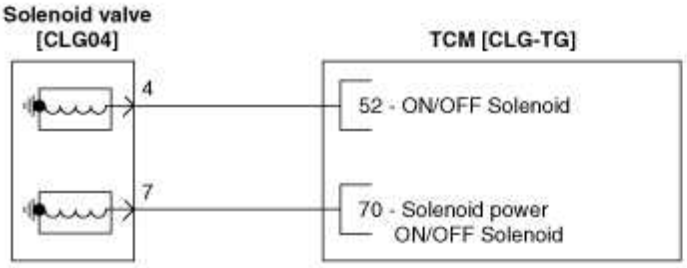
Control type : Normal low type

Control pressure kpa (kgf/cm², psi)	539.36 (5.5, 78.23)
Internal resistance(Ω)	10~11

Automatic Transaxle System > Automatic Transaxle Control System > ON/OFF Solenoid Valve > Schematic Diagrams

Circuit Diagram

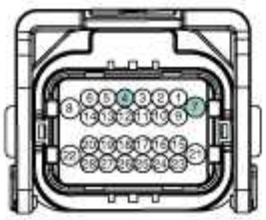
[Circuit Diagram]



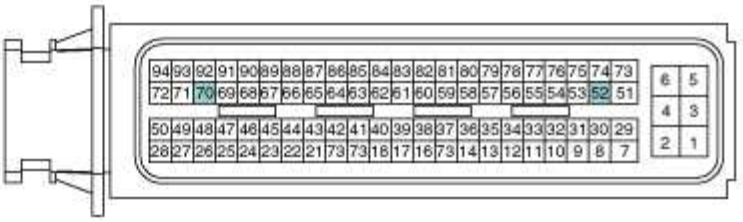
[Connection Information]

Terminal	Connected to	Function
4	TCM(52)	ON/OFF Solenoid
7	TCM(70)	Solenoid power

[Harness Connector]



E Module Connector
[CLG04]



TCM Connector
[CLG-TG]

Automatic Transaxle System > Automatic Transaxle Control System > ON/OFF Solenoid Valve > Repair procedures

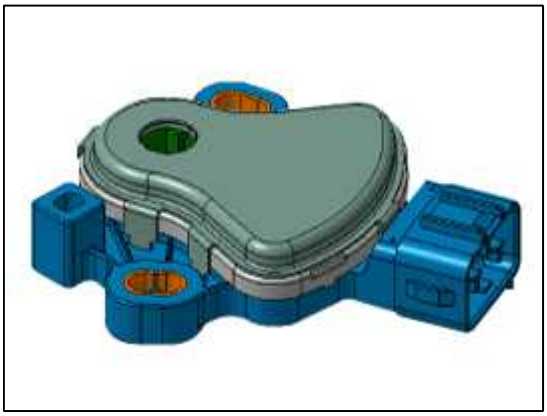
Inspection

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

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

Description

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



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

Specifications

Type: Combination of output signals from 4 terminals

Power supply (V)	12
Output type	Pin to Pin

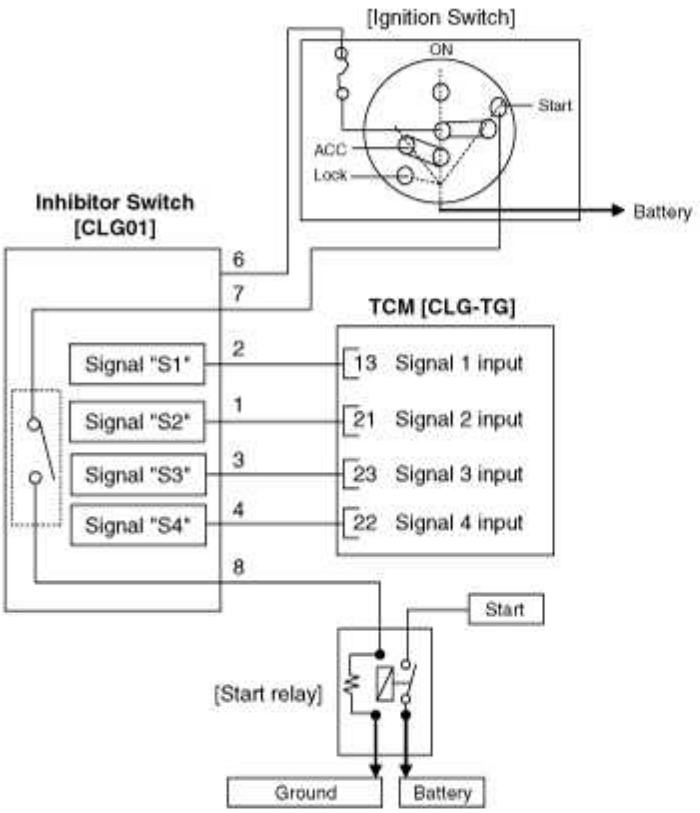
Signal Code Table

PIN No.	P	P-R	R	R-N	N	N-D	D
S1	12V	12V	O	O	O	O	O
S2	O	12V	12V	12V	O	O	O
S3	O	O	O	12V	12V	12V	O
S4	O	O	O	O	O	12V	12V

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

Circuit Diagram

[Circuit Diagram]



[Connection Information]

Terminal	Connected to	Function
1	TCM (21)	Signal 2 input
2	TCM (13)	Signal 1 input
3	TCM (23)	Signal 3 input
4	TCM (22)	Signal 4 input
6	Ignition switch	IG 1
7	Ignition switch	Start power(ON) 12V
8	Start relay	Start relay

[Harness Connector]

Inhibitor Switch Connector
[CLG01]

TCM Connector
[CLG-TG]

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

Inspection

NOTE

- Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.

Power Circuit Inspection

1. Disconnect the Inhibitor swtich connector.
2. Ignition KEY "ON"" & Engine "OFF".

3. Measure voltge between supplied power and ground at inhibitor circuit.

Specification : Approx. 12V

Signal Circuit Inspection

1. Connect the Inhibitor switch connector.
2. Ignition KEY "ON" & Engine "OFF".
3. Measure voltages between each terminal and chassis ground during shift lever changed "P, R, N, D".

Specification : See below "Signal Code Table"

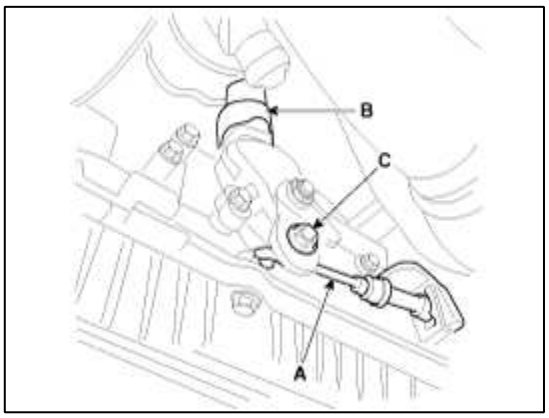
Signal Code Table

	P	P-R	R	R-N	N	N-D	D
Signal "1"	12V	12V	0	0	0	0	0
Signal "2"	0	12V	12V	12V	0	0	0
Signal "3"	0	0	0	12V	12V	12V	0
Signal "4"	0	0	0	0	0	12V	12V

Removal

1. Turn ignition switch OFF and disconnect the negative (-) battery cable.
2. Disconnect the inhibitor connector (B) and then remove the shift cable (A) by removing nut (C).

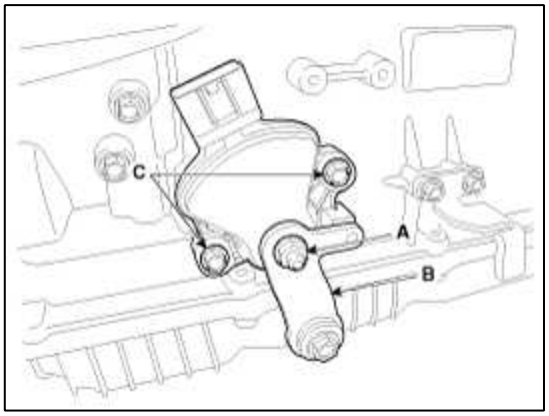
Tightening torque:
13.7 ~ 17.7 N.m (1.4 ~ 1.8 kgf.m, 10.1 ~ 13.0 lb-ft)



3. Remove the manual control lever (B) after removing a nut (A).

4. Remove the inhibitor switch assembly after removing the bolts (C).

Tightening torque:
[A] 16.7 ~ 25.5 N.m (1.7 ~ 2.6 kgf.m, 12.3 ~ 18.8 lb-ft)
[C] 9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)

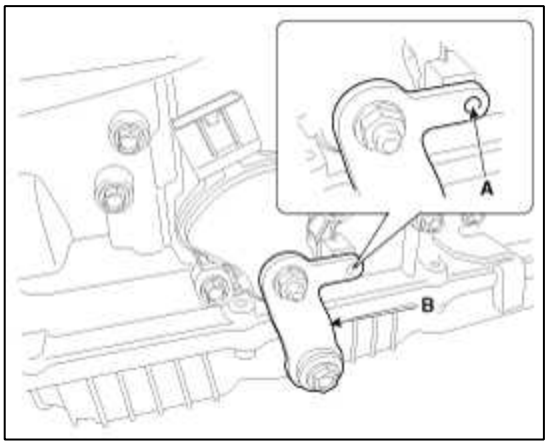


Installation

1. Installation is the reverse of removal.

NOTE

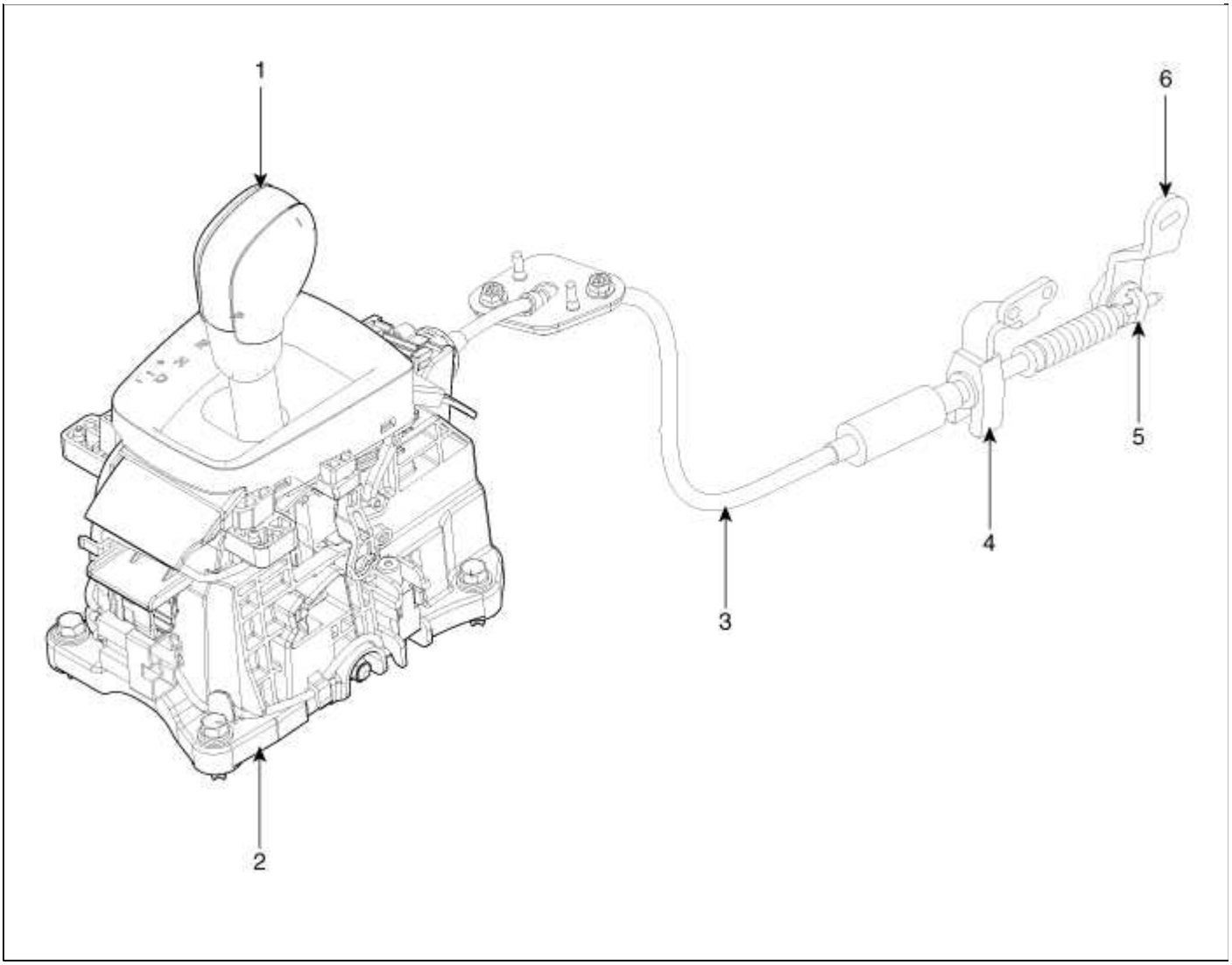
- Assembly the control lever (B) after seeting hole (A) aligning.



- Install the shift cable after adjust the FREE PLAY of cable.

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

Components



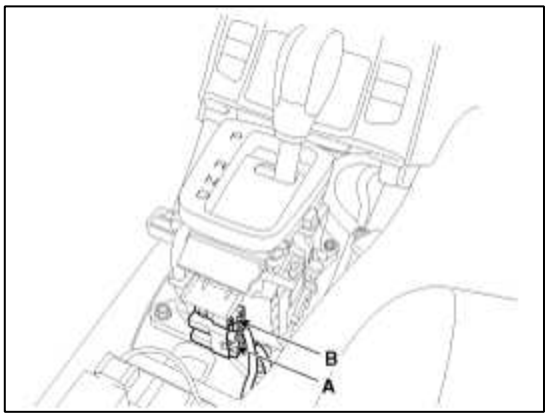
1. Shift lever knob 2. Shift lever assembly 3. Shift cable	4. Bracket 5. Special bolt 6. Manual lever

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

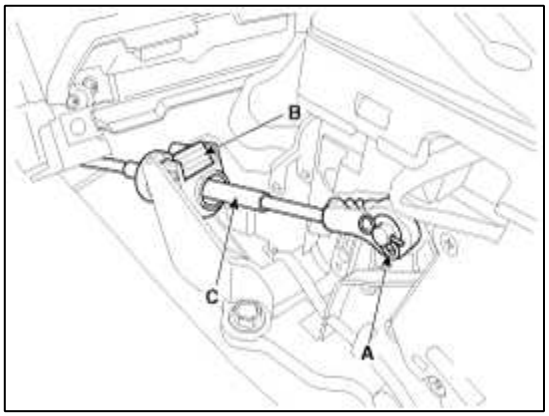
Removal

1. Disconnect (-) terminal from the battery.
2. Remove the console assembly.
   (Refer to Body - "console")

3. Disconnect the sport mode connector (A) and indicator connector (B).

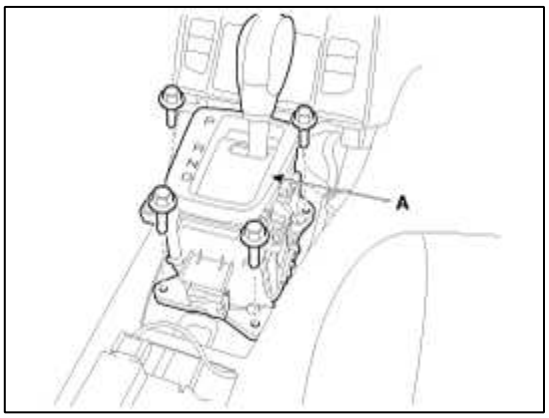


4. Take off the clip (A) and remove the shift cable assembly (C) by pressing the guide (B).



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

Tightening torque :
9 ~ 14 N.m (0.9 ~ 1.4 kgf.m, 6.51 ~ 10.12 lb-ft)



Installation

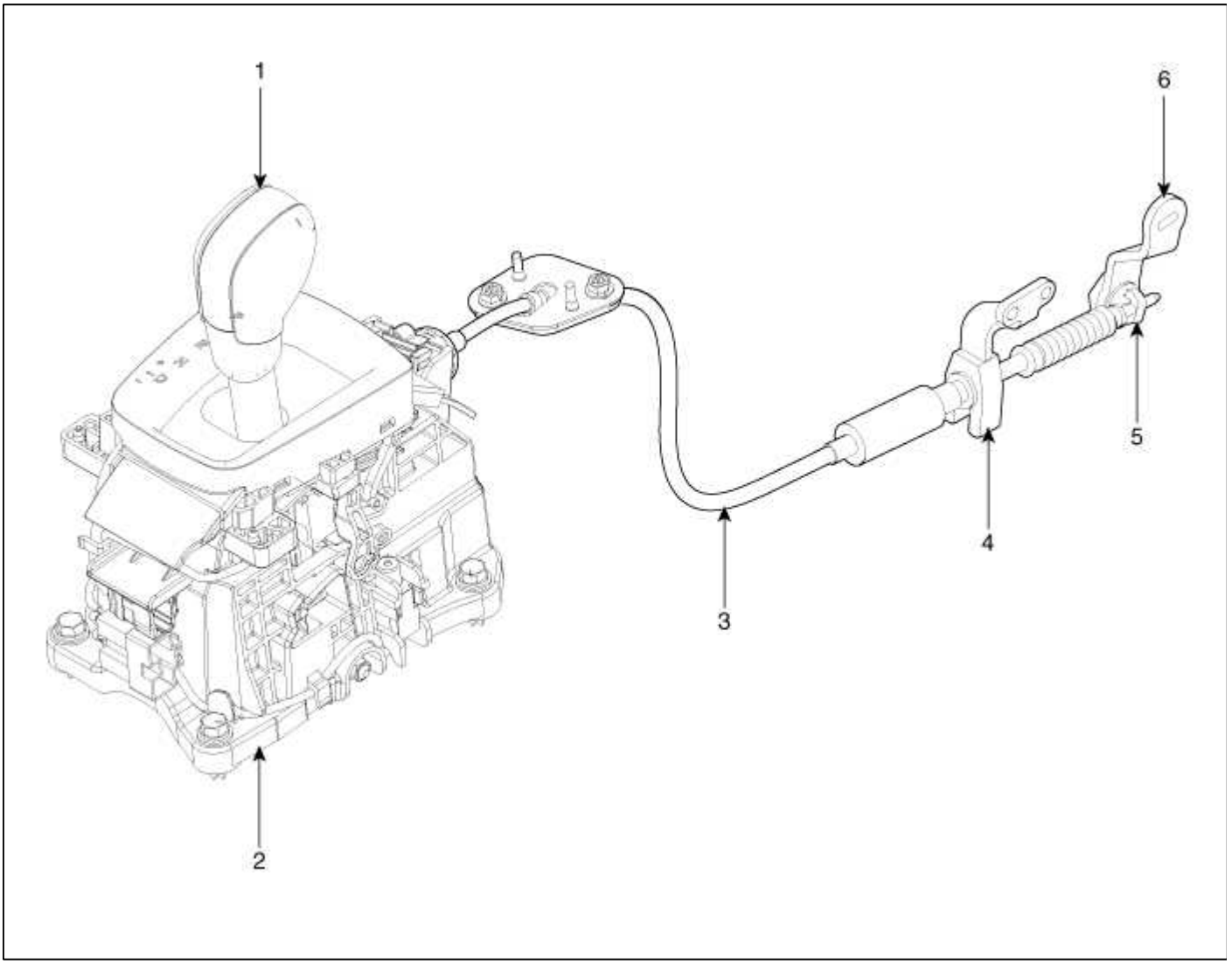
1. Installation is the reverse order of removal.

CAUTION

- When installing, set room side Shift lever and T/M side manual control lever to N position.
- After installing, check to be sure that this part operates as designed at each range of T/M side corresponding to each position of room lever.

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

Components



1. Shift lever knob 2. Shift lever assembly 3. Shift cable	4. Bracket 5. Special bolt 6. Manual lever

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

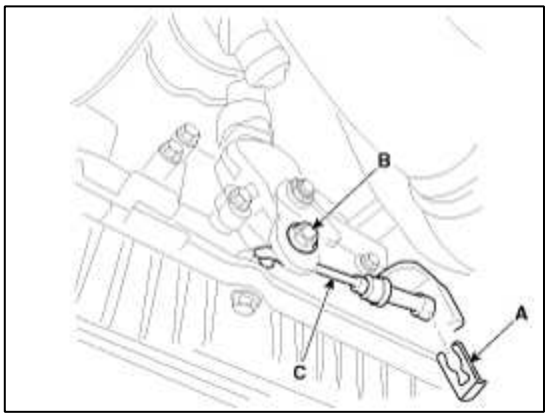
Inspection

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

Removal

1. Disconnect (-) terminal from the battery.

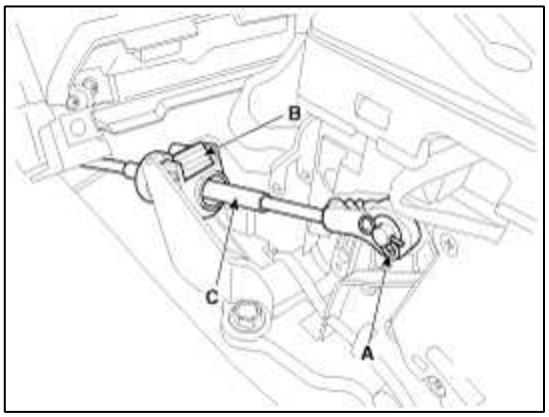
2. Loosen the nut (B) and then remove the shift cable (C) by removing the clip (A).



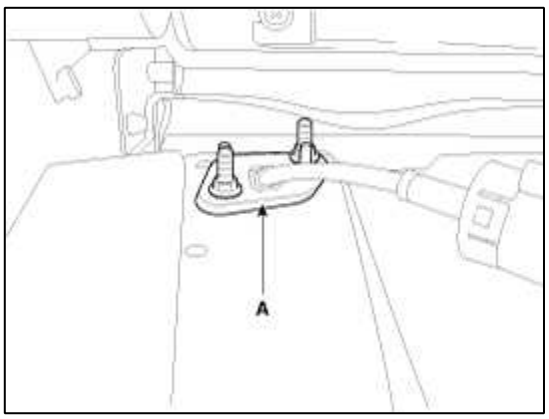
NOTE

Do not reuse the clip (A).

3. Remove the console assembly.
   (Refer to Body - "console")
4. Take off the clip (A) and remove the shift cable assembly (C) by pressing the guide (B).



5. Remove the retainer (A).



Installation

1. Installation is the reverse order of removal.

CAUTION

- When installing, set room side Shift lever and T/M side manual control lever to N position.
- When installing, adjust the shift cable.
- After installing, check to be sure that this part operates as designed at each range of T/M side corresponding to each position of room lever.

Adjustment

How To Adjust Shift Cable

1. Set room side Shift lever and T/M side manual control lever to N position.
2. Insert the shift cable to the bracket and hold it with a new clip.
3. Push cable to "F" direction shown to eliminate FREE PLAY.
4. Firmly hold the special bolt with a spaner and tighten the nut with the specified torque.

Tightening torque :
13.7 ~ 17.7 N.m (1.4 ~ 1.8 kgf.m, 10.1 ~ 13.0 lb-ft)