ATA -2

GENERAL

SPECIFICATION E3E15784

Transaxle model		A4CF2	
Engine model		Gasoline 2.0L/ Diesel 1.6L	
Torque o	converter	3 elements 2 phases 1 stage	
Torque cor	verter size	Ø236	
Oil pun	np type	Parachoid	
Transaxle	case type	Separated	
		Clutch: 3EA	
Friction 6	elements	Brake: 2EA	
		OWC: 1EA	
Planeta	ry gear	2EA	
	1st	2.919	
	2nd	1.551	
Gear ratio	o 3rd	1.000	
0100	4th	0.713	
	Reverse	2.480	
Final ge	ear ratio	3.849(Gasoline)/ 3.532(Diesel)	
Fluid pressure	balance piston	3EA	
Stall s	speed	2,000~2,700 rpm	
Accumulator		4EA	
Solenoi	d valve	6EA (PWM:5EA, VFS:1EA)	
Gear shift position		4 range (P,R,N,D)	
Oil filter		1EA	

PWM : Pulse Width ModulationVFS : Variable Force Solenoid

GENERAL ATA -3

TIGHTENING TORQUE

Item	Nm	kgf.m	lb-ft
Control cable bracket	15~22	1.5~2.2	11~16
Input shaft speed sensor	10~12	1.0~1.2	7~8
Output shaft speed sensor	10~12	1.0~1.2	7~8
Manual control lever	17~21	1.7~2.1	13~15
Inhibitor switch	10~12	1.0~1.2	7~8
Oil pan	10~12	1.0~1.2	7~8
Valve body mounting bolt	10~12	1.0~1.2	7~8
Oil drain plug	35~45	3.5~4.5	25~32
Pressure check plug	8~10	0.8~1.0	6~7
Front roll support bracket bolt	60~80	6.0~8.0	43~58
Rear roll support bracket bolt	60~80	6.0~8.0	43~58
Transaxle support bracket bolt	60~80	6.0~8.0	43~58

LUBRICANT ECGBEABS				
Item	Specified lubricant	Quantity		
Transaxle fluid liter (US qt, Imp.qt)	GENUINE DIAMOND ATF SP-III or SK ATF SP -III	6.6 (6.9, 5.81)		
شرکت دیجیتال خودرو سامانه (مسئولیت محمده)				

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

AUTOMATIC TRANSAXLE (A4CF2)

SPECIAL TOOL E9708F91

Tool (Number and name)	Illustration	Use
09200-38001 Engine support fixture		Removal and installation of the transaxle.
	AKGF020A	
09624-38000 Crossmember supporter		Supporting of the crossmember.
خودرو	EKBF005A	000



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AUTOMATIC TRANSAXLE SYSTEM

DESCRIPTION E99A07D1

The new small sized automatic transaxle (A4CF2) is for gasoline 2.0 & Diesel 1.6 engine. The transaxle (A4CF2) is improved on the durability, fuel consumption and efficiency by the new main features as followed.

The new main features

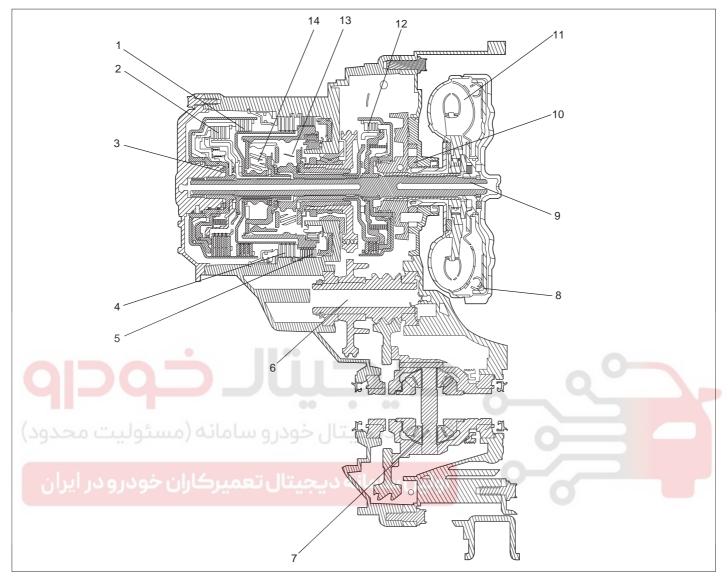
- 1. The hydraulic centrifugal oil pressure balance piston.
- 2. The full line pressure variable control system.
- 3. The long travel damper clutch.
- 4. The disc type return spring.
- 5. The ultra flat torque converter.

FUNCTIONS

Item	Contents
	The full line pressure variable control operates in the valve body to improve the fuel consumption.
	The long travel damper clutch is applied to the torque converter to improve the engine revolution change reduction capability and the fuel consumption. (17~20°)
()0) 70, "	The oil pump of the trochocentric type is changed to parachoid type to improve the processing and the capacity efficiency at the low RPM range.
Components	The disc type return spring is applied to the low & reverse brake to improve the durability and reduce the length.
ان خودرو در ایران	The hydraulic centrifugal oil pressure balance piston is applied to the inside of clutch to improve the durability and the shift control capability.
	The low noise gear and the gear teeth face grinding are applied to the transfer driven gear to improve the noise and the durability.
	The oil pressure value set by TCM is coupled with the engine torque so that the stable shift feeling can be improved.
	The engine torque reduction control operates effectively to improve the shift feeling and the durability.
	It can be the skip shift of 1 3 and 2 4 when shifting.
	The reverse clutch, not L/R brake is controlled when controlling the N R shift so that the N R shift feeling can be improved.
Electronic control system	The range of the damper clutch direct control expands to improve the fuel consumption.
	The current control chip is installed into the TCM to regulate the solenoid control current and control the oil pressure securely according to the change of the temperature and voltage.
	The FPC(Flexible Printed Circuit) harness is composed of the thin and flat copper in the insulating film like electric wire.
	The tachometer is operated by the change of the frequency forwarded from the TCM to the instrument cluster, not vehicle speed sensor.

ATA -6

TRANSAXLE STRUCTURE



- 1. Reverse clutch
- 2. Overdrive clutch
- 3. Rear cover
- 4. Second brake
- 5. Low and reverse brake
- 6. Output shaft
- 7. Differential

- 8. Damper clutch
- 9. Input shaft
- 10. Oil pump assembly
- 11. Torque converter assembly
- 12. Underdrive clutch
- 13. Output planetary carrier
- 14. Overdrive planetary carrier

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ATA -7

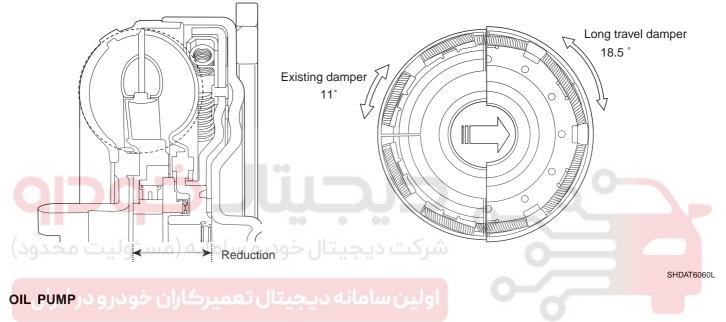
MECHANICAL SYSTEM

FUNCTION

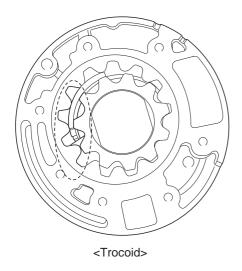
TORQUE CONVERTER

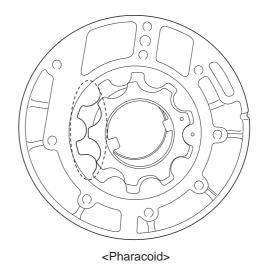
The torque converter, as the power plant which delivers the power of engine to the automatic transaxle, consists of 3 elements, 2 phases and 1 stage type.

- The flowing section form of the torque converter changes the round type to the flat type to reduce the length of the torque converter.
- The maximum operating degree of the damper clutch installed inside the transaxle increases from 11° to 18.5° to improve the engine revolution change reduction capability and the fuel consumption



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





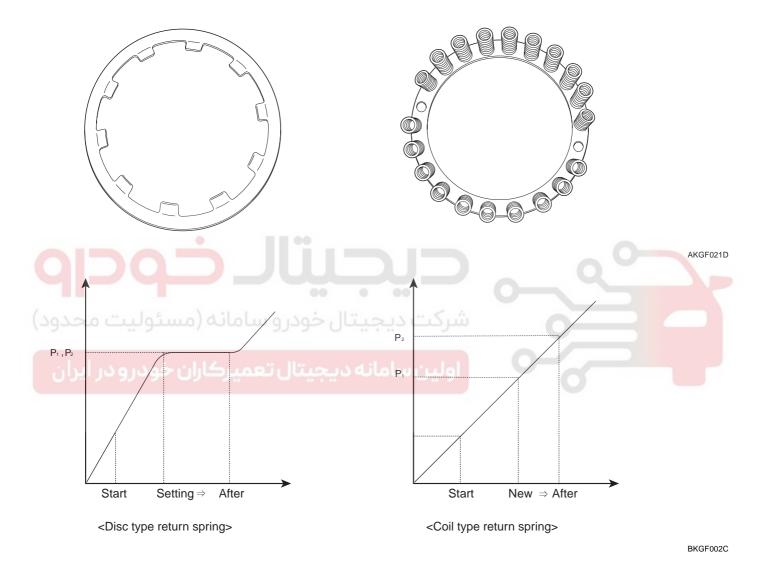
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BRAKES

The automatic transaxle (A4CF2) uses the low and reverse brake and the second brake. The low and reverse brake is fixed by the low and reverse annulus gear and overdrive planetary carrier at the 1st speed.

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

The overdrive sun gear is held on the transaxle case by the second brake at the 2nd speed.



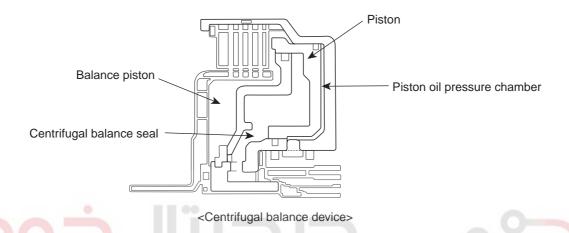
CLUTCH

The multiple clutches and the one way clutch are used as the transaxle device.

The retainer of each clutch is composed of the precision sheet metal parts to realize the productivity and the light weight.

The hydraulic centrifugal oil pressure balance device places inside the clutch assembly.

Generally the oil remained in the piston oil pressure chamber pushes the piston by the centrifugal force. But to prevent the piston from being pushed, the oil filled in between the piston and the return spring retainer occurs the centrifugal force and both of the power is offset so that the piston don't move. In result, it improves the durability and the shift control ability.

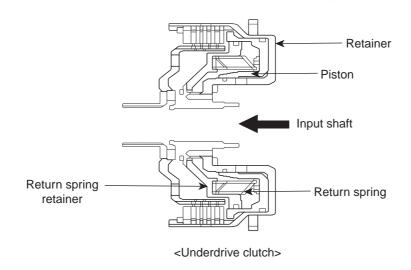


1. UNDERDRIVE CLUTCH

The underdrive clutch is engaged at 1st, 2nd and 3rd speed.

The driving force of input shaft is delivered to the underdrive sun gear.

The operating oil pressure in the underdrive clutch components operates between the piston and the retainer and pushes the piston to the clutch discs to deliver the driving force from the retainer to the hub.



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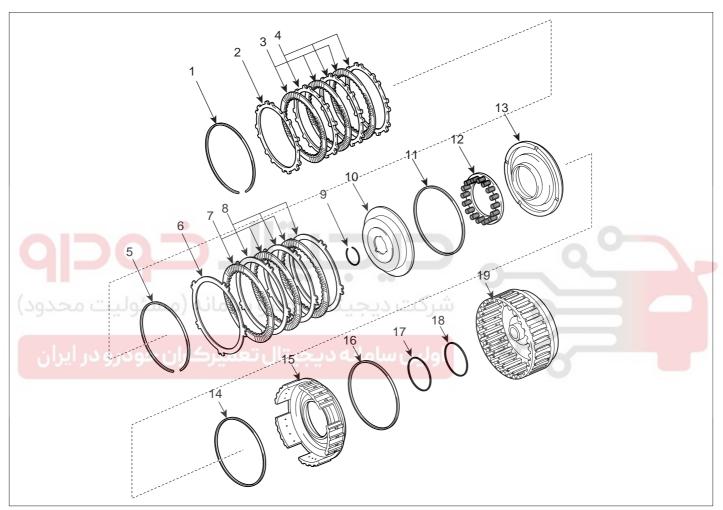
2. REVERSE CLUTCH AND OVERDRIVE CLUTCH

The reverse clutch is engaged at the reverse and delivers the driving force of input shaft to the reverse sun gear.

The overdrive clutch is engaged at the 3rd and 4th speed and delivers the driving force of input shaft to the overdrive planetary carrier and the low and reverse annulus gear.

The operating oil pressure of the reverse clutch operates between the reverse clutch retainer and overdrive clutch retainer and it has the whole overdrive clutch moved to deliver into the hub via retainer.

STRUCTURE OF THE REVERSE AND THE OVERDRIVE CLUTCH



- 1. Snap ring
- 2. Clutch reaction plate
- 3. Clutch disc
- 4. Clutch plate
- 5. Snap ring
- 6. Clutch reaction plate
- 7. Clutch disc

- 8. Clutch plate
- 9. Snap ring
- 10. Spring retainer
- 11. D-ring
- 12. Return spring
- 13. Overdrive clutch piston
- 14. D-ring

- 15. Reverse clutch piston
- 16. D-ring
- 17. D-ring
- 18. D-ring
- 19. Reverse clutch retainer

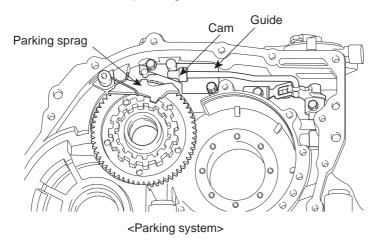
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ATA -11

PARKING SYSTEM

The parking system for A4CF2 model is the cam type. The roller type installed to the existing new generation AT needs the support to move the roller when operating the

parking system and is so complicated. But the cam type for A4CF2 model doesn't need the support and the structure is simply. It only needs the guide to prevent from moving the cam idly.



BKGF003D

POWER TRAIN

	UD/C	OD/C	REV/C	2-4/B	LR/B	OWC
P	4		LU.			
R	1 6 \		11			
(29220 CT	ته (مستون	حودرو ساما	ت دیجیتال	سرد	0	
D1	كالمنظمة		and the land			
D2	ركارال حودار				0	
D3						
D4						
L						

OPERATION EBB55498

HYDRAULIC CONTROL SYSTEM

MAIN FEATURES

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

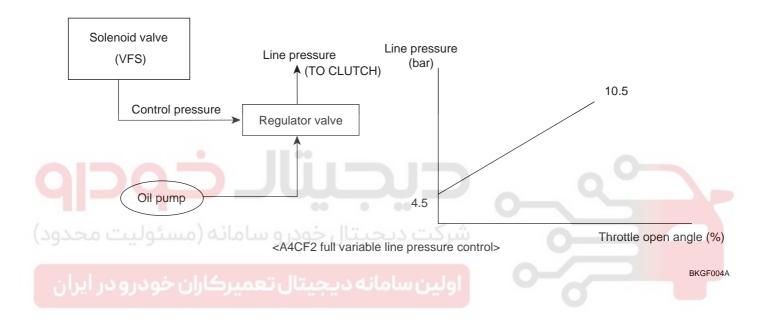
And the reducing valve which is installed in the valve body makes the solenoid control pressure using the reducing

AUTOMATIC TRANSAXLE (A4CF2)

pressure instead of the line pressure like the HIVEC transaxle.

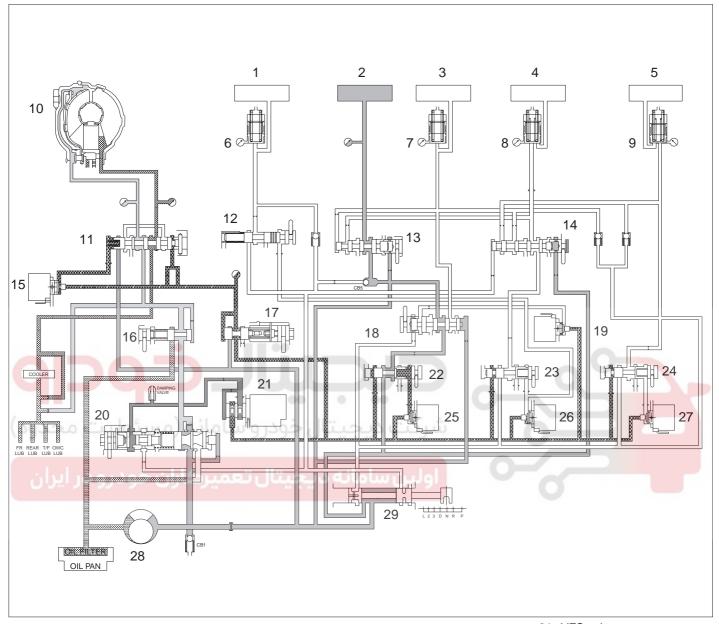
The material of spool valve in the valve body is changed from the steel to aluminum to reduce the oil leakage by the thermal expansion between the valve body and spool valve at the high temperature.

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



ATA -13

STRUCTURE OF HYDRAULIC CIRCUIT



- 1. Reverse clutch
- 2. Low and reverse brake
- 3. Overdrive clutch
- 4. 2/4 brake
- 5. Underdrive clutch
- 6. Reverse clutch accumulator
- 7. Overdrive clutch accumulator
- 8. 2/4 brake accumulator
- 9. Underdrive clutch accumulator
- 10. Torque converter assembly

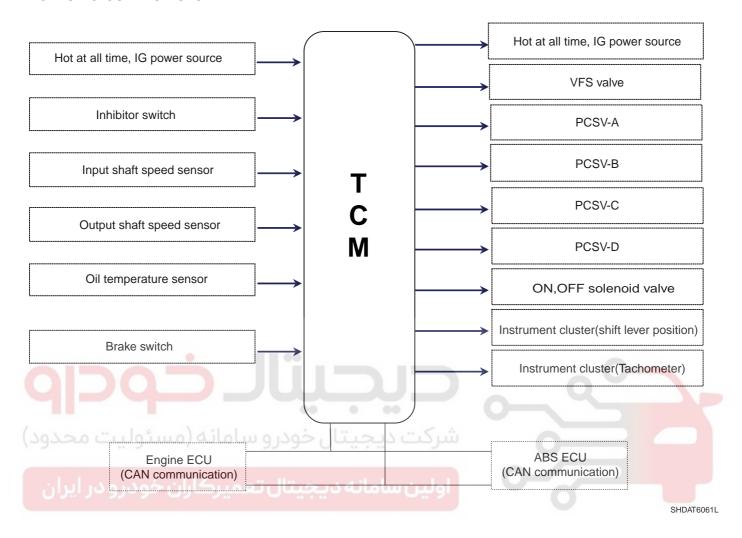
- 11. Damper clutch control valve
- 12. N-R control valve
- 13. Fail safe valve-A
- 14. Fail safe valve-B
- 15. PCSV-D
- 16. Torque converter pressure control valve
- 17. Reducing valve
- 18. OD & L/R switch valve
- 19. ON/OFF solenoid valve
- 20. Regulating valve

- 21. VFS valve
- 22. Pressure control valve-A
- 23. Pressure control valve-B
- 24. Pressure control valve-C
- 25. PCSV-A
- 26. PCSV-B
- 27. PCSV-C
- 28. Oil pump
- 29. Manual valve

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AUTOMATIC TRANSAXLE (A4CF2)

ELECTRONIC CONTROL SYSTEM



ATA -15

SENSOR AND ACTUATOR FUNCTION

ITEM	FUNCTION
Input shaft speed sensor	Detect the input shaft rpm(TURBINE RPM) at the OD/RVS retainer
Output shaft speed sensor	Detect the output shaft rpm(T/F DRIVE GEAR RPM) at the T/F drive gear
Engine rpm signal	Receive the engine rpm via CAN communication with ECM
Fluid temperature sensor	Detect the temperature of ATF through the thermistor
Brake switch	Detect the brake operation at the contact switch of the brake pedal
Inhibitor switch	Detect the position of select lever through the contact switch
ON/OFF solenoid valve (SCSV-A)	Control the hydraulic passage for the shift control
VFS solenoid valve	Change the line pressure from 4.5 bar to 10.5 bar according to throttle open angle and shift ranges
PCSV-A(SCSV-B)	Control the OD or L/R hydraulic pressure to the pressure control valve for shift control
PCSV-B(SCSV-C)	Control the 2/4 or REV hydraulic pressure to the pressure control valve for shift control
PCSV-C(SCSV-D)	Control the UD hydraulic pressure to the pressure control valve for shift control
PCSV-D(TCC)	Control the hydraulic pressure for the damper clutch control
Torque reduction operation signal	Receive the signal of engine reduction pressure operation from ECM via CAN communication
و سامانه (مسئولیت Cluster	Send the signal of the current position of shift lever and vehicle speed and operate the lamp, distance meter and speed meter

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AUTOMATIC TRANSAXLE (A4CF2)

TCM

The TCM which is adapted to the new small sized automatic transaxle (A4CF2) is integrated into the ECM and deliver information via CAN communication.

ITEM	BOSCH TCM	
Hardware	Integrated type	
Duty driving	Chopping method	
Main oil pressure control components	Turbin torque, Vehicle speed	
ATF Temp. compensation control	Independently	
Direct control range	Wide	

TLE6288 current control chip

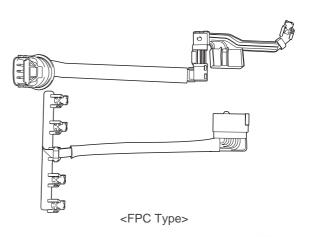
The TLE6288 current control chip is installed into the TCM to regulate the solenoid control current and control the oil pressure securely according to the change of the temperature and voltage. In this case, the control signal of solenoid valve is divided into the Peak signal and the Hold signal.

1. Peak: The 12 voltage signal applied to move the solenoid plunger quickly.

2. Hold: The signal applied to keep holding the pulled solenoid valve.

FPC (FLEXIBLE PRINTED CIRCUIT) HARNESS

The FPC (Flexible Printed Circuit) harness is composed of the thin and flat copper in the insulating film like electric wire.



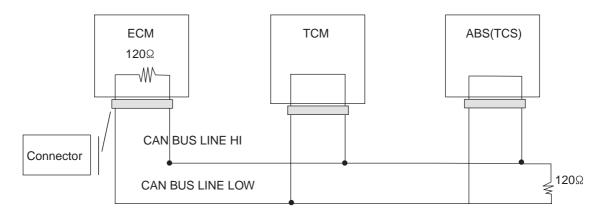
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ltem	Round Wire Type	FPC Type
Weight (g)	96.6	72
Practical use of space	Low	High
TM installation capability	اولین ساBad دیجیتال تـ	Good
Softness	High	Low
Drawing modification	Normal Low	
Quality occurring	High	Low
Tighten in solenoid valve	Bad	Good
Measurement	Unstable	Stable

ATA -17

CAN COMMUNICATION

LAYOUT



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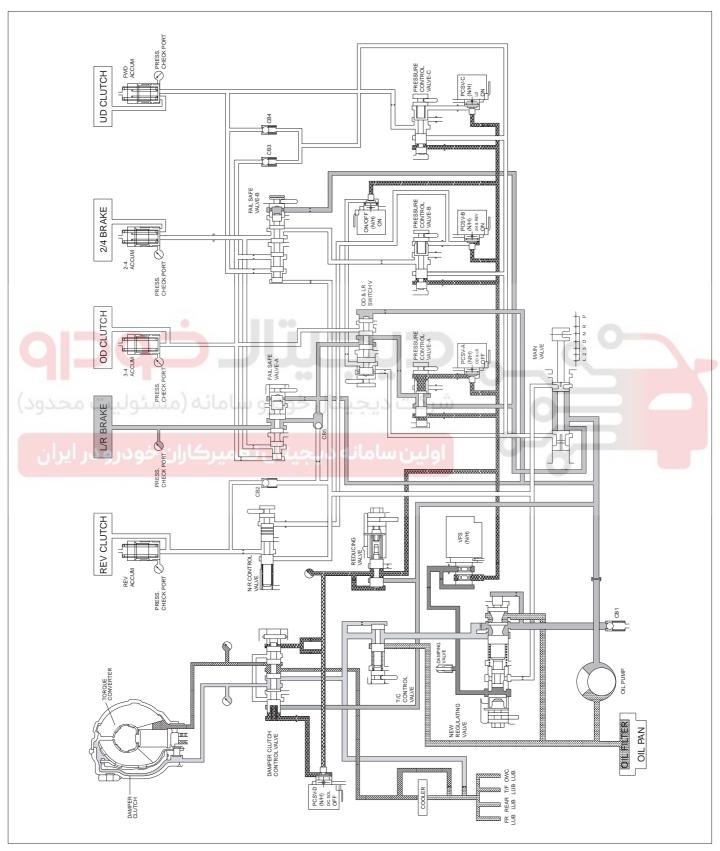
ECM- TCM CAN COMMUNICATION ERROR MANAGEMENT

No.	Item	Error management
1	Engine rpm	3,000 RPM
2	Engine torque	80%
3	Vehicle speed	0 km/h
(101004	A/C Switch	OFF
5	Engine coolant temperature	70°C
6	TPS	50%
1 2 3 John Janes	Shift range hold signal	OFF

ATA -18

HYDRAULIC CIRCUIT E3672CF

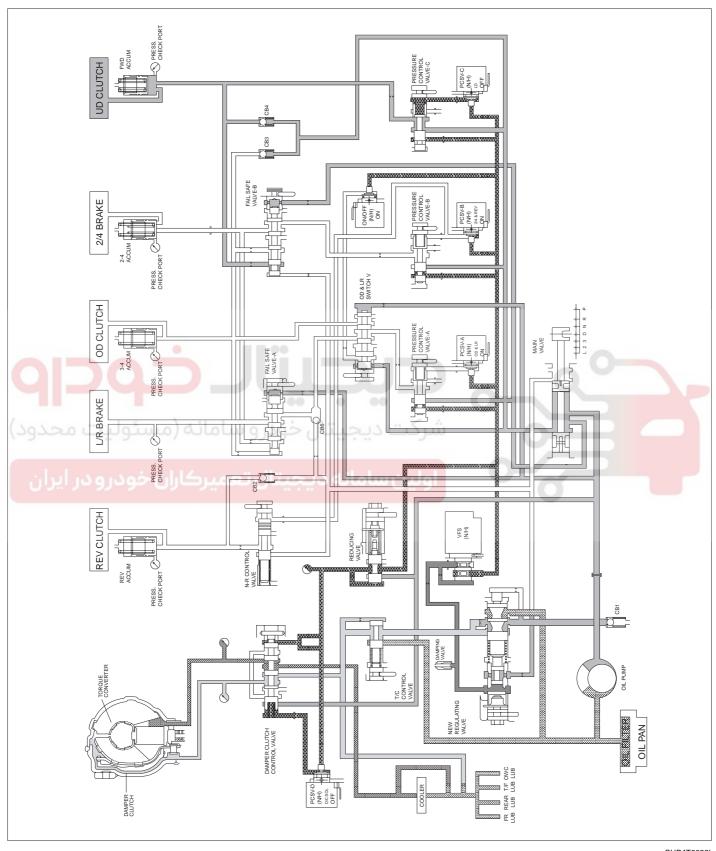
N RANGE, P RANGE



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ATA -19

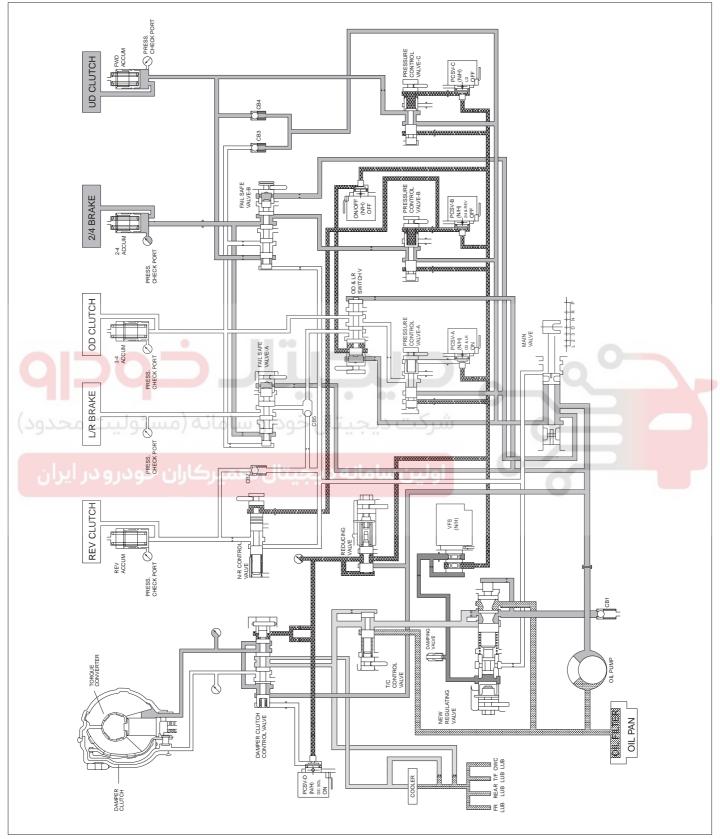
D RANGE(1ST)



SHDAT6032L

ATA -20

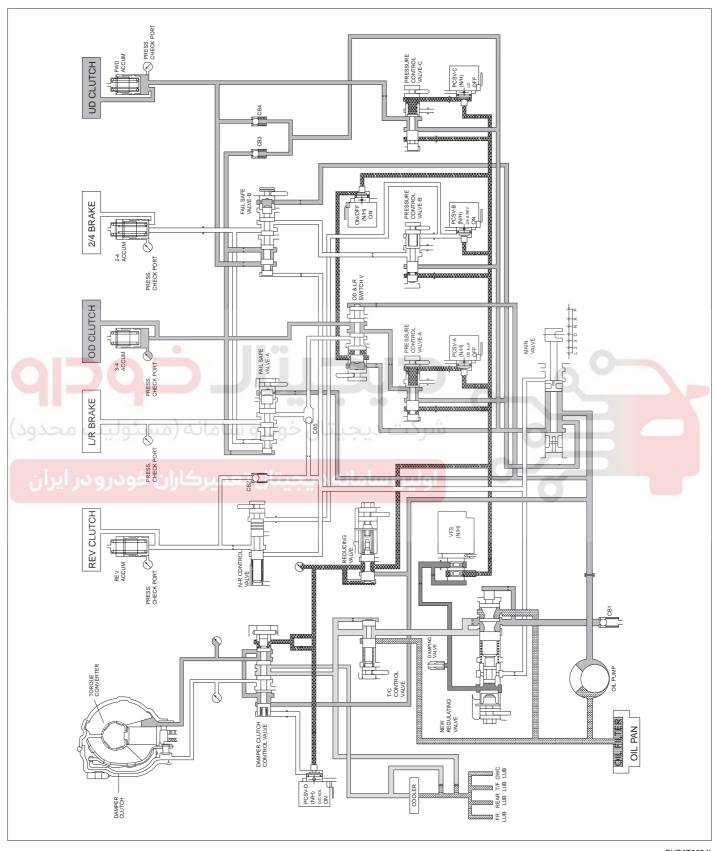
D RANGE(2ND)



SHDAT6033L

ATA -21

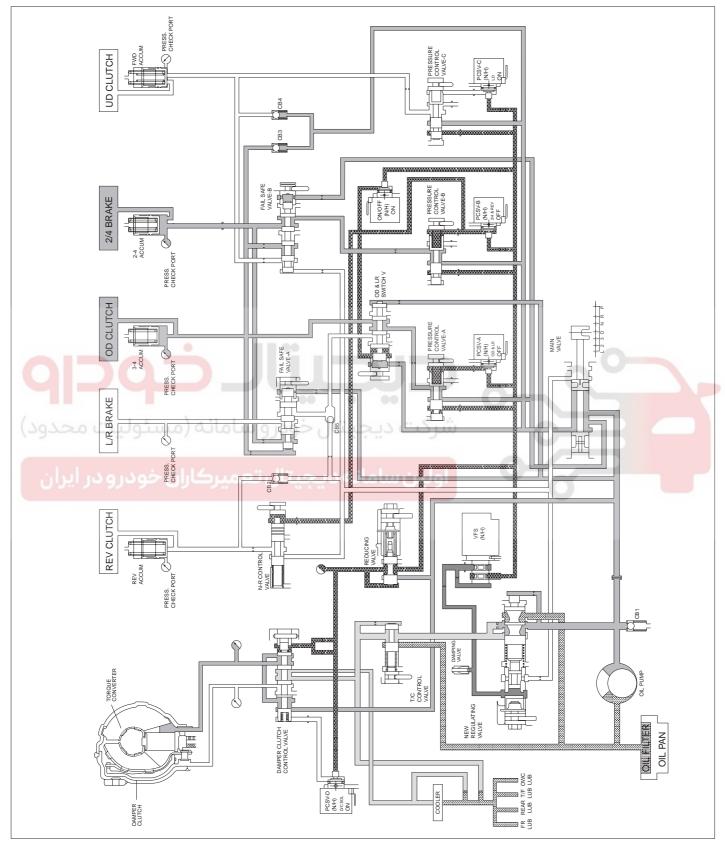
D RANGE(3RD)



SHDAT6034L

ATA -22

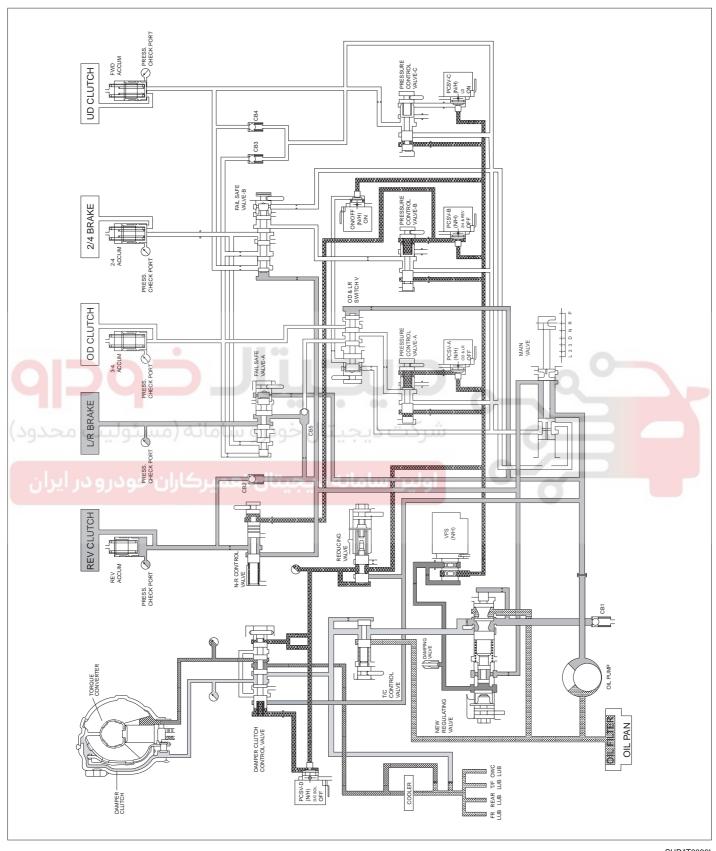
D RANGE(4TH)



SHDAT6035L

<u>ATA -23</u>

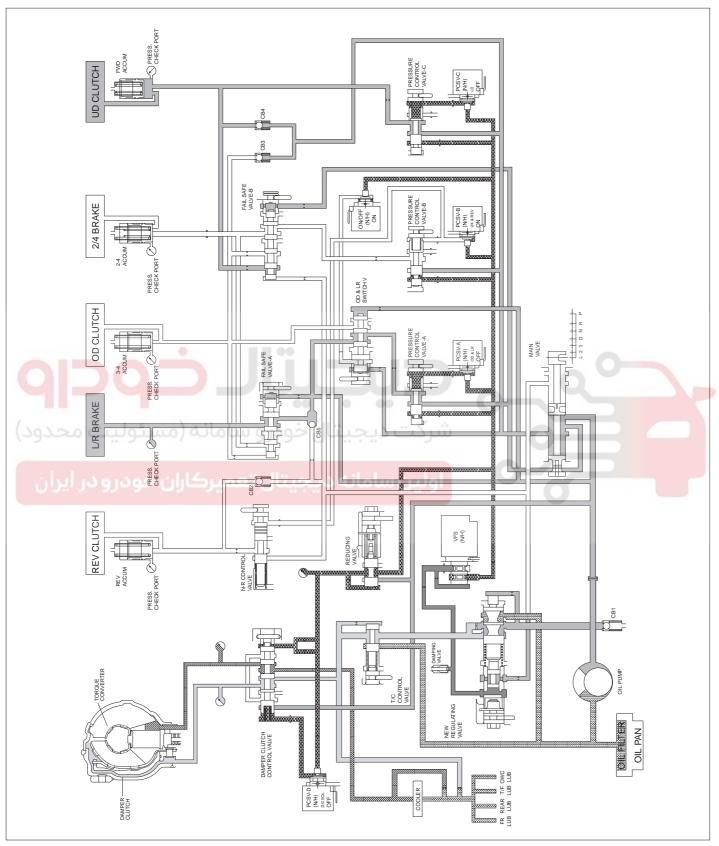
R RANGE



SHDAT6036L

L RANGE

ATA -24



SHDAT6037L

ATA -25

BASIC INSPECTION ADJUSTMENT EB540

TRANSAXLE FLUID LEVEL

INSPECTION

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

MOTE

If the fluid smells as if it is burning, it means that the fluid has been contaminated by fine particles from the bushes and friction materials, a transmission overhaul may be necessary.

 Check that the fluid level is in the "HOT" mark on the oil level gauge. If fluid level is low, add automatic transaxle fluid until the level reaches the "HOT" mark.

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

NOTE

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

6. Insert the oil level gauge securely.

NOTE

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

REPLACEMENT

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

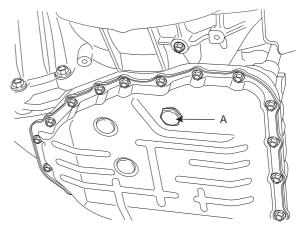
- 1. Disconnect the hose, which connects the transmission and the oil cooler (inside the radiator).
- 2. Start the engine and let the fluid drain out.

Running conditions: "N" range with engine idling

A CAUTION

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

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



AKGF032W

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

TORQUE:

35~45 Nm (3.5~4.5kgf.m, 25~32lb-ft)

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Pour the new fluid in through the oil filler tube.



(1) CAUTION

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

Repeat the procedure in step (2).



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

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

TORQUE CONVERTER STALL TEST

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



A CAUTION

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

- Check the automatic transmission fluid level and temperature and the engine coolant temperature.
 - Fluid level: At the HOT mark on the oil level
 - Fluid temperature: 80~100°C (176~212°F)
 - Engine coolant temperature : 80~100°C (176~212°F)
- Check both rear wheels (left and right).
- Pull the parking brake lever on, with the brake pedal fully depressed.
- 4. Start the engine.
- Move the select lever to the "D" position, fully depress the accelerator pedal and take a reading of the maximum engine speed at this time.



CAUTION

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

Stall rpm: 2,000~2,700 RPM

ATA -27

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

ELEMENTS IN USE IN EACH GEAR

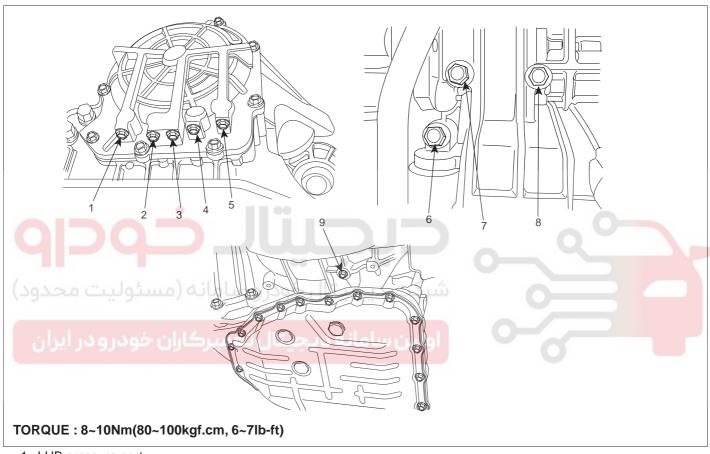
	UD/C	OD/C	REV/C	2-4/B	LR/B	OWC
Р						
R						
N						
D1						
D2					0	
D3	4					
D4	راه (میرو) دا	مَا الله الله	11:10:10:11	<		
L	ب رستون	حودرو سام	ا دیجیت	سرد		

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AUTOMATIC TRANSAXLE (A4CF2)

HYDRAULIC PRESSURE TEST

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



- 1. LUB pressure port
- 2. RED pressure port
- 3. OD pressure port

- 4. 2/4 pressure port
- 5. REV pressure port
- 6. DA pressure port
- 7. UD pressure port
- 8. LR pressure port
- 9. DR pressure port

BKGF008A

ATA -29

STANDARD HYDRAULIC PRESSURE TABLE

Nia	Shift range	Operation				N.4	Oil pressure (kgf/om²)					
No.	position	PCSV-A	PCSV-B	PCSV-C	PCSV-D	ON/OFF	OFF Measuring	LR	2-4(2ND)	UD	OD	REV
1	D	0	100	0	0	ON	LR	10.5±0.2	0	10.5±0.2	0	0
2	1	50	1	1	1	↑	1	5.7±0.4	1	1	1	1
3	1	75	1	1	1	1	1	0.9±0.3	1	1	1	1
4	1	100	1	1	1	1	1	0	1	1	1	1
5	1	1	0	1	100	OFF	2-4(2ND)	0	10.5±0.2	1	1	1
6	1	1	50	↑	1	↑	1	↑	5.7±0.4	1	1	1
7	1	1	75	↑	1	↑	1	↑	0.9±0.3	1	1	↑
8	1	↑	100	↑	1	↑	1	↑	0	↑	1	↑
9	↑	0	1	↑	1	↑	OD	↑	1	↑	10.5±0.2	↑
10	1	50	1	↑	1	1	1	↑	1	1	5.7±0.4	↑
11	1	75	1	1	1	1	1	↑	1	1	0.9±0.3	1
12	1	100	1	1	1	1	1	1	1	1	0	1
13	1	1	1	0	0	1	UD	1	1	10.5±0.2	1	1
14	1	1	1	50	1	1	1	1	1	5.8±0.4	1	1
15	1	1	1	75	1	1	1	1	1	1.0±0.3	1	1
16	1	0	○ ↑	100		1	1	1	1	0		1
17	R	1	0	1	1	ON	REV	17.5±0.2	1	1	1	17.5±0.2
18	\uparrow	1	50	\uparrow	\uparrow	1	1	1	1	1	1	8.7±0.6
19	1	1	75	1	↑ ○ ○	1		1	1	1	1	0.9±0.5
20	1	1.	100	م بأبام	112	11.1	1	1	1	1	1	0

[Measure condition]

Oil pump revolution : 2500rpm

LPCSV Duty ratio: 0%

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

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

SHDAT6062L

ATA -30

TROUBLESHOOTING

DIAGNOSTIC TROUBLE CODES (INSPECTION PROCEDURE)

Check the Diagnostic Trouble Codes

- 1. Turn the ignition switch to OFF.
- Connect the Hi-scan tool to the DLC connector for diagnosis.
- 3. Turn the ignition switch to ON.
- 4. Check the diagnostic trouble codes using the Hi-scan tool
- Read the output diagnostic trouble codes. Then follow the remedy procedures according to the "DIAGNOS-TIC TROUBLE CODE DESCRIPTION" on the following pages.

₩ NOTE

- A maximum of 10 diagnostic trouble codes (in the sequence of occurrence) can be stored in the Random Access Memory (RAM) incorporated within the control module.
- The same diagnostic trouble code can be stored one time only.
- If the number of stored diagnostic trouble codes or diagnostic trouble patterns exceeds 10, already stored diagnostic trouble codes will be erased in sequence, beginning with the oldest.
- Do not disconnect the battery until all diagnostic trouble codes or diagnostic trouble patterns have been read out, because all stored diagnostic trouble codes or diagnostic trouble patterns will be cancelled when the battery is disconnected.
- All diagnostic trouble codes are deleted from memory the 200th time the ATF temperature reaches 50°C(122°F) after memorization of the most recent diagnostic code.
- 6. Delete the diagnostic trouble code.
- 7. Disconnect the Hi-scan tool.



DTC cleaning should only be done with the scan tool.



ATA -31

DIAGNOSTIC TROUBLE CODE TABLE

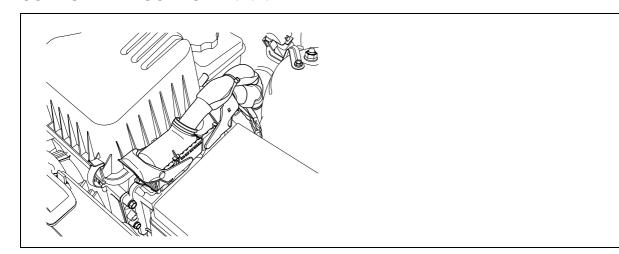
[GASOLINE 2.0]

No.	Code	Item	MIL	Remark
1	P0605	CHECK SUM ERROR		ATA-32
2	P0707	TRANSAXLE RANGE SWITCH CIRCUIT LOW INPUT		ATA-34
3	P0708	TRANSAXLE RANGE SWITCH CIRCUIT HIGH INPUT		ATA-40
4	P0711	TRANSAXLE FLUID TEMPERATURE SENSOR RATIONALITY		ATA-43
5	P0712	TRANSAXLE FLUID TEMPERATURE SENSOR CIRCUIT LOW INPUT		ATA-49
6	P0713	TRANSAXLE FLUID TEMPERATURE SENSOR CIRCUIT HIGH INPUT		ATA-50
7	P0716	A/T INPUT SPEED SENSOR RATIONALITY		ATA-53
8	P0717	A/T INPUT SPEED SENSOR CIRCUIT - OPEN or SHORT(GND)		ATA-60
9	P0722	A/T OUTPUT SPEED SENSOR CIRCUIT - OPEN or SHORT(GND)		ATA-62
10	P0731	GEAR 1 INCORRECT RATIO		ATA-69
11	P0732	GEAR 2 INCORRECT RATIO		ATA-76
12	P0733	GEAR 3 INCORRECT RATIO	0	ATA-82
13	P0734	GEAR 4 INCORRECT RATIO		ATA-88
14	P0741	TORQUE CONVERTER CLUTCH STUCK OFF		ATA-92
15	P0742	TORQUE CONVERTER CLUTCH STUCK ON		ATA-96
16	P0743	TORQUE CONVERTER CLUTCH CONTROL SOLENOID VALVE - OPEN or SHORT(GND)		ATA-100
17	P0748	VFS SOLENOID VALVE CIRCUIT - OPEN or SHORT(GND)		ATA-108
18	P0750	ON/OFF(SCSV-A) SOLENOID VALVE CIRCUIT - OPEN or SHORT(GND)		ATA-116
19	P0755	PCSV-A(OD & LR) SOLENOID VALVE CIRCUIT - OPEN or SHORT(GND)		ATA-124
20	P0760	PCSV-B(2-4 SOLENOID VALVE) CIRCUIT - OPEN or SHORT(GND)		ATA-133
21	P0765	PCSV-C(UD) SOLENOID VALVE CIRCUIT - OPEN or SHORT(GND)		ATA-141
22	P0880	TCM POWER SIGNAL ERROR		ATA-149
23	U0001	CAN TIME OUT		ATA-153
24	U0100	CAN BUS OFF		ATA-157

AUTOMATIC TRANSAXLE (A4CF2)

DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY(ROM) ERROR

COMPONENT LOCATION E9BD9FF6



SHDAT6311D

GENERAL DESCRIPTION EB054AAD

The TCU check ROM I.D all the time, in order to maintain for best condition and surrounding.

DTC DESCRIPTION ED831243

The TCU set this code When the ROM I.D is changed by external force or input non-available data.

DTC DETECTING CONDITION E39166A4

Item Detecting Condition		Possible Cause
DTC Strategy	Check sum fault	Faulty TCM
Enable Conditions	• IG "ON"	
Threshold Value • CAN message transfer error		
Diagnostic Time	More than 1sec	
Fail safe		

ATA -33

MONITOR SCANTOOL DATA E52CADC8

- 1. Connect scantool to data link connector(DLC).
- 2. Ignition "ON".
- 3. Confirm the "ROM I.D".
- 4. Perform the "ROM UP-DATE".
- 5. Perform the Re-diagnosis.
- 6. Is "DTC" disappeared?



Fault is intermittent caused by poor contact in the sensor's and/or PCM/TCM's connector or was repaired and PCM/TCM memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration or damage. Repair or replace as necessary and go to "Verification of Vehicle Repair" procedure.

NO

Replace PCM/TCM as necessary and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR E1E593D2

After a repair, it is essential to verify that the fault has been corrected.

- 1. Connect scan tool and select "Diagnostic Trouble Codes(DTCs)" mode
- 2. Using a scantool, clear DTC
- 3. Operate the vehicle within DTC Enable conditions in general information.
- 4. Are any DTCs present?

YES

Go to the applicable troubleshooting procedure.

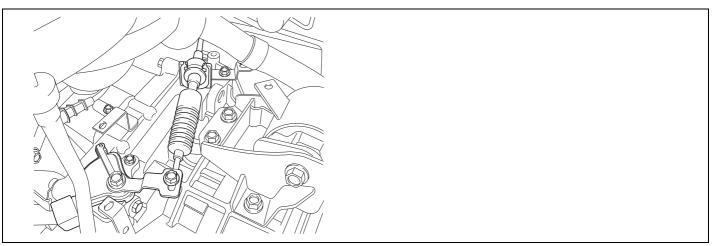
NO

System performing to specification at this time.

DTC P0707 TRANSAXLE RANGE SWITCH - LOW INPUT

COMPONENT LOCATION

EA966D07



AKGF101A

GENERAL DESCRIPTION EBFBBBCA

The Transaxle Range Switch sends the shift lever position information to the TCM(PCM) using a 12V (battery voltage) signal. When the shift lever is in the D (Drive) position the output signal of Transaxle Range Switch is 12V and in all other positions the voltage is 0V. The TCM(PCM) judges the shift lever position by reading all signals, for the Transaxle Range Switch, simultaneously.

DTC DESCRIPTION ED9D4AA7

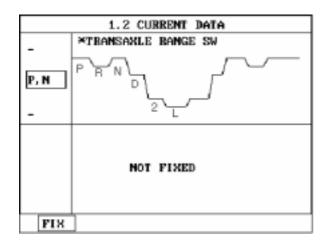
The TCM(PCM) sets this code when the Transaxle Range Switch has no output signal for more than 30 seconds.

DTC DETECTING CONDITION E11D1D33

Item	Detecting Condition	Possible cause		
DTC Strategy	Check for no signal	Open or short in circuit		
Enable Conditions	Engine Speed 1200rpm Battery Voltage 10V	 Faulty Shift cable adjustment Faulty Inhibitor switch and Manual control lever position 		
Threshold value	No signal detected	adjustment		
Diagnostic Time	More than 30 secs	Faulty TRANSAXLE RANGE SWITCH Faulty TCM(PCM)		
Fail Safe	Recognition as previous signal. When P-D or R-D or D-R SHIFT is detected, it is regarded as N-D or N-R though "N" signal is not detected			

ATA -35

SIGNAL WAVEFORM EF200B69



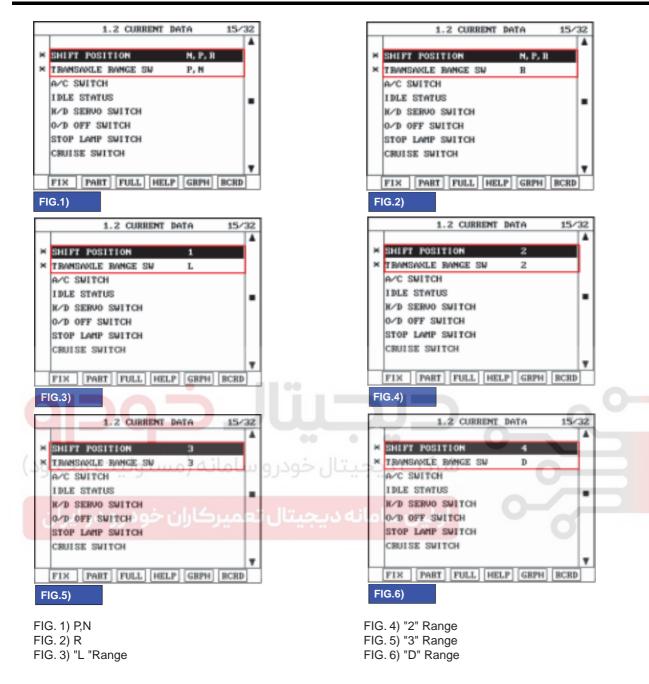
SHDAT6201L

MONITOR SCANTOOL DATA EDC10C3C

- 1. Connect scantool to data link connector(DLC).
- 2. Ignition "ON" & Engine "OFF".
- 3. Monitor the "TRANSAXLE RANGE SWITCH" parameter on the scantool.
- 4. Move selector lever from "P" range to "L" range.

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BKGF101C

5. Does "TRANSAXLE RANGE SWITCH" follow the reference data?

YES

Fault is intermittent caused by poor contact in the sensor's and/or TCM(PCM)'s connector or was repaired and TCM(PCM) memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration or damage. Repair or replace as necessary and go to "Verification of Vehicle Repair" procedure.

NO

Go to "Terminal & connector inspection" procedure.

ATA -37

Most of fault that happen about inhibitor switch, result from faulty shift cable adjustment or incorrect location of manual control lever and inhibitor switch. So, when DTC which related inhibitor switch or engine start defectiveness at "P" range happen, After check the shift cable adjustment or location of manual control lever and inhibitor switch, repair or replace as necessary.

TERMINAL & CONNECTOR INSPECTION E67C41B.

- 1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
- 2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.
- 3. Has a problem been found?



Repair as necessary and go to "Verification of vehicle repair" procedure.



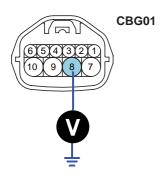
Go to "Power supply circuit inspection" procedure.

POWER SUPPLY CIRCUIT INSPECTION

EDED8C1

- CHECK POWER TO RANGE SWITCH
 - 1) Disconnect "TRANSAXLE RANGE SWITCH" connector.
 - 2) Ignition "ON" & Engine "OFF".
 - 3) Measure voltage between terminal "8" of the sensor harness connector and chassis ground.

Specification: approx. B+



- P Range
- 2. D Range
- 6. N Range
- 7. R Range
- 8. Power supply IG1

9.ST

10.ST

SLDAA7202L

4) Is voltage within specifications?



Go to "Signal circuit inspection" procedure.

NO

Check that Fuse1-10A is installed or not blown.

Check for open in harness. Repair as necessary and go to "Verification of vehicle repair" procedure.

ATA -38

SIGNAL CIRCUIT INSPECTION EAE255E

- 1. Ignition "OFF".
- 2. Disconnect "TRANSAXLE RANGE SWITCH" and "TCM(PCM)" connector.
- Measure resistance between each teminal of the sensor harness connector and TCM(PCM)harness connector as below.

Specification:

Pin No of "TRANSAXLE RANGE SWITCH"	CBG01 No.1	CBG01 No.7	CBG01 No.6	CBG01 No.2
Pin No of "TCM(PCM)" harness	CBG-A No.6	CBG-A No.7	CBG-A No.8	CBG-A No.9
Specification	0	0	0	0



SLDAA7206L

4. Is resistance within specifications?



Go to "Component inspection" procedure.



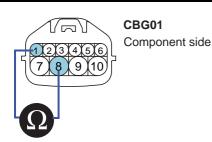
Check for Open in harness. Repair as necessary and Go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION ED7021EA

- 1. Ignition "OFF".
- 2. Remove "TRANSAXLE RANGE SWITCH".
- 3. Measure the resistance between each terminal of the sensor.

Specification: approx. 0

ATA -39



P Range
 D Range
 N Range
 R Range
 Power supply IG1
 ST
 ST

Range Terminal	Р	R	N	D
1	•			
2				•
3				
4				
5				
6			•	
7		•		
8	•			
9	•		•	
10				

[RANGE SWITCH continuity check table (Case of SPORTS MODE vehicle has no 3,2,L range)]

SLDAA7204L

Is resistance within specifications?



Substitute with a known-good PCM/TCM and check for proper operation. If the problem is corrected, replace PCM/TCM and then go to "Verification of Vehicle Repair" procedure.

NO

Replace "TRANSAXLE RANGE SWITCH" as necessary and Go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR E6B0FFCC

After a repair, it is essential to verify that the fault has been corrected.

- 1. Connect scantool and select "Diagnostic Trouble Codes(DTCs)" mode.
- 2. Using a scantool, Clear DTC.
- 3. Operate the vehicle within DTC Enable conditions in General information.
- 4. Are any DTCs present?



Go to the applicable troubleshooting procedure.



System performing to specification at this time.

ATA -40

DTC P0708 TRANSAXLE RANGE SWITCH - HIGH INPUT

COMPONENT LOCATION E8B896F2

Refer to DTC P0707.

GENERAL DESCRIPTION EE3B2DFD

Refer to DTC P0707.

DTC DESCRIPTION E7A9DE58

The TCM sets this code when the Transaxle Range Switch outputs multiple signals for more than 30 seconds.

DTC DETECTING CONDITION ECCC2F7E

Item	Detecting Condition	Possible cause
DTC Strategy	Check for multiple signals	Open or short in
Enable Conditions	Battery Voltage 10V	TRANSAXLE RANGE SWITCH
Threshold value	Multiple signal	Faulty Shift cable adjustment
Diagnostic Time	More than 10 secs	 Faulty Inhibitor switch and Manual control lever position
ئولىت محدود) Fail Safe	 Recognition as previous signal When signal is input "D" and "N" at the same time, TCM regards it as "N" RANGE After PCM/TCM Reset, if the PCM/TCM 	adjustment • Faulty TRANSAXLE RANGE SWITCH • Faulty PCM
فودرو در ایران	detects multiple signal or no signal, then it holds the 3rd gear position	

SIGNAL WAVEFORM E2FE50BC

Refer to DTC P0707.

MONITOR SCANTOOL DATA E9EC6BA9

Refer to DTC P0707.

TERMINAL & CONNECTOR INSPECTION EB2B0830

Refer to DTC P0707.

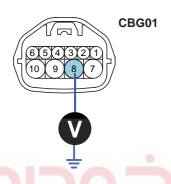
ATA -41

POWER SUPPLY CIRCUIT INSPECTION EC415B7.

- 1. Disconnect "TRANSAXLE RANGE SWITCH" connector.
- 2. Ignition "ON" & Engine "OFF".
- 3. Measure voltage between each terminal of the sensor harness connector and chassis ground.

Specification:

TERMINAL No.	1	2	4	6	7	8	9	10
SPECIFICATION	0V	0V	0V	0V	0V	12V	0V	12V



- 1. P Range
- 2. D Range
- 6. N Range
- 7. R Range
- 8. Power supply IG1
- 9.ST
- 10.ST

4. Is voltage within specifications?

YES

Go to "Signal circuit inspection" procedure.

NO

Check for Short in harness. Repair as necessary and Go to "Verification of Vehicle Repair" procedure.

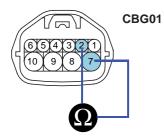
SLDAA7202L

ATA -42

SIGNAL CIRCUIT INSPECTION

- 1. Ignition "OFF".
- Disconnect "TRANSAXLE RANGE SWITCH" and "TCM(PCM)" connector.
- Measure resistance between each terminals of the sensor harness to check for Short.

Specification: Infinite



1. P Range

2. D Range

6. N Range

7. R Range

8. Power supply IG1

9.ST

10.ST

SLDAA7205L

Is resistance within specifications?

YES

Go to "Component inspection" procedure.

NO

Check for Short in harness. Repair as necessary and Go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION E54CEF0E

Refer to DTC P0707.

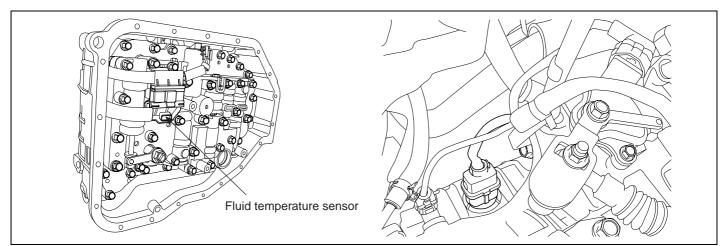
VERIFICATION OF VEHICLE REPAIR EA2AEF1C

Refer to DTC P0707.

ATA -43

DTC P0711 TRANSAXLE FLUID TEMPERATURE SENSOR RATIONALITY

COMPONENT LOCATION E4020C7C



SHDAT6217L

GENERAL DESCRIPTION E30A2C

The automatic TRANSAXLE fluid(ATF) temperature sensor is installed in the Valve Body. This sensor uses a thermistor whose resistance changes according to the temperature changes. The TCM supplies a 5V reference voltage to the sensor, and the output voltage of the sensor changes when the ATF temperature varies. The automatic TRANSAXLE fluid(ATF) temperature provides very important data for the TCM's control of the Torque Converter Clutch, and is also used for many other purposes.

DTC DESCRIPTION E37AFF86

This DTC code is set when the ATF temperature output voltage is lower than a value generated by thermistor resistance, in a normal operating range, for approximately 1 second or longer. The TCM regards the ATF temperature as fixed at a value of 80°C(176°F).

ATA -44

AUTOMATIC TRANSAXLE (A4CF2)

DTC DETECTING CONDITION EE58F7D4

Item		Detecting Condition	Possible cause
DTC Strateg	у	Check rationality	Sensor signal circuit is
Enable Conditions	Case 1	 Output Speed 1000rpm Engine Speed 1000rpm ATF temperature 30°C or 50°C(Ambient temp. > -7°C) Accumulated time in condition 5min 	short to groundFaulty sensorFaulty PCM
	Case2	 Output Speed 1000rpm Engine Speed 1000rpm ATF temperature > 73.5°C Accumulated time in condition 5min 	
Threshold value	Case1	 Present Oil temp - Oil temp When the time starts 2°C(35.6°F) 	
	Case2	• ATF temperature -10°C	
Diagnostic Ti	me • More than 1 sec		
 Learning control and Intelligent shift are inhibited Fluid temperature is regarded as 80°C(176°F) 			

SPECIFICATION ECC63AD2

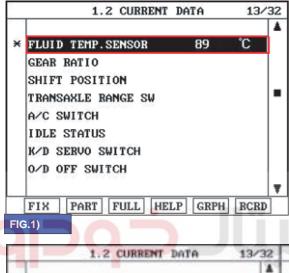
TEMP.[°C(°F)]	Resistance(k)	TEMP.[°C(°F)]	Resistance(k)
-40(-40)	139.5	80(176)	1.08
-20(-4)	47.7	100(212)	0.63
0(32)	18.6	120(248)	0.38
20(68)	8.1	140(284)	0.25
40(104)	3.8	160(320)	0.16
60(140)	1.98		

ATA -45

MONITOR SCANTOOL DATA E5E51EEA

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- 3. Monitor the "TRANSAXLE FLUID TEMPERATURE SENSOR" parameter on the scan tool.

Specification: Increasing Gradually



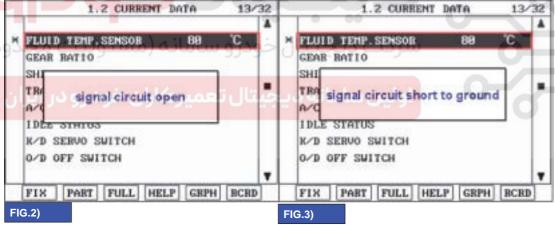


FIG.1) Normal

FIG.2) Signal harness Open

FIG.3) Signal harness Short

SHDAT6211L

4. Does "TRANSAXLE FLUID TEMPERATURE SENSOR " follow the reference data?

YES

Fault is intermittent caused by poor contact in the sensor's and/or TCM(PCM)'s connector or was repaired and TCM(PCM) memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration or damage. Repair or replace as necessary and go to "Verification of Vehicle Repair" procedure.

NO

Go to "Terminal & connector inspection" procedure.

ATA -46

TERMINAL & CONNECTOR INSPECTION EFCEDBB

- 1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
- 2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.
- 3. Has a problem been found?



Repair as necessary and go to "Verification of vehicle Repair" procedure.



Go to "Component inspection" procedure.

SIGNAL CIRCUIT INSPECTION EB62E4FA

- 1. Ignition "ON" & Engine "OFF".
- 2. Disconnect the "TRANSAXLE FLUID TEMPERATURE SENSOR" connector.
- 3. Measure the voltage between terminal "5" of the "TRANSAXLE FLUID TEMPERATURE SENSOR" harness connector and chassis ground.

Specification: Approx. 5 V



SHDAT6212N

4. Is voltage within specifications?



Go to "Component Inspection" procedure.

NO

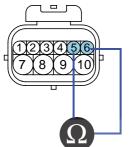
Check for short to ground in harness. Repair as necessary and Go to "Verification of Vehicle Repair" procedure.

ATA -47

COMPONENT INSPECTION

- 1. CHECK "TRANSAXLE FLUID TEMPERATURE SENSOR"
 - 1) Ignition "OFF".
 - Disconnect the "TRANSAXLE FLUID TEMPERATURE SENSOR" connector.
 - 3) Measure the resistance between terminals "5" and "6" of the "TRANSAXLE FLUID TEMPERATURE SENSOR".

Specification: Refer to "Reference data"



CBG04 Component side

5.TRANSAXLE FLUID TEMPERATURE SENSOR 6.Sensor ground

SHDAT6213N

[REFERENCE DATA]

TEMP.[°C(°F)]	Resistance(k)	TEMP.[°C(°F)]	Resistance(k)
-40(-40)	139.5	80(176)	1.08
-20(-4)	47.7	100(212)	0.63
0(32)	18.6	120(248)	0.38
20(68)	8.1	140(284)	0.25
40(104)	3.8	160(320)	0.16
60(140)	1.98		

4) Is resistance within specifications?



Go to "CHECK PCM/TCM" as below.

NO

Replace "TRANSAXLE FLUID TEMPERATURE SENSOR" as necessary and Go to "Verification of Vehicle Repair" procedure.

2. CHECK TCM

- 1) Ignition "ON" & Engine "OFF".
- 2) Connect "TRANSAXLE FLUID TEMPERATURE SENSOR" connector.
- 3) Install scan tool and select a SIMU-SCAN.
- 4) Simulate voltage (0 5V) to "TRANSAXLE FLUID TEMPERATURE SENSOR" signal circuit.

ATA -48

AUTOMATIC TRANSAXLE (A4CF2)

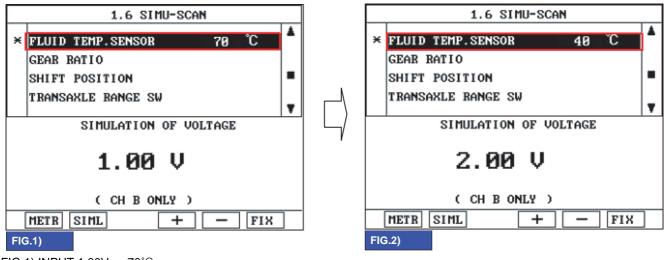


FIG.1) INPUT $1.00V \rightarrow 70^{\circ}C$ FIG.2) INPUT $2.00V \rightarrow 40^{\circ}C$

*The values are subject to change according to vehicle model or conditions.

SHDAT6214L

5) Is FLUID TEMP. SENSOR signal value changed according to simulation voltage?

YES

Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO

Substitute with a known-good PCM/TCM and check for proper operation. If the problem is corrected, replace PCM/TCM and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR EECCAC80

After a repair, it is essential to verify that the fault has been corrected.

- Connect scantool and select "Diagnostic Trouble Codes(DTCs)" mode.
- 2. Using a scantool, Clear DTC.
- 3. Operate the vehicle within DTC Enable conditions in General information.
- 4. Are any DTCs present?

YES

Go to the applicable troubleshooting procedure.

NO

System performing to specification at this time.

ATA -49

DTC P0712 FLUID(OIL) TEMPERATURE SENSOR CIRCUIT - LOW

COMPONENT LOCATION EDD1E23A

Refer to DTC P0711.

GENERAL DESCRIPTION EEAD2EF3

Refer to DTC P0711.

DTC DESCRIPTION E7FBDCA7

Refer to DTC P0711.

DTC DETECTING CONDITION EA5B6B9B

Item	Detecting Condition	Possible cause
DTC Strategy	Check for Voltage range	Sensor signal circuit is
Enable Conditions • Battery Voltage 10V		short to ground • Faulty sensor
Threshold Value	Voltage < 0.05V	Faulty PCM
Diagnostic Time	More than 1sec	
Fail Safe • Learning control and Intelligent shift are inhibited • Fluid temperature is regarded as 80°C(176°F)		

SPECIFICATION E306BB1D

Refer to DTC P0711.

MONITOR SCANTOOL DATA E3E21ED8

Refer to DTC P0711.

TERMINAL & CONNECTOR INSPECTION E3FC9002

Refer to DTC P0711.

SIGNAL CIRCUIT INSPECTION E27179DC

Refer to DTC P0711.

COMPONENT INSPECTION E94873E4

Refer to DTC P0711.

VERIFICATION OF VEHICLE REPAIR EB69229F

Refer to DTC P0711.

ATA -50

AUTOMATIC TRANSAXLE (A4CF2)

DTC P0713 FLUID(OIL) TEMPERATURE SENSOR CIRCUIT - HIGH

COMPONENT LOCATION E480BEBD

Refer to DTC P0711.

GENERAL DESCRIPTION E7D1E9E2

Refer to DTC P0711.

DTC DESCRIPTION EDA10621

This DTC code is set when the ATF temperature output voltage is higher than a value generated by thermistor resistance, in a normal operating range, for an extended period of time. The TCM regards the ATF temperature as fixed at a value of 80°C(176°F).

DTC DETECTING CONDITION ECD25E8B

Item	Detecting Condition	Possible cause	
DTC Strategy	Check for Voltage range	Sensor signal circuit is	
Enable Conditions	Battery Voltage 10V	short to ground Faulty sensor	
Threshold Value	Voltage 4.9V	Faulty PCM	
Diagnostic Time	More than 1sec		
Fail Safe	 Learning control and Intelligent shift are inhibited Fluid temperature is regarded as 80°C(176°F) 		
فودرو در ایران	اولین سامانه دیجیتال تعمیرکاران ۱		

SPECIFICATION ECBC1F6F

Refer to DTC P0711.

MONITOR SCANTOOL DATA EDC8ED14

Refer to DTC P0711.

TERMINAL & CONNECTOR INSPECTION EA51A7B5

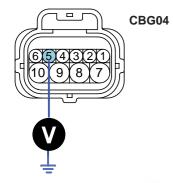
Refer to DTC P0711.

ATA -51

SIGNAL CIRCUIT INSPECTION E814C399

- 1. Ignition "OFF".
- 2. Disconnect the "TRANSAXLE FLUID TEMPERATURE SENSOR" connector.
- 3. Measure the voltage between terminal "5" of the "TRANSAXLE FLUID TEMPERATURE SENSOR" harness connector and chassis ground.

Specification: Approx. 5 V



5.TRANSAXLE FLUID TEMPERATURE SENSOR

6.Sensor ground

SHDAT6212N

4. Is voltage within specifications?



Go to "Ground circuit inspection" procedure.

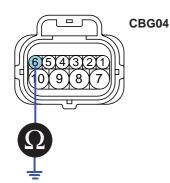
NO

Check for short to ground in harness. Repair as necessary and Go to "Verification of Vehicle Repair" procedure.

ATA -52

GROUND CIRCUIT INSPECTION EB97ADO

- 1. Ignition "OFF".
- 2. Disconnect the "TRANSAXLE FLUID TEMPERATURE SENSOR" connector.
- Measure the resistance between terminal "6" of the "TRANSAXLE FLUID TEMPERATURE SENSOR" harness connector and chassis ground.



5.TRANSAXLE FLUID TEMPERATURE SENSOR

6.Sensor ground

SHDAT6216N

4. Is resistance within specifications?



Go to "Component inspection" procedure.



Check for open in harness. Repair as necessary and Go to "Verification of Vehicle Repair" procedure .

COMPONENT INSPECTION E1501A0A

Refer to DTC P0711.

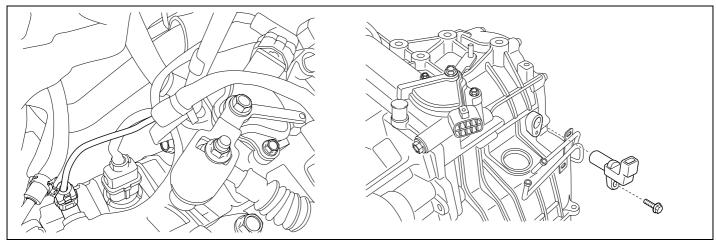
VERIFICATION OF VEHICLE REPAIR E1C9EDFF

Refer to DTC P0711.

ATA -53

DTC P0716 INPUT SPEED SENSOR RANGE/PERFORMANCE

COMPONENT LOCATION ED2D92DA



SHDAT6226D

GENERAL DESCRIPTION E5D09427

The input(turbine) speed sensor outputs pulse-signals according to the revolutions of the input shaft of the transmission. The PCM/TCM determines the input shaft speed by counting the frequency of the pulses. This value is mainly used to control the optimum fluid pressure during shifting.

DTC DESCRIPTION E1906760

The PCM/TCM sets this code if an output pulse-signal is not detected, from the input speed sensor, when the vehicle is running faster than 19 Mile/h(30 Km/h). The Fail-Safe function will be set by the PCM/TCM if this code is detected.

DTC DETECTING CONDITION EB537EAG

Item	Detecting Condition	Possible cause
DTC Strategy	Speed rationality check	Signal circuit is open or short.
Enable Conditions	Battery Voltage 10V	Sensor power circuit is openSensor ground circuit is open
Threshold value	Input speed 8000rpm	Faulty INPUT SPEED SENSOR
Diagnostic Time	More than 1sec	Faulty PCM/TCM
Fail Safe	Locked into 3rd or 2nd gearManual shifting is possible(2nd 3rd, 3rd 2nd)	

SPECIFICATION E7A3FD86

Input shaft & Output shaft speed sensor

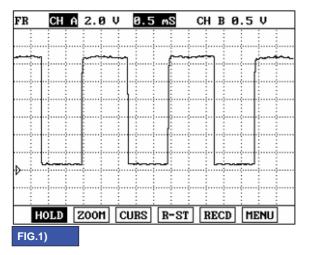
• Type : Hall sensor

• Current consumption: 22mA(MAX)

· Sensor body and sensor connector have been unified as one.

ATA -54

SIGNAL WAVEFORM E491



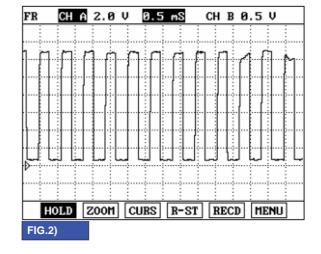


FIG.1) INPUT SIGNAL \rightarrow LOW SPEED FIG.2) INPUT SIGNAL \rightarrow HIGH SPEED

BKGF105B



شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

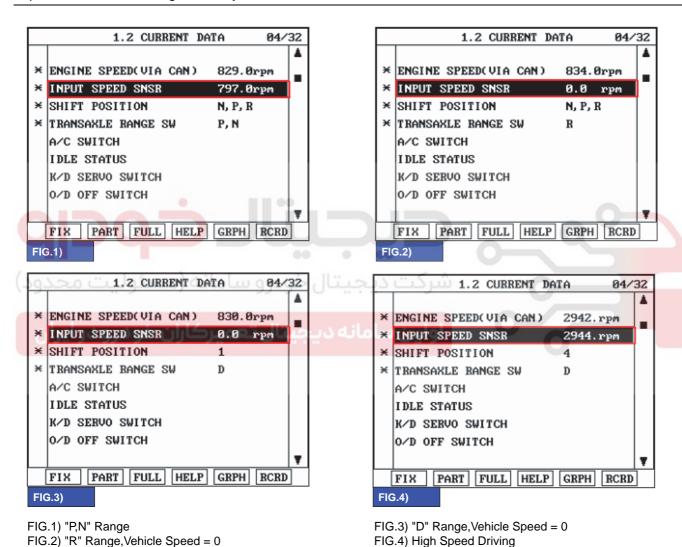


ATA -55

MONITOR SCANTOOL DATA E986CCFE

- 1. Connect scan tool to data link connector(DLC).
- 2. Engine "ON".
- 3. Monitor the "INPUT SPEED SENSOR" parameter on the scantool.
- 4. Driving at speed of over 19 Mile/h(30 Km/h).

Specification: Increasing Gradually



BKGF105C

5. Does "Input speed sensor" follow the reference data?



Fault is intermittent caused by poor contact in the sensor's and/or TCM(PCM)'s connector or was repaired and TCM(PCM) memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration or damage. Repair or replace as necessary and go to "Verification of Vehicle Repair" procedure.

NO

Go to "Terminal & connector inspection" procedure.

ATA -56

TERMINAL & CONNECTOR INSPECTION E08ECDE

- 1. Many malfunctions in the electrical system may be caused from poor harness and terminals. These faults can be caused by interference from other electrical systems and mechanical or chemical damage.
- 2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.
- 3. Has a problem been found?



Repair as necessary and go to "Verification of vehicle repair" procedure.



Go to "Signal circuit inspection" procedure.

SIGNAL CIRCUIT INSPECTION EAF4E383

- 1. Ignition "ON" & Engine "OFF".
- 2. Disconnect the "INPUT SPEED SENSOR" connector.
- Measure voltage between terminal "2" of the INPUT SPEED SENSOR harness connector and chassis ground.

Specification: approx. 5V



SHDAT6222N

4. Is voltage within specifications?



Go to "Power supply circuit Inspection" procedure.

NO

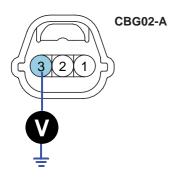
Check for open or short in harness. Repair as necessary and Go to "Verification of Vehicle Repair" procedure. If signal circuit in harness is OK, Go to "Check PCM/TCM" of the "Component Inspection" procedure.

POWER SUPPLY CIRCUIT INSPECTION E28C3F56

- Ignition "ON" & Engine "OFF".
- 2. Disconnect the "INPUT SPEED SENSOR" connector.
- 3. Measure voltage between terminal "3" of the INPUT SPEED SENSOR harness connector and chassis ground.

ATA -57

Specification: approx. B+



- 1. Sensor ground
- 2. Input speed sensor
- 3. Power supply IG1

SHDAT6223N

4. Is voltage within specifications?



Go to "Ground circuit inspection" procedure.

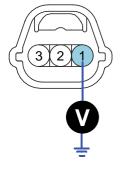
NO

Check for open in harness. Repair as necessary and Go to "Verification of Vehicle Repair" procedure.

GROUND CIRCUIT INSPECTION ECGASCOD

- 1. Ignition "ON" & Engine "OFF".
- 2. Disconnect the "INPUT SPEED SENSOR" connector.
- 3. Measure resistance between terminal "1" of the INPUT SPEED SENSOR harness connector and chassis ground.

Specification: approx. 0



CBG02-A

- 1. Sensor ground
- 2. Input speed sensor
- 3. Power supply IG1

SHDAT6224N

4. Is resistance within specifications?



Go to "Component Inspection" procedure.

NO

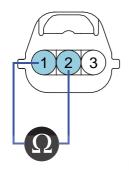
Check for open in harness. Repair as necessary and Go to "Verification of Vehicle Repair" procedure. If ground circuit in harness is OK, Go to "Check PCM/TCM" of the "Component Inspection" procedure.

ATA -58

COMPONENT INSPECTION E4D7E0

- 1. Check "INPUT SPEED SENSOR"
 - 1) Ignition "OFF".
 - Disconnect the "INPUT SPEED SENSOR" connector.
 - 3) Measure resistance between terminal "1","2" and "2","3" and "1","3" of the "INPUT SPEED SENSOR" connector.

Specification: Refer to "Reference data"



CBG02-A Component side

- 1. Sensor ground
- 2. Input speed sensor
- 3. Power supply IG1

SHDAT6225N

4) Is resistance within specifications?

[REFERENCE DATA]

Data	Reference Data		
Current	22 mA		
Air Gap	Input sensor	1.3mm (0.051in)	
Ан бар	Output sensor	0.85mm (0.033in)	
Davistanas	Input sensor	Above 4 MΩ	
Resistance	Output sensor	Above 4 MΩ	
Voltogo	High	4.8 ~ 5.2V	
Voltage	Low	Below 0.8V	

YES

Go to "CHECK PCM/TCM" as below.

NO

Replace "INPUT SPEED SENSOR" as necessary and Go to "Verification of Vehicle Repair" procedure.

2. CHECK PCM/TCM

- 1) Ignition "ON" & Engine "OFF".
- 2) Connect "INPUT SPEED SENSOR" connector.
- 3) Install scantool and select a SIMU-SCAN.
- 4) Simulate frequency to INPUT SPEED SENSOR signal circuit.

ATA -59

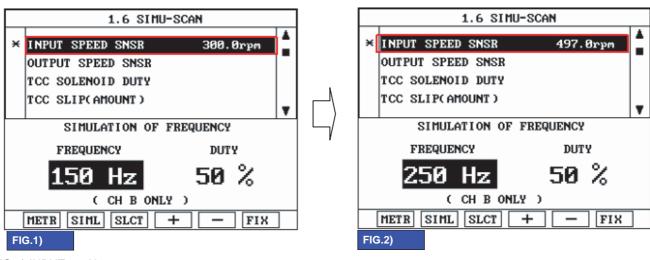


FIG.1) INPUT 150Hz \rightarrow 300rpm FIG.2) INPUT 250Hz \rightarrow 497rpm

* The values are subject to change according to vehicle model or conditions.

BKGF105H

5) Is "INPUT SPEED SENSOR" signal value changed according to simulation frequency?

YES

Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO

Substitute with a known-good PCM/TCM and check for proper operation. If the problem is corrected, replace PCM/TCM as necessary and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR E6D5E88D

After a repair, it is essential to verify that the fault has been corrected.

- 1. Connect scan tool and select "Diagnostic Trouble Codes(DTCs)" mode.
- 2. Using a scan tool, Clear DTC.
- 3. Operate the vehicle within DTC Enable conditions in General information.
- 4. Are any DTCs present?



Go to the applicable troubleshooting procedure.

NO

System performing to specification at this time.

ATA -60

AUTOMATIC TRANSAXLE (A4CF2)

DTC P0717 INPUT SPEED SENSOR CIRCUIT - NO SIGNAL

COMPONENT LOCATION E980F277

Refer to DTC P0716.

GENERAL DESCRIPTION EB9FFED9

Refer to DTC P0716.

DTC DESCRIPTION E22817A9

Refer to DTC P0716.

DTC DETECTING CONDITION EA817CC7

Item	Detecting Condition	Possible cause
DTC Strategy	Speed rationality check	Signal circuit is open or short.
 Battery Voltage 10V Engine speed 2600rpm Lever position: D,3,2,L Vehicle speed > 16mph(25km/h) 		 Sensor power circuit is open Sensor ground circuit is open Faulty INPUT SPEED SENSOR Faulty PCM/TCM
Threshold value	• Input speed = 0	
Diagnostic Time	More than 1sec	
Fail Safe	Locked into 3rd or 2nd gear	

SPECIFICATION E42EC4C3

Refer to DTC P0716.

SIGNAL WAVEFORM EC4002CC

Refer to DTC P0716.

MONITOR SCANTOOL DATA EC45C027

Refer to DTC P0716.

TERMINAL & CONNECTOR INSPECTION EDATA572

Refer to DTC P0716.

SIGNAL CIRCUIT INSPECTION EDAAE6BF

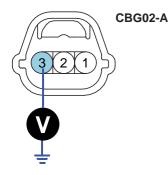
Refer to DTC P0716.

ATA -61

POWER SUPPLY CIRCUIT INSPECTION E54FODDS

- 1. Ignition "ON" & Engine "OFF".
- 2. Disconnect the "INPUT SPEED SENSOR" connector.
- 3. Measure voltage between terminal "3" of the INPUT SPEED SENSOR harness connector and chassis ground.

Specification: approx. B+



- 1. Sensor ground
- 2. Input speed sensor
- 3. Power supply IG1

SHDAT6223N

4. Is voltage within specification?

YES

Go to "Ground circuit inspection" procedure.

NO

Check for open in harness. Repair as necessary and Go to "Verification of Vehicle Repair" procedure.

GROUND CIRCUIT INSPECTION E084D68D

Refer to DTC P0716.

COMPONENT INSPECTION E6719737

Refer to DTC P0716.

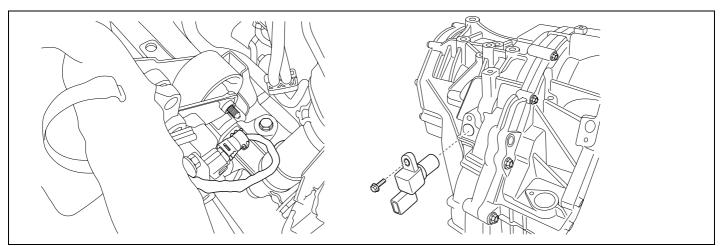
VERIFICATION OF VEHICLE REPAIR EE29FE84

Refer to DTC P0716.

ATA -62 AUTOMATIC TRANSAXLE (A4CF2)

DTC P0722 OUTPUT SPEED SENSOR CIRCUIT - NO SIGNAL

COMPONENT LOCATION E360FE67



SHDAT6236D

GENERAL DESCRIPTION EE288893

The Output Speed Sensor outputs pulse-signals according to the revolutions of the output shaft of the transmission. The Output Speed Sensor is installed in front of the Transfer Drive Gear to determine the Transfer Drive Gear rpms by counting the frequency of the pulses. This value, together with the throttle position data, is mainly used to decide the optimum gear position.

DTC DESCRIPTION E8539F41

The TCM sets this code if the calculated value of the pulse-signal is noticeably different from the value calculated, using the Vehicle Speed Sensor output, when the vehicle is running faster than 12mph(20km/h). The TCM will initiate the fail safe function if this code is detected.

ATA -63

DTC DETECTING CONDITION ECB0953D

Item		Detecting Condition	Possible cause	
DTC Strategy		Speed rationality check	Signal circuit is open or short	
Enable Conditions	Case 1	 Battery Voltage 10V TPS 7% or current gear 2 Engine speed 2600rpm Lever position : D State of brake : OFF Vehicle speed 20Km/h 	 Sensor power circuit is open Sensor ground circuit is open Faulty OUTPUT SPEED SENSOR Faulty PCM 	
	Case 2	Battery Voltage 10VLever position: D,3,2State of brake: OFF		
Threshold value	Case 1	• Output speed = 0		
	Case 2	• Output speed = 0		
Diagnostic Time	Case 1	more than 4sec		
	Case 2	more than 4sec		
Fail Safe		 Locked into 3rd or 2nd gear Apply an electric current to solenoid valve Manual shifting is possible (2nd 3rd, 3rd 2nd) 	0	

SPECIFICATION

EBB270F0

Refer to DTC P0716.

SIGNAL WAVEFORM EB7D5B51

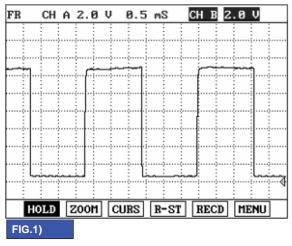
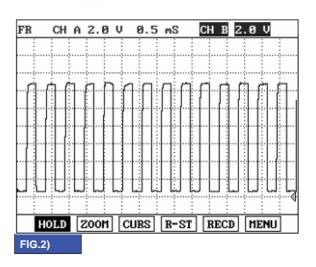


FIG.1) OUTPUT SIGNAL \rightarrow LOW SPEED FIG.2) OUTPUT SIGNAL \rightarrow HIGH SPEED



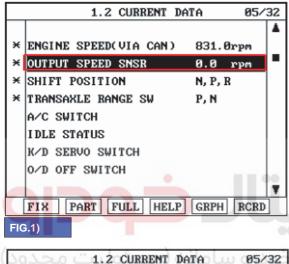
BKGF107A

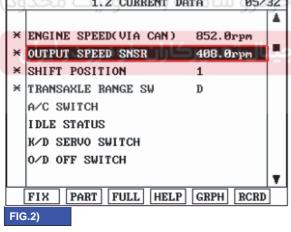
ATA -64

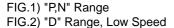
MONITOR SCANTOOL DATA E2E1AE2

- Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- 3. Monitor the "OUTPUT SPEED SENSOR" parameter on the scantool.
- 4. Driving at speed of over 30 Km/h(19 mph).

Specification: Increasing Gradually







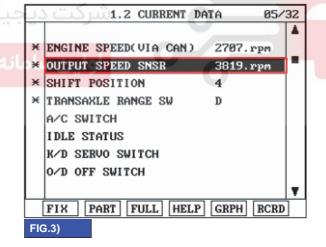


FIG.3) "D" Range, High Speed

BKGF107B

5. Does "Output speed sensor" follow the reference data?



Fault is intermittent caused by poor contact in the sensor's and/or TCM(PCM)'s connector or was repaired and TCM(PCM) memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration or damage. Repair or replace as necessary and go to "Verification of Vehicle Repair" procedure.



Go to "Terminal & connector inspection" procedure.

ATA -65

TERMINAL & CONNECTOR INSPECTION ECE65DO

Refer to DTC P0716.

SIGNAL CIRCUIT INSPECTION E16169D6

- 1. Ignition "ON" & Engine "OFF".
- 2. Disconnect the "OUTPUT SPEED SENSOR" connector.
- 3. Measure voltage between terminal "2" of the OUTPUT SPEED SENSOR harness connector and chassis ground.

Specification: approx. 5V



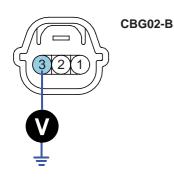
Check for open or short in harness. Repair as necessary and Go to "Verification of Vehicle Repair" procedure. If signal circuit in harness is OK, Go to "Check PCM/TCM" of the "Component Inspection" procedure.

POWER SUPPLY CIRCUIT INSPECTION ECD6287D

- 1. Ignition "ON" & Engine "OFF".
- 2. Disconnect the "OUTPUT SPEED SENSOR" connector.
- 3. Measure voltage between terminal "3" of the "OUTPUT SPEED SENSOR" harness connector and chassis ground.

Specification: approx. B+

ATA -66



- 1. Sensor ground
- 2. Output speed sensor
- 3. Power supply IG1

SHDAT6233N

4. Is voltage within specification?



Go to "Ground circuit inspection" procedure.



Check for open in harness. Repair as necessary and Go to "Verification of Vehicle Repair" procedure.

GROUND CIRCUIT INSPECTION E3DF0C64

- Ignition "ON" & Engine "OFF".
- 2. Disconnect the "OUTPUT SPEED SENSOR" connector.
- 3. Measure resistance between terminal "1" of the OUTPUT SPEED SENSOR harness connector and chassis ground.



SHDAT6234N

4. Is resistance within specifications?



Go to "Component Inspection" procedure.

NO

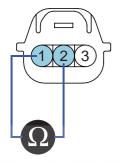
Check for open in harness. Repair as necessary and Go to "Verification of Vehicle Repair" procedure. If ground circuit is OK, Go to "Check PCM/TCM" of the "Component Inspection" procedure.

ATA -67

COMPONENT INSPECTION

- 1. Check "OUTPUT SPEED SENSOR"
 - 1) Ignition "OFF".
 - 2) Disconnect the "OUTPUT SPEED SENSOR" connector.
 - 3) Measure resistance between terminal "1","2" and "2","3" and "1","3" of the "OUTPUT SPEED SENSOR" connector.

Specification: Refer to "Reference data"



CBG02-B Component side

- 1. Sensor ground
- 2. Output speed sensor
- 3. Power supply IG1

4) Is resistance within specifications?

SHDAT6235N

[REFERENCE DATA]

Data	Reference Data			
Current	22 mA			
Air gap	Input sensor	1.3mm (0.051in)		
All gap	Output sensor	0.85mm (0.033in)		
	1(red) - 2(black)	Infinite		
	1(black) - 2(red)	Approx. 3.89 M		
Resistance	1(red) - 3(black)	Approx. 6.55 M		
Resistance	1(black) - 3(red)	Approx. 5.27 M		
	2(red) - 3(black)	Approx. 17.5 M		
	2(black) - 3(red)	Infinite		

YES

Go to "CHECK PCM/TCM" as below.

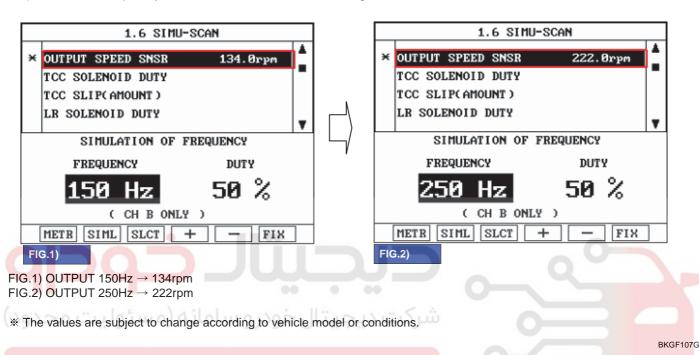
NO

Replace "OUTPUT SPEED SENSOR" as necessary and Go to "Verification of Vehicle Repair" procedure.

ATA -68

2. CHECK PCM/TCM

- 1) Ignition "ON" & Engine "OFF".
- 2) Connect "OUTPUT SPEED SENSOR" connector.
- 3) Install scantool and select a SIMU-SCAN.
- 4) Simulate frequency to OUTPUT SPEED SENSOR signal circuit.



5) Is "OUTPUT SPEED SENSOR" signal value changed according to simulation frequency?

YES

Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.

NO

Substitute with a known-good PCM/TCM and check for proper operation. If the problem is corrected, replace PCM/TCM as necessary and then go to "Verification of Vehicle Repair" procedure.

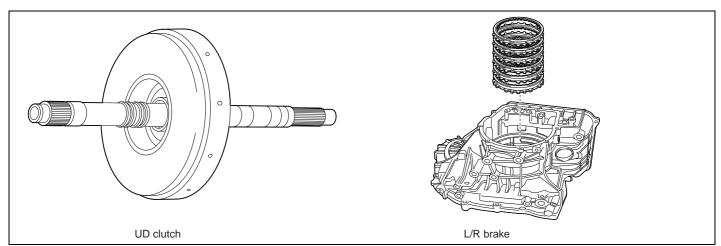
VERIFICATION OF VEHICLE REPAIR EDDDC26

Refer to DTC P0716.

ATA -69

DTC P0731 GEAR 1 INCORRECT RATIO

COMPONENT LOCATION E57BB90B



BKGF108A

GENERAL DESCRIPTION EB5C7DA7

The value of the input shaft speed should be equal to the value of the output shaft speed, when multiplied by the 1st gear ratio, while the transaxle is engaged in the 1st gear. For example, if the output speed is 1000 rpm and the 1st gear ratio is 2.842, then the input speed is 2,842 rpm.

DTC DESCRIPTION E26CC334

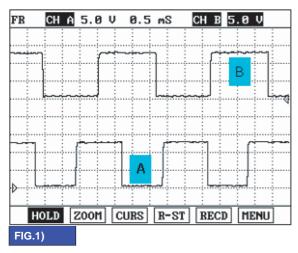
This code is set if the value of input shaft speed is not equal to the value of the output shaft, when multiplied by the 1st gear ratio, while the transaxle is engaged in 1st gear. This malfunction is mainly caused by mechanical troubles such as control valve sticking or solenoid valve malfunctioning rather than an electrical issue.

DTC DETECTING CONDITION E0797C65

Item	Detecting Condition	Possible cause	
DTC Strategy	1st gear incorrect ratio	 Faulty input speed sensor Faulty output speed sensor Faulty UD clutch or LR brake or One way clutch 	
Enable Conditions	 Engine speed > 450rpm Output speed > 200rpm Lever position: D,3,2,L Input speed > 0rpm A/T oil temp output -10°C(14°F) TRANSAXLE RANGE SWITCH is normal and after 2sec is passed from IG ON 		
Threshold value	 Input speed/1st gear ratio - output speed 200rpm 		
Diagnostic Time	More than 1sec		
Fail Safe	 Locked into 3rd gear.(If diagnosis code P0731 is output four times, the transaxle is locked into 3rd gear) 		

ATA -70

SIGNAL WAVEFORM EBE8243D



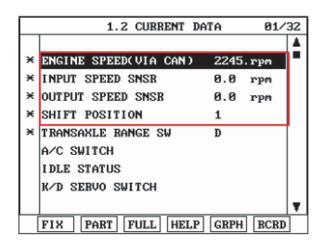
A: INPUT SPEED SENSOR B: OUTPUT SPEED SENSOR

BKGF108B

MONITOR SCANTOOL DATA E77C96BB

- 1. Connect scan tool to data link connector(DLC).
- 2. Engine "ON".
- 3. Monitor the "ENGINE SPEED, INPUT SPEED SENSOR, OUTPUT SPEED SENSOR, GEAR POSITION" parameter on the scan tool.
- 4. Perform the "STALL TEST" with gear position "1"

Specification: 2000~2700 engine rpm



BKGF108C

ATA -71

OPERATING ELEMENT OF EACH SHIFTING RANGE

	UD/C	OD/C	REV/C	2-4/B	LR/B	OWC
Р						
R						
N						
D1						
D2						
D3						
D4						
L						

Stall test procedure in D1 and reason

Procedure

- 1. Warm up the engine.
- 2. After positioning the select lever in "D", depress the foot brake pedal fully after that, depress the accelerator pedal to the maximum.
 - * The slippage of 1st gear operating parts can be detected by stall test in D

Reason for stall test

- 1. If there is no mechanical defaults in A/T, every slippage occur in torque converter.
 - 2. Therefore, engine revolution is output, but input and output speed revolution must be "zero" due to wheel's lock.
 - 3. If 1st gear operating part has faults, input speed revolution will be out.
 - If output speed revolution is output. It means that the foot brake force is not applied fully. Remeasuring is required.
- Is "STALL TEST " within specification?

YES

Go to "Signal circuit inspection" procedure.

NO

Go to "Component inspection" procedure.



- 1. Do not let anybody stand in front of or behind the vehicle while this test is being carried out.
- 2. Check the A/T fluid level and temperature and the engine coolant temperature.
 - Fluid level: At the hot mark on the oil level gauge.
 - Fluid temperature : 176 °F~ 212 °F (80~100 °C).
 - Engine coolant temperature : 176 °F~ 212 °F (80~100 °C).
- 3. Chock both rear wheel(left and right).
- 4. Pull the parking brake lever on with the brake pedal fully depressed.
- 5. The throttle should not be left fully open for more than eight second.
- 6. If carrying out the stall test two or more time, move the select lever to the "N" position and run the engine at 1,000 rpm to let the A/T fluid cool down before carrying out subsequent.

BKGF108D

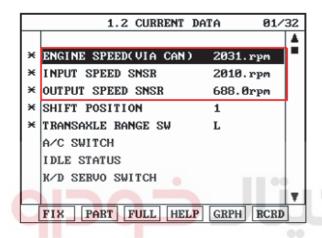
AUTOMATIC TRANSAXLE (A4CF2)

ATA -72

SIGNAL CIRCUIT INSPECTION E9A1041E

- 1. Connect Scan tool.
- 2. Engine "ON".
- 3. Monitor the "INPUT & OUTPUT SPEED SENSOR" parameter on the scan tool.
- 4. Accelerate the Engine speed until about 2000 rpm in the 1st gear.

Specification: INPUT SPEED - (OUTPUT SPEED x 1st GEAR RATIO) 200 RPM



5. Are "INPUT & OUTPUT SPEED SENSOR" within specifications?



Go to "Component Inspection" procedure.

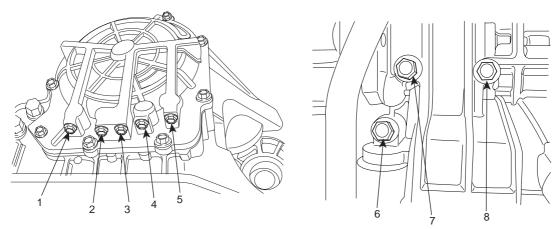
NO

Check for electrical noise of circuit in INPUT & OUTPUT SPEED SENSOR or Replace INPUT & OUTPUT SPEED SENSOR. Repair as necessary and Go to "Verification of Vehicle Repair" procedure.

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ATA -73

COMPONENT INSPECTION



- 1. LUB Pressure port
- 2. RED Pressure port
- 3. OD Pressure port

- 4. 2-4 Pressure port
- 5. REV Pressure port
- 6. DA Pressure port
- 7. UD Pressure port
- 8. LR Pressure port

BKGF108E

- 1. Connect oil pressure gauge to "UD" and "L/R" port.
- 2. Engine "ON".
- 3. Drive a car with gear position 1 in "SPORTS MODE"
- 4. Compare it with reference data as below.

Specification:

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ATA -74

STANDARD HYDRAULIC PRESSURE TABLE

No	Shift range			Operation			N4		C	Dil pressure	pressure (kgf/cm²) UD OD 0.5±0.2 0 ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ 10.5±0.2 ↑ 5.6±0.4 ↑ 1.0±0.3	
No.	position	PCSV-A	PCSV-B	PCSV-C	PCSV-D	ON/OFF	Measuring	LR	2/4(2ND)	UD	OD	REV
1	D	0	100	0	0	ON	LR	10.5±0.2	0	10.5±0.2	0	0
2	1	50	1	1	1	1	1	5.3±0.4	↑	1	↑	1
3	1	75	1	1	1	1	1	1.0±0.3	1	1	1	1
4	1	100	1	1	1	1	1	0	1	1	1	1
5	1	↑	0	1	100	OFF	2/4(2ND)	0	10.5±0.2	1	1	1
6	1	↑	50	↑	1	1	1	1	5.3±0.4	1	1	1
7	1	↑	75	1	1	1	1	1	0.9±0.3	1	↑	1
8	1	\uparrow	100	↑	↑	1	1	1	0	1	↑	1
9	1	0	↑	↑	1	1	OD	↑	↑	↑	10.5±0.2	↑
10	1	50	1	1	1	1	1	1	1	1	5.6±0.4	1
11	1	75	1	1	1	1	1	1	↑	1	1.0±0.3	1
12	1	100	1	1	1	1	1	1	1	1	0	1
13	1	↑	1	0	0	1	UD	1	↑	10.5±0.2	1	1
14	1	↑	↑	50	1	1	1	1	↑	5.6±0.4	1	1
15	1	↑	1	75	1	1	1	1	1	1.0±0.3	1	1
16	1	0	1	100	_ îo	1	1	1	↑	0	1	1
17	R	\uparrow	0	1	1	ON	REV	17.7±0.8	1	1	\uparrow	17.7±0.8
18	1	\uparrow	50	\uparrow	1	1	1	1	1	1		8.7±0.8
19	1	↑	75	1	1 00	1	\uparrow	1	1	1	1	0.9±0.5
20	1	ء 🐧	100	1	1	1	1	< 1°	1	1	1	0

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

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SHDAT6240L

5. Is oil pressure value within specifications?

YES

Repair AUTO TRANSAXLE(Clutch or Brake) as necessary and Go to "Verification of Vehicle Repair" procedure.

NO

Replace AUTO TRANSAXLE (BODY CONTROL VALVE faulty) as necessary and Go to "Verification of Vehicle Repair " procedure.

ATA -75

VERIFICATION OF VEHICLE REPAIR EBBCF/

After a repair, it is essential to verify that the fault has been corrected.

- 1. Connect scantool and select "Diagnostic Trouble Codes(DTCs)" mode.
- 2. Using a scantool, Clear DTC.
- 3. Operate the vehicle within DTC Enable conditions in General information.
- 4. Are any DTCs present?

YES

Go to the applicable troubleshooting procedure.

NO

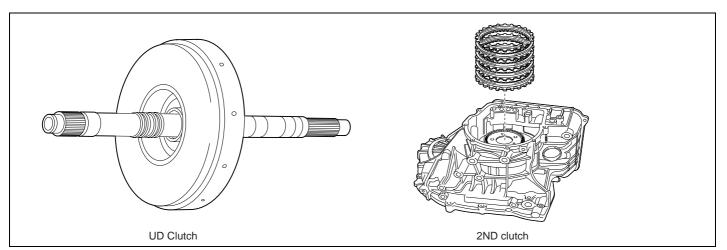
System performing to specification at this time.



ATA -76

DTC P0732 GEAR 2 INCORRECT RATIO

COMPONENT LOCATION EBC1A552



BKGF109A

GENERAL DESCRIPTION E946C139

The value of the input shaft speed should be equal to the value of the output shaft speed, when multiplied by the 2nd gear ratio, while the transaxle is engaged in the 2nd gear. For example, if the output speed is 1000 rpm and the 2nd gear ratio is 1.529, then the input speed is 1,592 rpm.

DTC DESCRIPTION E087320D

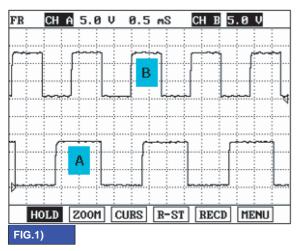
This code is set if the value of input shaft speed is not equal to the value of the output shaft, when multiplied by the 2nd gear ratio, while the transaxle is engaged in 2nd gear. This malfunction is mainly caused by mechanical troubles such as control valve sticking or solenoid valve malfunctioning rather than an electrical issue.

DTC DETECTING CONDITION EDB92EE

Item	Detecting Condition	Possible cause	
DTC Strategy	2nd gear incorrect ratio	Faulty input speed sensor	
Enable Conditions	 Engine speed > 450rpm Output speed > 500rpm Lever position: D,3,2 Input speed > 0rpm A/T oil temp output -10°C(14°F) 11V Battery Voltage 16V TRANSAXLE RANGE SWITCH is normal and after 2sec is passed from IG ON 	 Faulty output speed sensor Faulty UD clutch or 2-4 brake 	
Threshold value	 Input speed/2nd gear ratio - output speed 200rpm 		
Diagnostic Time	More than 1sec		
Fail Safe	 Locked into 3rd gear.(If diagnosis code P0732 is output four times, the transaxle is locked into 3rd gear) 		

ATA -77

SIGNAL WAVEFORM EEC82405



A: INPUT SPEED SENSOR B: OUTPUT SPEED SENSOR

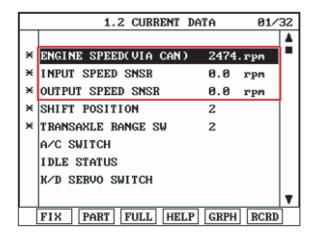
BKGF109B

MONITOR SCANTOOL DATA E45A4641

- Connect scan tool to data link connector(DLC).
- 2. Engine "ON".
- Monitor the "ENGINE SPEED, INPUT SPEED SENSOR, OUTPUT SPEED SENSOR, GEAR POSITION" parameter on the scan tool.
- 4. Perform the "STALL TEST" with gear position "2".

Specification: 2000~2700 engine rpm

This test is possible only for "HOLD S/W" or "SPORTS MODE" applied vehicles.



BKGF109C

ATA -78

AUTOMATIC TRANSAXLE (A4CF2)

OPERATING ELEMENT OF EACH SHIFTING RANGE

	UD/C	OD/C	REV/C	2-4/B	LR/B	OWC
Р						
R						
N						
D1						
D2						
D3						
D4						
L						

Stall test procedure in D2 and reason

Procedure

- 1. Warm up the engine.
- 2. After positioning the select lever in "D" or "ON" of the HOLD SW (Operate UP SHIFT in case of "SPORTS MODE"),depress the foot brake pedal fully after that, depress the accelerator pedal to the maximum.
 - * The slippage of 2ND BRAKE can be detected by stall test in D2.

Reason for stall test

- 1. If there is no mechanical defaults in A/T, every slippage occur in torque converter.
- Therefore, engine revolution is output, but input and output speed revolution must be "zero" due to wheel's lock.
- 3. If 2nd brake system(2nd gear operating part) has faults, input speed revolution will be out.
- 4. If output speed revolution is output. It means that the foot brake force is not applied fully. Remeasuring is required.
- 5. Is "STALL TEST " within specification?



Go to "Signal circuit inspection" procedure.



Go to "Component inspection" procedure.



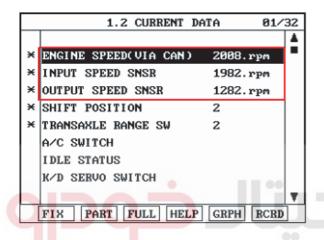
- 1. Do not let anybody stand in front of or behind the vehicle while this test is being carried out.
- Check the A/T fluid level and temperature and the engine coolant temperature.
 - Fluid level: At the hot mark on the oil level gauge.
 - Fluid temperature : 176 $^{\circ}$ F~ 212 $^{\circ}$ F (80~100 $^{\circ}$ C).
 - Engine coolant temperature : 176 °F~ 212 °F (80~100 °C).
- 3. Chock both rear wheel(left and right).
- 4. Pull the parking brake lever on with the brake pedal fully depressed.
- 5. The throttle should not be left fully open for more than eight second.
- 6. If carrying out the stall test two or more time, move the select lever to the "N" position and run the engine at 1,000 rpm to let the A/T fluid cool down before carrying out subsequent.

ATA -79

SIGNAL CIRCUIT INSPECTION E3998F8D

- 1. Connect Scantool.
- 2. Engine "ON".
- 3. Monitor the "INPUT & OUTPUT SPEED SENSOR" parameter on the scantool.
- 4. Accelerate the Engine speed until about 2000 rpm in the 2nd gear.

Specification: INPUT SPEED - (OUTPUT SPEED x 2nd GEAR RATIO) 200 RPM



5. Does "INPUT & OUTPUT SPEED SENSOR" within specifications?



Go to "Component Inspection" procedure.

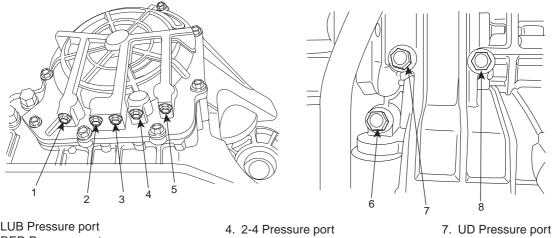


Check for electrical noise of circuit in INPUT & OUTPUT SPEED SENSOR or Replace INPUT & OUTPUT SPEED SENSOR. Repair as necessary and Go to "Verification of Vehicle Repair" procedure.

BKGF109D

ATA -80

COMPONENT INSPECTION



- 1. LUB Pressure port
- 2. RED Pressure port
- 3. OD Pressure port

- 5. REV Pressure port
- 6. DA Pressure port
- 8. LR Pressure port

BKGF108E

- Connect oil pressure gauge to "UD" and "2-4/B" port.
- 2. Engine "ON".
- 3. Drive a car with gear position 2 in "SPORTS MODE"
- Compare it with reference data as below. 4.

Specification:

ATA -81

STANDARD HYDRAULIC PRESSURE TABLE

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

^{*} The values are subject to change according to vehicle model or condition.

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5. Is oil pressure value within specifications?

YES

Repair AUTO TRANSAXLE(Clutch or Brake) as necessary and Go to "Verification of Vehicle Repair" procedure.

NO

Replace AUTO TRANSAXLE (BODY CONTROL VALVE faulty) as necessary and Go to "Verification of Vehicle Repair " procedure.

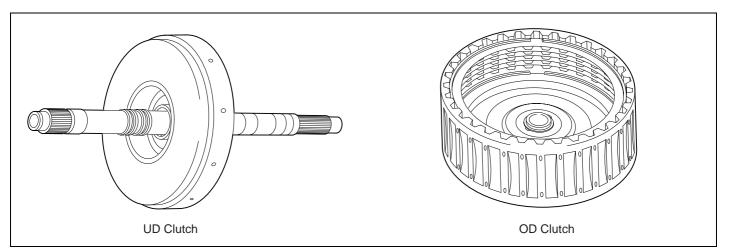
VERIFICATION OF VEHICLE REPAIR E18107E4

Refer to DTC P0731.

ATA -82

DTC P0733 GEAR 3 INCORRECT RATIO

COMPONENT LOCATION E50DA047



BKGF110A

GENERAL DESCRIPTION EDCA6BE5

The value of the input shaft speed should be equal to the value of the output shaft speed, when multiplied by the 3rd gear ratio, while the transaxle is engaged in the 3rd gear. For example, if the output speed is 1,000 rpm and the 3rd gear ratio is 1.000, then the input speed is 1,000 rpm.

DTC DESCRIPTION E802A634

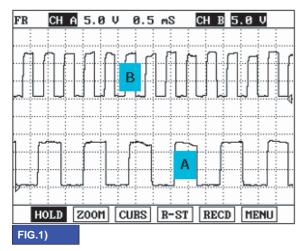
This code is set if the value of input shaft speed is not equal to the value of the output shaft, when multiplied by the 3rd gear ratio, while the transaxle is engaged in 3rd gear. This malfunction is mainly caused by mechanical troubles such as control valve sticking or solenoid valve malfunctioning rather than an electrical issue.

DTC DETECTING CONDITION E48AFCDF

Item	Detecting Condition	Possible cause	
DTC Strategy	3rd gear incorrect ratio	Faulty input speed sensor	
Enable Conditions	 Engine speed > 450rpm Output speed > 900rpm Lever position: D,3 A/T oil temp output -10°C(14°F) 11V Battery Voltage 16V TRANSAXLE RANGE SWITCH is normal and after 2sec is passed from IG ON 	 Faulty output speed sensor Faulty UD clutch or OD clutch 	
Threshold value	Input speed/3rd gear ratio - output speed 200rpm		
Diagnostic Time	More than 1sec		
Fail Safe	Locked into 3rd gear.(If diagnosis code P0733 is output four times, the transaxle is locked into 3rd gear)		

ATA -83

SIGNAL WAVEFORM E68EEA2D



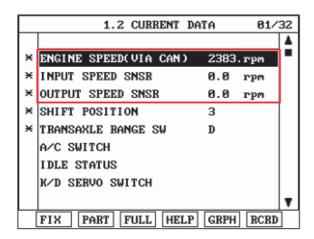
A: INPUT SPEED SENSOR B: OUTPUT SPEED SENSOR

BKGF110B

MONITOR SCANTOOL DATA E22C2E12

- Connect scan tool to data link connector(DLC)
- 2. Engine "ON".
- Monitor the "ENGINE SPEED, INPUT SPEED SENSOR, OUTPUT SPEED SENSOR, GEAR POSITION" parameter on the scan tool.
- 4. Disconnect the solenoid valve connector and perform the "STALL TEST".

Specification: 2000~2700 engine rpm



BKGF110C

ATA -84

AUTOMATIC TRANSAXLE (A4CF2)

OPERATING ELEMENT OF EACH SHIFTING RANGE

	UD/C	OD/C	REV/C	2-4/B	LR/B	OWC
Р						
R						
N						
D1						
D2						
D3						
D4						
L						

Stall test procedure in D3 and reason

Procedure

- 1. Warm up the engine.
- 2. After making 3rd gear hold by disconnecting the solenoid connector, and Then depress the foot brake pedal fully After that, step on the accelerator pedal to the maximum.
 - * The slippage of OD clutch can be detected by stall test in D3.

Reason for stall test

- 1. If there is no mechanical defaults in A/T, every slippage occur in torque converter.
- 2. Therefore, engine revolution is output, but input and output speed revolution must be "zero" due to wheel's lock.
- 3. If OD clutch system(3rd gear operating part) has faults, input speed revolution will be output.
- 4. If output speed revolution is output. It means that the foot brake force is not applied fully. Remeasuring is required.
- 5. Is "STALL TEST " within specification?

YES

Go to "Signal circuit inspection" procedure.

NO

Go to "Component inspection" procedure.



- 1. Do not let anybody stand in front of or behind the vehicle while this test is being carried out.
- 2. Check the A/T fluid level and temperature and the engine coolant temperature.
 - Fluid level: At the hot mark on the oil level gauge.
 - Fluid temperature : 176 °F~ 212 °F (80~100 °C).
 - Engine coolant temperature : 176 °F~ 212 °F (80~100 °C).
- 3. Chock both rear wheel(left and right).
- 4. Pull the parking brake lever on with the brake pedal fully depressed.
- 5. The throttle should not be left fully open for more than eight second.
- 6. If carrying out the stall test two or more time, move the select lever to the "N" position and run the engine at 1,000 rpm to let the A/T fluid cool down before carrying out subsequent.

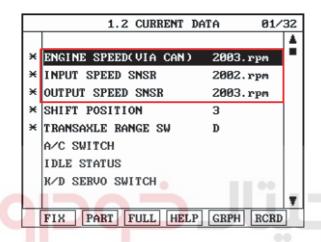
ATA -85

BKGF110D

SIGNAL CIRCUIT INSPECTION EC30AED7

- 1. Connect Scantool.
- 2. Engine "ON".
- 3. Monitor the "INPUT & OUTPUT SPEED SENSOR" parameter on the scantool.
- 4. Accelerate the Engine speed until about 2000 rpm in the 3rd gear.

Specification: INPUT SPEED - (OUTPUT SPEED × 3rd GEAR RATIO) 200 RPM



5. Is "INPUT & OUTPUT SPEED SENSOR" within specifications?



Go to "Component Inspection" procedure.

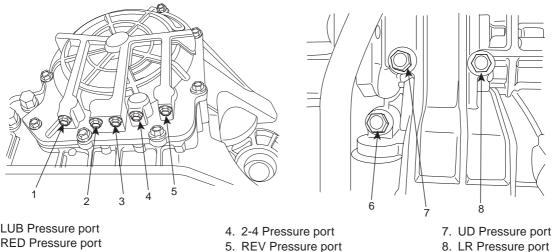


Check for electrical noise of circuit in INPUT & OUTPUT SPEED SENSOR or Replace INPUT & OUTPUT SPEED SENSOR. Repair as necessary and Go to "Verification of Vehicle Repair" procedure.

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ATA -86

COMPONENT INSPECTION



- 1. LUB Pressure port
- 2. RED Pressure port
- 3. OD Pressure port

- 6. DA Pressure port
- 8. LR Pressure port

BKGF108E

- Connect oil pressure gauge to "UD" and "OD" port.
- 2. Engine "ON".
- 3. Disconnect the solenoid valve connector.
- Drive a car with gear position 3 in fail mode. 4.
- 5. Compare it with reference data as below.

Specification: Refer to the "Standard hydraulic pressure table"

ATA -87

STANDARD HYDRAULIC PRESSURE TABLE

No.	Shift range			Operation	1		N.4		(Dil pressure	e (kgf/cm²)	
INO.	position		PCSV-B	PCSV-C	PCSV-D	ON/OFF	Measuring	LR	2/4(2ND)	UD	OD	REV
1	D	0	100	0	0	ON	LR	10.5±0.2	0	10.5±0.2	0	0
2	1	50	1	1	1	1	1	5.3±0.4	1	1	1	1
3	1	75	1	1	1	1	1	1.0± 0.3	1	1	1	1
4	1	100	1	1	1	1	1	0	1	1	1	1
5	1	1	0	1	100	OFF	2/4(2ND)	0	10.5±0.2	1	1	1
6	1	1	50	1	1	↑	1	↑	5.3±0.4	1	↑	1
7	1	1	75	1	1	↑	1	↑	0.9±0.3	1	↑	↑
8	1	1	100	1	1	↑	1	↑	0	1	↑	↑
9	1	0	1	1	1	↑	OD	↑	1	1	10.5±0.2	1
10	1	50	1	1	1	1	1	↑	1	1	5.6±0.4	↑
11	1	75	1	1	1	1	1	1	1	1	1.0±0.3	1
12	1	100	1	1	1	1	1	1	1	1	0	1
13	1	1	1	0	0	↑	UD	1	1	10.5±0.2	1	1
14	1	1	1	50	1	1	1	1	1	5.6±0.4	1	1
15	1	1	1	75	1	1	1	1	1	1.0±0.3	1	1
16	1	0	1	100	_ oĵ	1	1	1	1	0	1	1
17	R	1	0	1	1	ON	REV	17.7±0.8	1	1	1	17.7±0.8
18	1	1	50	1	1	1	1	1		1	1	8.7±0.8
19	1	1	75	1	100	1		1	1	1	1	0.9±0.5
20	1	1_1=	100		1	∏ . ↑	1	1	1	1	1	0

^{*} The values are subject to change according to vehicle model or condition.

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SHDAT6240L

6. Is oil pressure value within specifications?

YES

Repair AUTO TRANSAXLE(Clutch or Brake) as necessary and Go to "Verification of Vehicle Repair" procedure.

NO

Replace AUTO TRANSAXLE (BODY CONTROL VALVE faulty) as necessary and Go to "Verification of Vehicle Repair" procedure.

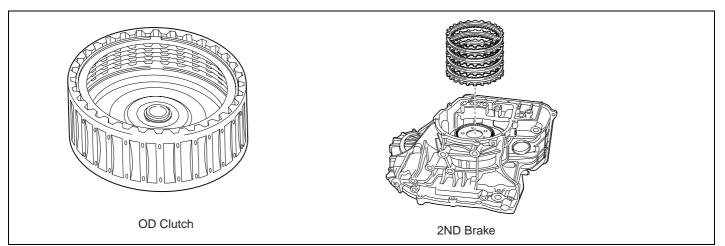
VERIFICATION OF VEHICLE REPAIR E83B89A0

Refer to DTC P0731.

ATA -88

DTC P0734 GEAR 4 INCORRECT RATIO

COMPONENT LOCATION EC1218FA



BKGF111A

GENERAL DESCRIPTION EC5246

The value of the input shaft speed should be equal to the value of the output shaft speed, when multiplied by the 4th gear ratio, while the transaxle is engaged in the 4th gear. For example, if the output speed is 1,000 rpm and the 4th gear ratio is 0.712, then the input speed is 712 rpm.

DTC DESCRIPTION E646124A

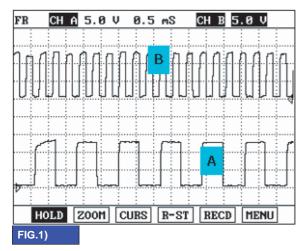
This code is set if the value of input shaft speed is not equal to the value of the output shaft, when multiplied by the 4th gear ratio, while the transaxle is engaged in 4th gear. This malfunction is mainly caused by mechanical troubles such as control valve sticking or solenoid valve malfunctioning rather than an electrical issue.

DTC DETECTING CONDITION EC9CB6DE

Item	Detecting Condition	Possible cause		
DTC Strategy	4th gear incorrect ratio	 Faulty input speed sensor 		
Enable Conditions	 Engine speed > 450rpm Output speed > 900rpm Lever position : D Input speed > 300rpm A/T oil temp output -10°C(14°F) TRANSAXLE RANGE SWITCH is normal and above 2sec is passed from IG ON 	 Faulty output speed sensor Faulty OD clutch or 2nd brake 		
Threshold value	Threshold value Input speed/4th gear ratio - output speed 200rpm			
Diagnostic Time	More than 1sec			
Fail Safe	 Locked into 3rd gear.(If diagnosis code P0734 is output four times, the transaxle is locked into 3rd gear) 			

ATA -89

SIGNAL WAVEFORM E9679261



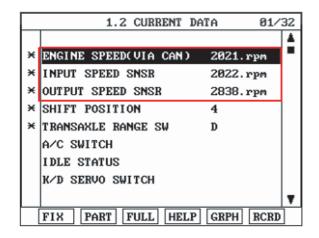
A: INPUT SPEED SENSOR B: OUTPUT SPEED SENSOR

BKGF111B

SIGNAL CIRCUIT INSPECTION

- 1. Connect Scantool.
- 2. Engine "ON".
- 3. Monitor the "INPUT & OUTPUT SPEED SENSOR" parameter on the scantool.
- 4. Accelerate the Engine speed until about 2000 rpm in the 4th gear.

Specification: INPUT SPEED - (OUTPUT SPEED × 4th GEAR RATIO) 200 RPM



BKGF111C

ATA -90

5. Is "INPUT & OUTPUT SPEED SENSOR" within specifications?

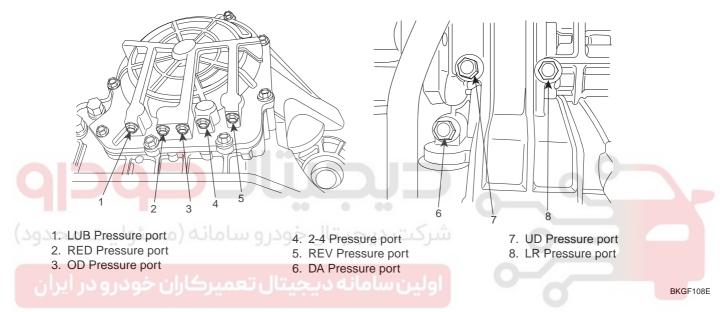


Go to "Component Inspection" procedure.



Check for electrical noise of circuit in INPUT & OUTPUT SPEED SENSOR or Replace INPUT & OUTPUT SPEED SENSOR. Repair as necessary and Go to "Verification of Vehicle Repair" procedure.

COMPONENT INSPECTION E080B2A



- 1. Connect oil pressure gauge to "OD" and "2nd" port.
- 2. Engine "ON".
- 3. Drive a car with gear position "4".
- 4. Compare it with reference data as below.

Specification: Refer to the "Standard hydraulic pressure table"

ATA -91

STANDARD HYDRAULIC PRESSURE TABLE

No.	Shift range			Operation	1		Mananima		(Dil pressure	e (kgf/cm²)	
INO.	position	PCSV-A	PCSV-B	PCSV-C	PCSV-D	ON/OFF	Measuring	LR	2/4(2ND)	UD	OD	REV
1	D	0	100	0	0	ON	LR	10.5±0.2	0	10.5±0.2	0	0
2	1	50	1	1	1	1	1	5.3±0.4	1	1	↑	1
3	1	75	1	1	1	1	1	1.0±0.3	1	1	1	1
4	1	100	1	1	1	1	1	0	1	1	1	1
5	1	1	0	1	100	OFF	2/4(2ND)	0	10.5±0.2	1	↑	1
6	1	1	50	1	1	1	1	1	5.3±0.4	1	↑	1
7	1	1	75	1	1	1	1	↑	0.9±0.3	1	↑	↑
8	1	1	100	↑	1	↑	1	↑	0	1	↑	↑
9	↑	0	1	1	1	↑	OD	↑	↑	↑	10.5±0.2	↑
10	1	50	1	1	1	1	1	<u> </u>	1	1	5.6±0.4	1
11	1	75	1	1	1	1	1	1	1	1	1.0±0.3	1
12	1	100	1	1	1	1	1	1	1	1	0	↑
13	1	1	1	0	0	1	UD	1	1	10.5±0.2	↑	1
14	1	1	1	50	1	1	1	1	1	5.6±0.4	↑	1
15	1	1	1	75	1	1	1	<u> </u>	1	1.0±0.3	<u> </u>	↑
16	1	0	\uparrow	100		1	1	1	1	0	1	1
17	R	\uparrow	0	1	1	ON	REV	17.7±0.8	1	1	1	17.7±0.8
18	1	1	50		\uparrow	1	\uparrow	1	1	1	1	8.7±0.8
19	1	1	75	1	100	1		1	1	1	1	0.9±0.5
20	1	1_1=	100	1	1	1	1	1	1	1		0

^{*} The values are subject to change according to vehicle model or condition.

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SHDAT6240L

5. Is oil pressure value within specifications?

YES

Repair AUTO TRANSAXLE(Clutch or Brake) as necessary and Go to "Verification of Vehicle Repair" procedure.

NO

Replace AUTO TRANSAXLE (BODY CONTROL VALVE faulty) as necessary and Go to "Verification of Vehicle Repair" procedure.

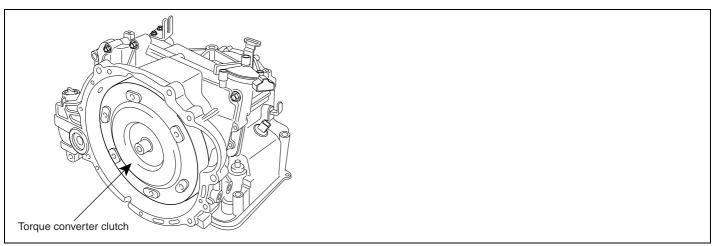
VERIFICATION OF VEHICLE REPAIR E808F7CE

Refer to DTC P0731.

ATA -92

DTC P0741 TORQUE CONVERTER CLUTCH CIRCUIT - STUCK OFF

COMPONENT LOCATION E1D988F9



BKGF115A

GENERAL DESCRIPTION E0435161

The PCM/TCM controls the locking and unlocking of the Torque Converter Clutch (or Damper Clutch), to the input shaft of the transmission, by appling hydraulic pressure. The main purpose of T/C clutch control is to save fuel by decreasing the hydraulic load inside the T/C. The PCM/TCM outputs duty pulses to control the Damper Clutch Control Solenoid Valve(DCCSV) and hydraulic pressure is applied to the DC according to the DCC duty ratio value. When the duty ratio is high, high pressure is applied and the Damper Clutch is locked. The normal operating range of the Damper Clutch Control duty ratio value is from 30%(unlocked) to 85%(locked).

DTC DESCRIPTION E647FA2A

The PCM/TCM increases the duty ratio to engage the Damper Clutch by monitoring slip rpms (difference value between engine speed and turbine speed). To decrease the slip of the Damper Clutch, the PCM/TCM increases the duty ratio by appling more hyraulic pressure. When slip rpm does not drop under some value with 100% duty ratio, the PCM/TCM determines that the Torque Converter Clutch is stuck OFF and sets this code.

DTC DETECTING CONDITION EFBD1006

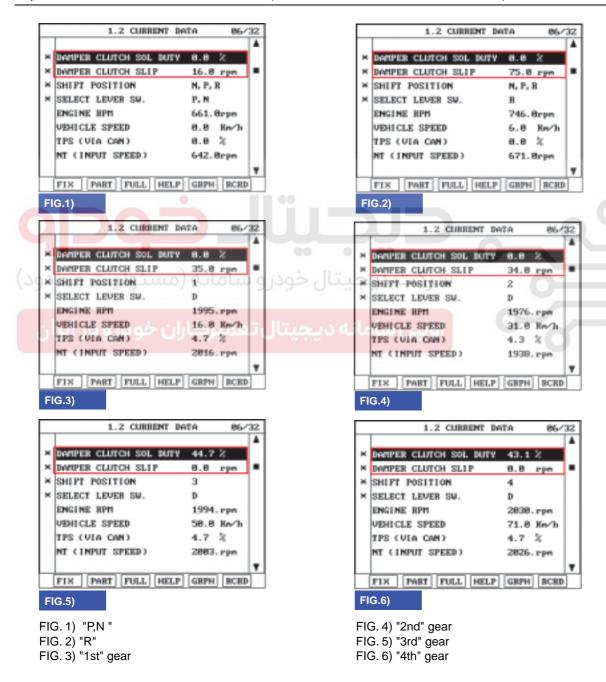
Item	Detecting Condition	Possible cause		
DTC Strategy	Stuck "OFF"	TORQUE CON-		
Enable Conditions	Duty of Damper clutch solenoid valve = 100%	VERTER(DAMPER) CLUTCH : TCC		
Threshold value	Detect the Lock-up clutch control duty = 100% for 2sec	Faulty TCC or oil pressure system		
Diagnostic Time	More than 2 times	Faulty TCC solenoid valve		
Fail Safe	Damper clutch abnormal system (If diagnosis code P0741 is output four times, TORQUE CONVERTER(DAMPER) CLUTCH is not controlled by PCM/TCM)	Faulty body control valve Faulty PCM/TCM		

ATA -93

MONITOR SCANTOOL DATA E660101

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- 3. Select "D RANGE" and drive vehicle.
- 4. Monitor the "TORQUE CONVERTER(DAMPER) CLUTCH" parameter on the scantool.

Specification: TCC SOL. DUTY > 30% (In that condition TCC SLIP < 100RPM)



SHDAT6250L

ATA -94

5. Are "TCC SOLENOID DUTY and TCC SLIP" within specifications?



Fault is intermittent caused by poor contact in the sensor's and/or TCM(PCM)'s connector or was repaired and TCM(PCM) memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration or damage. Repair or replace as necessary and go to "Verification of vehicle repair" procedure.



Go to "Component inspection" procedure.

COMPONENT INSPECTION EB9FC801

- 1. CHECK TORQUE CONVERTER CLUTCH SOLENOID VALVE
 - 1) Connect scantool to data link connector(DLC).
 - 2) Ignition "ON" & Engine "OFF".
 - 3) Select A/T solenoid valve actuator test and operate actuator test.



SHDAT6249L

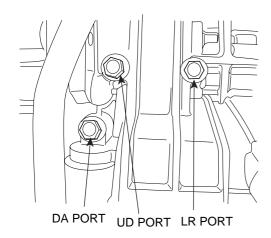
YES

Go to "CHECK OIL PRESSURE" as below.

NO

Replace "TCC SOLENOID VALVE" as necessary and go to "Verification of vehicle repair" procedure.

2. CHECK OIL PRESSURE



BKGF115C

- 1) Connect oil pressure gauge to "DA" port.
- 2) Engine "ON".
- 3) After connecting Scantool and monitor the "TCC SOLENIOD VALVE DUTY" parameter on the scantool data list.
- 4) Operate vehicle with 3rd or 4tf gear and operate the "TCC SOLENIOD VALVE DUTY" more than 35%.

Specification: Above 2.0~4.6kg/cm² (196~451kpa, 28.4~65.4psi) (Engine Speed: 2500rpm, DCC sol Duty: 50%)

5) Is oil pressure value within specification?



Repair TORQUE CONVERTER CLUTCH(REPLACE Torque Converter) as necessary and go to "Verification of vehicle repair" procedure.

NO

Replace A/T assembly (possible to BODY CONTROL VALVE faulty) as necessary and go to "Verification of vehicle repair" procedure.

VERIFICATION OF VEHICLE REPAIR E6879647

After a repair, it is essential to verify that the fault has been corrected.

- Connect scantool and select "Diagnostic Trouble Codes(DTCs)" mode.
- 2. Using a scantool, Clear DTC.
- 3. Operate the vehicle within DTC Enable conditions in General information.
- 4. Are any DTCs present?



Go to the applicable troubleshooting procedure.

NO

System performing to specification at this time.

ATA -96 AUTOMATIC TRANSAXLE (A4CF2)

DTC P0742 TORQUE CONVERTER CLUTCH CIRCUIT - STUCK ON

GENERAL DESCRIPTION ECBC1BB7

Refer to DTC P0741.

DTC DESCRIPTION E1260C28

The TCM increases the duty ratio to engage the Damper Clutch by monitoring the slip rpms (difference value between engine speed and turbine speed). If a very small amount of slip rpm is maintained though the TCM applies 0% duty ratio value, then the TCM determines that the Torque Converter Clutch is stuck ON and sets this code.

DTC DETECTING CONDITION E0C2BDB3

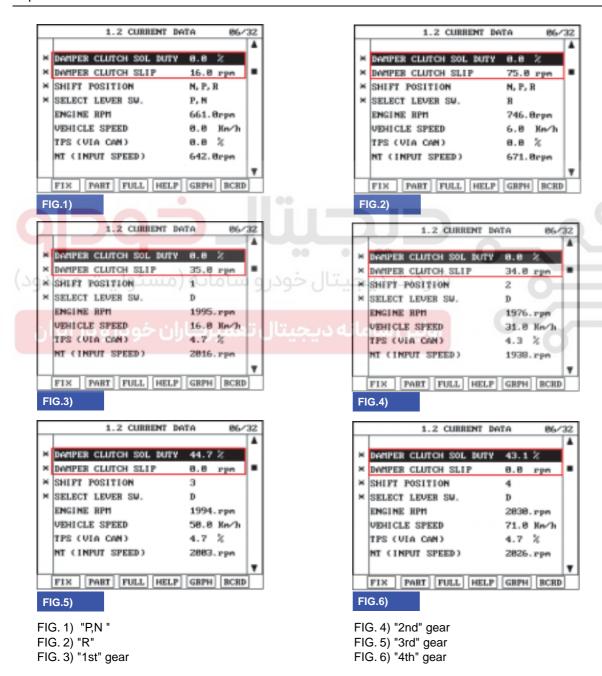
Item	Detecting Condition	Possible cause		
DTC Strategy	Stuck "ON"	TORQUE CON-		
Enable Conditions	 Throttle position > 20% Output speed > 1000 rpm Engine speed > 0rpm A/T range switch D,3 The time after the last shift was finished > 3secs Duty of Damper clutch solenoid valve = 0% ATF temperature > -10°C(14°F) 	VERTER(DAMPER) CLUTCH : TCC • Faulty TCC or oil pressure system • Faulty TCC solenoid valve • Faulty body control valve • Faulty TCM(PCM)		
Threshold value	Engine rpm - Input speed sensor rpm 5 rpm			
Diagnostic Time	More than 3 seconds	0		
Fail Safe	 Damper clutch abnormal system (If diagnosis code P0741 is output four times, TORQUE CONVERTER(DAMPER) CLUTCH is not controlled by PCM/TCM) 			

ATA -97

MONITOR SCANTOOL DATA E37677D

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- 3. Select "D RANGE" and drive vehicle.
- Monitor the "TORQUE CONVERTER(DAMPER) CLUTCH" parameter on the scantool.

Specification: TCC SLIP > 5RPM



SHDAT6250L

ATA -98

5. Is TCC SLIP" within specifications?



Fault is intermittent caused by poor contact in the sensor's and/or TCM(PCM)'s connector or was repaired and TCM(PCM) memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration or damage. Repair or replace as necessary and go to "Verification of vehicle repair" procedure.



Go to "Component inspection" procedure.

COMPONENT INSPECTION E1EDFEBO

- 1. CHECK TORQUE CONVERTER CLUTCH SOLENOID VALVE
 - 1) Connect scantool to data link connector(DLC).
 - 2) Ignition "ON" & Engine "OFF".
 - 3) Select A/T solenoid valve actuator test and operate actuator test.
 - 1.5 ACTUATION TEST 85/88

 DAMPER CLUTCH CONTROL SOL. WALVE DURATION 5 SECONDS

 METHOD ACTIVATION

 CONDITION IG. KEY ON, ENGINE OFF

 TRANSANLE RANGE: P

 PRESS [STRT], IF YOU ARE READY!

SHDAT6249L

YES

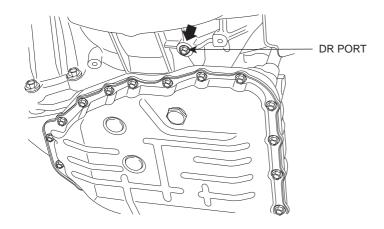
Go to "CHECK OIL PRESSURE" as below.

NO

Repair or replace as necessary and then go to "Verification of vehicle repair" procedure.

ATA -99

2. CHECK OIL PRESSURE



BKGF116B

- 1) Connect oil pressure gauge to "DR" port.
- 2) Ignition "ON" & Engine "OFF".
- 3) After connecting scantool and monitor the "TCC SOLENIOD VALVE DUTY" parameter on the scantool data list.
- 4) Select 1st gear and accelerate Engine speed to 2500 rpm.
- 5) Measure oil pressure.

Specification: approx. Above 5.1~7.1kg/cm² (500~696kpa, 72.5~100.99psi)

6) Is oil pressure value within specification?



Repair TORQUE CONVERTER CLUTCH(REPLACE Torque Converter) as necessary and go to "Verification of vehicle repair" procedure.



Replace A/T assembly (possible to BODY CONTROL VALVE faulty) as necessary and Go to "Verification of vehicle Repair" procedure.

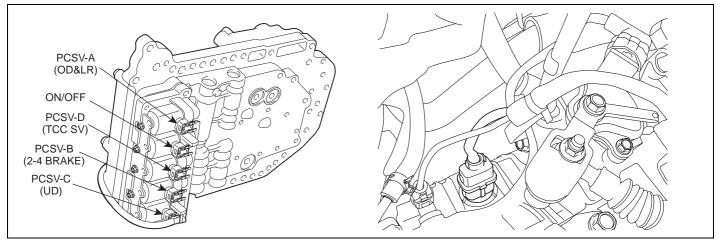
VERIFICATION OF VEHICLE REPAIR E45C2364

Refer to DTC P0741.

ATA -100

DTC P0743 TORQUE CONVERTER CLUTCH CIRCUIT - ELECTRICAL

COMPONENT LOCATION EB1F0645



SHDAT6251D

GENERAL DESCRIPTION

Refer to DTC P0741.

DTC DESCRIPTION E66CE837

The PCM/TCM checks the Damper Clutch Control Signal by monitoring the feedback signal from the solenoid valve drive circuit. If an unexpected signal is monitored (for example, high voltage is detected when low voltage is expected, or low voltage is detected when high voltage is expected) the PCM/TCM judges that DCCSV circuit is malfunctioning and sets this code.

DTC DETECTING CONDITION E7FF7047

E30F232B

Item		Detecting Condition	Possible cause
DTC Strategy		Check voltage range	TORQUE CON-
	Case 1	Solenoid status = open	VERTER(DAMPER) CLUTCH : TCC
Enable Conditions	Case 2	Solenoid status = opentime after TCM turns "ON" = 0.5sec	Open or short in circuit Faulty TCC SOLENOID
Threshold value	Case 1	• Feed back voltage < 5.5V	VALVE • Faulty PCM/TCM
Threshold value	Case 2	Feed back voltage > Battery voltage-1	T duty T OW TOW
Diagnostic Time		• more than 1sec	
Fail Safe		 Locked in 3 rd gear 	

ATA -101

SPECIFICATION

Solenoid Valve for Pressure Control

• Sensor type: Normal open 3-way

• Operating temperature : -30°C~130°C(-22~266°F)

• Frequency:

PCSV-A,B,C,D: 50Hz (at the ATF temp. -20°C above)

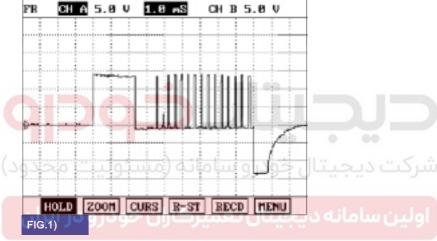
VFS: 400~1000 KM series: 35Hz

• Internal resistance :

Internal resistance : 3.5 ± 0.2 (20°C or 68°F)

• Surge voltage: 56 V

SIGNAL WAVEFORM





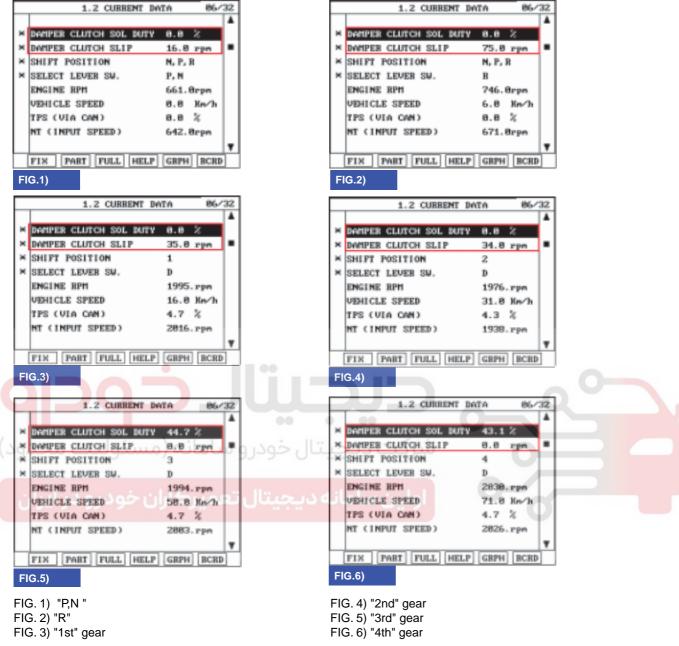
MONITOR SCANTOOL DATA

Connect scantool to data link connector(DLC).

- 2. Engine "ON".
- Monitor the "TCC SOL. VALVE" parameter on the scantool
- Select "D RANGE" and Operate "TCC SOLENOID DUTY" more than 35%.

SHDAT6258L





SHDAT6259L

5. Does "TCC SOLENOID DUTY" follow the reference data?

YES

Fault is intermittent caused by poor contact in the sensor's and/or TCM(PCM)'s connector or was repaired and TCM(PCM) memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration or damage. Repair or replace as necessary and go to "Verification of vehicle repair" procedure.

NO

Go to "Terminal & connector inspection" procedure.

ATA -103

TERMINAL & CONNECTOR INSPECTION E9D2E97

- 1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
- 2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.
- 3. Has a problem been found?



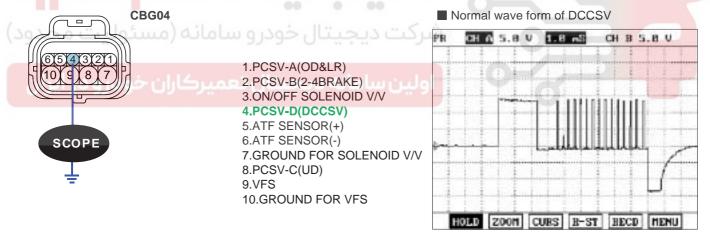
Repair as necessary and then go to "Verification of vehicle repair" procedure.



Go to "Power supply circuit inspection" procedure.

POWER SUPPLY CIRCUIT INSPECTION E1F2A5C3

- 1. Connect "A/T SOLENOID VALVE" connector and install device for measuring wave form.
- 2. Turn on the engine and operate damper clutch.
- 3. Measure wave form between terminal "4" of the sensor harness connector and chassis ground.



SHDAT6252N

4. Is measured normally operating wave form?



Go to "Signal circuit inspection" procedure.

NO

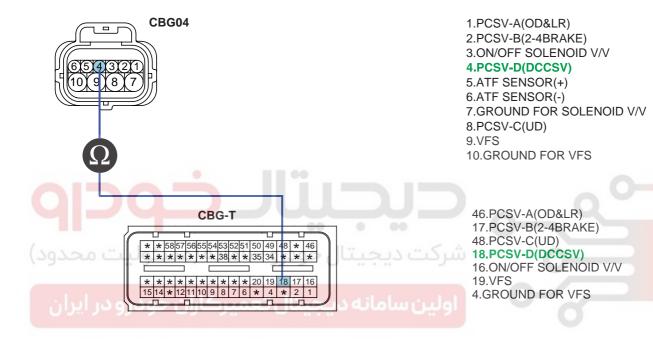
Check for open in harness. Repair as necessary and Go to "Verification of vehicle repair" procedure.

ATA -104

SIGNAL CIRCUIT INSPECTION EAB65F

- 1. Check signal circuit open inspection
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector and "PCM/TCM" connector.
 - 3) Measure resistance between terminal "4" of the ATM SOLENOID VALVE harness connector and terminal "18" of the PCM/TCM harness connector.

Specification: approx. 0



4) Is resistance within specifications?



Go to "Check signal circuit short inspection" procedure.



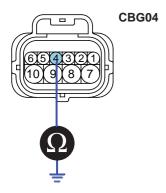
Check for open in harness. Repair as necessary and go to "Verification of vehicle repair" procedure.

SLDAA7260L

ATA -105

- 2. Check signal circuit short inspection
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector and "PCM/TCM" connector.
 - 3) Measure resistance between terminal "4" of the ATM SOLENOID VALVE harness and chassis ground.

Specification: Infinite



1.PCSV-A(OD&LR)
2.PCSV-B(2-4BRAKE)
3.ON/OFF SOLENOID V/V
4.PCSV-D(DCCSV)
5.ATF SENSOR(+)
6.ATF SENSOR(-)
7.GROUND FOR SOLENOID V/V
8.PCSV-C(UD)
9.VFS
10.GROUND FOR VFS

SHDAT6254N

4) Is resistance within specifications?



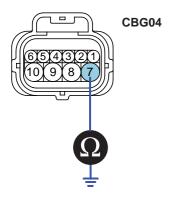
Go to "signal circuit ground inspection" procedure.

NO NO CONTRACTOR IN L

Check for short to ground in harness. Repair as necessary and go to "Verification of vehicle repair" procedure.

- 3. Check signal circuit ground inspection
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector and "PCM/TCM" connector.
 - 3) Measure resistance between terminal "7" of the ATM SOLENOID VALVE harness and chassis ground.

Specification: approx. 0



1.PCSV-A(OD&LR)
2.PCSV-B(2-4BRAKE)
3.ON/OFF SOLENOID V/V
4.PCSV-D(DCCSV)
5.ATF SENSOR(+)
6.ATF SENSOR(-)
7.GROUND FOR SOLENOID V/V
8.PCSV-C(UD)
9.VFS
10.GROUND FOR VFS

SHDAT6255N

ATA -106

4) Is resistance within specifications?



Go to "Component Inspection" procedure.

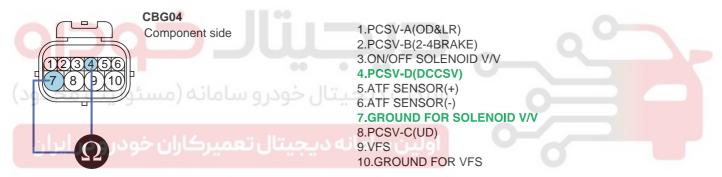


Check for short to ground in harness. Repair as necessary and Go to "Verification of vehicle repair" procedure.

COMPONENT INSPECTION EEA64882

- 1. CHECK SOLENOID VALVE
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector.
 - 3) Measure resistance between terminal "4" and terminal "7" of the ATM SOLENOID VALVE harness connector.

Specification: Approximately 3.5±0.2 [(25°C(77°F)]



SHDAT6256N

4) Is resistance within specification?



Go to "CHECK PCM/TCM" as below.



Replace DCC SOLENOID VALVE as necessary and go to "Verification of vehicle repair" procedure.

ATA -107

2. CHECK PCM/TCM

- 1) Connect scantool to data link connector(DLC).
- 2) Ignition "ON" & Engine "OFF".
- 3) Select A/T solenoid valve actuator test and operate actuator test.
- 4) Is Actuator Testing performed normally?



SHDAT6257L

YES

Go to "Verification of vehicle repair" procedure.

NO

Replace PCM/TCM as necessary and go to "Verification of vehicle repair" procedure.

ACTUATOR TEST CONDITION

- 1. IG SWITCH ON
- 2. TRANSAXLE RANGE SWITCH is normal
- P RANGE
- 4. Vehicle Speed 0mph(0km/h)
- 5. Throttle position sensor < 1V
- 6. IDLE SWITCH ON
- 7. ENGINE RPM 0

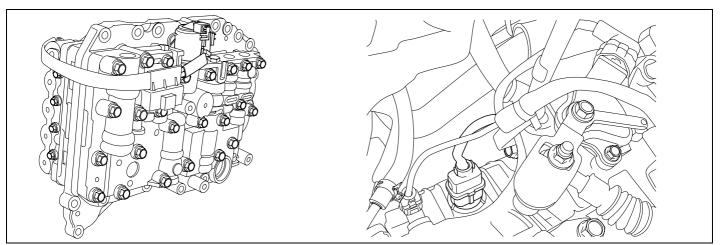
VERIFICATION OF VEHICLE REPAIR EFEEOBO9

Refer to DTC P0741.

ATA -108

DTC P0748 VFS SOLENOID VALVE CIRCUIT - OPEN OR SHORT(GND)

COMPONENT LOCATION E0076A19



SHDAT6268D

GENERAL DESCRIPTION E3BE7364

Variable Faced Solenoid (Linear Solenoid): With the duty control which uses higher frequency(600Hz), instead of the existing PWM type which adapts low frequency(60Hz) to control, spool valve can be controlled precisely.

In PWM control, the amount of oil flow is determined by the duration of "ON" signal among continuously repeated ON/OFF signals.

In VFS, the amount is decided by how widely spool valve open the passage of going through.

DTC DESCRIPTION E820D6E6

The TCM checks the VFS Control Signal by monitoring the feedback signal from the solenoid valve drive circuit. If an unexpected signal is monitored (for example, high voltage is detected when low voltage is expected, or low voltage is detected when high voltage is expected), the TCM judges that the Low and Reverse control solenoid circuit is malfunctioning and sets this code.

DTC DETECTING CONDITION E712A10E

Item	Detecting Condition	Possible cause
DTC Strategy	Check feed back period	Open or short in circuit Faulty VF SOLENOID VALVE Faulty PCM/TCM
Enable Conditions	10% Output duty 90% Battery voltage 9V	
Threshold value	Circuit open or short to ground or short to Battery	
Diagnostic Time	More than 1sec	
Fail Safe	Prohibited VFS control	

SPECIFICATION FEBESE79

Refer to DTC P0743.

ATA -109

SIGNAL WAVEFORM EDODAEBO

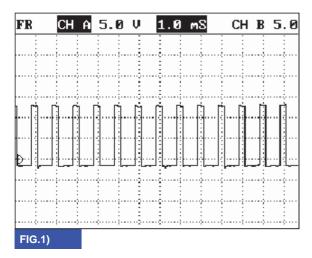


FIG. 1) Wave form of "VFS"

BKGF118A

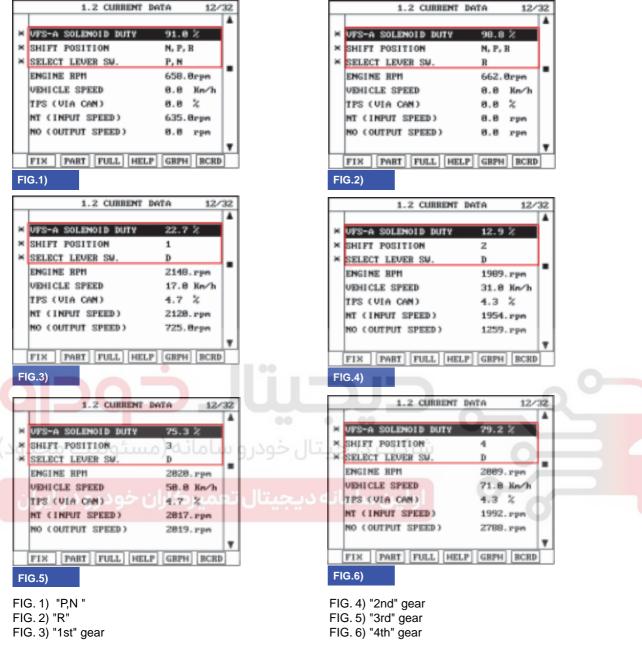
MONITOR SCANTOOL DATA EC4867A9

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- 3. Monitor the "VF SOL. VALVE" parameter on the scantool.
- 4. Shift gear at each position.





AUTOMATIC TRANSAXLE (A4CF2)



SHDAT6261L

5. Does "VF SOL DUTY" follow the reference data?

YES

Fault is intermittent caused by poor contact in the sensor's and/or TCM(PCM)'s connector or was repaired and TCM(PCM) memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration or damage. Repair or replace as necessary and go to "Verification of vehicle repair" procedure.

NO

Go to "Terminal & connector inspection" procedure.

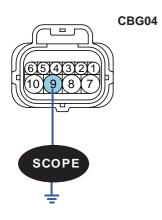
TERMINAL & CONNECTOR INSPECTION E41A76AA

Refer to DTC P0743.

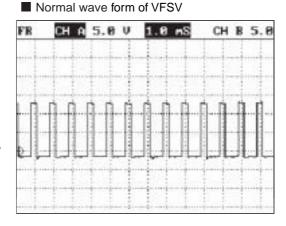
ATA -111

POWER SUPPLY CIRCUIT INSPECTION E390EC

- 1. Connect "A/T SOLENOID VALVE" connector and install device for measuring wave form.
- 2. Turn on the Engine and operate VFS SOLENOID VALVE.
- 3. Measure wave form between terminal "9" of the sensor harness connector and chassis ground.



1.PCSV-A(OD&LR)
2.PCSV-B(2-4BRAKE)
3.ON/OFF SOLENOID V/V
4.PCSV-D(DCCSV)
5.ATF SENSOR(+)
6.ATF SENSOR(-)
7.GROUND FOR SOLENOID V/V
8.PCSV-C(UD)
9.VFS
10.GROUND FOR VFS



SHDAT6262N

4. Is measured normally operating wave form?



Go to "Signal circuit inspection" procedure.

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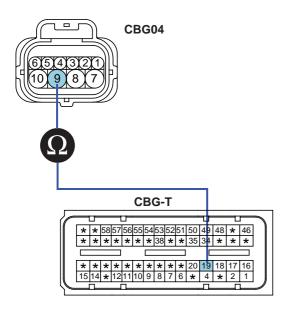
Check for open in harness. Repair as necessary and Go to "Verification of Vehicle Repair" procedure.

SIGNAL CIRCUIT INSPECTION EE546120

- Check signal circuit open inspection
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector and "PCM/TCM" connector.
 - Measure resistance between terminal "9" of the ATM SOLENOID VALVE harness connector and terminal "19" of the PCM/TCM harness connector

Specification: approx. 0

AUTOMATIC TRANSAXLE (A4CF2)



1.PCSV-A(OD&LR)
2.PCSV-B(2-4BRAKE)
3.ON/OFF SOLENOID V/V
4.PCSV-D(DCCSV)
5.ATF SENSOR(+)
6.ATF SENSOR(-)
7.GROUND FOR SOLENOID V/V
8.PCSV-C(UD)
9.VFS
10.GROUND FOR VFS

46.PCSV-A(OD&LR)
17.PCSV-B(2-4BRAKE)
48.PCSV-C(UD)
18.PCSV-D(DCCSV)
16.ON/OFF SOLENOID V/V
19.VFS
4.GROUND FOR VFS

SLDAA7270L

4) Is resistance within specifications?



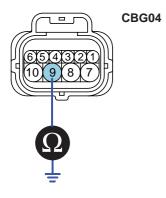
Go to "Check signal circuit short inspection" procedure.

NO

Check for open in harness. Repair as necessary and go to "Verification of vehicle repair" procedure.

- 2. Check signal circuit short inspection
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector and "PCM/TCM" connector.
 - Measure resistance between terminal "9" of the ATM SOLENOID VALVE harness and chassis ground.

Specification: Infinite



1.PCSV-A(OD&LR)
2.PCSV-B(2-4BRAKE)
3.ON/OFF SOLENOID V/V
4.PCSV-D(DCCSV)
5.ATF SENSOR(+)
6.ATF SENSOR(-)
7.GROUND FOR SOLENOID V/V
8.PCSV-C(UD)
9.VFS
10.GROUND FOR VFS

SHDAT6264N

ATA -113

4) Is resistance within specifications?



Go to "signal circuit ground inspection" procedure.



Check for short to ground in harness. Repair as necessary and go to "Verification of vehicle repair" procedure.

- 3. Check signal circuit ground inspection
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector and "PCM/TCM" connector.
 - 3) Measure resistance between terminal "10" of the ATM SOLENOID VALVE harness and chassis ground.

Specification: approx. 0



4) Is resistance within specifications?



Go to "Component Inspection" procedure.



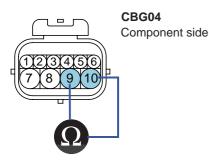
 $Check for short to ground in harness. \ Repair as necessary and Go to "Verification of vehicle repair" procedure.$

ATA -114

COMPONENT INSPECTION E3

- 1. CHECK SOLENOID VALVE
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector.
 - Measure resistance between terminal "9" and terminal "10" of the ATM SOLENOID VALVE harness connector.

Specification: Approximately 3.5±0.2 [(25°C(77°F)]



1.PCSV-A(OD&LR)
2.PCSV-B(2-4BRAKE)
3.ON/OFF SOLENOID V/V
4.PCSV-D(DCCSV)
5.ATF SENSOR(+)
6.ATF SENSOR(-)
7.GROUND FOR SOLENOID V/V
8.PCSV-C(UD)
9.VFS
10.GROUND FOR VFS

SHDAT6266N

4) Is resistance within specification?

YES

Go to "CHECK PCM/TCM" as below.

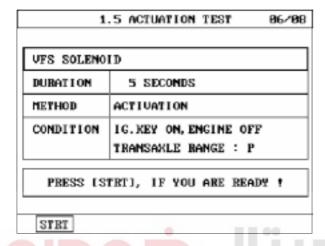


Replace "VF SOL VALVE" as necessary and go to "Verification of Vehicle Repair" procedure.

ATA -115

2. CHECK PCM/TCM

- 1) Connect scantool to data link connector(DLC).
- 2) Ignition "ON" & Engine "OFF".
- 3) Select A/T Solenoid valve Actuator test and Operate Actuator test.
- 4) Can you hear operating sound for "VF SOL VALVE" Actuator Testing Function?



SHDAT6267L

YES

Go to "Verification of vehicle repair" procedure.

NO

Replace PCM/TCM as necessary and go to "Verification of vehicle repair" procedure.

ACTUATOR TEST CONDITION

- 1. IG SWITCH ON
- 2. TRANSAXLE RANGE SWITCH is normal
- P RANGE
- 4. Vehicle Speed 0mph(0km/h)
- 5. Throttle position sensor < 1V
- 6. IDLE SWITCH ON
- 7. ENGINE RPM 0

VERIFICATION OF VEHICLE REPAIR EA867E20

Refer to DTC P0741.

ATA -116

DTC P0750 ON/OFF(SCSV-A) SOLENOID VALVE CIRCUIT - OPEN OR SHORT(GND)

COMPONENT LOCATION E97A1COC

Refer to DTC P0743.

GENERAL DESCRIPTION EDBC08D7

The Automatic transmission changes the gear position of the transmission by utilizing a combination of clutches and brakes, which are controlled by solenoid valves. This HIVEC automatic transmission consists of a: LR (Low and Reverse Brake), 2ND (2nd Brake), UD (Under Drive Clutch), OD (Over Drive Clutch).

DTC DESCRIPTION EDA4658E

The PCM/TCM checks the Low and Reverse Control Signal by monitoring the feedback signal from the solenoid valve drive circuit. If an unexpected signal is monitored (for example, high voltage is detected when low voltage is expected, or low voltage is detected when high voltage is expected), the PCM/TCM judges that the Low and Reverse control solenoid circuit is malfunctioning and sets this code.

DTC DETECTING CONDITION EF5920A7

Item	Detecting Condition	Possible cause
DTC Strategy	Check voltage range	Open or short in circuit Faulty ON/OFF SOLENOID VALVE Faulty PCM/TCM
Enable Conditions	16V > Actuator(TCU) power supply voltage > 10V	
Threshold value	Circuit open or short to ground	
Diagnostic Time	More than 0.3 sec	
Fail Safe	Locked in 3rd gear.	

SPECIFICATION EA1B29CE

Refer to DTC P0743.

ATA -117

SIGNAL WAVEFORM EA6E21ED

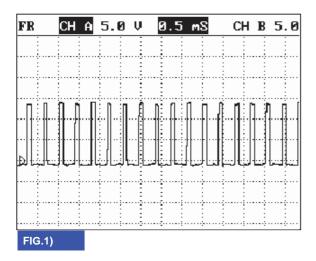


FIG. 1) Wave form of "ON/OFF(SCSV-A)"

BKGF119A

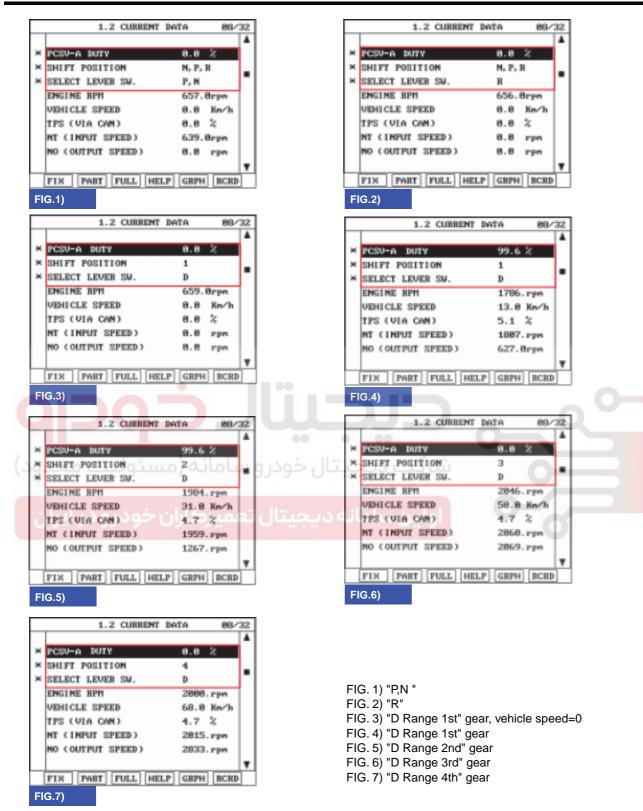
MONITOR SCANTOOL DATA E05B7503

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- 3. Monitor the "ON/OFF SOL VALVE" parameter on the scantool.
- 4. Shift gear at each position.





AUTOMATIC TRANSAXLE (A4CF2)



SHDAT6271L

ATA -119

5. Does "ON/OFF SOL VALVE" follow the reference data?



Fault is intermittent caused by poor contact in the sensor's and/or TCM(PCM)'s connector or was repaired and TCM(PCM) memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration or damage. Repair or replace as necessary and go to "Verification of vehicle repair" procedure.



Go to "Terminal & connector inspection " procedure.

TERMINAL & CONNECTOR INSPECTION E6276E9A

Refer to DTC P0743.

POWER SUPPLY CIRCUIT INSPECTION E73D9A2I

- 1. Connect "A/T SOLENOID VALVE" connector and install device for measuring wave form.
- 2. Turn on the Engine and operate ON/OFF(SCSV-A) SOLENOID VALVE.
- Measure wave form between terminal "3" of the sensor harness connector and chassis ground.



SHDAT6272N

4. Is measured normally operating wave form?



Go to "Signal circuit inspection" procedure.

NO

Check for open in harness. Repair as necessary and go to "Verification of vehicle repair" procedure.

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SIGNAL CIRCUIT INSPECTION EBDECE

- 1. Check signal circuit open inspection
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector and "PCM/TCM" connector.
 - 3) Measure resistance between terminal "3" of the ATM SOLENOID VALVE harness connector and terminal "16" of the PCM/TCM harness connector.

Specification: approx. 0



4) Is resistance within specifications?



Go to "Check signal circuit short inspection" procedure.

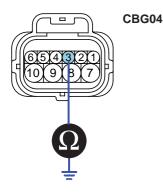


Check for open in harness. Repair as necessary and go to "Verification of vehicle repair" procedure.

ATA -121

- 2. Check signal circuit short inspection
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector and "PCM/TCM" connector.
 - 3) Measure resistance between terminal "3" of the ATM SOLENOID VALVE harness and chassis ground.

Specification: Infinite



1.PCSV-A(OD&LR)
2.PCSV-B(2-4BRAKE)
3.ON/OFF SOLENOID V/V
4.PCSV-D(DCCSV)
5.ATF SENSOR(+)
6.ATF SENSOR(-)
7.GROUND FOR SOLENOID V/V
8.PCSV-C(UD)
9.VFS
10.GROUND FOR VFS

SHDAT6274N

4) Is resistance within specifications?

YES

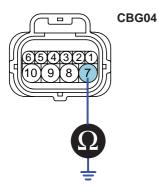
Go to "signal circuit ground inspection" procedure.

NO

Check for short to ground in harness. Repair as necessary and go to "Verification of vehicle repair" procedure.

- Check signal circuit ground inspection
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector and "PCM/TCM" connector.
 - Measure resistance between terminal "7" of the ATM SOLENOID VALVE harness and chassis ground.

Specification: approx. 0



1.PCSV-A(OD&LR)
2.PCSV-B(2-4BRAKE)
3.ON/OFF SOLENOID V/V
4.PCSV-D(DCCSV)
5.ATF SENSOR(+)
6.ATF SENSOR(-)
7.GROUND FOR SOLENOID V/V
8.PCSV-C(UD)
9.VFS
10.GROUND FOR VFS

SHDAT6275N

ATA -122

4) Is resistance within specifications?



Go to "Component Inspection" procedure.



Check for short to ground in harness. Repair as necessary and Go to "Verification of vehicle repair" procedure.

COMPONENT INSPECTION E0B2046E

- 1. CHECK SOLENOID VALVE
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector.
 - 3) Measure resistance between terminal "3" and terminal "7" of the ATM SOLENOID VALVE harness connector.

Specification: Approximately 3.5±0.2 [(25°C(77°F)]



SHDAT6276N

4) Is resistance within specification?



Go to "CHECK PCM/TCM" as below.

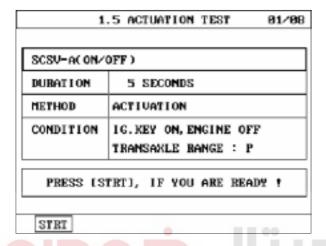


Replace ON/OFF SOLENOID VALVE as necessary and go to "Verification of vehicle repair" procedure.

ATA -123

2. CHECK PCM/TCM

- 1) Connect scantool to data link connector(DLC).
- 2) Ignition "ON" & Engine "OFF".
- 3) Select A/T solenoid valve actuator test and operate actuator test.
- 4) Is Actuator Testing performed normally?



SHDAT6277L

YES

Go to "Verification of vehicle repair" procedure.

NO

Replace PCM/TCM as necessary and go to "Verification of vehicle repair" procedure.

ACTUATOR TEST CONDITION

- 1. IG SWITCH ON
- 2. TRANSAXLE RANGE SWITCH is normal
- P RANGE
- 4. Vehicle Speed 0mph(0km/h)
- 5. Throttle position sensor < 1V
- 6. IDLE SWITCH ON
- ENGINE RPM 0

VERIFICATION OF VEHICLE REPAIR E55A4EEC

Refer to DTC P0743.

ATA -124

DTC P0755 PCSV-A(OD $\&\,LR$) SOLENOID VALVE CIRCUIT - OPEN OR SHORT(GND)

COMPONENT LOCATION E9D7EE29

Refer to DTC P0743.

GENERAL DESCRIPTION E9F0ED3C

Refer to DTC P0750.

DTC DESCRIPTION E1EDC76A

The PCM/TCM checks the Under Drive Clutch Control Signal by monitoring the feedback signal from the solenoid valve drive circuit. If an unexpected signal is monitored (for example, high voltage is detected when low voltage is expected, or low voltage is detected when high voltage is expected), the PCM/TCM judges that Under Drive Clutch control solenoid circuit is malfunctioning and sets this code.

DTC DETECTING CONDITION E6D86F68

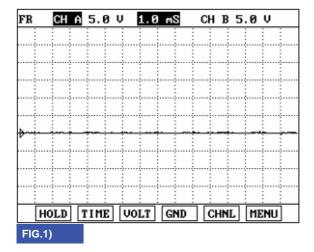
Item	Detecting Condition	Possible cause
DTC Strategy	Check voltage range	Open or short in circuit
Enable Conditions	• 16V > Actuator(TCU) power supply voltage > 10V	 Faulty UD SOLENOID VALVE Faulty PCM/TCM
Threshold value	Circuit open or short to ground	
Diagnostic Time	More than 0.3 sec	
Fail Safe	Locked in 3rd gear.	

SPECIFICATION E52E4646

Refer to DTC P0743.

ATA -125

SIGNAL WAVEFORM E01F4D1E



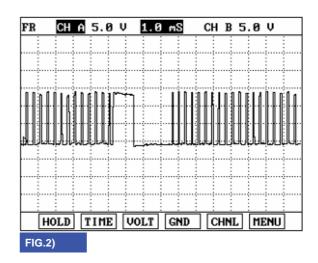


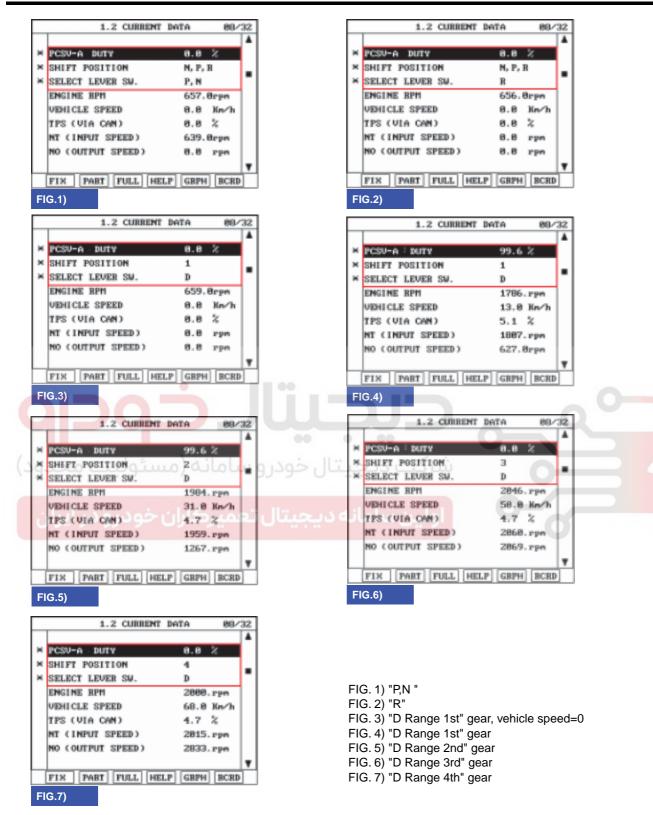
FIG. 1) Wave form of "ON/OFF(SCSV-A)" in 1st, 3rd, 4th gear FIG. 2) Wave form of "ON/OFF(SCSV-A)" in 2nd gear

BKGF120A

MONITOR SCANTOOL DATA EB56CCBD

- Connect scantool to data link connector(DLC)
- Engine "ON". 2.
- Monitor the "PCSV-A(OD & LR) SOLENOID VALVE" parameter on the scantool.
- Shift gear at each position.

AUTOMATIC TRANSAXLE (A4CF2)



SHDAT6281L

ATA -127

5. Does "PCSV-A(OD & LR) SOLENOID VALVE" follow the reference data?



Fault is intermittent caused by poor contact in the sensor's and/or TCM(PCM)'s connector or was repaired and TCM(PCM) memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration or damage. Repair or replace as necessary and go to "Verification of vehicle repair" procedure.



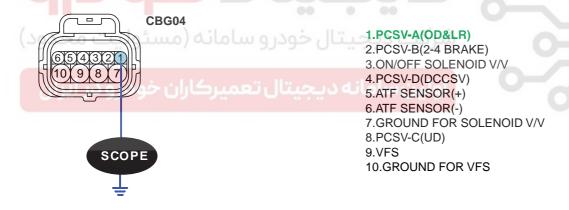
Go to "Terminal & connector inspection" procedure.

TERMINAL & CONNECTOR INSPECTION ED935EFG

Refer to DTC P0743.

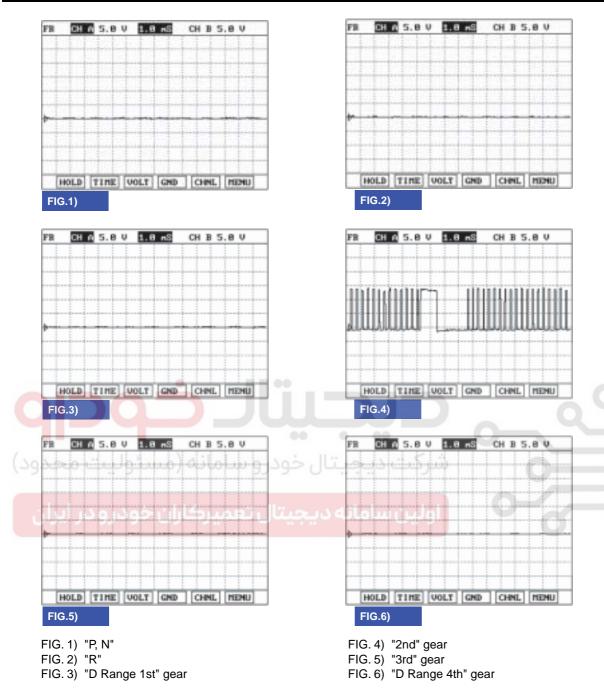
POWER SUPPLY CIRCUIT INSPECTION E9038E6

- 1. Connect "A/T SOLENOID VALVE" connector and install device for measuring wave form.
- 2. Turn on the Engine and operate PCSV-A(OD & LR) SOLENOID VALVE.
- Measure wave form between terminal "1" of the sensor harness connector and chassis ground.



SHDAT6282N





BKGF120D

4. Is measured normally operating wave form?

YES

Go to "Signal circuit inspection" procedure.

NO

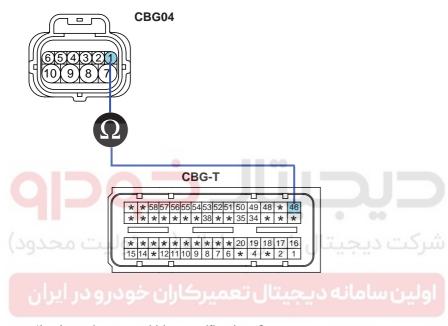
Check for open in harness. Repair as necessary and go to "Verification of vehicle repair" procedure.

ATA -129

SIGNAL CIRCUIT INSPECTION

- 1. Check signal circuit open inspection
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector and "PCM/TCM" connector.
 - Measure resistance between terminal "1" of the ATM SOLENOID VALVE harness connector and terminal "46" of the PCM/TCM harness connector.

Specification: approx. 0



1.PCSV-A(OD&LR)

2.PCSV-B(2-4 BRAKE)
3.ON/OFF SOLENOID V/V
4.PCSV-D(DCCSV)
5.ATF SENSOR(+)
6.ATF SENSOR(-)
7.GROUND FOR SOLENOID V/V
8.PCSV-C(UD)
9.VFS
10.GROUND FOR VFS

46.PCSV-A(OD&LR)

17.PCSV-B(2-4BRAKE) 48.PCSV-C(UD) 18.PCSV-D(DCCSV) 16.ON/OFF SOLENOID V/V 19.VFS 4.GROUND FOR VFS

SLDAA7290L

4) Is resistance within specifications?



Go to "Check signal circuit short inspection" procedure.

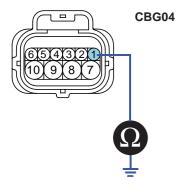


Check for open in harness. Repair as necessary and go to "Verification of vehicle repair" procedure.

AUTOMATIC TRANSAXLE (A4CF2)

- 2. Check signal circuit short inspection
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector and "PCM/TCM" connector.
 - 3) Measure resistance between terminal "1" of the ATM SOLENOID VALVE harness and chassis ground.

Specification: Infinite



1.PCSV-A(OD&LR)

2.PCSV-B(2-4 BRAKE)
3.ON/OFF SOLENOID V/V
4.PCSV-D(DCCSV)
5.ATF SENSOR(+)
6.ATF SENSOR(-)
7.GROUND FOR SOLENOID V/V
8.PCSV-C(UD)
9.VFS
10.GROUND FOR VFS

SHDAT6284N

4) Is resistance within specifications?



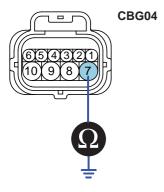
Go to "signal circuit ground inspection" procedure.

NO

Check for short to ground in harness. Repair as necessary and go to "Verification of vehicle repair" procedure.

- Check signal circuit ground inspection
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector and "PCM/TCM" connector.
 - 3) Measure resistance between terminal "7" of the ATM SOLENOID VALVE harness and chassis ground.

Specification: approx. 0



1.PCSV-A(OD&LR)

2.PCSV-B(2-4BRAKE)

3.ON/OFF SOLENOID V/V

4.PCSV-D(DCCSV)

5.ATF SENSOR(+)

6.ATF SENSOR(-)

7.GROUND FOR SOLENOID V/V

8.PCSV-C(UD)

9.VFS

10.GROUND FOR VFS

SHDAT6275N

ATA -131

4) Is resistance within specifications?



Go to "Component Inspection" procedure.

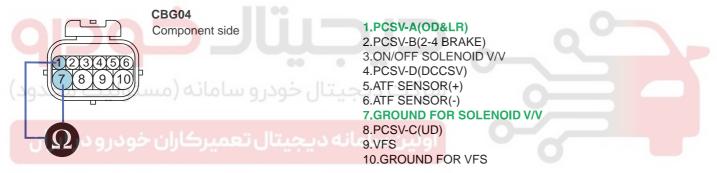


Check for short to ground in harness. Repair as necessary and Go to "Verification of vehicle repair" procedure.

COMPONENT INSPECTION EOEEDO5A

- CHECK SOLENOID VALVE
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector.
 - 3) Measure resistance between terminal "1" and terminal "7" of the ATM SOLENOID VALVE harness connector.

Specification: Approximately 3.5±0.2 [(25°C(77°F)]



SHDAT6286N

4) Is resistance within specification?



Go to "CHECK PCM/TCM" as below.

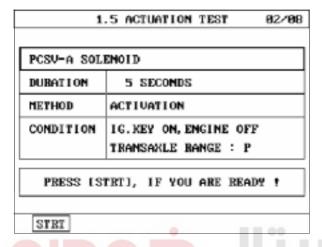


Replace PCSV-A(OD & LR) SOLENOID VALVE as necessary and go to "Verification of vehicle repair" procedure.

ATA -132

2. CHECK PCM/TCM

- 1) Connect scantool to data link connector(DLC).
- 2) Ignition "ON" & Engine "OFF".
- 3) Select ATM solenoid valve actuator test and operate actuator test.
- 4) Is Actuator Testing performed normally?



SHDAT6287L

YES

Go to "Verification of vehicle repair" procedure.

NO

Replace PCM/TCM as necessary and go to "Verification of vehicle repair" procedure.

ACTUATOR TEST CONDITION

- 1. IG SWITCH ON
- 2. TRANSAXLE RANGE SWITCH is normal
- 3. PRANGE
- 4. Vehicle Speed 0mph(0km/h)
- 5. Throttle position sensor < 1V
- 6. IDLE SWITCH ON
- 7. ENGINE RPM 0

VERIFICATION OF VEHICLE REPAIR E2744016

Refer to DTC P0741.

ATA -133

DTC P0760 PCSV-B(2-4 SOLENOID VALVE) CIRCUIT - OPEN OR SHORT(GND)

COMPONENT LOCATION ED73FB53

Refer to DTC P0743.

GENERAL DESCRIPTION E000DFBC

Refer to DTC P0750.

DTC DESCRIPTION E737A454

The PCM/TCM checks the 2nd brake drive control signal by monitoring the feedback signal from the solenoid valve drive circuit. If an unexpected signal is monitored, (For example, high voltage is detected when low voltage is expected or low voltage is detected when high voltage is expected) the PCM/TCM judges that 2nd Brake drive control solenoid circuit is malfunctioning and sets this code.

DTC DETECTING CONDITION EF144174

Item	Detecting Condition	Possible cause
DTC Strategy	Check voltage range	Open or short in circuit Faulty 2-4 SOLENOID VALVE Faulty PCM/TCM
Enable Conditions	• 16V > Actuator(TCU) power supply voltage > 10V	
Threshold value	Circuit open or short to ground	
Diagnostic Time	More than 0.3 sec	
Fail Safe	Locked in 3rd gear	

SPECIFICATION EDB3EF83

Refer to DTC P0743.

SIGNAL WAVEFORM E8C9D812

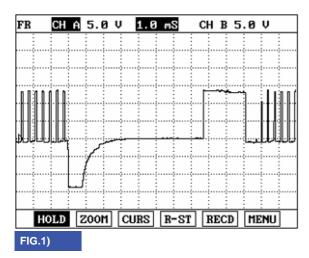
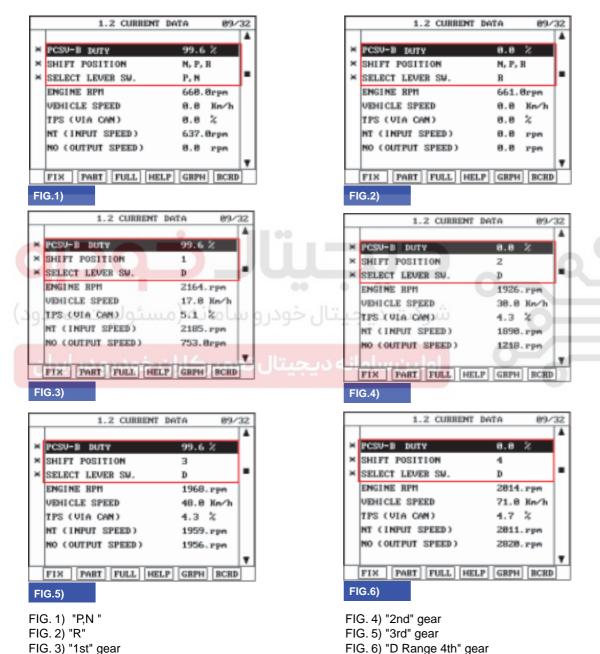


FIG. 1) Wave form of "PCSV-B (2-4 SOLENOID VALVE)"

BKGF121A

MONITOR SCANTOOL DATA E3DBF98

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- 3. Monitor the "PCSV-B(2-4 SOLENOID VALVE)" parameter on the scantool.
- 4. Shift gear at each position.



SHDAT6291L

ATA -135

5. Does "PCSV-B(2-4SOLENOID VALVE)" follow the reference data?



Fault is intermittent caused by poor contact in the sensor's and/or TCM(PCM)'s connector or was repaired and TCM(PCM) memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration or damage. Repair or replace as necessary and go to "Verification of vehicle repair" procedure.



Go to "Terminal & connector inspection " procedure.

TERMINAL & CONNECTOR INSPECTION ESFERIF

Refer to DTC P0743.

POWER SUPPLY CIRCUIT INSPECTION EFBD5180

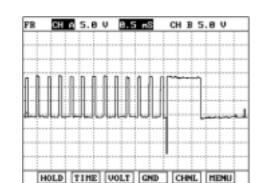
- 1. Connect "A/T SOLENOID VALVE" connector and install device for measuring wave form.
- Turn on the Engine and operate PCSV-B(2-4 SOLENOID VALVE).
- 3. Measure wave form between terminal "2" of the sensor harness connector and chassis ground.

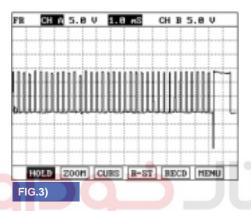


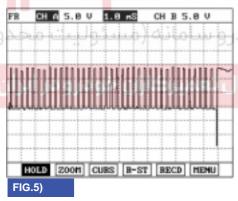
SHDAT6292N

FIG.1)

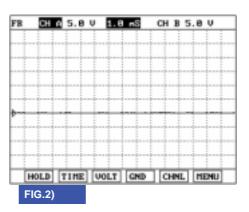
AUTOMATIC TRANSAXLE (A4CF2)

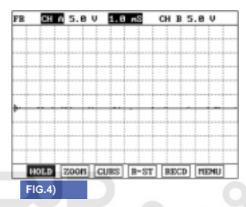


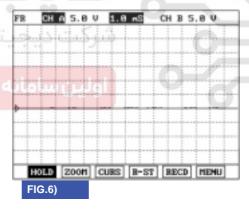




- FIG. 1) "P, N"
- FIG. 2) "R"
- FIG. 3) "D Range 1st" gear







- FIG. 4) "2nd" gear
- FIG. 5) "3rd" gear
- FIG. 6) "D Range 4th" gear

BKGF121D

4. Is measured normally operating wave form?



Go to "Signal circuit inspection" procedure.



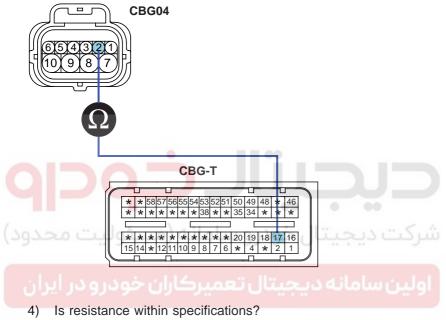
Check for open in harness. Repair as necessary and go to "Verification of vehicle repair" procedure.

ATA -137

SIGNAL CIRCUIT INSPECTION

- 1. Check signal circuit open inspection
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector and "PCM/TCM" connector.
 - Measure resistance between terminal "2" of the ATM SOLENOID VALVE harness connector and terminal "17" of the PCM/TCM harness connector.

Specification: approx. 0



1.PCSV-A(OD&LR)

2.PCSV-B(2-4BRAKE)

3.ON/OFF SOLENOID V/V

4.PCSV-D(DCCSV)

5.ATF SENSOR(+)

6.ATF SENSOR(-)

7.GROUND FOR SOLENOID V/V

8.PCSV-C(UD)

9.VFS

10.GROUND FOR VFS

46.PCSV-A(OD&LR)
17.PCSV-B(2-4BRAKE)
48.PCSV-C(UD)
18.PCSV-D(DCCSV)
16.ON/OFF SOLENOID V/V
19.VFS
4.GROUND FOR VFS

SLDAA7300L



Go to "Check signal circuit short inspection" procedure.

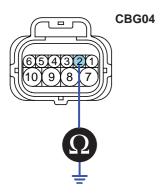


Check for open in harness. Repair as necessary and go to "Verification of vehicle repair" procedure.

ATA -138

- 2. Check signal circuit short inspection
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector and "PCM/TCM" connector.
 - 3) Measure resistance between terminal "2" of the ATM SOLENOID VALVE harness and chassis ground.

Specification: Infinite



1.PCSV-A(OD&LR)

2.PCSV-B(2-4BRAKE)

3.ON/OFF SOLENOID V/V

4.PCSV-D(DCCSV)

5.ATF SENSOR(+)

6.ATF SENSOR(-)

7.GROUND FOR SOLENOID V/V

8.PCSV-C(UD)

9.VFS

10.GROUND FOR VFS

SHDAT6294N

4) Is resistance within specifications?



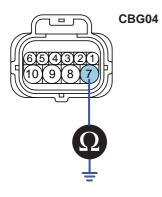
Go to "signal circuit ground inspection" procedure.

NO

Check for short to ground in harness. Repair as necessary and go to "Verification of vehicle repair" procedure.

- Check signal circuit ground inspection
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector and "PCM/TCM" connector.
 - 3) Measure resistance between terminal "7" of the ATM SOLENOID VALVE harness and chassis ground.

Specification: approx. 0



1.PCSV-A(OD&LR)
2.PCSV-B(2-4BRAKE)
3.ON/OFF SOLENOID V/V
4.PCSV-D(DCCSV)
5.ATF SENSOR(+)
6.ATF SENSOR(-)
7.GROUND FOR SOLENOID V/V
8.PCSV-C(UD)
9.VFS
10.GROUND FOR VFS

SHDAT6275N

ATA -139

4) Is resistance within specifications?



Go to "Component Inspection" procedure.



Check for short to ground in harness. Repair as necessary and Go to "Verification of vehicle repair" procedure.

COMPONENT INSPECTION E30E32E8

- CHECK SOLENOID VALVE
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector.
 - 3) Measure resistance between terminal "2" and terminal "7" of the ATM SOLENOID VALVE harness connector.

Specification: Approximately 3.5±0.2 [(25°C(77°F)]



SHDAT6296N

4) Is resistance within specification?



Go to "CHECK PCM/TCM" as below.

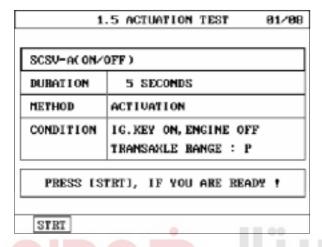


Replace PCSV-B(2-4 SOLENOID VALVE) as necessary and go to "Verification of Vehicle Repair" procedure.

ATA -140

2. CHECK PCM/TCM

- 1) Connect scantool to data link connector(DLC).
- 2) Ignition "ON" & Engine "OFF".
- 3) Select A/T solenoid valve actuator test and operate actuator test.
- 4) Is Actuator Testing performed normally?



SHDAT6297L

YES

Go to "Verification of vehicle repair" procedure.

NO

Replace PCM/TCM as necessary and go to "Verification of vehicle repair" procedure.

ACTUATOR TEST CONDITION

- 1. IG SWITCH ON
- 2. TRANSAXLE RANGE SWITCH is normal
- 3. PRANGE
- 4. Vehicle Speed 0mph(0km/h)
- 5. Throttle position sensor < 1V
- 6. IDLE SWITCH ON
- 7. ENGINE RPM 0

VERIFICATION OF VEHICLE REPAIR E78C74C8

Refer to DTC P0743.

ATA -141

DTC P0765 PCSV-C(UD) SOLENOID VALVE CIRCUIT - OPEN OR SHORT(GND)

COMPONENT LOCATION E27195CS

Refer to DTC P0743.

GENERAL DESCRIPTION E786D975

Refer to DTC P0750.

DTC DESCRIPTION E6A320CA

The PCM/TCM checks the Under Drive Clutch Control Signal by monitoring the feedback signal from the solenoid valve drive circuit. If an unexpected signal is monitored (for example, high voltage is detected when low voltage is expected or low voltage is detected when high voltage is expected), the PCM/TCM judges that the OVER DRIVE CLUTCH drive control solenoid circuit is malfunctioning and sets this code.

DTC DETECTING CONDITION E8363A26

Item	Detecting Condition	Possible cause
DTC Strategy	Check voltage range	Open or short in circuit Faulty UD SOLENOID VALVE Faulty PCM/TCM
Enable Conditions	• 16V > Actuator(TCU) power supply voltage > 10V	
Threshold value	Circuit open or short to ground	
Diagnostic Time	More than 0.3 sec	
Fail Safe	Locked in 3rd gear.	

SPECIFICATION E1172D4D

Refer to DTC P0743.

SIGNAL WAVEFORM E3CC1309

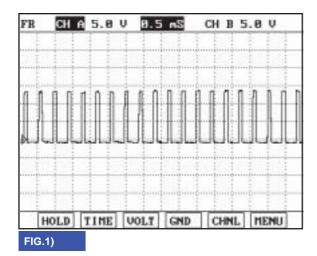
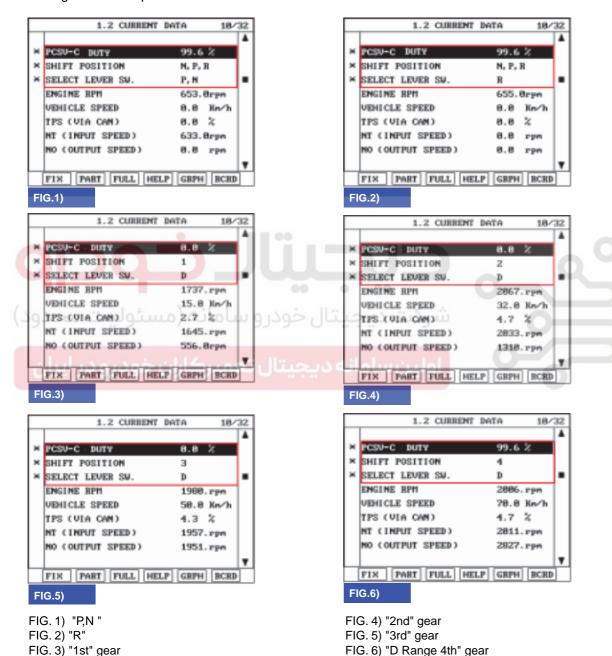


FIG. 1) Wave form of "PCSV-C(UD) SOLENOID VALVE"

BKGF122A

MONITOR SCANTOOL DATA E9A84FR

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- 3. Monitor the "PCSV-C(UD) SOLENOID VALVE" parameter on the scantool.
- 4. Shift gear at each position.



SHDAT6301L

ATA -143

5. Does "PCSV-C(UD) SOLENOID VALVE" follow the reference data?



Fault is intermittent caused by poor contact in the sensor's and/or TCM(PCM)'s connector or was repaired and TCM(PCM) memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration or damage. Repair or replace as necessary and go to "Verification of vehicle repair" procedure.



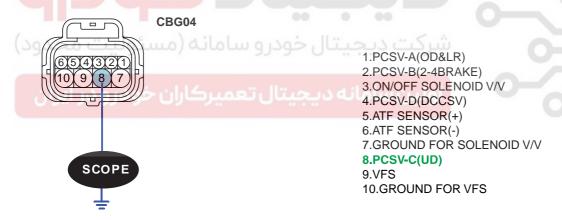
Go to "Terminal & connector inspection " procedure.

TERMINAL & CONNECTOR INSPECTION E9BBACCE

Refer to DTC P0743.

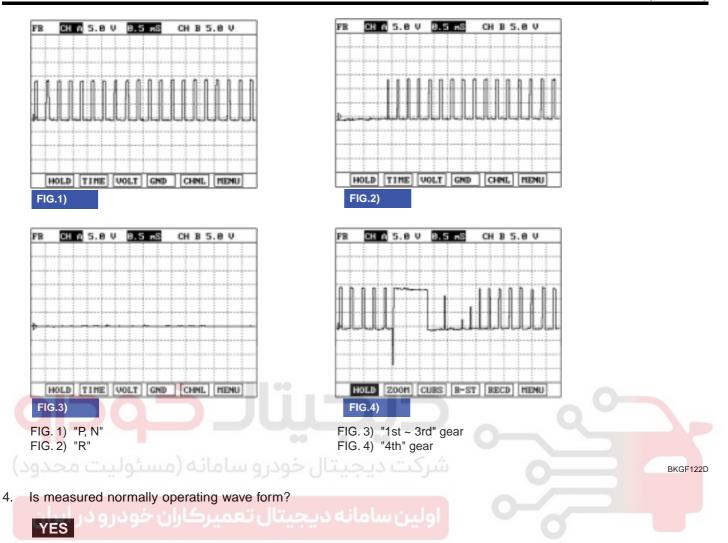
POWER SUPPLY CIRCUIT INSPECTION ED4143CF

- 1. Connect "A/T SOLENOID VALVE" connector and install device for measuring wave form.
- 2. Turn on the Engine and operate PCSV-C(UD) SOLENOID VALVE.
- Measure wave form between terminal "8" of the sensor harness connector and chassis ground.



SHDAT6302N

AUTOMATIC TRANSAXLE (A4CF2)



Go to "Signal circuit inspection" procedure.

NO

Check for open in harness. Repair as necessary and go to "Verification of vehicle repair" procedure.

ATA -145

SLDAA7308L

SIGNAL CIRCUIT INSPECTION EDG

- 1. Check signal circuit open inspection
 - 1) Ignition "OFF".

Specification: approx. 0

- 2) Disconnect "A/T SOLENOID VALVE" connector and "PCM/TCM" connector.
- 3) Measure resistance between terminal "8" of the ATM SOLENOID VALVE harness connector and terminal "48" of the PCM/TCM harness connector.

1.PCSV-A(OD&LR) CBG04 2.PCSV-B(2-4BRAKE) 3.ON/OFF SOLENOID V/V 4.PCSV-D(DCCSV) 5.ATF SENSOR(+) 6.ATF SENSOR(-) 7.GROUND FOR SOLENOID V/V 8.PCSV-C(UD) 9.VFS 10.GROUND FOR VFS **CBG-T** 46.PCSV-A(OD&LR) 17.PCSV-B(2-4BRAKE) 453 52 51 50 49 48 * 46 48.PCSV-C(UD) 18.PCSV-D(DCCSV) 16.ON/OFF SOLENOID V/V 19.VFS 4.GROUND FOR VFS

YES

4) Is resistance within specifications?

Go to "Check signal circuit short inspection" procedure.

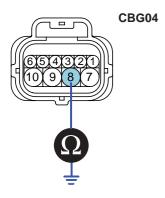
NO

Check for open in harness. Repair as necessary and go to "Verification of vehicle repair" procedure.

ATA -146 AUTOMATIC TRANSAXLE (A4CF2)

- 2. Check signal circuit short inspection
 - 1) Ignition "OFF" & Engine "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector and "PCM/TCM" connector.
 - 3) Measure resistance between terminal "8" of the ATM SOLENOID VALVE harness and chassis ground.

Specification: Infinite



1.PCSV-A(OD&LR)
2.PCSV-B(2-4BRAKE)
3.ON/OFF SOLENOID V/V
4.PCSV-D(DCCSV)
5.ATF SENSOR(+)
6.ATF SENSOR(-)
7.GROUND FOR SOLENOID V/V
8.PCSV-C(UD)
9.VFS

10.GROUND FOR VFS

SHDAT6304N

4) Is resistance within specifications?

YES

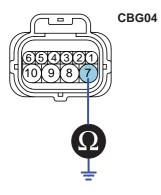
Go to "signal circuit ground inspection" procedure.

NO

Check for short to ground in harness. Repair as necessary and go to "Verification of vehicle repair" procedure.

- 3. Check signal circuit ground inspection
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector and "PCM/TCM" connector.
 - 3) Measure resistance between terminal "7" of the ATM SOLENOID VALVE harness and chassis ground.

Specification: approx. 0



1.PCSV-A(OD&LR)
2.PCSV-B(2-4BRAKE)
3.ON/OFF SOLENOID V/V
4.PCSV-D(DCCSV)
5.ATF SENSOR(+)
6.ATF SENSOR(-)
7.GROUND FOR SOLENOID V/V
8.PCSV-C(UD)
9.VFS
10.GROUND FOR VFS

SHDAT6275N

ATA -147

4) Is resistance within specifications?



Go to "Component Inspection" procedure.



Check for short to ground in harness. Repair as necessary and Go to "Verification of vehicle repair" procedure.

COMPONENT INSPECTION E95CF3EF

- CHECK SOLENOID VALVE
 - 1) Ignition "OFF".
 - 2) Disconnect "A/T SOLENOID VALVE" connector.
 - 3) Measure resistance between terminal "7" and terminal "8" of the ATM SOLENOID VALVE harness connector.

Specification: Approximately 3.5±0.2 [(25°C(77°F)]



SHDAT6306N

4) Is resistance within specification?



Go to "CHECK PCM/TCM" as below.



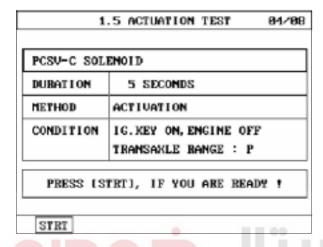
Replace PCSV-C(UD) SOLENOID VALVE as necessary and go to "Verification of Vehicle Repair" procedure.

AUTOMATIC TRANSAXLE (A4CF2)

ATA -148

2. CHECK PCM/TCM

- 1) Connect scantool to data link connector(DLC).
- 2) Ignition "ON" & Engine "OFF".
- 3) Select A/T solenoid valve actuator test and operate actuator test.
- 4) Is Actuator Testing performed normally?



YES

Go to "Verification of vehicle repair" procedure.

NO

Replace PCM/TCM and go to "Verification of vehicle repair" procedure.

ACTUATOR TEST CONDITION

- 1. IG SWITCH ON
- 2. TRANSAXLE RANGE SWITCH is normal
- 3. PRANGE
- 4. Vehicle Speed 0mph(0km/h)
- 5. Throttle position sensor < 1V
- 6. IDLE SWITCH ON
- 7. ENGINE RPM 0

VERIFICATION OF VEHICLE REPAIR ED7617A5

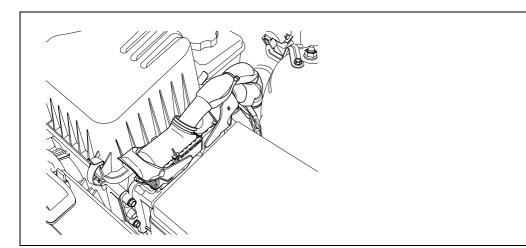
Refer to DTC P0743.

SHDAT6307L

ATA -149

DTC P0880 TCM POWER SIGNAL ERROR

COMPONENT LOCATION ECB19EF9



SHDAT6311D

GENERAL DESCRIPTION E5832E4D

The TCM monitors suppling voltage to "SOLENOID VALVE".

The gear position is fixed at 3rd gear when input value is higher or lower than specification.

DTC DESCRIPTION E304ACC8

The TCM set this code If an input voltage is higher or lower than specification.

DTC DETECTING CONDITION ETCAA1E8

Item	Detecting Condition	Possible cause
DTC Strategy	Check communication	Open or Short in harness
Enable Conditions	 22V Input voltage to TCM 9V and after 0.5 sec is passed from IG ON 	Faulty TCM
Threshold value	• 24.5V < Input voltage to TCM < 7V	
Diagnostic Time	More than 0.1sec	
Fail Safe	Locked in 3 rd gear	

SIGNAL WAVEFORM EA107B3

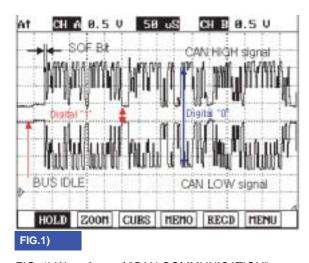


FIG. 1) Wave form of "CAN COMMUNICATION"

BKGF123A

MONITOR SCANTOOL DATA EEDAE688

- 1. Connect scantool to data link connector(DLC).
- 2. Ignition "ON" & Engine "OFF".
- 3. Monitor the "BATTERY VOLTAGE" parameter on the scantool.

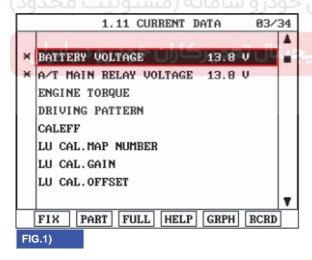


FIG. 1) BATTERY VOLTAGE

SHDAA6371L

ATA -151

4. Does "BATTERY VOLTAGE" follow the reference data?



Fault is intermittent caused by poor contact in the sensor's and/or TCM(PCM)'s connector or was repaired and TCM(PCM) memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration or damage. Repair or replace as necessary and go to "Verification of Vehicle Repair" procedure.



Go to "Terminal & connector inspection" procedure.

TERMINAL & CONNECTOR INSPECTION E9E3DF72

- 1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
- 2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.
- 3. Has a problem been found?

YES

Repair as necessary and go to "Verification of vehicle repair" procedure.

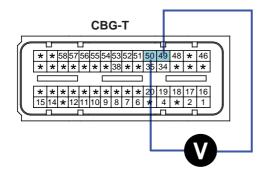
NO

Go to "Power supply circuit inspection" procedure.

POWER SUPPLY CIRCUIT INSPECTION E601BCCD

- 1. Ignition "ON" & Engine "OFF".
- 2. Disconnect the "PCM/TCM" connector.
- 3. Measure voltage between terminal No"49" of TCM harness connector and chassis ground and then terminal No"50" of the TCM harness connector and chassis ground.

Specification: approx. 12V



49. Suppling Voltage 50. Suppling Voltage

SLDAA7372L

AUTOMATIC TRANSAXLE (A4CF2)

ATA -152

4. Is voltage within specifications?



Fault is intermittent caused by poor contact in the sensor's and/or PCM/TCM's connector or was repaired and PCM/TCM memory was not cleared. And go to Verification of Vehicle Repair procedure.



Substitute with a known-good PCM/TCM and check for proper operation. If the problem is corrected, replace PCM/TCM as necessary and then go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR E9FCAC70

After a repair, it is essential to verify that the fault has been corrected.

- 1. Connect scantool and select "Diagnostic Trouble Codes(DTCs)" mode.
- 2. Using a scantool, Clear DTC.
- 3. Operate the vehicle within DTC Enable conditions in General information.
- 4. Are any DTCs present?



Go to the applicable troubleshooting procedure.



System performing to specification at this time.

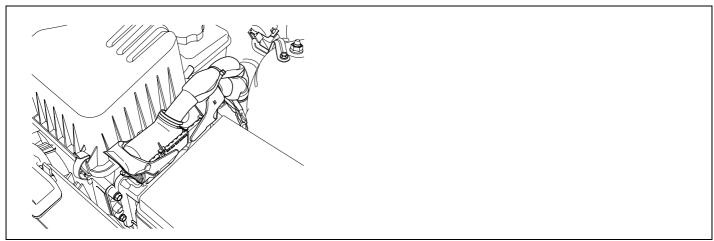


ATA -153

DTC U0001 CAN COMMUNICATION MALFUNCTION

COMPONENT LOCATION

E825E402



SHDAT6311D

GENERAL DESCRIPTION EF96C6CA

The TCM can either receive data from the Engine Control Module or ABS control module, or it can send data to the ECM and ABSCM by using CAN communication. The CAN communication is one of the vehicle communication methods, which is now widely used to transfer the vehicle data.

DTC DESCRIPTION EC1AE2C3

The TCM reads data on the CAN-BUS line and checks whether the data is equal to the data which the TCM sent before. If the data is not the same the TCM decides that either the CAN-BUS line or TCM are malfuncting and sets this code.

DTC DETECTING CONDITION E97D0387

Item	Detecting Condition	Possible cause
DTC Strategy	Check communication	Open or short in CAN
Enable Conditions	• Input Speed > 1000rpm	communication harness • Faulty ECM
Threshold value	No message from ems	Faulty TCM
Diagnostic Time	More than 0.5sec	
Fail Safe	 INTELLIGENT SHIFT is inhibited Learning for oil pressure control is inhibited Torque Retard requirement is inhibited Direct connection control of DCC is inhibited 	

SIGNAL WAVEFORM EFD2/

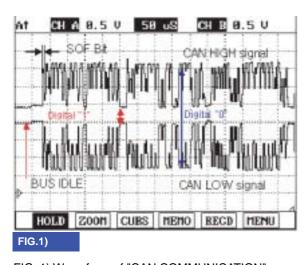


FIG. 1) Wave form of "CAN COMMUNICATION"

BKGF123A

MONITOR SCANTOOL DATA EE5E7EFC

- Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- Monitor the "CAN COMMUNICATION SERVICE DATA (ENGINE RPM, VEHICLE SPEED SENSOR, THROTTLE P. SENSOR)" parameters on the scantool.

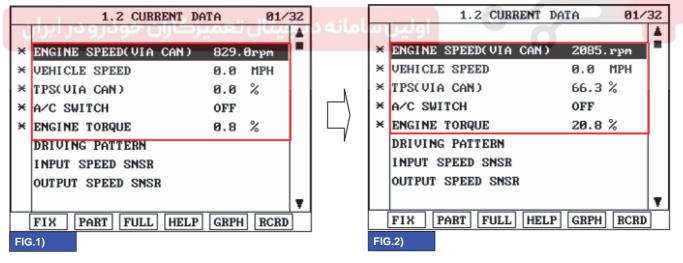


FIG.1) Low-RPM FIG.2) High-RPM

BKGF123B

ATA -155

4. Does "CAN BUS LINE DATA" follow the reference data?



Fault is intermittent caused by poor contact in the sensor's and/or TCM(PCM)'s connector or was repaired and TCM(PCM) memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration or damage. Repair or replace as necessary and go to "Verification of Vehicle Repair" procedure.



Go to "Terminal & connector inspection" procedure.

TERMINAL & CONNECTOR INSPECTION E56D555C

- 1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
- 2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.
- 3. Has a problem been found?

YES

Repair as necessary and go to "Verification of vehicle repair" procedure.

NO

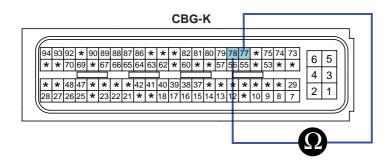
Go to "Signal circuit inspection" procedure.

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SIGNAL CIRCUIT INSPECTION EFB1458D

- 1. Ignition "ON" & Engine "OFF".
- 2. Disconnect the "PCM/TCM" connector.
- 3. Measure resistance between terminal "77" and "78" of the "PCM/TCM" harness connector.

Specification: Approx. 120



77. CAN-HIGH 78. CAN-LOW

SLDAA7312L

AUTOMATIC TRANSAXLE (A4CF2)

ATA -156

4. Is measured resistance within specifications?



Substitute with a known-good PCM/TCM and check for proper operation. If the problem is corrected, replace PCM/TCM as necessary and then go to "Verification of Vehicle Repair" procedure.



Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration or damage of ECM.and then Repair or replace Resistance for CAN communication as necessary and go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR EDF8E63F

After a repair, it is essential to verify that the fault has been corrected.

- 1. Connect scantool and select "Diagnostic Trouble Codes(DTCs)" mode.
- 2. Using a scantool, Clear DTC.
- 3. Operate the vehicle within DTC Enable conditions in General information.
- 4. Are any DTCs present?



Go to the applicable troubleshooting procedure.

NO

System performing to specification at this time.



ATA -157

DTC U0100 CAN MI-COM OR CIRCUIT MAL

COMPONENT LOCATION E57CBC66

Refer to DTC U0001.

GENERAL DESCRIPTION EBCD0E54

Refer to DTC U0001.

DTC DESCRIPTION E22EAAF8

Refer to DTC U0001.

DTC DETECTING CONDITION E671900F

Item	Detecting Condition	Possible cause
DTC Strategy	Check communication	Open or short in CAN
Enable Conditions	Input Speed > 1000rpm	communication harness • Faulty ECM
Threshold value	No message from ems	Faulty TCM
Diagnostic Time	More than 1.5sec	0
سئول Fail Safe دود)	 INTELLIGENT SHIFT is inhibited Learning for oil pressure control is inhibited Torque Retard requirement is inhibited Direct connection control of DCC is inhibited 	

SIGNAL WAVEFORM E8DCEB76

Refer to DTC U0001.

MONITOR SCANTOOL DATA E05E1DE0

Refer to DTC U0001.

TERMINAL & CONNECTOR INSPECTION ED41559F

Refer to DTC U0001.

SIGNAL CIRCUIT INSPECTION E98BFE24

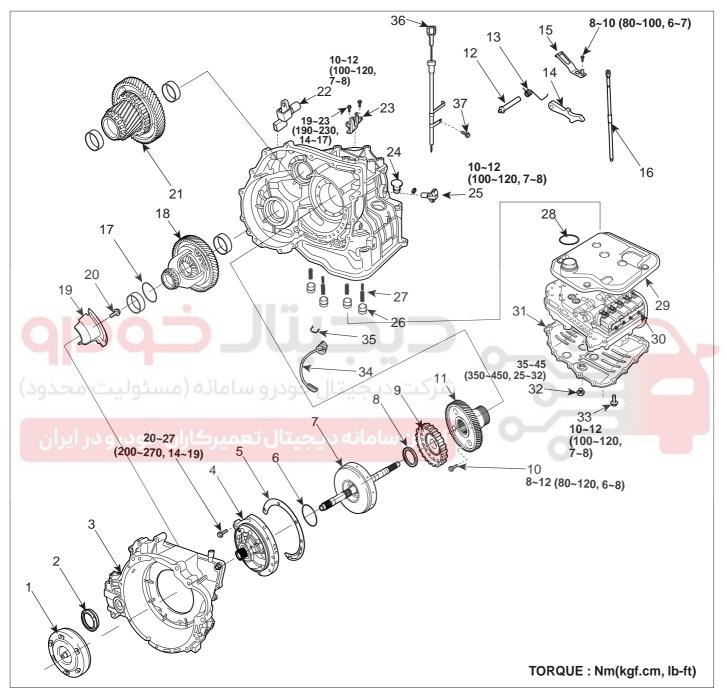
Refer to DTC U0001.

VERIFICATION OF VEHICLE REPAIR ECCF3632

Refer to DTC U0001.

AUTOMATIC TRANSAXLE

COMPONENTS(1) E0FDA143



- 1. Torque converter
- 2. Differential oil seal
- 3. Converter housing
- 4. Oil pump
- 5. Oil pump gasket
- 6. Thrust washer
- 7. Underdrive(U/D) clutch
- 8. Thrust bearing
- 9. Underdrive(U/D) clutch hub
- 10. Transfer drive gear mounting bolt
- 11. Transfer drive gear
- 12. Parking sprag shaft
- 13. Sprag spring

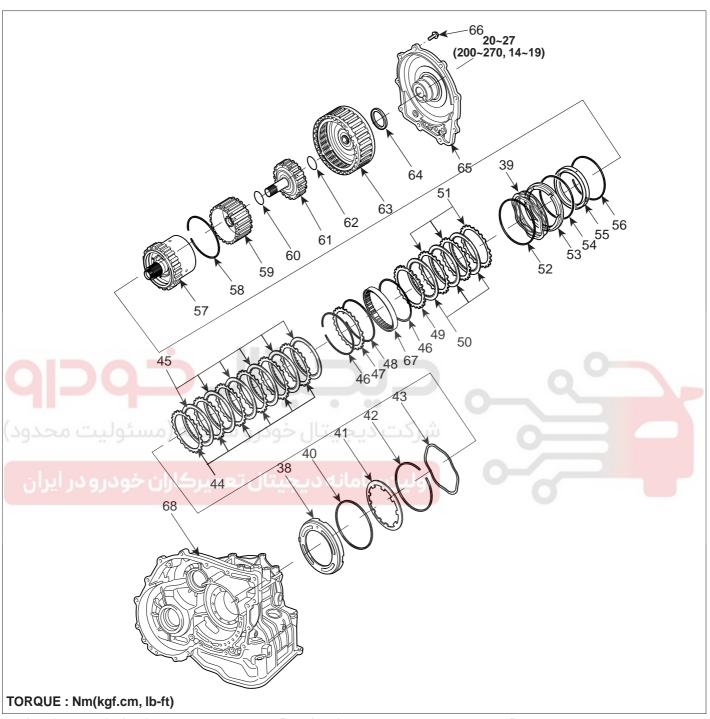
- Parking sprag
- 15. Detent spring
- 16. Manual control shaft
- 17. Spacer
- 18. Differential
- 19. Oil separate
- 20. Oil separate mounting bolt
- 21. Transfer driven gear
- 22. Output shaft speed sensor
- 23. Shift cable bracket
- 24. Plug
- 25. Input shaft speed sensor
- 26. Accumulator piston

- 27. Coil spring
- 28. O-ring
- 29. Oil filter
- 30. Valve body
- 31. Oil pan
- 32. Drain plug
- 33. Valve body cover bolt
- 34. Valve body connector
- 35. Valve body connector mounting clip
- 36. Oil level gauge
- 37. Oil level gauge bracket bolt

SHDAT6063L

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COMPONENTS(2)



- 38. Low & reverse brake piston
- 39. Low & reverse brake return spring
- 40. Low & reverse brake spring retainer
- 41. Return spring
- 42. Snap ring
- 43. Wave spring
- 44. Low & reverse pressure plate
- 45. Low & reverse brake disc
- 46. Snap ring
- 47. Reaction plate
- 48. Snap ring

- 49. Reaction plate
- 50. 2ND brake disc
- 51. 2ND brake pressure plate
- 52. Snap ring
- 53. 2ND brake retainer
- 54. D-ring
- 55. 2ND brake piston
- 56. D-ring
- 57. Low & reverse planetary gear set
- 58. Snap ring

- 59. Reverse sun gear
- 60. Thrust bearing
- 61. Overdrive(O/D) hub
- 62. Thrust bearing
- 63. Reverse & Overdrive(O/D) clutch
- 64. Thrust bearing
- 65. Rear cover
- 66. Rear cover bolt
- 67. One way clutch inner race
- 68. Transmission case

SHDAT6064L

AUTOMATIC TRANSAXLE (A4CF2)

REMOVAL

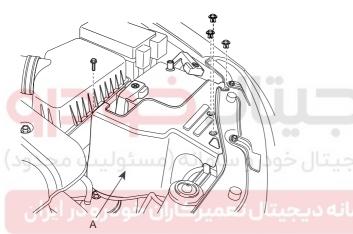


(1) CAUTION

- · Use fender covers to avoid damaging painted
- · To avoid damage, unplug the wiring connectors carefully while holding the connector portion.

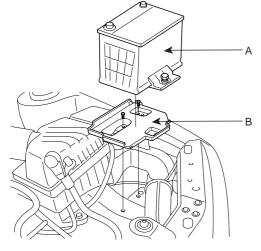


- · Mark all wiring and hoses to avoid misconnec-
- Remove the engine cover.
- 2. Remove the battery heat shield (A).



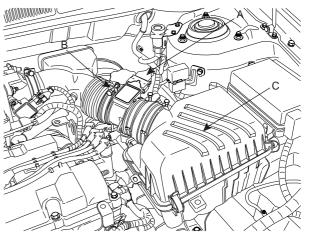
SLDAT7002D

Remove the battery (A) and the battery tray (B).



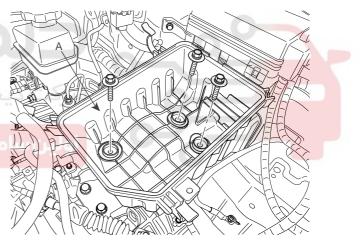
SLDAT7003D

Remove the upper cover (C) of the air cleaner assembly after disconnecting the AFS(Air Flow Sensor) connector (A), the clamp (B).



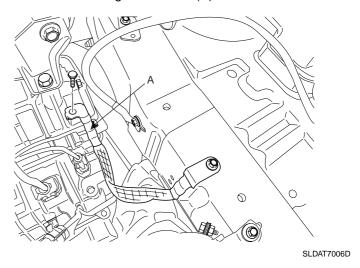
SLDAA7001D

Remove the lower cover (A) of the air cleaner assem-



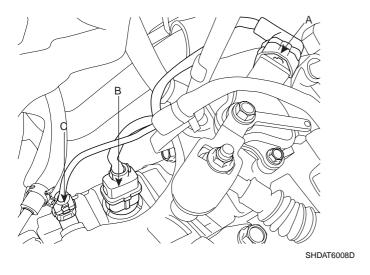
SLDAT7005D

Remove the ground cable (A) from transaxle.

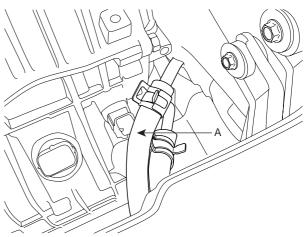


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 Disconnect the inhibiter switch connector (A), the solenoid valve connector (B) and the input shaft speed sensor connector (C).

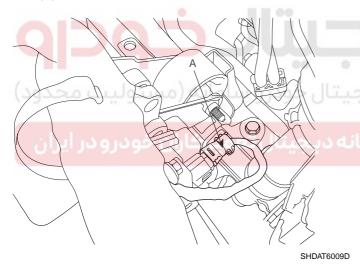


Disconnect the output shaft speed sensor connector (A). 10. Remove the oil cooler hoses (A).

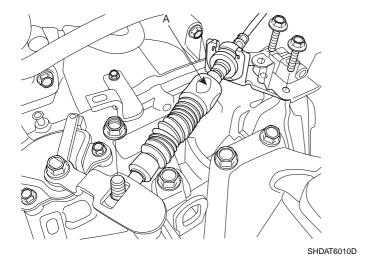


SHDAT6011D

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

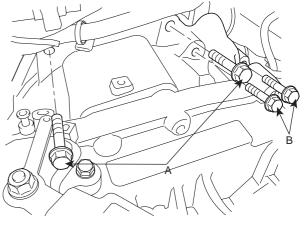


P. Remove the shift cable assembly (A).



09200-38001 SHDAA6002D

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

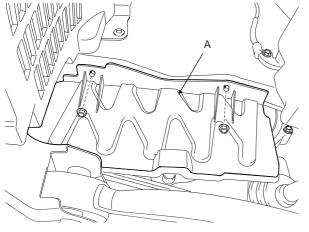


SHDAA6003D

13. After removing the mounting bolts, take the transaxle insulator mounting bracket off.

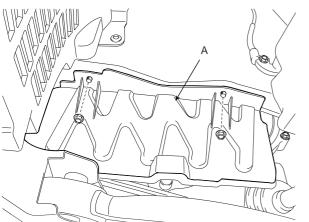
AUTOMATIC TRANSAXLE (A4CF2)

- 14. Remove the steering joint assembly bolt. (refer to Steering column/shaft in ST group)
- 15. Remove the front wheels and tires. (refer to removal in SS group)
- 16. Remove the side mud cover (A).

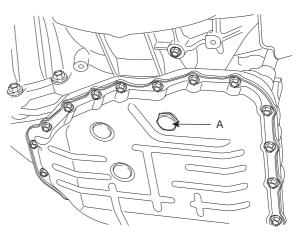


KKNF060A

17. Remove the under shield cover (A).

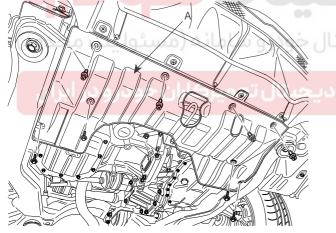


18. Drain the transaxle fluid by removing the oil drain plug

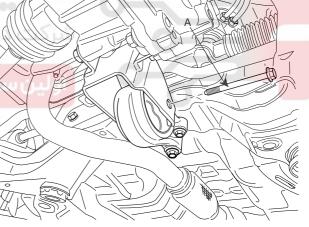


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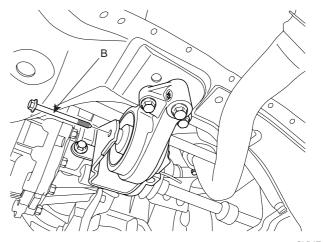
- 19. Remove the lower arm ball joint mounting nut, the stabilizer link mounting nut, and the tie rod end mounting nut from the front knuckles. (refer to Front suspension system in SS group)
- 20. Remove the roll stopper mounting bolts (A, B).



SLDAT7009D



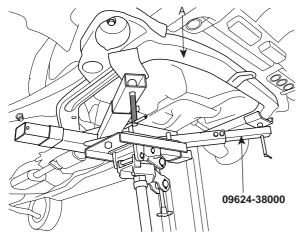
SLDAT7010D



SLDAT7011D

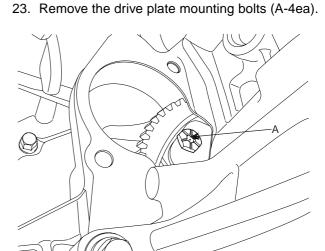
ATA -163

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



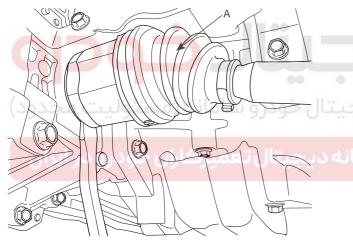
SHDAT6051D

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

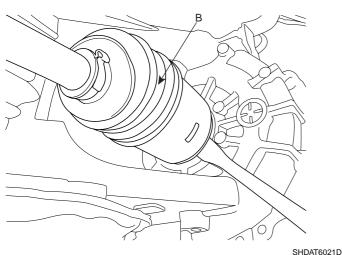


SHDAA6011D

24. Supporting the transaxle with a jack, remove the transaxle lower mounting bolts (A-3ea, B-2ea).



SHDAT6020D



SHDMA6005D 25. Lowering the jack slowly, remove the transaxle.

∴ CAUTION

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

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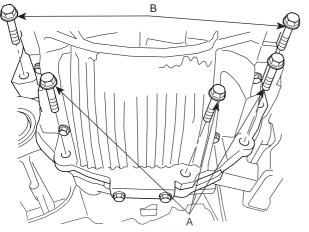
021 62 99 92 92

AUTOMATIC TRANSAXLE (A4CF2)

INSTALLATION

 Install the transaxle lower mounting bolts (A-3ea, B-2ea) after fitting the transaxle assembly into the engine assembly.

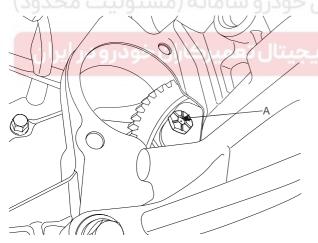
TORQUE: 43-55Nm (4.3-5.5kgf.m, 31.1-39.8lb-ft)



SHDMA6005D

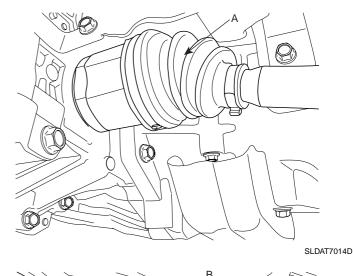
Install the drive plate mounting bolts (A-4ea).

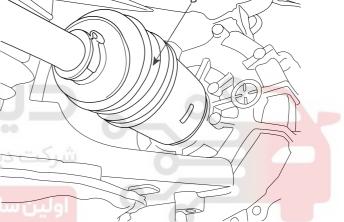
TORQUE: 46-53Nm (4.6-5.3kgf.m, 33.3-38.3lb-ft)



SHDAA6011D

3. Connect the drive shafts (A, B) to the transaxle.

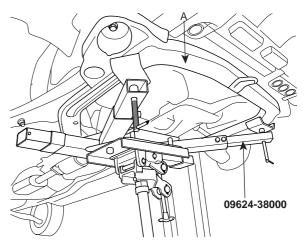




SLDAT7015D

4. Supporting the sub frame (A) with a jack and the Special tool(09624-38000), install the mounting bolts. (refer to Stabilizer's installation in SS group).

TORQUE: 140-160Nm (14-16kgf.m, 101-118lb-ft)

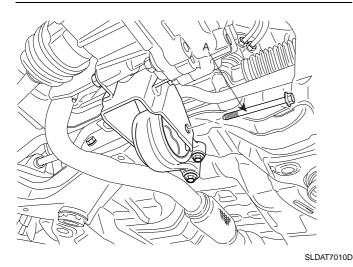


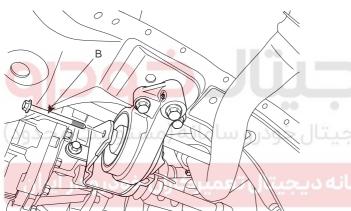
SHDAT6051D

ATA -165

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

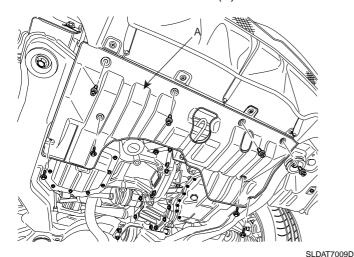
TORQUE: 50-65Nm (5-6.5kgf.m, 36.2-47.0lb-ft)



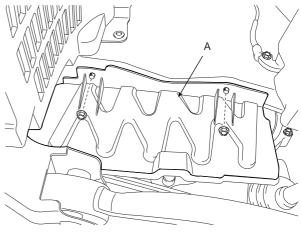


SLDAT7011D

- Install the lower arm ball joint mounting nut, the stabilizer link mounting nut, and the tie rod end mounting nut to the front knuckles. (refer to Front suspension system in SS group)
- 7. Install the under shield cover (A).



8. Install the side mud cover (A).



KKNF060A

- 9. Install the front wheels and tires. (refer to installation in SS group)
- 10. Install the steering joint assembly bolt. (refer to Steering column/shaft in ST group)
- 11. Install the transaxle insulator mounting bracket.

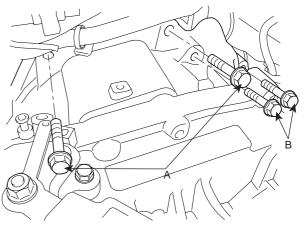
TORQUE: 60-80Nm (6.0-8.0kgf.m, 43.4-57.9lb-ft)

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

TORQUE:

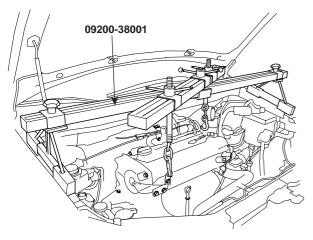
[A] 43-55Nm (4.3-5.5kgf.m, 31.1-39.8lb-ft)

[B] 39-60Nm (3.9-6.0kgf.m, 28.2-43.4lb-ft)



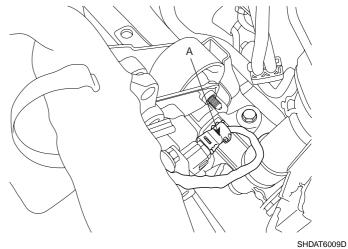
SHDAA6003D

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

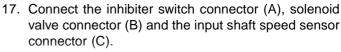


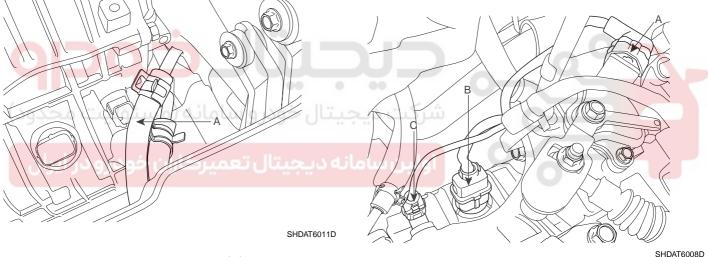
SHDAA6002D

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

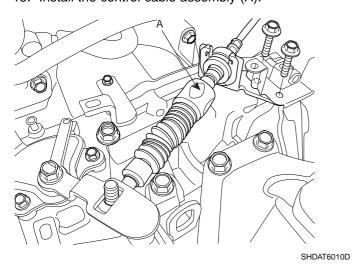


14. Connect the transaxle oil cooler hoses (A) to the tubes by fastening the clamps.

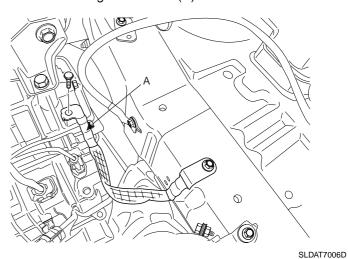




15. Install the control cable assembly (A).

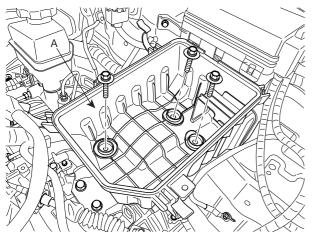


18. Install the ground cable (A) to transaxle.



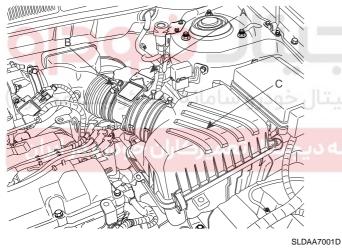
ATA -167

19. Install the lower cover (A) of the air cleaner assembly.

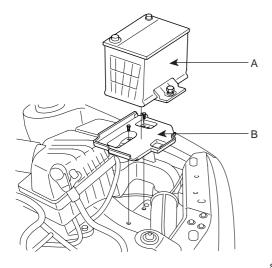


SLDAT7005D

20. Install the upper cover (C) of the air cleaner assembly and connect the AFS(Air Flow Sensor) connector (A), the clamp (B).



21. Install the battery (A) and the battery tray (B).



SLDAT7003D

22. Install the battery heat shield (A).

23. Install the engine cover.

After completing the installation perform the following procedure;

- · Adjust the shift cable.
- · Refill the transaxle fluid.
- Clean the battery posts and cable terminals with sandpaper and grease them to prevent corrosion before installing.

NOTE

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

- a. Connect the Hi-Scan Pro connector to the data link connector under the crash pad and power cable to the cigar jack under the center facia.
- b. Turn the ignition switch on and power on the Hi-Scan Pro.
- Select the vehicle's name.
- Select 'AUTOMATIC TRANSAXLE'.
- e. Select 'RESETTING AUTO T/A VALUES' and perform the procedure

1.7. RESETTING AUTO T/A VALUES

THIS FUNCTION IS FOR RESETTING
THE ADAPTIVE VALUES FROM THE
USED AUTO T/A WHEN REPLACING IT.

IF YOU ARE READY,
PRESS [ENTER] KEY!

SCMAT6512L

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

1.7. RES	ETTING AUTO T/A VALUES		
RESETTING AUTO T/A VALUES			
CONDITION	IG KEY ON TRANSAXLE RANGE : P VEHICLE SPEED : Ø ENGINE OFF		
PRESS [REST], IF YOU ARE READY !			
REST			

SCMAT6513L

ADJUSTMENT E418DB2

- 1. Install the transaxle control cable and adjust as follows.
- 2. Move the shift lever and the transaxle range switch to the "N" Position, and install the control cable.
- 3. When connecting the control cable to the transaxle mounting bracket, install the clip until it contacts the control cable.
- Remove any free-play in the control cable by adjusting nut and then check to see that the select lever moves smoothly.
- Check to see that the control cable (A) has been adjusted correctly.

