Automatic Transaxle System

General Information

SPECIFICATION

		Туре	A5SR2		
		Driving system	2WD/ 4WD		
		Туре	3 elements, 1 stage, 2 phase		
T/CON	Identificat	ion inscription [Nominal diameter (mm)]	8 (Ф250)		
		Stall torque ratio	1.76		
		Manipulating system	Remote control flow transmission (Cable method)		
		Р	Fix output axle (Engine start allowed)		
	Shift position	R	Reverse		
	Shint position	Ν	Neutral (Engine start allowed)		
		D	1↔2↔3↔4↔5		
		1st	3.827		
		2nd	2.368		
		3rd	1.52		
	Gear ratio	4th			
		5th • ••	0.834		
محدود)	سئوليت	o) duloluu g Reverse	2.613		
		Final gear ratio	3.333		
Transmission	ی خودرو در	Control method	Electronic control		
		Lock-up control	Equipped		
		Operating fluid pressure control	Equipped		
		Real time feedback transmission control	Equipped		
	Function	Transmission pattern auto change control	Equipped		
		Self-diagnosis control	Equipped		
		Fail-safe function	Equipped		
		Sports mode function	Equipped		
	Spe	edometer gear teeth (drive/driven)	6/14		
		Туре	Trochoid oil pump		
		Driving system	Engine drive		
		The recommended	APOLLOIL ATF RED-1		
		Quantity	10ℓ(10.57 US qt, 8.8 lmp.qt)		

DESCRIPTION

We have employed A5SR2, the 5th speed automatic transmission with full range electronic control and sports mode that provides smooth driving with lesser transmission shock as well as pleasant driving from manual transmission.

A/t electronic control system is the system where an optimized transmission has been realized from taking a grasp of driving status, A/T internal status at A/T control unit that has integrated with control valve assembly. This paper describes apparatus cross-sectional view, major controls and control circuit diagram, major components and their functions, and etc.

A5SR2

ltem	Contents
Improved transmission feel	 Integrated control over engine and A/T (CAN communication control) system employed Turbine sensor 1.2 employed Real time feedback control at all phases applied
Improved driving	 Sports mode function employed Snow mode function employed (2WD applied) Gear ratio extension
Improved fuel consum- ption	 Slip lock-up employed Full range lock-up employed (Larger lock-up zone) E-flow torque converter employed (Improved driving efficiency) Small transmission power train employed
Improved safety	- Transmission lock apparatus (P range maintenance apparatus affixed) employed
Improved maintenance	- Electronic system diagnosis tester (hi-scan) counterpart

MAJOR COMPONENTS AND THEIR FUNCTIONS

Part name	Acronyms	Function
Front brake	F/B	Fastens the front sun gear
Input clutch	I/ C	Engages the input shaft, with the middle annulus gear and the fr- ont annulus gear
Direct clutch	D/C	Engages the rear planetary carrier with a rear sun gear
High & low reverse clutch	H&LR/C	Engages the middle sun gear with the rear sun gear
Reverse brake	R/B	Fastens the rear planetary carrier
Forward brake	FWD/B	Fastens the middle sun gear
Low cost brake	LC/B	Fastens the middle sun gear
1st one-way clutch	1st OWC	Allows the rear sun gear to turn freely forward relative to the mid sun gear but fastens it for reverse rotation
Forward one-way clutch	FWD OWC	Allows the mid sun gear to turn freely in the forward direction but fastens it for reverse rotation
3rd one-way clutch	3rd OWC	Allows the front sun gear to turn freely in the forward direction b- ut fastens it for reverse rotation

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OPERATION



Shift Po	osition	I/C	H&L R/C	D/C	Rev/B	Fr/B	LC/B	Fwd/B	Ratio1 OWC	Forword OWC	Ratio 2 OWC	Remarks	
F	2		Δ			Δ						Parking position	
F	1	M	0	_	0	0			0	0-	Ø	Reverse position	
N	1		Δ			Δ	Δ""					Neutral position	
D.9-	1st	ىوىيە	\triangle "		ودرو م		ديجيا	60)	O	Ø	O	Automatic	
	2nd			0		Δ		0		Ø	Ô	shift	
Ú	3rd	ودرو	0	0	ບປະ	0	autou	Δ	\diamond		O	↔4↔5	
	4th	0	0	0				\triangle	\diamond				
	5th	0	0			0		Δ	\diamond		\diamond		
5M	5th	0	0			0		Δ	\diamond		\diamond	Fix to the 5th speed	
4M	4th	0	0	0				Δ	\diamond			Fix to the 4th speed	
ЗM	3rd		0	0		0		Δ	\diamond		Ø	Fix to the 3rd speed	
2M	2nd			0		0	0	0		Ø	Ø	Fix to the 2nd speed	
1M	1st		0			0	0	0	Ø	Ø	Ø	Fix to the 1st speed	

0 : Operates.

© : Operates during progressive acceleration.

 \diamond : Operates and effects power transmission while coasting.

△ : Line pressure is applied but does not affect power transmission.

 Δ " : Operates under conditions shown in the high & low reverse clutch operating condition.

 Δ "" : Operates under conditions shown in the LC/B operating condition.

Note) Delay control is applied during D(4,3,2,1) ⇒N shift.

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OPERATING PRINCIPLES OF EACH RANGE

1. N range

Since the forward and reverse brakes are released, driving force of input shaft is not transmitted to output shaft.

- 2. P range
 - Since the forward and reverse brakes are released, as those in the N range, driving force of input shaft is not transmitted to output shaft.
 - Parking pawl that is linked with select lever parking gear meshes with and fastens output shaft mechanically.

- 3. D, M2, M3, M4, M5 range 1st speed
 - Fastens the front brake.
 - The front brake and the forward one-way clutch regulate reverse rotation of the mid sun gear.
 - The 1st one-way clutch regulates reverse rotation of the rear sun gear.
 - The 3rd one-way clutch regulates reverse rotation of the front sun gear.



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- 4. D, M3, M4, M5 range ratio 2nd
 - Fasten the front brake.
 - The front brake and the forward one-way clutch regulate reverse rotation of the mid sun gear.
 - The 3rd one-way clutch regulates reverse rotation of the front sun gear.



* POWER FLOW

Input shaft \Rightarrow Front internal gear \Rightarrow Front carrier \Rightarrow Rear internal gear \Rightarrow Rear carrier \Rightarrow Rear carrier \Rightarrow Middle internal gear \Rightarrow Middle carrier \Rightarrow Output shaft

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5. D, M3, M4, M5 range 3rd speed

- Fastens the front brake.
- The 3rd one-way clutch regulates reverse rotation of the front sun gear.



ولين سامانه ديجيتال تعميركاران خود North Line *

Input shaft ⇒Front internal gear ⇒Front carrier ⇒Rear internal gear ⇒Rear carrier ⇒Rear carrier ⇒Middle internal gear ⇒Middle carrier ⇒Output shaft

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6. D, M4, M5 range 4th speed

- The front brake is released and sun gear turns freely forward.
- The input clutch is coupled and the front and middle internal gears are connected.



Driving force is conveyed to the front internal gear, the middle internal gear, and the rear carrier and the three planetary gears rotate forward as a unit.

* POWER FLOW

Input shaft \Rightarrow Front internal gear \Rightarrow Front carrier \Rightarrow Rear internal gear \Rightarrow Rear carrier \Rightarrow Middle internal carrier \Rightarrow Middle carrier \Rightarrow Output shaft

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- 7. D, M5 range 5th speed
 - The front brake fastens the front sun gear.
 - The direct clutch is released and the rear carrier and rear sun gear are disconnected.



carrier ⇒Output shaft

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8. R range

- The front brake fastens the front sun gear.
- The high & low reverse clutch is coupled and the middle and rear sun gears are connected.
- The reverse brake fastens the rear carrier.



* POWER FLOW

Input shaft⇒Front internal⇒Front carrier⇒Rear internal⇒Rear sun gear⇒Middle sun gear⇒Middle carrier⇒Output shaft

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CONTROL SYSTEM DIAGRAM



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MAIN COMMUNICATION SIGNAL

Input to ECM(CAN)	Output to ECM(CAN)	Input from external sys.	Output to external sys.
-	-	A/T driving mode SW	Self-diagnosis indicator
Engine torque signal	Output revolution signal	Sports mode SW	Range signal (P, R, N, D)
Engine revolution signal	Turbine sensor signal	Up SW	Range signal
-	Torque reduction request signal	Down SW	Reverse lamp signal
Accelerator opening signal		Stop lamp SW	N position signal
Power		4 x 4 Low signal	

LINE PRESSURE CONTROL

- If the engine control unit sends the input torque signal equivalent to the engine driving force to the A/T control unit (TCM), the A/T control unit (TCM) controls line pressure solenoid.
- This line pressure solenoid controls the pressure regulator valve as the signal pressure and adjusts the pressure of theoperating oil discharged from the oil pump to the line pressure most appropriate to the driving plate.

LINE PRESSURE SYSTEM DIAGRAM



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Line pressure

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Line pressure control based on line pressure characteristic pattern of A/T control unit (TCM)

- A/T control unit (TCM) has stored in memory a number of patterns for the optimum line pressure characteristics according to driving conditions.
- In order to obtain the most appropriate line pressure characteristic to meet the current driving state, the TCM controls the line pressure solenoid current valve and thus controls the line pressure.

Normal time line pressure characteristic

- Normal line pressure control.
 - Each clutch is adjusted to the necessary pressure to match the engine drive force.

During shift change

Set to line pressure that is necessary for shift change. Therefore, line pressure characteristic is set according to input torque and shift types.



- At low fluid temperature

When the A/T fluid temperature drops below the prescribed temperature, in order to speed up the action of each friction element, the line pressure is set higher than the normal line pressure characteristic.



Shift control

• The clutch pressure control solenoid is controlled by the signals from the switches and sensors. Thus the clutch pressure is adjusted to be appropriate to the engine load state and vehicle driving state. It becomes possible to finely control the clutch hydraulic pressure with high precision and a smoother shift change characteristic is attained.

SHIFT CONTROL SYSTEM DIAGRAM

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Shift description

Controls clutches with optimum timing and fluid pressure in response to engine speed, engine torque information, and e-tc.

Lock-up control

Lock-up control is to enhance delivery efficiency by preventing the torque converter from slipping, engaging the lock-up piston into the torque converter.

It operates lock-up solenoid control in response to a signal from A/T control unit (TCM) and lock-up control valve behavior control, engages or releases the lock up piston of the torque converter.

LOCK-UP OPERATING CONDITION TABLE

Select lever	درو سامانه (م	Sports mode				
Gear position	5	4		3	5	4
ن خود رود Lock-up	ئال تعاميركارا	ر سامانه دیجیا	اوليز	- 0	0	0
Slip lock-up	0	0		-		-

LLAE002N

Lock-up control valve control

- In the lock-up control valve, there is operating fluid pressure circuit linked into the lock-up piston and lock-up solenoid operates valve shift in response to a signal from the A/T control unit.
- Operating fluid pressure circuit that is applied to the lock-up piston chamber is controlled with the release or apply sides.

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LOCK-UP CONTROL SYSTEM DIAGRAM



Lock-up released

In the lock-up control valve, there is operating fluid pressure circuit connected into the lock-up piston and lock-up solenoid operates valve shift in response to a signal from the A/T control unit. Therefore, the lock-up piston is not coupled.

Lock-up applied

 During the lock-up applied status, lock-up apply pressure is generated having the lock-up control valve to L/U by the lock-up solenoid.

Therefore, press the lock-up piston to be coupled.

Smooth lock-up control

• A/T control unit (TCM) controls current value that is output to the lock-up solenoid when shifting lock-up applied state e from lock-up released state.

Therefore the lock-up clutch is temporarily set to half-clutched state when shifting the lock-up applied state to reduce the shock.

Half-clutched state

Changes current value that is output to the lock-up solenoid from A/T control unit (TCM) to gradually increase lock-up solenoid pressure.

In this way, the lock up apply pressure gradually rises and while the lock-up piston is put into half-clutched status, the lock-up piston operating pressure is increased and the coupling is completed smoothly.

Slip lock-up control

 In the slip region, A/T control unit controls current value of the lock-up solenoid to half-clutched status. Therefore lock-up operates from low speed absorbing torque fluctuation of engine.

Thereby fuel consumption was increased during low accelerator opening with 4th, and 5th gears at low speed.

Engine brake control

- The forward one-way clutch delivers driving force from the engine to the rear wheel but reverse driving from the wheel drive is not delivered since the one-way clutch is idling. Therefore low coast brake solenoid is operated to prevent the forward one-way clutch from idling so that the engine
 - brake is operated in the same as before.

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ENGINE BRAKE CONTROL SYSTEM DIAGRAM



The operation of the low coast brake solenoid switches the low coast brake switch valve and controls the coupling and releasing of the low coast brake.

The low coast brake reducing valve controls the low coast brake coupling force.

CONTROL VALVE

Control valve functions

Valve name	Function
Torque converter regulator valve	Regulates line pressure to the optimum pressure (torque converter operating press- ure) to prevent pressure applied to the torque converter from being excessive.
Pressure regulator valve Pressure regulator plug Pressure regulator sleeve	Regulates oil pump discharge pressure to the optimum pressure (line pressure) in response to the driving conditions.
Front brake control valve	Regulates line pressure to the optimum pressure (front brake pressure) to be appli- ed to the front brake during the front brake apply.
Accumulator control valve	Regulates pressure applied to the accumulator piston, and the low coast reducing valve (accumulator control pressure) inresponse to the driving conditions (regulates clutch pressure at 1st, 2nd, 3rd, 5th gears).
Pilot valve A	Regulates line pressure to the regular pressure required by line pressure control, s- hift control, and lock-up control (pilot pressure).
Pilot valve B	Regulates line pressure to the regular pressure required by shift control (pilot pressure).

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Valve name	Function
Low coast brake switching valve	Provides the low coast brake reducing valve with line pressure during engine brake operation.
Low coast brake reducing valve	Regulates line pressure to the optimum pressure to be applied to the low coast bra- ke when the low coast brake is coupled.
N-R accumulator	Produces the stabilizing pressure for when N-R is selected.
Direct clutch piston switching valve	Operates in 4th gear and switches the direct clutch coupling capacity.
High & low reverse clutch control v- alve	Regulates line pressure to the optimum pressure (high & low reverse clutch pressure) to be applied to the high & low reverse clutch when the high & low reverse clutch is coupled (regulates clutch pressure in 1st, 3rd, 4th, 5th gears).
Input clutch control valve	Regulates line pressure to the optimum pressure (input clutch pressure) to be appli- ed to the input clutch when the inputclutch is coupled (regulates clutch pressure in 4th, 5th gears).
Direct clutch control valve	Regulates line pressure to the optimum pressure (direct clutch pressure) to be applied to the direct clutch when the direct clutch is coupled (regulates clutch pressure i n 2nd, 3rd, 4th gears).
Lock-up control valve Lock-up control plug Lock-up control sleeve	Switches lock-up to operating or released. Also, by performing the lock-up operation transiently, lock-up smoothly.
Torque converter lubrication valve	Operates to switch torque converter, cooling, and oil path of lubrication system during lock-up.
Cool bypass valve	Allows excess oil to by pass cooler circuit without being fed into it.
Line pressure relief valve	Discharges excess oil from line pressure circuit.
N-D accumulator	Produces the stabilizing pressure for when N-D is selected.
Manual valve	Delivers line pressure to each circuit in response to each select position. Circuit to which line pressure is not sent drain.

FUNCTION OF PRESSURE SWITCH

Name	Function
Fluid pressure switch 1 (FR/B)	Detects abnormal fluid pressure of the front brake. When it detects any malfunction, it puts the system into fail-safe mode.
Fluid pressure switch 2(LC/B)	Detects abnormal fluid pressure of the low coast brake. When it detects any malfunction, it puts the system into fail-safe mode.
Fluid pressure switch 3(I/C)	Detects abnormal fluid pressure of the input clutch. When it detects any malfunction , it puts the system into fail-safe mode.
Fluid pressure switch 5(D/C)	Detects abnormal fluid pressure of the direct clutch. When it detects any malfunctio- n, it puts the system into fail-safe mode.
Fluid pressure switch 6 (H & LR/C)	Detects abnormal fluid pressure of the high & low reverse clutch. When it detects any malfunction, it puts the system into fail-safe mode.

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SUB ROM unit

- 1. Installing location: The valve body upper part
- 2. Function: To obtain A/T fluid pressure stability by compensating for solenoid & valve body unit fluid pressure differential.
- 3. Principle: Install additional ROM onto valve body of automatic transmission and input fluid pressure differential of solenoid & valve body so that TCM reads the input data to perform fluid pressure compensation.



LLAE117A



LLAE117B

- 4. Maintenance
 - 1) When replacing with a new TCM in the vehicle
 - TCM automatically reads SUB ROM DATA during I.G ON. At this time, shift range valve is off for about 2.5 second.
 - When replacing A/T (regardless of new or old ones) in the vehicle
 - Must erase SUB ROM DATA stored in TCM.
 - Erase SUB ROM DATA in SCAN TOOL delete mode during shift stage in R-range + accelerator opening angle maintains 50% + I.G ON.
 - TCM reads SUB ROM DATA from a new A/T upon I.G ON again after I.G OFF.

VALVE BODY fluid pressure circuit diagram (D Range)

- 3) Moving TCM from vehicle A to another vehicle B
 - Perform the same way as in 2) above.

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* Refer to body valves for L(number) valve name.

1st gear

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3rd gear

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C/B



B/B

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LLAE006D

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4th gear

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5th gear (lock-up)



LLAE006F

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5th gear

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LLAE006G

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P&N range



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R range

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BASIC INSPECTION ADJUSTMENT TRANSAXLE FLUID LEVEL

INSPECTION

- 1. Drive the vehicle until the fluid reaches normal operating temperature $[70 \sim 80^{\circ}C(158 \sim 176^{\circ}F)]$.
- 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.
- 4. Before removing the oil level gauge, wipe all contaminants from around the oil level gauge. Then take out the oil level gauge and check the condition of the fluid.

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 :

APOLLOIL ATF RED-1

ATF capacity: 10ℓ(10.57 US qt, 8.8 Imp.qt)

WNOTICE

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.

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

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

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



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

TORQUE:

58.83~63.74Nm (6~6.5kgf.m, 43.39~47.01lb-ft)

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

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

6. Repeat the procedure in step (2).

WNOTICE

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

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

(In case of this "replace", this means after wiping off any dirt around the oil level gauge, insert it into the filler tube.)

- 9. Start the engine and run it at idle for $1\sim 2$ 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.

TROUBLESHOOTING DIAGNOSTIC TROUBLE CODES (INSPECTION PROCEDURE)

Check the Diagnostic Trouble Codes

- 1. Turn the ignition switch to OFF.
- 2. 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.
- 5. Read the output diagnostic trouble codes. Then follow the remedy procedures according to the "DIAGNOSTIC TROUBLE CODE DESCRIPTION" on the following pages.

WNOTICE

- 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.

Diagnostic trouble code table

No.	Code	Item	MIL	Remark
1	P0705	TRANSMISSION RANGE SENSOR CIRCUIT MALFUNCTION (PRND Input)	Х	
2	P0711	TRANSMISSION FLUID TEMPERATURE SENSOR A RATIONALITY		
3	P0712	TRANSMISSION FLUID TEMPERATURE SENSOR A STUCK OFF(HIGH INPUT)	•	
4	P0713	TRANSMISSION FLUID TEMPERATURE SENSOR A STUCK ON(LOW INPUT)	٠	

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5	P0716	A/T INPUT SPEED SENSOR CIRCUIT - OPEN or SHORT(GND)	•	
6	P0721	A/T OUTPUT SPEED SENSOR CIRCUIT - OPEN or SHORT(GND)		
7	P0741	TORQUE CONVERTER CLUTCH STUCK OFF	●	
8	P0743	TCC CONTROL SOLENOID VALVE CIRCUIT - OPEN or SHORT(GND)	\bullet	
9	P0748	PRESSURE CONTROL SOLENOID VALVE-A CIRCUIT - OPEN or SHORT(GND)	●	
10	P0751	SHIFT SOLENOID "A(I/C SOLENOID)" PERPOMANCE OR STUCK OFF	●	
11	P0752	SHIFT SOLENOID "A(I/C SOLENOID)" PERPOMANCE OR STUCK ON	●	
12	P0753	SHIFT SOLENOID "A(I/C SOLENOID)" CIRCUIT - OPEN or SHORT(GND)	●	
13	P0756	SHIFT SOLENOID "B(Fr/B SOLENOID)" PERPOMANCE OR STUCK OFF	●	
14	P0757	SHIFT SOLENOID "B(Fr/B SOLENOID)" PERPOMANCE OR STUCK ON	•	
15	P0758	SHIFT SOLENOID "B(Fr/B SOLENOID)" CIRCUIT - OPEN or SHORT(GND)	Х	
16	P0761	SHIFT SOLENOID "C(D/C SOLENOID)" PERPOMANCE OR STUCK OFF	Х	
17	P0762	SHIFT SOLENOID "C(D/C SOLENOID)" PERPOMANCE OR STUCK ON	Х	
18	P0763	SHIFT SOLENOID "C(D/C SOLENOID)" CIRCUIT - OPEN or SHORT(GND)	Х	
19	P0766	SHIFT SOLENOID "D(H & LR/C SOLENOID)" PERPOMANCE OR STUCK OFF	Х	
20	P0767	SHIFT SOLENOID "D(H & LR/C SOLENOID)" PERPOMANCE OR STUCK ON	•	
21	P0768	SHIFT SOLENOID "D(H & LR/C SOLENOID)" CIRCUIT - OPEN or SHORT(GND)	•	
22	P0772	SHIFT SOLENOID "E(LC/B SOLENOID)" PERPOMANCE OR STUCK OFF		
23	P0773	SHIFT SOLENOID "E(LC/B SOLENOID)" CIRCUIT - OPEN or SHORT(GND)	•	
24	P0863	CAN COMMUNICATION BUS OFF	•	
25	P0893	MULTIPLE GEARS ENGAGED		

Automatic Transaxle System

P0601

COMPONENT LOCATION



DTC DESCRIPTION

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

DTC DETECTING CONDITION

Item	Detecting Condition	Possible cause
DTC Strategy	Check sum fault	Faulty TCM
Enable Conditions	• IG "on"	
Threshold value	Checksum fault or TCU internal Failure	
Diagnostic Time	More than 1sec	o o
Fail Safe	Locked in 3rd gear	

Monitor Scantool Data

- 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?

YES

► 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.

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SBLAT6200L

Automatic Transaxle System

P0641

COMPONENT LOCATION



GENERAL DESCRIPTION

The TCM monitors voltage that supplied to solenoid valve.

DTC DESCRIPTION

The TCM sets this code when suppling voltage to TCM is lower or higher than specification.

شركت درجيتا ، خودرو ساه DTC DETECTING CONDITION

Item	Detecting Condition	Possible cause	
DTC Strategy	Check voltage range	Faulty TCM	
Enable Conditions	Battery voltage > 11.7V		
Threshold value	 10.4V < Sensor supply voltage > 16V 		
Diagnostic Time	More than 0.2sec		
Fail Safe	Damper clutch "OFF"Prevention of pressure adaptation		

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SBLAT6200L

Automatic Transaxle System

Monitor Scantool Data

- 1. Connect scantool to data link connector(DLC).
- 2. Ignition "ON" & Engine "OFF".
- Monitor the "BATTERY VOLTAGE and A/T MAIN RELAY VOLTAGE" parameter on the scantool.

Specification : approx. 12V



4. Does "BATTERY VOLTAGE and A/T MAIN RELAY VOLTAGE" follow the reference data?

YES

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▶ 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

► Go to "Terminal & connector inspection" procedure.

SBLAT6201L

TERMINAL & CONNECTOR INSPECTION

- 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.

Automatic Transaxle System

POWER SUPPLY CIRCUIT INSPECTION

- 1. IG "ON" Engine "OFF".
- 2. Disconnect the "PCM/TCM" connector.
- Measure voltage between terminal No"29" of TCM harness connector and chassis ground and then terminal No"73" of the TCM harness connector and chassis ground.

Specification : approx. 12V



► 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.

AT-35

SBLAT6100

AT-36

Automatic Transaxle System

P0705

COMPONENT LOCATION



GENERAL DESCRIPTION

The TRANSMISSION Range Switch sends the shift lever position information to the TCM using a 5V signal. Deciding each TCM range depend on 4 s/w signal. Standard patterns are fixed and these patterns are on the Specification table as listed below. For example, when s/w 1,2,4 are 'ON(0V)' and s/w 3 is 'OFF(5V)', TCM recognizes 'D Range'. When the shift lever is in the D (Drive) position the output signal of Tansaxle Range Switch is 12V and in all other positions the voltage is 0V. The TCM judges the shift lever position by reading all signals, for the TRANSMISSION Range Switch, simultaneously.

DTC DETECTING CONDITION

[DSL 2.5]

Item	Detecting Condition	Possible cause		
DTC Strategy	Range decision by switch pattern	 OPEN OR SHORT IN CIRCUIT Faulty TRANSMISSION RAN- GE SWITCH Faulty TCM 		
Enable Conditions	 Vehicle speed ≥ 10km/h[6.2MPH] Throttle opening≥12.5% 			
Threshold value	 Detect irregular range pattern (REFER TO SPECCI- FICATION) 			
Diagnostic Time	More than 2sec			
Fail Safe	 SELECT POSITION IS REGARDED AS "D" INDICATOR DECISION "OFF" START RERAY SIGNAL "OFF" REVERSE LAMP SIGNAL "OFF" 			

DTC DESCRIPTION

The TCM sets this code when patterns are without Specification of the table shown below.

The TRANSMISSION Range Switch has no output signal for an extended period of time.

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AT-37

Automatic Transaxle System

[GSL 3.3/3.8]

Item	Detecting Condition	Possible cause
DTC Strategy	Range decision by switch pattern	OPEN OR SHORT IN CIRCUIT
Enable Conditions	• Always	Faulty TRANSMISSION RAN- GE SWITCH
Threshold value	"INHIBITOR SWITCH" pattern check.	Faulty TCM
Diagnostic Time	More than 10sec	
Fail Safe	 SELECT POSITION IS REGARDED AS "D" INDICATOR DECISION "OFF" REVERSE LAMP SIGNAL "OFF" 	

SPECIFICATION A/T RANGE PATTERN

	A/T rang	Dongo ovreiteb	Domorko		
SW1	SW2	SW3	SW4	Range swsitch	Remarks
OFF	OFF	OFF	OFF	Pst	P start
OFF	OFF	ON	OFF	Р	Р
OFF	OFF	ON	ON	P-R	Intermediate
ON	OFF	ON	ON	R	R
ON	OFF	ON	OFF	N-R	Intermediate
ON	OFF	OFF	OFF	Nst	N start
ON ON	OFF	یتان OFF رو س	ON	N-D	Intermediate
ON	ON	OFF	ON	D	D
OFF J-9) N N	OFF OFF	ON	3	3
OFF	ON	ON	ON	2	2
OFF	ON	ON	OFF	1	1
Irregular Pattern				Otl	ner

[OFF= 5V, ON = 0V]

Monitor Scantool Data

- 1. Connect scantool to data link connector(DLC).
- 2. Ignition "ON" & Engine "OFF".
- 3. Monitor the "TRANSMISSION RANGE SWITCH" parameter on the scantool.
- 4. Move selector lever from "P" range to "D" range.
AT-38



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

YES

► 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

Go to "Terminal & connector inspection"

procedure.

TERMINAL & CONNECTOR INSPECTION

Automatic Transaxle System

- 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.

SIGNAL CIRCUIT INSPECTION

- 1. Disconnect "C06-3/C106-3" connector.
- 2. Ignition "ON" & Engine "OFF".
- 3. Measure voltage between each terminal "1,2,3,4" of the TCM side harness connector and chassis ground.

Specification : approx. 5V



4. Is voltage within specifications?



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

COMPONENT INSPECTION

- 1. Ignition "OFF".
- 2. Disconnect "C06-3/C106-3" connector.
- 3. Measure the resistance between each terminal of the sensor.

Specification :



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AT-40

Automatic Transaxle System



SWITCH IS ON(GND LEVER)

- : RANGE INDICATER LAMP "OFF" AND MAINTAIN PREVIOUS RANGE

[RANGE SWITCH continuity check table]



4. Is resistance within specifications?

► 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

► 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, Substitute with a known-good "TRANSMISSION RANGE SWITCH" and check for proper operation. If the problem is corrected, replace "TRANSMISSION RANGE SWITCH" as necessary and go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

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.
- Are any DTCs present?
 YES
 - Go to the applicable troubleshooting procedure.

NO

System performing to specification at this time.

P0711

COMPONENT LOCATION



GENERAL DESCRIPTION

The automatic transmission fluid(ATF) temperature sensor A is installed in the INHIBITOR SWITCH and fluid(ATF) temperature sensor B is installed in the valve body. Sensor "B" is measure the oil temperature that inflowed in from Torque convertor. This sensors use 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 transmission 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

This DTC is for checking sensor failure. This code is set if the temperture data from Oil Temperture sensor is fixed between -4°F and 32°F or 32°F and 68°F for 10min. after driving a behicle.

DTC DETECTING CONDITION [DSL 2.5]

Item	Detecting Condition	Possible cause	
DTC Strategy	Fluctuation of A/T fluid temperature	* ATF T/S : Automatic Transmis-	
Enable Conditions	 A/T range switch is D range Vehicle speed ≥ 6.2MPH(10km/h) Throttle opening ≥ 12.5% Engine speed ≥ 305rpm 	 Sion Fluid Temperature Sensor OPEN OR SHORT IN CIRCUIT Faulty ATF T/S 1 Faulty TCM 	
Threshold value	 -4°F≤A/T fluid temperature < 32°F for cumul ative t- otal of 10 minutes or 32°F≤A/T fluid te mperature < 68°F for cumulative total of 10 minutes(refer fig.2 D- iagnostic logic for ATF temp. sensor) 		
Diagnostic Time	10minutes accumulative total		
Fail Safe	S-MODE is Inhibited5th gear is Inhibite		

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AT-41

SBLAT6110L



AT-42

Automatic Transaxle System

[GSL 3.3/3.8]

Item Detecting Condition		Possible cause	
DTC Strategy • Rationality		* ATF T/S : Automatic Transmis	
Enable Conditions	• Always	sion Fluid Temperature Sensor	
Threshold value	 Oil temp. at IG "ON" - Coolant temp. at IG "ON" > 1 0°C 	OPEN OR SHORT IN CIRCUIT Faulty ATF T/S 1	
Diagnostic Time	More than 2 sec	• Faulty TCM	
Fail Safe	 Fluid temperature is regarded as 80°C 		

SPECIFICATION

	PIN No	TEMPERATURE (°F)	RESISTANCE (KΩ)	VOLTAGE (V)
ATF 1 C06-1/C106-1 : 9 ~		32	Approx. 15	Approx. 3.3
	C06-1/C106-1 : 9 ~ Earth	68	Approx. 6.5	Approx. 2.7
		176	Approx. 0.9	Approx. 0.9
		32	Approx. 10.5	Approx. 3.3
ATF 2	C06-2/C106-2 : 1 ~ Earth	68	Approx. 4.3	Approx. 2.5
		176	Approx. 0.5	Approx. 0.7

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Monitor Scantool Data

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

Specification : Increasing Gradually

1.3 CURRENT DATA

Automatic Transaxle System

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

► 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

YES

► Go to "Terminal & connector inspection" procedure.

TERMINAL & CONNECTOR INSPECTION

- 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.

SIGNAL CIRCUIT INSPECTION

- 1. Ignition "ON" & Engine "OFF".
- 2. Disconnect the "ATF 1[C06-1/C106-1] and ATF 2[C06-2/C106-2]" connector.
- 3. Measure the voltage between terminal "9" of the "ATF 1 [C06-1/C106-1]" harness connector and chassis ground.

Specification : Approx. 5 V

AT-43

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AT-44



C06-1 [DSL 2.5] C106-1 [GSL 3.3/3.8]

1.VIGN-OUT 1 2.DATA BIT 1 3.PSB 2 4.PSC 2 5.SEL 1 6.SEL 2 7.SEL 3 8.GND 9.ATF 1 10.VSP 1

4. Is voltage within specifications?

YES

► Go to "Component 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 TCM" of the "Component Inspection" procedure.

COMPONENT INSPECTION

- 1. CHECK "TRANSMISSION FLUID TEMPERATURE SENSOR"
 - شرکت دیجیتال خودرو سامانه (مسئو."gnition "OFF"
 - Disconnect the "ATF 1 [C06-1/C106-1] and ATF 2 [C06-2/C106-2]" connector.
 - Measure the rasistance between terminal "9" of the "ATF 1 [C06-1/C106-1]" harness connector and chassis ground.

Specification : Refer to " Reference data"

[Reference data]

	PIN No	TEMPERATURE (°F)	RESISTANCE (KΩ)	VOLTAGE (V)
		32	Approx. 15	Approx. 3.3
ATF 1 C06-1/C106-1 : 9 ~ Earth	C06-1/C106-1 : 9 ~ Earth	68	Approx. 6.5	Approx. 2.7
		176	Approx. 0.9	Approx. 0.9
ATF 2 C06-2/C106-2 : 1 ~ Earth	32	Approx. 10.5	Approx. 3.3	
	C06-2/C106-2 : 1 ~ Earth	68	Approx. 4.3	Approx. 2.5
		176	Approx. 0.5	Approx. 0.7



SBLAT6112L

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C06-1 [DSL 2.5] C106-1 [GSL 3.3/3.8] Component side

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1.VIGN-OUT 1 2.DATA BIT 1 3.PSB 2 4.PSC 2 5.SEL 1 6.SEL 2 7.SEL 3 8.GND **9.ATF 1**

10.VSP 1

4) Is resistance within specifications?

YES	

► Go to "CHECK PCM/TCM" as below.

NO

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

Replace "TRANSMISSION FLUID TEMPERATURE SENSOR 1" as necessary and Go to "Verification of Vehicle Repair" procedure.

2. CHECK TCM

- 1) Ignition "ON" & Engine "OFF".
- 2) Disconnect the "ATF 1 [C06-1/C106-1] " connector.
- 3) Install scantool and select a SIMU-SCAN.
- Simulate voltage (0→5V) to "TRANSMISSION FLUID TEMPERATURE SENSOR 1, 2" signal circuit.





FIG.1) INPUT 1.02V → 63°C FIG.2) INPUT 2.00V → 33°C

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

AT-45

SBLAT6113L



SBLAT6114L

AT-46

Automatic Transaxle System

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

YES

▶ Thoroughly check connectors for looseness, connection. bending, poor 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 TCM and check for proper operation. If the problem is corrected, replace TCM as necessary and go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

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.



P0712

COMPONENT LOCATION



GENERAL DESCRIPTION

The automatic transmission fluid(ATF) temperature sensor A is installed in the INHIBITOR SWITCH and fluid(ATF) temperature sensor B is installed in the valve body. Sensor "B" is measure the oil temperature that inflowed in from Torque convertor. This sensors use 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 transmission 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 DETECTING CONDITION

[DSL 2.5]

Item Detecting Condition		Possible cause
DTC Strategy	Fluctuation of A/T fluid temperature	* ATF T/S :Automatic Transmissi-
Enable Conditions	 A/T range switch is D range Vehicle speed ≥ 6.2MPH(10km/h) Throttle opening ≥ 12.5% Engine speed ≥ 305rpm 	 on Fluid Temperature Sensor OPEN IN CIRCUIT Faulty ATF T/S 1 Faulty TCM
Threshold value	 A/T fluid is below then -4°F for 10 minutes (refer fig. 2 Diagnostic logic for ATF temp. sensor) 	
Diagnostic Time	Diagnostic Time • 10minutes accumulative total	
Fail Safe	S-MODE is Inhibited5th gear is Inhibite	

DTC DESCRIPTION

This DTC is for checking sensor failure. This code is set if the temperture data from Oil Temperture sensor is fixed between $-4^{\circ}F$ and $32^{\circ}F$ or $32^{\circ}F$ and $68^{\circ}F$ for 10min. after driving a behicle.

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AT-48

Automatic Transaxle System

[GSL 3.3/3.8]

Item	Detecting Condition	Possible cause	
DTC Strategy • Check the voltage range		* ATF T/S : Automatic Transmis	
Enable Conditions	Battery voltage > 10V	 Sion Fluid Temperature Sensor OPEN IN CIRCUIT 	
Threshold value	Input voltage < 0.05V		
Diagnostic Time	More than 2 sec	Faulty ATF T/S 1	
Fail Safe	 Fluid temperature is regarded as 80°C 		

SPECIFICATION

	PIN No	TEMPERATURE (°F)	RESISTANCE (KΩ)	VOLTAGE (V)
		32	Approx. 15	Approx. 3.3
ATF 1 C06-1/C106-1 : 9 ~ Earth	C06-1/C106-1 : 9 ~ Earth	68	Approx. 6.5	Approx. 2.7
		176	Approx. 0.9	Approx. 0.9
		32	Approx. 10.5	Approx. 3.3
ATF 2	C06-2/C106-2 : 1 ~ Earth	68	Approx. 4.3	Approx. 2.5
		176	Approx. 0.5	Approx. 0.7

Monitor Scantool Data

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

Specification : Increasing Gradually

1.3 CURRENT DATA

FLUID TEMP-1(F.FAN) * FLUID TEMP-2(CONVERT.) 78

ATF SNSE-1(F.FAN)

Automatic Transaxle System

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°C



ATF SNSR-2(CONVERTER) LU SOL. OUTPUT LU SOL. MONITOR PL SOL. OUTPUT PL. SOL. MONITOR FIX PART FULL HELP GRPH BCRD FIG.1) 1.3 CURRENT DATA 12/76 1.3 CURRENT DATA 12/76 4 × FLUID TEMP-1(F.FAN) FLUID TEMP-1(F.FAN) 180 × °c X FLUID TEMP-2(CONVERT.) -40 FLUID TEMP-2(CONVERT.) × -40 °C ATE SNSE-1(F.FAN) ATF SNSE-1(F.FAN) ATF SNSR-2(CONVERTER) ATF SNSR-2(CONVERTER) LU SOL. OUTPUT LU SOL. OUTPUT LU SOL. MONITOR LU SOL. MONITOR PL SOL. OUTPUT PL SOL. OUTPUT PL. SOL. MONITOR PL. SOL. MONITOR FIX PART FULL HELP GRPH RCRD FIX PART FULL HELP GRPH RCRD FIG.2) FIG.3) FIG.1) Normal FIG.2) Signal harness open FIG.3) Signal harness ground short شرکت دیجیتال خودر و سامانه (مسئولیت

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

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

YES

Go to "Terminal & connector inspection" procedure.

TERMINAL & CONNECTOR INSPECTION

- 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

bending, corrosion, connection, 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.

SIGNAL CIRCUIT INSPECTION

- 1. Ignition "ON" & Engine "OFF".
- 2. Disconnect the "ATF 1[C06-1/C106-1] and ATF 2[C06-2/C106-2]" connector.
- 3. Measure the voltage between terminal "9" of the "ATF 1 [C06-1/C106-1]" harness connector and chassis ground.

Specification : Approx. 5 V

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SBLAT6111L

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SBLAT6112L

Automatic Transaxle System

AT-50



C06-1 [DSL 2.5] C106-1 [GSL 3.3/3.8]

1.VIGN-OUT 1 2.DATA BIT 1 3.PSB 2 4.PSC 2 5.SEL 1 6.SEL 2 7.SEL 3 8.GND **9.ATF 1**

10.VSP 1

4. Is voltage within specifications?

YES

► Go to "Component Inspection" procedure.

NO

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

COMPONENT INSPECTION

- 1. CHECK "TRANSMISSION FLUID TEMPERATURE SENSOR"
 - 1) Ignition "OFF".
 - Disconnect the "ATF 1 [C06-1/C106-1] and ATF 2 [C06-2/C106-2]" connector.
 - Measure the rasistance between terminal "9" of the "ATF 1 [C06-1/C106-1]" harness connector and chassis ground.

Specification : Refer to " Reference data"

[Reference data]

	PIN No	TEMPERATURE (°F)	RESISTANCE (KΩ)	VOLTAGE (V)
ATF 1 C06-1/C10		32	Approx. 15	Approx. 3.3
	C06-1/C106-1 : 9 ~ Earth	68	Approx. 6.5	Approx. 2.7
		176	Approx. 0.9	Approx. 0.9
ATF 2	C06-2/C106-2 : 1 ~ Earth	32	Approx. 10.5	Approx. 3.3
		68	Approx. 4.3	Approx. 2.5
		176	Approx. 0.5	Approx. 0.7





C06-1 [DSL 2.5] C106-1 [GSL 3.3/3.8] Component side

1.VIGN-OUT 1 2.DATA BIT 1 3.PSB 2 4.PSC 2 5.SEL 1 6.SEL 2 7.SEL 3 8.GND **9.ATF 1** 10.VSP 1



4) Is resistance within specifications?

YES

▶ Go to "CHECK PCM/TCM" as below.

NO

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

- ► Replace "TRANSMISSION FLUID TEMPERATURE SENSOR 1" as necessary and Go to "Verification of Vehicle Repair" procedure.
- 2. CHECK TCM
 - 1) Ignition "ON" & Engine "OFF".
 - 2) Disconnect the "ATF 1 [C06-1/C106-1]" connector.
 - 3) Install scantool and select a SIMU-SCAN.
 - Simulate voltage (0→5V) to "TRANSMISSION FLUID TEMPERATURE SENSOR 1, 2" signal circuit.



FIG.1) INPUT $1.02V \rightarrow 63^{\circ}C$ FIG.2) INPUT $2.00V \rightarrow 33^{\circ}C$

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

SBLAT6114L

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 TCM and check for proper operation. If the problem is corrected, replace TCM as necessary and go to "Verification of Vehicle Repair" procedure.

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021 62 99 92 92

AT-52

Automatic Transaxle System

VERIFICATION OF VEHICLE REPAIR

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.

حیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



P0713

COMPONENT LOCATION



GENERAL DESCRIPTION

The automatic transmission fluid(ATF) temperature sensor A is installed in the INHIBITOR SWITCH and fluid(ATF) temperature sensor B is installed in the valve body. Sensor "B" is measure the oil temperature that inflowed in from Torque convertor. This sensors use 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 transmission 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 DETECTING CONDITION

[DSL 2.5]

Item	Item Detecting Condition		
DTC Strategy	Fluctuation of A/T fluid temperature	* ATF T/S :Automatic Transmissi-	
Enable Conditions	 A/T range switch is D range Vehicle speed ≥ 6.2MPH(10km/h) Throttle opening ≥ 12.5% Engine speed ≥ 305rpm 	 on Fluid Temperature Sensor OPEN IN CIRCUIT Faulty ATF T/S 1 Faulty TCM 	
Threshold value	A/T fluid is over than 180degrees for 10 minutes(re- fer fig.2 Diagnostic logic for ATF temp. sensor)		
Diagnostic Time • 10minutes accumulative total			
Fail Safe	S-MODE is Inhibited5th gear is Inhibite		

DTC DESCRIPTION

This DTC is for checking sensor failure. This code is set if the temperture data from Oil Temperture sensor is fixed between $-4^{\circ}F$ and $32^{\circ}F$ or $32^{\circ}F$ and $68^{\circ}F$ for 10min. after driving a behicle.

AT-53

SBLAT6110L

AT-54

Automatic Transaxle System

[GSL 3.3/3.8]

Item Detecting Condition		Possible cause
DTC Strategy	Check the voltage range	* ATF T/S : Automatic Transmis-
Enable Conditions	 Oil temp. at IG "ON" ≤ -39°C Engine speed > 1000rpm Output speed ≥ 500rpm Engine coolant temp. ≥ 70°C Delay time = 160sec 	 sion Fluid Temperature Sensor OPEN OR SHORT IN CIRCUIT Faulty ATF T/S 1 Faulty TCM
Threshold value • Input voltage > 4.8V		
Diagnostic Time • 10 minutes accumulative total		
Fail Safe	Fluid temperature is regarded as 80°C	

SPECIFICATION

	PIN No	TEMPERATURE (°F)	RESISTANCE (KΩ)	VOLTAGE (V)
		32	Approx. 15	Approx. 3.3
ATF 1	C06-1/C106-1 : 9 ~ Earth	68	Approx. 6.5	Approx. 2.7
		176	Approx. 0.9	Approx. 0.9
		32	Approx. 10.5	Approx. 3.3
ATF 2	C06-2/C106-2 : 1 ~ Earth	68	Approx. 4.3	Approx. 2.5
		•• 176 ••	Approx. 0.5	Approx. 0.7

شرکت دیجیتال خودرو سامانه (Monitor Scantool Data

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

Specification : Increasing Gradually

1.3 CURRENT DATA

* FLUID TEMP-1(F.FAN) 76
* FLUID TEMP-2(CONVERT.) 78

Automatic Transaxle System

12/76

°C



ATF SNSE-1(F.FAN) ATF SNSR-2(CONVERTER) LU SOL. OUTPUT LU SOL. MONITOR PL SOL. OUTPUT PL. SOL. MONITOR FIX PART FULL HELP GRPH BCRD FIG.1) 1.3 CURRENT DATA 12/76 1.3 CURRENT DATA 12/76 4 × FLUID TEMP-1(F.FAN) FLUID TEMP-1(F.FAN) 180 × °c X FLUID TEMP-2(CONVERT.) -40 FLUID TEMP-2(CONVERT.) × -40 °C ATE SNSE-1(F.FAN) ATF SNSE-1(F.FAN) ATF SNSR-2(CONVERTER) ATF SNSR-2(CONVERTER) LU SOL. OUTPUT LU SOL. OUTPUT LU SOL. MONITOR LU SOL. MONITOR PL SOL. OUTPUT PL SOL. OUTPUT PL. SOL. MONITOR PL. SOL. MONITOR FIX PART FULL HELP GRPH RCRD FIX PART FULL HELP GRPH RCRD FIG.2) FIG.3) FIG.1) Normal FIG.2) Signal harness open FIG.3) Signal harness ground short شرکت دیجیتال خودر و سامانه (مسئولیت

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

► 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

YES

► Go to "Terminal & connector inspection" procedure.

TERMINAL & CONNECTOR INSPECTION

- 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.

SIGNAL CIRCUIT INSPECTION

- 1. Ignition "ON" & Engine "OFF".
- 2. Disconnect the "ATF 1 [C06-1/C106-1] and ATF 2 [C06-2/C106-2]" connector.
- 3. Measure the voltage between terminal "9" of the "ATF 1 [C06-1/C106-1]" harness connector and chassis ground.

Specification : Approx. 5 V

AT-55

021 62 99 92 92

SBLAT6111L

SBLAT6112L

Automatic Transaxle System

AT-56

5

2 4 3 1

6

C06-1 [DSL 2.5] C106-1 [GSL 3.3/3.8]



2.DATA BIT 1 3.PSB 2 4.PSC 2 5.SEL 1 6.SEL 2 7.SEL 3 8.GND 9.ATF 1 10.VSP 1

1.VIGN-OUT 1

4. Is voltage within specifications?

YES

► Go to "Component Inspection" procedure.

NO

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

COMPONENT INSPECTION

- 1. CHECK "TRANSMISSION FLUID TEMPERATURE SENSOR"
 - 1) Ignition "OFF".
 - 2) Disconnect the "ATF 1 [C06-1/C106-1] and ATF 2
 - [C06-2/C106-2]" connector.
 - 3) Measure the rasistance between terminal "9" of the "ATF 1 [C06-1/C106-1]" harness connector and chassis ground.

Specification : Refer to " Reference data"

[Reference data]

	PIN No	TEMPERATURE (°F)	RESISTANCE (KΩ)	VOLTAGE (V)
		32	Approx. 15	Approx. 3.3
ATF 1	C06-1/C106-1 : 9 ~ Earth	68	Approx. 6.5	Approx. 2.7
		176	Approx. 0.9	Approx. 0.9
ATF 2	C06-2/C106-2 : 1 ~ Earth	32	Approx. 10.5	Approx. 3.3
		68	Approx. 4.3	Approx. 2.5
		176	Approx. 0.5	Approx. 0.7





C06-1 [DSL 2.5] C106-1 [GSL 3.3/3.8] Component side



3/3.8] 1.VIGN-OUT 1 2.DATA BIT 1 3.PSB 2 4.PSC 2 5.SEL 1 6.SEL 2 7.SEL 3 8.GND

9.ATF 1 10.VSP 1

4) Is resistance within specifications?

YES

▶ Go to "CHECK PCM/TCM" as below.

NO

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

Replace "TRANSMISSION FLUID TEMPERATURE SENSOR 1" as necessary and Go to "Verification of Vehicle Repair" procedure.

2. CHECK TCM

- 1) Ignition "ON" & Engine "OFF".
- 2) Disconnect the "ATF 1 [C06-1/C106-1] "________ connector.
- 3) Install scantool and select a SIMU-SCAN.
- Simulate voltage (0→5V) to "TRANSMISSION FLUID TEMPERATURE SENSOR 1, 2" signal circuit.





FIG.1) INPUT $1.02V \rightarrow 63^{\circ}C$ FIG.2) INPUT $2.00V \rightarrow 33^{\circ}C$

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

AT-57

SBLAT6113L



SBLAT6114L

AT-58

Automatic Transaxle System

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

YES

▶ Thoroughly check connectors for looseness, connection. bending, poor 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 TCM and check for proper operation. If the problem is corrected, replace TCM as necessary and go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

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.



AT-59

021 62 99 92 92

P0716

COMPONENT LOCATION



SBLAT6120L

GENERAL DESCRIPTION

The Input Sensor of RXC Auto transmission is composed of S1(Sensor1) and S2(Sensor2). S1 inputs signal to TCM only at 4th gear and S2 does at 1st, 2nd, 3rd, 4th and 5th gear. Therefore, sensing pulse frequency outputted from 2 of signal, TCM calculates Inputshaft speed and compute Turbine rotation. This value is mainly used to control the optimum fluid pressure during shifting.

DTC DETECTING CONDITION

DTC DESCRIPTION

The TCM sets this code if an output pulse-signal is not detected, from the INPUT SPEED SENSOR 1 or 2, when the vehicle is running faster than 24.85MPH(40km/h). The Fail-Safe function will be set by the TCM if this code is detected.

Item	Detecting Condition	Possible cause	
DTC Strategy	Speed rationality check	Signal circuit is open or short	
Enable Conditions	 Vehicle speed > 24.85MPH(40km/h) Engine speed > 1500 rpm Throttle opening ≥ 12.5% A/T range switch is D range 	 Sensor power circuit is open Sensor ground circuit is open Faulty INPUT SPEED SENSOR R 1 Faulty TCM 	
Threshold value	Input speed < 600rpm		
Diagnostic Time	more than 5sec		
Fail Safe	 "Nt" is regarded as 600rpm(Nt = 600rpm) S-MODE is Inhibited 5th gear is Inhibited 		

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Automatic Transaxle System

[GSL 3.3/3.8]

Item	Detecting Condition	Possible cause
DTC Strategy	Speed rationality check	Signal circuit is open or short
Enable Conditions	 Battery voltage > 10V Output speed > 200rpm Engine speed > 700 rpm State of "TRANSMISSION" is "STATIC" The time after the last shift was finished 500sec 	 Sensor power circuit is open Sensor ground circuit is open Faulty INPUT SPEED SENSO- R 1 Faulty TCM
Threshold value	Input speed1 > 50rpm	
Diagnostic Time	More than 2sec	
Fail Safe	 "Input speed" is regarded as 600rpm(Nt = 600rpm) Shift prevention over 4th gear Prevention of manual shift Prevention of pressure adaptation 	

Signal Waveform



FIG.1) 1GEAR FIG.2) 4 GEAR

Caution:TURBINE SENSOR 2 CAN BE DETECTED 5V IN FIG.1

SPECIFICATION

SBLAT6121L

NAME	PIN NO	Measurement condition	Spec
Turbine Sensor1	6	1gear12.42MPH(20km/h)Idle SW OFF	Approx. 1.1K(Hz)
Turbine Sensor2	7	 4gear 31MPH(50km/h) Idle SW OFF	

Scan tool data link cable is maintain to connecting condition.

AT-61

SBI AT61221

Automatic Transaxle System

Monitor Scantool Data

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- 3. Monitor the "INPUT SPEED SENSOR 1" parameter on the scantool.
- 4. Driving at speed of over 12.42MPH(20km/h) at 1gear.

Specification : Increasing Gradually



FIG.1) Low speed FIG.2) High speed

(margarited)

Does "INPUT SPEED SENSOR" follow the reference data?
 YES

► 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

► Go to "Terminal & connector inspection" procedure.

TERMINAL & CONNECTOR INSPECTION

- 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.

SIGNAL CIRCUIT INSPECTION

- 1. Ignition "ON" & Engine "OFF".
- 2. Disconnect the "C06-3/C106-3" connector.
- 3. Measure voltage between terminal "6" of the C06-3/C106-3 harness connector and chassis ground.

Specification : Approx. 5 V

Automatic Transaxle System



2 1

5 6

• Go to "Power supply circuit inspection" procedure.

C06-3 [DSL 2.5] C106-3 [GSL 3.3/3.8]

NO

AT-62

4 З

8 7

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 TCM" of the "Component Inspection" procedure.

Power supply circuit inspection

- 1. Remove "OIL PAN".
- 2. Ignition "ON", Engine "OFF".
- 3. Connect the "C06-3/C106-3 and Shift CM" connector.
- 4. Measure resistance between terminal "4" of the TURBINE SENSOR harness connector and chassis ground.

Specification : approx. 12V



5. Is voltage within specifications?

YES

▶ Go to "Ground circuit inspection" procedure.





SBLAT6124L

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

1. TRANSMISSION RANGE SWITCH SW1 2. TRANSMISSION RANGE SWITCH SW2 3. TRANSMISSION RANGE SWITCH SW3 4. TRANSMISSION RANGE SWITCH SW4

6. TURBINE SENSOR 1 7. TURBINE SENSOR 2

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SBLAT6123L

YES

► Go to "Component inspection" procedure.

NO

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

COMPONENT INSPECTION

- 1. Check "TURBINE SENSOR 2"
 - 1) Ignition "ON" & Engine "OFF".
 - 2) Connect the "C06-3/C106-3" connector.
 - 3) Measure Frequency between terminal "6" of the C06-3/C106-3 harness connector and chassis ground.

Specification :

NAME	PIN NO	Measurement condition	Spec

Automatic Transaxle System

procedure.

If power circuit in harness is OK, Substitute with a known-good Shift CM and check for proper operation. If the problem is corrected, replace Shift CM as necessary and go to "Verification of Vehicle Repair" procedure.

Ground circuit inspection

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- 1. Remove "OIL PAN".
- 2. Engine "OFF".
- 3. Disconnect the "C06-3/C106-3 and Shift CM" connector.
- 4. Measure resistance between terminal "3" of the INPUT SPEED SENSOR harness connector and chassis ground.

2 3

Specification : approx. 0Ω





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AT-63



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Automatic Transaxle System

Turbine Sensor1	6	1gear12.42MPH(20km/h)Idle SW OFF	
Turbine Sensor2	7	 4gear 31MPH(50km/h) Idle SW OFF	

ACAUTION

Scan tool data link cable is maintain to connecting condition.



4)	Is frequency within specifications?		
	YES		
	Go to "CHECK TCM " as below.		

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

2. CHECK TCM

NO

- 1) Ignition "ON" & Engine "OFF".
- 2) Disconnect "C06-3/C106-3" connector.
- 3) Install scantool and select a SIMU-SCAN.
- 4) Simulate frequency to TURBINE SENSOR 1 signal circuit.



SBLAT6126L

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AT-65

Automatic Transaxle System





FIG.1) INPUT 150HZ → 224rpm FIG.2) INPUT 250HZ → 352rpm

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

5) Is "TURBINE SENSOR 1" signal value changed System performing to specification at this time. 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 TCM and check for proper operation. If the problem is corrected, replace TCM as necessary and go to "Verification of Vehicle Repair" procedure. VERIFICATION OF VEHICLE REPAIR 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

SBLAT6127L

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Automatic Transaxle System

P0717





SBLAT6120L

GENERAL DESCRIPTION

The Input Sensor of RXC Auto transmission is composed of S1(Sensor1) and S2(Sensor2). S1 inputs signal to TCM only at 4th gear and S2 does at 1st, 2nd, 3rd, 4th and 5th gear. Therefore, sensing pulse frequency outputted from 2 of signal, TCM calculates Inputshaft speed and compute Turbine rotation. This value is mainly used to control the optimum fluid pressure during shifting.

DTC DETECTING CONDITION

DTC DESCRIPTION

The TCM sets this code if an output pulse-signal is not detected, from the INPUT SPEED SENSOR 1 or 2, when the vehicle is running faster than 24.85MPH(40km/h). The Fail-Safe function will be set by the TCM if this code is detected.

TO DETECTING COL			
خودرو دtem خودرو	Detecting Condition	Possible cause	
DTC Strategy	Speed rationality check	Signal circuit is open or short	
Enable Conditions	 Battery voltage > 10V Output speed > 1000rpm Engine speed(Only current gear is the 1st gear) > 3 000 rpm Engine speed(2.3.4.5 gear) > 700 rpm Position lever = "D" 	 Sensor power circuit is open Sensor ground circuit is open Faulty INPUT SPEED SENSO R 1 Faulty TCM 	
Threshold value	• Input speed1 \leq 50rpm		
Diagnostic Time	More than 2sec		
Fail Safe	 "Input speed" is regarded as 600rpm(Nt = 600rpm) Shift prevention over 4th gear Prevention of manual shift Prevention of pressure adaptation 		

Automatic Transaxle System

Signal Waveform





FIG.1) 1GEAR FIG.2) 4 GEAR

Caution: TURBINE SENSOR 2 CAN BE DETECTED 5V IN FIG.1

SPECIFICATION

SBLAT6121L

NAME	PIN NO	Measurement condition	Spec	
Turbine Sensor1	ىامانە ⁶ (مسئ	 1gear 12.42MPH(20km/h) Idle SW OFF 	Approx. 1.1K(Hz)	
Turbine Sensor2	میرک ^ر ان خر	4gear 31MPH(50km/h) Idle SW OFF		

Scan tool data link cable is maintain to connecting condition.

Monitor Scantool Data

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- 3. Monitor the "INPUT SPEED SENSOR 1" parameter on the scantool.
- 4. Driving at speed of over 12.42MPH(20km/h) at 1gear.

Specification : Increasing Gradually

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Automatic Transaxle System

021 62 99 92 92



5. Does "INPUT SPEED SENSOR" follow the reference data?

YES

SBLAT6203L

Fault is intermittent caused by poor contact in the

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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

► Go to "Terminal & connector inspection" procedure.

TERMINAL & CONNECTOR INSPECTION

- 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.
- 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.

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Go to "Signal circuit inspection" procedure.

SIGNAL CIRCUIT INSPECTION

- 1. Ignition "ON" & Engine "OFF".
- 2. Disconnect the "C106-3" connector.
- 3. Measure voltage between terminal "6" of the C106-3 harness connector and chassis ground.

Specification : Approx. 5 V



1. TRANSMISSION RANGE SWITCH SW1 2. TRANSMISSION RANGE SWITCH SW2 3. TRANSMISSION RANGE SWITCH SW3 4. TRANSMISSION RANGE SWITCH SW4 6. TURBINE SENSOR 1

NO

- 7. TURBINE SENSOR 2
- 4. Is voltage within specifications?

YES

▶ Go to "Power supply circuit inspection" procedure.

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



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SBLAT6204L

AT-70

Automatic Transaxle System

If signal circuit in harness is OK, Go to "Check TCM" of the "Component Inspection" procedure.

Power supply circuit inspection

- 1. Remove "OIL PAN".
- 2. Ignition "ON", Engine "OFF".
- 3. Connect the "C106-3 and Shift CM" connector.
- 4. Measure resistance between terminal "4" of the TURBINE SENSOR harness connector and chassis ground.

Specification : approx. 12V



ـرکت دیجیتال خودرو سامانه (مسئولیت محدود)

5. Is voltage within specifications ?

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Go to "Ground circuit inspection" procedure.

NO

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

If power circuit in harness is OK, Substitute with a known-good Shift CM and check for proper operation. If the problem is corrected, replace Shift CM as necessary and go to "Verification of Vehicle Repair" procedure.

Ground circuit inspection

- 1. Remove "OIL PAN".
- 2. Engine "OFF".
- 3. Disconnect the "C106-3 and Shift CM" connector.
- 4. Measure resistance between terminal "3" of the INPUT SPEED SENSOR harness connector and chassis ground.

Specification : approx. 0Ω



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Automatic Transaxle System





5. Is resistance within specifications?

YES

► Go to "Component inspection" procedure.

NO

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

COMPONENT INSPECTION

- 1. Check "TURBINE SENSOR 2"
 - 1) Ignition "ON" & Engine "OFF".
 - 2) Connect the "C106-3" connector.
 - Measure Frequency between terminal "6" of the C106-3 harness connector and chassis ground.

Specification :

NAME	PIN NO	Measurement condition	Spec
Turbine Sensor1	6	 1gear 12.42MPH(20km/h) Idle SW OFF	Approx 1 1K(Hz)
Turbine Sensor2	7	 4gear 31MPH(50km/h) Idle SW OFF	

Scan tool data link cable is maintain to connecting condition.

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SBLAT6125L

SBLAT6205L

AT-72

Automatic Transaxle System



FIG.1) INPUT 150HZ \rightarrow 224rpm FIG.2) INPUT 250HZ \rightarrow 352rpm

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

SBLAT6127L

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5) Is "TURBINE SENSOR 1" 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

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"Verification of Vehicle Repair" procedure.

NO

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

VERIFICATION OF VEHICLE REPAIR

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

NO

► Go to the applicable troubleshooting procedure.

System performing to specification at this time.

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SBLAT6130L

AT-74

Automatic Transaxle System

P0721

COMPONENT LOCATION



GENERAL DESCRIPTION

The OUTPUT SPEED SENSOR outputs waveform signals according to the revolutions of the output shaft of the transmission. The Output Speed Sensor is installed in front of the Parking Gear to determine the Parking 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 DETECTING CONDITION IDSL 2.51

DTC DESCRIPTION

The TCM sets this code if the calculated value of the signals is noticeably different from the value calculated, using the Vehicle Speed Sensor output, when the vehicle is running faster than 18.6MPH(30km/h). The TCM will initiate the fail safe function if this code is detected.

Item	Detecting Condition	Possible cause
DTC Strategy	Speed rationality check	Signal circuit is open or short
Enable Conditions	 Vehicle speed ≥ 18.6MPH(30km/h) or engine speed > 3500 rpm (in case of failure at vehicle speed) A/T range switch is D range Throttle opening ≥12.5% 	 Sensor power circuit is open Sensor ground circuit is open Faulty OUTPUT SPEED SEN- SOR Faulty TCM
Threshold value	 output speed <5 pulse (Reference 18 pulses per 1 output revolution) 	
Diagnostic Time	more than 2sec	
Fail Safe	 Substitute for VSS. If Faulty in VSS, Locked into 4th gear (RETURN TO FAILSAFE: 5 < Vehicle speed < 20 SENSOR 1,2) 	

[GSL 3.3/3.8]

Item	Detecting Condition	Possible cause
DTC Strategy	Speed rationality check	Signal circuit is open or short
Enable Conditions	 Battery voltage > 10V Lever position = "D" Input speed > 1200 rpm Output speed > 3000 rpm 	 Sensor power circuit is open Sensor ground circuit is open Faulty OUTPUT SPEED SEN- SOR Faulty TCM
Threshold value	Output speed = 0 rpm	
Diagnostic Time	More than 4sec	
Fail Safe	 Shift prevention over 4th gear Prevention of manual shift Prevention of pressure adaptation Output speed from vehicle speed 	

Signal Waveform



FIG.1) LOW - SPEED FIG.2) HIGH - SPEED

SBLAT6131L

SPECIFICATION

NAME	PIN NO	Measurement condition	Spec
OUTPUT SPEED SENSOR	10	• 12.42MPH(20km/h)	Approx. 149(Hz)



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Automatic Transaxle System

Monitor Scantool Data

- 1. 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 5km/h.

Specification : Increasing Gradually



FIG.2) High-speed

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5. Does "OUTPUT SPEED SENSOR" follow the reference data?

► 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

► Go to "Terminal & connector inspection" procedure.

TERMINAL & CONNECTOR INSPECTION

- 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.

SIGNAL CIRCUIT INSPECTION

- 1. CHECK "OUTPUT SPEED SENSOR SIGNAL CIRCUIT 1"
 - 1) Ignition "ON" & Engine "OFF".
 - 2) Disconnect the "C06-1/C106-1" connector.
 - Measure voltage between terminal "10" of the C06-1/C106-1 harness connector and chassis ground.

Specification : approx. 5V

SBI AT61321



C06-1 [DSL 2.5] C106-1 [GSL 3.3/3.8]

1.VIGN-OUT 1 2.DATA BIT 1 3.PSB 2 4 PSC 2 5.SEL 1 6.SEL 2 7.SEL 3 8.GND 9.ATF 1 **10.OUTPUT SPEED SENSOR**

4) Is voltage within specifications? YES ▶ Go to "OUTPUT SPEED SENSOR SIGNAL CIRCUIT 2" as below. 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 "Component Inspection" procedure. 2. CHECK "OUTPUT SPEED SENSOR SIGNAL CIRCUIT 2" 2) Connect the "C06-1/C106-1" connector. 3) Ignition "ON" & Engine "OFF". 4) Disconnect the "OUTPUT SPEED SENSOR" connector. 5) Measure voltage between terminal "WHITE COLOR" of the OUTPUT SPEED SENSOR harness connector and chassis ground. Specification : approx. 5V (TRANSMISSION RANGE SWITCH SIDE)



SWITCH SIDE OUTPUT SPEED SENSOR



SBLAT6134L

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SBLAT6133L

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Automatic Transaxle System

6) Is voltage within specifications?

YES

► Go to "Power supply circuit inspection" procedure.

NO

► Check for open or short in harness(H-02[A]~TRANSMISSION RANGE SWITCH). Repair as necessary and Go to "Verification of Vehicle Repair" procedure.

If signal circuit in harness is OK, Replace "TRANSMISSION RANGE SWITCH" as necessary and Go to "Verification of Vehicle Repair" procedure.

Power supply circuit inspection

- 1. Remove "OIL PAN".
- 2. Connect the "C06-1/C106-1" connector.
- 3. Ignition "ON" & Engine "OFF".
- 4. Disconnect the "OUTPUT SPEED SENSOR" connector.
- Measure voltage between terminal "PINK COLOR" of the OUTPUT SPEED SENSOR harness connector and chassis ground.

Specification : approx. 12V



6. Is voltage within specifications?

YES

NO

► Go to "Ground circuit Inspection" procedure.

▶ Replace "TRANSMISSION RANGE SWITCH" as necessary and Go to "Verification of Vehicle Repair"

procedure.

Ground circuit inspection

- 1. Ignition "OFF" & Engine "OFF".
- 2. Remove "OIL PAN".
- 3. Connect the "C06-1/C106-1" connector.
- 4. Disconnect the "OUTPUT SPEED SENSOR" connector.

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Automatic Transaxle System

5. Measure resistance between terminal "BLACK COLOR" of the OUTPUT SPEED SENSOR harness connector and chassis ground.

Specification : approx. 0Ω

(TRANSMISSION RANGE SWITCH SIDE)



OUTPUT SPEED SENSOR CONNECTOR



6. Is resistance within specifications?

YES

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

NO

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

COMPONENT INSPECTION

CHECK TCM

- 1. Ignition "ON" & Engine "OFF".
- 2. Disconnect "C06-1/C106-1" connector.
- 3. Install scantool and slect a SIMU-SCAN.
- 4. Simulate frequency to OUTPUT SPEED SENSOR signal circuit.



FIG.1) INPUT 150HZ \rightarrow 480rpm FIG.2) INPUT 250HZ \rightarrow 800rpm

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

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

VERIFICATION OF VEHICLE REPAIR

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

SBLAT6137L

+ |

System performing to specification at this time.

Automatic Transaxle System

×

FIG.2)

VSS 1(A/T)

ENGINE SPEED

OUTPUT SPEED SNSR

FREQUENCY

METR SIML SLCT

TURBIN SPEED SENSOR

1.6 SIMU-SCAN

SIMULATION OF FREQUENCY

(CH B ONLY)

33

800

DUTY

50

_

%

FIX

km∕h

 $\mathbf{r}\mathbf{p}\mathbf{m}$

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P0731

COMPONENT LOCATION



SBLAT6210L

GENERAL DESCRIPTION

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 3.827, then the input speed is 3827 rpm.

DTC DETECTING CONDITION

DTC DESCRIPTION

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.

Item	Detecting Condition	Possible cause
DTC Strategy	1st gear incorrect ratio	 Faulty input speed sensor
Enable Conditions	 Engine speed > 600rpm 150rpm > Output speed < 6000rpm Lever Position = "D" Input speed > 600rpm A/T oil temp output ≥ -10°C Throttle opening > 15% The time after the last shift was finish > 1sec 	 Faulty output speed sensor Faulty inside transmission element
Threshold value	 Input speed - output speed × 1st gear ratio ≥20 0rpm 	
Diagnostic Time	More than 1sec	
Fail Safe	4th gear Limp-Home mode	

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Automatic Transaxle System

SIGNAL WAVEFORM



A : INPUT SPEED SENSOR

B : OUTPUT SPEED SENSOR

MONITOR SCANTOOL DATA

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- 3. Monitor the "ENGINE SPEED, INPUT SPEED SENSOR, OUTPUT SPEED SENSOR, GEAR POSITION" parameter on the scantool.

سامانه د

4. Perform the "STALL TEST" with gear position "1"

Specification : 2300 \pm 200 engine rpm 1.11 CURRENT DATA 01/59 4 × ENGINE SPEED 2233 rpm X INPUT SPEED(PG-A) 0.0 rpm ×|OUTPUT SPEED(PG-B) 0.0 rpm × CURRENT GEAR POSITION 1 GEAR × SELECTED LEVER RANGE D ACC ON FLAG SPORTS MODE SWITCH SPORTS MODE UP SW Ŧ PART FULL HELP GRPH RCRD FIX

SBLAT6211L



SBLAT6212L

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SBLAT6213L

Automatic Transaxle System

OPERATING ELEMENT OF EACH SHIFTING RANGE

Shifting	Position	Input clutch	High&Low Reverse Clutch	Direct clutch	Reverse Brake	Front Brake	Low Coast Brake	Forward Brake	1st OwnWayClutch	Forward OwnWayClutch	3rd OwnWayClutch
	Р										
	R		•								
	N						*				
	1st gear		*								
	2nd gear										
D	3rd gear		•						•		
	4th gear		•						•		
	5th gear										•

: WORKING.

: PARTICIPATE IN DELIVERY TORQUE WHEN COAST DRIVING.

▲ : SUPPLING OIL PRESSURE TO ELEMENT, BUT NOT EFFECT ON OUTPUT.

★: TEMPORARY WORKING.

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, all slippage occurs in the torque converter.
- Therefore, engine revolution is output, but input and output speed revolution must be "zero" due to wheel's lock.
- 3. If 1st gear operating parts have faults, input speed revolution will be out of specification.
- 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.

• 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 °F~ 212 °F (80~100 °C).
- Engine coolant temperature : 176 °F~ 212 °F (80~100 °C).
- Chock both rear wheels(left and right).
- Pull the parking brake lever on with the brake pedal fully depressed.
- The throttle should not be left fully open for 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 rpm to let the A/T fluid cool down before carrying out subsequent tests.

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 1st gear.

Specification : INPUT SPEED - (OUTPUT SPEED \times 1st GEAR RATIO) \leq 200 RPM

SBLAT6214L

Automatic Transaxle System

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	1.11 CURRENT DATA 01/2	59
×	ENGINE SPEED 2044 rpm	-
×	INPUT SPEED(PG-A) 2050.rpm	
×	TURBIN SPEED SENDOR 1 0.0 rpm	
×	TURBIN SPEED SENDOR 2 2070.rpm	
×	OUTPUT SPEED(PG-B) 544.0rpm	
×	CURRENT GEAR POSITION 1 GEAR	
×	SELECTED LEVER RANGE D	
	INHIBITOR SWITCH 1	
		Ŧ
	FIX PART FULL HELP GRPH BCRD	1

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

YES

NO

► 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

- اولين سامانه ديجيتال تعمير كاران خود.Connect Scantool
- 2. Engine "ON".
- 3. Monitor the "OIL PRESSURE. S/W 1,2,3,5,6" parameter on the scantool.
- 4. Move select lever to "D" range and operate vehicle within 1st gear condition.

Chiff r	agition	Oil Pressure Switch							
Shirt p	DOSITION	I/C(SW3)	H&LR/C(SW6)	H&LR/C(SW6)	FR/B(SW1)	LC/B(SW2)			
Р		X	0	х	0	х			
R		X	0	х	0	х			
Ν		X	X O		0	х			
	1st gear	Х	Х	х	0	х			
	2nd gear	X	Х	0	0	х			
D	3rd gear	X	0	0	0	х			
	4th gear	0	0	0	Х	х			
	5th gear	0	0	Х	0	Х			



	1.11 CURRENT DATA 33/	′59
×	CURRENT GEAR POSITION 1 GEAR	0
×	OIL PRESS.SW-2(LC/B) ON	
×	OIL PRESS.SW-5(D/C) OFF	
×	OIL PRESS.SW-3(I/C) OFF	
×	OIL PRESS.SW-1(Fr/B) ON	
×	OIL PRESS.SW-6(H&LR/C) ON	
×	SELECTED LEVER RANGE D	
	INHIBITOR SWITCH 1	
		Ŧ
	FIX PART FULL HELP GRPH RCRI)

5. Does "OIL PRESSURE. S/W 1,2,3,5,6 " follow the reference data?

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

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.



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SBLAT6216L

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Automatic Transaxle System

P0732

COMPONENT LOCATION



SBLAT6210L

GENERAL DESCRIPTION

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 2.368, then the input speed is 2368 rpm.

DTC DETECTING CONDITION

DTC DESCRIPTION

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.

Item	Detecting Condition	Possible cause
DTC Strategy	2nd gear incorrect ratio	 Faulty input speed sensor
Enable Conditions	 Engine speed > 600rpm 150rpm > Output speed < 6000rpm Lever Position = "D" Input speed > 600rpm A/T oil temp output ≥ -10°C Throttle opening > 15% The time after the last shift was finish > 1sec 	 Faulty output speed sensor Faulty inside transmission element
Threshold value	 Input speed - output speed × 2nd gear ratio ≥20 Orpm 	
Diagnostic Time	More than 1sec	
Fail Safe	4th gear Limp-Home mode	

SIGNAL WAVEFORM



A : INPUT SPEED SENSOR

B : OUTPUT SPEED SENSOR

MONITOR SCANTOOL DATA

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

Spec	Specification : 2300 ± 200 engine rpm									
	Ċ	1.11 CURRENT	DATA	01/59						
	× ×	ENGINE SPEED INPUT SPEED(PG-A)	2222 r 0.0 r	.bw .bw						
	×	OUTPUT SPEED(PG-B) CURRENT GEAR POSITION	0.0 r 2 GEAI	·pm						
	×	SELECTED LEVER RANGE INHIBITOR SWITCH 1 INHIBITOR SWITCH 2	D							
		INHIBITOR SWITCH 3		T						
		FIX PART FULL HELF	GRPH	RCRD						

SBLAT6221L



SBLAT6222L

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SBLAT6213L

AT-88

Automatic Transaxle System

OPERATING ELEMENT OF EACH SHIFTING RANGE

Shifting	Position	Input clutch	High&Low Reverse Clutch	Direct clutch	Reverse Brake	Front Brake	Low Coast Brake	Forward Brake	1st OwnWayClutch	Forward OwnWayClutch	3rd OwnWayClutch
	Р										
	R		•								
	N						*				
	1st gear		*								
	2nd gear										
D	3rd gear		•						•		
	4th gear		•						•		
	5th gear		•						•		•

: WORKING.

: PARTICIPATE IN DELIVERY TORQUE WHEN COAST DRIVING.

▲ : SUPPLING OIL PRESSURE TO ELEMENT, BUT NOT EFFECT ON OUTPUT.

★: TEMPORARY WORKING.

Stall test procedure in D2 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 2nd gear operating parts can be detected by stall test in D2

Reason for stall test

- 1. If there is no mechanical defaults in A/T, all slippage occurs in the torque converter.
- Therefore, engine revolution is output, but input and output speed revolution must be "zero" due to wheel's lock.
- 3. If 2nd gear operating parts have 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.
- 5. Is "STALL TEST " within specification?

YES

► Go to "Signal Circuit Inspection" procedure.

NO

▶ Go to "Component inspection" procedure.

• 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 °F~ 212 °F (80~100 °C).
- Engine coolant temperature : 176 °F~ 212 °F (80~100 °C).
- Chock both rear wheels(left and right).
- Pull the parking brake lever on with the brake pedal fully depressed.
- The throttle should not be left fully open for 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 rpm to let the A/T fluid cool down before carrying out subsequent tests.

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 2nd gear.

Specification : INPUT SPEED - (OUTPUT SPEED \times 2nd GEAR RATIO) \leq 200 RPM

	1.11 CURRENT DATA 01/3	59
⋇	ENGINE SPEED 1975 rpm	
×	INPUT SPEED(PG-A) 1953.rpm	
×	TURBIN SPEED SENDOR 1 0.0 rpm	
×	TURBIN SPEED SENDOR 2 1939.rpm	
×	OUTPUT SPEED(PG-B) 817.0rpm	
×	CURRENT GEAR POSITION 2 GEAR	
×	SELECTED LEVER RANGE D	
	INHIBITOR SWITCH 1	
		Ŧ
	FIX PART FULL HELP GRPH BCRD]

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

YES

NO

► 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

- اولین سامانه دیجیتال تعمیر کاران خود.Connect Scantool
- 2. Engine "ON".
- 3. Monitor the "OIL PRESSURE. S/W 1,2,3,5,6" parameter on the scantool.
- 4. Move select lever to "D" range and operate vehicle within 2nd gear condition.

Chiff.	nacition	Oil Pressure Switch				
Shint	Shift position		H & LR/C(SW6)	H&LR/C(SW6)	FR/B(SW1)	LC/B(SW2)
	Р	x	0	х	0	x
	R	x	0	х	0	Х
Ν		x	0	х	0	Х
	1st gear	X	X	х	0	Х
	2nd gear	X	X	0	0	Х
D	3rd gear	X	0	0	0	Х
	4th gear	0	0	0	Х	Х
	5th gear	0	0	х	0	Х
				· · · · · · · · · · · · · · · · · · ·		

PR" within





SBLAT6224L

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AT-90

	1.11 CURRENT DATA	33/5	59
			1
×	CURRENT GEAR POSITION 2 GEAR		
×	OIL PRESS.SW-2(LC/B) ON	- 1	
×	OIL PRESS.SW-5(D/C) ON	- 1	
×	OIL PRESS.SW-3(I/C) OFF	- 1	
×	OIL PRESS.SW-1(Fr/B) ON		
×	OIL PRESS.SW-6(H&LR/C) OFF		
×	SELECTED LEVER RANGE D		
	INHIBITOR SWITCH 1		
			Ŧ
	FIX PART FULL HELP GRPH R	CRD	

SBLAT6226L

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

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.



System performing to specification at this time.



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AT-91

P0733

COMPONENT LOCATION



SBLAT6210L

GENERAL DESCRIPTION

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 1.520, then the input speed is 1520 rpm.

DTC DETECTING CONDITION

DTC DESCRIPTION

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.

Item	Detecting Condition	Possible cause
DTC Strategy	3rd gear incorrect ratio	 Faulty input speed sensor
Enable Conditions	 Engine speed > 600rpm 150rpm > Output speed < 6000rpm Lever Position = "D" Input speed > 600rpm A/T oil temp output ≥ -10°C Throttle opening > 15% The time after the last shift was finish > 1sec 	 Faulty output speed sensor Faulty inside transmission element
Threshold value	 Input speed - output speed × 3rd gear ratio ≥20 Orpm 	
Diagnostic Time	More than 1sec	
Fail Safe	4th gear Limp-Home mode	

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Automatic Transaxle System

SIGNAL WAVEFORM



A : INPUT SPEED SENSOR

B : OUTPUT SPEED SENSOR

SIGNAL CIRCUIT INSPECTION

- 1. Connect Scantool.
- 2. Engine "ON".
- 3. Monitor the "INPUT & OUTPUT SPEED SENSOR" parameter on the scantool.

- SBLAT6231L
- 4. Accelerate the Engine speed until about 2000 rpm in the 3rd gear.

Specification : INPUT SPEED - (OUTPUT SPEED \times 3rd GEAR RATIO) \leq 200 RPM



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

YES

► 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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COMPONENT INSPECTION

- 1. Connect Scantool.
- 2. Engine "ON".

- 3. Monitor the "OIL PRESSURE. S/W 1,2,3,5,6" parameter on the scantool.
- 4. Move select lever to "D" range and operate vehicle within 3rd gear condition.

Shift position		Oil Pressure Switch						
		I/C(SW3)	H & LR/C(SW6)	H&LR/C(SW6)	FR/B(SW1)	LC/B(SW2)		
F	D	X	0	Х	0	х		
F	र	Х	0	х	0	Х		
Ν		X	0	Х	0	х		
	1st gear	X	Х	Х	0	х		
	2nd gear	X	Х	0	0	х		
D	3rd gear	X	0	0	0	х		
	4th gear	0	0	0	Х	Х		
	5th gear	0	0	Х	0	Х		



SBLAT6233L

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

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.

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Automatic Transaxle System

P0734

COMPONENT LOCATION



SBLAT6210L

GENERAL DESCRIPTION

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 1.000, then the input speed is 1000 rpm.

DTC DETECTING CONDITION

DTC DESCRIPTION

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.

Item	Detecting Condition	Possible cause
DTC Strategy	4th gear incorrect ratio	 Faulty input speed sensor
Enable Conditions	 Engine speed > 600rpm 150rpm > Output speed < 6000rpm Lever Position = "D" Input speed > 600rpm A/T oil temp output ≥ -10°C Throttle opening > 15% The time after the last shift was finish > 1sec 	 Faulty output speed sensor Faulty inside transmission element
Threshold value	 Input speed - output speed × 4th gear ratio ≥20 0rpm 	
Diagnostic Time	More than 1sec	
Fail Safe	4th gear Limp-Home mode	

SIGNAL WAVEFORM



SBLAT6242L

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AT-95

SBLAT6213L

AT-96

Automatic Transaxle System

OPERATING ELEMENT OF EACH SHIFTING RANGE

Shifting	Position	Input clutch	High&Low Reverse Clutch	Direct clutch	Reverse Brake	Front Brake	Low Coast Brake	Forward Brake	1st OwnWayClutch	Forward OwnWayClutch	3rd OwnWayClutch
	Р										
	R		•								
	N						*				
	1st gear		*								
	2nd gear										
D	3rd gear		•						•		
	4th gear		•						•		
	5th gear										

: WORKING.

: PARTICIPATE IN DELIVERY TORQUE WHEN COAST DRIVING.

▲ : SUPPLING OIL PRESSURE TO ELEMENT, BUT NOT EFFECT ON OUTPUT.

★: TEMPORARY WORKING.

Stall test procedure in D4 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 4th gear operating parts can be detected by stall test in D4

Reason for stall test

- 1. If there is no mechanical defaults in A/T, all slippage occurs in the torque converter.
- 2. Therefore, engine revolution is output, but input and output speed revolution must be "zero" due to wheel's lock.
- 3. If 4th gear operating parts have 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?

YES

Go to "Signal Circuit Inspection" procedure.
 NO

► Go to "Component inspection" procedure.

• 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 $^\circ\text{F}{\sim}$ 212 $^\circ\text{F}$ (80 ${\sim}100$ $^\circ\text{C}).$
- Engine coolant temperature : 176 °F~ 212 °F (80~100 °C).
- Chock both rear wheels(left and right).

• Pull the parking brake lever on with the brake pedal fully depressed.

• The throttle should not be left fully open for 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 rpm to let the A/T fluid cool down before carrying out subsequent tests.

021 62 99 92 92

Automatic Transaxle System

AT-97

SIGNAL CIRCUIT INSPECTION

- 1. Connect Scantool.
- 2. Engine "ON".
- 3. Monitor the "INPUT & OUTPUT SPEED SENSOR" parameter on the scantool.



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

YES

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. 4. Accelerate the Engine speed until about 2000 rpm in the 4th gear.

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

SBLAT6244L

COMPONENT INSPECTION

- 1. Connect Scantool.
- 2. Engine "ON".
- 3. Monitor the "OIL PRESSURE. S/W 1,2,3,5,6"
- parameter on the scantool.
- 4. Move select lever to "D" range and operate vehicle within 4th gear condition.

Shift position		Oil Pressure Switch						
Shift	position	I/C(SW3)	H & LR/C(SW6)	H&LR/C(SW6)	FR/B(SW1)	LC/B(SW2)		
I	P	x	0	х	0	х		
I	R	x	0	х	0	х		
Ν		X	0	х	0	х		
	1st gear	x	X	х	0	х		
	2nd gear	x	X	0	0	х		
D	3rd gear	x	0	0	0	х		
	4th gear	0	0	0	Х	×		
	5th gear	0	0	X	0	×		

	1.11 CURBENT DATA	33/59
×	CURRENT GEAR POSITION 4 GEAR	
×	OIL PRESS.SW-2(LC/B) OFF	
×	OIL PRESS.SW-5(D/C) ON	
×	OIL PRESS.SW-3(I/C) ON	
×	OIL PRESS.SW-1(Fr/B) OFF	
×	OIL PRESS.SW-6(H&LR/C) ON	
⋇	SELECTED LEVER RANGE D	
	INHIBITOR SWITCH 1	
		T
	FIX PART FULL HELP GRPH R	CRD

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.

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Automatic Transaxle System

SBLAT6246L

VERIFICATION OF VEHICLE REPAIR

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

NO

- Go to the applicable troubleshooting procedure.
- System performing to specification at this time.

AT-99

P0735

COMPONENT LOCATION



SBLAT6210L

GENERAL DESCRIPTION

The value of the input shaft speed should be equal to the value of the output shaft speed, when multiplied by the 5th gear ratio, while the transaxle is engaged in the 5th gear. For example, if the output speed is 1,000 rpm and the 5th gear ratio is 0.834, then the input speed is 834 rpm.

DTC DETECTING CONDITION

DTC DESCRIPTION

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 5th gear ratio, while the transaxle is engaged in 5th gear. This malfunction is mainly caused by mechanical troubles such as control valve sticking or solenoid valve malfunctioning rather than an electrical issue.

ltem	Detecting Condition	Possible cause
DTC Strategy	5th gear incorrect ratio	 Faulty input speed sensor
Enable Conditions	 Engine speed > 600rpm 150rpm > Output speed < 6000rpm Lever Position = "D" Input speed > 600rpm A/T oil temp output ≥ -10°C Throttle opening > 15% The time after the last shift was finish > 1sec 	 Faulty output speed sensor Faulty inside transmission element
Threshold value	 Input speed - output speed × 5th gear ratio ≥20 0rpm 	
Diagnostic Time	More than 1sec	
Fail Safe	4th gear Limp-Home mode	

Automatic Transaxle System

SIGNAL WAVEFORM



A : INPUT SPEED SENSOR

B : OUTPUT SPEED SENSOR

SIGNAL CIRCUIT INSPECTION

- 1. Connect Scantool.
- 2. Engine "ON".
- 3. Monitor the "INPUT & OUTPUT SPEED SENSOR" parameter on the scantool.

- SBLAT6251L
- 4. Accelerate the Engine speed until about 2000 rpm in the 5th gear.

Specification : INPUT SPEED - (OUTPUT SPEED \times 5th GEAR RATIO) \leq 200 RPM



SBLAT6252L

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

YES

► 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.

Automatic Transaxle System

COMPONENT INSPECTION

- 1. Connect Scantool.
- 2. Engine "ON".

- 3. Monitor the "OIL PRESSURE. S/W 1,2,3,5,6" parameter on the scantool.
- 4. Move select lever to "D" range and operate vehicle within 5th gear condition.

Shift position		Oil Pressure Switch						
		I/C(SW3)	H & LR/C(SW6)	H&LR/C(SW6)	FR/B(SW1)	LC/B(SW2)		
	P	X	0	Х	0	х		
R		X	0	Х	0	х		
Ν		x	0	Х	0	х		
	1st gear	x	X	Х	0	Х		
	2nd gear	x	X	0	0	Х		
D	3rd gear	x	0	0	0	х		
	4th gear	0	0	0	Х	х		
	5th gear	0	0	Х	0	Х		



SBLAT6253L

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

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.

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Automatic Transaxle System

P0741

COMPONENT LOCATION





SBLAT6140L

GENERAL DESCRIPTION

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 TCM outputs duty pulses to control the Damper Clutch Control Solenoid Valve(DCCSV) and hydraulic pressure is applied to 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 current is from 0.05A(unlocked) to 0.75A(locked).

DTC DESCRIPTION

The PCM/TCM increases the duty ratio to engage the Damper Clutch by monitoring slip rpms (difference vlaue beteween engine speed and turbine speed).

To decrease the slip of the Damper Clutch, the 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.

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Automatic Transaxle System

DTC DETECTING CONDITION

[DSL 2.5]

Item		Detecting Condition	Possible cause
DTC St	rategy	Stuck "OFF"	* TORQUE CONVERTE (DAMP-
Enable C -	case1	 Vehicle speed ≥ 6.2MPH(10km/h) Engine speed > 305 rpm A/T range switch is D range 68°F≤ A/T flued temperature≤212°F 	 ER) CLUTCH : TCC Faulty TCC or oil pressure system Faulty TCC solenoid valve
onditions case2	 Vehicle speed ≥ 6.2MPH(10km/h) Engine speed > 305 rpm A/T range switch is D range 68°F≤ A/T flued temperature ≤ 212°F 	 Faulty body control valve Faulty TCM 	
Threshol-	case1	 Calculated slip (engine speed-input speed) > 40rpm+Vsp1/2 at 5th gear full lock up 	
d Value	case2	 Calculated slip (engine speed-input speed) ≥Target slip speed+65rpm at 4th, 5th gear slip lock up 	
Diagnos	stic Time	more than 30sec	
Fail Safe		 Lock-up control is prohibited Slip lock-up control is prohibited 	0

[GSL 3.3/3.8]

GSL 3.3/3.8]		
Item	Detecting Condition	Possible cause
DTC Strategy	• Stuck "OFF" Stuck "OFF"	* TORQUE CONVERTER(DAM-
Enable Conditions	 Duty of "Damper clutch solenoid valve" = 100% Input speed > 0rpm 	PER) CLUTCH : TCC Faulty TCC or oil pressure sys-
Threshold value	 Calculated slip (engine speed-input speed) > 100rp- m 	 Faulty TCC solenoid valve Faulty body control valve
Diagnostic Time	More than 5sec	• Faulty TCM
Fail Safe	Damper clutch "OFF"	

AT-104

Automatic Transaxle System

Monitor Scantool Data

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- 3. Select "D RANGE" and drive vehicle 5 gear.
- 4. Monitor the "TORQUE CONVERTER(DAMPER) CLUTCH" parameter on the scantool .

Specification :

[DSL 2.5] TCC SLIP < 40RPM+ Vsp1/2(In condition that LU(TCC) SOL. current > 6.5A) [GSL 3.3/3.8] Calculated slip (engine speed-input speed) < 100rpm



FIG.1): Non-operating Lock-up Clutch

FIG.2) : Operating Lock-up Clutch

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SBLAT6141L

Automatic Transaxle System

[GSL 3.3/3.8]

	1.11 CURRENT DATA 8	9/59	1.11 CURRENT DATA 09/59
		▲	
×	ENGINE SPEED 721 rpm		× ENGINE SPEED 895 rpm
×	INPUT SPEED(PG-A) 701.0rpm		× INPUT SPEED(PG-A) 840.0rpm
×	TCC SLIP RPM 8.0 rpm		× TCC SLIP RPM 53.0 rpm
×	TCCSV(LU) 0.0 %		* TCCSV(LU) 0.0 %
×	TCCSV CURRENT(LU) 48.0 mA		* TCCSV CURRENT(LU) 48.0 mA
×	TCCSV PRESSURE(LU) -43.5psi		× TCCSV PRESSURE(LU) -43.5psi
×	CURRENT GEAR POSITION P N		× CURRENT GEAR POSITION REVERSE
×	SELECTED LEVER BANGE N		× SELECTED LEVER RANGE R
		T	
	FIX PART FULL HELP GRPH RC	RD	FIX PART FULL HELP GRPH RCRD
F	IG.1)		FIG.2)
	1.11 CURRENT DATA P	9/59	1 11 CHERENT DATA 09/59
×	ENGINE SPEED 1039 rpm		× ENGINE SPEED 1668 rpm
×	INPUT SPEED(PG-A) 1021.rpm		× INPUT SPEED(PG-A) 1642.rpm
×	TCC SLIP RPM 33.0 rpm		* TCC SLIP RPM 16.0 rpm
×	TCCSV(LU) 0.0 %		* TCCSV(LU) 8.8 %
×	TCCSV CURRENT(LU) 48.0 mA		* TCCSV CURRENT(LU) 48.0 mA
×	TCCSV PRESSURE(LU) -43.5psi		× TCCSV PRESSURE(LU) -43.5psi
×	CURRENT GEAR POSITION 1 GEAR		× CURRENT GEAR POSITION 2 GEAR
×	SELECTED LEVER RANGE D		* SELECTED LEVER RANGE D
		T	T
	FIX PART FULL HELP GRPH RC	RD	FIX PART FULL HELP GRPH RCRD
F	IG.3)		FIG.4)
	1.11 CURRENT DATA	9/59	1.11 CURRENT DATA 09/59
		4	
×	ENGINE SPEED 2335 rpr		* ENGINE SPEED 2293 rpm
×	INPUT SPEED(PG-A) 2325. rps		* INPUT SPEED(PG-A) 2304.rpm
×	TCC SLIP RPM 20.0 rpm	ں حودرو 🟎	* TCC SLIP RPM 0.0 rpm
×	TCCSV(LU) 0.0 %		* TCCSV(LU) 38.4 %
×	TCCSV CURRENT(LU) 48.0 mA		* TCCSV CURRENT(LU) 388.0mA
×	TCCSV PRESSURE(LU) -43.5psi	si llina.	* TCCSV PRESSURE(LU) 5.8 psi
×	CURRENT GEAR POSITION 3 GEAR		CURRENT GEAR POSITION 4 GEAR
×	SELECTED LEVER RANGE D		* SELECTED LEVER BANGE D
L		T T	
	TTA [PHRT] FULL [HELP] [GRPH] [RO	RD	FIN PART FULL HELP GRPH RCRD
F	IG.5)		FIG.6)
	1.11 CURRENT DATA @	9/59	
		4	
×	ENGINE SPEED 2352 rpr		EIG 1) "DN" range
×	INPUT SPEED(PG-A) 2353.rpr	_ •	
×	TCC SLIP RPM 0.0 rpr		FIG.2) "H" range
×	TCCSV(LU) 42.0 %		FIG.3) "D" range 1st gear
×	TCCSV CURRENT(LU) 400.0nA		FIG.4) "D" range 2nd gear
	TCCSV PRESSURE(LU) 10.1 psi		FIG.5) "D" range 3rd gear
×	CURRENT GEAR POSITION 5 GEAR		FIG 6) "D" range 4th gear
1.01	SELECTED LEVER RANGE D		FIG.0) D Tange 411 year
×			
×		RD	FIG.7) "D" range 5th gear
×	FIX PART FULL HELP GRPH RC	RD	FIG.7) "D" range 5th gear

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AT-106

Automatic Transaxle System

5. Is "TCC SLIP(DAMPER CLUTCH SL.RPM)" within specifications?

YES

▶ 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

Go to "Component Inspection" procedure.



C06-2 [DSL 2.5] C106-2 [GSL 3.3/3.8] Component side





TORQUE CONVERTER Repair 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.

COMPONENT INSPECTION

- 1. Disconnect "C06-2/C106-2" connector.
- 2. Ignition "OFF".
- 3. Measure resistance between terminal "9" of the C06-2/C106-2 harness connector and chassis ground.

Specification : approx. 3~9Ω

1.ATF 2 2.LOW COAST BRAKE SOLENOID VALVE 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 4.DIRECT CLUTCH SOLENOID VALVE 6.FRONT BRAKE SOLENOID VALVE 7.INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV

SBLAT6142L

VERIFICATION OF VEHICLE REPAIR

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.

P0743

COMPONENT LOCATION



GENERAL DESCRIPTION

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 TCM outputs duty pulses to control the Damper Clutch Control Solenoid Valve(DCCSV) and hydraulic pressure is applied to 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 current is from 0.05A(unlocked) to 0.75A(locked).

DTC DESCRIPTION

The 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 TCM judges that the DCCSV circuit is malfunctioning and sets this code.

DTC DETECTING CONDITION

[DSL 2.5]

Item	Detecting Condition	Possible cause
DTC Strategy	Check voltage range	* TORQUE CONVERTER(DAM-
Enable Conditions	CONTINUOUS	PER) CLUTCH : TCC Open or short in circuit
Threshold value	 Ground short/open :Monitoring value[current]≤ 0.05A, When the driver output ≥ 0.49A B+ short : Monitoring value[current]≤ 0.4A, When the driver output ≥ 0.75A 	 Faulty TCC SOLENOID VALVE Faulty PCM/TCM
Diagnostic Time	More than 5sec	
Fail Safe	Lock-up control is prohibited(L/U off)	

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AT-108

Automatic Transaxle System

[GSL 3.3/3.8]

Item	Detecting Condition	Possible cause
DTC Strategy	Check voltage range	* TORQUE CONVERTER(DAM-
Enable Conditions	 10V < Actuator power supply voltage < 16V 	PER) CLUTCH : TCC Open or short in circuit
Threshold value	Hardware "IC" check	Faulty TCC SOLENOID VALVE
Diagnostic Time	More than 0.2sec	Faulty PCM/TCM
Fail Safe	Lock-up control is prohibited(L/U off)	

MONITOR SCANTOOL DATA

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- 3. Monitor the "TCC SOL. VALVE" parameter on the scantool.
- 4. Select "D RANGE" and Operate the vehicle 5 gear.
- 5. Check "TCC SOL. VALVE" parameter value changes while driving.



	1.3 CURRENT DATA	A	61/26	
×	TURBIN SPEED SENSOR	2720 rj	pm 🔳	
×	ENGINE SPEED	2720 rj	pm	
ж	DAMPER CLUTCH SL.RPM	0 r)	pm	
×	LU SOL. OUTPUT	0.45 A		
×	LU SOL. MONITOR	0.57 A		
×	CURRENT GEAR POS.	4 GI	EAR	
ж	SHIFT RANGE INDICATOR			
-	SELECTED LEVER RANGE			
			- 	
	FIX PART FULL HELP	GRPH]	RCRD	
FIC	ā.2)			

FIG.1) Not engagement status of TCC FIG.2) Engagement status of TCC

6. 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

SBLAT6151L

► Go to "Terminal & connector inspection " procedure.

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AT-109

Automatic Transaxle System

TERMINAL & CONNECTOR INSPECTION

- 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 then go to "Verification of vehicle repair" procedure.



► Go to "Signal circuit Inspection" procedure.

C06-2 [DSL 2.5] C106-2 [GSL 3.3/3.8] 1.ATF 2 5 4 3 2 1 2.LOW COAST BRAKE SOLENOID VALVE 10 9 8 7 6 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 4.DIRECT CLUTCH SOLENOID VALVE 6.FRONT BRAKE SOLENOID VALVE 7. INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV SBLAT6152L

Is voltage within specifications?
 YES

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

SIGNAL CIRCUIT INSPECTION

- 1. Disconnect "C06-2/C106-2" connector.
- 2. IGNITION "ON", ENGINE "OFF".
- Measure voltage between terminal "9" of the C06-2/C106-2 harness connector and chassis ground.

Specification : approx. 5V
AT-110

COMPONENT INSPECTION

- 1. Disconnect "C06-2/C106-2" connector.
- 2. Ignition "OFF".

YES

connection.

NO

procedure.

Repair" procedure.

Automatic Transaxle System

3. Measure resistance between terminal "9" of the C06-2/C106-2 harness connector and chassis ground.

Specification : approx. $3 \sim 9\Omega$



C06-2 [DSL 2.5] C106-2 [GSL 3.3/3.8] Component side



4. Is resistance within specifications?

bending,



1.ATF 2 2.LOW COAST BRAKE SOLENOID VALVE 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 4.DIRECT CLUTCH SOLENOID VALVE 6.FRONT BRAKE SOLENOID VALVE 7.INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV

SBLAT6142L

VERIFICATION OF VEHICLE REPAIR

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

NO

- Go to the applicable troubleshooting procedure.
- If signal circuit in harness is OK, Replace "TCC SOLENOID VALVE" as necessary and Go to "Verification of Vehicle Repair" procedure.

Thoroughly check connectors for looseness, poor

deterioration, or damage. Repair or replace as

necessary and then go to "Verification of Vehicle

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

corrosion,

contamination.

System performing to specification at this time.

Automatic Transaxle System

P0748

COMPONENT LOCATION



GENERAL DESCRIPTION

The line pressure solenoid valve regulates the oil pump discharge pressure to suit the driving condition in response to a signal sent from the TCM. The line pressure duty cycle valve is not consistent when the closed throttle position signal is "ON".

DTC DESCRIPTION

To confirm the line pressure duty cycle at low pressure, the accelerator (throttle) should be open until the closed throttle position signal is "OFF".

DTC DETECTING CONDITION

[DSL 2.5]

Item	Detecting Condition	Possible cause
DTC Strategy	Check voltage range	* PRESSURE CONTROL SOLE-
Enable Conditions	CONTINUOUS	NOID VALVE(LINE PRESSURE :
Threshold value	 Ground short/open : Monitoring value[current] ≤ 0.05 A, When the driver output ≥ 0.49A B+ short : Monitoring value[current] ≤ 0.4A, When the e driver output ≥ 0.75A 	 Open or short in circuit Faulty PCSV Faulty TCM
Diagnostic Time	More than 5sec	
Fail Safe	5 gear is prohibited.(L/U off)Sports mode is prohibited.	

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021 62 99 92 92

AT-112

Automatic Transaxle System

[GSL 3.3/3.8]

Item	Detecting Condition	Possible cause
DTC Strategy	Check voltage range	* PRESSURE CONTROL SOLE-
Enable Conditions	 10V < Actuator power supply voltage < 16V 	NOID VALVE(LINE PRESSURE :
Threshold value	Hardware "IC" check	Open or short in circuit
Diagnostic Time	More than 0.2sec	Faulty PCSV Faulty TCM
Fail Safe	Lock-up control is prohibited(L/U off)	

Signal Waveform



FIG.1) N RANGE FIG.2) N \rightarrow D (Low pressure control) FIG.3) STALL TEST(High pressure control)

SBLAT6155L

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Automatic Transaxle System

MONITOR SCANTOOL DATA

- 1. Connect scantool to data link connector(DLC)
- 2. Engine "ON".
- 3. Monitor the "PCSV" parameter on the scantool.



4. Select "D RANGE" and Operate the vehicle.

5. Check "PCSV" parameter value changes while driving.

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Automatic Transaxle System

Does "PCSV DUTY " follow the reference data?
 YES

► 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

► Go to "Terminal & connector inspection procedure.

TERMINAL & CONNECTOR INSPECTION

- 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.
- Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.
- 3. Has a problem been found?

YES

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

NO

► Go to "Signal circuit Inspection" procedure.

SIGNAL CIRCUIT INSPECTION

- 1. Disconnect "C06-2/C106-2" connector.
- 2. IGNITION "ON", ENGINE "OFF"
- Measure voltage between terminal "8" of the C06-2/C106-2 harness connector and chassis ground.

Specification : approx. 5V



1.ATF 2 2.LOW COAST BRAKE SOLENOID VALVE 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 4.DIRECT CLUTCH SOLENOID VALVE 6.FRONT BRAKE SOLENOID VALVE 7.INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV

SBLAT6157L

4. Is voltage within specifications?

YES

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

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Automatic Transaxle System

COMPONENT INSPECTION

- 1. Disconnect "C06-2/C106-2" connector.
- 2. Ignition "OFF".

YES

connection.

NO

procedure.

Repair" procedure.

3. Measure resistance between terminal "8" of the C06-2/C106-2 harness connector and chassis ground.

Specification : approx. $3 \sim 9\Omega$



4. Is resistance within specifications?

bending,

C06-2 [DSL 2.5] C106-2 [GSL 3.3/3.8] Component side



contamination.

1.ATF 2 2.LOW COAST BRAKE SOLENOID VALVE 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 4.DIRECT CLUTCH SOLENOID VALVE 6.FRONT BRAKE SOLENOID VALVE 7.INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV

SBLAT6158L

VERIFICATION OF VEHICLE REPAIR

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.
- If signal circuit in harness is OK, Replace "PRESSURE CONTROL SOLENOID VALVE" as necessary and Go to "Verification of Vehicle Repair" procedure.

Thoroughly check connectors for looseness, poor

deterioration, or damage. Repair or replace as

necessary and then go to "Verification of Vehicle

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

corrosion,

NO

System performing to specification at this time.

SBLAT6150

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Automatic Transaxle System

P0751

COMPONENT LOCATION



GENERAL DESCRIPTION

The Automatic Transmission changes the gear position of the transmission utilizing a combination of Clutches and Brakes, which are controlled by solenoid valves. Input clutch solenoid valve is controlled by the TCM in response to signals sent from the inhibitor switch, vehicle speed sensor and accelerator pedal position sensor (throttle position sensor). Gears will then be shifted to the optimum position.

DTC DESCRIPTION

This is not only caused by electrical malfunction (circuits open or shorted) but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation.

DTC DETECTING CONDITION

ltem	Detecting Condition	Possible cause
DTC Strategy	Rationality check (stuck-off)	* INPUT CLUTCH SOLENOID V-
Enable Conditions	 Vehicle speed ≥ 6.2MPH(10km/h) Engine speed > 305 rpm A/T range switch is D range A/T flued temperature≥ -40°F 	ALVE : I/C SOLENOID VALVEOpen or short in circuitFaulty I/C SOLENOID VALVEFaulty TCM
Threshold value	• Fluid pressure switch A "OFF" when the monitoring value≤0.05A and When there's a difference between calculated and measured gear ratio.	
Diagnostic Time	 A/T flued temperature > 14°F : More then 2secs A/T flued temperature ≤ 14°F : More then 8secs 	
Fail Safe	Locked in to 4th gear.	

Automatic Transaxle System

Signal Waveform





FIG.1) N RANGE FIG.2) 4 GEAR

MONITOR SCANTOOL DATA

- 1. Connect scantool to data link connector(DLC)
- 2. Engine "ON".

SBLAT6160L

- 3. Monitor the "I/C SOLENOID" parameter on the scantool.
- 4. Select "D RANGE" and Operate the vehicle.
- 5. Check "I/C SOLENOID" parameter value changes while driving.

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Automatic Transaxle System

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- 6. Does "I/C SOLENOID " follow the reference data?
 - YES
 - ▶ Fault is intermittent caused by poor contact in the

SBLAT6161L

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

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Automatic Transaxle System

AT-119

necessary and go to "Verification of Vehicle Repair" SIGNAL CIRCUIT INSPECTION procedure. 1. Disconnect "C06-2" connector. NO 2. IGNITION "ON", ENGINE "OFF" 3. Measure voltage between terminal "7" of the C06-2 "Terminal & connector " Go inspection ► to harness connector and chassis ground. procedure. Specification : Output voltage repeated between 4V and **TERMINAL & CONNECTOR INSPECTION** 12V 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 then go to "Verification of vehicle repair" procedure. NO Go to "Signal circuit Inspection" procedure. C06-2 1.ATF 2 5 3 2 4 đũ 2.LOW COAST BRAKE SOLENOID VALVE 9 8 6 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 10 4.DIRECT CLUTCH SOLENOID VALVE 6.FRONT BRAKE SOLENOID VALVE **7.INPUT CLUTCH SOLENOID VALVE** 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV SBLAT6162L 4. Is voltage within specifications? YES

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

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Automatic Transaxle System

COMPONENT INSPECTION

- 1. Disconnect "C06-2" connector.
- 2. Ignition "OFF".
- 3. Measure resistance between terminal "7" of the C06-2 harness connector and chassis ground.

C06-2

Component side

Specification : approx. $3 \sim 9\Omega$



1.ATF 2

1.ATF 2 2.LOW COAST BRAKE SOLENOID VALVE 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 4.DIRECT CLUTCH SOLENOID VALVE 6.FRONT BRAKE SOLENOID VALVE 7.INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV

SBLAT6163L

4. Is resistance within specifications?

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

 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, Replace "I/C SOLENOID VALVE" as necessary and Go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

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.

Automatic Transaxle System

P0752

COMPONENT LOCATION



GENERAL DESCRIPTION

The Automatic Transmission changes the gear position of the transmission utilizing a combination of Clutches and Brakes, which are controlled by solenoid valves. Input clutch solenoid valve is controlled by the TCM in response to signals sent from the inhibitor switch, vehicle speed sensor and accelerator pedal position sensor (throttle position sensor). Gears will then be shifted to the optimum position.

DTC DESCRIPTION

This is not only caused by electrical malfunction (circuits open or shorted) but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation.

DTC DETECTING CONDITION

ltem	Detecting Condition	Possible cause
DTC Strategy	Rationality check (stuck-on)	※ INPUT CLUTCH SOLENOID V-
Enable Conditions	 Vehicle speed ≥ 6.2MPH(10km/h) Engine speed > 305 rpm A/T range switch is D range A/T flued temperature≥ -40°F 	ALVE : I/C SOLENOID VALVEOpen or short in circuitFaulty I/C SOLENOID VALVEFaulty TCM
Threshold value	• Fluid pressure switch A "ON" when the monitoring v- alue≤0.75A and When there's a difference between calculated and measured gear ratio.	
Diagnostic Time	 A/T flued temperature > 14°F : More then 2secs A/T flued temperature ≤ 14°F : More then 8secs 	
Fail Safe	Locked in to 4th gear.	

AT-121

Automatic Transaxle System

Signal Waveform FR CH A 2.0 V

AT-122





FIG.1) N RANGE FIG.2) 4 GEAR

MONITOR SCANTOOL DATA

- 1. Connect scantool to data link connector(DLC)
- 2. Engine "ON".
- 3. Monitor the "I/C SOLENOID" parameter on the scantool.
- 4. Select "D RANGE" and Operate the vehicle.
- 5. Check "I/C SOLENOID" parameter value changes while driving.

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Automatic Transaxle System

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SBLAT6161L

- Does "I/C SOLENOID " follow the reference data?
 YES
 - ▶ 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

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AT-124

Automatic Transaxle System

harness connector and chassis ground.

3. Measure voltage between terminal "7" of the C06-2

Specification : Output voltage repeated between 4V and

SIGNAL CIRCUIT INSPECTION

1. Disconnect "C06-2" connector.

12V

2. IGNITION "ON", ENGINE "OFF"

necessary and go to "Verification of Vehicle Repair" procedure.

NO

▶ Go to "Terminal & connector inspection " procedure.

TERMINAL & CONNECTOR INSPECTION

- 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.
- Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.
- 3. Has a problem been found?

YES

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

NO

Go to "Signal circuit Inspection" procedure.



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4. Is voltage within specifications?

YES

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

COMPONENT INSPECTION

- 1. Disconnect "C06-2" connector.
- 2. Ignition "OFF".
- 3. Measure resistance between terminal "7" of the C06-2 harness connector and chassis ground.

C06-2

Component side

Specification : approx. $3 \sim 9\Omega$



1.ATF 2 2.LOW COAST BRAKE SOLENOID VALVE 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 4.DIRECT CLUTCH SOLENOID VALVE 6.FRONT BRAKE SOLENOID VALVE 7.INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV

SBLAT6163L

4. Is resistance within specifications?

YES

NO

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. خودر و سامانه (مسئولیت مح

5. 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, Replace "I/C SOLENOID VALVE" as necessary and Go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

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.

SBLAT6150

AT-126

Automatic Transaxle System

P0753

COMPONENT LOCATION



GENERAL DESCRIPTION

The Automatic Transmission changes the gear position of the transmission utilizing a combination of Clutches and Brakes, which are controlled by solenoid valves. Input clutch solenoid valve is controlled by the TCM in response to signals sent from the inhibitor switch, vehicle speed sensor and accelerator pedal position sensor (throttle position sensor). Gears will then be shifted to the optimum position.

DTC DESCRIPTION

This is not only caused by electrical malfunction (circuits open or shorted) but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation.

DTC DETECTING CONDITION [DSL 2.5]

ltem	Detecting Condition	Possible cause
DTC Strategy	Check voltage range	* INPUT CLUTCH SOLENOID V-
Enable Conditions	• Vehicle speed \geq 6.2MPH(10km/h)	ALVE : I/C SOLENOID VALVE
Threshold value	 Ground short/open :Monitoring value[current]≤ 0.4A, When the driver output ≥ 0.7A B+ short:Monitoring value[current]≤ 0.4A, When the driver output ≥ 0.7A 	 Open or short in circuit Faulty I/C SOLENOID VALVE Faulty TCM
Diagnostic Time	more than 5sec	
Fail Safe	5 gear is prohibited.(L/U off)Sports mode is prohibited.	

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AT-127

Automatic Transaxle System

[GSL 3.3/3.8]

Item	Detecting Condition	Possible cause
DTC Strategy	Check voltage range	* INPUT CLUTCH SOLENOID V-
Enable Conditions	 10V < Actuator power supply voltage < 16V 	ALVE : I/C SOLENOID VALVE
Threshold value	Hardware "IC" check	Faulty I/C SOLENOID VALVE
Diagnostic Time	More than 0.2sec	Faulty TCM
Fail Safe	Lock-up control is prohibited(L/U off)	

Signal Waveform



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MONITOR SCANTOOL DATA

- 1. Connect scantool to data link connector(DLC)
- 2. Engine "ON".
- 3. Monitor the "I/C SOLENOID" parameter on the scantool.
- 4. Select "D RANGE" and Operate the vehicle.
- 5. Check "I/C SOLENOID" parameter value changes while driving.

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Automatic Transaxle System

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- 6. Does "I/C SOLENOID " follow the reference data?
 - YES
 - ▶ Fault is intermittent caused by poor contact in the

SBLAT6161L

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

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Automatic Transaxle System

necessary and go to "Verification of Vehicle Repair" SIGNAL CIRCUIT INSPECTION procedure. 1. Disconnect "C06-2/C106-2" connector. NO 2. IGNITION "ON", ENGINE "OFF" 3. Measure voltage between terminal "7" of the "Terminal & connector Go inspection ► to C06-2/C106-2 harness connector and chassis procedure. ground. **TERMINAL & CONNECTOR INSPECTION** Specification : Output voltage repeated between 4V and 1. Many malfunctions in the electrical system are 12V 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 contamination, connection, bending, corrosion, deterioration, or damage. 3. Has a problem been found? YES Repair as necessary and then go to "Verification of vehicle repair" procedure. NO Go to "Signal circuit Inspection" procedure. C06-2 [DSL 2.5] C106-2 [GSL 3.3/3.8] 1.ATF 2 5 4 3 2 ď 2.LOW COAST BRAKE SOLENOID VALVE 8 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 10 9 6 4.DIRECT CLUTCH SOLENOID VALVE 6.FRONT BRAKE SOLENOID VALVE **7.INPUT CLUTCH SOLENOID VALVE** 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV SBLAT6164L 4. Is voltage within specifications? YES

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

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AT-130

Automatic Transaxle System

COMPONENT INSPECTION

- 1. Disconnect "C06-2/C106-2" connector.
- 2. Ignition "OFF".
- 3. Measure resistance between terminal "7" of the C06-2/C106-2 harness connector and chassis ground.

Specification : approx. $3 \sim 9\Omega$



C06-2 [DSL 2.5] C106-2 [GSL 3.3/3.8] Component side

1.ATF 2 2.LOW COAST BRAKE SOLENOID VALVE 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 4.DIRECT CLUTCH SOLENOID VALVE 6.FRONT BRAKE SOLENOID VALVE 7.INPUT CLUTCH SOLENOID VALVE

8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV

4. Is resistance within specifications?

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

5. ► 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, Replace "I/C SOLENOID VALVE" as necessary and Go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

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.

Automatic Transaxle System

P0756

COMPONENT LOCATION



GENERAL DESCRIPTION

The Automatic Transmission changes the gear position of the transmission utilizing a combination of Clutches and Brakes, which are controlled by solenoid valves. Front brake solenoid valve is controlled by the TCM in response to signals sent from the inhibitor switch, vehicle speed sensor and accelerator pedal position sensor (throttle position sensor). Gear will then be shifted to the optimum position.

DTC DESCRIPTION

This is not only caused by electrical malfunction (circuit open or shorted) but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation.

DTC DETECTING CONDITION

ltem	Detecting Condition	Possible cause
DTC Strategy	Rationality check (stuck-off)	* FRONT BRAKE SOLENOID V-
Enable Conditions	 Vehicle speed ≥ 6.2MPH(10km/h) Engine speed > 305 rpm A/T range switch is D range A/T flued temperature≥ -40°F 	ALVE : Fr/B SOLENOID VALVEOpen or short in circuitFaulty Fr/B SOLENOID VALVEFaulty TCM
Threshold value	• Fluid pressure switch B "OFF" when the monitoring value≤0.75A and When there's a difference between calculated and measured gear ratio.	
Diagnostic Time	 A/T flued temperature > 14°F : More then 2secs A/T flued temperature ≤ 14°F : More then 8secs 	
Fail Safe	Locked in to 4th gear.	

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Automatic Transaxle System

AT-132

Signal Waveform





FIG.1) R RANGE FIG.2) 4 GEAR

MONITOR SCANTOOL DATA

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- 3. Monitor the "Fr/B SOLENOID" parameter on the scantool.
- 4. Select "R,D RANGE" and Operate the vehicle.
- 5. Check "Fr/B SOLENOID" parameter value changes while driving.

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FR/B SOL. OUTPUT

FR/B SOL. MONITOR

CURRENT GEAR POS.

BBAKE S₩ITCH

REVERSE LAMP STARTER RELAY MONITOR

FR/B SOL. OUTPUT

* FR/B SOL. MONITOR

× CURRENT GEAR POS.

BRAKE SWITCH

REVERSE LAMP

SHIFT RANGE INDICATOR

STARTER RELAY MONITOR

FR/B SOL. OUTPUT

FR/B SOL. MONITOR

CURRENT GEAR POS.

× OIL PRESS SW1(FR/B)

BRAKE SWITCH

REVERSE LAME

× FR∕B SOL. OUTPUT

★ FR/B SOL. MONITOR

CURRENT GEAR POS.

× OIL PRESS SW1(FR/B)

BRAKE SWITCH

REVERSE LAMP

SHIFT RANGE INDICATOR

STARTER RELAY MONITOR

FIG.5)

SHIFT RANGE INDICATOR

STARTER RELAY MONITOR

OIL PRESS SW1(FR/B)

FIG.1)

×

FIG.3)

SHIFT BANGE INDICATOR

OIL PRESS SW1(FR/B)

Automatic Transaxle System

1.3 CURRENT DATA

1.3 CURRENT DATA

1.3 CURRENT DATA

1.3 CURRENT DATA

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1.3 CURRENT DATA

FR/B SOL. OUTPUT

SHIFT BANGE INDICATOR

STARTER RELAY MONITOR

FIG.6) "D" Range 3rd gear

FIG.7) "D" Range 4th gear

FIG.8) "D" Range 5th gear

OIL PRESS SW1(FR/B)

★ FR/B SOL. MONITOR

× CURRENT GEAR POS.

BRAKE S₩ITCH

REVERSE LAMP

×

×

22/76

GEAR

0.71 A

0.79 A

1

R

ON

â

FIG.7) FIG.1) "P" Range

- FIG.2) "R" Shifting FIG.3) "N" Range
- FIG.4) "D" Range 1st gear
- 6. Does "Fr/B SOLENOID " follow the reference data? YES
 - Fault is intermittent caused by poor contact in the

SBLAT6166L

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

0.70 A

0.80 A

0.71 A

0.80 A

0.70 A

0.80 A

0.01 A

0.00 A

GEAR

4

OFF

GEAR

2

ON

GEAR

1

Ν

ON

1

P

ON

22/76

GEAR

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AT-134

Automatic Transaxle System

harness connector and chassis ground.

3. Measure voltage between terminal "6" of the C06-2

SIGNAL CIRCUIT INSPECTION

1. Disconnect "C06-2" connector.

2. IGNITION "ON", ENGINE "OFF"

Specification : approx. 5V

necessary and go to "Verification of Vehicle Repair" procedure.

NO

Go to "Terminal & connector inspection " procedure.

TERMINAL & CONNECTOR INSPECTION

- 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 then go to "Verification of vehicle repair" procedure.

NO

Go to "Signal circuit Inspection" procedure.



SBLAT6167L

4. Is voltage within specifications?

YES

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

COMPONENT INSPECTION

- 1. Disconnect "C06-2" connector.
- 2. Ignition "OFF".
- 3. Measure resistance between terminal "6" of the C06-2 harness connector and chassis ground.

C06-2

Component side

Specification : approx. $3 \sim 9\Omega$



1.ATF 2

2.LOW COAST BRAKE SOLENOID VALVE 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 4.DIRECT CLUTCH SOLENOID VALVE **6.FRONT BRAKE SOLENOID VALVE** 7. INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV

SBLAT6168L

4. Is resistance within specifications?

YES

NO

procedure.

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. خودرو سامانه (مسئولیت م

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

If signal circuit in harness is OK, Replace "Fr/B SOLENOID VALVE" as necessary and Go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

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.

AT-135

SBLAT6150

AT-136

Automatic Transaxle System

P0757

COMPONENT LOCATION



GENERAL DESCRIPTION

The Automatic Transmission changes the gear position of the transmission utilizing a combination of Clutches and Brakes, which are controlled by solenoid valves. Front brake solenoid valve is controlled by the TCM in response to signals sent from the inhibitor switch, vehicle speed sensor and accelerator pedal position sensor (throttle position sensor). Gear will then be shifted to the optimum position.

DTC DESCRIPTION

This is not only caused by electrical malfunction (circuit open or shorted) but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation.

DTC DETECTING CONDITION

ltem	Detecting Condition	Possible cause
DTC Strategy	Rationality check (stuck-off)	* FRONT BRAKE SOLENOID V-
Enable Conditions	 Vehicle speed ≥ 6.2MPH(10km/h) Engine speed > 305 rpm A/T range switch is D range A/T flued temperature≥ -40°F 	 ALVE : Fr/B SOLENOID VALVE Open or short in circuit Faulty Fr/B SOLENOID VALVE Faulty TCM
Threshold value	• Fluid pressure switch B "ON" when the monitoring v- alue≤0.05A and When there's a difference between calculated and measured gear ratio.	
Diagnostic Time	 A/T flued temperature > 14°F : More then 2secs A/T flued temperature ≤ 14°F : More then 8secs 	
Fail Safe	Locked in to 5th gear.	

Automatic Transaxle System

Signal Waveform

FIG.1) R RANGE FIG.2) 4 GEAR

2. Engine "ON".

scantool.

while driving.

MONITOR SCANTOOL DATA

1. Connect scantool to data link connector(DLC)

3. Monitor the "Fr/B SOLENOID" parameter on the

Select "R,D RANGE" and Operate the vehicle.
 Check "Fr/B SOLENOID" parameter value changes





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AT-137



SBLAT6165L



AT-138

Automatic Transaxle System

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- 6. Does "Fr/B SOLENOID " follow the reference data?
 - ▶ Fault is intermittent caused by poor contact in the

SBLAT6166L

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

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Automatic Transaxle System

AT-139

necessary and go to "Verification of Vehicle Repair" SIGNAL CIRCUIT INSPECTION procedure. 1. Disconnect "C06-2" connector. NO 2. IGNITION "ON", ENGINE "OFF" 3. Measure voltage between terminal "6" of the C06-2 "Terminal & connector " Go inspection ► to harness connector and chassis ground. procedure. Specification : approx. 5V **TERMINAL & CONNECTOR INSPECTION** 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 then go to "Verification of vehicle repair" procedure. NO Go to "Signal circuit Inspection" procedure. C06-2 1.ATF 2 5 3 2 4 đũ 2.LOW COAST BRAKE SOLENOID VALVE 9 8 7 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 10 6 4.DIRECT CLUTCH SOLENOID VALVE **6.FRONT BRAKE SOLENOID VALVE** 7.INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV SBLAT6167L 4. Is voltage within specifications?

YES

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

AT-140

Automatic Transaxle System

COMPONENT INSPECTION

- 1. Disconnect "C06-2" connector.
- 2. Ignition "OFF".
- 3. Measure resistance between terminal "6" of the C06-2 harness connector and chassis ground.

C06-2

Component side

Specification : approx. $3 \sim 9\Omega$



1.ATF 2

2.LOW COAST BRAKE SOLENOID VALVE 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 4.DIRECT CLUTCH SOLENOID VALVE **6.FRONT BRAKE SOLENOID VALVE** 7.INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV

SBLAT6168L

4. Is resistance within specifications?

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

 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, Replace "Fr/B SOLENOID VALVE" as necessary and Go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

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.

Automatic Transaxle System

P0758

COMPONENT LOCATION



GENERAL DESCRIPTION

The Automatic Transmission changes the gear position of the transmission utilizing a combination of Clutches and Brakes, which are controlled by solenoid valves. Front brake solenoid valve is controlled by the TCM in response to signals sent from the inhibitor switch, vehicle speed sensor and accelerator pedal position sensor (throttle position sensor). Gear will then be shifted to the optimum position.

DTC DESCRIPTION

This is not only caused by electrical malfunction (circuit open or shorted) but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation.

DTC DETECTING CONDITION [DSL 2.5]

ltem	Detecting Condition	Possible cause
DTC Strategy	Check voltage range	* FRONT BRAKE SOLENOID V-
Enable Conditions	• Vehicle speed \geq 6.2MPH(10km/h)	 ALVE : Fr/B SOLENOID VALVE Open or short in circuit Faulty Fr/B SOLENOID VALVE Faulty TCM
Threshold value	 Ground short/open :Monitoring value[current]≤ 0.4A, When the driver output ≥ 0.7A B+ short:Monitoring value[current]≤ 0.4A, When the driver output ≥ 0.7A 	
Diagnostic Time	more than 5sec	
Fail Safe	• Locked into 4 or 5th gear, lock-up control is inhibited, pressure control is inhibited.	

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AT-142

Automatic Transaxle System

[GSL 3.3/3.8]

Item	Detecting Condition	Possible cause
DTC Strategy	Check voltage range	* FRONT BRAKE SOLENOID V-
Enable Conditions	 10V < Actuator power supply voltage < 16V 	ALVE : Fr/B SOLENOID VALVE
Threshold value	Hardware "IC" check	Faulty Fr/B SOLENOID VALVE
Diagnostic Time	More than 0.2sec	Faulty TCM
Fail Safe	Lock-up control is prohibited(L/U off)	

Signal Waveform



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MONITOR SCANTOOL DATA

- 1. Connect scantool to data link connector(DLC)
- 2. Engine "ON".
- 3. Monitor the "Fr/B SOLENOID" parameter on the scantool.
- 4. Select "R,D RANGE" and Operate the vehicle.
- 5. Check "Fr/B SOLENOID" parameter value changes while driving.

SBLAT6165L

Automatic Transaxle System

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SBLAT6166L

- Does "Fr/B SOLENOID " follow the reference data?
 YES
 - 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

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Automatic Transaxle System

necessary and go to "Verification of Vehicle Repair" procedure.

NO

 Go to "Terminal & connector inspection " procedure.

TERMINAL & CONNECTOR INSPECTION

- 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 then go to "Verification of vehicle repair" procedure.

NO

Go to "Signal circuit Inspection" procedure.



SIGNAL CIRCUIT INSPECTION

- 1. Disconnect "C06-2/C106-2" connector.
- 2. IGNITION "ON", ENGINE "OFF"
- 3. Measure voltage between terminal "6" of the C06-2/C106-2 harness connector and chassis ground.

Specification : approx. 5V

SBLAT6173L

4. Is voltage within specifications?

YES

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

Automatic Transaxle System

COMPONENT INSPECTION

1. Disconnect "C06-2/C106-2" connector.

5

- 2. Ignition "OFF".
- 3. Measure resistance between terminal "6" of the C06-2/C106-2 harness connector and chassis ground.

Specification : approx. $3 \sim 9\Omega$



C06-2 [DSL 2.5] C106-2 [GSL 3.3/3.8] Component side

1.ATF 2 2.LOW COAST BRAKE SOLENOID VALVE 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 4.DIRECT CLUTCH SOLENOID VALVE **6.FRONT BRAKE SOLENOID VALVE** 7. INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV

4. Is resistance within specifications?

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

5. 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, Replace "Fr/B SOLENOID VALVE" as necessary and Go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

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.

AT-145

SBLAT6174L
SBLAT6150

AT-146

Automatic Transaxle System

P0761

COMPONENT LOCATION



GENERAL DESCRIPTION

The Automatic Transmission changes the gear position of the transmission utilizing a combination of Clutches and Brakes, which are controlled by solenoid valves. Direct clutch solenoid valve is controlled by the TCM in response to signals sent from the inhibitor switch, vehicle speed sensor and accelerator pedal position sensor (throttle position sensor). Gears will then be shifted to the optimum position.

DTC DESCRIPTION

This is not only caused by electrical malfunction (circuits open or shorted) but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation.

DTC DETECTING CONDITION

ltem	Detecting Condition	Possible cause			
DTC Strategy	Rationality check (stuck-off)	* DIRECT CLUTCH SOLENOID			
Enable Conditions	 Vehicle speed ≥ 6.2MPH(10km/h) Engine speed > 305 rpm A/T range switch is D range A/T flued temperature≥ -40°F 	 /ALVE : D/C SOLENOID VALVE Open or short in circuit Faulty D/C SOLENOID VALVE Faulty TCM 			
Threshold value	• Fluid pressure switch C "OFF" when the monitoring value≤0.05A and When there's a difference between calculated and measured gear ratio.				
Diagnostic Time	 A/T flued temperature > 14°F : More then 2secs A/T flued temperature ≤ 14°F : More then 8secs 				
Fail Safe	Locked in to 4th gear.				

Automatic Transaxle System

Signal Waveform





FIG.1) N RANGE FIG.2) 2 GEAR

MONITOR SCANTOOL DATA

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- 3. Monitor the "D/C SOLENOID" parameter on the scantool.
- 4. Select "D RANGE" and Operate the vehicle.
- 5. Check "D/C SOLENOID" parameter value changes while driving.

SBLAT6185L



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AT-148

Automatic Transaxle System

021 62 99 92 92



SBLAT6170L

- 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
- 6. Does "D/C SOLENOID" follow the reference data?
 - YES
 - ▶ Fault is intermittent caused by poor contact in the

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Automatic Transaxle System

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necessary and go to "Verification of Vehicle Repair" SIGNAL CIRCUIT INSPECTION procedure. 1. Disconnect "C06-2" connector. NO 2. IGNITION "ON", ENGINE "OFF" 3. Measure voltage between terminal "4" of the C06-2 "Terminal & connector " Go inspection ► to harness connector and chassis ground. procedure. Specification : approx. 5V **TERMINAL & CONNECTOR INSPECTION** 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 then go to "Verification of vehicle repair" procedure. NO Go to "Signal circuit Inspection" procedure. C06-2 1.ATF 2 3 2 5 đũ 2.LOW COAST BRAKE SOLENOID VALVE 10 8 7 6 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 4.DIRECT CLUTCH SOLENOID VALVE 6.FRONT BRAKE SOLENOID VALVE 7.INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV SBLAT6171L 4. Is voltage within specifications?

- _____
- ► Go to "Component inspection" procedure.

NO

YES

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

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Automatic Transaxle System

COMPONENT INSPECTION

- 1. Disconnect "C06-2" connector.
- 2. Ignition "OFF".
- 3. Measure resistance between terminal "4" of the C06-2 harness connector and chassis ground.

C06-2

Component side

Specification : approx. $3 \sim 9\Omega$



1.ATF 2

1.ATF 2 2.LOW COAST BRAKE SOLENOID VALVE 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE **4.DIRECT CLUTCH SOLENOID VALVE** 6.FRONT BRAKE SOLENOID VALVE 7.INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV

SBLAT6172L

4. Is resistance within specifications?

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

 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, Replace "D/C SOLENOID VALVE" as necessary and Go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

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.

Automatic Transaxle System

P0762

COMPONENT LOCATION



GENERAL DESCRIPTION

The Automatic Transmission changes the gear position of the transmission utilizing a combination of Clutches and Brakes, which are controlled by solenoid valves. Direct clutch solenoid valve is controlled by the TCM in response to signals sent from the inhibitor switch, vehicle speed sensor and accelerator pedal position sensor (throttle position sensor). Gears will then be shifted to the optimum position.

DTC DESCRIPTION

This is not only caused by electrical malfunction (circuits open or shorted) but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation.

DTC DETECTING CONDITION

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Item	Detecting Condition	Possible cause			
DTC Strategy	Rationality check (stuck-on)	* DIRECT CLUTCH SOLENOID			
Enable Conditions	 Vehicle speed ≥ 6.2MPH(10km/h) Engine speed > 305 rpm A/T range switch is D range A/T flued temperature≥ -40°F 	 VALVE : D/C SOLENOID VALVE Open or short in circuit Faulty D/C SOLENOID VALVE Faulty TCM 			
Threshold value	• Fluid pressure switch C "ON" when the monitoring v- alue≤0.75A and When there's a difference between calculated and measured gear ratio.	-			
Diagnostic Time	 A/T flued temperature > 14°F : More then 2secs A/T flued temperature ≤ 14°F : More then 8secs 				
Fail Safe	Locked in to 4th gear.				

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Automatic Transaxle System

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FIG.1) N RANGE FIG.2) 2 GEAR

MONITOR SCANTOOL DATA

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- 3. Monitor the "D/C SOLENOID" parameter on the scantool.
- 4. Select "D RANGE" and Operate the vehicle.
- 5. Check "D/C SOLENOID" parameter value changes while driving.

SBLAT6185L



Automatic Transaxle System

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SBLAT6170L

- Does "D/C SOLENOID" follow the reference data?
 YES
 - 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

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Automatic Transaxle System

harness connector and chassis ground.

3. Measure voltage between terminal "3" of the C06-2

SIGNAL CIRCUIT INSPECTION

1. Disconnect "C06-2" connector.

Specification : approx. 5V

2. IGNITION "ON", ENGINE "OFF"

necessary and go to "Verification of Vehicle Repair" procedure.

NO

Go to "Terminal & connector inspection " procedure.

TERMINAL & CONNECTOR INSPECTION

- 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 then go to "Verification of vehicle repair" procedure.

NO

Go to "Signal circuit Inspection" procedure.



SBLAT6171L

4. Is voltage within specifications?

YES

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

COMPONENT INSPECTION

- 1. Disconnect "C06-2" connector.
- 2. Ignition "OFF".

YES

NO

procedure.

Repair" procedure.

3. Measure resistance between terminal "4" of the C06-2 harness connector and chassis ground.

C06-2

Thoroughly check connectors for looseness, poor

deterioration, or damage. Repair or replace as

necessary and then go to "Verification of Vehicle

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

If signal circuit in harness is OK, Replace "D/C SOLENOID VALVE" as necessary and Go to

"Verification of Vehicle Repair" procedure.

خودر و سامانه (مسئولیت مح

Component side

Specification : approx. $3 \sim 9\Omega$



4. Is resistance within specifications?

connection, bending, corrosion,

1.A

contamination,

1.ATF 2 2.LOW COAST BRAKE SOLENOID VALVE 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE **4.DIRECT CLUTCH SOLENOID VALVE** 6.FRONT BRAKE SOLENOID VALVE 7.INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV

SBLAT6172L

VERIFICATION OF VEHICLE REPAIR

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.

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AT-156

Automatic Transaxle System

P0763

COMPONENT LOCATION



GENERAL DESCRIPTION

The Automatic Transmission changes the gear position of the transmission utilizing a combination of Clutches and Brakes, which are controlled by solenoid valves. Direct clutch solenoid valve is controlled by the TCM in response to signals sent from the inhibitor switch, vehicle speed sensor and accelerator pedal position sensor (throttle position sensor). Gears will then be shifted to the optimum position.

DTC DESCRIPTION

This is not only caused by electrical malfunction (circuits open or shorted) but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation.

DTC DETECTING CONDITION [DSL 2.5]

ltem	Detecting Condition	Possible cause
DTC Strategy	Check voltage range	* DIRECT CLUTCH SOLENOID
Enable Conditions	• Vehicle speed \geq 6.2MPH(10km/h)	VALVE : D/C SOLENOID VALVE
Threshold value	 Ground short/open :Monitoring value[current]≤ 0.4A, When the driver output ≥ 0.7A B+ short:Monitoring value[current]≤ 0.4A, When the driver output ≥ 0.7A 	 Faulty D/C SOLENOID VALVE Faulty TCM
Diagnostic Time	More than 5sec	
Fail Safe	 Locked into 4th gear, lock-up control is inhibited, pre- ssure control is inhibited. 	

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Automatic Transaxle System

[GSL 3.3/3.8]

Item	Detecting Condition	Possible cause
DTC Strategy	Check voltage range	* DIRECT CLUTCH SOLENOID
Enable Conditions	 10V < Actuator power supply voltage < 16V 	VALVE : D/C SOLENOID VALVE
Threshold value	Hardware "IC" check	Faulty D/C SOLENOID VALVE
Diagnostic Time	More than 0.2sec	Faulty TCM
Fail Safe	Lock-up control is prohibited(L/U off)	

Signal Waveform



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MONITOR SCANTOOL DATA

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- 3. Monitor the "D/C SOLENOID" parameter on the scantool.
- 4. Select "D RANGE" and Operate the vehicle.
- 5. Check "D/C SOLENOID" parameter value changes while driving.

SBLAT6185L

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Automatic Transaxle System

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SBLAT6170L

- 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
- Does "D/C SOLENOID" follow the reference data?
 YES
 - ▶ Fault is intermittent caused by poor contact in the

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Automatic Transaxle System

necessary and go to "Verification of Vehicle Repair" SIGNAL CIRCUIT INSPECTION procedure. 1. Disconnect "C06-2/C106-2" connector. NO 2. IGNITION "ON", ENGINE "OFF" 3. Measure voltage between terminal "4" of the "Terminal & connector Go inspection ► to C06-2/C106-2 harness connector and chassis procedure. ground. **TERMINAL & CONNECTOR INSPECTION** Specification : approx. 5V 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 then go to "Verification of vehicle repair" procedure. NO Go to "Signal circuit Inspection" procedure. C06-2 [DSL 2.5] C106-2 [GSL 3.3/3.8] 1.ATF 2 3 2 5 CĽ. 2.LOW COAST BRAKE SOLENOID VALVE 10 8 7 6 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 4.DIRECT CLUTCH SOLENOID VALVE 6.FRONT BRAKE SOLENOID VALVE 7.INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV SBLAT6104L 4. Is voltage within specifications?

YES

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

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Automatic Transaxle System

COMPONENT INSPECTION

- 1. Disconnect "C06-2/C106-2" connector.
- 2. Ignition "OFF".
- 3. Measure resistance between terminal "4" of the C06-2/C106-2 harness connector and chassis ground.

Specification : approx. $3 \sim 9\Omega$



C06-2 [DSL 2.5] C106-2 [GSL 3.3/3.8] Component side

1.ATF 2

2.LOW COAST BRAKE SOLENOID VALVE 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE **4.DIRECT CLUTCH SOLENOID VALVE** 6.FRONT BRAKE SOLENOID VALVE 7.INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV

SBLAT6105L

4. Is resistance within specifications?

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

5. ► 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, Replace "D/C SOLENOID VALVE" as necessary and Go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

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.

Automatic Transaxle System

P0766

COMPONENT LOCATION



GENERAL DESCRIPTION

DTC DETECTING CONDITION

The Automatic Transmission changes the gear position of the transmission utilizing a combination of Clutches and Brakes, which are controlled by solenoid valves. High & low reverse clutch solenoid valve is controlled by the TCM in response to signals sent from the inhibitor switch, vehicle speed sensor and accelerator pedal position sensor (throttle position sensor). Gears will then be shifted to the optimum position.

DTC DESCRIPTION

This is not only caused by electrical malfunction (circuits open or shorted) but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation.

ltem	Detecting Condition	Possible cause
DTC Strategy	Rationality check (stuck-off)	* HIGH & LOW REVERSE CLUT-
Enable Conditions	 Vehicle speed ≥ 6.2MPH(10km/h) Engine speed > 305 rpm A/T range switch is D range A/T flued temperature≥ -40°F 	 CH SOLENOID VALVE : H & LR/C SOLENOID Open or short in circuit Faulty H & LR/C SOLENOID V- ALVE
Threshold value	• Fluid pressure switch D "OFF" when the monitoring value≤0.05A and When there's a difference between calculated and measured gear ratio.	Faulty TCM
Diagnostic Time	 A/T flued temperature > 14°F : More then 2secs A/T flued temperature ≤ 14°F : More then 8secs 	
Fail Safe	Locked in to 4th gear.	

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SBI AT6150

Automatic Transaxle System

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Signal Waveform

AT-162





FIG.1) 2 RANGE FIG.2) 3 GEAR

MONITOR SCANTOOL DATA

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- Monitor the "H & LR/C SOLENOID" parameter on the scantool.
- 4. Select "D RANGE" and Operate the vehicle.
- 5. Check "H & LR/C SOLENOID" parameter value changes while driving.



SBLAT6186L

× H&L R∕C SOL. OUTPUT

× CURRENT GEAR POS.

×

H&L R/C SOL. MONITOR

× SHIFT RANGE INDICATOR

* OIL PRESS SW6(H&L R/C) ON

Automatic Transaxle System

26/76

GEAR

0.01 A

0.00 A

1

Р

1.3 CURRENT DATA

6. Does "H&LR/C SOLENOID" follow the reference

data?

YES



1.3 CURRENT DATA

H&L R/C SOL. OUTPUT

CURRENT GEAR POS.

×

H&L R/C SOL. MONITOR

SHIFT BANGE INDICATOR

OIL PRESS SW6(H&L R/C)

26/76

GEAR

0.00 A

1

R

ON

AT-163

021 62 99 92 92

SBLAT6175L

► 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,

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Automatic Transaxle System

harness connector and chassis ground.

3. Measure voltage between terminal "3" of the C06-2

Specification : Output voltage repeated between 4V and

SIGNAL CIRCUIT INSPECTION

1. Disconnect "C06-2" connector.

12V

2. IGNITION "ON", ENGINE "OFF"

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

- 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 then go to "Verification of vehicle repair" procedure.

NO

► Go to "Signal circuit Inspection" procedure.



1.ATF 2 2.LOW COAST BRAKE SOLENOID VALVE 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 4.DIRECT CLUTCH SOLENOID VALVE 6.FRONT BRAKE SOLENOID VALVE 7.INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV

SBLAT6176L

4. Is voltage within specifications?

YES

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

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COMPONENT INSPECTION

- 1. Disconnect "C06-2" connector.
- 2. Ignition "OFF".
- 3. Measure resistance between terminal "3" of the C06-2 harness connector and chassis ground.

C06-2

Component side

Specification : approx. $3 \sim 9\Omega$



1.ATF 2 2.LOW COAST BRAKE SOLENOID VALVE **3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE** 4.DIRECT CLUTCH SOLENOID VALVE 6.FRONT BRAKE SOLENOID VALVE 7. INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV

SBLAT6177L

4. Is resistance within specifications?

YES

NO

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. خودرو سامانه (مسئولیت م

5. 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, Replace "H&LR/C SOLENOID VALVE" as necessary and Go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

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.

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Automatic Transaxle System

P0767

COMPONENT LOCATION



GENERAL DESCRIPTION

DTC DETECTING CONDITION

The Automatic Transmission changes the gear position of the transmission utilizing a combination of Clutches and Brakes, which are controlled by solenoid valves. High & low reverse clutch solenoid valve is controlled by the TCM in response to signals sent from the inhibitor switch, vehicle speed sensor and accelerator pedal position sensor (throttle position sensor). Gears will then be shifted to the optimum position.

DTC DESCRIPTION

This is not only caused by electrical malfunction (circuits open or shorted) but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation.

Item	Detecting Condition	Possible cause
DTC Strategy	Rationality check (stuck-on)	* HIGH & LOW REVERSE CLUT-
Enable Conditions	 Vehicle speed ≥ 6.2MPH(10km/h) Engine speed > 305 rpm A/T range switch is D range A/T flued temperature≥ -40°F 	 CH SOLENOID VALVE : H & LR/C SOLENOID Open or short in circuit Faulty H & LR/C SOLENOID V- ALVE
Threshold value	• Fluid pressure switch D "ON" when the monitoring v- alue≤0.75A and When there's a difference between calculated and measured gear ratio.	Faulty TCM
Diagnostic Time	 A/T flued temperature > 14°F : More then 2secs A/T flued temperature ≤ 14°F : More then 8secs 	
Fail Safe	Locked in to 4th gear.	

Automatic Transaxle System

Signal Waveform





FIG.1) 2 RANGE FIG.2) 3 GEAR

MONITOR SCANTOOL DATA

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- 3. Monitor the "H & LR/C SOLENOID" parameter on the scantool.
- 4. Select "D RANGE" and Operate the vehicle.
- 5. Check "H & LR/C SOLENOID" parameter value changes while driving.



SBLAT6186L

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Automatic Transaxle System

021 62 99 92 92



SBLAT6175L

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,

6. Does "H&LR/C SOLENOID" follow the reference data?

YES

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021 62 99 92 92

Automatic Transaxle System

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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

- 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 then go to "Verification of vehicle repair" procedure.

NO

► Go to "Signal circuit Inspection" procedure.



1.ATF 2 2.LOW COAST BRAKE SOLENOID VALVE 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 4.DIRECT CLUTCH SOLENOID VALVE 6.FRONT BRAKE SOLENOID VALVE 7.INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV

SIGNAL CIRCUIT INSPECTION

3. Measure voltage between terminal "3" of the C06-2

Specification : Output voltage repeated between 4V and

harness connector and chassis ground.

1. Disconnect "C06-2" connector.

12V

2. IGNITION "ON", ENGINE "OFF"

SBLAT6176L

4. Is voltage within specifications?

YES

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

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Automatic Transaxle System

COMPONENT INSPECTION

- 1. Disconnect "C06-2" connector.
- 2. Ignition "OFF".
- 3. Measure resistance between terminal "3" of the C06-2 harness connector and chassis ground.

C06-2

Component side

Specification : approx. $3 \sim 9\Omega$



1.ATF 2

1.ATF 2 2.LOW COAST BRAKE SOLENOID VALVE 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 4.DIRECT CLUTCH SOLENOID VALVE 6.FRONT BRAKE SOLENOID VALVE 7.INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV

SBLAT6177L

4. Is resistance within specifications?

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

5. ► 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, Replace "H & LR/C SOLENOID VALVE" as necessary and Go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

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.

Automatic Transaxle System

P0768

COMPONENT LOCATION



GENERAL DESCRIPTION

The Automatic Transmission changes the gear position of the transmission utilizing a combination of Clutches and Brakes, which are controlled by solenoid valves. High & low reverse clutch solenoid valve is controlled by the TCM in response to signals sent from the inhibitor switch, vehicle speed sensor and accelerator pedal position sensor (throttle position sensor). Gears will then be shifted to the optimum position.

DTC DETECTING CONDITION

[DSL 2.5]

Detecting Condition Possible cause Item Check voltage range ※ HIGH & LOW REVERSE CLUT-**DTC Strategy** CH SOLENOID VALVE: H&LR/C • Vehicle speed \geq 6.2MPH(10km/h) **Enable Conditions** SOLENOID VALVE Ground short/open :Monitoring value[current] \leq 0.4A, Open or short in circuit ٠ When the driver output $\geq 0.7A$ Faulty H&LR/C SOLENOID V-Threshold value • B+ short:Monitoring value[current] \leq 0.4A, When the ALVE driver output $\geq 0.7A$ • Faulty TCM **Diagnostic Time** • More than 5sec Locked into 4th gear, lock-up control is inhibited, pre-• Fail Safe ssure control is inhibited.

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AT-171

SBI AT6150

DTC DESCRIPTION

This is not only caused by electrical malfunction (circuits open or shorted) but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation.

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Automatic Transaxle System

[GSL 3.3/3.8]

Item Detecting Condition		Possible cause			
DTC Strategy	Check voltage range	* HIGH & LOW REVERSE CLUT-			
Enable Conditions	 10V < Actuator power supply voltage < 16V 	CH SOLENOID VALVE: H&LR/C			
Threshold value	Hardware "IC" check	Open or short in circuit			
Diagnostic Time	More than 0.2sec	 Faulty H & LR/C SOLENOID V- 			
Fail Safe	Lock-up control is prohibited(L/U off)	• Faulty TCM			

Signal Waveform



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MONITOR SCANTOOL DATA

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- 3. Monitor the "H & LR/C SOLENOID" parameter on the scantool.
- 4. Select "D RANGE" and Operate the vehicle.
- 5. Check "H & LR/C SOLENOID" parameter value changes while driving.

SBLAT6186L

× H&L R∕C SOL. OUTPUT

× CURRENT GEAR POS.

×

H&L R/C SOL. MONITOR

Automatic Transaxle System

26/76

GEAR

0.01 A

0.00 A

1

Р

1.3 CURRENT DATA

6. Does "H&LR/C SOLENOID" follow the reference

data?

YES



1.3 CURRENT DATA

H&L R/C SOL. OUTPUT

CURRENT GEAR POS.

×

H&L R/C SOL. MONITOR

SHIFT BANGE INDICATOR

26/76

GEAR

0.00 A

1

R

AT-173

SBLAT6175L

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.

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of the

chassis

AT-174

Automatic Transaxle System

3. Measure voltage between terminal "3"

C06-2/C106-2 harness connector and

Specification : Output voltage repeated between 4V and

SIGNAL CIRCUIT INSPECTION

2. IGNITION "ON", ENGINE "OFF"

ground.

12V

1. Disconnect "C06-2/C106-2" connector.

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

- 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 then go to "Verification of vehicle repair" procedure.

NO

► Go to "Signal circuit Inspection" procedure.



1.ATF 2 2.LOW COAST BRAKE SOLENOID VALVE 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 4.DIRECT CLUTCH SOLENOID VALVE 6.FRONT BRAKE SOLENOID VALVE 7.INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV

SBLAT6178L

4. Is voltage within specifications?

YES

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

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Automatic Transaxle System

COMPONENT INSPECTION

- 1. Disconnect "C06-2/C106-2" connector.
- 2. Ignition "OFF".
- 3. Measure resistance between terminal "3" of the C06-2/C106-2 harness connector and chassis ground.

Specification : approx. $3 \sim 9\Omega$



C06-2 [DSL 2.5] C106-2 [GSL 3.3/3.8] Component side

1.ATF 2 2.LOW COAS

- 2.LOW COAST BRAKE SOLENOID VALVE **3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE** 4.DIRECT CLUTCH SOLENOID VALVE 6.FRONT BRAKE SOLENOID VALVE 7.INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV
- 4. Is resistance within specifications?

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.

5. ► 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, Replace "H & LR/C SOLENOID VALVE" as necessary and Go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

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.
- 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.

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SBLAT6179L

SBI AT6150

AT-176

Automatic Transaxle System

P0772

COMPONENT LOCATION



GENERAL DESCRIPTION

Low coast brake solenoid valve is turned "ON" or "OFF" by the TCM in response to signals sent from the inhibitor switch, vehicle speed sensor and accelerator pedal position sensor (throttle position sensor). Gears will then be shifted to the optimum position.

DTC DESCRIPTION

This is not only caused by electrical malfunction (circuits open or shorted) but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation.

DTC DETECTING CONDITION

ltem	Detecting Condition	Possible cause
DTC Strategy	Rationality check (stuck-on)	* LOW COAST BRAKE SOLEN-
Enable Conditions	 Vehicle speed ≥ 6.2MPH(10km/h) Engine speed > 305 rpm A/T range switch is D range A/T flued temperature≥ -40°F 	 OID VALVE: LC/B SOLENOID VALVE Open or short in circuit Faulty LC/B SOLENOID VALV-F
Threshold value	 Fluid pressure switch E "ON" when the monitoring v- alue is "OFF". 	Faulty TCM
Diagnostic Time	 A/T flued temperature > 14°F : More then 2secs A/T flued temperature ≤ 14°F : More then 8secs 	
Fail Safe	Locked into 2nd gear.	

MONITOR SCANTOOL DATA

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- 3. Monitor the "LC/B SOLENOID" parameter on the scantool.
- 4. Select "D RANGE" and Operate the vehicle.

5. Check "LC/B SOLENOID" parameter value changes while driving.

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Automatic Transaxle System

YES

SBLAT6180L 6. Does "LC/B SOLENOID" follow the reference data? 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, ▶ Fault is intermittent caused by poor contact in the deterioration or damage.Repair or replace as

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_	1.3 CURRENT DATA 28/7	76		1.3 CURRENT DA	TA	28/	76 A
		•	×	LCZB SOLENOLD	OFF		•
÷	LC/B SOLENOID OFF		×	LC/B SOL. MONITOR	ÓN		
¥	CUPPENT CEAR DOS 1 CEAR		×	CURRENT GEAR POS.	1	GEAR	
×	SHIFT BANGE INDICATOR P	-	×	SHIFT BANGE INDICATOR	R		-
×	OIL PRESS SW2(LC/B) OFF		×	OIL PRESS SW2(LC/B)	OFF		
	OIL PRESS SW1(FR/B)			OIL PRESS SW1(FR/B)			
	BRAKE SWITCH			BRAKE SWITCH			
	REVERSE LAMP			REVERSE LAMP			
_		<u>+</u>			Connu	nonn	T
	FIX PART FULL HELP GRPH RCRD			FIX PART FULL HELP	GRPH	RCRD	
F	IG.1)		FI	G.2)			
_	1.3 CURRENT DATA 28/7	76		1.3 CURRENT DA	ÌTA	28/	76
¥	LCZR SOLENOLD OFF	*	~		OFF		•
×	LC/B SOL. HONITOR ON		×	LC/B SOLL MONITOR	OFF		
×	CUBRENT GEAR POS. 1 GEAR		×	CURRENT GEAR POS.	1	GEAR	
×	SHIFT BANGE INDICATOR N	-	×	SHIFT BANGE INDICATOR	D		
×	OIL PRESS SW2(LC/B) OFF		×	OIL PRESS SW2(LC/B)	OFF		
	OIL PRESS SW1(FR/B)			OIL PRESS SW1(FR/B)			
	BRAKE SWITCH			BRAKE SWITCH			
	REVERSE LAMP			REVERSE LAMP			
_		T			annu		Ŧ
	IC 2)			FIX PART FULL HELP	GRPH	RCRD	
	G.3)		FU	G.4)			
	1.3 CURRENT DATA 28/3	76		1.3 CURRENT DA	TA	28/1	6
×	LCZB SOLENOLD ON	-		LC/R SOLENOLD	OFF		^
×	LC/B SOL. MONITOR OFF		, v	LC/B SOLEMOID	OFF		
×	CURRENT GEAR POS. 2 GEAR		×	CURRENT GEAR POS.	3	GEAR	
×	SHIFT BANGE INDICATOR -		×	SHIFT RANGE INDICATOR	-		-
×	OIL PRESS SW2(LC/B) ON	I. covi	×	OIL PRESS SW2(LC/B)	OFF		
	OIL PRESS SW1(FR/B)	, <u> </u>		OIL PRESS S₩1(FR/B)			-
	BRAKE SWITCH			BRAKE SWITCH		_	
	REVERSE LHIT	- 1		REVERSE LAMP			1
	FIX PART FULL HELP GRPH BCRD	ديجيناخ		FIX PART FULL HELP	GRPH	RCRD	-
F	IG.5)	<u> </u>	FI	G.6)		TIOND	
_	1.3 CURRENT DATA 28/7	76		1.3 CURRENT D	ATA	28/	76
		*					
×	LC/B SOLENOID OFF		×	LC/B SOLENOID	OFF		
×	LC/B SOL. MONITOR ON		×	LC/B SOL. MONITOR	ON		
×	CUBRENT GEAR POS. 4 GEAR	-	×	CURRENT GEAR POS.	5	GEAR	
×	SHIFT RANGE INDICATOR -			SHIFT RANGE INDICATOR	-		
-	OIL PRESS SW2(LC/B) OFF		^	OIL PRESS SW2(LC/B)	UFF		Ł
	OIL FREOD OWICEN B)			BRAKE SWITCH			
	BRAKE SWITCH						
	BRANE SWITCH REVERSE LAMP			REVERSE LAMP			
	BRAKE SWITCH Reverse lamp	+		REVERSE LAMP			.
	BRAKE SWITCH REVERSE LAMP FIX PART FULL HELP GRPH RCRD	Ŧ		REVERSE LAMP	GRP	I RCRD	•
F	BRAKE SWITCH REVERSE LAMP FIX PART FULL HELP GRPH RCRD G.7)	Ŧ	F	REVERSE LAMP FIX PART FULL HELP] [GRPI	I RCRD	•
FI	BRAKE SWITCH REVERSE LAMP FIX PART FULL HELP GRPH RCRD G.7) 3.1) "P" Range	Ŧ	FIG	REVERSE LAMP FIX PART FULL HELF IG.8) A.5) "D" Range 2nd dea] [GRPH	I RCRD	•
FI FI(BRAKE SWITCH REVERSE LAMP FIX PART FULL HELP GRPH RCRD G.7) G.1) "P" Range G.2) "R" Shifting	•	FIG	REVERSE LAMP FIX PART FULL HELF IG.8) 5.5) "D" Range 2nd gea 6.6) "D" Range 3rd gear	GRPI	I RCRD	.
FI FI FI	BRAKE SWITCH REVERSE LAMP FIX PART FULL HELP GRPH RCRD G.7) G.1) "P" Range G.2) "R" Shifting G.3) "N" Range	•	FIG	REVERSE LAMP FIX PART FULL HELF IG.8) 5.5) "D" Range 2nd gea 6.6) "D" Range 3rd gear 6.7) "D" Range 4th gear] [GRPH	I RCRD	.
FI FI FI FI	BRAKE SWITCH REVERSE LAMP FIX PART FULL HELP GRPH RCRD G.7) G.1) "P" Range G.2) "R" Shifting G.3) "N" Range G.4) "D" Bange 1st gear	T	F FIG FIG FIG	REVERSE LAMP [FIX] [PART] [FULL] [HELF [G.8] (5.5) "D" Range 2nd gea (6.6) "D" Range 3rd gear (7.7) "D" Range 4th gear (8.8) "D" Range 5th gear	GRP	I] RCRD]
	BRAKE SWITCH REVERSE LAMP FIX PART FULL HELP GRPH RCRD G.7) G.2) "R" Shifting G.3) "N" Range G.4) "D" Range 1st gear	•	F FIG FIG FIG	REVERSE LAMP FIX PABT FULL HELF IG.8)] GRP	i RCRD]



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Automatic Transaxle System

harness connector and chassis ground.

3. Measure voltage between terminal "2" of the C06-2

SIGNAL CIRCUIT INSPECTION

1. Disconnect "C06-2" connector.

Specification : approx. 12V

2. IGNITION "ON", ENGINE "OFF"

necessary and go to "Verification of Vehicle Repair" procedure.

NO

Go to "Terminal & connector inspection " procedure.

TERMINAL & CONNECTOR INSPECTION

- 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 then go to "Verification of vehicle repair" procedure.

NO

Go to "Signal circuit Inspection" procedure.



SBLAT6181L

4. Is voltage within specifications?

YES

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

COMPONENT INSPECTION

- 1. Disconnect "C06-2" connector.
- 2. Ignition "OFF".
- 3. Measure resistance between terminal "2" of the C06-2 harness connector and chassis ground.

C06-2

Component side

Specification : approx. $3 \sim 9\Omega$



1.ATF 2 2.LOW COAST BRAKE SOLENOID VALVE 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 4.DIRECT CLUTCH SOLENOID VALVE 6.FRONT BRAKE SOLENOID VALVE 7.INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE)

9.TCCSV

SBLAT6182L

4. Is resistance within specifications?

YES

NO

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. خودر و سامانه (مسئولیت مح

5. 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, Replace "LC/B SOLENOID VALVE" as necessary and Go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

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.

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SBLAT6150

AT-180

Automatic Transaxle System

P0773

COMPONENT LOCATION



GENERAL DESCRIPTION

Low coast brake solenoid valve is turned "ON" or "OFF" by the TCM in response to signals sent from the inhibitor witch, vehicle speed sensor and accelerator pedal position sensor (throttle position sensor). Gears will then be shifted to the optimum position.

DTC DESCRIPTION

This is not only caused by electrical malfunction (circuits open or shorted) but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation.

DTC DETECTING CONDITION [DSL 2.5]

ltem	Detecting Condition	Possible cause
DTC Strategy	Check voltage range	* LOW COAST BRAKE SOLEN-
Enable Conditions	• Vehicle speed \geq 6.2MPH(10km/h)	OID VALVE: LC/B SOLENOID VA-
Threshold value	 Ground short/open :Monitoring value[ON/OFF] "OFF", When the driver output is "ON" B+ short:Monitoring value[ON/OFF] "OFF", When the driver output is "ON" 	 Open or short in circuit Faulty LC/B SOLENOID VALV- E Faulty TCM
Diagnostic Time	more than 0.2sec	
Fail Safe	Locked into 2nd gear.	

Automatic Transaxle System

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[GSL 3.3/3.8]

ltem	Detecting Condition	Possible cause
DTC Strategy	Check voltage range	* LOW COAST BRAKE SOLEN-
Enable Conditions	 10V < Actuator power supply voltage < 16V 	OID VALVE: LC/B SOLENOID VA-
Threshold value	Hardware "IC" check	Open or short in circuit
Diagnostic Time	More than 0.2sec	Faulty LC/B SOLENOID VALV-
Fail Safe	Lock-up control is prohibited(L/U off)	Faulty TCM

MONITOR SCANTOOL DATA

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- Monitor the "LC/B SOLENOID" parameter on the scantool.
- 4. Select "D RANGE" and Operate the vehicle.
- 5. Check "LC/B SOLENOID" parameter value changes while driving.

حیجیتال خودرو سامانه (مسئولیت محدود)

ولین سامانه دیجیتال تعمیرکاران خودرو در ایران



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1.3 CURRENT DATA 28/76 1.3 CURRENT DATA 28/76 4 4 LCZB SOLENOID OFI LC/B SOLENOID OFF * LC/B SOL. MONITOR **ON** ★ LC/B SOL. MONITOR ON CURRENT GEAR POS. GEAR 1 × SHIFT BANGE INDICATOR P × OIL PRESS SW2(LC/B) OFF OIL PRESS SW1(FR/B) BRAKE SWITCH REVERSE LAMP FIX PART FULL HELP GRPH RCRD F FIG.1) 1.3 CURRENT DATA 28/76 4 LC/B SOLENOID OFF × LC/B SOL. MONITOR × 0N CURRENT GEAR POS. 1 GEAR × SHIFT BANGE INDICATOR × Ν OIL PRESS SW2(LC/B) OFF OIL PRESS SW1(FR/B) BRAKE SWITCH REVERSE LAMP FIX PART FULL HELP GRPH RCRD FIG.3) 1.3 CURRENT DATA 28/76 LC/B SOLENOID **ON** LC/B SOL. MONITOR OFF × CURRENT GEAR POS. z GEAR × SHIFT BANGE INDICATOR _ × OIL PRESS SW2(LC/E) ON × OIL PRESS SW1(FR/B) BRAKE SWITCH REVERSE LAMP FIX PART FULL HELP GRPH BCRD FIG.5) F 1.3 CURRENT DATA 28/76 4 LC/B SOLENOID OFF LC/B SOL. MONITOR ON CURRENT GEAR POS. × 4 GEAR SHIFT BANGE INDICATOR ж -× OIL PRESS SW2(LC/B) OFF OIL PRESS SW1(FR/B) BRAKE SWITCH REVERSE LAMP FIX PART FULL HELP GRPH RCRD F

FIG.8) "D" Range 5th gear

FIG.7)

×

×

FIG.1) "P" Range FIG.2) "R" Shifting FIG.3) "N" Range FIG.4) "D" Range 1st gear

6. Does "LC/B SOLENOID" follow the reference data?

YES

Fault is intermittent caused by poor contact in the

Automatic Transaxle System

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×	CURRENT GEAR POS.	1	GEAR		
×	SHIFT RANGE INDICATOR	R		-	
*	OIL PRESS SW2(LC/B)	OFF			
	OIL PRESS SW1(FR/B)				
	BRAKE SWITCH				
	REVERSE LAMP				
	FIX PART FULL HELP	GRPH	BCRD	F	
FI	G.2)				
	1.3 CURRENT DA	ìTA	28/	76	
				▲	
*	LC/B SOLENOID	OFF			
I Ĉ I	LC/B SOL. HUMITUR	UN	ODAD		
Ĵ	CURRENT GEAR PUS.	1 D	GEAR	-	
121	ALL DRESS SHOLLOWDS	D			
	VIL FRESS SW2(LU/B)	OFF			
	REAKE SHITCH				
	REVERSE LAMP				
				Ţ	
	FIX PART FULL HELP	GRPH	RCRD]	
FI	G.4)				
	1.3 CURRENT DA	ITA	28/	76	
×	LC/B SOLENOID	OFF			
×	LC/B SOL. MONITOR	ON			
×	CURRENT GEAR POS.	3	GEAR		
×	SHIFT RANGE INDICATOR	-			
×	OIL PRESS SWZ(LC/B)	OFF			
**	OIL PRESS SW1(FR/B)				
1	BRAKE SWITCH				
	VEARUR THUS				
		CPPH	RCBD	Ŧ	
EL	G 6)	GAPH	Incun		
	a.o,			<i>(</i> 1-	1
\vdash	1.3 CURRENT D	ATA	28/	76	1
×	LC/B SOLENOID	OFF		1	
×	LC/B SOL. MONITOR	ON			
×	CURRENT GEAR POS.	5	GEAR		
×	SHIFT RANGE INDICATOR	-		1	
×	OIL PRESS SW2(LC/B)	OFF			
	OIL PRESS SW1(FR/B)				
	BRAKE SWITCH				
	REVERSE LAMP				
	FIX PART FULL HELD	CBB		<u> </u> T	J
		JUMP	Incu	<u>u</u>	L
F	(4.8)				
FIG	i.5) "D" Range 2nd gea	r			
FIG	i.6) "D" Range 3rd gear				

SBLAT6180L

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

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Automatic Transaxle System

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necessary and go to "Verification of Vehicle Repair" SIGNAL CIRCUIT INSPECTION procedure. 1. Disconnect "C06-2/C106-2" connector. NO 2. IGNITION "ON", ENGINE "OFF" 3. Measure voltage between terminal "2" of the "Terminal & connector Go inspection ► to C06-2/C106-2 harness connector and chassis procedure. ground. **TERMINAL & CONNECTOR INSPECTION** Specification : approx. 12V 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 then go to "Verification of vehicle repair" procedure. NO Go to "Signal circuit Inspection" procedure. C06-2 [DSL 2.5] C106-2 [GSL 3.3/3.8] 1.ATF 2 5 3 4 2 CĽ. 2.LOW COAST BRAKE SOLENOID VALVE 9 8 6 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 10 4.DIRECT CLUTCH SOLENOID VALVE 6.FRONT BRAKE SOLENOID VALVE 7. INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV SBLAT6183L 4. Is voltage within specifications?

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

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Automatic Transaxle System

COMPONENT INSPECTION

- 1. Disconnect "C06-2/C106-2" connector.
- 2. Ignition "OFF".
- 3. Measure resistance between terminal "2" of the C06-2/C106-2 harness connector and chassis ground.

Specification : approx. $3 \sim 9\Omega$



C06-2 [DSL 2.5] C106-2 [GSL 3.3/3.8] Component side

1.ATF 2 2.LOW COAST BRAKE SOLENOID VALVE 3.HIGH&LOW REVERSE CLUTCH SOLENOID VALVE 4.DIRECT CLUTCH SOLENOID VALVE 6.FRONT BRAKE SOLENOID VALVE 7.INPUT CLUTCH SOLENOID VALVE 8.PCSV(LINE PRESSURE CONTROL SOLENOID VALVE) 9.TCCSV

SBLAT6184L

4. Is resistance within specifications?

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

5. ► 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, Replace "LC/B SOLENOID VALVE" as necessary and Go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

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.
- 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.

Automatic Transaxle System

P0819

COMPONENT LOCATION



GENERAL DESCRIPTION

The TRANSMISSION Range Switch sends the shift lever position information to the TCM using a 5V signal. Deciding each TCM range depend on 4 s/w signal. Standard patterns are fixed and these patterns are on the Specification table as listed below. For example, when s/w 1,2,4 are 'ON(0V)' and s/w 3 is 'OFF(5V)', TCM recognizes 'D Range'.

When the shift lever is in the D (Drive) position the output signal of Tansaxle Range Switch is 12V and in all other positions the voltage is 0V. The TCM judges the shift lever position by reading all signals, for the TRANSMISSION Range Switch, simultaneously.

DTC DETECTING CONDITION

Item	Detecting Condition	Possible cause
DTC Strategy	Rationality	OPEN OR SHORT IN CIRCUIT
Enable Conditions	Battery voltage >10V	Faulty TRANSMISSION RAN-
Threshold value	Abnormal input signal is detected.	Faulty TCM
Diagnostic Time	More than 5sec	
Fail Safe	Prevention of manual shift	

DTC DESCRIPTION

The TCM sets this code when patterns are without Specification of the table shown below.

The TRANSMISSION Range Switch has no output signal for an extended period of time.



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SBLAT6260L

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Automatic Transaxle System

SPECIFICATION A/T RANGE PATTERN

	A/T rang	Danga awaitah	Domorko			
SW1	SW2	SW3	SW4	Range swsitch	INCIDAL INS	
OFF	OFF	OFF	OFF	Pst	P start	
OFF	OFF	ON	OFF	Р	Р	
OFF	OFF	ON	ON	P-R	Intermediate	
ON	OFF	ON	ON	R	R	
ON	OFF	ON	OFF	N-R	Intermediate	
ON	OFF	OFF	OFF	Nst	N start	
ON	OFF	OFF	ON	N-D	Intermediate	
ON	ON	OFF	ON	D	D	
OFF	ON	OFF	ON	3	3	
OFF	ON	ON	ON	2	2	
OFF	ON	ON	OFF	1	1	
	Irregular	Otl	ner			

[OFF= 5V, ON = 0V]

Monitor Scantool Data

- 1. Connect scantool to data link connector(DLC).
- 2. Ignition "ON" & Engine "OFF".
- 3. Monitor the "SPORTS MODE SELECT S/W, SPORTS MODE UP S/W, SPORTS MODE DOWN S/W " parameter on the scantool.
- 4. Move selector lever to "SPORTS MODE".

Automatic Transaxle System



5. Does "SPORTS MODE SELECT S/W" follow the reference data?

YES

► 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

► Go to "Terminal & connector inspection" procedure.

TERMINAL & CONNECTOR INSPECTION

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

- 1. Connect "M62" connector.
- 2. Ignition "ON" & Engine "OFF"
- 3. Measure voltage between terminal "2" of the "M62" connector and chassis ground.

Specification : approx. 12V

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Automatic Transaxle System



5. Is voltage within specifications?

YES

► Go to "Component inspection" procedure.

NO

▶ Substitute with a known-good "SPORTS MODE SWITCH" and check for proper operation. If the problem is corrected, replace "SPORTS MODE SWITCH" and Go to "Verification Vehicle Repair" procedure.

COMPONENT INSPECTION

- 1. Connect "TCU" connector.
- 2. Ignition "ON" & Engine "OFF".
- 3. Move select lever to "SPORTS MODE" and operate select lever to up and down.
- 4. Measure voltage between terminal "16, 17, 61" of the "TCU" connector(C120) and chassis ground.

Specification : approx. 12V

021 62 99 92 92

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Automatic Transaxle System



SBLAT6264L

5. Is voltage within specifications?

YES

▶ Substitute with a known-good "TCU" and check for proper operation. If the problem is corrected, replace "TCU" and Go to "Verification of Vehicle Repair" procedure.

NO

Check for open or short between "M62" and "C120" harness . Repair as necessary and Go to "Verification of Vehicle Repair" procedure.

VERIFICATION OF VEHICLE REPAIR

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.



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Automatic Transaxle System

P0863

COMPONENT LOCATION



SBLAT6190L

GENERAL DESCRIPTION

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 communications method, which is now widely used to transfer the vehicle data.

یتال خودرو سامانه (مسئولیت محدود)

ه دیجیتال تعمیرکاران خودرو در ایران

DTC DESCRIPTION

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent malfunction detection ability.Many electronic control units are equipped on a vehicle, and each control units shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring.Each control unit transmits/receives data but selectively reads required data only.

Item **Detecting Condition** Possible cause · Open or Short in CAN commu-**DTC Strategy** • Check voltage range nication harness **Enable Conditions** CONTINUOUS • Faulty ECM **Threshold value** • No signal transmitted at CAN module Faulty TCM • More then 2sec **Diagnostic Time** Fail Safe CAN COMMUNICATION IS INHIBITED.

DTC DETECTING CONDITION

Automatic Transaxle System

Signal Waveform

FR	СН	A 1.	0 V	50 u	ε	CH B 1	L.0 V
-							
1		With AL	ក់ដំណែ	Min	CA	N BUS	SHIGH
, n al	la de la	, AN) autoriti i i	1.41.14	Ęi-	+	
n di ti	n, de	WIN	hund	i Alike	V		
					<u>CA</u>	N BUS	LOW
Þ					1		4
			······	0			······································
				0			
			1		1		
		·····	·!·····	() 			······································
ľ	HOLD		M CU	I 28	1EMO	RECD	MENU

MONITOR SCANTOOL DATA

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

	1.3 CURRENT	DATA	02/76	
- (مسئوليت، محدود) ailali	1000	÷.
×	VSS 1(A/T)	0	km∕h 📕	0
×	VSS 2(ECU)	0	km/h	
×	ENGINE SPEED	ر ڪ 736 -	rpn	-
×	TPS OPEN SIGNAL	0.0		
×	ACCEL.FULL SW(CAL.)	OFF		
×	ACCELIDLE SW(CAL.)	ON		
×	CAN FLAG(ECU-TCU)	ОК		
×	CAN FLAG(TX)	ОК		
	FIX PART FULL HE	LP GRPH	RCRD	
FIC	ā.1)			

FIG.1) LOW - SPEED FIG.2) HIGH - SPEED

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

YES

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.



NO

SBLAT6192L

"Terminal & connector Go to inspection procedure.

SBLAT6191L

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AT-192

Automatic Transaxle System

TERMINAL & CONNECTOR INSPECTION

- 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 then go to "Verification of vehicle repair" procedure.

NO

► Go to "Signal circuit Inspection" procedure.

SIGNAL CIRCUIT INSPECTION

- 1. Ignition "OFF".
- 2. Disconnect the "TCM" connector.
- 3. Measure resistance between terminal "6" and "7" of the "TCM" harness connector.

Specification : approx. 120 Ω



M60-1

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.

NO

► 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

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.
- System performing to specification at this time.

SBLAT6193L

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Automatic Transaxle System

AT-193

SBI AT6195I

P0893

COMPONENT LOCATION



GENERAL DESCRIPTION

While monitoring clutch engagement using Oil pressure switch of clutch pressure circuit, if abnormal Inter-lock engagement pattern is dettected, 'Fail safe' mode is activated.

DTC DESCRIPTION

In case of abnormal shift pattern, the DTC-code is set(Refer to Specification as below).

DTC DETECTING CONDITION

Item	Detecting Condition	Possible cause
DTC Strategy	Check voltage range	Open or short in circuit
Enable Conditions	Time after gear shifting	 Faulty FLUID PRESSURE SW- ITCH F(H & I R/C)
Threshold value	Each fluid pressure switch agree with the patterns in fig.3 interlock	Faulty SHIFT C/U
Diagnostic Time	More then 2sec	
Fail Safe	Locked into 2nd or 4th or 5th gear.	

SBLAT6196L

AT-194

Automatic Transaxle System

Specification

*** DETECTING PATTERN AND FAIL SAFE**

					: Don't	care	④ Oi	pressure Ol	N/OFF
			GEAR		PRES	SURE S	WITCH		Fail cafe
		RANGE	POSITION	I/C	H&LR/C	D/C	Fr/B	LC/B	i ali sale
	1	D,4,3,2,			0		0	0	Fixed at 4th gear
	2	1,M	I		0			0	Fixed at 4th gear
	3	2,M				0		0	Fixed at 4th gear
INTER	4		2			0	0		Fixed at 4th gear
LOCK	5				0	0			Fixed at 2nd gear
PATTE	6	D,4,3,1VI	3			0	0		Fixed at 4th gear
RN	7	DAM	4		0	0			Fixed at 2nd gear
	8	D,4,1VI	4	0		0			Fixed at 5th gear
	9		F	Ó	O I		0		Fixed at 2nd gear
	10	D,IVI	5	0			0		Fixed at 4th gear

MONITOR SCANTOOL DATA

- 1. Connect scantool to data link connector(DLC).
- 2. Engine "ON".
- 3. Monitor the "FLUID PRESSURE SWITCH" parameter on the scantool.
- 4. Select "D RANGE or SPORTS MODE" and Operate the vehicle.
- Check "FLUID PRESSURE SWITCH" parameter value changes while driving.

Automatic Transaxle System





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SBLAT6197L

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Automatic Transaxle System

6. Does "FLUID PRESSURE SWITCH" follow the reference data?

YES

► 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

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

VERIFICATION OF VEHICLE REPAIR

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.
 - System performing to specification at this time.



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Automatic Transaxle System

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COMPONENT LOCATION



SBLAT6200L

GENERAL DESCRIPTION

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 communications method, which is now widely used to transfer the vehicle data.

یتال خودر و سامانه (مسئولیت محدود

ه دیجیتال تعمیرکاران خودرو در ایران

DTC DESCRIPTION

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent malfunction detection ability.

Many electronic control units are equipped on a vehicle, and each control units shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring.

Each control unit transmits/receives data but selectively reads required data only.

Item	Detecting Condition	Possible cause	
DTC Strategy	Check voltage range	Open or Short in CAN commu-	
Enable Conditions	 IG "ON" Battery voltage > 10V Input speed > 300rpm 	nication harness Faulty ECM Faulty TCM 	
Threshold value	BUS OFF		
Diagnostic Time	More than 2sec		
Fail Safe	Default value		

DTC DETECTING CONDITION

AT-197

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021 62 99 92 92

AT-198

Automatic Transaxle System

Signal Waveform

FR	СН	A 1	.0V	50	υS	СН В	L.0 V
W.C.	i. Min	WHAT		mini	m C/	AN BU	S HIGH
P 1	U, in	3			نىسىيە مىرسىيە	anna an	
	l i l	ALLER		հերթո	Jul		
					C/	AN BUS	
Þ							
	HOLD	ZO	om] [URS	MEMO	RECD	MENU

Monitor Scantool Data

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

	1.11 CURRENT DATA 01/	59	•
(ار و سامانه (مسئولیت محدود	A 2	>,
×	ENGINE SPEED 2438 rpm	-	0
×	VEHICLE SPEED 123.0km/h		
×	ACCEL. POSITION SENSOR 11.0 %	14	<u>ب</u>
×	TPS SENSOR 12.2 %		
×	SNOW(HOLD) SW(2W ONLY) OFF		
×	4L SWITCH OFF		
	ABS ACTIVA SIG(OPTION)		
	ACC OFF FLAG		
		Ŧ	
	FIX PART FULL HELP GRPH RCRD]	
FIC	G.1)		-

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

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

YES

► 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

1.11	CURRENT DATA	01/59
شركيت		4
× ENGINE SPEED	243	38 rpm
× VEHICLE SPEED	123	3.0km/h
× ACCEL. POSITION	SENSOR 11.	.0%
× TPS SENSOR	12.	.2 %
× SNOW(HOLD) SWO	2W ONLY) OF	F
× 4L SWITCH	OFI	F
ABS ACTIVA SIC	G(OPTION)	
ACC OFF FLAG		
		T
FIX PART FU	JLL HELP GRI	PH RCRD
FIG.2)		

SBLAT6272L

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.

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SBLAT6271L

021 62 99 92 92

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Automatic Transaxle System

TERMINAL & CONNECTOR INSPECTION

- 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.



► Go to "Signal circuit inspection" procedure.

SIGNAL CIRCUIT INSPECTION

- 1. Ignition "OFF".
- 2. Disconnect the "TCM" connector.
- 3. Measure resistance between terminal "65" and "87" of the "TCM" harness connector.

Specification : Approx. 120Ω



YES

► 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.

NO

► 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.

AT-200

Automatic Transaxle System

U0100

COMPONENT LOCATION



SBLAT6200L

GENERAL DESCRIPTION

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 communications method, which is now widely used to transfer the vehicle data.

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DTC DESCRIPTION

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent malfunction detection ability.

Many electronic control units are equipped on a vehicle, and each control units shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring.

Each control unit transmits/receives data but selectively reads required data only.

Item	Detecting Condition	Possible cause	
DTC Strategy	Check voltage range	Open or Short in CAN commu-	
Enable Conditions	 IG "ON" Battery voltage > 10V Input speed > 300rpm 	nication harnessFaulty ECMFaulty TCM	
Threshold value	Lost communication		
Diagnostic Time	More than 2sec		
Fail Safe	Default value		

DTC DETECTING CONDITION

Automatic Transaxle System

Signal Waveform

FR	СН	A 1.	øν	50	υS	CH B 1	.0V
	<u>.</u>						
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Monitor Scantool Data

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

			0
	1.11 CURRENT DATA 01/	59	
(درو سامانه (مسئولیت محدود	.≜2	>
×	ENGINE SPEED 2438 rpm	-	0
×	VEHICLE SPEED 123.0km/h		
×	ACCEL. POSITION SENSOR 11.0 %	1.1	2
×	TPS SENSOR 12.2 %		
×	SNOW(HOLD) SW(2W ONLY) OFF		
×	4L SWITCH OFF		
	ABS ACTIVA SIG(OPTION)		
	ACC OFF FLAG		
		Ŧ	
	FIX PART FULL HELP GRPH RCRD]	
FIG	à.1)		-

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

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

YES

► 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

-		
×.	1.11 CURRENT DATA 01/3	59
	شىكى:	
×	ENGINE SPEED 2438 rpm	
×	VEHICLE SPEED 123.0km/h	
×	ACCEL. POSITION SENSOR 11.0 %	
×	TPS SENSOR 12.2 %	
×	SNOW(HOLD) SW(2W ONLY) OFF	
×	4L SWITCH OFF	
	ABS ACTIVA SIG(OPTION)	
	ACC OFF FLAG	
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	FIX PART FULL HELP GRPH RCRD	1
FIC	G.2)	-

SBLAT6272L

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.

AT-201

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AT-202

Automatic Transaxle System

TERMINAL & CONNECTOR INSPECTION

- 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.



► Go to "Signal circuit inspection" procedure.

SIGNAL CIRCUIT INSPECTION

- 1. Ignition "OFF".
- 2. Disconnect the "TCM" connector.
- 3. Measure resistance between terminal "65" and "87" of the "TCM" harness connector.

Specification : Approx. 120Ω



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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.

NO

► 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

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.

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Automatic Transaxle System

Automatic Transaxle

COMPONENTS



- 1. Adapter case (4WD)
- 2. Parking gear
- 3. Output shaft
- 4. Control valve upper body
- 5. Control valve lower body
- 6. Separator plate assembly
- 7. Rear sun gear
- 8. Rear sun plate
- 9. Middle sun gear assembly
- 10. Rear annulus gear assembly
- 11. Rear annulus cell
- 12. Automatic transmission case

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- 13. Converter housing
- 14. Oil pump cover

- 15. Oil pump housing
- 16. Stator
- 17. Impeller assembly
- 18. Turbine & lockup assembly
- 19. Torque converter cover assembly
- 20. Front pinion gear
- 21. Front planetary carrier
- 22. Front sun gear
- 23. Front brake drum 24. Rear pinion gear
- 25. Rear planetary carrier plate
- 26. Middle annulus gear
- 27. Middle pinion gear
- 28. Middle planetary carrier

- 29. Input clutch drum
- 30. Input shaft
- 31. Front annulus gear
- 32. Direct clutch return spring
- 33. Direct clutch piston
- 34. Reverse brake hub
- 35. Direct clutch assembly
- 36. High & low reverse clutch return spring

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- 37. High & low reverse clutch piston
- 38. High & low reveres clutch assembly
- 39. Low coast brake clutch assembly
 - 40. Forward one-way clutch
- 41. Forward brake clutch assembly
- 42. Low coast brake hub

AT-203

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AT-204

Automatic Transaxle System



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



AKAF051A

2. Drain the automatic transmission fluid after removing the drain plug (A).



Tightening torque :

49.1 ~ 58.9 N.m (5.0 ~ 6.0 kgf.m, 36.2 ~ 43.4lb-ft)

[Front side]



SBLAT6300L



- 4. Remove the under cover.
- 5. Disconnect the ATF oil cooler hose.
- 6. Remove the transmission oil level gage pipe.

Automatic Transaxle System

8. Remove the front propeller shaft (A).

Tightening torque :

Part time 4WD: $25.5 \sim 29.4$ N.m ($2.6 \sim 3.0$ kgf.m, $18.8 \sim 21.7$ lb-ft) Full time 4WD: $49.1 \sim 58.9$ N m ($5.0 \sim 6.0$ kgf m, $36.2 \sim 10^{-10}$

Full time 4WD: 49.1 \sim 58.9 N.m (5.0 \sim 6.0 kgf.m, 36.2 \sim 43.4lb-ft)

[Front side]

[Rear side]





SBLAT6303L

SBLAT6302L

9. Remove the front muffler (A).

Tightening torque :

 $42.2 \simeq 60.8$ N.m (4.3 $\simeq 6.2$ kgf.m, 31.1 ~ 44.9 lb-ft)



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10. Disconnect the transfer case connector (4WD).



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AT-205

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AT-206

11. Disconnect the transmission connector (3ea).



Automatic Transaxle System

13. Remove the bellhousing cover.

Tightening torque :

 $9.8 \simeq 11.8 \text{ N.m}$ (1.0 $\simeq 1.2 \text{ kgf.m},$ 7.2 $\sim 8.7 \text{ lb-ft})$

- 14. Remove the drive plate (A) and the torque converter mounting bolt (6ea).
- 15. Remove the mounting bolt after rotating the crankshaft pully.



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16. Remove the transmission housing mounting bolt.



AKAF051J

AKAF051H

SBLAT6304L

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12. Remove the starter motor.

26.5 ~ 33.4 N.m (2.7 ~ 3.4 kgf.m, 19.5 ~ 24.6 lb-ft)

Tightening torque :

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AT-207

Automatic Transaxle System

17.Remove the transmission mounting (A) and the cross member (B) with a jack.



AKAF051K

Tightening torque :

Bolt (C): 39.2 \sim 49.1 N.m (4.0 \sim 5.0 kgf.m, 28.9 \sim 36.2 lb-ft)

Bolt (D): 19.6 ~ 28.4 N.m (2.0 ~ 2.9 kgf.m, 14.5 ~21.0 lb-ft)

Installation

1. Installation is the reverse of removal.

After replacement or reinstallation procedure of the automatic transaxle assembly, must perform procedures below.

- Power steering fluid replacement and air bleeding (Refer to "General information" in ST group.)
- Adding automatic transaxle fluid. (Refer to "automatic transaxle assembly" in this group.)



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18. Remove the transmission.