

## AT-2

## Automatic Transmission System

## General Information

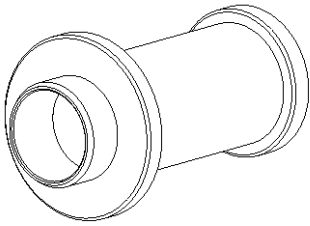
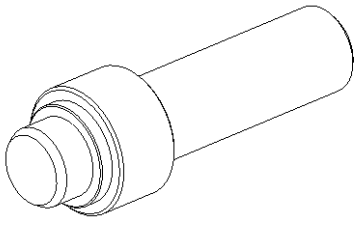
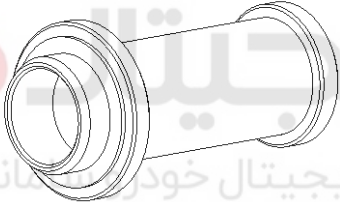
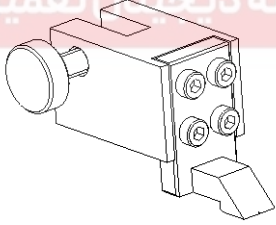
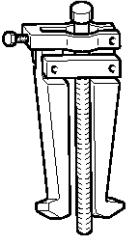
## Specifications

Type of A/T		TB-65N	TB-60N
Engine		λ3.3	λ3.8
Stall torque ratio		1.85	
Stall revolution (rpm)		2444	2493
Oil pump system		Trochoid pump (Engine drive)	
Gear ratio	1st	3.538	3.520
	2nd	2.060	2.042
	3rd	1.404	1.400
	4th	1.000	1.000
	5th	0.713	0.716
	6th	0.582	0.586
	Rev.	3.168	3.224
Clutch Number of disc	C1	4	4
	C2	5	5
	C3	5	5
	C4	4	3
Brake Number of disc	B1	3	3
	B2	4	4
	B3	4	4
	B4	6	4
One-way Clutch		4[F1,F2,F3,F4]	
Solenoid	3-way	5 [S1,S2,S3,S4,SR]	
	Linear	4 [SLT,SLU,SL1,SL2]	
Line pressure	D	idle: 358~428 kPa	idle: 358~428 kPa
		stall: 534~672 kPa	stall: 534~672 kPa
	R	idle: 1159~1255 kPa	idle: 1207~1303 kPa
		stall: 1355~1539 kPa	stall: 1400~1584 kPa
ATF		NWS-9638	

# General Information

# AT-3

## Special Service Tools

Tool (Number and name)	Illustration	Use
09452-3M100 Oil seal installer	 <p style="text-align: center;">SBHAT8031D</p>	Oil seal (for Oil pump) installer
09452-3M200 Oil seal installer	 <p style="text-align: center;">SBHAT8030D</p>	Oil seal (for Flange yolk) installer
09452-3M300 Oil seal installer	 <p style="text-align: center;">SBHAT8032D</p>	Oil seal (for Extension housing) installer
09452-3M400 Neutral position adjuster	 <p style="text-align: center;">SBHAT8033D</p>	Neutral position adjuster for Neutral start switch
09455-32200 Oil seal puller	 <p style="text-align: center;">UMQG010A</p>	Oil seal (for Oil pump) remover

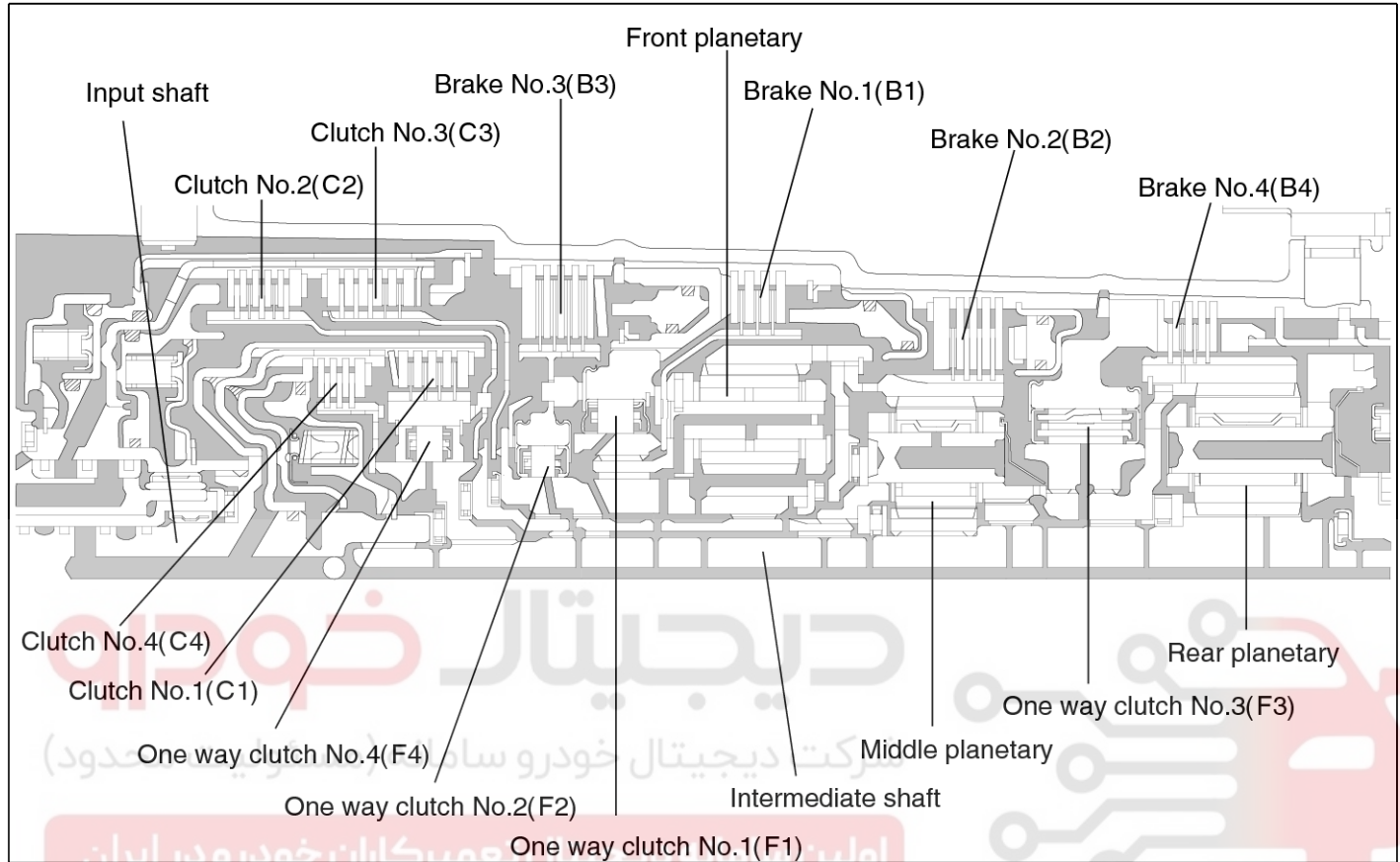
# AT-4

# Automatic Transmission System

## Automatic Transmission System

### Description

### Operations Of Clutches And Brakes



SBHAT9022L

Component	Function
C1	Clutch No.1 Connect input shaft to intermediate shaft through one way clutch No.4 (F4)
C2	Clutch No.2 Connect input shaft to middle planetary gear carrier
C3	Clutch No.3 Connect input shaft to front sun gear
C4	Clutch No.4 Connect input shaft to intermediate shaft
B1	Brake No.1 Lock front planetary gear carrier
B2	Brake No.2 Lock front & middle ring gear
B3	Brake No.3 Lock outer race of one way clutch No.2 (F2)
B4	Brake No.4 Lock rear ring gear
F1	OWC No.1 Lock counterclockwise rotation of front planetary carrier.
F2	OWC No.2 Lock counterclockwise rotation of front sun gear, when B3 operations.
F3	OWC No.3 Lock counterclockwise rotation of rear ring gear. Lock counterclockwise rotation of middle planetary carrier.
F4	OWC No.4 Lock counterclockwise rotation of intermediate shaft, when C1 operations.

# Automatic Transmission System

## AT-5

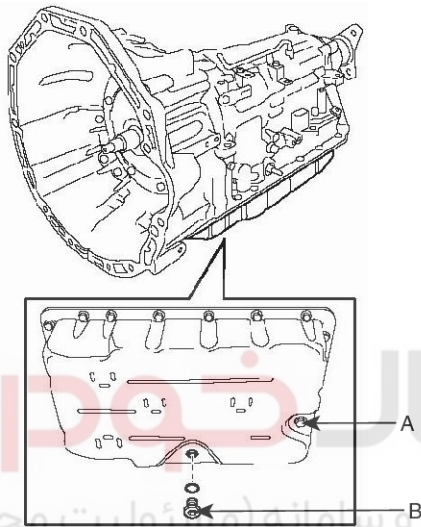
### Inspection And Adjustment

#### Procedure Of ATF Level Adjusting

1. Park the vehicle on a flat load and lock the tires.
2. Shift the shift lever to "P" range. Do not start the engine.
3. Using a TORX wrench, remove the overflow plug (B) and the gasket under 30°C(86°F) of ATF temperature.

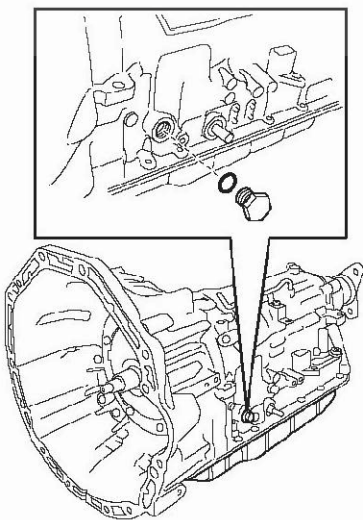
#### ⚠CAUTION

Be sure not to remove the drain play (A).



SBHAT9023L

4. Remove the filling plug and the "O" ring.  
(If ATF drops, go to step 6)



SBHAT8052D

5. Check if ATF drops from the overflow hole. If ATF does not drop, add ATF until it drops.

#### Specified AFT : NWS-9638

6. Using a TORX wrench, install the overflow plug lightly to stop leakage.
7. Install the filling plug lightly to stop leakage.
8. Start the engine.
9. Wait until ATF temperature has reached the appropriate level. (3.3L: 36°C(97°F), 3.8L: 35°C(95°F))

#### ⚠CAUTION

Do not raise ATF temperature by "Stall test"

10. Shift through all ranges, from "P" to "D". Stay in each range for more than 2 seconds.  
Perform this step twice, and then return to "P".
11. Remove filling plug and add ATF(3.8L:0.2L, 3.3L: 0.3L) from the filling hole.

#### Specified AFT : NWS-9638

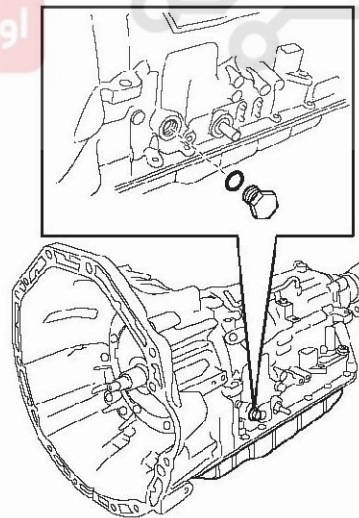
12. Coat a new "O" ring with ATF, and instal it to the filling plug.

#### O-ring size:

inner dia.-15.41mm(0.61in), thickness-2.21mm(0.087in)

#### Tightening torque :

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



SBHAT8052D

13. Using a TORX wrench, remove the overflow plug and the gasket.

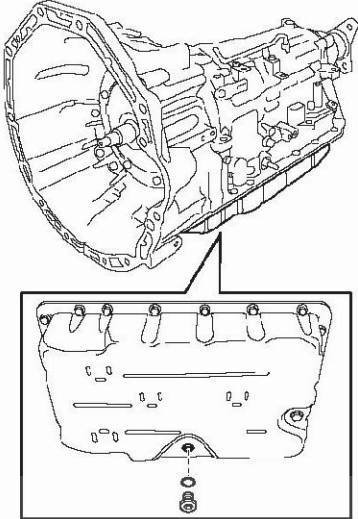
## AT-6

## Automatic Transmission System

14. Check that the ATF flows out of the overflow hole.

Wait until there is no more ATF flowing out of the overflow hole.

(ATF temperature : 36-41°C(97-106°F)(3.3L), 35-39°C(95-102°F)(3.8L))



SBHAT8051D

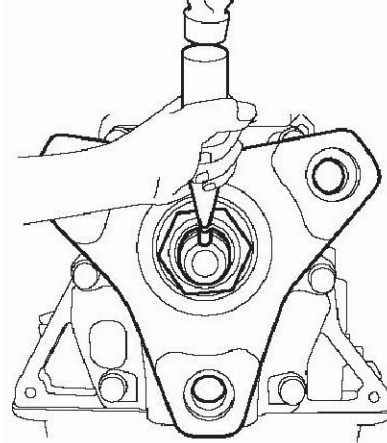
15. Using a TORX wrench, install the overflow plug with a new gasket.

**Tightening torque :**

17.9~23 Nm(1.79~2.3 kgf.m, 12.95~16.6 lb-ft)

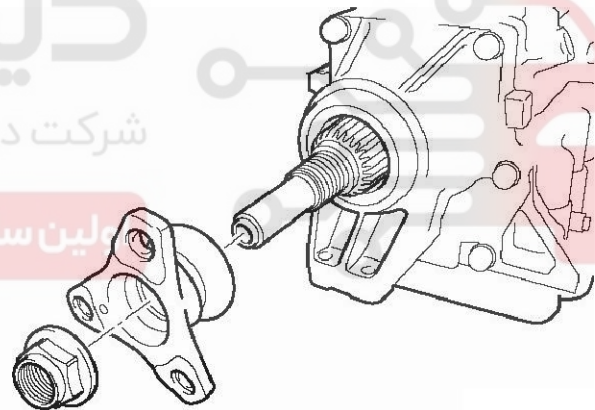
**Replacement Of Flange Yoke Assembly**

1. Remove the propellar shaft assembly. (refer to Propellar shaft in DS group)
2. Using a hammer and chisel, loosen the staked part of the nut.



SBHAT8054D

3. Remove the nut and flange yoke.



SBHAT8055D

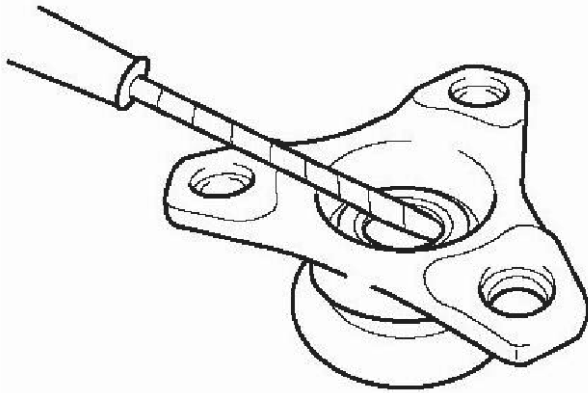
# Automatic Transmission System

## AT-7

4. Remove the oil seal from the flange yoke.

**CAUTION**

Be careful not to damage the flange yoke.



SBHAT8056D

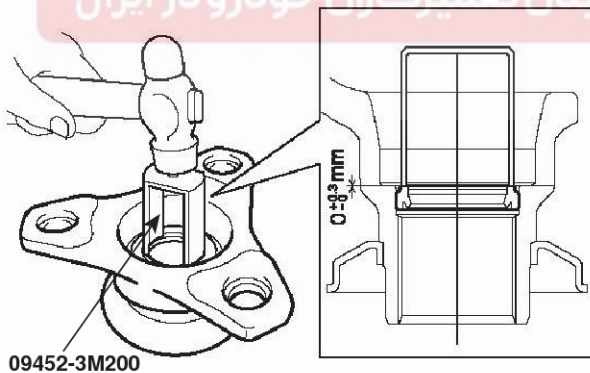
5. Using the special sevice tool(09452-3M200) and a hammer, install a new oil seal to the flange yoke.

**Specification :**

0 + 0.3mm(0.012in) (shown in the figure)

**CAUTION**

- Be careful not to damage the flange yoke oil seal.
- Be careful not to damage the flange yoke.



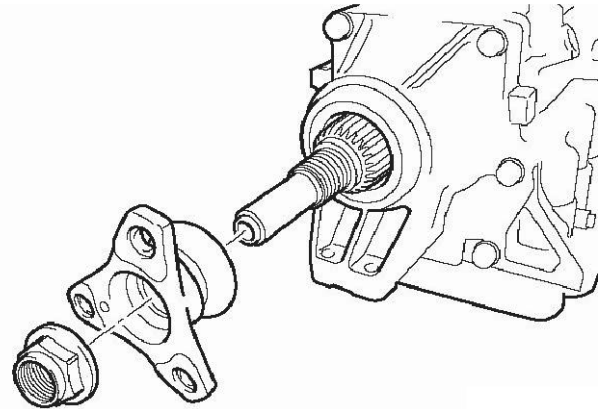
09452-3M200

SBHAT8057D

6. Install the flange yoke to the output shaft with a new nut.

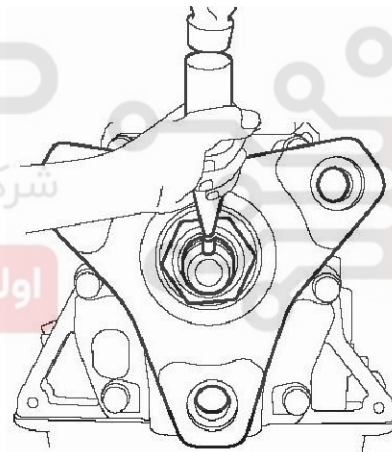
**Tightening torque :**

11.7~14.0 Nm(1.17~1.40 kgf.m, 8.46~10.12 lb-ft)



SBHAT8058D

7. Using a hammer and chisel, stake the nut.



SBHAT8059D

8. Install the propellar shaft assembly. (refer to Propellar shaft in DS group)

**Replacement for Oil seal of Extension housing assembly**

1. Remove the propellar shaft assembly. (refer to Propellar shaft in DS group)
2. Remove the flange york. (refer to Flange york replacement)

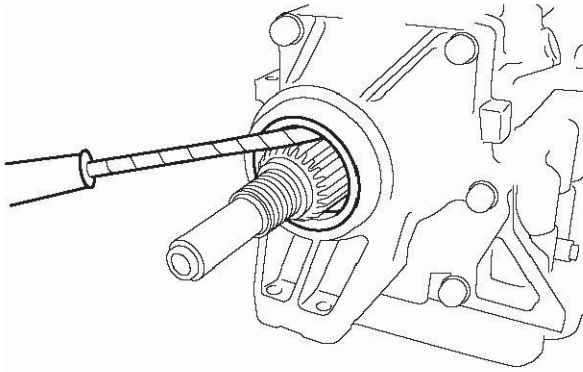
# AT-8

# Automatic Transmission System

3. Remove the oil seal from the extension housing.

**CAUTION**

- Be careful not to damage the extension dust deflector.
- Be careful not to damage the extension housing.



SBHAT8060D

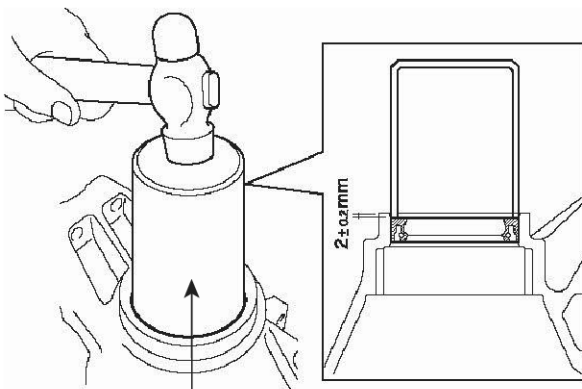
4. Using the special service tool(09452-3M300) and a hammer, install the new oil seal to the extension housing assembly.

**Specification :**

2 ±0.2mm(0.0787 ±0.0078in) (From the end of the extension housing)

**CAUTION**

- Be careful not to damage the extension dust deflector.
- Be careful not to damage the extension housing.



09452-3M300

SBHAT8061D

5. Coat the oil seal lip with grease.

6. Install the flange yolk. (refer to Flange yolk replacement)

7. Install the propellar shaft assembly. (refer to Propellar shaft in DS group)

**Replacement for Oil seal of Front oil pump assembly**

1. Drain ATF by removing the drain plug and the gasket from the oil pan.

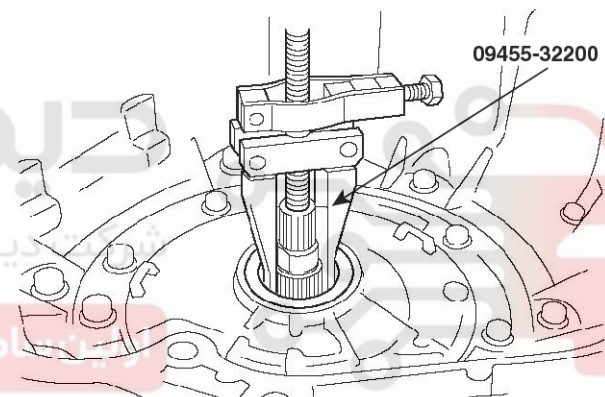
2. Remove the A/T assembly (refer to Automatic transmission Removal)

3. Remove the torque converter assembly.

4. Using the special service tool(09455-32200), remove the oil seal from the oil pump assembly

**CAUTION**

Be careful not to damage the bushing and the oil pump assembly.

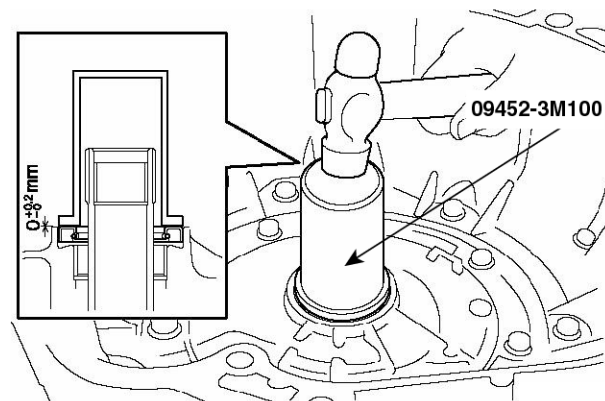


SBHAT8062D

5. Using the special service tool(09452-3M100) and a hammer, install the new oil seal to the oil pump assembly. Coat the oil seal lip with grease.

**Specification :**

0 + 0.2mm(0.0078in) (From the end of the pump assembly)



SBHAT8063D

# Automatic Transmission System

## AT-9

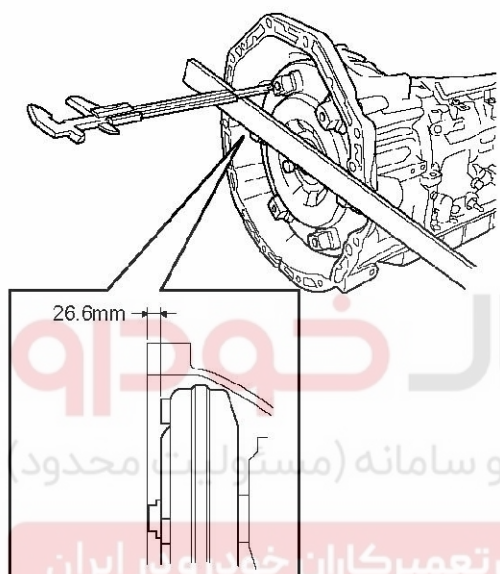
6. Using a screwdriver, position the drive gear on the oil pump assembly in the center. Then install the torque converter assembly on the A/T assembly.

### ⚠ CAUTION

- Be careful not to damage the oil seal.
- Be careful not to drop the torque converter.

7. Measure the dimension from the end face of the housing to the torque converter assembly as shown in the figure, and check that the torque converter assembly is installed properly.

**Specification :** 26.6mm(1.047in)



SBHAT8064D

8. Install the A/T assembly (refer to Automatic transmission Installation)
9. Refill ATF. (refer to Procedure of ATF level adjusting)





# AT-10

# Automatic Transmission System

## Troubleshooting

### How to perform initial learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### 1. Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the special tester and make sure it is between 50°C(122°F) and 120°C(248°F). If the oil temperature is outside this range, work to bring in inside the range.

#### **CAUTION**

**Do not raise the oil temperature by stalling the engine.**

#### **NOTICE**

*If the oil temperature is not between 50 and 120°C, initial learning cannot be performed.*

*Before learning, check for variable speed shock or shift shock.*

#### 2. Gear shift control learning

In D, with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80km/h(50mi/h) or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

#### 3. Check learning results

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

## DTC List

No.	DTC	DTC Description	Remark
1	P0601	Internal Control Module Memory Check Sum Error	
2	P0603	Internal Control Module Keep Alive Memory (KAM) Error	
3	P0604	Internal Control Module Random Access Memory (RAM) Error	
4	P0707	Transmission Range Sensor Circuit Low Input	
5	P0708	Transmission Range Sensor Circuit High Input	
6	P0711	Transmission Fluid Temperature Sensor "A" Circuit Range/Performance	
7	P0712	Transmission Fluid Temperature Sensor "A" Circuit Low Input	
8	P0713	Transmission Fluid Temperature Sensor "A" Circuit High Input	
9	P0717	Input/Turbine Speed Sensor "A" Circuit No Signal	
10	P0722	Output Speed Sensor Circuit No Signal	
11	P0741	Torque Converter Clutch Circuit Performance or Stuck Off	
12	P0742	Torque Converter Clutch Circuit Stuck On	
13	P0751	Shift Control Solenoid Valve "A" Performance or Stuck Off(S1)	
14	P0752	Shift Control Solenoid Valve "A" Stuck On(S1,S4)	
15	P0756	Shift Control Solenoid Valve "B" Performance or Stuck Off(S2)	
16	P0757	Shift Control Solenoid Valve "B" Stuck On(S2)	
17	P0761	Shift Control Solenoid Valve "C" Performance or Stuck Off(S3)	
18	P0762	Shift Control Solenoid Valve "C" Stuck On(S3)	
19	P0766	Shift Control Solenoid Valve "D" Performance or Stuck Off(S4)	

# Automatic Transmission System

## AT-11

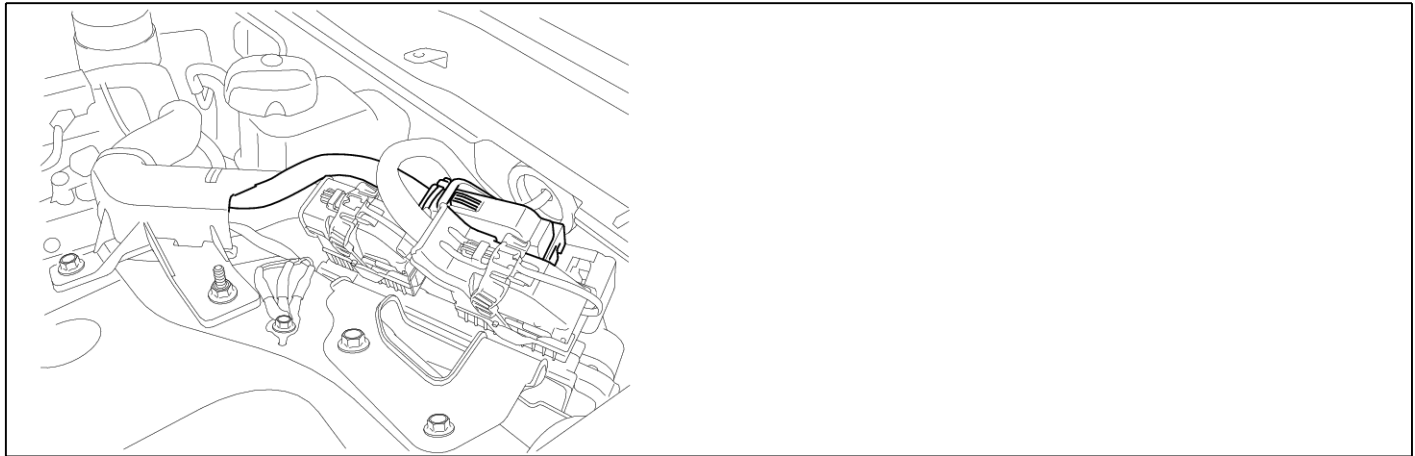
No.	DTC	DTC Description	Remark
20	P0781	1-2 Shift	
21	P0813	Reverse Output Circuit	
22	P0882	Battery Voltage Low Supply	
23	P0961	Line Pressure Control Solenoid Valve Feedback Current Stuck(SLT)	
24	P0962	Line Pressure Control Solenoid Valve Circuit Low (SLT)	
25	P0963	Line Pressure Control Solenoid Valve Circuit Low High (SLT)	
26	P0965	Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL2)	
27	P0966	Clutch Pressure Control Solenoid Valve Circuit Low(SL2)	
28	P0967	Clutch Pressure Control Solenoid Valve Circuit High(SL2)	
29	P0969	Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL1)	
30	P0970	Clutch Pressure Control Solenoid Valve Circuit Low(SL1)	
31	P0971	Clutch Pressure Control Solenoid Valve Circuit High(SL1)	
32	P0973	Shift Control Solenoid Valve "A" Circuit Low(S1)	
33	P0974	Shift Control Solenoid Valve "A" Circuit High(S1)	
34	P0976	Shift Control Solenoid Valve "B" Circuit Low(S2)	
35	P0977	Shift Control Solenoid Valve "B" Circuit High(S2)	
36	P0979	Shift Control Solenoid Valve "C" Circuit Low(S3)	
37	P0980	Shift Control Solenoid Valve "C" Circuit High(S3)	
38	P0982	Shift Control Solenoid Valve "D" Circuit Low(S4)	
39	P0983	Shift Control Solenoid Valve "D" Circuit High(S4)	
40	P0985	Shift Control Solenoid Valve "E" Circuit Low(SR)	
41	P0986	Shift Control Solenoid Valve "E" Circuit High(SR)	
42	P2762	Torque Converter Clutch Control Solenoid Valve Feedback Current Stuck(SLU)	
43	P2763	Torque Converter Clutch Control Solenoid Valve Circuit High (SLU)	
44	P2764	Torque Converter Clutch Control Solenoid Valve Circuit Low (SLU)	
45	U0001	High Speed CAN Communication Bus off	
46	U0100	Lost Communication With ECM/PCM "A"	
47	U0122	Lost Communication With Vehicle Dynamics Control Module	

# AT-12

# Automatic Transmission System

## P0601 Internal Control Module Memory Check Sum Error

### Component Location



SBHAT8499D

### General Description

A malfunction is detected by using a checksum technique for verifying data. The digital data is composed of zeros and ones. A checksum is the total of all ones in a string of data. By comparing the checksum value with a stored value, a malfunction can be detected.

### DTC Description

By comparing the checksum value with a stored value in flash ROM, a malfunction can be detected after IG ON. ( MIL : 1 Driving Cycle)

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• Checksum	• Faulty TCM
Enable Conditions	• "IG KEY" ON	
Threshold Value	• Different from correct CHECKSUM value in flash ROM	
Diagnostic Time	• More than 1 time different value detection	
Fail Safe	• Fixed at 4th gear	

### Component Inspection

1. Ignition "ON" & Engine "OFF".
2. Connect scantool and check DTC.
3. Erase the DTC with scantool.
4. After turning IG OFF to IG ON twice or three times, check DTC again.

5. Does the scantool show same DTC again ?

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

**NO** ▶ Fault is intermittent caused by poor contact in the sensor's and/or PCM's connector or was repaired and PCM memory was not cleared. Thoroughly check connectors for looseness, poor connection, ending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and go to "Verification of Vehicle Repair" procedure.

# Automatic Transmission System

## AT-13

### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C( 122 °F) and 120°C( 248 °F). If the ATF temperature is outside this range, work to bring the range.

#### CAUTION

**Don't raise the oil temperature by stalling the engine.**

(Reference)

If the oil temperature is not between 50°C( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

#### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

#### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

#### STEP 4) Check learning results

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

### How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### 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 scan tool, 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-14

## Automatic Transmission System

## P0603 Internal Control Module Keep Alive Memory (KAM) Error

## Component Location

Refer to DTC P0601 : Internal Control Module Memory Check Sum Error.

## General Description

Refer to DTC P0601 : Internal Control Module Memory Check Sum Error.

## DTC Description

By comparing the checksum value in RAM with a stored value in EEPROM, a malfunction can be detected after IG ON.

( MIL : 1 Driving Cycle)

## DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• Read / write Error	• Faulty TCM
Enable Conditions	• "IG KEY" ON	
Threshold Value	• Checksum in RAM is different from EEPROM	
Diagnostic Time	• More than 1 time different value detection	
Fail Safe	• TCU uses the default value as the initial value for EEPROM	

## Component Inspection

1. Ignition "ON" & Engine "OFF".
2. Connect scantool and check DTC.
3. Erase the DTC with scantool.
4. After turning IG OFF to IG ON twice or three times, check DTC again.
5. Does the scantool show same DTC again ?

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

**NO** ▶ Fault is intermittent caused by poor contact in the sensor's and/or PCM's connector or was repaired and PCM memory was not cleared. Thoroughly check connectors for looseness, poor connection, ending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and go to "Verification of Vehicle Repair" procedure.

## How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

## Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C ( 122 °F) and 120°C ( 248 °F). If the ATF temperature is outside this range, work to bring the range.

## ⚠ CAUTION

**Don't raise the oil temperature by stalling the engine.**

## (Reference)

If the oil temperature is not between 50°C ( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

# Automatic Transmission System

## AT-15

### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

### STEP 4) Check learning results

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

### How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### Verification of Vehicle Repair

Refer to DTC P0601 : Internal Control Module Memory Check Sum Error.



## AT-16

## Automatic Transmission System

## P0604 Internal Control Module Random Access Memory (RAM) Error

## Component Location

Refer to DTC P0601 : Internal Control Module Memory Check Sum Error.

## General Description

Refer to DTC P0601 : Internal Control Module Memory Check Sum Error.

## DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• Read / write error	• Faulty TCM
Enable Conditions	• IG ON	
Threshold Value	• Read and write value are different each other	
Diagnostic Time	• More than 1 time detection	
Fail Safe	• Fixed at 4th gear	

## Component Inspection

1. Ignition "ON" & Engine "OFF".
2. Connect scantool and check DTC.
3. Erase the DTC with scantool.
4. After turning IG OFF to IG ON twice or three times, check DTC again.
5. Does the scantool show same DTC again ?

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

**NO** ▶ Fault is intermittent caused by poor contact in the sensor's and/or PCM's connector or was repaired and PCM memory was not cleared. Thoroughly check connectors for looseness, poor connection, ending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and go to "Verification of Vehicle Repair" procedure.

## DTC Description

TCM detects internal RAM value by itself. If the value TCM wrote on RAM differs from the value TCM read, Malfunction can be detected.

( MIL : 1 Driving Cycle)

## How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

## Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C ( 122 °F) and 120°C ( 248 °F). If the ATF temperature is outside this range, work to bring the range.

## ⚠ CAUTION

**Don't raise the oil temperature by stalling the engine.**

## (Reference)

If the oil temperature is not between 50°C ( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

# Automatic Transmission System

## AT-17

### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

### STEP 4) Check learning results

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

### How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### Verification of Vehicle Repair

Refer to DTC P0601 : Internal Control Module Memory Check Sum Error.



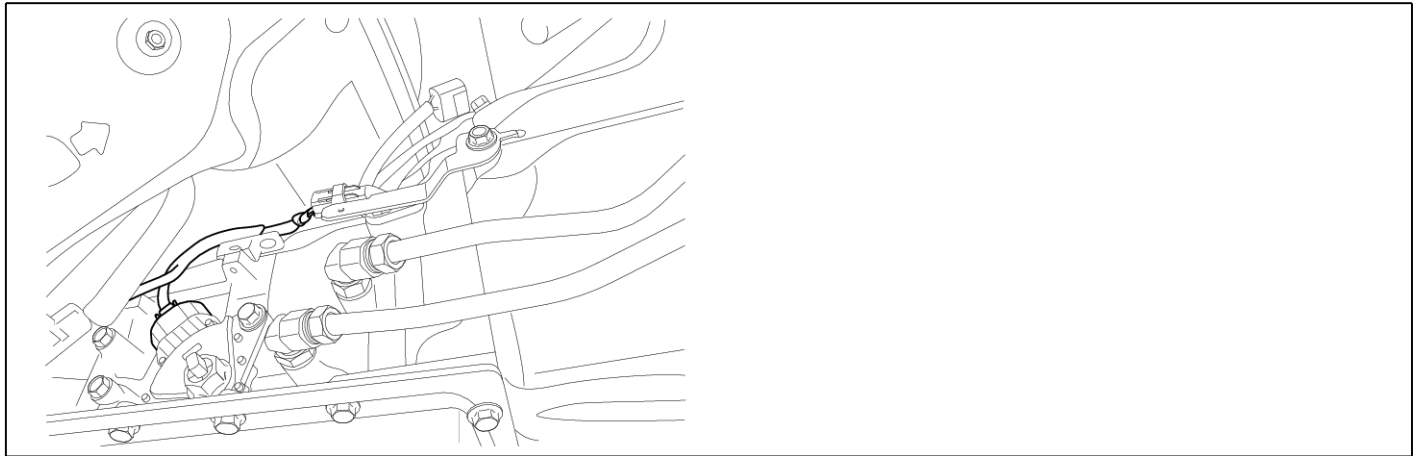


# AT-18

# Automatic Transmission System

## P0707 Transmission Range Sensor Circuit Low Input

### Component Location



SBHAT8498D

### General Description

Inhibitor switch transmits the information which range includes shift lever of A/T to TCM by combination of a position circuit terminal. It is possible for inhibitor switch to start an engine in only P and N(Prevention of reckless driving) and used for inhibitor switch to shift control.

### DTC Description

DTC is set if TCM receives multiple signal, more than 2 2 signal, from the inhibitor switch for 10 seconds. While TCM proceeds final confirm for this fault in its internal process, Shift Lock functions to prevent shifting to Reverse for safety.

(MIL : 1 Driving Cycle)

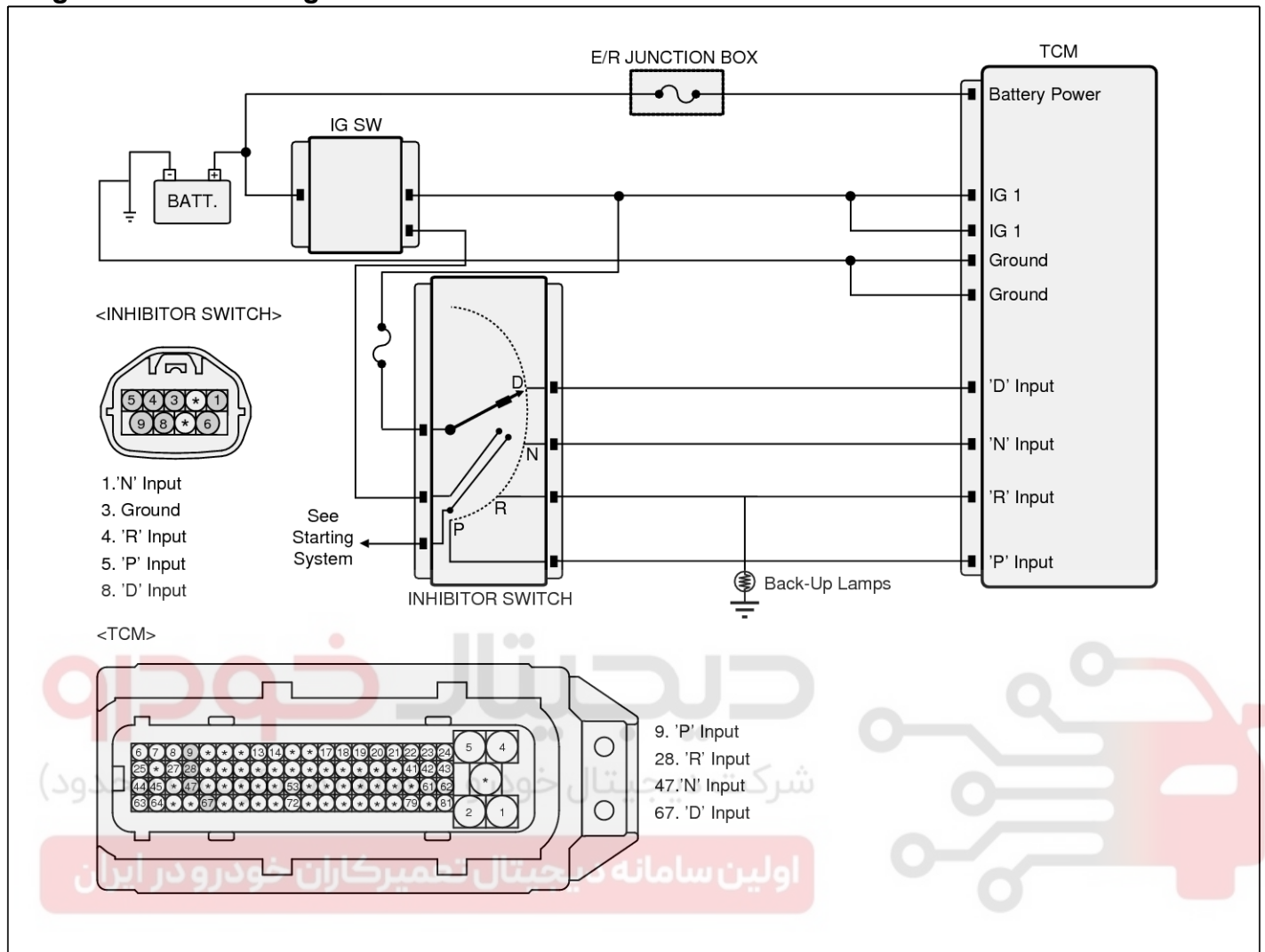
### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>B+ Short</li> </ul>	<ul style="list-style-type: none"> <li>Short in circuit</li> <li>Misalignment of neutralization of inhibitor switch</li> <li>Faulty Inhibitor switch</li> <li>Faulty TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>IG "ON"</li> <li>10.2V &lt; Battery Voltage &lt; 14V</li> <li>CAN Communication : Normal</li> <li>Not in Fail Safe mode</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Two or more 'ON' signal of Inhibitor switch</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 10 seconds</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>No self learning control</li> <li>No adaptive shift control</li> <li>Shift Lock is locked</li> <li>Priority, if two or more "ON" signal N(P) &gt; R &gt; D</li> </ul>	

# Automatic Transmission System

# AT-19

## Diagnostic Circuit Diagram



SBHAT9701L

# AT-20

# Automatic Transmission System

## Signal Waveform & Data



Fig.1

SBHAT9501L

# Automatic Transmission System

# AT-21

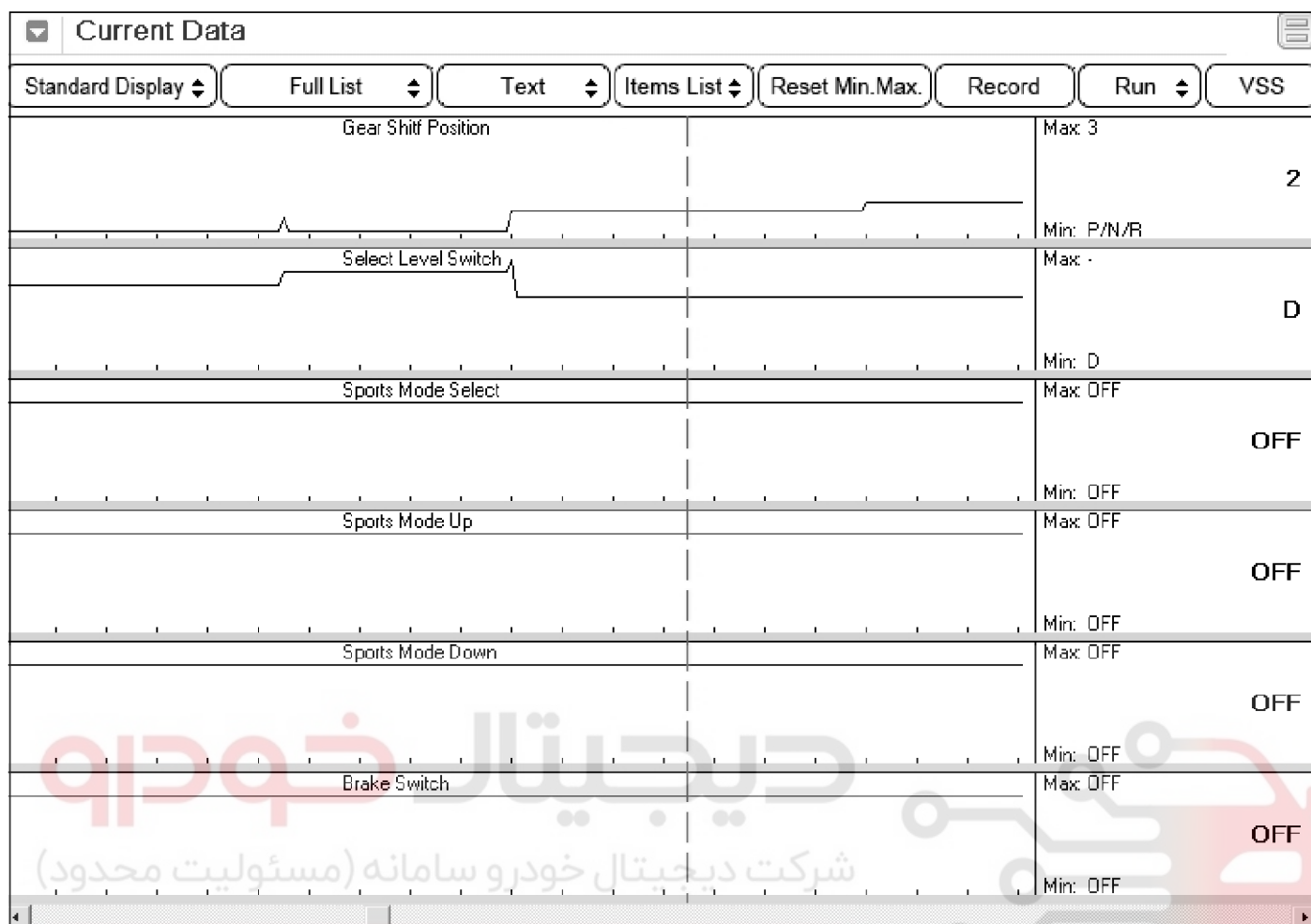


Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9502L

# AT-22

# Automatic Transmission System

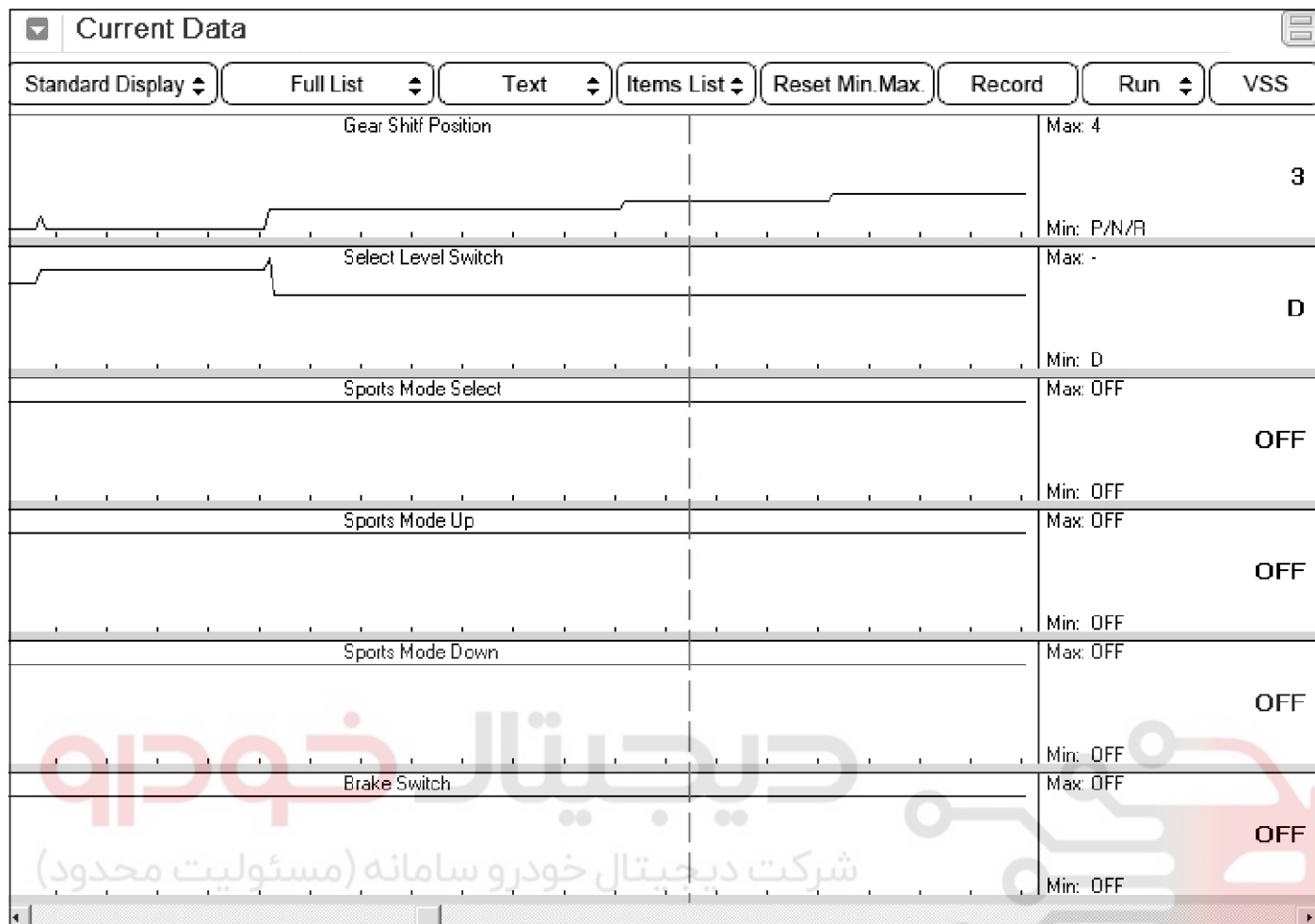


Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9503L

# Automatic Transmission System

# AT-23

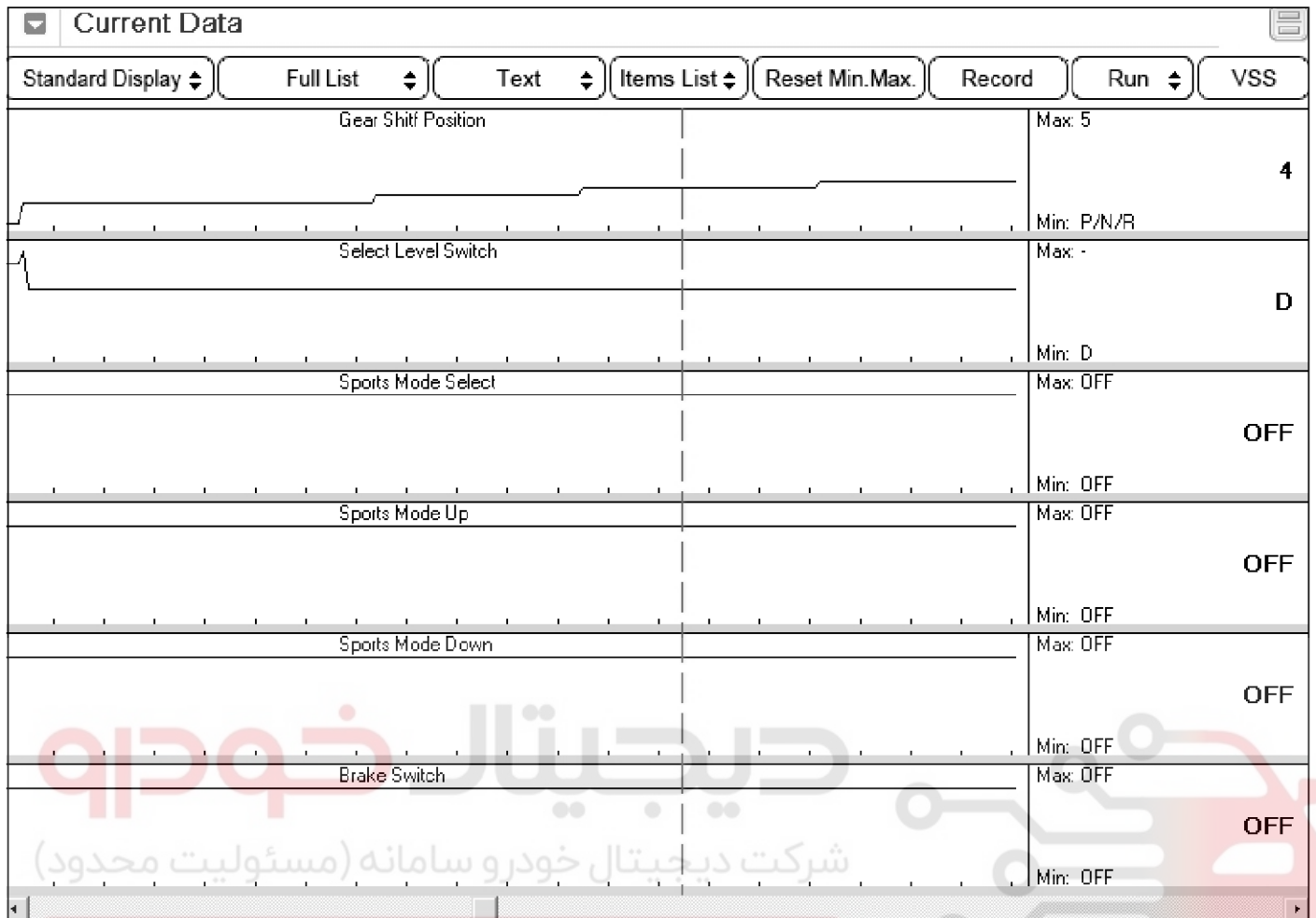


Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9504L

# AT-24

# Automatic Transmission System

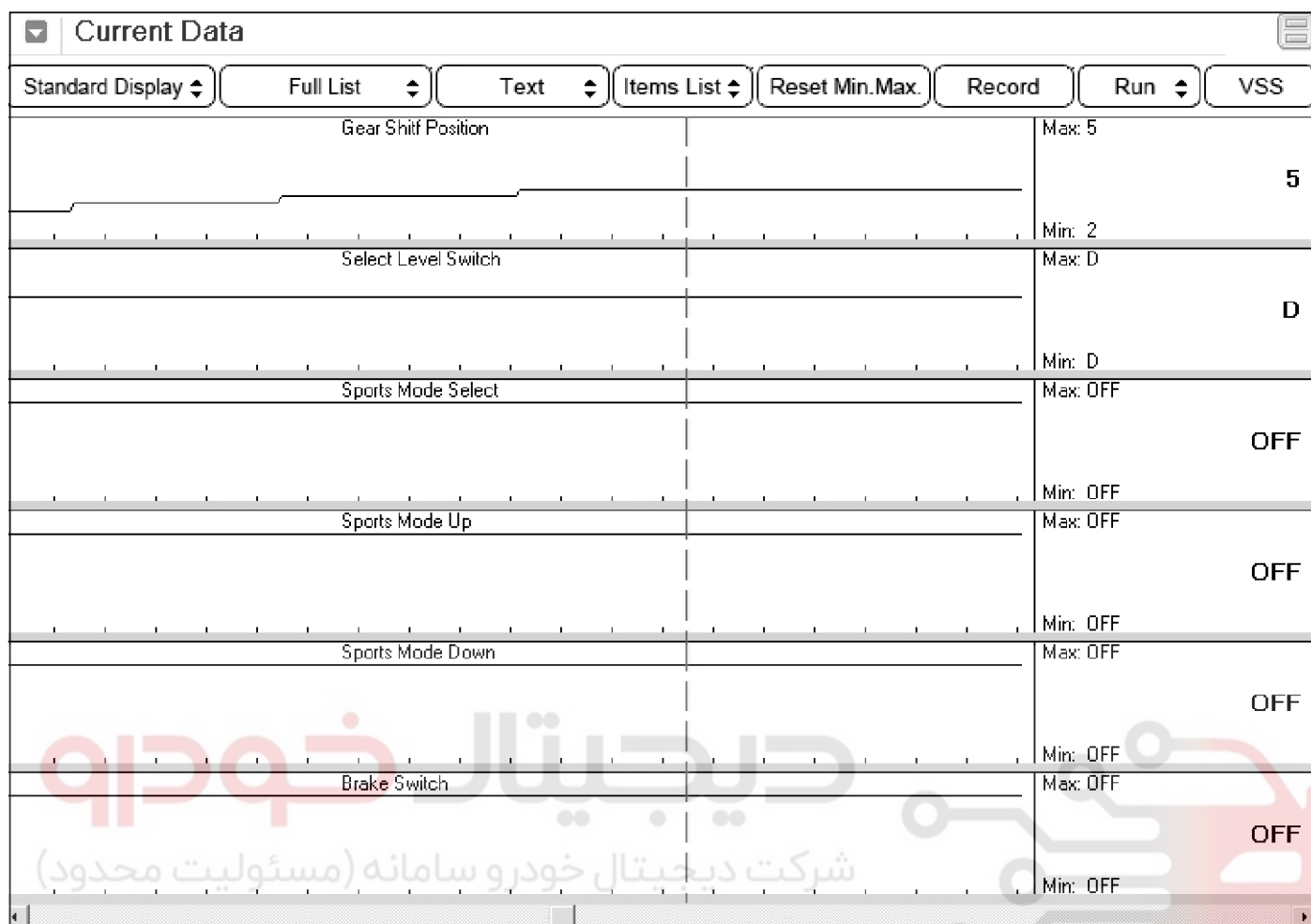


Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9505L

# Automatic Transmission System

# AT-25

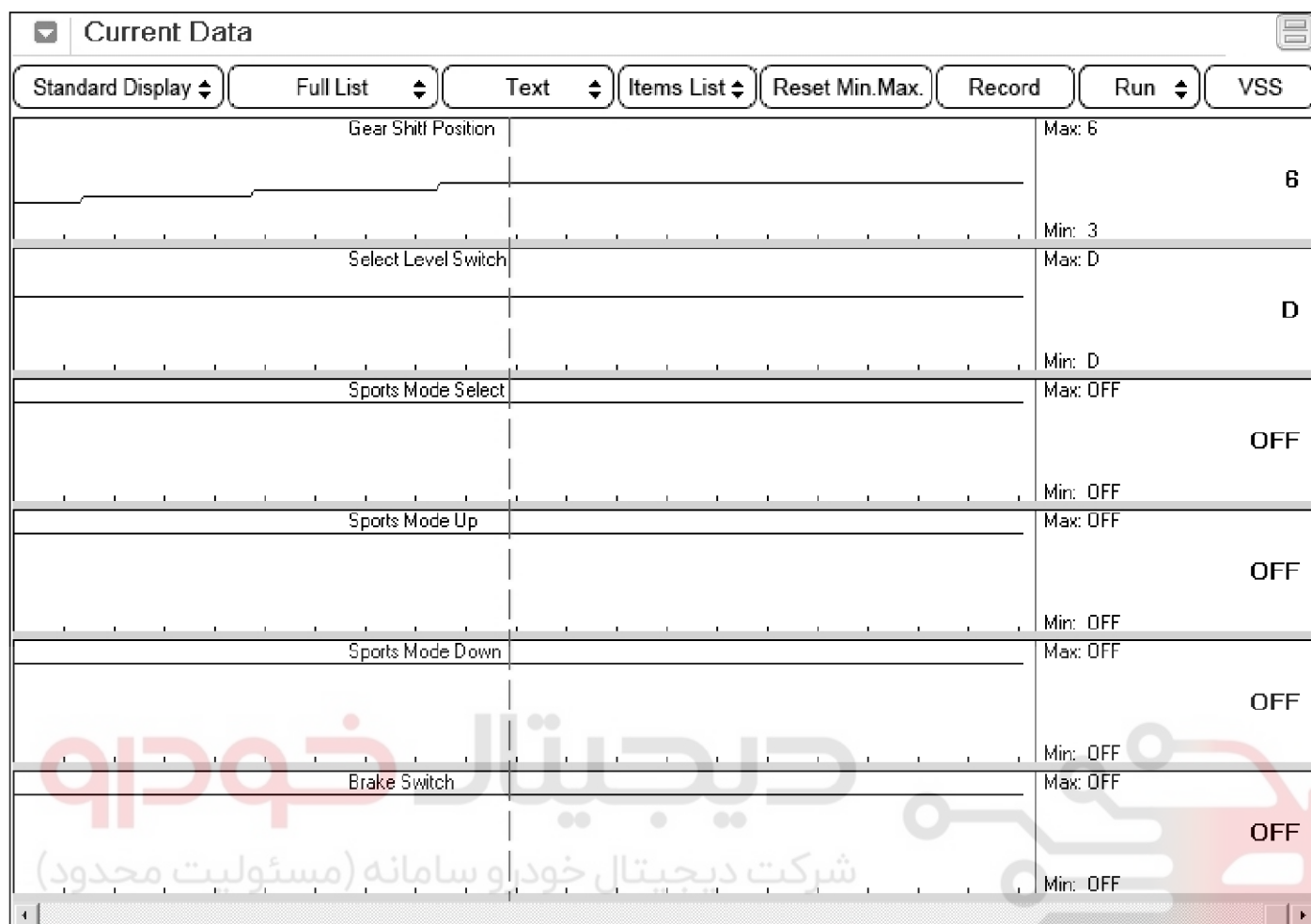


Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9506L



# AT-26

# Automatic Transmission System

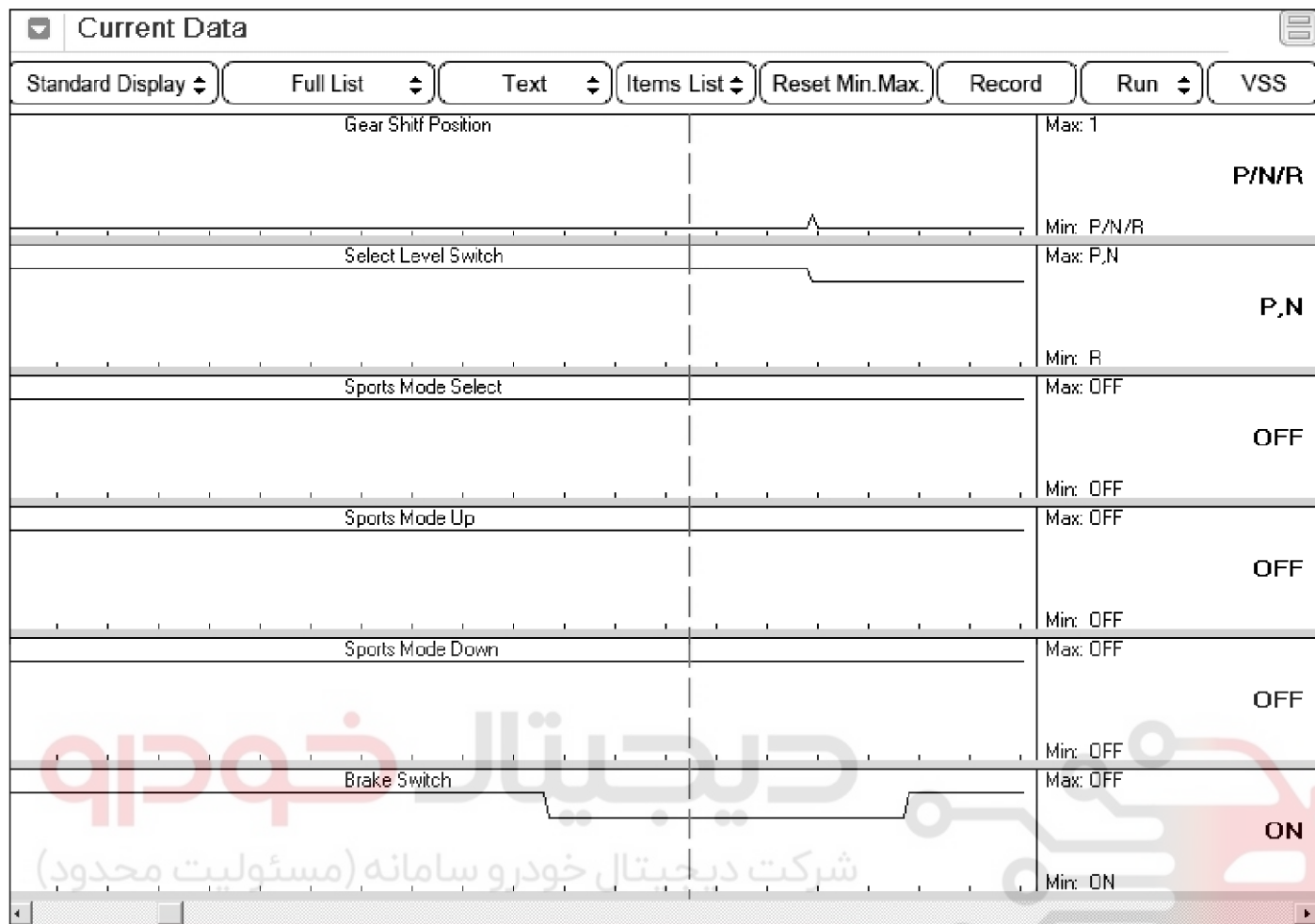


Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9507L

# Automatic Transmission System

AT-27

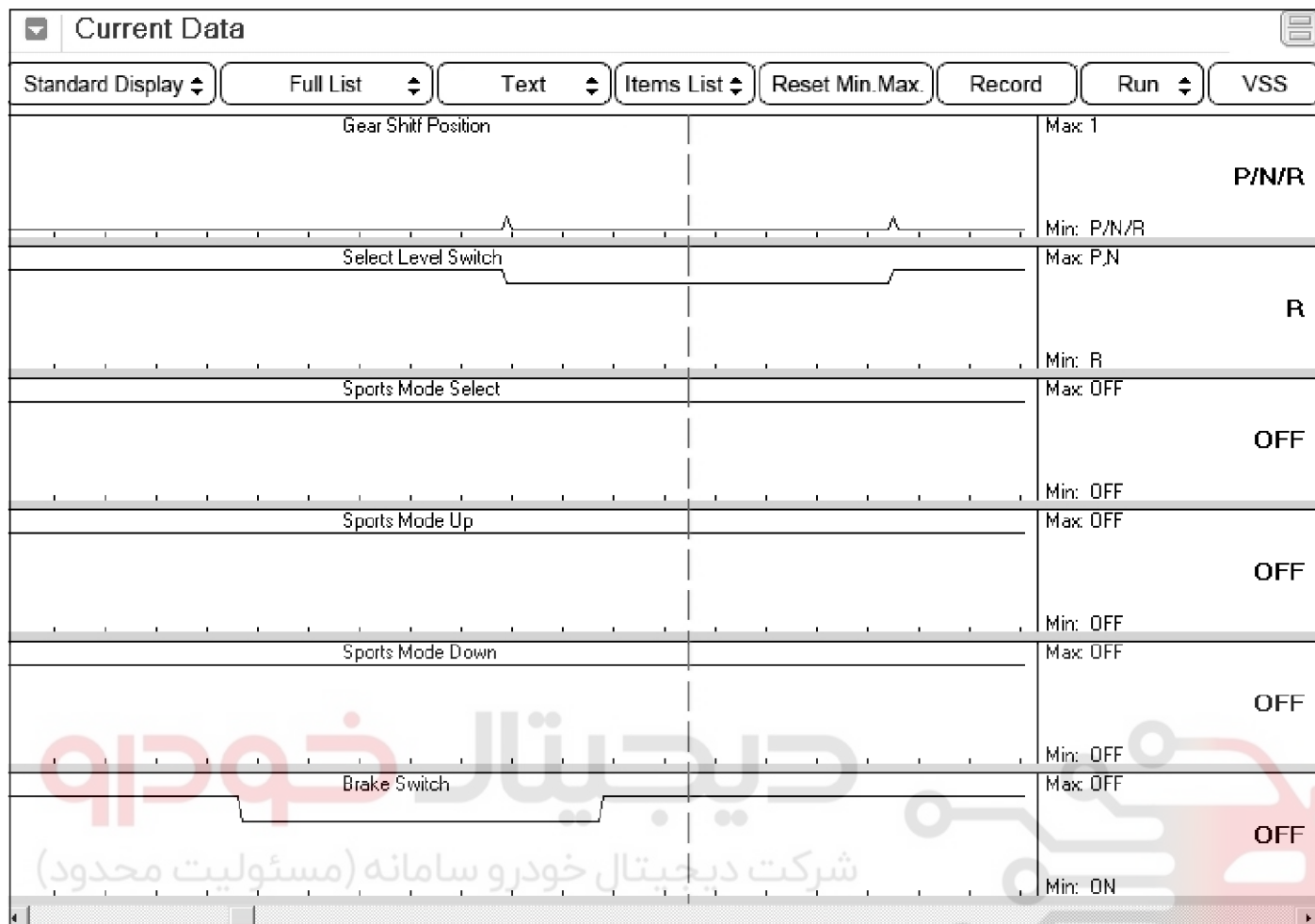


Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9508L

## AT-28

## Automatic Transmission System

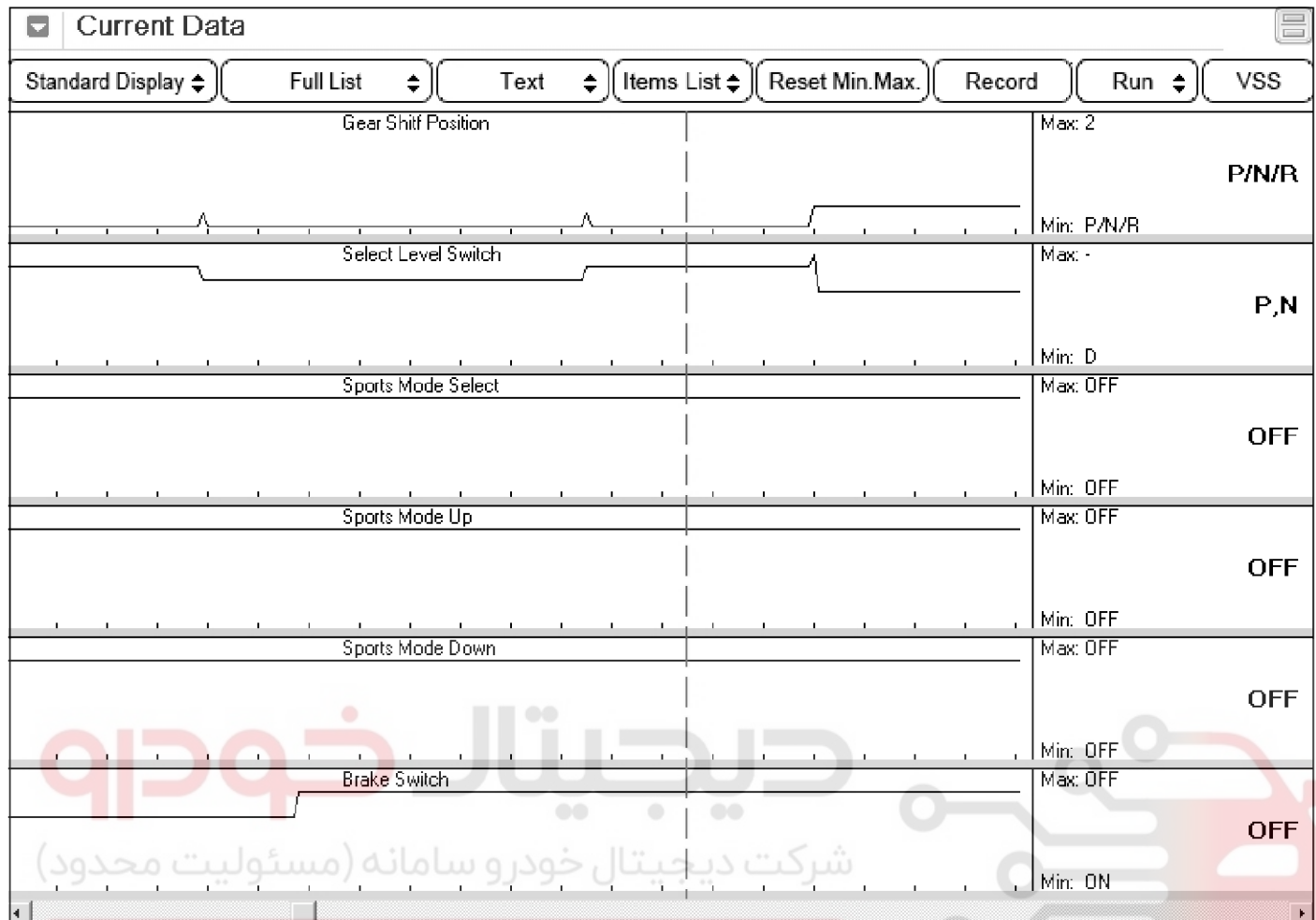


Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9509L

- Fig 1) 1st gear in D range
- Fig 2) 2nd gear in D range
- Fig 3) 3rd gear in D range
- Fig 4) 4th gear in D range
- Fig 5) 5th gear in D range
- Fig 6) 6th gear in D range
- Fig 7) P range
- Fig 8) R range
- Fig 9) N range

# Automatic Transmission System

## AT-29

### Monitor Scantool Data

1. Connect scantool to Diagnostic Connector.
2. Ignition "ON" & Engine "OFF"

3. Monitor the "Inhibitor Switch" parameter on the scan tool
4. Shift to D range from P range with selector lever.

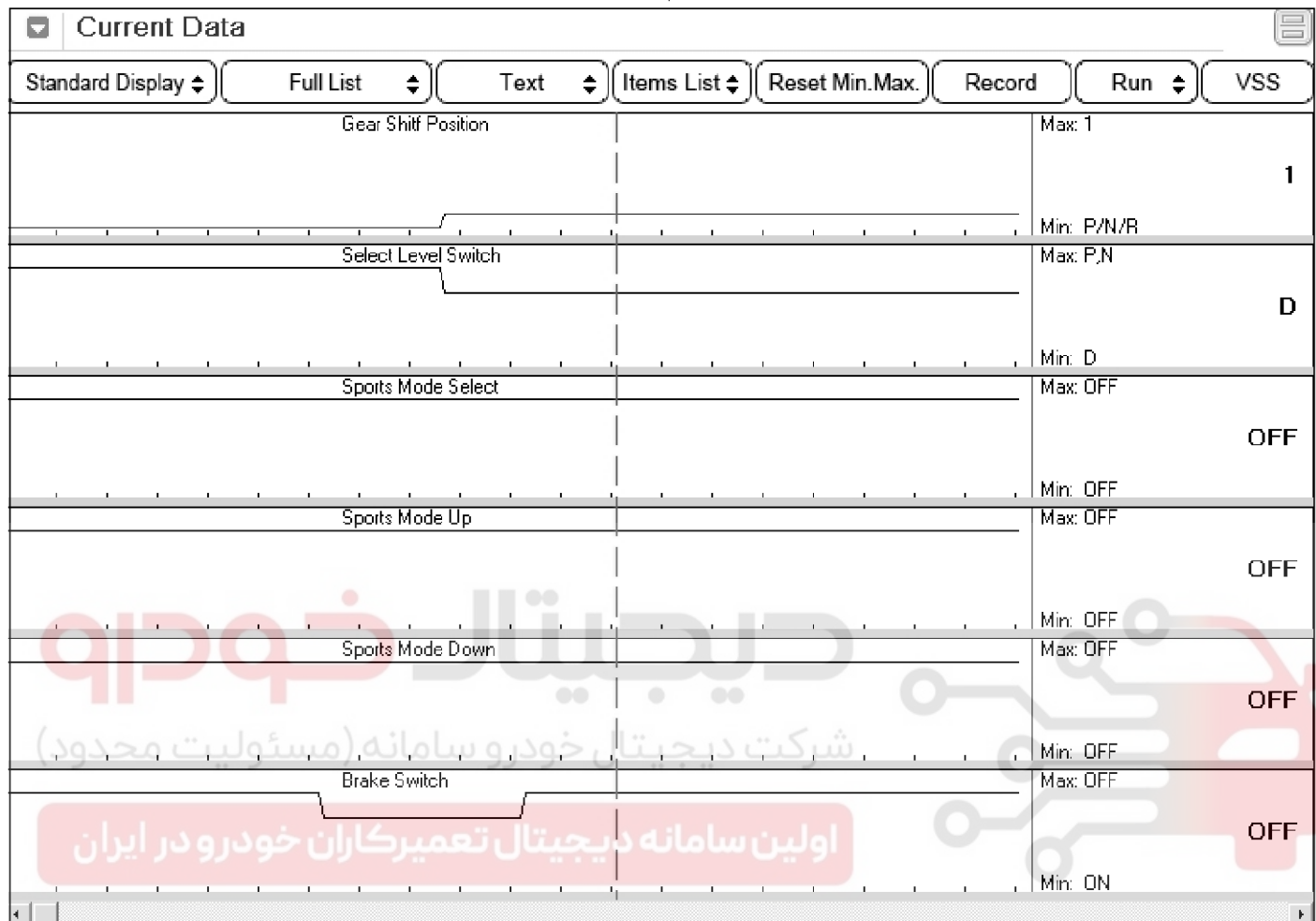


Fig.1

SBHAT9501L

# AT-30

# Automatic Transmission System

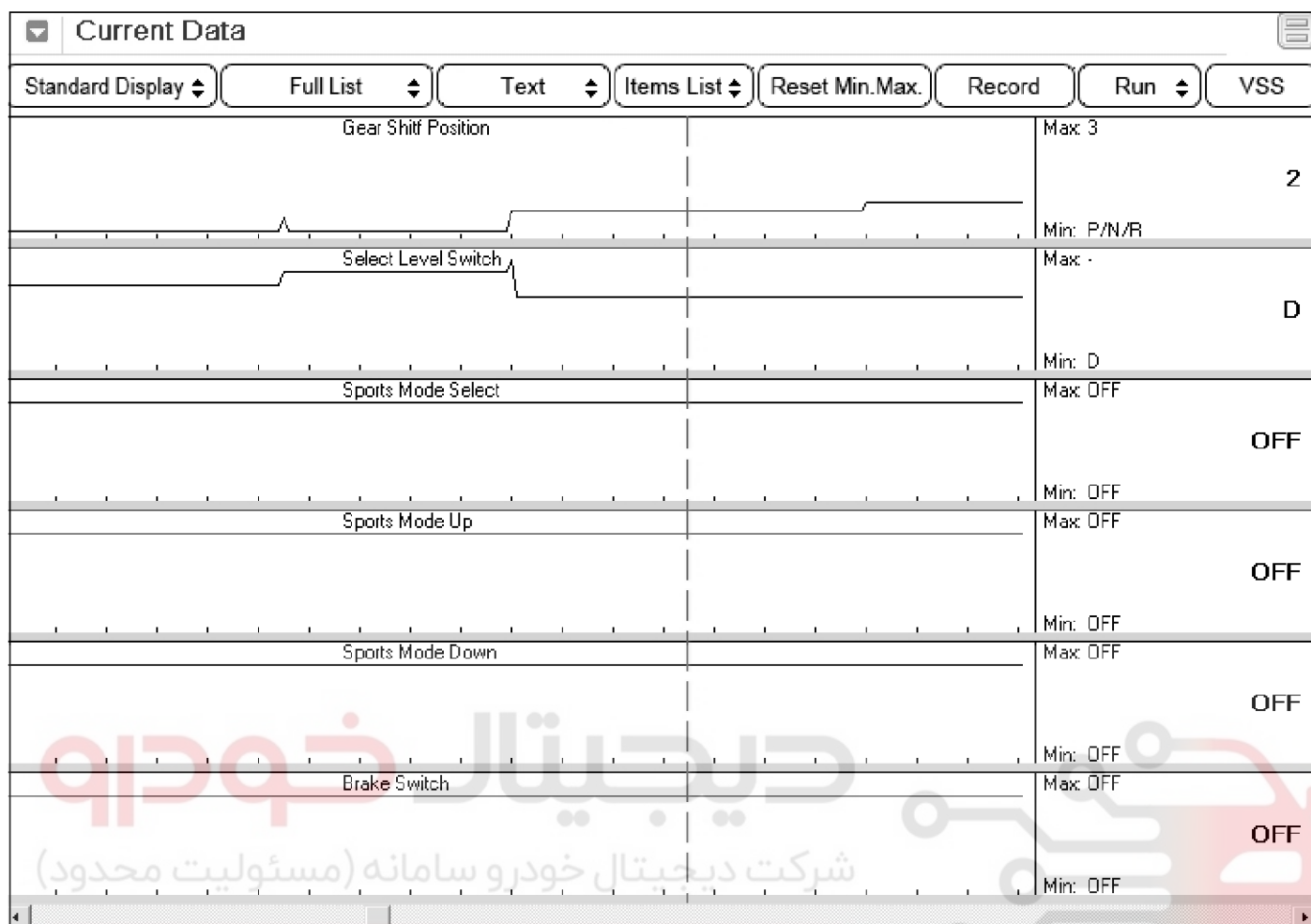


Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9502L

# Automatic Transmission System

# AT-31

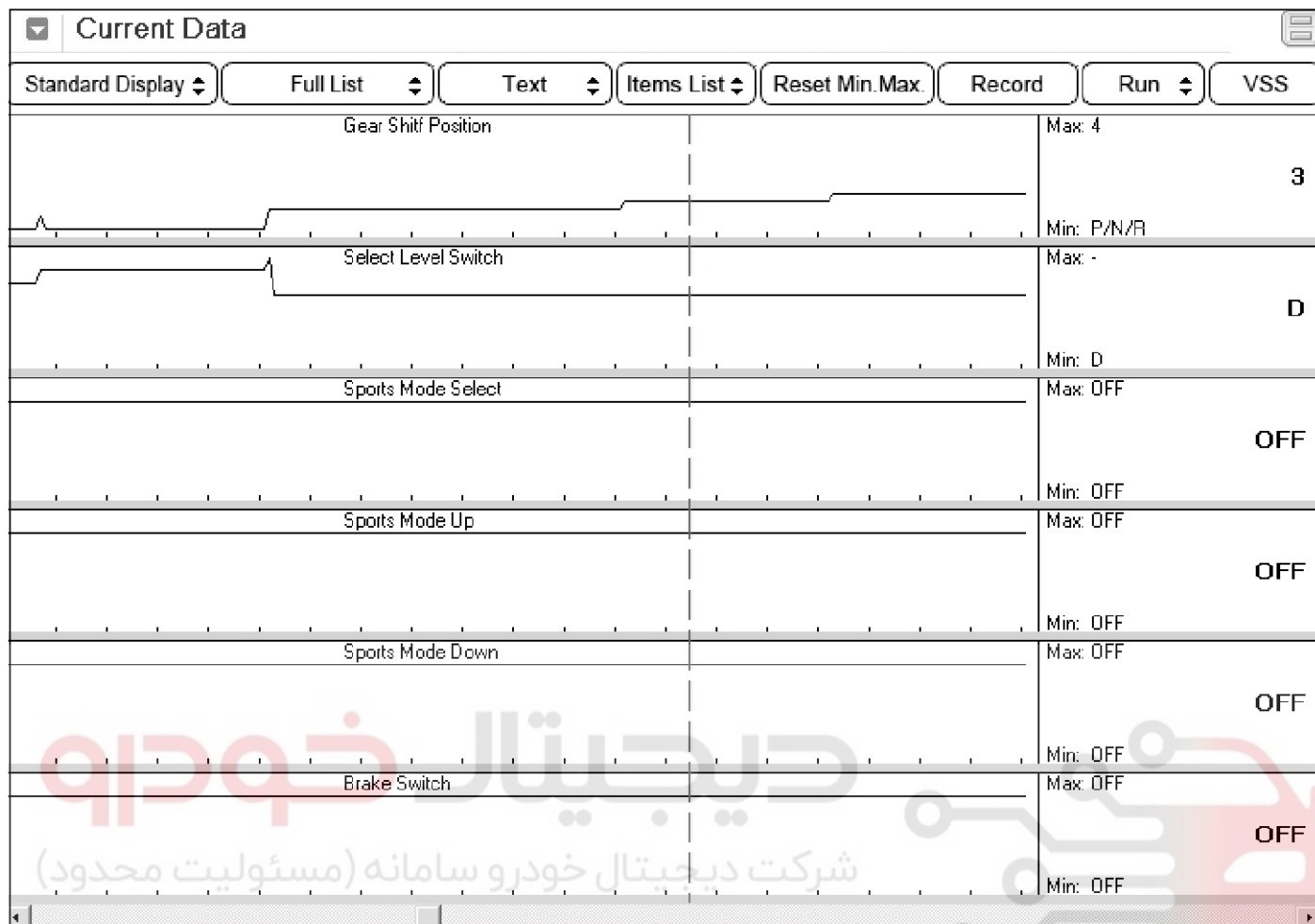


Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9503L

# AT-32

# Automatic Transmission System

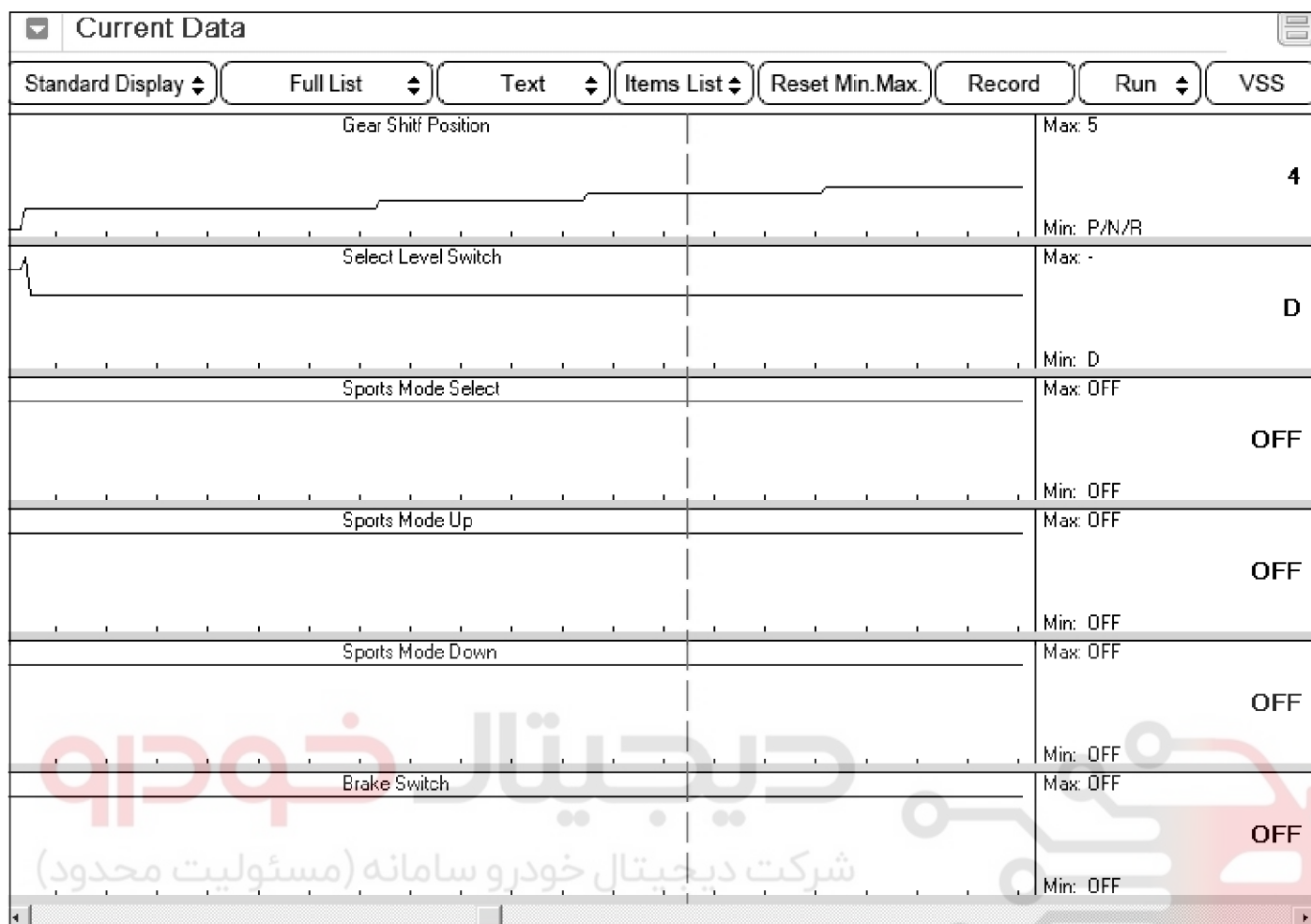


Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9504L

# Automatic Transmission System

# AT-33

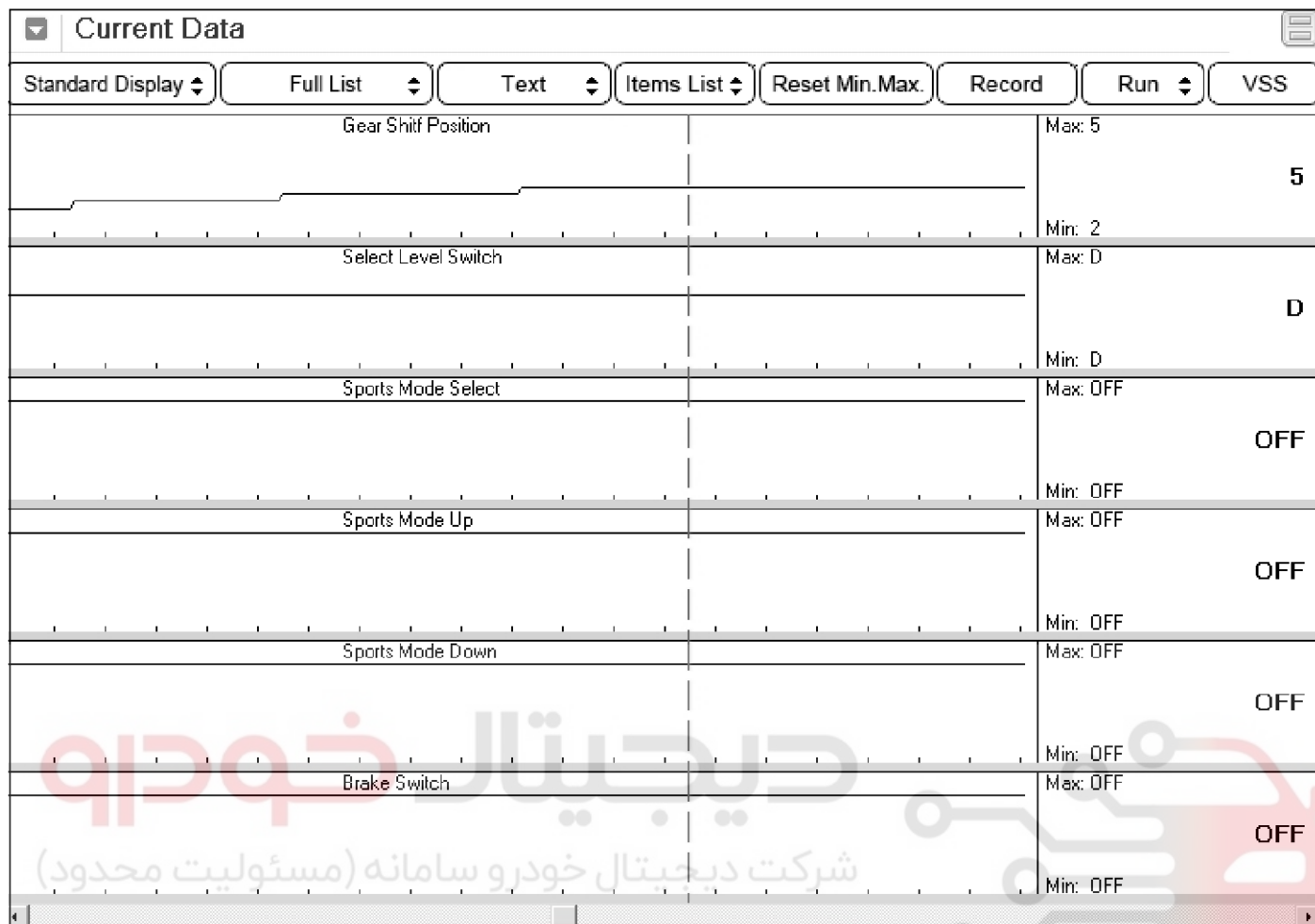


Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9505L



# AT-34

# Automatic Transmission System

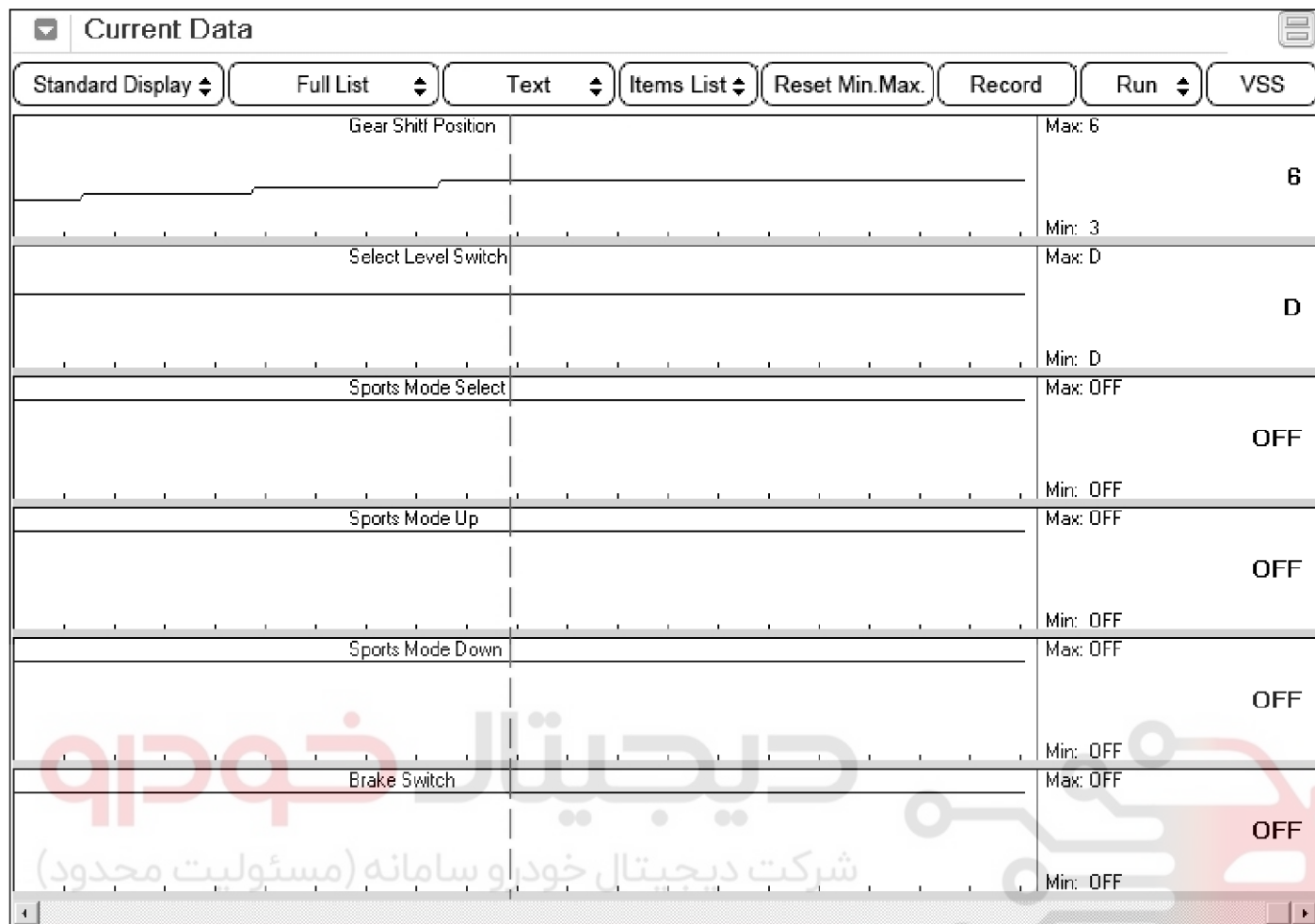


Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9506L

# Automatic Transmission System

AT-35

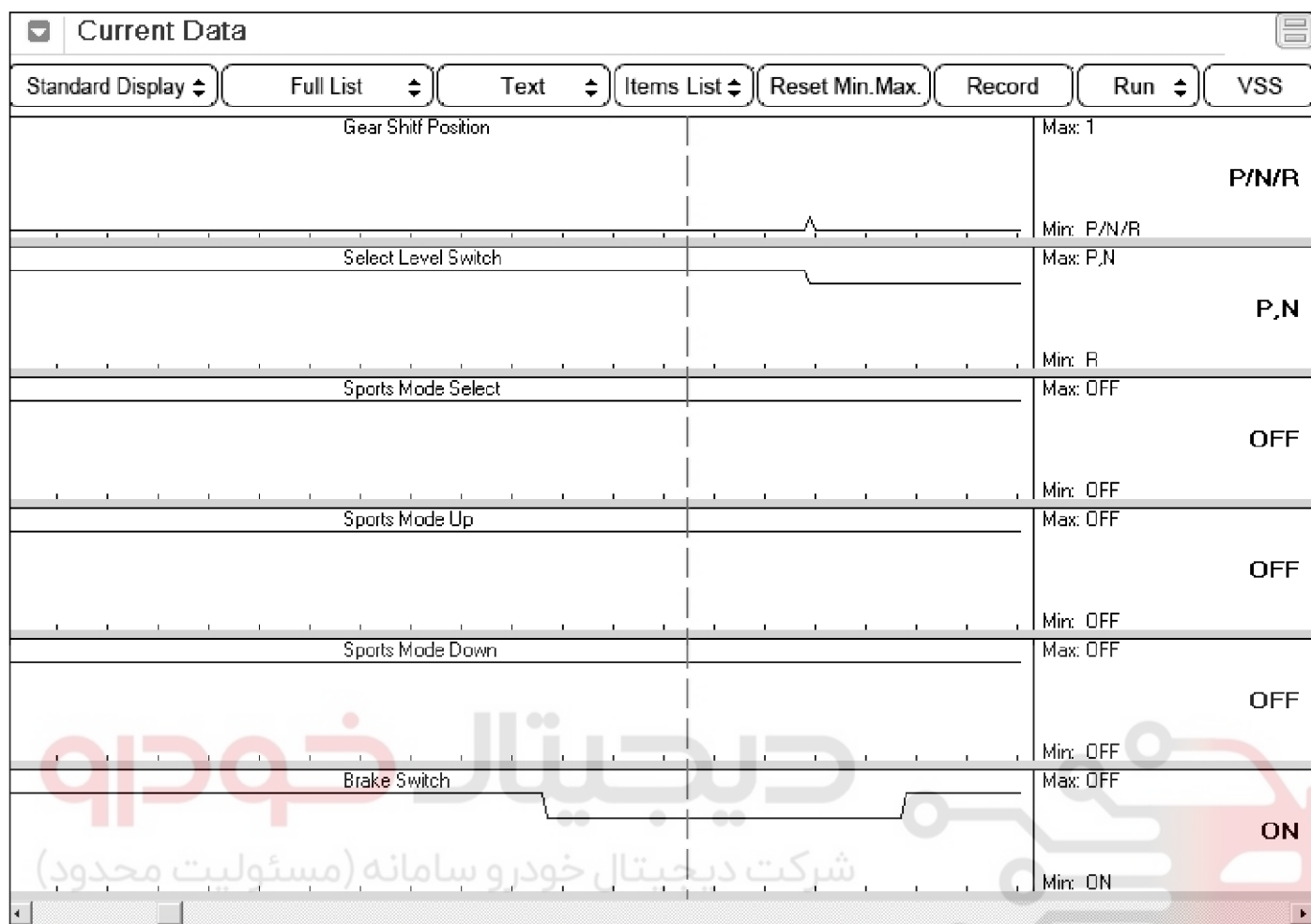


Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9507L

# AT-36

# Automatic Transmission System

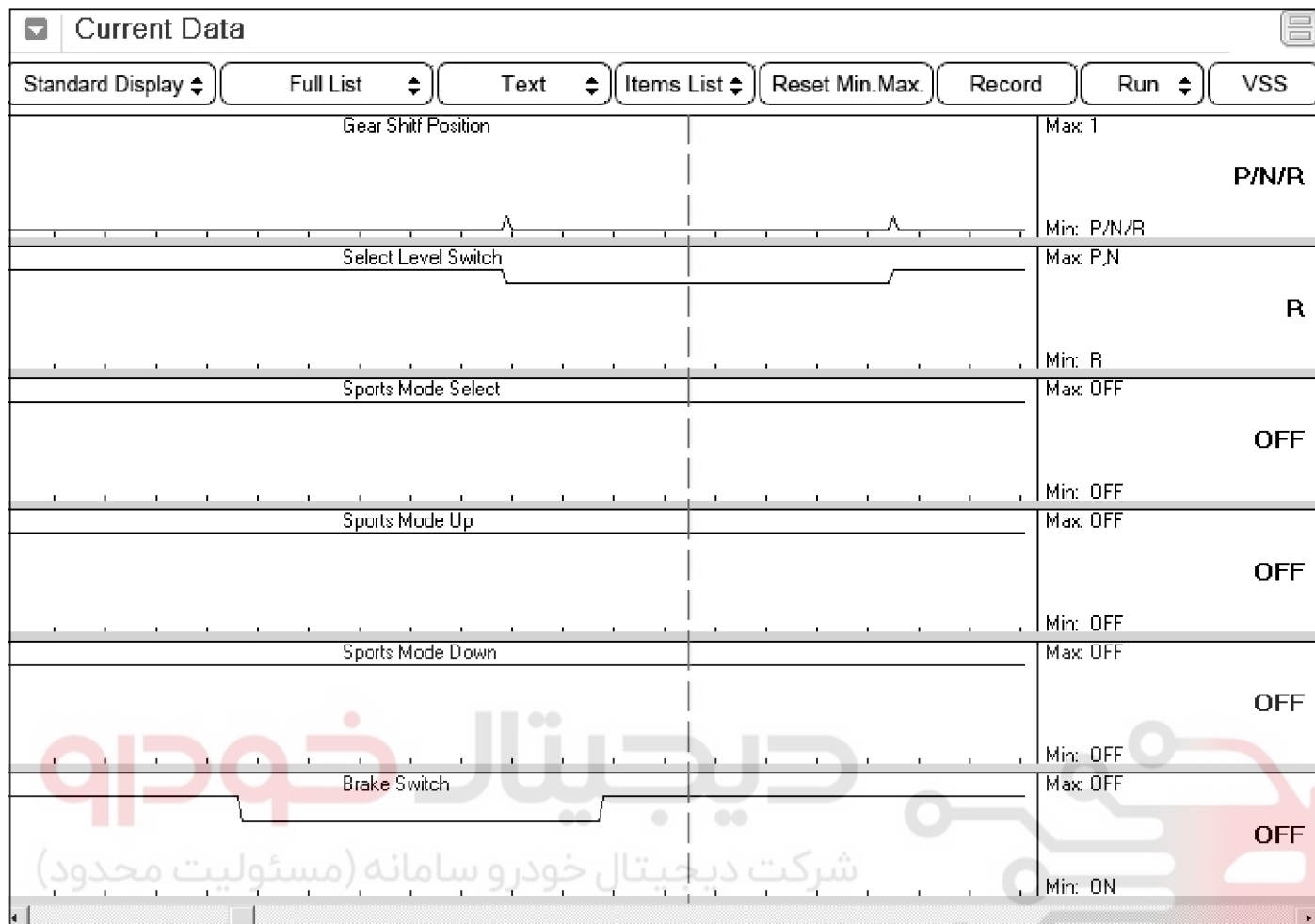


Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9508L

## Automatic Transmission System

## AT-37

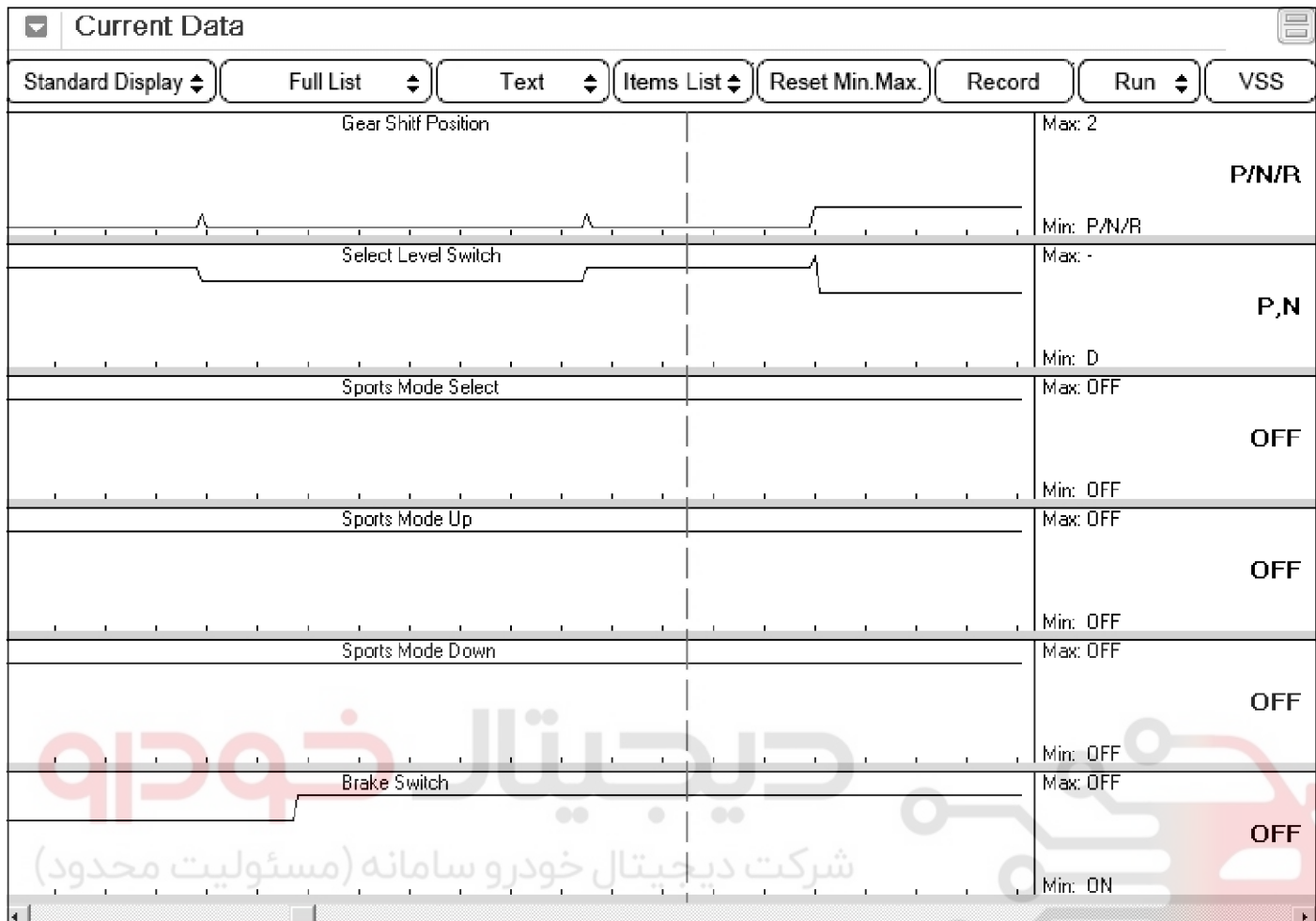


Fig.9 اولین سامانه دیجیتال خودرو در ایران

SBHAT9509L

- Fig 1) 1st gear in D range
- Fig 2) 2nd gear in D range
- Fig 3) 3rd gear in D range
- Fig 4) 4th gear in D range
- Fig 5) 5th gear in D range
- Fig 6) 6th gear in D range
- Fig 7) P range
- Fig 8) R range
- Fig 9) N range

5. Is the "Inhibitor Switch" operating normal ?

**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 Vehicle Repair" procedure

**NO** ► Go to "W/Harness 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 vehicle Repair" procedure.

**NO** ► Go to "Signal circuit inspection" procedure.

# AT-38

# Automatic Transmission System

## Signal Circuit Inspection

1. Disconnect TCM connector.
2. Ignition "ON" & Engine "OFF"

3. Check voltage at each terminal of TCM harness connector with shifting inhibitor switch at each range.

## Specification :

	P terminal	R terminal	N terminal	D terminal
<b>P range</b>	12V	0V	0V	0V
<b>R range</b>	0V	12V	0V	0V
<b>N range</b>	0V	0V	12V	0V
<b>D range</b>	0V	0V	0V	12V

4. Is the measured voltage within specification ?

**YES** ▶ Go to "Component Inspection" procedure.

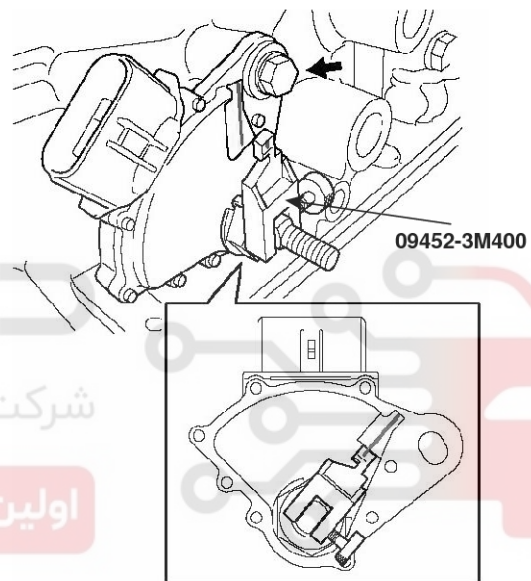
**NO** ▶ Except for the position inhibitor switch placed, 0V should be measured. If the 12V is measured where inhibitor switch is not placed range position, check short to battery in harness. Repair or replace wire harness as necessary and go to "Verification of Vehicle Repair" Procedure.

## Component Inspection

### ■ Inspect neutral position for inhibitor switch

1. Shift inhibitor switch to "P" range in order not to move the vehicle.
2. IG "ON" & Engine "OFF".
3. Release shift lock and shift inhibitor switch to N position.
4. Set SST to inhibitor switch lever shaft and align the reference line of SST with the neutral reference line of the inhibitor switch.
5. Tighten the bolts and shift to "P" position

6. Check alignment of inhibitor switch with scantool after IG ON



SBHAT9628L

7. Does the scantool show the inhibitor switch position correctly ?

**YES** ▶ Go to "Verification of Vehicle Repair" procedure.

**NO** ▶ Substitute with a known-good inhibitor switch and check for proper operation. If the problem is corrected, replace inhibitor switch as necessary and then Go to "Verification of Vehicle Repair" procedure.  
▶ Go to "Check TCM" as follow if the scantool still shows abnormal operation after inhibitor switch replacement.

# Automatic Transmission System

## AT-39

### ■ Check TCM

1. Ignition "ON" & Engine "OFF".
2. Check DTC and erase DTC with scantool
3. Turn IG OFF ↔ IG ON twice or more then, check DTC again.
4. Is the same DTC set again ?

**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** ▶ 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. And Go to Component Inspection procedure.

### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C ( 122 °F) and 120°C ( 248 °F). If the ATF temperature is outside this range, work to bring the range.

#### ⚠ CAUTION

**Don't raise the oil temperature by stalling the engine.**

(Reference)

If the oil temperature is not between 50°C ( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

#### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

#### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

#### STEP 4) Check learning results

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

### How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform "N" position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### 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 scan tool, 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-40

## Automatic Transmission System

## P0708 Transmission Range Sensor Circuit High Input

**Component Location**

Refer to DTC P0707 : Transmission Range Sensor Circuit Low Input.

**General Description**

Refer to DTC P0707 : Transmission Range Sensor Circuit Low Input.

**DTC Detecting Condition**

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Open / Ground Short</li> </ul>	<ul style="list-style-type: none"> <li>Open or short in circuit</li> <li>Misalignment of neutralization for inhibitor switch</li> <li>Faulty Inhibitor switch</li> <li>Faulty TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>IG "ON"</li> <li>10.2V &lt; Battery Voltage &lt; 14V</li> <li>CAN Communication : Normal</li> <li>Not in Fail Safe mode</li> <li>Output RPM is normal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Vehicle Speed <math>\geq</math> 30km/h and</li> <li>No signal from the inhibitor switch</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 30 seconds</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>No self learning control</li> <li>No adaptive shift control</li> <li>Shift Lock is locked</li> <li>Recognition as D, if all signal are OFF.</li> </ul>	

**Diagnostic Circuit Diagram**

Refer to DTC P0707 : Transmission Range Sensor Circuit Low Input.

**Signal Waveform & Data**

Refer to DTC P0707 : Transmission Range Sensor Circuit Low Input.

**Monitor Scantool Data**

Refer to DTC P0707 : Transmission Range Sensor Circuit Low Input.

**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.
- Has a problem been found?

**YES** ▶ Repair as necessary and go to "Verification vehicle Repair" procedure.

**NO** ▶ Go to " Power circuit inspection" procedure.

# Automatic Transmission System

## AT-41

### Power Circuit Inspection

1. Disconnect Inhibitor switch.
2. Ignition "ON" & Engine "OFF".
3. Check voltage between power terminal of inhibitor switch harness connector and chassis ground.

### Specification : B+

4. Is the measured voltage within specification?

**YES** ▶ Go to "Signal Circuit Inspection" procedure.

**NO** ▶ Check melting fuse on IG 1 power and check open in harness between battery and inhibitor switch. Repair or replace as necessary and then, go to "Verification of Vehicle Repair " procedure.

### Signal Circuit Inspection

Refer to DTC P0707 : Transmission Range Sensor Circuit Low Input.

### Component Inspection

Refer to DTC P0707 : Transmission Range Sensor Circuit Low Input.

### Verification of Vehicle Repair

Refer to DTC P0707 : Transmission Range Sensor Circuit Low Input.



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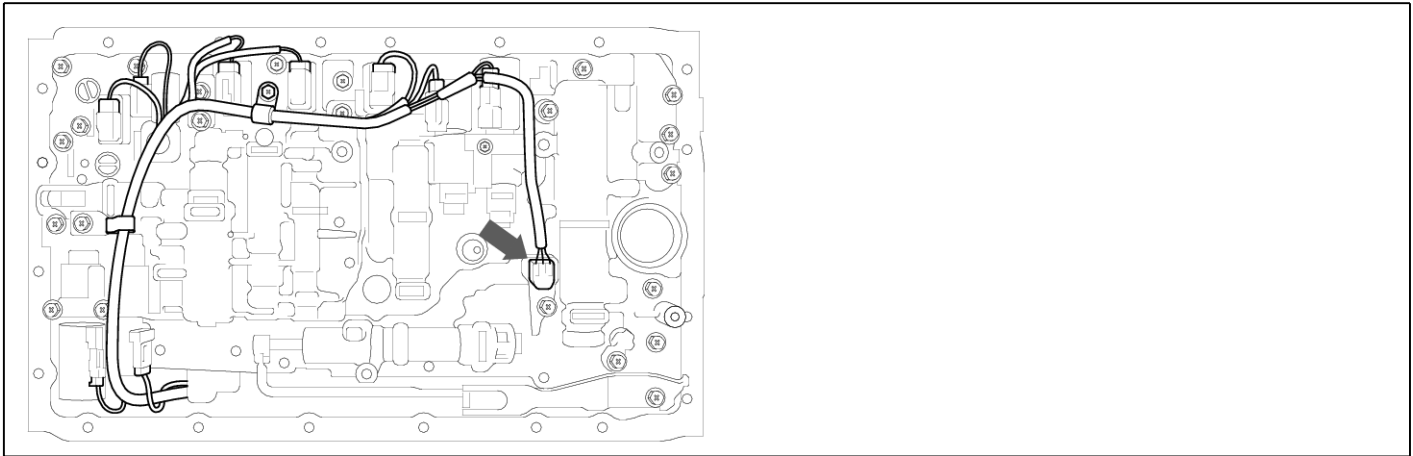


# AT-42

# Automatic Transmission System

## P0711 Transmission Fluid Temperature Sensor "A" Circuit Range/Performance

### Component Location



SBHAT8497D

### General Description

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

### DTC Description

This DTC code is set when the ATF temperature output voltage is not changed for 10 minutes. The TCM regards the ATF temperature as fixed at a value of 80 °C (176°F). (MIL : Consecutive 2 Driving Cycle)

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Stick</li> </ul>	<ul style="list-style-type: none"> <li>Faulty ATF sensor</li> <li>Faulty TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>IG "ON"</li> <li>10.2V &lt; Battery Voltage &lt; 14V</li> <li>CAN Communication : Normal</li> <li>Not in Fail Safe mode</li> <li>-43°C (-45.4 °F) ≤ ATF temperature ≤ 200°C (392 °F)</li> <li>Shift Lever Switch = Normal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>No AFT temperature changes</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 10 minutes</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>No torque up control</li> <li>No upshift to 5th to 6th</li> <li>ATF temperature : Regarded as 80°C</li> </ul>	

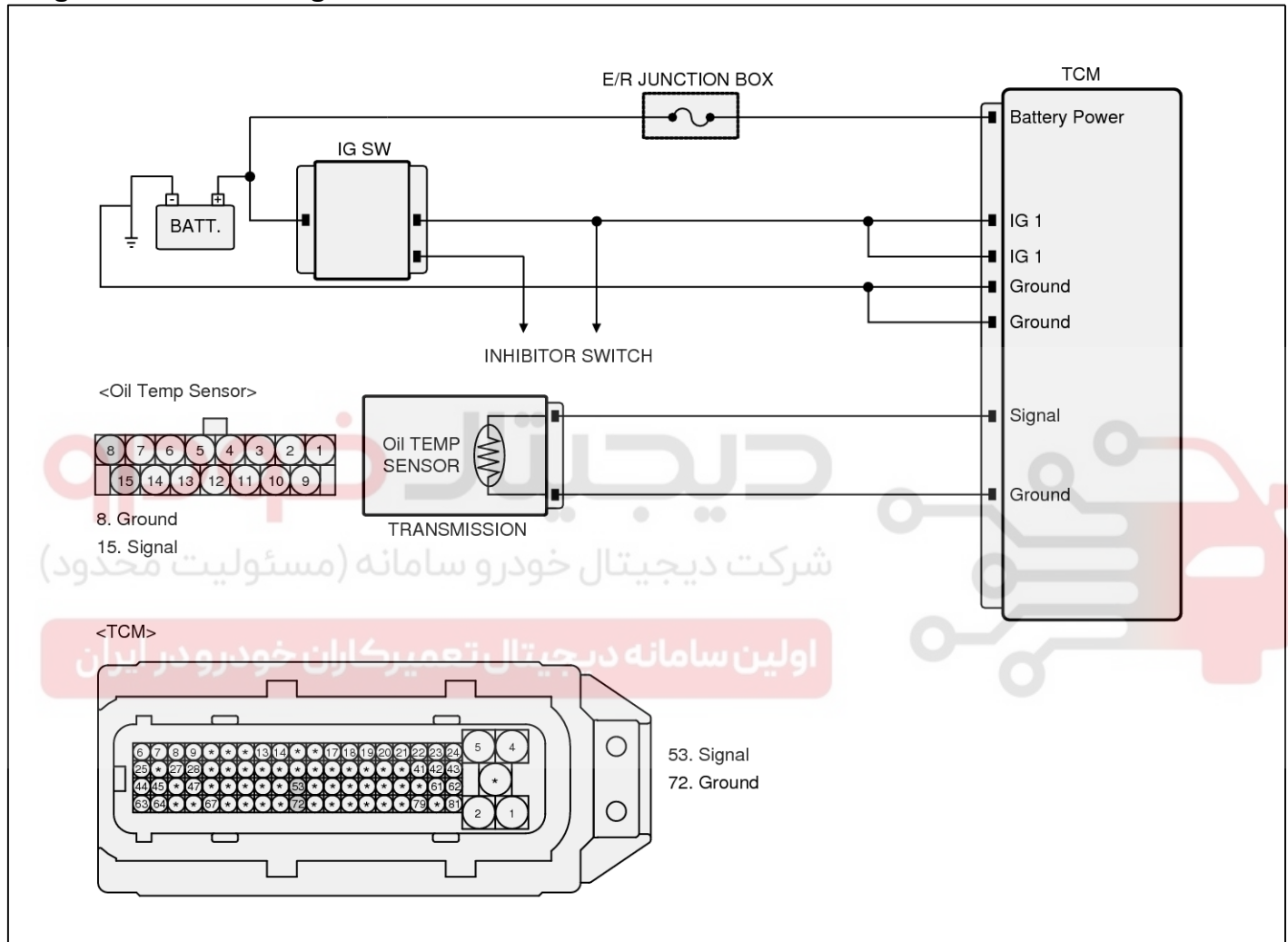
# Automatic Transmission System

# AT-43

## Specification

ATF Temp. (°C)	Resistance(Ω)
10( 50 °F)	6.445
25( 77 °F)	3.5
110( 230 °F)	0.247

## Diagnostic Circuit Diagram



SBHAT9702L

# AT-44

# Automatic Transmission System

## Signal Waveform & Data

Current Data

Standard Display  Full List  Graph  Items List    VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Oil Temperature Sensor	174	'F
<input type="checkbox"/> Engine Speed	646	RPM
<input type="checkbox"/> Vehicle Speed	0	MPH
<input type="checkbox"/> Throttle Position	3.9	%
<input type="checkbox"/> Input Speed	639	RPM
<input type="checkbox"/> Output Speed	0	RPM
<input type="checkbox"/> Damper Clutch Slip	7	RPM
<input type="checkbox"/> Gear Ratio	65.535	-
<input type="checkbox"/> Gear Shift Position	P/N/R	-
<input type="checkbox"/> Select Level Switch	P,N	-
<input type="checkbox"/> A/C Switch	OFF	-
<input type="checkbox"/> Idle Switch	ON	-
<input type="checkbox"/> Brake Switch	OFF	-
<input type="checkbox"/> Auto Cruise Switch	OFF	-
<input type="checkbox"/> Sports Mode Select	OFF	-
<input type="checkbox"/> Sports Mode Up	OFF	-
<input type="checkbox"/> Sports Mode Down	OFF	-
<input type="checkbox"/> Next Gear Position	1	-
<input type="checkbox"/> Number of DTC	1	-
<input type="checkbox"/> A/T Relay Voltage	14.1	V
<input type="checkbox"/> Engine Torque	11.0	%

Fig.1 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9510L

Current Data

Standard Display  Full List  Graph  Items List    VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Oil Temperature Sensor	-39	'F
<input type="checkbox"/> Engine Speed	646	RPM
<input type="checkbox"/> Vehicle Speed	0	MPH
<input type="checkbox"/> Throttle Position	4.3	%
<input type="checkbox"/> Input Speed	632	RPM
<input type="checkbox"/> Output Speed	0	RPM
<input type="checkbox"/> Damper Clutch Slip	14	RPM
<input type="checkbox"/> Gear Ratio	-0.00	-

Fig.2

SBHAT9511L

## Automatic Transmission System

AT-45

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Stop	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Oil Temperature Sensor	-39	'F
<input type="checkbox"/> Engine Speed	646	RPM
<input type="checkbox"/> Vehicle Speed	0	MPH
<input type="checkbox"/> Throttle Position	4.3	%
<input type="checkbox"/> Input Speed	632	RPM
<input type="checkbox"/> Output Speed	0	RPM
<input type="checkbox"/> Damper Clutch Slip	14	RPM
<input type="checkbox"/> Gear Ratio	-0.00	-

Fig.3

SBHAT9512L

Fig 1) Normal

Fig 2) Open or Short to battery

Fig 3) Short to ground

**Monitor Scantool Data**

1. Connect scantool to Diagnostic Connector.
2. Engine "ON" .
3. Monitor the "OIL TEMPERATURE SENSOR" parameter on the scan tool

**Specification** : Increasing gradually

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



# AT-46

# Automatic Transmission System

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Stop ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Oil Temperature Sensor	174	'F
<input type="checkbox"/> Engine Speed	646	RPM
<input type="checkbox"/> Vehicle Speed	0	MPH
<input type="checkbox"/> Throttle Position	3.9	%
<input type="checkbox"/> Input Speed	639	RPM
<input type="checkbox"/> Output Speed	0	RPM
<input type="checkbox"/> Damper Clutch Slip	7	RPM
<input type="checkbox"/> Gear Ratio	65.535	-
<input type="checkbox"/> Gear Shift Position	P/N/R	-
<input type="checkbox"/> Select Level Switch	P,N	-
<input type="checkbox"/> A/C Switch	OFF	-
<input type="checkbox"/> Idle Switch	ON	-
<input type="checkbox"/> Brake Switch	OFF	-
<input type="checkbox"/> Auto Cruise Switch	OFF	-
<input type="checkbox"/> Sports Mode Select	OFF	-
<input type="checkbox"/> Sports Mode Up	OFF	-
<input type="checkbox"/> Sports Mode Down	OFF	-
<input type="checkbox"/> Next Gear Position	1	-
<input type="checkbox"/> Number of DTC	1	-
<input type="checkbox"/> A/T Relay Voltage	14.1	V
<input type="checkbox"/> Engine Torque	11.0	%

Fig.1

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9510L

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Stop ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Oil Temperature Sensor	-39	'F
<input type="checkbox"/> Engine Speed	646	RPM
<input type="checkbox"/> Vehicle Speed	0	MPH
<input type="checkbox"/> Throttle Position	4.3	%
<input type="checkbox"/> Input Speed	632	RPM
<input type="checkbox"/> Output Speed	0	RPM
<input type="checkbox"/> Damper Clutch Slip	14	RPM
<input type="checkbox"/> Gear Ratio	-0.00	-

Fig.2

SBHAT9511L

# Automatic Transmission System

# AT-47

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Stop	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Oil Temperature Sensor	-39	'F
<input type="checkbox"/> Engine Speed	646	RPM
<input type="checkbox"/> Vehicle Speed	0	MPH
<input type="checkbox"/> Throttle Position	4.3	%
<input type="checkbox"/> Input Speed	632	RPM
<input type="checkbox"/> Output Speed	0	RPM
<input type="checkbox"/> Damper Clutch Slip	14	RPM
<input type="checkbox"/> Gear Ratio	-0.00	-

Fig.3

SBHAT9512L

Fig 1) Normal

Fig 2) Open or Short to battery

Fig 3) Short to ground

4. Does "OIL TEMPERATURE SENSOR " follow the referance 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 Vehicle Repair" procedure

**NO** ▶ Go to "Component Inspection" procedure.

## Component Inspection

### ■ Check "ATF temperature sensor"

1. IG KEY "OFF"
2. Disconnect TCM connector.
3. Measure resistance between signal and ground terminal at the TCM harness connector.

## Specification :

ATF Temp. (°C)	Resistance(Ω)
10( 50 °F)	6.445
25( 77 °F)	3.5
110( 230 °F)	0.247

4. Is the measured resistance within specification ?

**YES** ▶ Go to Check PCM/TCM" as follow

**NO** ▶ Substitute with a known-good ATF temperature sensor and check for proper operation. If the problem is corrected, replace ATF temperature sensor as necessary and then, Go to " Verification of Vehicle Repair" procedure.

# AT-48

# Automatic Transmission System

### ■ Check TCM

1. Disconnect solenoid valve connector.
2. IG "ON" & Engine "OFF"

3. Select simulator function on the scantool.
4. Apply simulation voltage from 0V to 5V with signal terminal of ATF temperature sensor harness connector.

**Current Data**

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Oil Temperature Sensor	156	'F
<input type="checkbox"/> Engine Speed	0	RPM
<input type="checkbox"/> Vehicle Speed	0	MPH
<input type="checkbox"/> Throttle Position	9.8	%
<input type="checkbox"/> Input Speed	0	RPM
<input type="checkbox"/> Output Speed	0	RPM
<input type="checkbox"/> Damper Clutch Slip	0	RPM
<input type="checkbox"/> Gear Ratio	-0.00	-

**Simulation Test (Channel B Only)**

VOLT(V) Output: Pulse Output: Duty Output:

**Volt Output**

1.0 v

STOP

Fig.1

SBHAT9513L

## Automatic Transmission System

## AT-49

The screenshot shows a diagnostic tool interface with two main sections. The top section is titled 'Current Data' and contains a table of sensor readings. The bottom section is titled 'Simulation Test (Channel B Only)' and features several control buttons and a large digital display.

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Oil Temperature Sensor	109	'F
<input type="checkbox"/> Engine Speed	0	RPM
<input type="checkbox"/> Vehicle Speed	0	MPH
<input type="checkbox"/> Throttle Position	9.8	%
<input type="checkbox"/> Input Speed	0	RPM
<input type="checkbox"/> Output Speed	0	RPM
<input type="checkbox"/> Damper Clutch Slip	0	RPM
<input type="checkbox"/> Gear Ratio	-0.00	-

The 'Simulation Test' section includes buttons for 'VOLT(V) Output', 'Pulse Output', and 'Duty Output'. A large digital display shows 'Volt Output 2.0 v'. To the right of the display are four waveform icons and a 'STOP' button.

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9514L

Fig 1) 1.0V → 156 °F

Fig 1) 2.0V → 109 °F

※ This value is subject to change vehicle condition or model.

5. Does the simulation voltage make ATF temperature sensor value change in accordance with reference value ?

**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. Drive the vehicle to meet the enable condition for DTC. And Go to "Verification of Vehicle Repair:" procedure.

**NO** ▶ Substitute with a known-good PCM/TCM and check for proper operation. If the problem is corrected, replace PCM/TCM as necessary and then Go to "Verification of Vehicle Repair" procedure.

## How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

## Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C( 122 °F) and 120°C( 248 °F). If the ATF temperature is outside this range, work to bring the range.

## ⚠ CAUTION

Don't raise the oil temperature by stalling the engine.



## AT-50

# Automatic Transmission System

(Reference)

If the oil temperature is not between 50°C ( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

### STEP 4) Check learning results

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

### اولین سامانه دیجیتال تعییر کار با این خودرو

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### 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 scan tool, 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 Transmission System

# AT-51

## P0712 Transmission Fluid Temperature Sensor "A" Circuit Low Input

### Component Location

Refer to DTC P0711 : Transmission Fluid Temperature Sensor "A" Circuit Range/Performance.

### General Description

Refer to DTC P0711 : Transmission Fluid Temperature Sensor "A" Circuit Range/Performance.

### DTC Description

TCM sets DTC when the ATF temperature sensor signal has been detected over 200°C, voltage is approximately 0V, for 5 minutes. The TCM regards the ATF temperature as fixed at a value of 80 °C(176°F) when ATF temperature sensor is faulty.

(MIL : Consecutive 2 Driving Cycle)

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Short to ground</li> </ul>	<ul style="list-style-type: none"> <li>Short to ground in circuit</li> <li>Faulty ATF temperature sensor</li> <li>Faulty TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>IG "ON"</li> <li>10.2V &lt; Battery Voltage &lt; 14V</li> <li>CAN Communication : Normal</li> <li>Not in Fail Safe mode</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>ATF temperature &gt; 200°C ( 392 °F) : Approximately 0V)</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 5 minutes</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>No lock up slip control</li> <li>No adoptive shift control</li> <li>No upshift 5th and 6th</li> <li>Regard ATF temperature as 80°C(176°F)</li> </ul>	

### Specification

Refer to DTC P0711 : Transmission Fluid Temperature Sensor "A" Circuit Range/Performance.

### Diagnostic Circuit Diagram

Refer to DTC P0711 : Transmission Fluid Temperature Sensor "A" Circuit Range/Performance.

### Signal Waveform & Data

Refer to DTC P0711 : Transmission Fluid Temperature Sensor "A" Circuit Range/Performance.

### Monitor Scantool Data

Refer to DTC P0711 : Transmission Fluid Temperature Sensor "A" Circuit Range/Performance.

### 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.
- Has a problem been found?

**YES** ► Repair as necessary and go to "Verification vehicle Repair" procedure.

**NO** ► Go to " Signal circuit inspection" procedure.

## AT-52

## Automatic Transmission System

### Signal Circuit Inspection

1. IG KEY "OFF"
2. Disconnect solenoid valve connector.
3. IG KEY "ON" & Engine "OFF"
4. Check voltage between signal terminal of ATF harness connector and chassis ground.

---

### Specification : 5V

---

5. Is the measured voltage within specification ?

**YES** ▶ Go to "Component Inspection" procedure.

**NO** ▶ Check short to ground in harness.  
Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

### Component Inspection

Refer to DTC P0711 : Transmission Fluid Temperature Sensor "A" Circuit Range/Performance.

### Verification of Vehicle Repair

Refer to DTC P0711 : Transmission Fluid Temperature Sensor "A" Circuit Range/Performance.



دیجیال خودرو  
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

# Automatic Transmission System

## AT-53

### P0713 Transmission Fluid Temperature Sensor "A" Circuit High Input

#### Component Location

Refer to DTC P0711 : Transmission Fluid Temperature Sensor "A" Circuit Range/Performance.

#### General Description

Refer to DTC P0711 : Transmission Fluid Temperature Sensor "A" Circuit Range/Performance.

#### DTC Description

TCM sets this DTC when ATF temperature sensor has been detected below  $-43^{\circ}\text{C}$  ( $-45.4^{\circ}\text{F}$ ), voltage is approximately 5V, for 12 seconds. The TCM regards the ATF temperature as fixed at a value of  $80^{\circ}\text{C}$  ( $176^{\circ}\text{F}$ ).

(MIL : 1 Driving Cycle)

#### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Open / Short to battery</li> </ul>	<ul style="list-style-type: none"> <li>Open or short to battery in circuit</li> <li>Faulty ATF sensor</li> <li>Faulty TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>IG "ON"</li> <li><math>10.2\text{V} &lt; \text{Battery Voltage} &lt; 14\text{V}</math></li> <li>CAN Communication : Normal</li> <li>Not in Fail Safe mode</li> <li>Engine Coolant Temperature <math>&gt; 50^{\circ}\text{C}</math> (<math>122^{\circ}\text{F}</math>)</li> <li>Shift Lever switch, Inhibitor switch = Normal</li> <li>Not P or N range</li> <li>Output speed <math>\geq 0</math> rpm</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>ATF temperature <math>&lt; -43^{\circ}\text{C}</math> (Approximately 5V)</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 12 seconds</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>No lock up slip control</li> <li>No adoptive shift control</li> <li>No upshift 5th and 6th</li> <li>Regard ATF temperature as <math>80^{\circ}\text{C}</math> (<math>176^{\circ}\text{F}</math>)</li> </ul>	

#### Specification

Refer to DTC P0711 : Transmission Fluid Temperature Sensor "A" Circuit Range/Performance.

#### Diagnostic Circuit Diagram

Refer to DTC P0711 : Transmission Fluid Temperature Sensor "A" Circuit Range/Performance.

# AT-54

# Automatic Transmission System

## Signal Waveform & Data

Current Data

Standard Display | Full List | Graph | Items List | Reset Min.Max. | Record | Stop | VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Oil Temperature Sensor	174	'F
<input type="checkbox"/> Engine Speed	646	RPM
<input type="checkbox"/> Vehicle Speed	0	MPH
<input type="checkbox"/> Throttle Position	3.9	%
<input type="checkbox"/> Input Speed	639	RPM
<input type="checkbox"/> Output Speed	0	RPM
<input type="checkbox"/> Damper Clutch Slip	7	RPM
<input type="checkbox"/> Gear Ratio	65.535	-
<input type="checkbox"/> Gear Shift Position	P/N/R	-
<input type="checkbox"/> Select Level Switch	P,N	-
<input type="checkbox"/> A/C Switch	OFF	-
<input type="checkbox"/> Idle Switch	ON	-
<input type="checkbox"/> Brake Switch	OFF	-
<input type="checkbox"/> Auto Cruise Switch	OFF	-
<input type="checkbox"/> Sports Mode Select	OFF	-
<input type="checkbox"/> Sports Mode Up	OFF	-
<input type="checkbox"/> Sports Mode Down	OFF	-
<input type="checkbox"/> Next Gear Position	1	-
<input type="checkbox"/> Number of DTC	1	-
<input type="checkbox"/> A/T Relay Voltage	14.1	V
<input type="checkbox"/> Engine Torque	11.0	%

Fig.1 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9510L

Current Data

Standard Display | Full List | Graph | Items List | Reset Min.Max. | Record | Stop | VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Oil Temperature Sensor	-39	'F
<input type="checkbox"/> Engine Speed	646	RPM
<input type="checkbox"/> Vehicle Speed	0	MPH
<input type="checkbox"/> Throttle Position	4.3	%
<input type="checkbox"/> Input Speed	632	RPM
<input type="checkbox"/> Output Speed	0	RPM
<input type="checkbox"/> Damper Clutch Slip	14	RPM
<input type="checkbox"/> Gear Ratio	-0.00	-

Fig.2

SBHAT9511L

# Automatic Transmission System

# AT-55

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Stop	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Oil Temperature Sensor	-39	'F
<input type="checkbox"/> Engine Speed	646	RPM
<input type="checkbox"/> Vehicle Speed	0	MPH
<input type="checkbox"/> Throttle Position	4.3	%
<input type="checkbox"/> Input Speed	632	RPM
<input type="checkbox"/> Output Speed	0	RPM
<input type="checkbox"/> Damper Clutch Slip	14	RPM
<input type="checkbox"/> Gear Ratio	-0.00	-

Fig.3

SBHAT9512L

Fig 1) Normal

Fig 2) Open or Short to battery

Fig 3) Short to ground

### Monitor Scantool Data

Refer to DTC P0711 : Transmission Fluid Temperature Sensor "A" Circuit Range/Performance.

### 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.
- Has a problem been found?

**YES** ▶ Repair as necessary and go to "Verification vehicle Repair" procedure.

**NO** ▶ Go to " Signal circuit inspection" procedure.

### Signal Circuit Inspection

- IG KEY "OFF"
- Disconnect solenoid valve connector.
- IG KEY "ON" & Engine "OFF"
- Check voltage between signal terminal of ATF harness connector and chassis ground.

**Specification** : 5V

5. Is the measured voltage within specification ?

**YES** ▶ Go to "Ground Circuit Inspection" procedure.

**NO** ▶ Check open or short to battery in harness. Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

### Ground Circuit Inspection

- IG KEY "OFF"
- Disconnet solenoid valve connector.
- IG KEY "ON" & Engine "OFF"
- Check voltage between ATF temperature sensor signal terminal of solenoid vavle harness connector and chassis ground.(Measurement 1)
- Check voltage between ATF temperature signal terminal and ground terminal of solenoid valve harnesss connector.(Measurement 2)

**Specification** : Measurement 1 - Measurement 2 = below 200mV

6. Is the measured voltage within specification ?

**YES** ▶ Go to "Component Inspection" procedure.

**NO** ▶ Check open or contact resistance. Repair or replace as necessary and then, go to 'Verificat- ion of Vehicle Repair " procedure.

### Component Inspection

Refer to DTC P0711 : Transmission Fluid Temperature Sensor "A" Circuit Range/Performance.

### Verification of Vehicle Repair

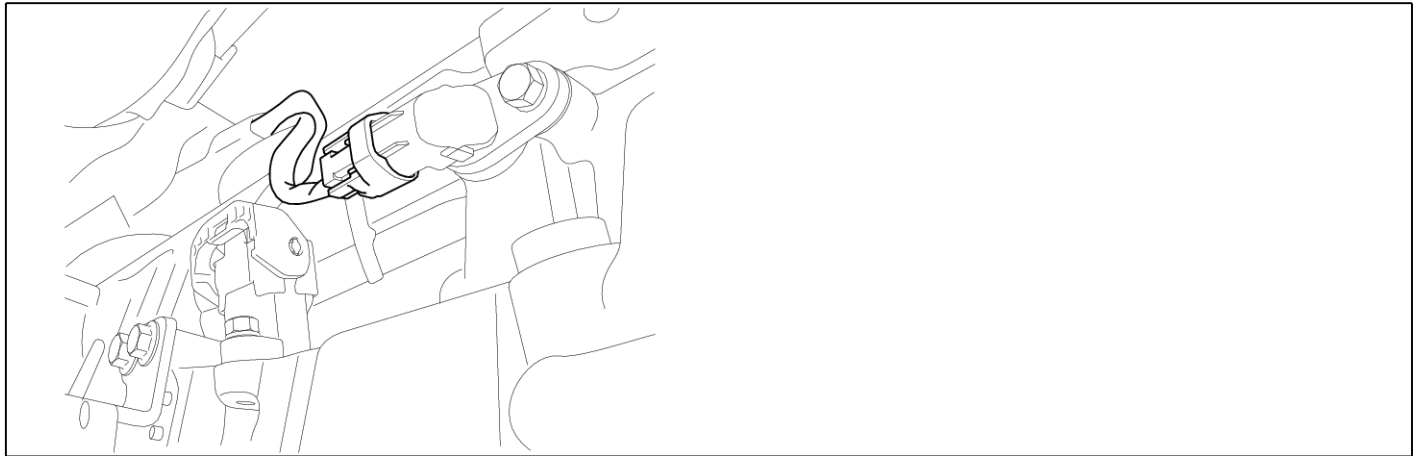
Refer to DTC P0711 : Transmission Fluid Temperature Sensor "A" Circuit Range/Performance.

# AT-56

# Automatic Transmission System

## P0717 Input/Turbine Speed Sensor "A" Circuit No Signal

### Component Location



SBHAT8496D

### General Description

Input speed sensor detects input speed from rotation number of direct & reverse disc clutch case. And transmit to TCU as a signal. The TCM determines the input shaft speed by counting the frequency of the pulses. This value is mainly used to control the optimum fluid pressure during shifting.

### DTC Description

TCM sets this DTC if signal from input speed sensor is not detected even though vehicle is driving. Fail safe mode is excuted if TCM detects this DTC.

(MIL : 1 Driving Cycle)

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>No pulse(B+ short/Ground Short/Open)</li> </ul>	<ul style="list-style-type: none"> <li>Open or short in circuit</li> <li>Faulty input speed sensor</li> <li>Faulty TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>Engine "ON"</li> <li>Input RPM &gt; 550rpm</li> <li>10.2V &lt; Battery Voltage &lt; 14V</li> <li>CAN Communication : Normal</li> <li>Not in Fail Safe mode</li> <li>Inhibitor switch = "D" range</li> <li>Not shifting</li> <li>Output, Inhibitor switch, Engine Torque = Normal</li> <li>All solenoid Valves = Normal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Output speed signal is 12 pulse but, No input signal detected</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 500 seconds</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>No Torque Converter Clutch Slip control</li> <li>No torque reduction control</li> <li>No up shift 5th and 6th</li> <li>Substitution input sensor for output sensor</li> </ul>	

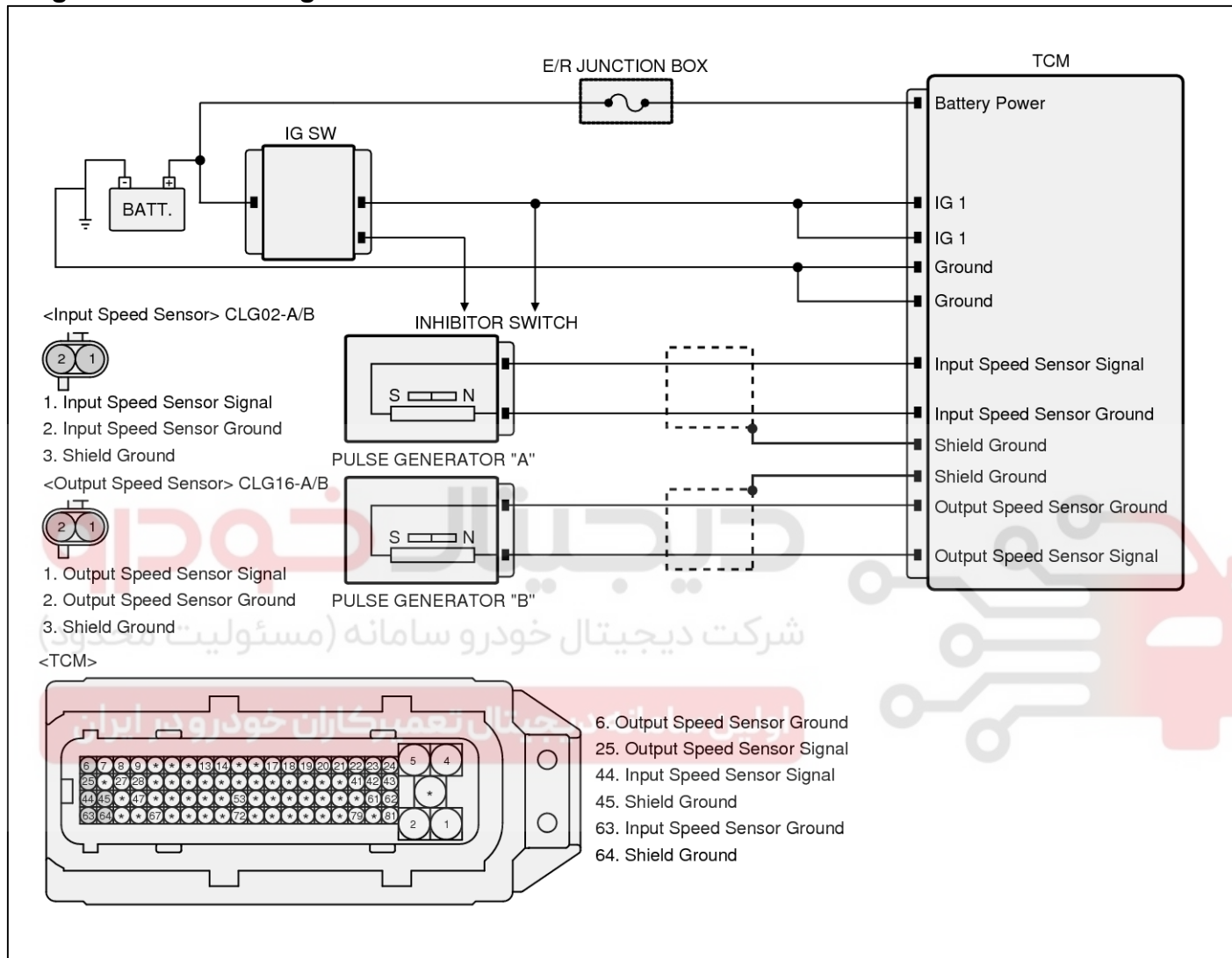
# Automatic Transmission System

# AT-57

## Specification

Check Position	Resistance (20°C, 68 °F )
Signal - Ground	560 ~ 680Ω

## Diagnostic Circuit Diagram



SBHAT9703L



# AT-58

# Automatic Transmission System

## Signal Waveform & Data

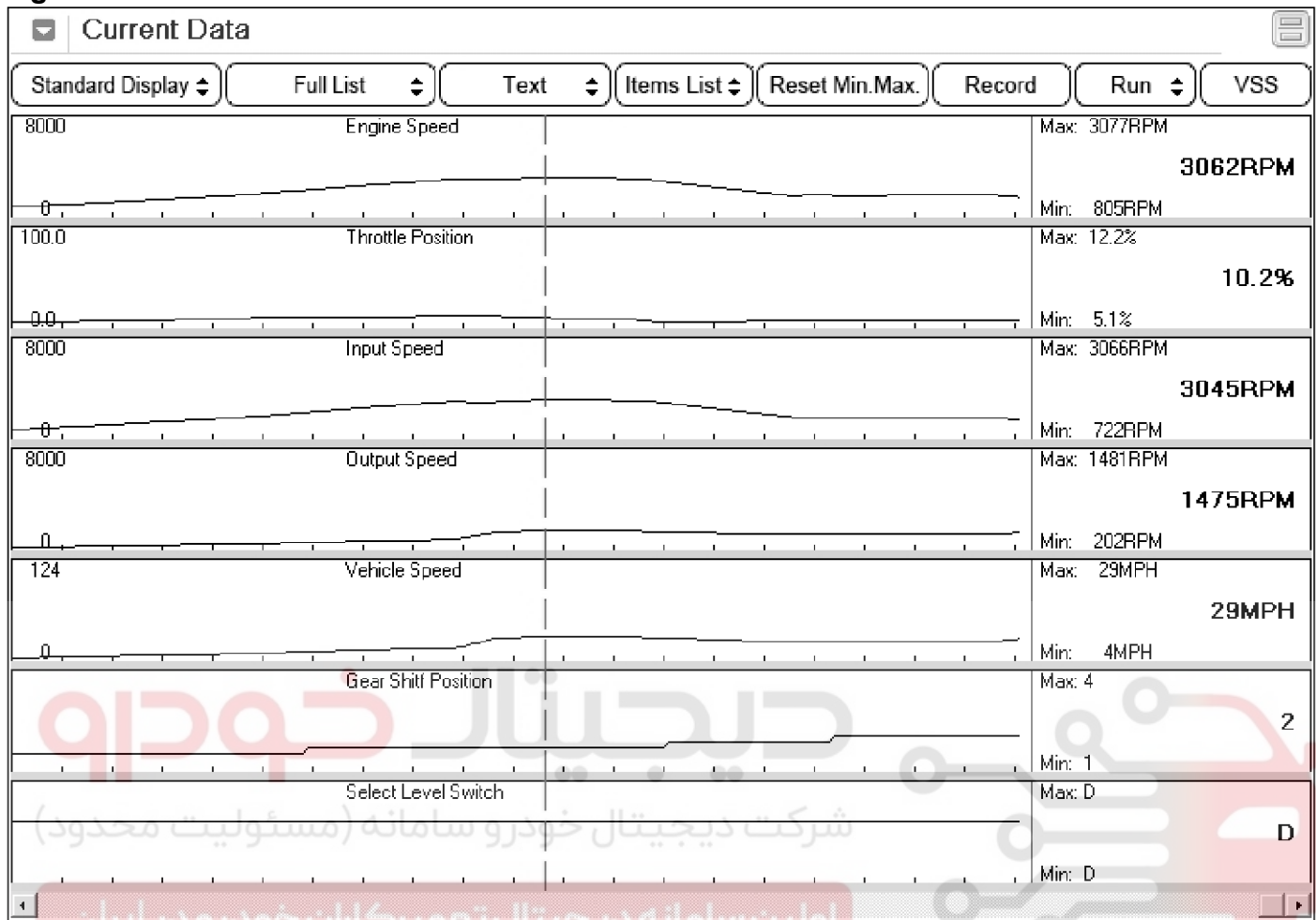


Fig.1

SBHAT9515L

# Automatic Transmission System

AT-59

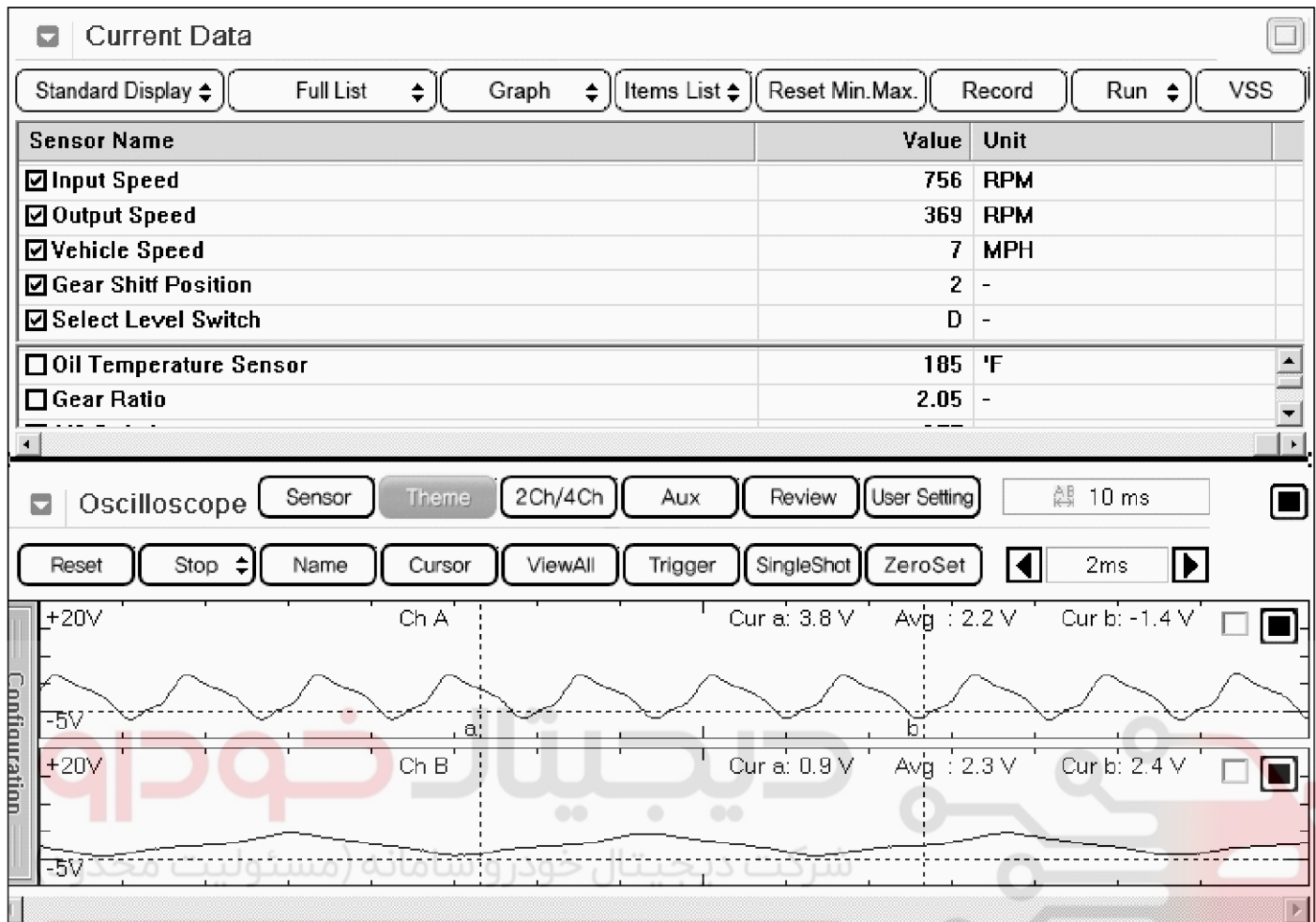


Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9516L

# AT-60

# Automatic Transmission System

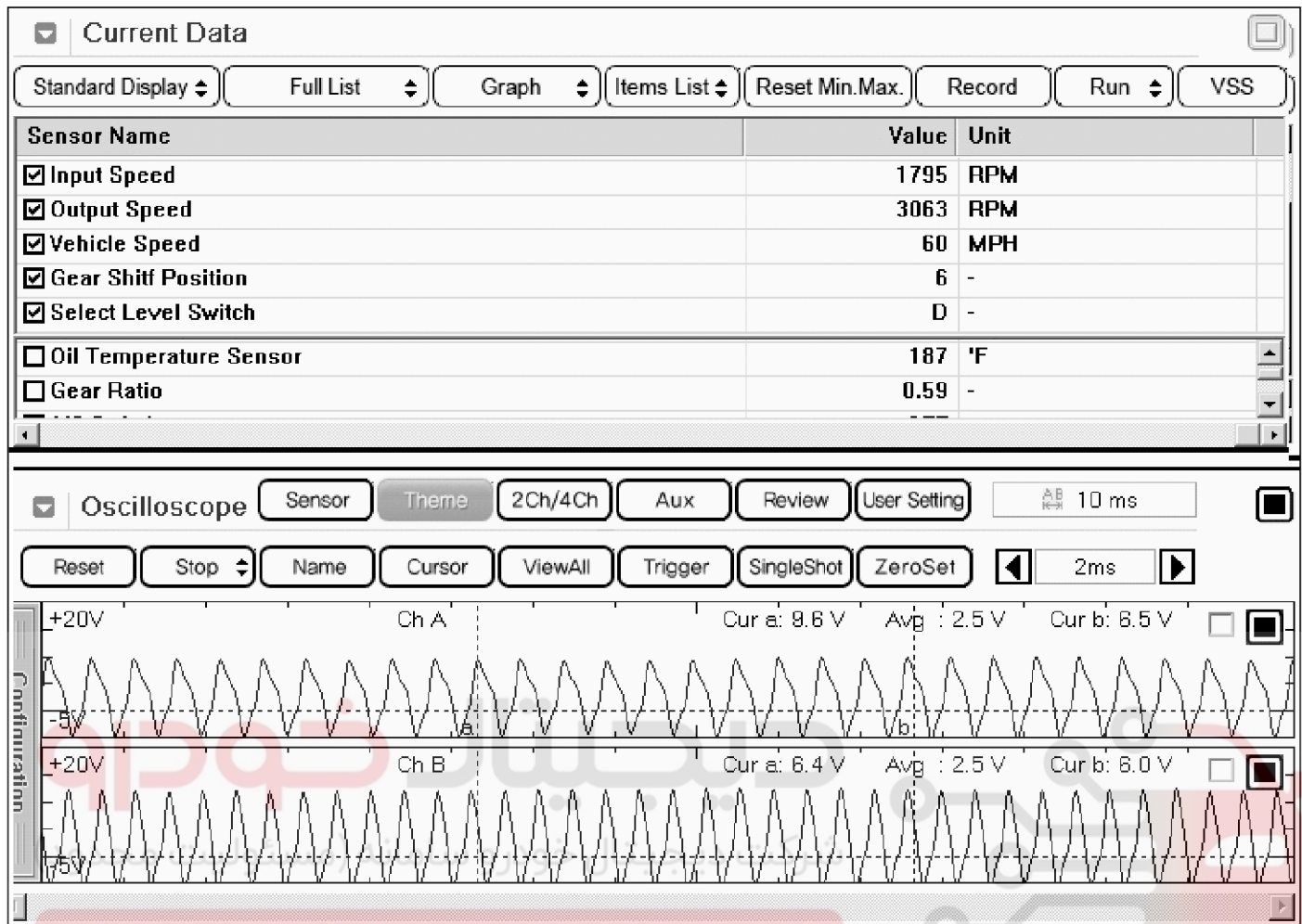


Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9517L

Fig 1) Input Speed Sensor - Driving Condition

Fig 2) Input/Output Sensor - Low speed driving condition

Fig 3) Input/Output Sensor - High speed driving condition

# Automatic Transmission System

# AT-61

### Monitor Scantool Data

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

3. Monitor the "INPUT SPEED SENSOR" parameter on the scantool
4. Driving at speed of over 19 Mile/h(30 Km/h)

**Specification** : Increasing gradually



Fig.1

SBHAT9515L

# AT-62

# Automatic Transmission System

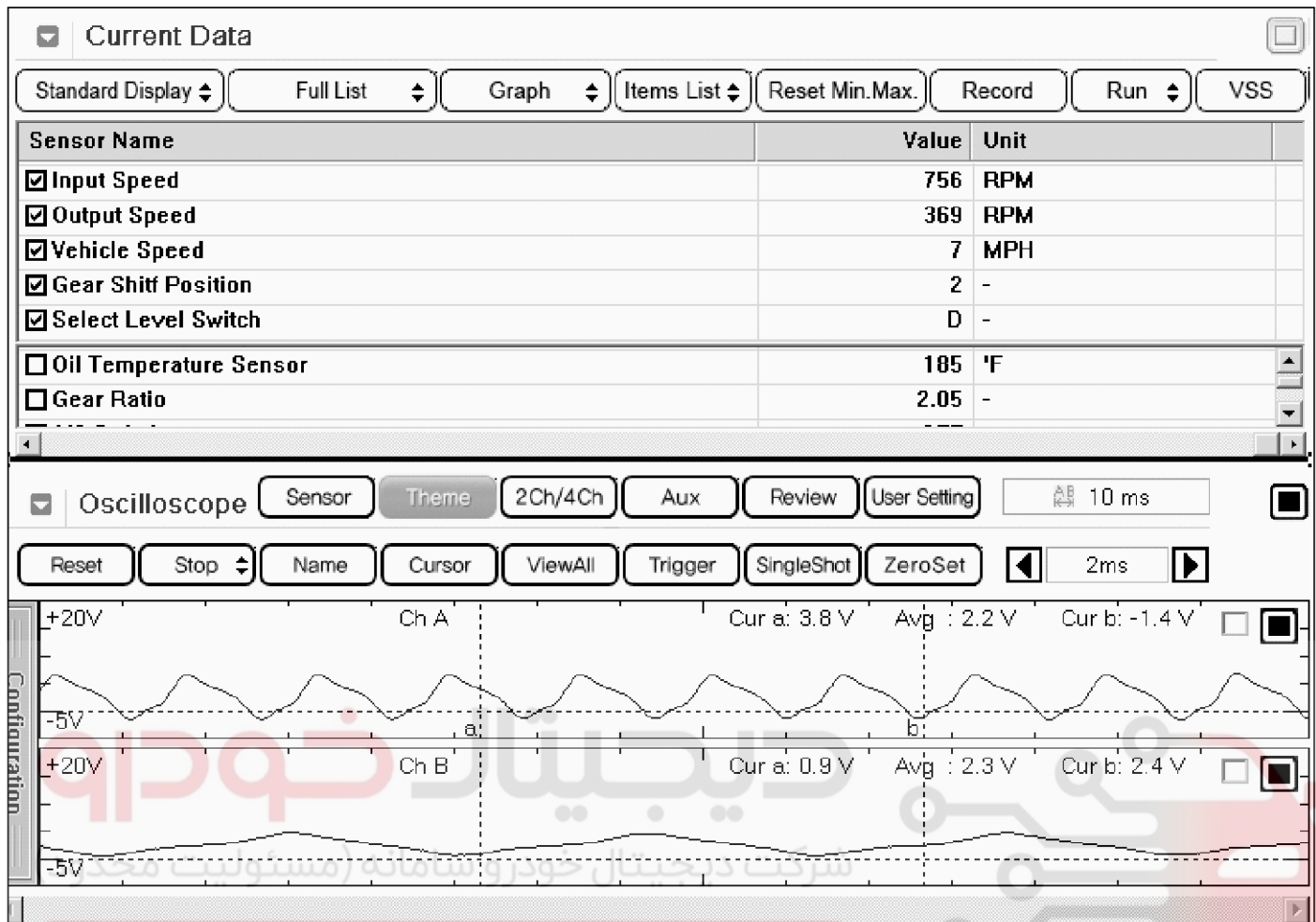


Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9516L

## Automatic Transmission System

## AT-63

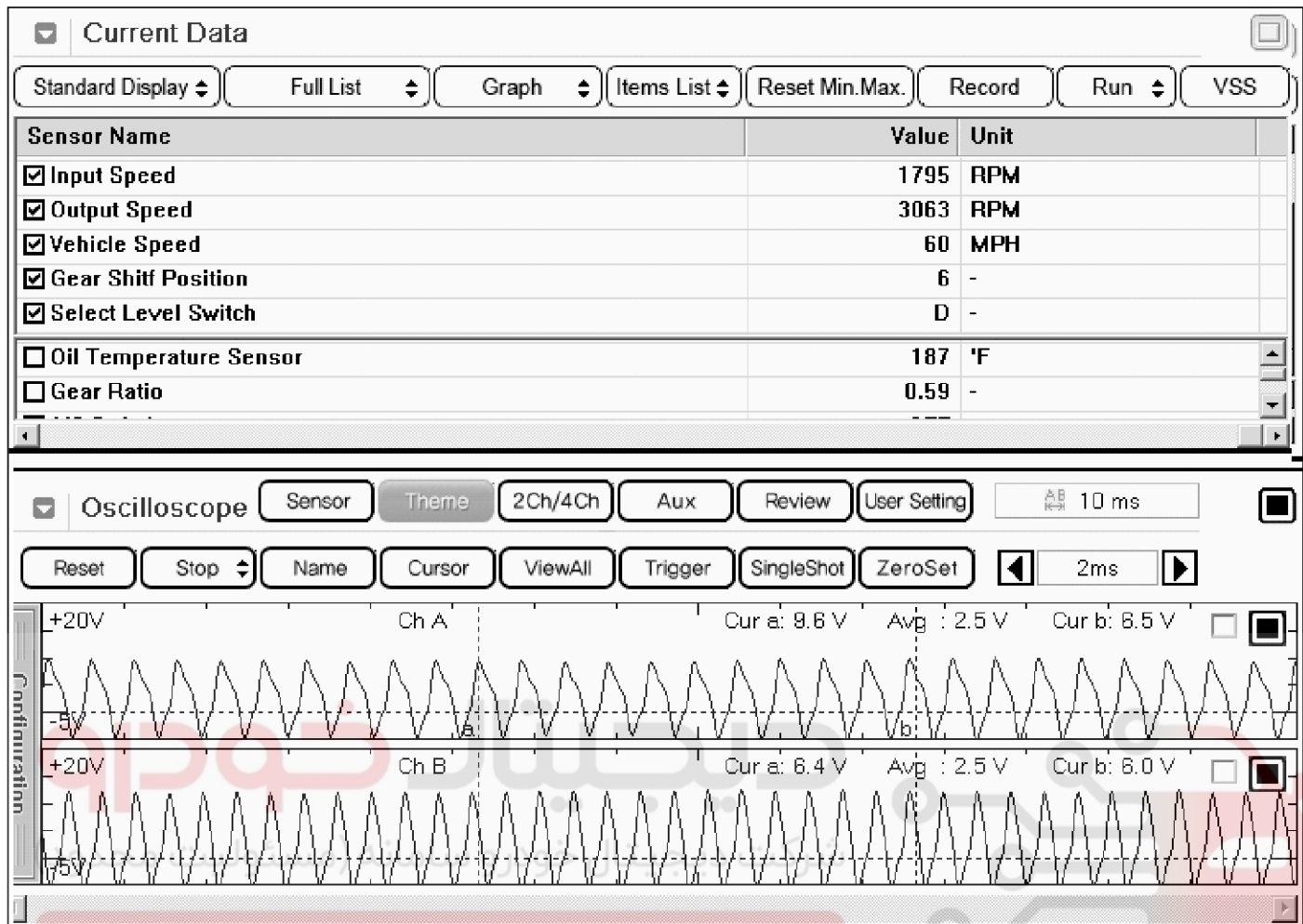


Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9517L

Fig 1) Input Speed Sensor - Driving Condition

Fig 2) Input/Output Sensor - Low speed driving condition

Fig 3) Input/Output Sensor - High speed driving condition

5. Does the input sensor signal 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 Vehicle Repair" procedure

**NO** ▶ Go to "W/Harness 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 vehicle Repair" procedure.

**NO** ▶ Go to "Signal circuit inspection" procedure.

## AT-64

## Automatic Transmission System

## Signal Circuit Inspection

1. IG KEY "OFF"
2. Disconnect solenoid valve connector.
3. IG KEY "ON" & Engine "OFF"
4. Check voltage between signal terminal of input speed sensor harness connector and chassis ground.

---

**Specification : 2.5V**

---

5. Is the measured voltage within specification ?

**YES** ▶ Go to "Ground Circuit Inspection" procedure.

**NO** ▶ Check open or short in harness and then, repair or replace as necessary. Finally go to "Verification of Vehicle Repair" procedure.

## Ground Circuit Inspection

1. IG KEY "OFF"
2. Disconnect solenoid valve connector.
3. IG KEY "ON" & Engine "OFF"
4. Check voltage between ground terminal of input speed sensor connector and chassis ground.

---

**Specification : 2.5V**

---

5. Is the measured voltage within specification ?

**YES** ▶ Go to "Component Inspection" procedure.

**NO** ▶ Check open or short in harness and then, repair or replace as necessary. Finally, go to "Verification of Vehicle Repair" procedure.

## Component Inspection

## ■ Check "Input Speed Sensor"

1. IG KEY "OFF" & Engine "OFF".
2. Disconnect TCM connector.
3. Check resistance between signal terminal and ground terminal of input speed sensor at the TCM harness connector.

---

**Specification : 560 ~ 680Ω**

---

4. Is the measured resistance within specifications?

**YES** ▶ Go to "Check TCM" as follow.

**NO** ▶ Substitute with a known-good input speed sensor and check for proper operation. If the problem is corrected, replace input sensor as necessary and then, Go to "Verification of Vehicle Repair" procedure.

## ■ Check PCM/TCM

1. IG "ON"
2. Connect input speed sensor connector.
3. Select simulation Test for simulating input speed sensor.
4. Simulate input speed sensor at signal circuit of input speed sensor.

# Automatic Transmission System

AT-65

Current Data

Standard Display | Full List | Graph | Items List | Reset Min.Max. | Record | Stop | VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Input Speed	371	RPM
<input checked="" type="checkbox"/> Output Speed	0	RPM
<input type="checkbox"/> Engine Speed	0	RPM
<input type="checkbox"/> Vehicle Speed	0	MPH
<input type="checkbox"/> Throttle Position	9.8	%
<input type="checkbox"/> Damper Clutch Slip	-370	RPM
<input type="checkbox"/> Oil Temperature Sensor	-39	'F
<input type="checkbox"/> Gear Ratio	-0.00	-

Simulation Test (Channel B Only)

VOLT(V) Output | Pulse Output | Duty Output

## Pulse Output

# 150 Hz

10 Hz

1 Hz

STOP

Fig.1 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9518L

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## AT-66

## Automatic Transmission System

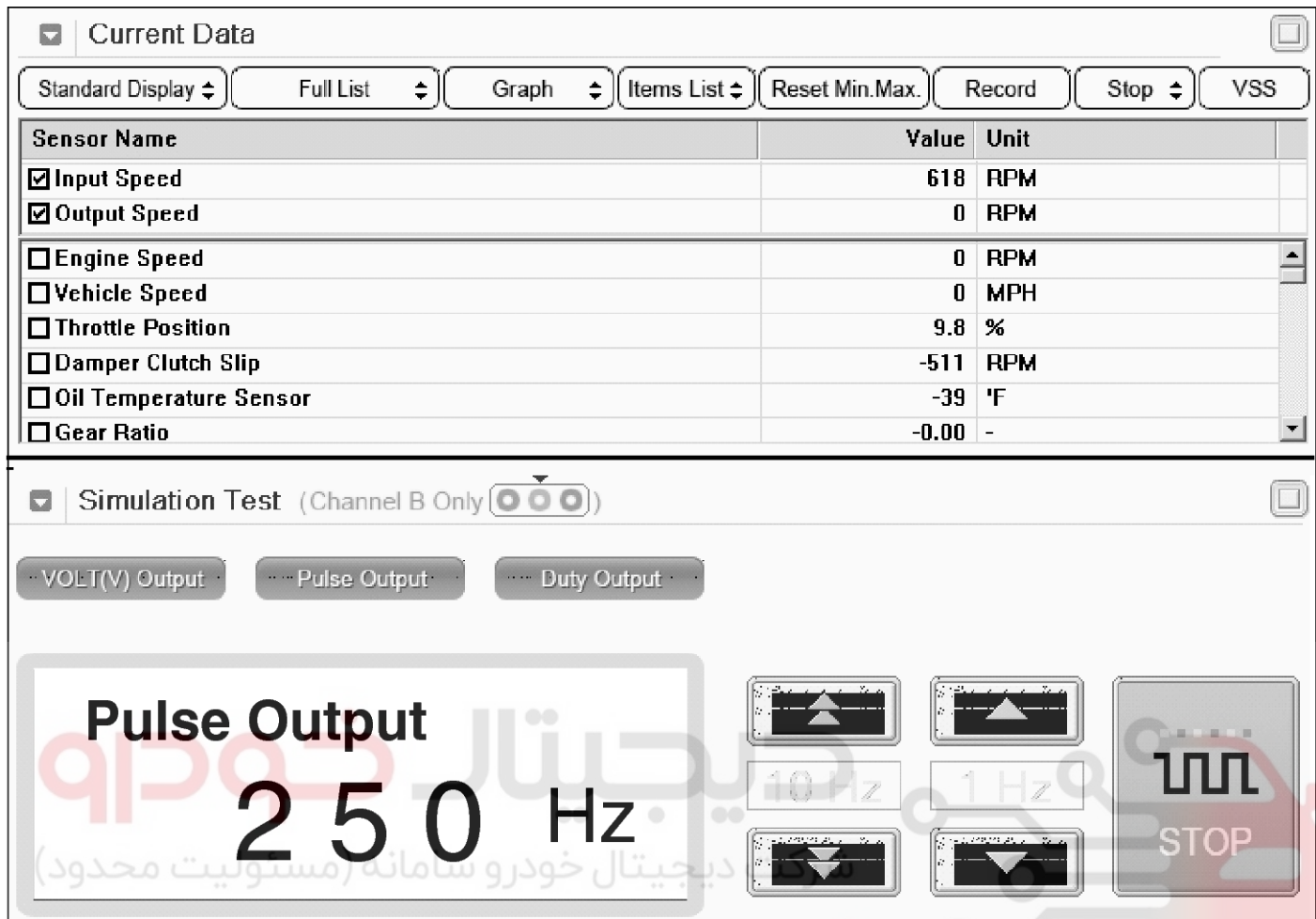


Fig.2

SBHAT9519L

Fig 1) 150Hz → 371rpm

Fig 1) 250Hz → 618rpm

※ This value is subject to change vehicle condition or model.

5. Does the simulation frequency make input speed sensor value change ?

**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. Drive the vehicle to meet the enable condition for DTC. And Go to "Verification of Vehicle Repair:" procedure.

**NO** ▶ Substitute with a known-good PCM/TCM and check for proper operation. If the problem is corrected, replace PCM/TCM as necessary and then Go to "Verification of Vehicle Repair" procedure.

## How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

## Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C( 122 °F) and 120°C( 248 °F). If the ATF temperature is outside this range, work to bring the range.

**CAUTION**

**Don't raise the oil temperature by stalling the engine.**

# Automatic Transmission System

## AT-67

(Reference)

If the oil temperature is not between 50°C ( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

### STEP 4) Check learning results

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

### اولین سامانه دیجیتال تعییر کار با این خودرو

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### 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 scan tool, 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.

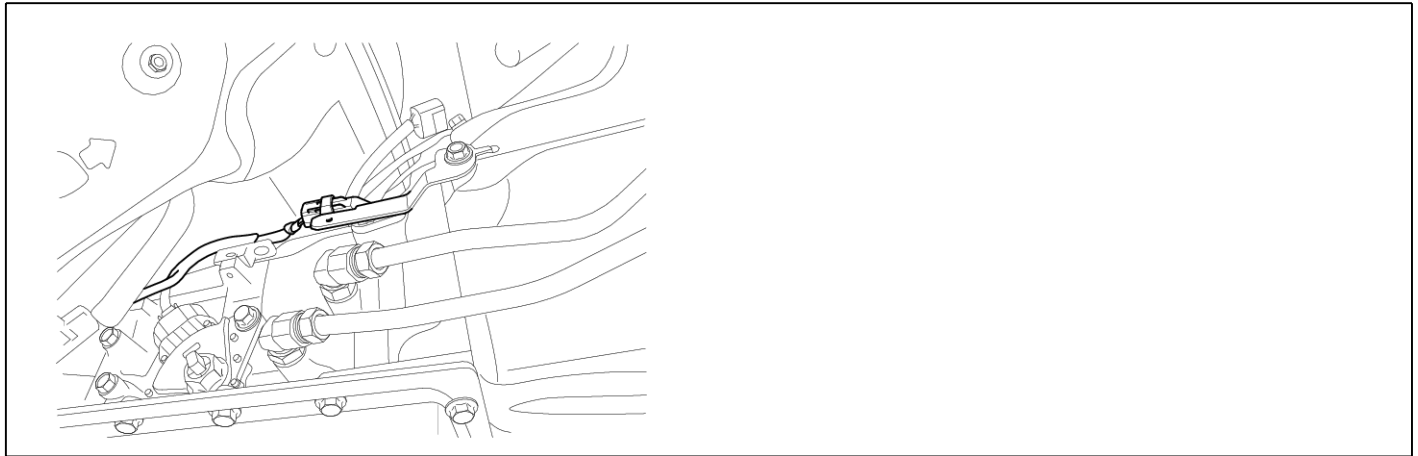


# AT-68

# Automatic Transmission System

## P0722 Output Speed Sensor Circuit No Signal

### Component Location



SBHAT8495D

### General Description

Output speed sensor detects vehicle speed from rotation number of parking lock gear and transmits to TCU as a signal. This value, together with the throttle position data, is mainly used to decide the optimum gear position.

### DTC Description

TCM sets this DTC if output speed sensor signal is not detected even though, vehicle is driving over 30km/h. TCM sets fail safe mode if this DTC is detected. During the TCM internal process to judge this DTC, Shift Lock, which is safety function for controlling to keep neutral when shifting to Reverse by accident, is performed while driving the vehicle over 11km/h.

(MIL : 1 Driving Cycle)

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>No pulse( Short to B+, ground and open)</li> </ul>	<ul style="list-style-type: none"> <li>Open or short in circuit</li> <li>Faulty output speed sensor</li> <li>Faulty TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>Engine "ON"</li> <li>Input RPM &gt; 550rpm</li> <li>10.2V &lt; Battery Voltage &lt; 14V</li> <li>CAN Communication : Normal</li> <li>Not in Fail Safe mode</li> <li>Inhibitor switch = "D" range</li> <li>Not in shifting mode</li> <li>Input, Inhibitor switch, engine torque = Normal</li> <li>All solenoid Valves = Normal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Input speed signal is 12 pulse but no output speed signal</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>500 seconds</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>No lock up slip control</li> <li>No sports mode control</li> <li>No self learning control</li> <li>No torque reduction control</li> <li>No up shift to 5th and 6th</li> </ul>	

# Automatic Transmission System

# AT-69

### Specification

Refer to DTC P0717 : Input/Turbine Speed Sensor "A"  
Circuit No Signal.

### Diagnostic Circuit Diagram

Refer to DTC P0717 : Input/Turbine Speed Sensor "A"  
Circuit No Signal.

### Signal Waveform & Data

Refer to DTC P0717 : Input/Turbine Speed Sensor "A"  
Circuit No Signal.

### Monitor Scantool Data

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

**Specification** : Increasing gradually

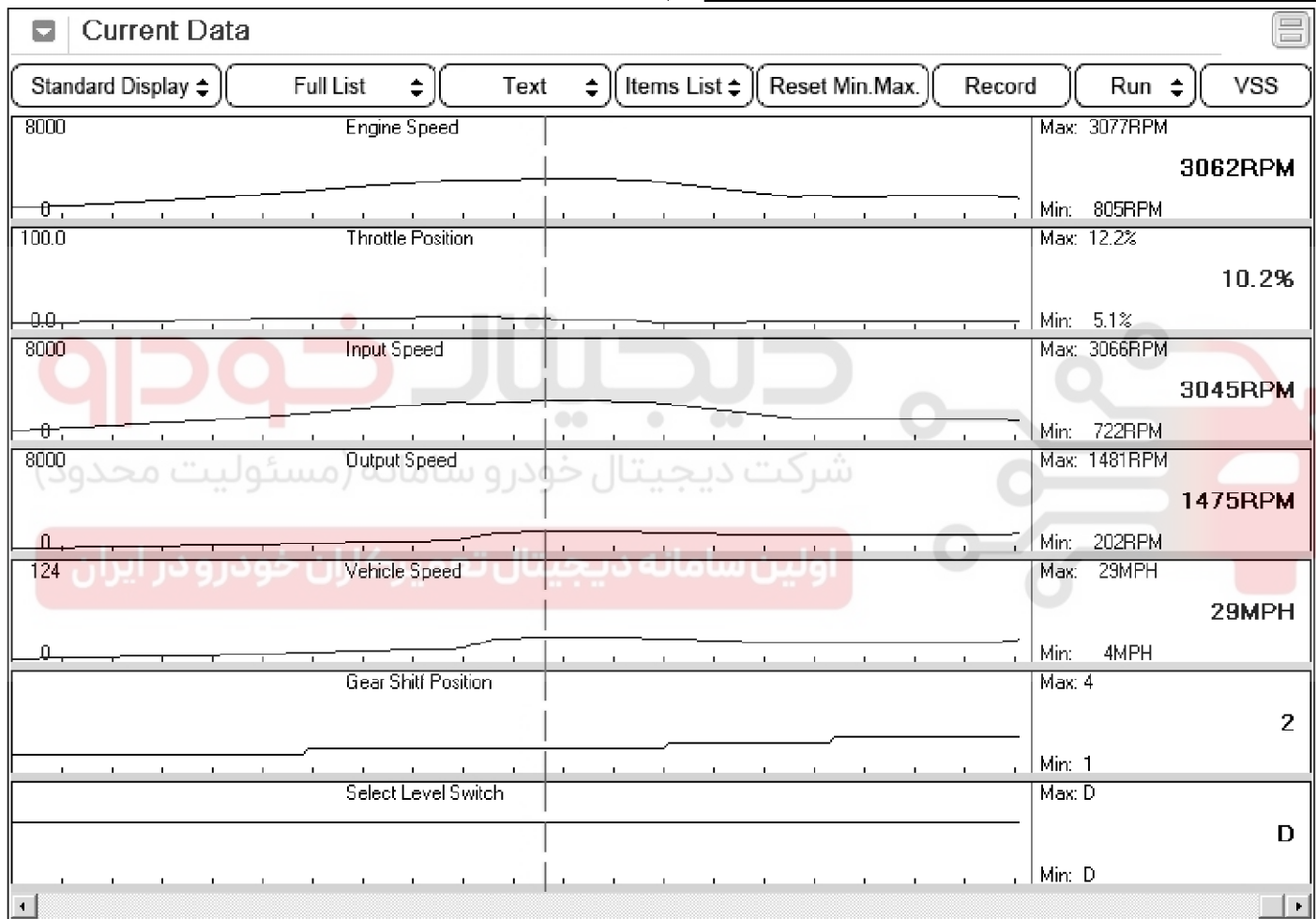


Fig.1

SBHAT9515L

# AT-70

# Automatic Transmission System

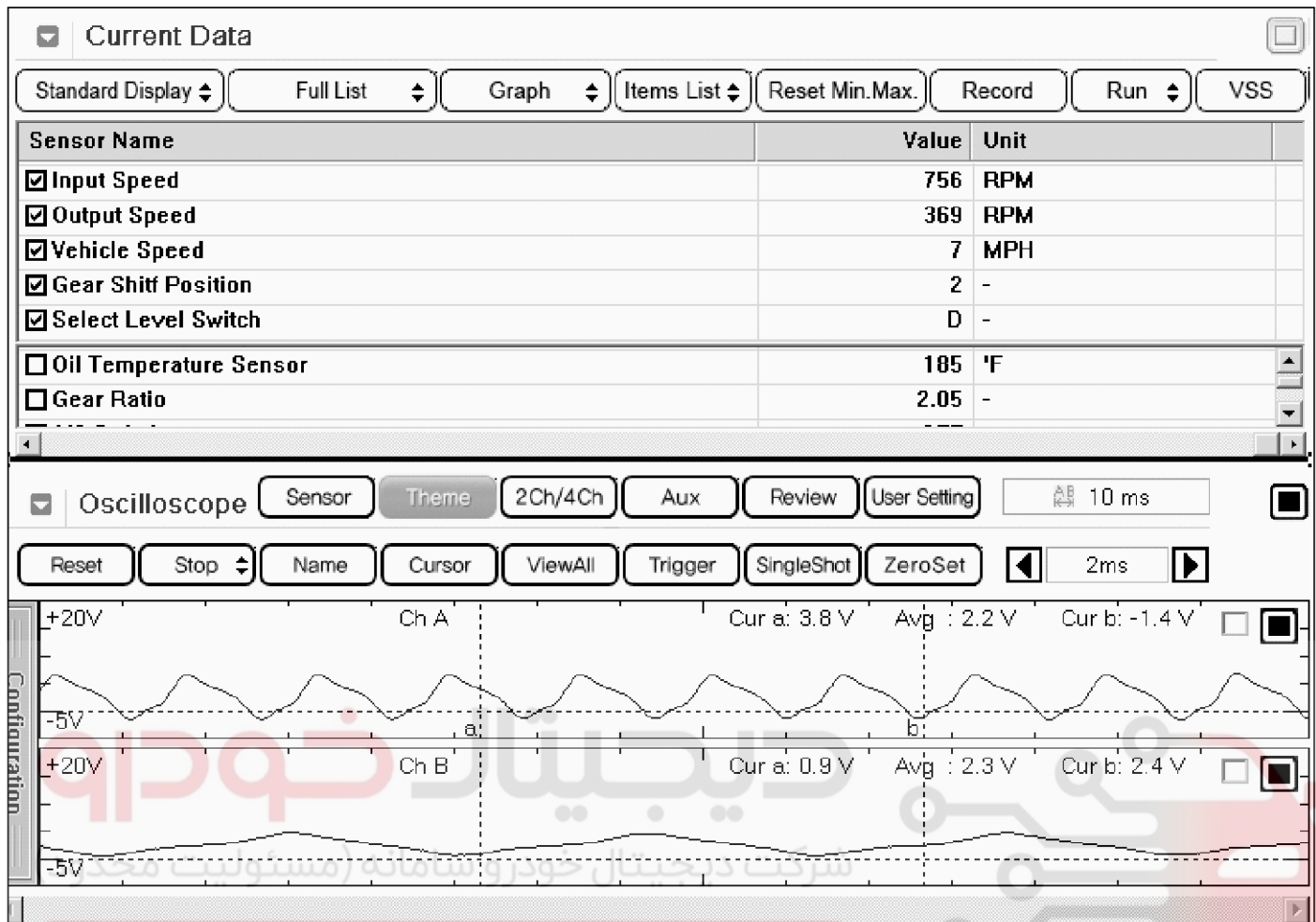


Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9516L

## Automatic Transmission System

AT-71

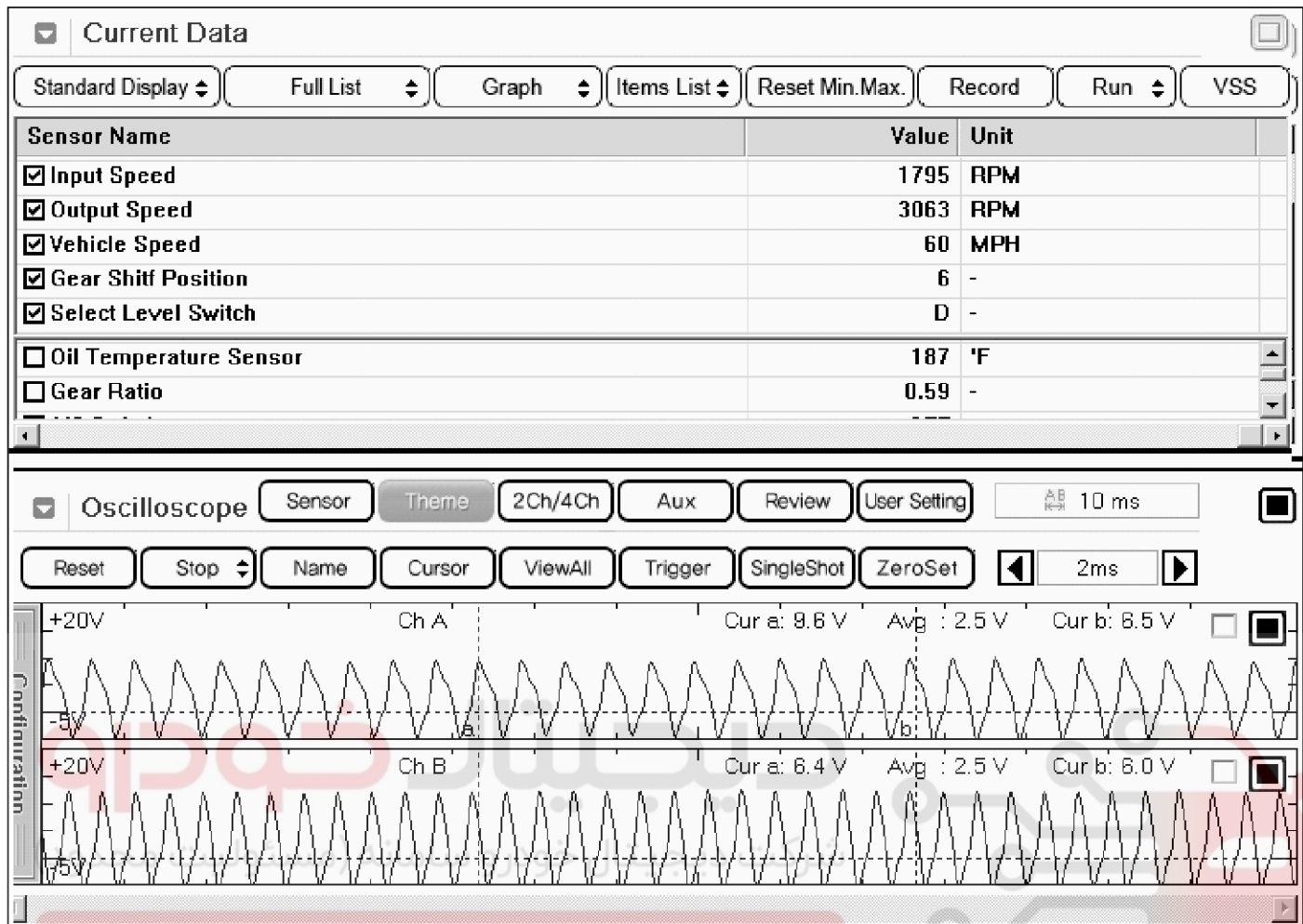


Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9517L

Fig 1) Input Speed Sensor - Driving Condition

Fig 2) Input/Output Sensor - Low speed driving condition

Fig 3) Input/Output Sensor - High speed driving condition

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

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

**NO** ▶ Go to "W/Harness Inspection" procedure

**Terminal & Connector Inspection**

Refer to DTC P0717 : Input/Turbine Speed Sensor "A"  
Circuit No Signal.

## AT-72

# Automatic Transmission System

### Signal Circuit Inspection

1. IG KEY "OFF"
2. Disconnect the "OUTPUT SPEED SENSOR" connector.
3. IG KEY "ON" & Engine "OFF"
4. Measure voltage between terminal "signal wiring" of the OUTPUT SPEED SENSOR harness connector and chassis ground .

**Specification : 2.5V**

5. Is voltage within specifications ?

**YES** ▶ Go to "Ground Circuit Inspection" procedure.

**NO** ▶ Check for open or short in harness. Repair as necessary and Go to "Verification Vehicle Repair" procedure.  
▶ If signal circuit in harness is OK, Go to "Check PCM/TCM" of the "Component Inspection" procedure.

### Ground Circuit Inspection

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

**Specification : 2.5V**

5. Is voltage within specifications ?

**YES** ▶ Go to "Component Inspection" procedure.

**NO** ▶ Check for open in harness. Repair as necessary and Go to "Verification Vehicle Repair" procedure .

### Component Inspection

#### ■ Check "Output Speed Sensor"

1. IG KEY "OFF" & Engine "OFF".
2. Disconnect the "OUTPUT SPEED SENSOR" connector.
3. Measure resistance between terminal "signal wiring" and "ground wiring" of the "OUTPUT SPEED SENSOR" connector .

**Specification : 560 ~ 680Ω**

4. Is the measured resistance within specifications?

**YES** ▶ Go to "CHECK PCM/TCM " as below

**NO** ▶ Replace "OUTPUT SPEED SENSOR" as necessary and Go to "Verification Vehicle Repair" procedure.

#### ■ Check PCM/TCM

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

# Automatic Transmission System

# AT-73

Current Data

Standard Display ▾
Full List ▾
Graph ▾
Items List ▾
Reset Min.Max.
Record
Stop ▾
VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Input Speed	0	RPM
<input checked="" type="checkbox"/> Output Speed	495	RPM
<input type="checkbox"/> Engine Speed	0	RPM
<input type="checkbox"/> Vehicle Speed	9	MPH
<input type="checkbox"/> Throttle Position	9.8	%
<input type="checkbox"/> Damper Clutch Slip	0	RPM
<input type="checkbox"/> Oil Temperature Sensor	-39	'F
<input type="checkbox"/> Gear Ratio	0.00	-

Simulation Test (Channel B Only (●●●))

VOLT(V) Output
Pulse Output
Duty Output

## Pulse Output

# 150 Hz

▲

▲

10 Hz

1 Hz

▼

▼

STOP

Fig.1

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9520L



## AT-74

## Automatic Transmission System

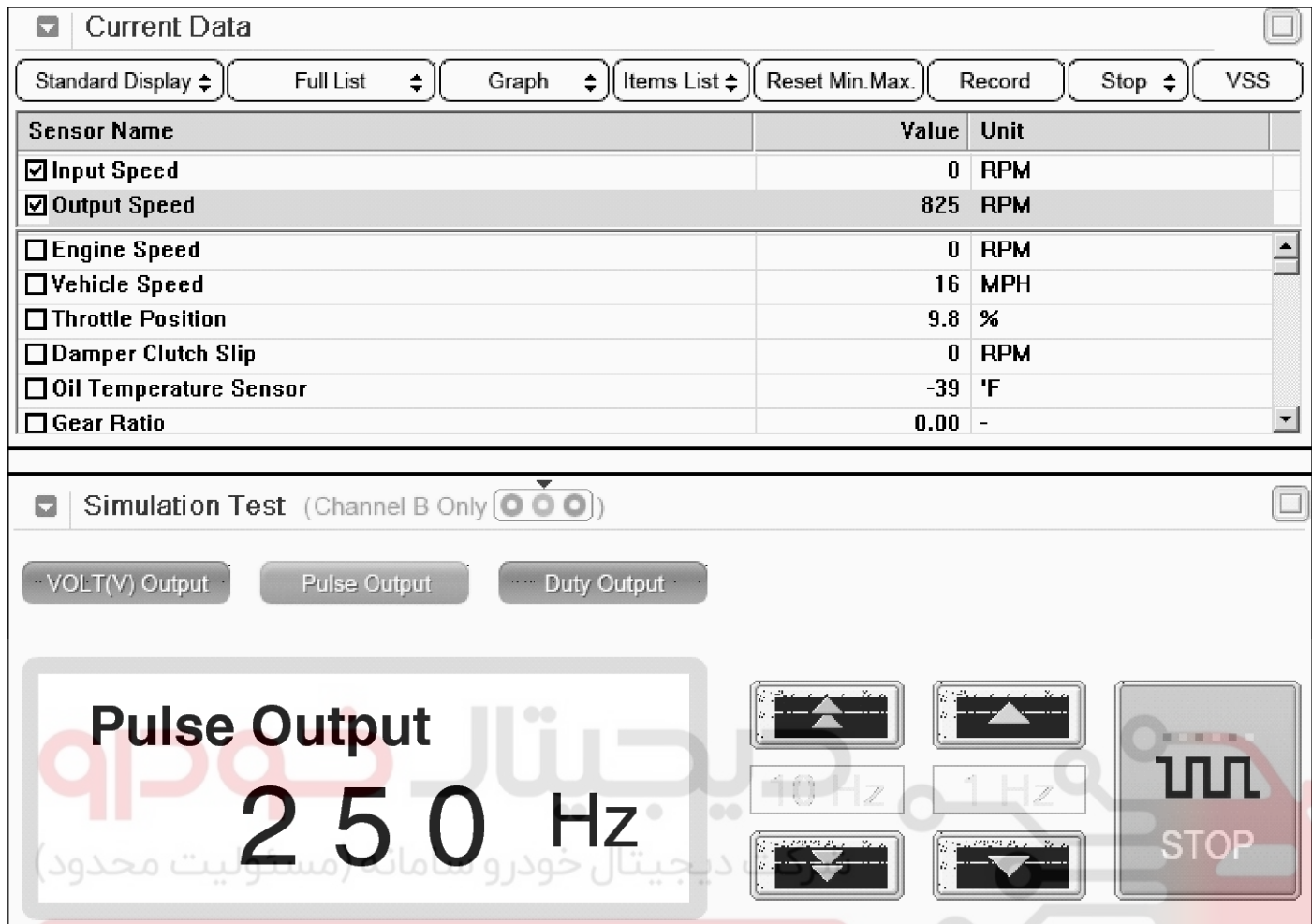


Fig.2 اولین سامانه دیجیتال خودرو در ایران

SBHAT9521L

Fig 1) 150Hz → 495rpm

Fig 1) 250Hz → 825rpm

※ 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.

**NO** ▶ Substitute with a known-good PCM/TCM and check for proper operation. If the problem is corrected, replace PCM/TCM as necessary and then go to "Verification of Vehicle Repair" procedure.

### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C( 122 °F) and 120°C( 248 °F). If the ATF temperature is outside this range, work to bring the range.

#### ⚠ CAUTION

Don't raise the oil temperature by stalling the engine.

# Automatic Transmission System

## AT-75

(Reference)

If the oil temperature is not between 50°C ( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

STEP 4) Check learning results

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

اولین سامانه دیجیتال تعمیرکاران خودرو

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### Verification of Vehicle Repair

Refer to DTC P0717 : Input/Turbine Speed Sensor "A" Circuit No Signal.

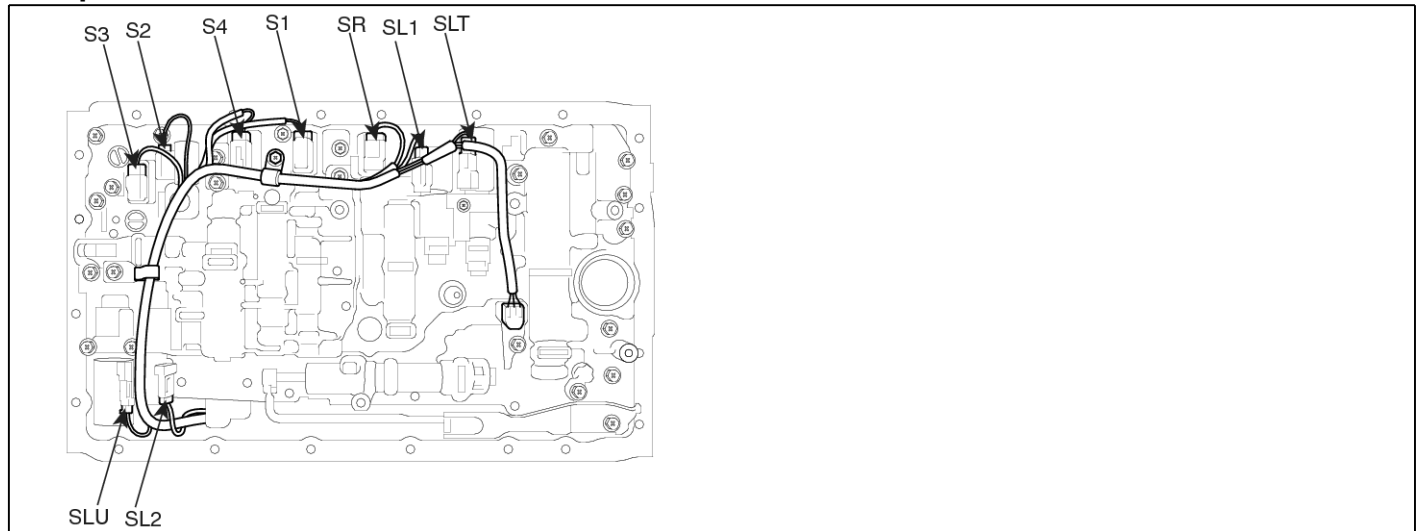


## AT-76

## Automatic Transmission System

## P0741 Torque Converter Clutch Circuit Performance or Stuck Off

## Component Location



SBHAT8494D

## General Description

The PCM/TCM controls the locking and unlocking of the Torque Converter Clutch ( or Torque Converter Clutch ), to the input shaft of the transmission, by applying hydraulic pressure. The main purpose of T/C clutch control is to save fuel by decreasing the hydraulic load inside the T/C. The PCM/TCM outputs current to control the Torque Converter Clutch Control Solenoid Valve( TCCSV ) and hydraulic pressure is applied to the TCC according to the TCC current value. When the amount of current is high, high pressure is applied and the Torque Converter Clutch is locked. The normal operating range of the Torque Converter Clutch Control current value is from 200mA(unlocked) to 1000mA(locked).

## DTC Description

TCM increases amount of current, which controls slippage between engine rpm and turbine rpm, in order to engage torque converter clutch.

TCM sets this DTC if Torque converter silpage is not reduced even though TCM controls Torque converter clutch solenoid valve with 1000mA. - It is not the electrical problem but machanical problem.

(MIL : Consecutive 2 driving cycle)

# Automatic Transmission System

## AT-77

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Stuck "OFF"</li> </ul>	<ul style="list-style-type: none"> <li>Lock-up solenoid valve(SLU)</li> <li>Torque convertor</li> <li>Valve-body(TCC pressure system)</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>Input speed &amp; Output speed sensor : normal.</li> <li>Shift solenoid valve &amp; Lineae solenoid valve : normal.</li> <li>Engine coolant Temp <math>\geq 40^{\circ}\text{C}</math>.</li> <li>ATF Temp <math>\geq 20^{\circ}\text{C}</math>.</li> <li>CAN communication : normal.</li> <li>Gear position : 4th, 5th, 6th gear.</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Engine rpm - Input speed <math>\geq 70</math> rpm(Present gear : 4th, 5th, 6th )</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 2seconds</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>none</li> </ul>	

### Specification

Measuring Position	Resistance (20 $^{\circ}\text{C}$ )
Signal - Ground	5.0 ~ 5.6 $\Omega$

# دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

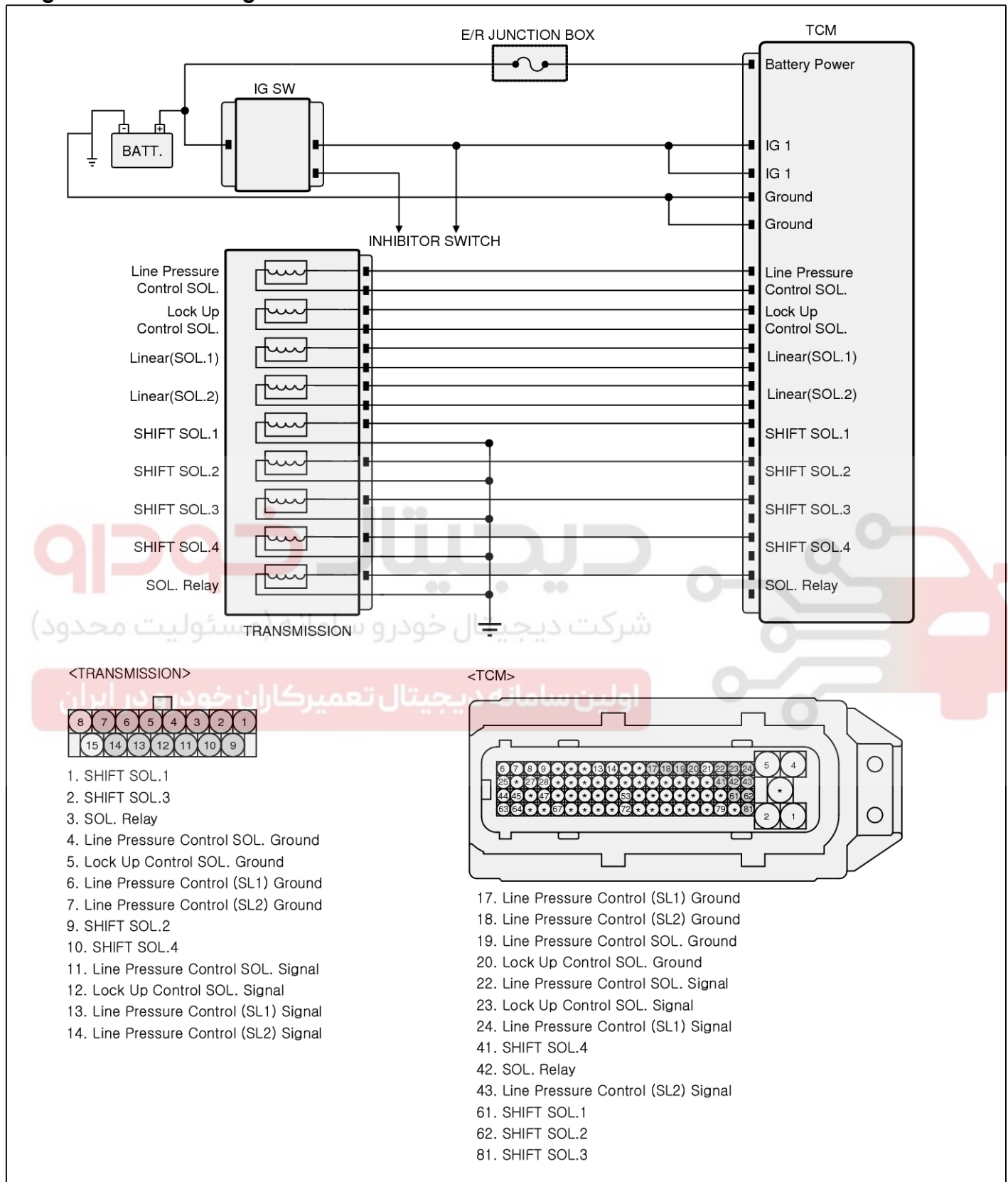
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



# AT-78

# Automatic Transmission System

## Diagnostic Circuit Diagram



SBHAT9704L

# Automatic Transmission System

# AT-79

## Signal Waveform & Data

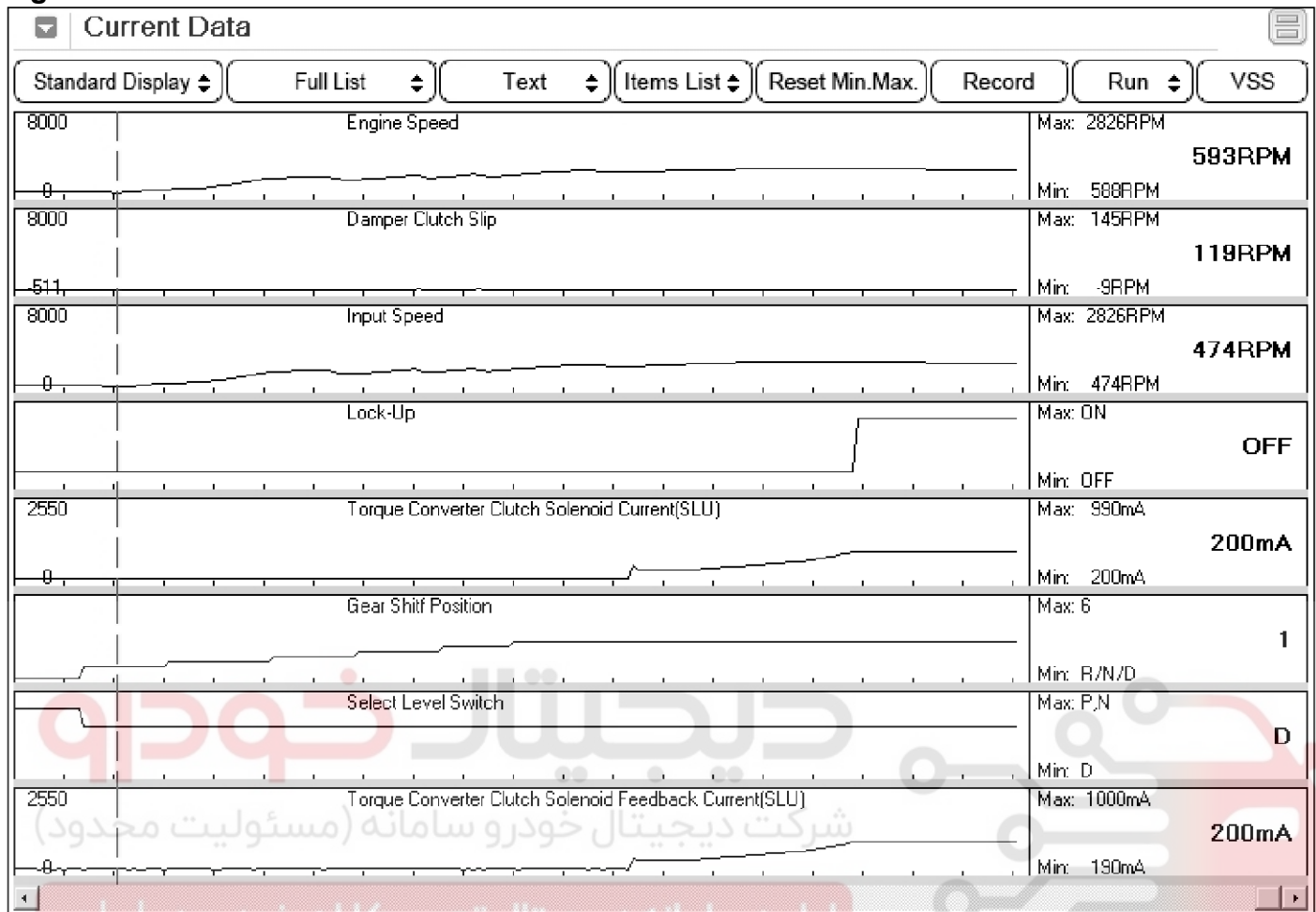


Fig.1 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9522L

# AT-80

# Automatic Transmission System

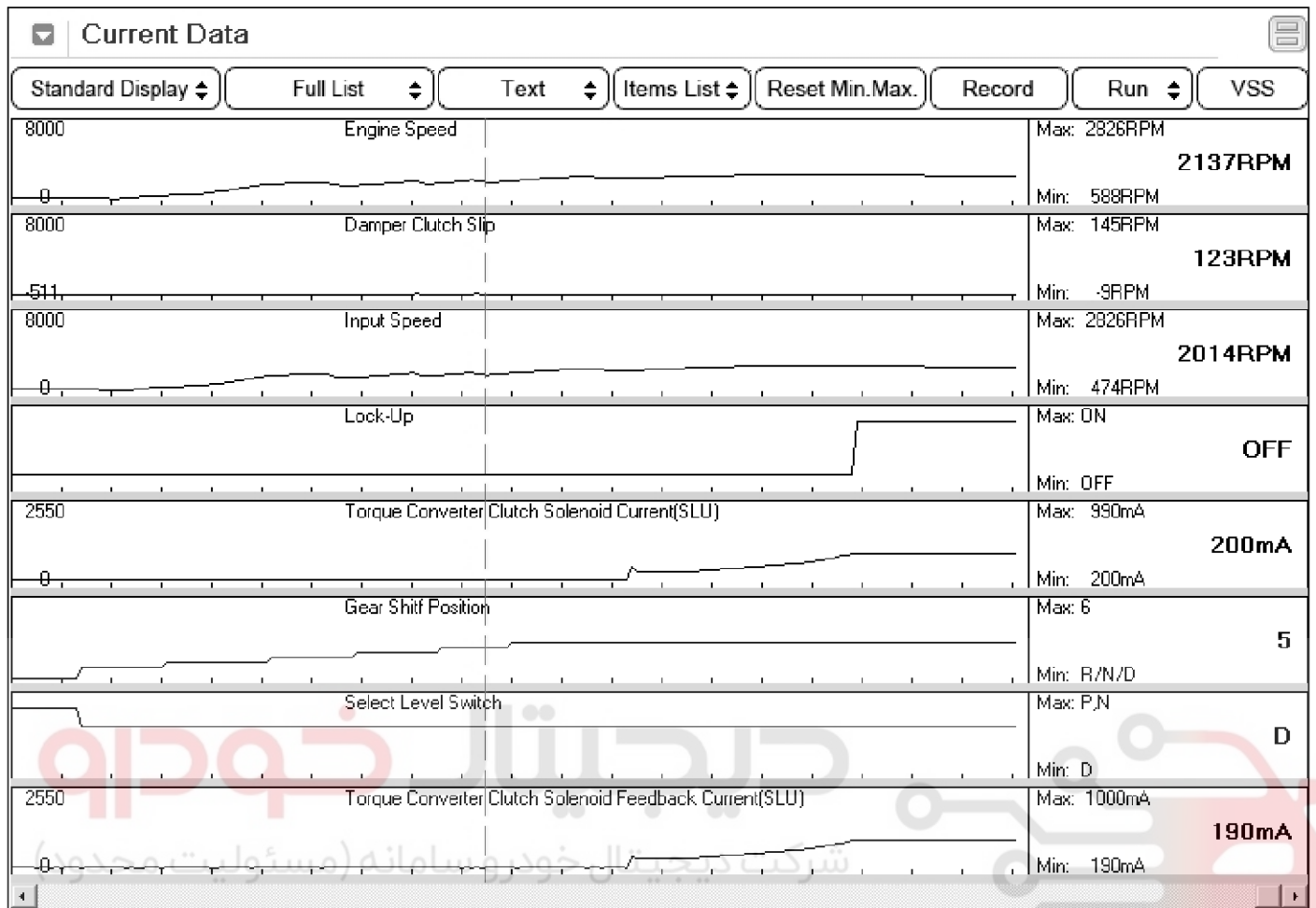


Fig.2

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9523L

# Automatic Transmission System

# AT-81

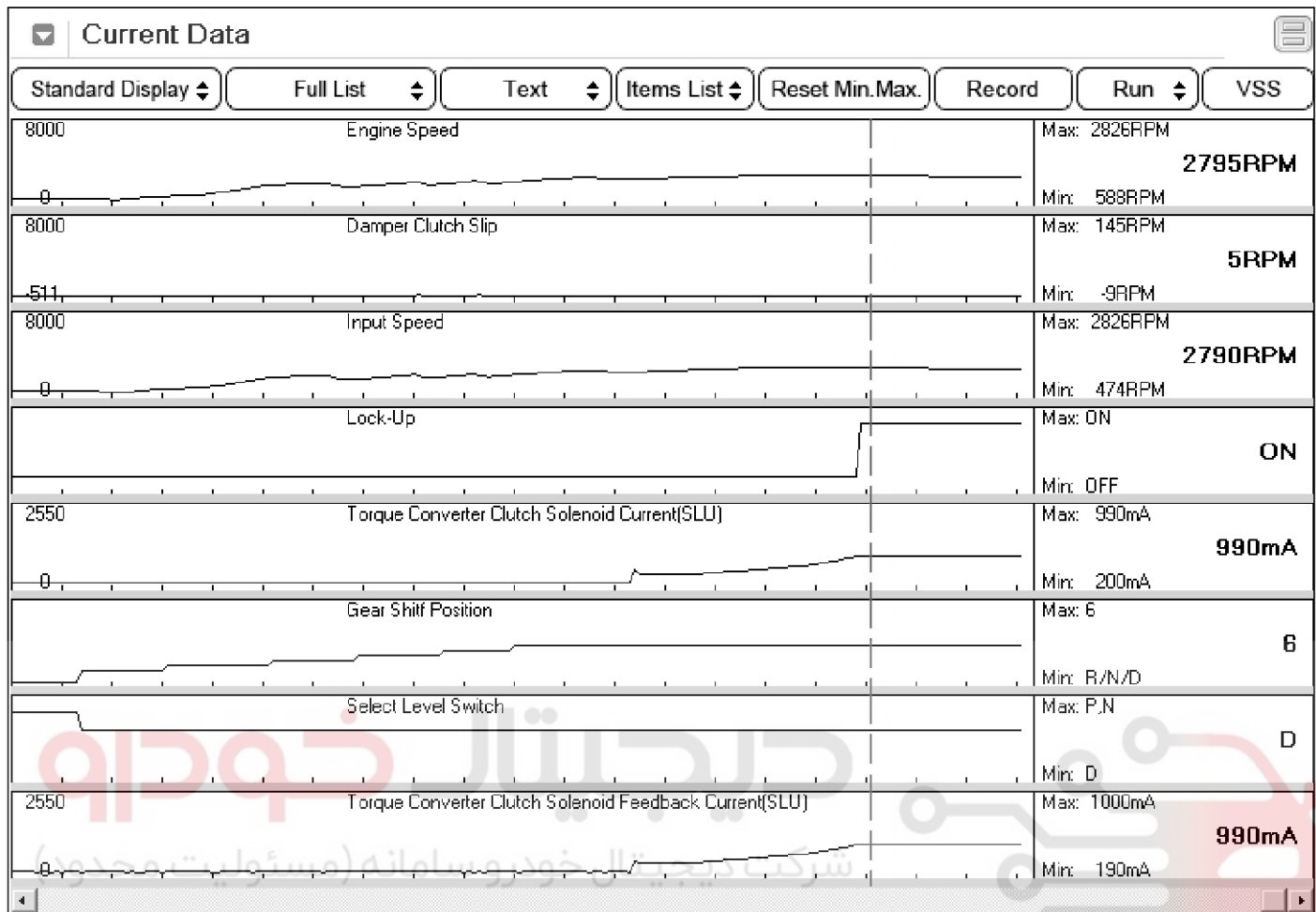


Fig.3

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9524L

Fig 1) Operation status of TCC SOL V/V in accordance with driving condition.

Fig 2) Slip status of TCC with 5th gear.

Fig 3) Direct connection status of TCC with 6th gear.



# AT-82

# Automatic Transmission System

### Monitor Scantool Data

1. Connect scantool with data link connector(DLC)
2. Engine "ON" .
3. Select "D RANGE" and drive vehicle.

4. Monitor the "TORQUE CONVERTER(DAMPER) CLUTCH" parameter on the scan tool.

**Specification** : TCC SLIP>70RPM((In condition that TCC SOL valve working )

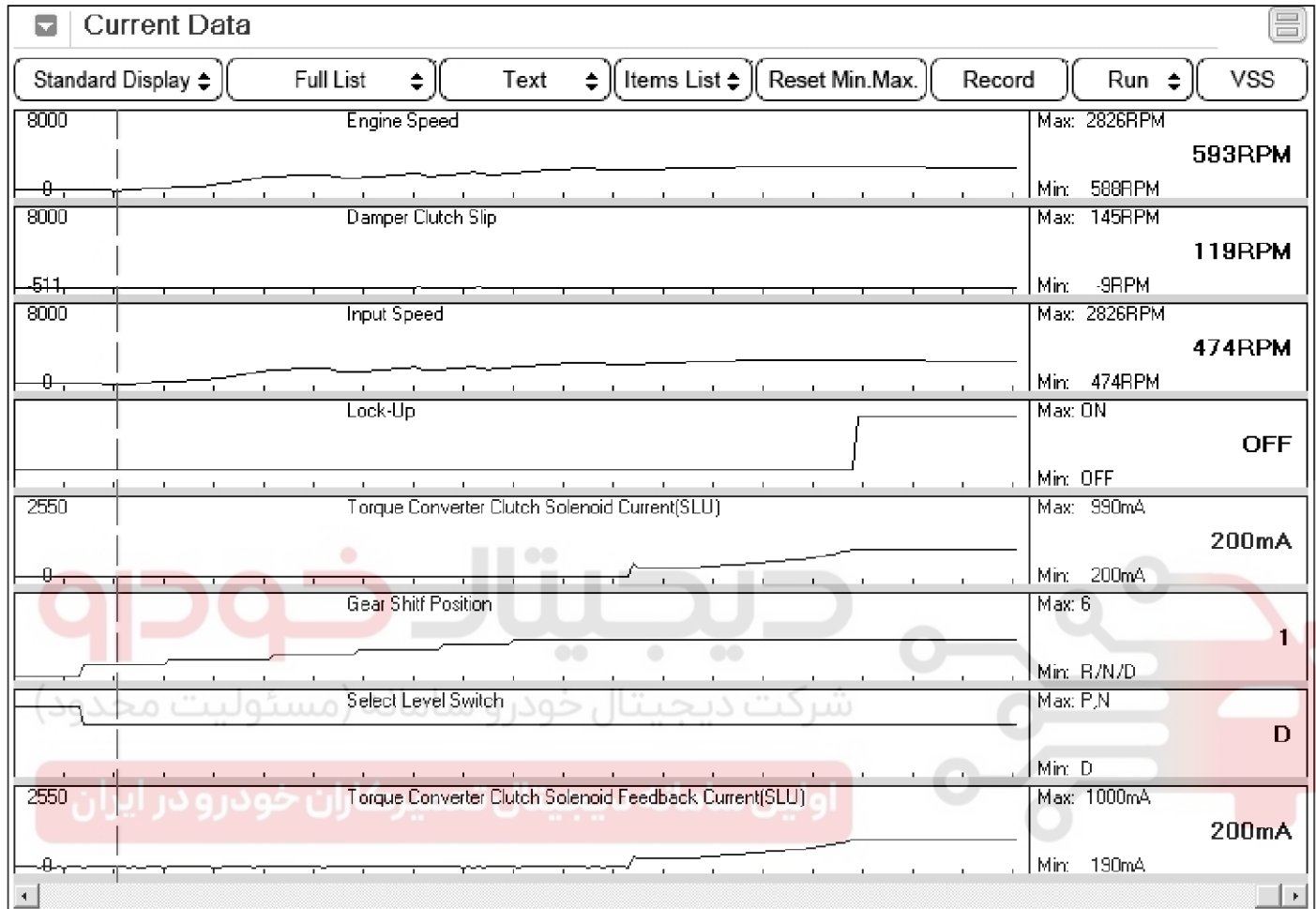


Fig.1

SBHAT9522L

# Automatic Transmission System

# AT-83

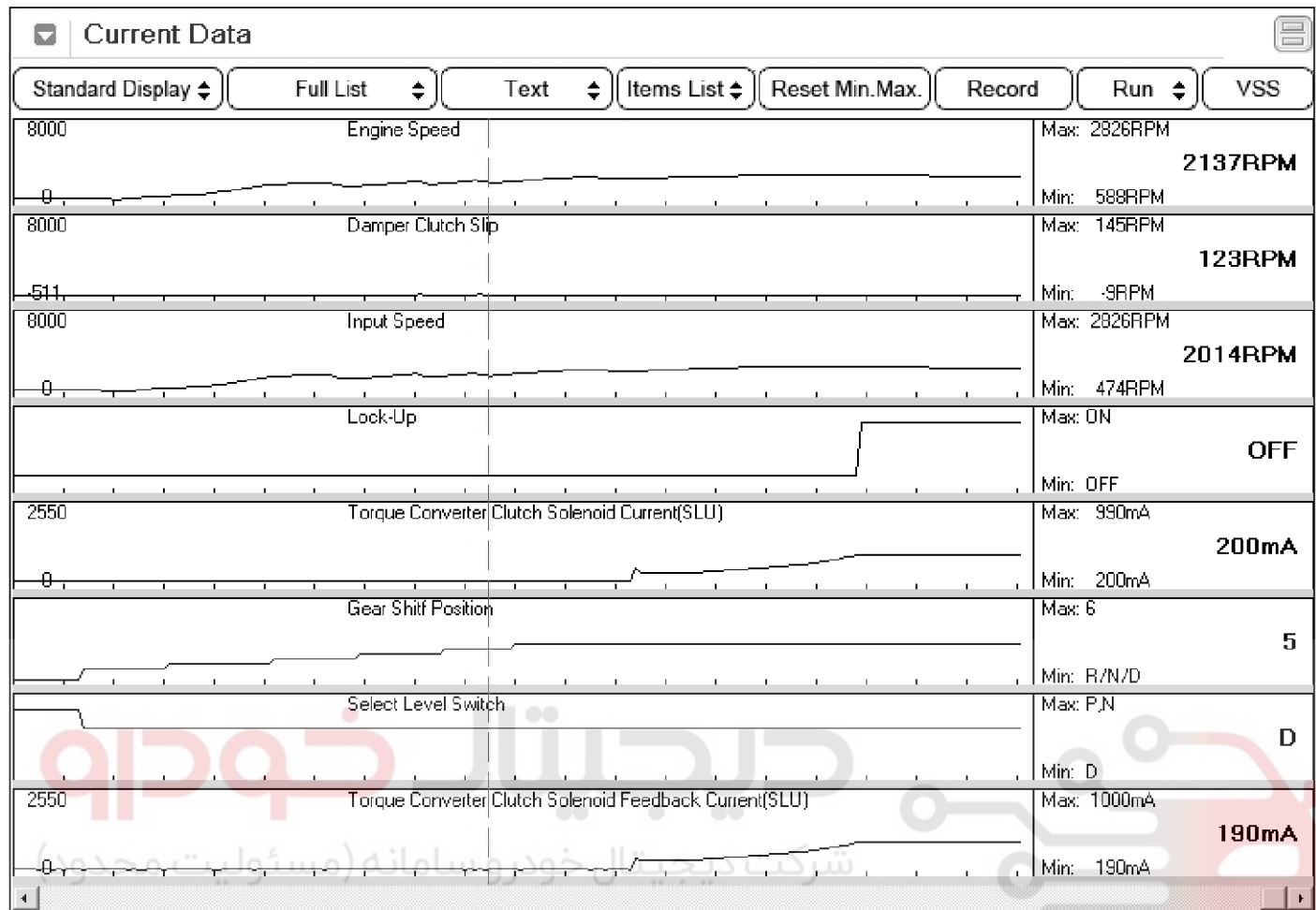


Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9523L

# AT-84

# Automatic Transmission System

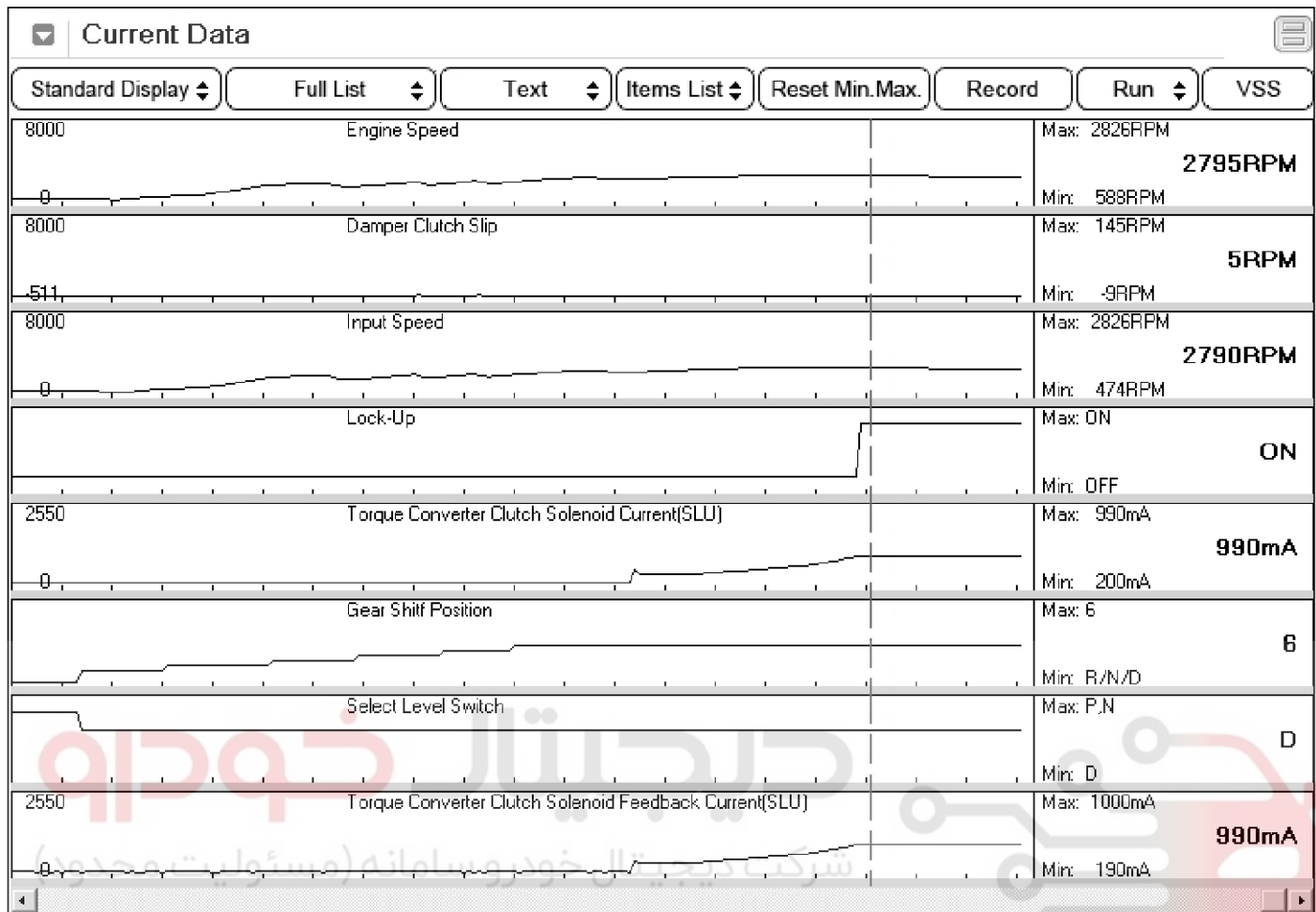


Fig.3

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9524L

Fig 1) Operation status of TCC SOL V/V in accordance with driving condition.

Fig 2) Slip status of TCC with 5th gear.

Fig 3) Direct connection status of TCC with 6th gear.

5. Are "current of TCC SOLENOID and TCC SLIP" within specifications ?

**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 Vehicle Repair" procedure

**NO** ► Go to "W/Harness 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 vehicle Repair" procedure.

**NO** ► Go to "Component Inspection" procedure.

# Automatic Transmission System

## AT-85

### Component Inspection

1. IG KEY "OFF" and Engine "OFF".
2. Disconnect the "TCM" connector.
3. Measure resistance between signal and ground terminal at the SLU solenoid valve.

**Specification :** Appox. 5.0~5.6  $\Omega$  (20°C)

4. Is the measured resistance within specifications?

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

### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C ( 122 °F) and 120°C ( 248 °F). If the ATF temperature is outside this range, work to bring the range.

#### **CAUTION**

**Don't raise the oil temperature by stalling the engine.**

(Reference)

If the oil temperature is not between 50°C ( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

#### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for

3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

#### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

#### STEP 4) Check learning results

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

#### How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform "N" position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### 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 scan tool, 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-86

# Automatic Transmission System

## P0742 Torque Converter Clutch Circuit Stuck On

### Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### General Description

The TCM controls the locking and unlocking of the Torque Converter Clutch ( or Damper Clutch ), to the input shaft of the transmission, by applying 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 the DC according to the DCC duty ratio value. When the duty ratio is high, high pressure is applied and the Damper Clutch is locked. The normal operating range of the Damper Clutch Control duty ratio value is from 30%(unlocked) to 85%(locked).

### DTC Description

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

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Stuck "ON"</li> </ul>	<ul style="list-style-type: none"> <li>Lock-up solenoid valve(SLU)</li> <li>Torque convertor</li> <li>Valve-body(TCC pressure system)</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>TCC solenoid valve(SLU) : normal</li> <li>TCC solenoid valve(SLU) : ON</li> <li>Engine coolant Temp <math>\geq 40^{\circ}\text{C}</math>.</li> <li>ATF Temp <math>\geq 20^{\circ}\text{C}</math>.</li> <li>CAN communication : normal.</li> <li>Gear position : 4th, 5th, 6th gear.</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Engine rpm - Input speed <math>&lt; 35\text{rpm}</math></li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 2seconds</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>Engine stall avoidance control(No squat control, 2ND start inhibit at Manual mode)</li> </ul>	

### Specification

Measuring Position	Resistance (20°C)
Signal - Ground	5.0 ~ 5.6 Ω

### Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### Signal Waveform & Data

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### Monitor Scantool Data

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### Terminal & Connector Inspection

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

# Automatic Transmission System

## AT-87

### Component Inspection

1. IG KEY "OFF" and Engine "OFF".
2. Disconnect the "TCM" connector.
3. Measure resistance between signal and ground terminal at the SLU solenoid valve.

**Specification :** Appox. 5.0~5.6  $\Omega$  (20°C)

4. Is the measured resistance within specifications?

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

### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C ( 122 °F) and 120°C ( 248 °F). If the ATF temperature is outside this range, work to bring the range.

#### **CAUTION**

**Don't raise the oil temperature by stalling the engine.**

(Reference)

If the oil temperature is not between 50°C ( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

#### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

#### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

#### STEP 4) Check learning results

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

#### How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### Verification of Vehicle Repair

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

## AT-88

## Automatic Transmission System

## P0751 Shift Control Solenoid Valve "A" Performance or Stuck Off(S1)

## Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

## General Description

4 shift solenoid valves are installed directly in valve-body. The solenoids operates of ON and OFF by the control signal from TCU. Combinations of 4 solenoids, S1, S2, S3 and S4, changes gear ranges(1st to 6th)

## DTC Description

TCM set this code If the rear gear ratio that calculated by Engine speed/Output speed and the target gear ratio that calculated by compounding of solenoid valves are not match.

## DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Stuck "OFF"</li> </ul>	<ul style="list-style-type: none"> <li>Faulty in SCSV "A"(S1)</li> <li>Faulty in TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal.</li> <li>Solenoid valve : normal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Current gear 5th and Present gear 5th ① or ②</li> <li>① Current gear 6th gear and Present gear Neutral ,or</li> <li>② Current gear 2nd gear and Present gear 1st</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>Immediately</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>1st and 2nd gear inhibit at manual mode.</li> <li>4No up shift to 4th, 5th and 6th gear.</li> </ul>	

## Specification

Measuring Position	Resistance (20℃)
Signal - Ground	11 ~ 16 Ω

## Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

# Automatic Transmission System

AT-89

## Signal Waveform & Data

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9525L



## AT-90

## Automatic Transmission System

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9526L

## Automatic Transmission System

AT-91

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9527L

## AT-92

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9528L

## Automatic Transmission System

AT-93

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9529L

## AT-94

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9530L

## Automatic Transmission System

AT-95

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9531L

## AT-96

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9532L

## Automatic Transmission System

AT-97

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9533L

Fig 1) D Range-1st gear

Fig 2) D Range-2nd gear

Fig 3) Sports mode -1st gear

Fig 4) Sports mode -2nd gear

Fig 5) Sports mode -3rd gear

Fig 6) Sports mode -4th gear

Fig 7) Sports mode -5th gear

Fig 8) Sports mode -6th gear

Fig 9) Reverse



**AT-98****Automatic Transmission System****Monitor Scantool Data**

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

3. Monitor the "SCSV "A"(S1)" parameter on the scan tool
4. Shift gear at each position .

**Specification :****Solenoid Valve Operation Table**

Shift Gear	S1	S2	S3	S4	SR	SL	SL2
1st	OFF	ON	ON	OFF	ON	OFF	ON
2nd	ON	ON	ON	OFF	ON	OFF	ON
3rd	ON	OFF	ON	OFF	ON	OFF	ON
4th	ON	OFF	OFF	OFF	ON	OFF	ON
5th	ON	OFF	OFF	ON	OFF	ON	OFF
6th	ON	ON	OFF	ON	OFF	ON	OFF

**Normal**

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st	2nd	3rd	4th	5th	6th
S1 ON stuck	2nd	2nd	3rd	4th	5th	6th
S1 OFF stuck	1st	1st	3rd	4th	5th	Neutral
S2 ON stuck	1st	2nd	2nd	4th	6th	6th
S2 OFF stuck	3rd	3rd	3rd	4th	5th	5th
S3 ON stuck	1st	2nd	3rd	4th	Neutral	Neutral
S3 OFF stuck	3rd	4th	4th	4th	5th	6th
S4 OFF stuck	1st	2nd	3rd	4th	4th	4th
1-2 shift valve stuck (1 gear side)	1st	1st	3rd	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st	2nd	3rd	4th	5th	4th

## Automatic Transmission System

AT-99

## Engine Brake

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st E/B	2nd E/B	3rd E/B	4th	5th	6th
S1 ON stuck	2nd	2nd E/B	3rd E/B	4th	5th	6th
S1 OFF stuck	1st E/B	2nd E/B	3rd E/B	4th	5th	Neutral
S2 ON stuck	1st E/B	2nd E/B	2nd	4th	6th	6th
S2 OFF stuck	3rd E/B	3rd E/B	3rd E/B	4th	5th	5th
S3 ON stuck	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
S3 OFF stuck	1st	6th	4th	4th	5th	6th
S4 ON stuck	2nd E/B	2nd E/B	3rd E/B	4th	5th	6th
S4 OFF stuck	1st E/B	2nd	3rd E/B	4th	4th	4th
1-2 shift valve stuck (1gear side)	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st E/B	2nd	3rd E/B	4th	5th	4th

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9525L

## AT-100

## Automatic Transmission System

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9526L

## Automatic Transmission System

AT-101

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9527L

## AT-102

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9528L

## Automatic Transmission System

AT-103

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9529L

## AT-104

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9530L

## Automatic Transmission System

AT-105

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9531L



## AT-106

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9532L

## Automatic Transmission System

## AT-107

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتالی تعمیرکاران خودرو در ایران

SBHAT9533L

Fig 1) D Range-1st gear

Fig 2) D Range-2nd gear

Fig 3) Sports mode -1st gear

Fig 4) Sports mode -2nd gear

Fig 5) Sports mode -3rd gear

Fig 6) Sports mode -4th gear

Fig 7) Sports mode -5th gear

Fig 8) Sports mode -6th gear

Fig 9) Reverse

5. Is "SCSV "A"(S1) " operation normally?

**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 Vehicle Repair" procedure

**NO** ► If same error pattern with S1, Go to "Component Inspection" procedure.

### Component Inspection

1. Engine "OFF" IG KEY "OFF".
2. Disconnect the TCM connector.
3. Measure resistance both terminal of "Shift control solenoid valve A(S1) ".

**Specification** : Approx. 11~16 Ω (20℃)

4. Is resistance within specifications?

**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** ► Replace "Shift control solenoid valve A(S1) " as necessary and Go to "Verification Vehicle Repair" procedure.

## AT-108

# Automatic Transmission System

### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C( 122 °F) and 120°C( 248 °F). If the ATF temperature is outside this range, work to bring the range.

#### **CAUTION**

**Don't raise the oil temperature by stalling the engine.**

#### (Reference)

If the oil temperature is not between 50°C( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

#### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

#### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

#### STEP 4) Check learning results

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

### How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### 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 scan tool, 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 Transmission System

## AT-109

### P0752 Shift Control Solenoid Valve "A" Stuck On(S1,S4)

#### Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

#### General Description

Refer to DTC P0751 : Shift Control Solenoid Valve "A" Performance or Stuck Off(S1).

#### DTC Description

Refer to DTC P0751 : Shift Control Solenoid Valve "A" Performance or Stuck Off(S1).

#### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Stuck ON</li> </ul>	<ul style="list-style-type: none"> <li>Faulty in SCSV "A"(S1)</li> <li>Faulty in TCM</li> </ul> <p><b>CAUTION</b></p> <p><b>S4 stuck ON fail does not make wrong gear at D-range. So ECM cannot detect S4 stuck ON fail at Normal-mode.</b></p> <p><b>S4 stuck ON fail and S1 stuck ON fail use same DTC.</b></p> <p><b>(S4 stuck ON and S1 stuck ON fail makes same wrong gear pattern at Manual-gear, so TCM cannot distinguish S4 stuck ON fail and S1 stuck ON fail)</b></p> <p><b>S4 stuck On fail and S1 stuck ON fail can be distinguished by what percent gear is made at current gear 1st(not 1st EB)</b></p> <p><b>S4 stuck ON fail:Current gear 1st then present gear 1st</b></p> <p><b>S1 stuck ON fail:Current gear 1st then present gear 2nd</b></p>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal.</li> <li>Solenoid valve : normal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Current gear 5th and Present gear 5th ① or ②</li> <li>① Current gear 1st and Present gear 2nd</li> <li>② Current gear 1st EB and Present gear 2nd</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>After 2 times of above detection continuously</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>None</li> </ul>	

#### Specification

Measuring Position	Resistance (20℃)
Signal - Ground	11 ~ 16 Ω

#### Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

#### Monitor Scantool Data

Refer to DTC P0751 : Shift Control Solenoid Valve "A" Performance or Stuck Off(S1).

# AT-110

# Automatic Transmission System

## Component Inspection

1. Engine "OFF" IG KEY "OFF".
2. Disconnect the TCM connector.
3. Measure resistance both terminal of "Shift control solenoid valve A(S1)".

**Specification :** Approx. 11~16 Ω (20°C)

4. Is resistance within specifications?

**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** ▶ Replace "Shift control solenoid valve A(S1)" as necessary and Go to "Verification Vehicle Repair" procedure.

### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### (Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C ( 122 °F) and 120°C ( 248 °F). If the ATF temperature is outside this range, work to bring the range.

#### **CAUTION**

**Don't raise the oil temperature by stalling the engine.**

(Reference)

If the oil temperature is not between 50°C ( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

#### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

#### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

#### STEP 4) Check learning results

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

### How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform "N" position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

## Verification of Vehicle Repair

Refer to DTC P0751 : Shift Control Solenoid Valve "A" Performance or Stuck Off(S1).

# Automatic Transmission System

## AT-111

### P0756 Shift Control Solenoid Valve "B" Performance or Stuck Off(S2)

#### Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

#### General Description

Refer to DTC P0751 : Shift Control Solenoid Valve "A" Performance or Stuck Off(S1).

#### DTC Description

Refer to DTC P0751 : Shift Control Solenoid Valve "A" Performance or Stuck Off(S1).

#### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Stuck "OFF"</li> </ul>	<ul style="list-style-type: none"> <li>Faulty in SCSV "B"(S2)</li> <li>Faulty in TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal.</li> <li>Solenoid valve : normal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Current gear 6th and Present gear 5th ① or ②</li> <li>① Current gear 1st and Present gear 3rd</li> <li>② Current gear 1st EB and Present gear 3rd</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>Immediately</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>None</li> </ul>	

#### Specification

Measuring Position	Resistance (20℃)
Signal - Ground	11 ~ 16 Ω

#### Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

# AT-112

# Automatic Transmission System

## Signal Waveform & Data

Current Data
☰

Standard Display
Full List
Graph
Items List
Reset Min.Max.
Record
Run
VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9543L

## Automatic Transmission System

AT-113

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9544L



## AT-114

## Automatic Transmission System

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9545L

## Automatic Transmission System

AT-115

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9546L

## AT-116

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9547L

## Automatic Transmission System

AT-117

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9548L

## AT-118

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9549L

## Automatic Transmission System

AT-119

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9550L

## AT-120

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9551L

Fig 1) D Range-1st gear

Fig 2) D Range-2nd gear

Fig 3) Sports mode -1st gear

Fig 4) Sports mode -2nd gear

Fig 5) Sports mode -3rd gear

Fig 6) Sports mode -4th gear

Fig 7) Sports mode -5th gear

Fig 8) Sports mode -6th gear

Fig 9) Reverse

# Automatic Transmission System

## AT-121

### Monitor Scantool Data

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

3. Monitor the "SCSV "B"(S2)" parameter on the scan tool
4. Shift gear at each position .

### Specification :

#### Solenoid Valve Operation Table

Shift Gear	S1	S2	S3	S4	SR	SL	SL2
1st	OFF	ON	ON	OFF	ON	OFF	ON
2nd	ON	ON	ON	OFF	ON	OFF	ON
3rd	ON	OFF	ON	OFF	ON	OFF	ON
4th	ON	OFF	OFF	OFF	ON	OFF	ON
5th	ON	OFF	OFF	ON	OFF	ON	OFF
6th	ON	ON	OFF	ON	OFF	ON	OFF

### Normal

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st	2nd	3rd	4th	5th	6th
S1 ON stuck	2nd	2nd	3rd	4th	5th	6th
S1 OFF stuck	1st	1st	3rd	4th	5th	Neutral
S2 ON stuck	1st	2nd	2nd	4th	6th	6th
S2 OFF stuck	3rd	3rd	3rd	4th	5th	5th
S3 ON stuck	1st	2nd	3rd	4th	Neutral	Neutral
S3 OFF stuck	3rd	4th	4th	4th	5th	6th
S4 OFF stuck	1st	2nd	3rd	4th	4th	4th
1-2 shift valve stuck (1 gear side)	1st	1st	3rd	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st	2nd	3rd	4th	5th	4th



# AT-122

# Automatic Transmission System

## Engine Brake

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st E/B	2nd E/B	3rd E/B	4th	5th	6th
S1 ON stuck	2nd	2nd E/B	3rd E/B	4th	5th	6th
S1 OFF stuck	1st E/B	2nd E/B	3rd E/B	4th	5th	Neutral
S2 ON stuck	1st E/B	2nd E/B	2nd	4th	6th	6th
S2 OFF stuck	3rd E/B	3rd E/B	3rd E/B	4th	5th	5th
S3 ON stuck	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
S3 OFF stuck	1st	6th	4th	4th	5th	6th
S4 ON stuck	2nd E/B	2nd E/B	3rd E/B	4th	5th	6th
S4 OFF stuck	1st E/B	2nd	3rd E/B	4th	4th	4th
1-2 shift valve stuck (1gear side)	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st E/B	2nd	3rd E/B	4th	5th	4th

**Current Data**

Standard Display | Full List | Graph | Items List | Reset Min.Max. | Record | Run | VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9543L

## Automatic Transmission System

AT-123

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9544L

## AT-124

## Automatic Transmission System

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9545L

## Automatic Transmission System

AT-125

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9546L

## AT-126

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9547L

## Automatic Transmission System

AT-127

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9548L

## AT-128

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9549L

## Automatic Transmission System

AT-129

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9550L



## AT-130

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتالی تعمیرکاران خودرو در ایران

SBHAT9551L

Fig 1) D Range-1st gear

Fig 2) D Range-2nd gear

Fig 3) Sports mode -1st gear

Fig 4) Sports mode -2nd gear

Fig 5) Sports mode -3rd gear

Fig 6) Sports mode -4th gear

Fig 7) Sports mode -5th gear

Fig 8) Sports mode -6th gear

Fig 9) Reverse

5. Is "SCSV "B"(S2) " operation normally?

**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 Vehicle Repair" procedure

**NO** ► If same error pattern with S2, Go to "Component Inspection" procedure.

### Component Inspection

1. Engine "OFF" IG KEY "OFF".
2. Disconnect the TCM connector.
3. Measure resistance both terminal of "Shift control solenoid valve B(S2) ".

**Specification** : Approx. 11~16  $\Omega$  (20 $^{\circ}$ C)

4. Is resistance within specifications?

**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** ► Replace "Shift control solenoid valve B(S2) " as necessary and Go to "Verification Vehicle Repair" procedure.

# Automatic Transmission System

## AT-131

### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C( 122 °F) and 120°C( 248 °F). If the ATF temperature is outside this range, work to bring the range.

#### **CAUTION**

**Don't raise the oil temperature by stalling the engine.**

(Reference)

If the oil temperature is not between 50°C( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

#### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

#### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

#### STEP 4) Check learning results

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

### How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### 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 scan tool, 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-132

## Automatic Transmission System

## P0757 Shift Control Solenoid Valve "B" Stuck On(S2)

**Component Location**

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

**General Description**

Refer to DTC P0751 : Shift Control Solenoid Valve "A" Performance or Stuck Off(S1).

**DTC Description**

Refer to DTC P0751 : Shift Control Solenoid Valve "A" Performance or Stuck Off(S1).

**DTC Detecting Condition**

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Stuck ON</li> </ul>	<ul style="list-style-type: none"> <li>Faulty in SCSV "B"(S2)</li> <li>Faulty in TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal.</li> <li>Solenoid valve : normal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Current gear 6th and Present gear 5th ① or ②</li> <li>① Current gear 1st and Present gear 3rd</li> <li>② Current gear 1st EB and Present gear 3rd</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>Immediately</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>None</li> </ul>	

**Specification**

Measuring Position	Resistance (20℃)
Signal - Ground	11 ~ 16 Ω

**Diagnostic Circuit Diagram**

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

**Signal Waveform & Data**

Refer to DTC P0756 : Shift Control Solenoid Valve "B" Performance or Stuck Off(S2).

**Monitor Scantool Data**

Refer to DTC P0756 : Shift Control Solenoid Valve "B" Performance or Stuck Off(S2).

**Component Inspection**

- Engine "OFF" IG KEY "OFF".
- Disconnect the TCM connector.
- Measure resistance both terminal of "Shift control solenoid valve B(S2)".

**Specification** : Approx. 11~16 Ω (20℃)

4. Is resistance within specifications?

**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**

▶ Replace "Shift control solenoid valve B(S2)" as necessary and Go to "Verification Vehicle Repair" procedure.

How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

# Automatic Transmission System

## AT-133

### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C( 122 °F) and 120°C( 248 °F). If the ATF temperature is outside this range, work to bring the range.

### **CAUTION**

**Don't raise the oil temperature by stalling the engine.**

### (Reference)

If the oil temperature is not between 50°C( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

### STEP 4) Check learning results

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

### How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### Verification of Vehicle Repair

Refer to DTC P0756 : Shift Control Solenoid Valve "B" Performance or Stuck Off(S2).



## AT-134

## Automatic Transmission System

## P0761 Shift Control Solenoid Valve "C" Performance or Stuck Off(S3)

## Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

## General Description

Refer to DTC P0751 : Shift Control Solenoid Valve "A" Performance or Stuck Off(S1).

## DTC Description

Refer to DTC P0751 : Shift Control Solenoid Valve "A" Performance or Stuck Off(S1).

## DTC Detecting Condition

Item	Detecting Condition		Possible Cause
DTC Strategy	• Stuck "OFF"		<ul style="list-style-type: none"> <li>• Faulty in SCSV "C"(S3)</li> <li>• Faulty in TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>• 10.2V &lt; Battery voltage &lt; 14V</li> <li>• Not error in system</li> <li>• CAN communication : normal</li> <li>• Solenoid valve : normal</li> </ul>		
Threshold Value	Case 1	• Current gear 1st and Present gear = 3rd and Current gear 6th and Present gear = 6th	
	Case 2	• Current gear 2nd EB and Present gear = 6th and ① Current gear 3rd and Present gear = 4th or ② Current gear 3rd EB and Present gear = 4th	
Diagnostic Time	• Immediately		
Fail Safe	• None		

## Specification

Measuring Position	Resistance (20℃)
Signal - Ground	11 ~ 16 Ω

## Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

## Automatic Transmission System

AT-135

## Signal Waveform &amp; Data

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9552L

## AT-136

## Automatic Transmission System

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9553L

## Automatic Transmission System

AT-137

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9554L



## AT-138

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9555L

## Automatic Transmission System

AT-139

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9556L

## AT-140

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9557L

## Automatic Transmission System

AT-141

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9558L

## AT-142

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9559L

## Automatic Transmission System

AT-143

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9560L

Fig 1) D Range-1st gear

Fig 2) D Range-2nd gear

Fig 3) Sports mode -1st gear

Fig 4) Sports mode -2nd gear

Fig 5) Sports mode -3rd gear

Fig 6) Sports mode -4th gear

Fig 7) Sports mode -5th gear

Fig 8) Sports mode -6th gear

Fig 9) Reverse

**AT-144****Automatic Transmission System****Monitor Scantool Data**

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

3. Monitor the "SCSV "C"(S3)" parameter on the scan tool

4. Shift gear at each position .

**Specification :****Solenoid Valve Operation Table**

Shift Gear	S1	S2	S3	S4	SR	SL	SL2
1st	OFF	ON	ON	OFF	ON	OFF	ON
2nd	ON	ON	ON	OFF	ON	OFF	ON
3rd	ON	OFF	ON	OFF	ON	OFF	ON
4th	ON	OFF	OFF	OFF	ON	OFF	ON
5th	ON	OFF	OFF	ON	OFF	ON	OFF
6th	ON	ON	OFF	ON	OFF	ON	OFF

**Normal**

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st	2nd	3rd	4th	5th	6th
S1 ON stuck	2nd	2nd	3rd	4th	5th	6th
S1 OFF stuck	1st	1st	3rd	4th	5th	Neutral
S2 ON stuck	1st	2nd	2nd	4th	6th	6th
S2 OFF stuck	3rd	3rd	3rd	4th	5th	5th
S3 ON stuck	1st	2nd	3rd	4th	Neutral	Neutral
S3 OFF stuck	3rd	4th	4th	4th	5th	6th
S4 OFF stuck	1st	2nd	3rd	4th	4th	4th
1-2 shift valve stuck (1 gear side)	1st	1st	3rd	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st	2nd	3rd	4th	5th	4th

# Automatic Transmission System

# AT-145

## Engine Brake

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st E/B	2nd E/B	3rd E/B	4th	5th	6th
S1 ON stuck	2nd	2nd E/B	3rd E/B	4th	5th	6th
S1 OFF stuck	1st E/B	2nd E/B	3rd E/B	4th	5th	Neutral
S2 ON stuck	1st E/B	2nd E/B	2nd	4th	6th	6th
S2 OFF stuck	3rd E/B	3rd E/B	3rd E/B	4th	5th	5th
S3 ON stuck	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
S3 OFF stuck	1st	6th	4th	4th	5th	6th
S4 ON stuck	2nd E/B	2nd E/B	3rd E/B	4th	5th	6th
S4 OFF stuck	1st E/B	2nd	3rd E/B	4th	4th	4th
1-2 shift valve stuck (1gear side)	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st E/B	2nd	3rd E/B	4th	5th	4th

Current Data ☰

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9552L



## AT-146

## Automatic Transmission System

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9553L

## Automatic Transmission System

AT-147

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9554L

## AT-148

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9555L

## Automatic Transmission System

AT-149

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9556L

## AT-150

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9557L

## Automatic Transmission System

AT-151

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9558L

## AT-152

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9559L

## Automatic Transmission System

## AT-153

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتالی تعمیرکاران خودرو در ایران

SBHAT9560L

Fig 1) D Range-1st gear

Fig 2) D Range-2nd gear

Fig 3) Sports mode -1st gear

Fig 4) Sports mode -2nd gear

Fig 5) Sports mode -3rd gear

Fig 6) Sports mode -4th gear

Fig 7) Sports mode -5th gear

Fig 8) Sports mode -6th gear

Fig 9) Reverse

5. Is "SCSV "C"(S3) " operation normally?

**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 Vehicle Repair" procedure

**NO** ► If same error pattern with S3, Go to "Component Inspection" procedure.

### Component Inspection

1. Engine "OFF" IG KEY "OFF".
2. Disconnect the TCM connector.
3. Measure resistance both terminal of "Shift control solenoid valve C(S3) ".

**Specification** : Approx. 11~16 Ω (20℃)

4. Is resistance within specifications?

**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** ► Replace "Shift control solenoid valve C(S3) " as necessary and Go to "Verification Vehicle Repair" procedure.



## AT-154

# Automatic Transmission System

### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C( 122 °F) and 120°C( 248 °F). If the ATF temperature is outside this range, work to bring the range.

#### **CAUTION**

**Don't raise the oil temperature by stalling the engine.**

(Reference)

If the oil temperature is not between 50°C( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

#### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

#### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

#### STEP 4) Check learning results

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

### How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### 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 scan tool, 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 Transmission System

## AT-155

### P0762 Shift Control Solenoid Valve "C" Stuck On(S3)

#### Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

#### General Description

Refer to DTC P0751 : Shift Control Solenoid Valve "A" Performance or Stuck Off(S1).

#### DTC Description

Refer to DTC P0751 : Shift Control Solenoid Valve "A" Performance or Stuck Off(S1).

#### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Stuck ON</li> </ul>	<ul style="list-style-type: none"> <li>Faulty in SCSV "C"(S3)</li> <li>Faulty in TCM</li> </ul> <p><b>CAUTION</b> Fail-safe cannot release after detection at 2 driving cycle.(No up shift 4th, 5th and 6th. so cannot judge pass criteria)</p> <p>The detection criteria of S3 ON fail and 1-2 shift valve SP stick is the same name, so if detection criteria is fulfilled, then both S3 ON DTC and 1-2 shift valve DTC are stored.</p> <p>But if present gear is judged 1st at current gear 2nd before this detection criteria is fulfilled, then only the DTC of 1-2 shift valve SP stick is stored. S3 ON fail and 1-2 shift valve SP stick can be distinguished by what present gear is made at current gear 2nd(not 2nd EB)</p> <p>S3 ON fail:Current gear 2nd then present gear 2nd. 1-2 shift valve SP stick:Current gear 2nd then present gear 1st.</p>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal.</li> <li>Solenoid valve : normal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Current gear 2nd and Present gear = not 1st and               <ol style="list-style-type: none"> <li>Current gear 4th and Present gear = 3rd or</li> <li>Current gear 5th and Present gear = Neutral</li> </ol> </li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>Immediately</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>No up-shift to 4th, 5th and 6th</li> <li>* Fail-safe condition</li> <li>S3 stuck On decision               <ol style="list-style-type: none"> <li>Not manual mode or</li> <li>Manual mode and speed &lt; 80km/h</li> </ol> </li> </ul>	

#### Specification

Measuring Position	Resistance (20℃)
Signal - Ground	11 ~ 16 Ω

## AT-156

# Automatic Transmission System

### Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### Signal Waveform & Data

Refer to DTC P0761 : Shift Control Solenoid Valve "C" Performance or Stuck Off(S3).

### Monitor Scantool Data

Refer to DTC P0761 : Shift Control Solenoid Valve "C" Performance or Stuck Off(S3).

### Component Inspection

1. Engine "OFF" IG KEY "OFF".
2. Disconnect the TCM connector.
3. Measure resistance both terminal of "Shift control solenoid valve C(S3)".

**Specification :** Approx. 11~16 Ω (20°C)

4. Is resistance within specifications?

**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** ▶ Replace "Shift control solenoid valve C(S3)" as necessary and Go to "Verification Vehicle Repair" procedure.

### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C ( 122 °F) and 120°C ( 248 °F). If the ATF temperature is outside this range, work to bring the range.

#### **CAUTION**

**Don't raise the oil temperature by stalling the engine.**

(Reference)

If the oil temperature is not between 50°C ( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

#### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

#### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

#### STEP 4) Check learning results

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

#### How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### Verification of Vehicle Repair

Refer to DTC P0761 : Shift Control Solenoid Valve "C" Performance or Stuck Off(S3).

# Automatic Transmission System

# AT-157

## P0766 Shift Control Solenoid Valve "D" Performance or Stuck Off(S4)

### Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### General Description

Refer to DTC P0751 : Shift Control Solenoid Valve "A" Performance or Stuck Off(S1).

### DTC Description

Refer to DTC P0751 : Shift Control Solenoid Valve "A" Performance or Stuck Off(S1).

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Stuck "OFF"</li> </ul>	<ul style="list-style-type: none"> <li>Faulty in SCSV "C"(S3)</li> <li>Faulty in TCM</li> </ul> <p><b>⚠CAUTION</b> Fail-safe cannot release after detection at 2 driving cycle.(No up shift 4th, 5th and 6th. so cannot judge pass criteria) If the DTC of S4 OFF fail is stored, then there is a possibility fo SL2 ON fail.(S4 OFF and SL2 ON fail makes same wrong gear pattern, so TCM can be distinguish S4 ON fail and SL2 ON fail.) S4 ON fail and SL2 ON fail can be distinguished by whether engine brake is effective or not. S4 OFF fail:Current gear 1st EB then present gear 1st EB and Current gear 3rd EB then present gear 3rd EB SL2 ON fail:Current gear 1st EB then present gear 1st and Current gear 3rd EB then present gear 3rd.</p>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal.</li> <li>Solenoid valve : normal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Current gear 5th and Present gear 4th</li> <li>Current gear 6th and Present gear 4th</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>Immediately</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>No up-shift to 4th, 5th and 6th</li> </ul> <p>* Fail-safe condition S3 stuck On decision 1. Not manual mode or 2. Manual mode and speed &lt; 80km/h</p>	

### Specification

Measuring Position	Resistance (20°C)
Signal - Ground	11 ~ 16 Ω

### Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

# AT-158

# Automatic Transmission System

## Signal Waveform & Data

☑ Current Data
☰

Standard Display ▾
Full List ▾
Graph ▾
Items List ▾
Reset Min.Max.
Record
Run ▾
VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9561L

## Automatic Transmission System

AT-159

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9562L

## AT-160

## Automatic Transmission System

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9563L

## Automatic Transmission System

AT-161

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9564L



## AT-162

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9565L

## Automatic Transmission System

AT-163

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9566L

## AT-164

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9567L

## Automatic Transmission System

AT-165

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9568L

## AT-166

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9569L

Fig 1) D Range-1st gear

Fig 2) D Range-2nd gear

Fig 3) Sports mode -1st gear

Fig 4) Sports mode -2nd gear

Fig 5) Sports mode -3rd gear

Fig 6) Sports mode -4th gear

Fig 7) Sports mode -5th gear

Fig 8) Sports mode -6th gear

Fig 9) Reverse

# Automatic Transmission System

## AT-167

### Monitor Scantool Data

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

3. Monitor the "SCSV "D"(S4)" parameter on the scan tool
4. Shift gear at each position .

### Specification :

#### Solenoid Valve Operation Table

Shift Gear	S1	S2	S3	S4	SR	SL	SL2
1st	OFF	ON	ON	OFF	ON	OFF	ON
2nd	ON	ON	ON	OFF	ON	OFF	ON
3rd	ON	OFF	ON	OFF	ON	OFF	ON
4th	ON	OFF	OFF	OFF	ON	OFF	ON
5th	ON	OFF	OFF	ON	OFF	ON	OFF
6th	ON	ON	OFF	ON	OFF	ON	OFF

### Normal

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st	2nd	3rd	4th	5th	6th
S1 ON stuck	2nd	2nd	3rd	4th	5th	6th
S1 OFF stuck	1st	1st	3rd	4th	5th	Neutral
S2 ON stuck	1st	2nd	2nd	4th	6th	6th
S2 OFF stuck	3rd	3rd	3rd	4th	5th	5th
S3 ON stuck	1st	2nd	3rd	4th	Neutral	Neutral
S3 OFF stuck	3rd	4th	4th	4th	5th	6th
S4 OFF stuck	1st	2nd	3rd	4th	4th	4th
1-2 shift valve stuck (1 gear side)	1st	1st	3rd	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st	2nd	3rd	4th	5th	4th

# AT-168

# Automatic Transmission System

## Engine Brake

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st E/B	2nd E/B	3rd E/B	4th	5th	6th
S1 ON stuck	2nd	2nd E/B	3rd E/B	4th	5th	6th
S1 OFF stuck	1st E/B	2nd E/B	3rd E/B	4th	5th	Neutral
S2 ON stuck	1st E/B	2nd E/B	2nd	4th	6th	6th
S2 OFF stuck	3rd E/B	3rd E/B	3rd E/B	4th	5th	5th
S3 ON stuck	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
S3 OFF stuck	1st	6th	4th	4th	5th	6th
S4 ON stuck	2nd E/B	2nd E/B	3rd E/B	4th	5th	6th
S4 OFF stuck	1st E/B	2nd	3rd E/B	4th	4th	4th
1-2 shift valve stuck (1gear side)	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st E/B	2nd	3rd E/B	4th	5th	4th

Current Data
☰

Standard Display ▾
Full List ▾
Graph ▾
Items List ▾
Reset Min.Max.
Record
Run ▾
VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9561L

# Automatic Transmission System

# AT-169

Current Data
☰

Standard Display
Full List
Graph
Items List
Reset Min.Max.
Record
Run
VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9562L



## AT-170

## Automatic Transmission System

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9563L

## Automatic Transmission System

AT-171

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	190	mA

Fig.4 اولین سامانه دیجیتالی تعمیرکاران خودرو در ایران

SBHAT9564L

## AT-172

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9565L

## Automatic Transmission System

AT-173

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9566L

## AT-174

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9567L

## Automatic Transmission System

AT-175

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9568L

## AT-176

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9569L

Fig 1) D Range-1st gear

Fig 2) D Range-2nd gear

Fig 3) Sports mode -1st gear

Fig 4) Sports mode -2nd gear

Fig 5) Sports mode -3rd gear

Fig 6) Sports mode -4th gear

Fig 7) Sports mode -5th gear

Fig 8) Sports mode -6th gear

Fig 9) Reverse

5. Is "SCSV "D"(S4) " operation normally?

**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 Vehicle Repair" procedure

**NO** ► If same error pattern with S4, Go to "Component Inspection" procedure.

### Component Inspection

1. Engine "OFF" IG KEY "OFF".
2. Disconnect the TCM connector.
3. Measure resistance both terminal of "Shift control solenoid valve D(S4) ".

**Specification** : Approx. 11~16  $\Omega$  (20 $^{\circ}$ C)

4. Is resistance within specifications?

**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** ► Replace "Shift control solenoid valve D(S4) " as necessary and Go to "Verification Vehicle Repair" procedure.

# Automatic Transmission System

## AT-177

### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C( 122 °F) and 120°C( 248 °F). If the ATF temperature is outside this range, work to bring the range.

#### **CAUTION**

**Don't raise the oil temperature by stalling the engine.**

(Reference)

If the oil temperature is not between 50°C( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

#### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

#### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

#### STEP 4) Check learning results

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

### How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### 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 scan tool, 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-178

## Automatic Transmission System

## P0781 1-2 Shift

## General Description

1-2 Shift valve is shift to oil-pathway in order to maintain over the 2nd gear shifting. 1-2 Shift valve function is deliver oil-pressure to clutch that over the 2nd gear operation element, When 1-2 shifting.

## DTC Description

TCM set this code If the rear gear ratio that calculated by Engine speed/Output speed and the target gear ratio that calculated by compounding of solenoid valves are not match.

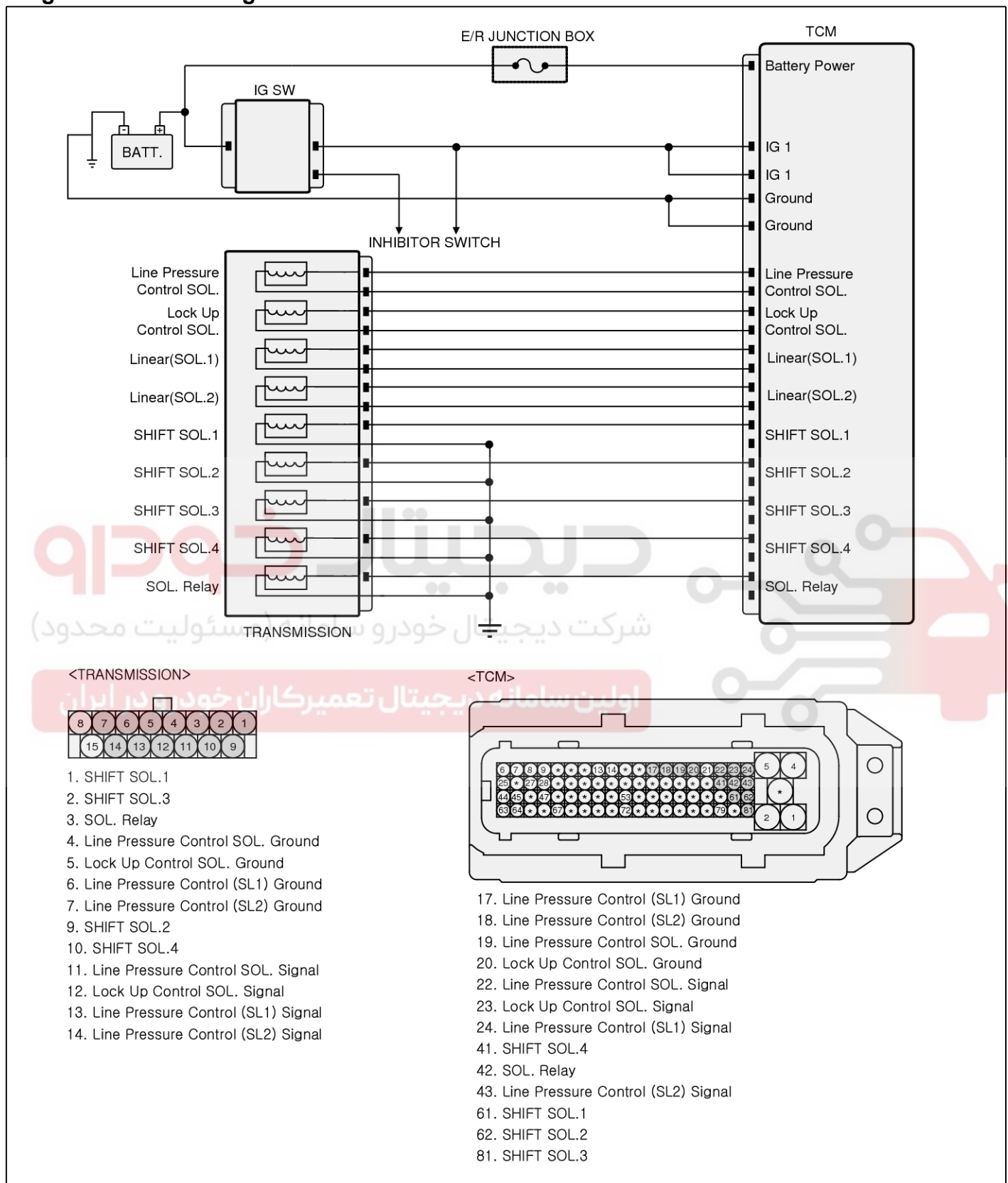
## DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Valve Stuck</li> </ul>	<ul style="list-style-type: none"> <li>Valve-body</li> <li>A/T Assembly</li> </ul> <p><b>CAUTION</b></p> <p>1: The detection criteria of S3 ON fail and 1-2 shift valve SP stick is the same, so if this detection criteria is fulfilled, then both S3 ON DTC and 1-2 shift valve DTC are stored. But if present gear judged 1st and current gear 2nd before this detection criteria is fulfilled, then only the DTC of 1-2 shift valve SP stick is stored.</p> <p>S3 ON fail and 1-2 shift valve SP stick can be distinguished by what present gear is made at current gear 2nd(Not 2nd EB).S3 ON fail : Current gear 2nd then present gear 2nd 1-2 shift valve SP stick : Current gear 2nd then present gear 1st</p>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal.</li> <li>Solenoid valve : normal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Current gear 4th and Present gear 3rd</li> <li>Current gear 5th and Present gear neutral</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>Immediately</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>1st and 2nd gear inhibit at Manual mode</li> <li>* Only 1st and 2nd gear inhibit at Manual mode fail safe After 2 driving cycle of above detection continuously</li> <li>No up shift 4th, 5th and 6th</li> <li>1-2 shift valve stick decision               <ol style="list-style-type: none"> <li>Not manual mode or</li> <li>Manual mode and speed &lt; 80km/h</li> </ol> </li> </ul>	

# Automatic Transmission System

# AT-179

## Diagnostic Circuit Diagram



SBHAT9704L

# AT-180

# Automatic Transmission System

## Signal Waveform & Data

Current Data
☰

Standard Display
Full List
Graph
Items List
Reset Min.Max.
Record
Run
VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9552L

## Automatic Transmission System

AT-181

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9553L

## AT-182

## Automatic Transmission System

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9554L

## Automatic Transmission System

AT-183

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9555L

## AT-184

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9556L

## Automatic Transmission System

AT-185

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9557L



## AT-186

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9558L

## Automatic Transmission System

AT-187

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9559L

## AT-188

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9560L

Fig 1) D Range-1st gear

Fig 2) D Range-2nd gear

Fig 3) Sports mode -1st gear

Fig 4) Sports mode -2nd gear

Fig 5) Sports mode -3rd gear

Fig 6) Sports mode -4th gear

Fig 7) Sports mode -5th gear

Fig 8) Sports mode -6th gear

Fig 9) Reverse

# Automatic Transmission System

# AT-189

## Monitor Scantool Data

1. Connect scan tool to data link connector(DLC)
2. Engine "ON".
3. Monitor the "SCSV "C"(S3)" parameter on the scan tool
4. Shift gear at each position .

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9552L

## AT-190

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9553L

## Automatic Transmission System

AT-191

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9554L

## AT-192

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9555L

## Automatic Transmission System

AT-193

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9556L



## AT-194

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9557L

## Automatic Transmission System

AT-195

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9558L

## AT-196

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9559L

## Automatic Transmission System

## AT-197

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9560L

Fig 1) D Range-1st gear

Fig 2) D Range-2nd gear

Fig 3) Sports mode -1st gear

Fig 4) Sports mode -2nd gear

Fig 5) Sports mode -3rd gear

Fig 6) Sports mode -4th gear

Fig 7) Sports mode -5th gear

Fig 8) Sports mode -6th gear

Fig 9) Reverse

5. Is the same error pattern with "1-2 shift valve"?

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

**NO** ▶ If the P0762 output and confirmed the S3 ON error, then repair as necessary and Go to "Verification Vehicle Repair" procedure.

How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C( 122 °F) and 120°C( 248 °F). If the ATF temperature is outside this range, work to bring the range.

**CAUTION**

**Don't raise the oil temperature by stalling the engine.**

## AT-198

## Automatic Transmission System

(Reference)

If the oil temperature is not between 50°C ( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

### STEP 4) Check learning results

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

### اولین سامانه دیجیتال تعییر کار با این خودرو

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### 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 scan tool, 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 Transmission System

## AT-199

### P0813 Reverse Output Circuit

#### General Description

Reverse Sequence valve function is generation of oil-pressure When select Reverse range. And also output engine brake pressure When 1st and 2nd gear at Manual mode.

#### DTC Description

TCM set this code If the rear gear ratio that calculated by Engine speed/Output speed and the target gear ratio that calculated by compounding of solenoid valves are not match.

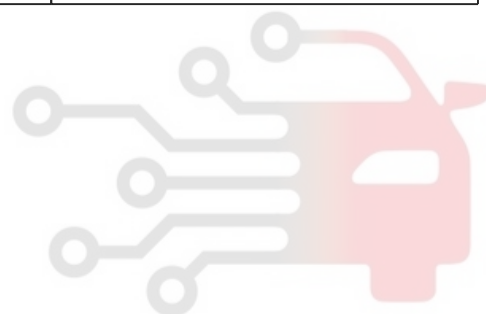
#### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Valve Stuck</li> </ul>	<ul style="list-style-type: none"> <li>Valve-body</li> <li>A/T Assembly</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal.</li> <li>Solenoid valve : normal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Current gear 5h and Present gear 5th</li> <li>Current gear 6th and Present gear 4th</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>Immediately</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>No upshift to 6th gear</li> </ul>	

# دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



# AT-200

# Automatic Transmission System

## Signal Waveform & Data

Current Data
☰

Standard Display
Full List
Graph
Items List
Reset Min.Max.
Record
Run
VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9552L

## Automatic Transmission System

AT-201

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9553L



## AT-202

## Automatic Transmission System

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9554L

## Automatic Transmission System

AT-203

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9555L

## AT-204

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9556L

## Automatic Transmission System

AT-205

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9557L

## AT-206

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9558L

## Automatic Transmission System

AT-207

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9559L

## AT-208

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9560L

- Fig 1) D Range-1st gear
- Fig 2) D Range-2nd gear
- Fig 3) Sports mode -1st gear
- Fig 4) Sports mode -2nd gear
- Fig 5) Sports mode -3rd gear
- Fig 6) Sports mode -4th gear
- Fig 7) Sports mode -5th gear
- Fig 8) Sports mode -6th gear
- Fig 9) Reverse

# Automatic Transmission System

# AT-209

## Monitor Scantool Data

1. Connect scan tool to data link connector(DLC)
2. Engine "ON".
3. Shift gear at each position and check the operation status of solenoid valve.

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9552L



## AT-210

## Automatic Transmission System

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9553L

## Automatic Transmission System

AT-211

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9554L

## AT-212

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9555L

## Automatic Transmission System

AT-213

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9556L

## AT-214

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9557L

## Automatic Transmission System

AT-215

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9558L

## AT-216

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9559L

## Automatic Transmission System

## AT-217

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9560L

- Fig 1) D Range-1st gear
- Fig 2) D Range-2nd gear
- Fig 3) Sports mode -1st gear
- Fig 4) Sports mode -2nd gear
- Fig 5) Sports mode -3rd gear
- Fig 6) Sports mode -4th gear
- Fig 7) Sports mode -5th gear
- Fig 8) Sports mode -6th gear
- Fig 9) Reverse

4. Is the same error pattern with "Reverse Sequence valve"?

- YES** ▶ Replace AUTO TRANSAXLE (BODY CONTROL VALVE faulty) as necessary and Go to "Verification Vehicle Repair" procedure.
- NO** ▶ 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 Vehicle Repair" procedure



## AT-218

# Automatic Transmission System

### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C( 122 °F) and 120°C( 248 °F). If the ATF temperature is outside this range, work to bring the range.

#### **CAUTION**

**Don't raise the oil temperature by stalling the engine.**

(Reference)

If the oil temperature is not between 50°C( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

#### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

#### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

#### STEP 4) Check learning results

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

### How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### 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 scan tool, 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

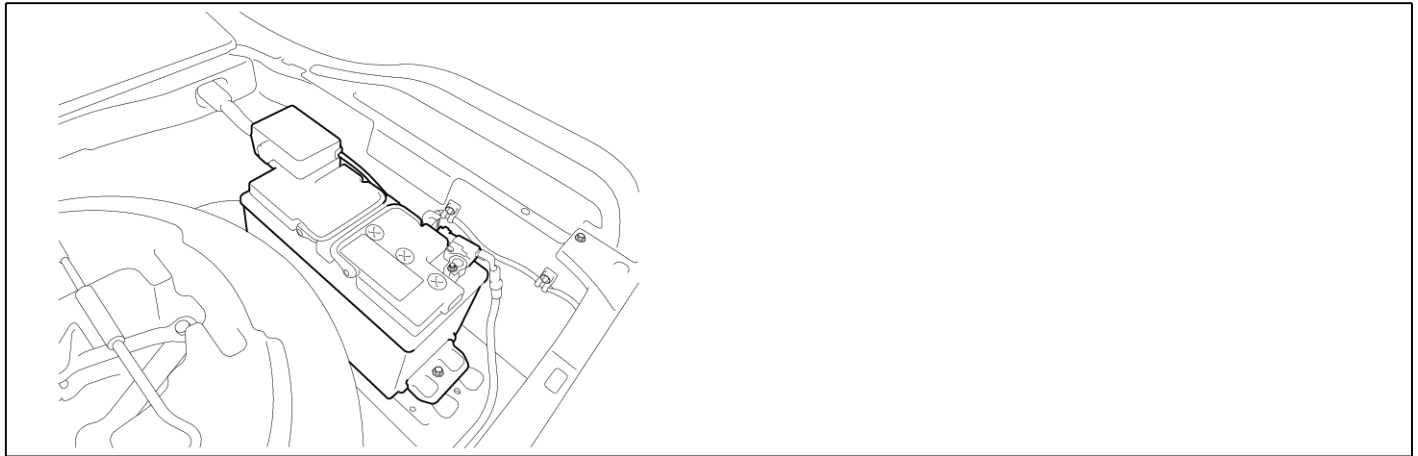
**NO** ▶ System performing to specification at this time.

# Automatic Transmission System

# AT-219

## P0882 Battery Voltage Low Supply

### Component Location



SBHAT8493D

### General Description

TCM check the Battery voltage in order to normal operation of each solenoid valves and sensors. Normal Battery voltage is essential for control in A/T system.

### DTC Description

TCM set this code If Battery voltage lower than 9volt.

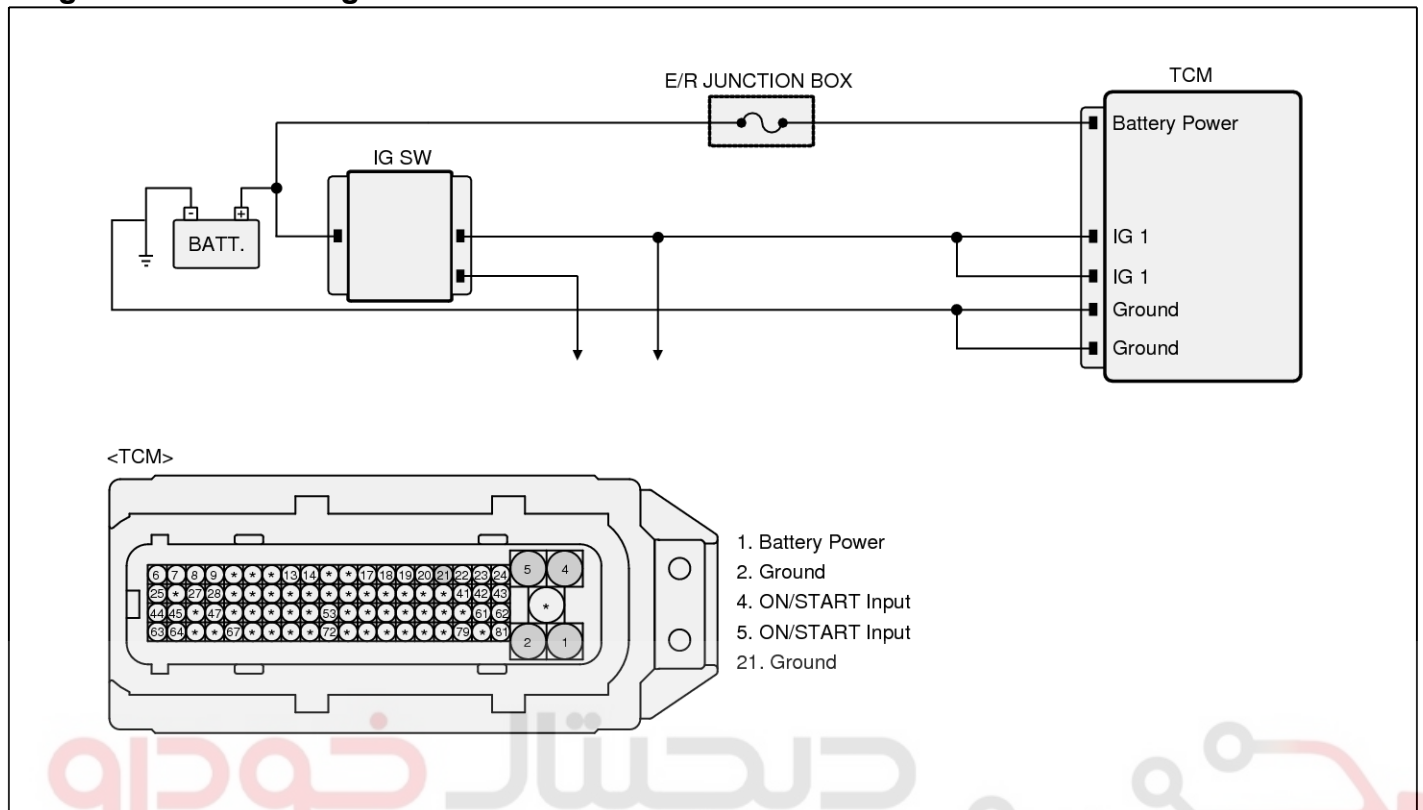
### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>• Check voltage range</li> </ul>	<ul style="list-style-type: none"> <li>• Power supply wiring</li> <li>• Battery</li> <li>• Alternator</li> <li>• TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>• IG "ON"</li> <li>• Engine rpm &gt; 400rpm or</li> <li>• Input speed &gt; 400rpm</li> <li>• CAN communication : normal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>• Battery voltage &gt; 9V</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>• More than 20seconds</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>• Fixed at 4th gear.</li> </ul>	

# AT-220

# Automatic Transmission System

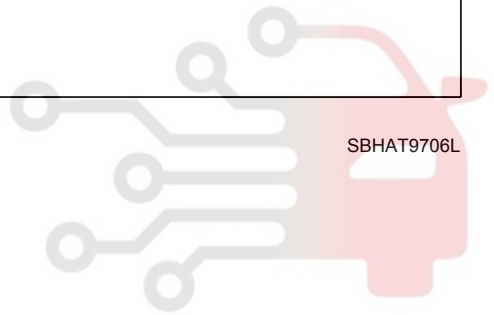
## Diagnostic Circuit Diagram



دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



# Automatic Transmission System

# AT-221

## Monitor Scantool Data

1. Connect scan tool to data link connector(DLC)
2. Ignition "ON". & Engine "OFF"

3. Monitor the "Battery Voltage" parameter on the scan tool

**Specification :** Approx, 9~14V

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> A/T Relay Voltage	11.8	V
<input type="checkbox"/> Sports Mode Up	OFF	-
<input type="checkbox"/> Sports Mode Down	OFF	-
<input type="checkbox"/> Lock-Up	OFF	-
<input type="checkbox"/> Next Gear Position	1	-
<input type="checkbox"/> Number of DTC	0	-
<input type="checkbox"/> Engine Torque	0.0	%
<input type="checkbox"/> Driving Pattern	NORMAL MO	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA

Fig.1

SBHAT9570L

## AT-222

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Stop	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> A/T Relay Voltage	14.0	V
<input type="checkbox"/> Sports Mode Up	OFF	-
<input type="checkbox"/> Sports Mode Down	OFF	-
<input type="checkbox"/> Lock-Up	OFF	-
<input type="checkbox"/> Next Gear Position	1	-
<input type="checkbox"/> Number of DTC	0	-
<input type="checkbox"/> Engine Torque	12.2	%
<input type="checkbox"/> Driving Pattern	NORMAL MO	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9571L

Fig 1) IG ON

Fig 2) When starting

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

**YES** ▶ Go to "Component Inspection" procedure.

**NO** ▶ Go to "W/Harness Inspection" procedure.

### Power Circuit Inspection

1. IG KEY "ON" & Engine "OFF" .
2. Disconnect TCM connector.
3. Measure the voltage between power supply wiring of TCM connector side and chassis ground.

**Specification** : Approx, 9~14V

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

**YES** ▶ Go to "Ground circuit Inspection" procedure.

**NO** ▶ Repair as necessary and go to "Verification vehicle Repair" procedure.

# Automatic Transmission System

## AT-223

### Ground Circuit Inspection

1. IG KEY "ON" & Engine "OFF" .
2. Disconnect TCM connector.
3. Measure the voltage between power supply wiring of wiring side and chassis ground..(Test 1)
4. Measure the voltage between power supply wiring of TCM connector side and ground circuit..(Test 2)

**Specification :** Test1 - Test2 = below 200mV

5. Is voltage 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 Vehicle Repair" procedure.

**NO** ▶ Repair as necessary and go to "Verification vehicle Repair" procedure.

### System Inspection

#### ■ Alternator circuit Inspection

1. Engine "ON".
2. Turn "ON" headlamp and defogger S/W and then Keep the 2500 Engine rpm for 2minutes.
3. Measure the voltage between Battery (+) terminal and (-) terminal .

**Specification :** Approx 12.5 ~ 14.7V

4. Is voltage within specifications?

**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 the "Charging system" Repair or replace as necessary and go to "Verification Vehicle Repair" procedure.  
▶ If not detected error in this procedure, replace Alternator and go to "Verification 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 scan tool, 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-224

## Automatic Transmission System

## P0961 Line Pressure Control Solenoid Valve Feedback Current Stuck(SLT)

**Component Location**

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

**General Description**

SLT controls linear throttle pressure by control signal from TCU and line pressure for clutched and brakes to reduce shift shock.

**DTC Description**

TCM set this code If the Targer current and feedback current are not match.

**DTC Detecting Condition**

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Check the current range</li> </ul>	<ul style="list-style-type: none"> <li>LINEAR PRESSURE SOLENOID VALVE(SLT)</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> <li>Current &lt; 1358mA</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Targer current - feedback current &gt; 8Ampere</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>After 2 times of above detection continuously.</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>Fixed at 4th gear.</li> </ul>	

**Specification**

Measuring Position	Resistance (20℃)
Signal - Ground	5.0 ~ 5.6 Ω

**Diagnostic Circuit Diagram**

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

## Automatic Transmission System

AT-225

## Signal Waveform &amp; Data

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9572L



## AT-226

## Automatic Transmission System

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9573L

## Automatic Transmission System

AT-227

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9574L

# AT-228

# Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9575L

## Automatic Transmission System

AT-229

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9576L

## AT-230

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9577L

## Automatic Transmission System

AT-231

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9578L

## AT-232

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9579L

## Automatic Transmission System

AT-233

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9580L

Fig 1) D Range-1st gear

Fig 2) D Range-2nd gear

Fig 3) Sports mode -1st gear

Fig 4) Sports mode -2nd gear

Fig 5) Sports mode -3rd gear

Fig 6) Sports mode -4th gear

Fig 7) Sports mode -5th gear

Fig 8) Sports mode -6th gear

Fig 9) Reverse



**AT-234****Automatic Transmission System****Monitor Scantool Data**

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

3. Monitor the "LINE PRESSURE SOLENOID VALVE(SLT)" parameters on the scan tool
4. Shift gear at each position .

**Specification :****Solenoid Valve Operation Table**

Shift Gear	S1	S2	S3	S4	SR	SL	SL2
1st	OFF	ON	ON	OFF	ON	OFF	ON
2nd	ON	ON	ON	OFF	ON	OFF	ON
3rd	ON	OFF	ON	OFF	ON	OFF	ON
4th	ON	OFF	OFF	OFF	ON	OFF	ON
5th	ON	OFF	OFF	ON	OFF	ON	OFF
6th	ON	ON	OFF	ON	OFF	ON	OFF

**Normal**

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st	2nd	3rd	4th	5th	6th
S1 ON stuck	2nd	2nd	3rd	4th	5th	6th
S1 OFF stuck	1st	1st	3rd	4th	5th	Neutral
S2 ON stuck	1st	2nd	2nd	4th	6th	6th
S2 OFF stuck	3rd	3rd	3rd	4th	5th	5th
S3 ON stuck	1st	2nd	3rd	4th	Neutral	Neutral
S3 OFF stuck	3rd	4th	4th	4th	5th	6th
S4 OFF stuck	1st	2nd	3rd	4th	4th	4th
1-2 shift valve stuck (1 gear side)	1st	1st	3rd	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st	2nd	3rd	4th	5th	4th

# Automatic Transmission System

# AT-235

## Engine Brake

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st E/B	2nd E/B	3rd E/B	4th	5th	6th
S1 ON stuck	2nd	2nd E/B	3rd E/B	4th	5th	6th
S1 OFF stuck	1st E/B	2nd E/B	3rd E/B	4th	5th	Neutral
S2 ON stuck	1st E/B	2nd E/B	2nd	4th	6th	6th
S2 OFF stuck	3rd E/B	3rd E/B	3rd E/B	4th	5th	5th
S3 ON stuck	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
S3 OFF stuck	1st	6th	4th	4th	5th	6th
S4 ON stuck	2nd E/B	2nd E/B	3rd E/B	4th	5th	6th
S4 OFF stuck	1st E/B	2nd	3rd E/B	4th	4th	4th
1-2 shift valve stuck (1gear side)	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st E/B	2nd	3rd E/B	4th	5th	4th

Current Data ☰

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9572L

## AT-236

## Automatic Transmission System

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9573L

## Automatic Transmission System

AT-237

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9574L

## AT-238

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9575L

## Automatic Transmission System

AT-239

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9576L

## AT-240

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9577L

## Automatic Transmission System

AT-241

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9578L



## AT-242

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9579L

## Automatic Transmission System

## AT-243

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9580L

- Fig 1) D Range-1st gear
- Fig 2) D Range-2nd gear
- Fig 3) Sports mode -1st gear
- Fig 4) Sports mode -2nd gear
- Fig 5) Sports mode -3rd gear
- Fig 6) Sports mode -4th gear
- Fig 7) Sports mode -5th gear
- Fig 8) Sports mode -6th gear
- Fig 9) Reverse

5. Does "LINE PRESSURE SOLENOID VALVE(SLT)" 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 Vehicle Repair" procedure

**NO** ► Go to "W/Harness Inspection " procedure

## AT-244

# Automatic Transmission System

### Terminal and 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 "Component Inspection" procedure.

### Component Inspection

1. Engine "OFF" IG KEY "OFF".
2. Disconnect the TCM connector.
3. Measure resistance both terminal of "LINE PRESSURE SOLENOID VALVE(SLT)".

**Specification** : Approx. 5.0~5.6  $\Omega$  (20°C)

4. Is resistance within specifications?

**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** ▶ Replace "LINE PRESSURE SOLENOID VALVE(SLT)" as necessary and Go to "Verification of Vehicle Repair" procedure.

### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C( 122 °F) and 120°C( 248 °F). If the ATF temperature is outside this range, work to bring the range.

#### CAUTION

**Don't raise the oil temperature by stalling the engine.**

(Reference)

If the oil temperature is not between 50°C( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

#### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

#### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

#### STEP 4) Check learning results

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

# Automatic Transmission System

## AT-245

How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### 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 scan tool, 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-246

# Automatic Transmission System

## P0962 Line Pressure Control Solenoid Valve Circuit Low (SLT)

### Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### General Description

Refer to DTC P0961 : Line Pressure Control Solenoid Valve Feedback Current Stuck(SLT).

### DTC Description

TCM set this code If feedback current lower than 92mA.

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Check the current range</li> </ul>	<ul style="list-style-type: none"> <li>Line pressure solenoid valve(SLT)</li> <li>Wiring harness(SLT)</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> <li>No detection of B+ short.</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Feedback current &lt; 92mA for 100ms continuously.</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 0.5 second.</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>Fixed at 4th gear.</li> </ul>	

### Specification

Measuring Position	Resistance (20°C)
Signal - Ground	5.0 ~ 5.6 Ω

### Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### Signal Waveform & Data

Refer to DTC P0961 : Line Pressure Control Solenoid Valve Feedback Current Stuck(SLT).

### Monitor Scantool Data

Refer to DTC P0961 : Line Pressure Control Solenoid Valve Feedback Current Stuck(SLT).

### Terminal and 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.
- 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

- Engine "OFF" IG KEY "OFF".
- Disconnect solenoid valve connector.
- Engine "OFF" IG KEY "ON"
- Measure voltage between "Line pressure solenoid valve(SLT)" terminal and chassis ground.

**Specification** : Approx. 2V

- Is voltage within specifications?

**YES** ▶ Go to "Ground circuit inspection" procedure.

**NO** ▶ Check for short to ground in harness. Repair as necessary and Go to "Verification Vehicle Repair" procedure.

# Automatic Transmission System

## AT-247

### Ground Circuit Inspection

1. IG KEY "ON" & Engine "OFF" .
2. Disconnect Solenoid Valve connector.
3. Measure the voltage between signal wiring of Line pressure solenoid valve(SLT) and chassis ground..(Test 1)
4. Measure the voltage between signal wiring of Line pressure solenoid valve(SLT) and ground circuit..(Test 2)

**Specification :** Test1 - Test2 = below 200mV

5. 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 Vehicle Repair" procedure.

### Component Inspection

Refer to DTC P0961 : Line Pressure Control Solenoid Valve Feedback Current Stuck(SLT).

### Verification of Vehicle Repair

Refer to DTC P0961 : Line Pressure Control Solenoid Valve Feedback Current Stuck(SLT).



اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

# AT-248

# Automatic Transmission System

## P0963 Line Pressure Control Solenoid Valve Circuit Low High (SLT)

### Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### General Description

Refer to DTC P0961 : Line Pressure Control Solenoid Valve Feedback Current Stuck(SLT).

### DTC Description

TCM set this code If feedback current higher than 1358mA.

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Check the current range</li> </ul>	<ul style="list-style-type: none"> <li>Line pressure solenoid valve(SLT)</li> <li>Wiring harness(SLT)</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> <li>No detection of B+ short.</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Feedback current &gt; 1358mA for 100ms continuously.</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 0.5 second.</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>Fixed at 4th gear.</li> </ul>	

### Specification

Measuring Position	Resistance (20°C)
Signal - Ground	5.0 ~ 5.6 Ω

### Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### Signal Waveform & Data

Refer to DTC P0961 : Line Pressure Control Solenoid Valve Feedback Current Stuck(SLT).

### Monitor Scantool Data

Refer to DTC P0961 : Line Pressure Control Solenoid Valve Feedback Current Stuck(SLT).

### Terminal and 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.
- 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

- Engine "OFF" IG KEY "OFF".
- Disconnect solenoid valve connector.
- Engine "OFF" IG KEY "ON"
- Measure voltage between "Line pressure solenoid valve(SLT)" terminal and chassis ground.

**Specification** : Approx. 2V

- Is voltage within specifications?

**YES** ▶ Go to "Ground circuit inspection" procedure.

**NO** ▶ Check for short to ground in harness. Repair as necessary and Go to "Verification Vehicle Repair" procedure.

# Automatic Transmission System

## AT-249

### Ground Circuit Inspection

1. Engine "OFF" IG KEY "OFF".
2. Disconnect solenoid valve connector.
3. Measure voltage between Ground terminal of "Line pressure solenoid valve(SLT)" and chassis ground.

#### Specification : 0V

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 Vehicle Repair" procedure.

### Component Inspection

Refer to DTC P0961 : Line Pressure Control Solenoid Valve Feedback Current Stuck(SLT).

### Verification of Vehicle Repair

Refer to DTC P0961 : Line Pressure Control Solenoid Valve Feedback Current Stuck(SLT).

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران





# AT-250

# Automatic Transmission System

## P0965 Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL2)

### Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### General Description

SL1, SL2 controls linear pressure by control signal from TCU and controls C3 clutch directly and B2 brake directly under 5th to 6th.

### DTC Description

TCM controls clutch control solenoid valve at 5th and 6th gear. TCM set this code If target current and feedback current are not match.

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Check the current range</li> </ul>	<ul style="list-style-type: none"> <li>Clutch pressure control solenoid valve(SL2)</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> <li>Current &lt; 1358mA</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Not available feedback current</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>After 2 times of above detection continuously.</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>Fixed at 4th gear.</li> </ul>	

### Specification

Measuring Position	Resistance (20℃)
Signal - Ground	11 ~ 16 Ω

### Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

# Automatic Transmission System

# AT-251

## Signal Waveform & Data

Current Data
☰

Standard Display
Full List
Graph
Items List
Reset Min.Max.
Record
Run
VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9581L

## AT-252

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9582L

## Automatic Transmission System

AT-253

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9583L

## AT-254

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9584L

## Automatic Transmission System

AT-255

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9585L

## AT-256

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9586L

## Automatic Transmission System

AT-257

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9587L



## AT-258

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9588L

## Automatic Transmission System

AT-259

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9589L

Fig 1) D Range-1st gear

Fig 2) D Range-2nd gear

Fig 3) Sports mode -1st gear

Fig 4) Sports mode -2nd gear

Fig 5) Sports mode -3rd gear

Fig 6) Sports mode -4th gear

Fig 7) Sports mode -5th gear

Fig 8) Sports mode -6th gear

Fig 9) Reverse

**AT-260****Automatic Transmission System****Monitor Scantool Data**

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

3. Monitor the "Clutch pressure control solenoid valve(SL2)" parameters on the scan tool

4. Shift gear at each position .

**Specification :****Solenoid Valve Operation Table**

Shift Gear	S1	S2	S3	S4	SR	SL	SL2
1st	OFF	ON	ON	OFF	ON	OFF	ON
2nd	ON	ON	ON	OFF	ON	OFF	ON
3rd	ON	OFF	ON	OFF	ON	OFF	ON
4th	ON	OFF	OFF	OFF	ON	OFF	ON
5th	ON	OFF	OFF	ON	OFF	ON	OFF
6th	ON	ON	OFF	ON	OFF	ON	OFF

**Normal**

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st	2nd	3rd	4th	5th	6th
S1 ON stuck	2nd	2nd	3rd	4th	5th	6th
S1 OFF stuck	1st	1st	3rd	4th	5th	Neutral
S2 ON stuck	1st	2nd	2nd	4th	6th	6th
S2 OFF stuck	3rd	3rd	3rd	4th	5th	5th
S3 ON stuck	1st	2nd	3rd	4th	Neutral	Neutral
S3 OFF stuck	3rd	4th	4th	4th	5th	6th
S4 OFF stuck	1st	2nd	3rd	4th	4th	4th
1-2 shift valve stuck (1 gear side)	1st	1st	3rd	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st	2nd	3rd	4th	5th	4th

## Automatic Transmission System

AT-261

## Engine Brake

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st E/B	2nd E/B	3rd E/B	4th	5th	6th
S1 ON stuck	2nd	2nd E/B	3rd E/B	4th	5th	6th
S1 OFF stuck	1st E/B	2nd E/B	3rd E/B	4th	5th	Neutral
S2 ON stuck	1st E/B	2nd E/B	2nd	4th	6th	6th
S2 OFF stuck	3rd E/B	3rd E/B	3rd E/B	4th	5th	5th
S3 ON stuck	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
S3 OFF stuck	1st	6th	4th	4th	5th	6th
S4 ON stuck	2nd E/B	2nd E/B	3rd E/B	4th	5th	6th
S4 OFF stuck	1st E/B	2nd	3rd E/B	4th	4th	4th
1-2 shift valve stuck (1gear side)	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st E/B	2nd	3rd E/B	4th	5th	4th

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9581L

## AT-262

## Automatic Transmission System

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9582L

## Automatic Transmission System

AT-263

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9583L

## AT-264

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9584L

## Automatic Transmission System

AT-265

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9585L



## AT-266

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9586L

## Automatic Transmission System

AT-267

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9587L

## AT-268

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9588L

## Automatic Transmission System

## AT-269

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9589L

Fig 1) D Range-1st gear

Fig 2) D Range-2nd gear

Fig 3) Sports mode -1st gear

Fig 4) Sports mode -2nd gear

Fig 5) Sports mode -3rd gear

Fig 6) Sports mode -4th gear

Fig 7) Sports mode -5th gear

Fig 8) Sports mode -6th gear

Fig 9) Reverse

5. Does "Clutch pressure control solenoid valve(SL2)" 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 Vehicle Repair" procedure

**NO** ► Go to "W/Harness Inspection " procedure

## AT-270

# Automatic Transmission System

### Terminal and 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 "Component Inspection" procedure.

### Component Inspection

1. Engine "OFF" IG KEY "OFF".
2. Disconnect the TCM connector.
3. Measure voltage between "Clutch pressure control solenoid valve(SL2)" terminal and chassis ground.

**Specification** : Approx. 11~16  $\Omega$  (20°C)

4. Is resistance within specifications?

**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** ▶ Replace "Clutch pressure control solenoid valve(SL2)" as necessary and Go to "Verification of Vehicle Repair" procedure.

#### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C( 122 °F) and 120°C( 248 °F). If the ATF temperature is outside this range, work to bring the range.

### ⚠CAUTION

**Don't raise the oil temperature by stalling the engine.**

(Reference)

If the oil temperature is not between 50°C( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

#### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

#### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

#### STEP 4) Check learning results

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

#### How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform "N" position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

# Automatic Transmission System

## AT-271

### 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 scan tool, 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.

# دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



# AT-272

# Automatic Transmission System

## P0966 Clutch Pressure Control Solenoid Valve Circuit Low(SL2)

### Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### General Description

Refer to DTC P0965 : Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL2).

### DTC Description

TCM set this code If feedback current lower than 92mA.

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Check the current range</li> </ul>	<ul style="list-style-type: none"> <li>Clutch pressure control solenoid valve(SL2)</li> <li>Wiring harness(SL2)</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> <li>No detection of B+ short.</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Feedback current &lt; 92mA for 100ms continuously.</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 0.5 second.</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>Fixed at 4th gear.</li> </ul>	

### Specification

Measuring Position	Resistance (20°C)
Signal - Ground	11 ~ 16 Ω

### Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### Signal Waveform & Data

Refer to DTC P0965 : Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL2).

### Monitor Scantool Data

Refer to DTC P0965 : Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL2).

### Terminal and 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.
- 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

- Engine "OFF" IG KEY "OFF".
- Disconnect solenoid valve connector.
- Engine "OFF" IG KEY "ON"
- Measure voltage between "Clutch pressure control solenoid valve(SL2)" terminal and chassis ground.

**Specification** : Approx. 2V

- Is voltage within specifications?

**YES** ▶ Go to "Ground circuit inspection" procedure.

**NO** ▶ Check for short to ground in harness. Repair as necessary and Go to "Verification Vehicle Repair" procedure.

# Automatic Transmission System

## AT-273

### Ground Circuit Inspection

1. IG KEY "ON" & Engine "OFF" .
2. Disconnect Solenoid Valve connector.
3. Measure the voltage between signal wiring of "Clutch pressure control solenoid valve(SL2)" and chassis ground..(Test 1)
4. Measure the voltage between signal wiring of "Clutch pressure control solenoid valve(SL2)" and ground circuit..(Test 2)

**Specification :** Test1 - Test2 = below 200mV

5. 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 Vehicle Repair" procedure.

### Component Inspection

Refer to DTC P0965 : Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL2).

### Verification of Vehicle Repair

Refer to DTC P0965 : Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL2).



اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



# AT-274

# Automatic Transmission System

## P0967 Clutch Pressure Control Solenoid Valve Circuit High(SL2)

### Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### General Description

Refer to DTC P0965 : Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL2).

### DTC Description

TCM set this code If feedback current higher than 1358mA.

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Check the current range</li> </ul>	<ul style="list-style-type: none"> <li>Clutch pressure control solenoid valve(SL2)</li> <li>Wiring harness(SL2)</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> <li>No detection of B+ short.</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Feedback current &gt; 1358mA for 100ms continuously.</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 0.5 second.</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>Fixed at 4th gear.</li> </ul>	

### Specification

Measuring Position	Resistance (20°C)
Signal - Ground	11 ~ 16 Ω

### Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### Signal Waveform & Data

Refer to DTC P0965 : Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL2).

### Monitor Scantool Data

Refer to DTC P0965 : Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL2).

### Terminal and 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.
- 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

- Engine "OFF" IG KEY "OFF".
- Disconnect solenoid valve connector.
- Engine "OFF" IG KEY "ON"
- Measure voltage between "Clutch pressure control solenoid valve(SL2)" terminal and chassis ground.

**Specification** : Approx. 2V

- Is voltage within specifications?

**YES** ▶ Go to "Ground circuit inspection" procedure.

**NO** ▶ Check for short to ground in harness. Repair as necessary and Go to "Verification Vehicle Repair" procedure.

# Automatic Transmission System

## AT-275

### Ground Circuit Inspection

1. Engine "OFF" IG KEY "OFF".
2. Disconnect solenoid valve connector.
3. Measure voltage between Ground terminal of "Clutch pressure control solenoid valve(SL2)" and chassis ground.

---

#### Specification : 2V

---

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 Vehicle Repair" procedure.

### Component Inspection

Refer to DTC P0965 : Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL2).

### Verification of Vehicle Repair

Refer to DTC P0965 : Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL2).



دیجیتال خودرو  
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

## AT-276

## Automatic Transmission System

**P0969 Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL1)****Component Location**

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

**General Description**

SL1, SL2 controls linear pressure by control signal from TCU and controls C3 clutch directly and B2 brake directly under 5th to 6th.

**DTC Description**

TCM controls clutch control solenoid valve at 5th and 6th gear. TCM set this code If target current and feedback current are not match.

**DTC Detecting Condition**

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Check the current range</li> </ul>	<ul style="list-style-type: none"> <li>Clutch pressure control solenoid valve(SL1)</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> <li>Current &lt; 1358mA</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Not available feedback current</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>After 2 times of above detection continuously.</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>Fixed at 4th gear.</li> </ul>	

**Specification**

Measuring Position	Resistance (20℃)
Signal - Ground	11 ~ 16 Ω

**Diagnostic Circuit Diagram**

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

# Automatic Transmission System

# AT-277

## Signal Waveform & Data

Current Data
☰

Standard Display
Full List
Graph
Items List
Reset Min.Max.
Record
Run
VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9590L

# AT-278

# Automatic Transmission System

Current Data

Standard Display | Full List | Graph | Items List | Reset Min.Max. | Record | Run | VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9591L

## Automatic Transmission System

AT-279

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9592L

## AT-280

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9593L

## Automatic Transmission System

AT-281

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9594L



## AT-282

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9595L

## Automatic Transmission System

AT-283

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9596L

## AT-284

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9597L

## Automatic Transmission System

AT-285

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9598L

Fig 1) D Range-1st gear

Fig 2) D Range-2nd gear

Fig 3) Sports mode -1st gear

Fig 4) Sports mode -2nd gear

Fig 5) Sports mode -3rd gear

Fig 6) Sports mode -4th gear

Fig 7) Sports mode -5th gear

Fig 8) Sports mode -6th gear

Fig 9) Reverse

**AT-286****Automatic Transmission System****Monitor Scantool Data**

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

3. Monitor the "Clutch pressure control solenoid valve(SL1)" parameters on the scan tool

4. Shift gear at each position .

**Specification :****Solenoid Valve Operation Table**

Shift Gear	S1	S2	S3	S4	SR	SL	SL2
1st	OFF	ON	ON	OFF	ON	OFF	ON
2nd	ON	ON	ON	OFF	ON	OFF	ON
3rd	ON	OFF	ON	OFF	ON	OFF	ON
4th	ON	OFF	OFF	OFF	ON	OFF	ON
5th	ON	OFF	OFF	ON	OFF	ON	OFF
6th	ON	ON	OFF	ON	OFF	ON	OFF

**Normal**

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st	2nd	3rd	4th	5th	6th
S1 ON stuck	2nd	2nd	3rd	4th	5th	6th
S1 OFF stuck	1st	1st	3rd	4th	5th	Neutral
S2 ON stuck	1st	2nd	2nd	4th	6th	6th
S2 OFF stuck	3rd	3rd	3rd	4th	5th	5th
S3 ON stuck	1st	2nd	3rd	4th	Neutral	Neutral
S3 OFF stuck	3rd	4th	4th	4th	5th	6th
S4 OFF stuck	1st	2nd	3rd	4th	4th	4th
1-2 shift valve stuck (1 gear side)	1st	1st	3rd	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st	2nd	3rd	4th	5th	4th

## Automatic Transmission System

AT-287

## Engine Brake

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st E/B	2nd E/B	3rd E/B	4th	5th	6th
S1 ON stuck	2nd	2nd E/B	3rd E/B	4th	5th	6th
S1 OFF stuck	1st E/B	2nd E/B	3rd E/B	4th	5th	Neutral
S2 ON stuck	1st E/B	2nd E/B	2nd	4th	6th	6th
S2 OFF stuck	3rd E/B	3rd E/B	3rd E/B	4th	5th	5th
S3 ON stuck	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
S3 OFF stuck	1st	6th	4th	4th	5th	6th
S4 ON stuck	2nd E/B	2nd E/B	3rd E/B	4th	5th	6th
S4 OFF stuck	1st E/B	2nd	3rd E/B	4th	4th	4th
1-2 shift valve stuck (1gear side)	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st E/B	2nd	3rd E/B	4th	5th	4th

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9590L

## AT-288

## Automatic Transmission System

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9591L

## Automatic Transmission System

AT-289

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9592L



## AT-290

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9593L

## Automatic Transmission System

AT-291

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9594L

## AT-292

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9595L

## Automatic Transmission System

AT-293

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9596L

## AT-294

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9597L

## Automatic Transmission System

## AT-295

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9598L

- Fig 1) D Range-1st gear
- Fig 2) D Range-2nd gear
- Fig 3) Sports mode -1st gear
- Fig 4) Sports mode -2nd gear
- Fig 5) Sports mode -3rd gear
- Fig 6) Sports mode -4th gear
- Fig 7) Sports mode -5th gear
- Fig 8) Sports mode -6th gear
- Fig 9) Reverse

5. Does "Clutch pressure control solenoid valve(SL1)" 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 Vehicle Repair" procedure

**NO** ► Go to "W/Harness Inspection " procedure

## AT-296

# Automatic Transmission System

### Terminal and 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 "Component Inspection" procedure.

### Component Inspection

1. Engine "OFF" IG KEY "OFF".
2. Disconnect the TCM connector.
3. Measure voltage between "Clutch pressure control solenoid valve(SL1)" terminal and chassis ground.

**Specification** : Approx. 11~16 Ω (20°C)

4. Is resistance within specifications?

**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** ▶ Replace "Clutch pressure control solenoid valve(SL2)" as necessary and Go to "Verification of Vehicle Repair" procedure.

#### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C( 122 °F) and 120°C( 248 °F). If the ATF temperature is outside this range, work to bring the range.

### ⚠CAUTION

**Don't raise the oil temperature by stalling the engine.**

(Reference)

If the oil temperature is not between 50°C( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

#### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

#### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

#### STEP 4) Check learning results

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

#### How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform "N" position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

# Automatic Transmission System

## AT-297

### 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 scan tool, 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.

# دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران





# AT-298

# Automatic Transmission System

## P0970 Clutch Pressure Control Solenoid Valve Circuit Low(SL1)

### Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### General Description

Refer to DTC P0969 : Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL1).

### DTC Description

TCM set this code If feedback current lower than 92mA.

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Check the current range</li> </ul>	<ul style="list-style-type: none"> <li>Clutch pressure control solenoid valve(SL1)</li> <li>Wiring harness(SL1)</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> <li>No detection of B+ short.</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Feedback current &lt; 92mA for 100ms continuously.</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 0.5 second.</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>Fixed at 4th gear.</li> </ul>	

### Specification

Measuring Position	Resistance (20°C)
Signal - Ground	11 ~ 16 Ω

### Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### Signal Waveform & Data

Refer to DTC P0969 : Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL1).

### Monitor Scantool Data

Refer to DTC P0969 : Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL1).

### Terminal and 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.
- 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

- Engine "OFF" IG KEY "OFF".
- Disconnect solenoid valve connector.
- Engine "OFF" IG KEY "ON"
- Measure voltage between "Clutch pressure control solenoid valve(SL1)" terminal and chassis ground.

**Specification** : Approx. 2V

- Is voltage within specifications?

**YES** ▶ Go to "Ground circuit inspection" procedure.

**NO** ▶ Check for short to ground in harness. Repair as necessary and Go to "Verification Vehicle Repair" procedure.

# Automatic Transmission System

## AT-299

### Ground Circuit Inspection

1. IG KEY "OFF" .
2. Disconnect Solenoid Valve connector.
3. Measure the voltage between signal wiring of "Clutch pressure control solenoid valve(SL1)" and chassis ground..(Test 1)
4. Measure the voltage between signal wiring of "Clutch pressure control solenoid valve(SL1)" and ground circuit..(Test 2)

**Specification :** Test1 - Test2 = below 200mV

5. 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 Vehicle Repair" procedure.

### Component Inspection

Refer to DTC P0969 : Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL1).

### Verification of Vehicle Repair

Refer to DTC P0969 : Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL1).



اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

# AT-300

# Automatic Transmission System

## P0971 Clutch Pressure Control Solenoid Valve Circuit High(SL1)

### Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### General Description

Refer to DTC P0969 : Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL1).

### DTC Description

TCM set this code If feedback current higher than 1358mA.

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Check the current range</li> </ul>	<ul style="list-style-type: none"> <li>Clutch pressure control solenoid valve(SL1)</li> <li>Wiring harness(SL1)</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> <li>No detection of B+ short.</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Feedback current &gt; 1358mA for 100ms continuously.</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 0.5 second.</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>Fixed at 4th gear.</li> </ul>	

### Specification

Measuring Position	Resistance (20°C)
Signal - Ground	11 ~ 16 Ω

### Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### Signal Waveform & Data

Refer to DTC P0969 : Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL1).

### Monitor Scantool Data

Refer to DTC P0969 : Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL1).

### Terminal and 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.
- 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

- Engine "OFF" IG KEY "OFF".
- Disconnect solenoid valve connector.
- Engine "OFF" IG KEY "ON"
- Measure voltage between "Clutch pressure control solenoid valve(SL1)" terminal and chassis ground.

**Specification** : Approx. 2V

- Is voltage within specifications?

**YES** ▶ Go to "Ground circuit inspection" procedure.

**NO** ▶ Check for short to ground in harness. Repair as necessary and Go to "Verification Vehicle Repair" procedure.

# Automatic Transmission System

# AT-301

## Ground Circuit Inspection

1. Engine "OFF" IG KEY "OFF".
2. Disconnect solenoid valve connector.
3. Measure voltage between Ground terminal of "Clutch pressure control solenoid valve(SL1)" and chassis ground.

### Specification : 2V

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 Vehicle Repair" procedure.

## Component Inspection

Refer to DTC P0969 : Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL1).

## Verification of Vehicle Repair

Refer to DTC P0969 : Clutch Pressure Control Solenoid Valve Feedback Current Stuck(SL1).



دیجیتال خودرو  
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

**AT-302****Automatic Transmission System****P0973 Shift Control Solenoid Valve "A" Circuit Low(S1)****Component Location**

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

**General Description**

4 shift solenoid valves are installed directly in valve-body. The solenoids operates of ON and OFF by the control signal from TCU.

Combinations of 4 solenoids, S1, S2, S3 and S4, changes gear ranges(1st to 6th)

**DTC Description**

TCM set this code If detected "OFF(0V)" signal When TCM output "ON(12V)" signal to "Shift control solenoid valve A(S1)"

**DTC Detecting Condition**

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Ground short</li> </ul>	<ul style="list-style-type: none"> <li>Wiring harness(S1) short to ground</li> <li>Shift control solenoid valve A(S1)</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> <li>S1 drive output "ON" signal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>To detected "OFF" signal (0V) of the S1 monitor, When S1 drive output "ON" signal (12V)</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 0.5 second.</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>Fixed at 4th gear.</li> </ul>	

**Specification**

Measuring Position	Resistance (20℃)
Signal - Ground	11 ~ 16 Ω

**Diagnostic Circuit Diagram**

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

# Automatic Transmission System

# AT-303

## Signal Waveform & Data

Current Data
☰

Standard Display
Full List
Graph
Items List
Reset Min.Max.
Record
Run
VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9599L

## AT-304

## Automatic Transmission System

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9600L

## Automatic Transmission System

## AT-305

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9601L



## AT-306

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9602L

## Automatic Transmission System

AT-307

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9603L

## AT-308

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9604L

## Automatic Transmission System

AT-309

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9605L

## AT-310

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9606L

## Automatic Transmission System

AT-311

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9607L

Fig 1) D Range-1st gear

Fig 2) D Range-2nd gear

Fig 3) Sports mode -1st gear

Fig 4) Sports mode -2nd gear

Fig 5) Sports mode -3rd gear

Fig 6) Sports mode -4th gear

Fig 7) Sports mode -5th gear

Fig 8) Sports mode -6th gear

Fig 9) Reverse

# AT-312

# Automatic Transmission System

## Monitor Scantool Data

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

3. Monitor the "Shift control solenoid valve A(S1)" parameters on the scan tool
4. Shift gear at each position .

## Specification :

### Solenoid Valve Operation Table

Shift Gear	S1	S2	S3	S4	SR	SL	SL2
1st	OFF	ON	ON	OFF	ON	OFF	ON
2nd	ON	ON	ON	OFF	ON	OFF	ON
3rd	ON	OFF	ON	OFF	ON	OFF	ON
4th	ON	OFF	OFF	OFF	ON	OFF	ON
5th	ON	OFF	OFF	ON	OFF	ON	OFF
6th	ON	ON	OFF	ON	OFF	ON	OFF

## Normal

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st	2nd	3rd	4th	5th	6th
S1 ON stuck	2nd	2nd	3rd	4th	5th	6th
S1 OFF stuck	1st	1st	3rd	4th	5th	Neutral
S2 ON stuck	1st	2nd	2nd	4th	6th	6th
S2 OFF stuck	3rd	3rd	3rd	4th	5th	5th
S3 ON stuck	1st	2nd	3rd	4th	Neutral	Neutral
S3 OFF stuck	3rd	4th	4th	4th	5th	6th
S4 OFF stuck	1st	2nd	3rd	4th	4th	4th
1-2 shift valve stuck (1 gear side)	1st	1st	3rd	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st	2nd	3rd	4th	5th	4th

## Automatic Transmission System

AT-313

## Engine Brake

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st E/B	2nd E/B	3rd E/B	4th	5th	6th
S1 ON stuck	2nd	2nd E/B	3rd E/B	4th	5th	6th
S1 OFF stuck	1st E/B	2nd E/B	3rd E/B	4th	5th	Neutral
S2 ON stuck	1st E/B	2nd E/B	2nd	4th	6th	6th
S2 OFF stuck	3rd E/B	3rd E/B	3rd E/B	4th	5th	5th
S3 ON stuck	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
S3 OFF stuck	1st	6th	4th	4th	5th	6th
S4 ON stuck	2nd E/B	2nd E/B	3rd E/B	4th	5th	6th
S4 OFF stuck	1st E/B	2nd	3rd E/B	4th	4th	4th
1-2 shift valve stuck (1gear side)	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st E/B	2nd	3rd E/B	4th	5th	4th

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9599L



# AT-314

# Automatic Transmission System

Current Data
☰

Standard Display
Full List
Graph
Items List
Reset Min.Max.
Record
Run
VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9600L

## Automatic Transmission System

AT-315

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9601L

## AT-316

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9602L

## Automatic Transmission System

AT-317

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9603L

## AT-318

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9604L

## Automatic Transmission System

AT-319

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9605L

## AT-320

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9606L

## Automatic Transmission System

## AT-321

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9607L

- Fig 1) D Range-1st gear
- Fig 2) D Range-2nd gear
- Fig 3) Sports mode -1st gear
- Fig 4) Sports mode -2nd gear
- Fig 5) Sports mode -3rd gear
- Fig 6) Sports mode -4th gear
- Fig 7) Sports mode -5th gear
- Fig 8) Sports mode -6th gear
- Fig 9) Reverse

5. Does "Shift control solenoid valve A(S1)" 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 Vehicle Repair" procedure

**NO** ► Go to "W/Harness Inspection " procedure



## AT-322

# Automatic Transmission System

### Terminal and 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. Engine "OFF" IG KEY "OFF".
2. Disconnect solenoid valve connector.
3. Engine "OFF" IG KEY "ON"
4. Measure voltage between "Shift control solenoid valve A(S1)" terminal and chassis ground.

**Specification** : Approx. 2V

5. 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 Vehicle Repair" procedure.

### Component Inspection

1. Engine "OFF" IG KEY "OFF".
2. Disconnect the TCM connector.
3. Measure resistance both terminal of "Shift control solenoid valve A(S1)".

**Specification** : Approx. 11~16 Ω (20°C)

4. Is resistance within specifications?

**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** ▶ Replace "Shift control solenoid valve A(S1)" as necessary and Go to "Verification Vehicle Repair" procedure.

### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C ( 122 °F) and 120°C ( 248 °F). If the ATF temperature is outside this range, work to bring the range.

#### ⚠CAUTION

**Don't raise the oil temperature by stalling the engine.**

(Reference)

If the oil temperature is not between 50°C ( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

#### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

#### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

#### STEP 4) Check learning results

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

# Automatic Transmission System

## AT-323

How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### 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 scan tool, 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-324

# Automatic Transmission System

## P0974 Shift Control Solenoid Valve "A" Circuit High(S1)

### Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### General Description

Refer to DTC P0973 : Shift Control Solenoid Valve "A" Circuit Low(S1).

### DTC Description

TCM set this code If detected "ON(12V)" signal When TCM output "OFF(0V)" signal to "Shift control solenoid valve A(S1)"

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Open/short</li> </ul>	<ul style="list-style-type: none"> <li>Wiring harness(S1) short to Battery or OPen</li> <li>Shift control solenoid valve A(S1)</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> <li>S1 drive output "OFF" signal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>To detected "ON" signal (12V) of the S1 monitor, When S1 drive output "OFF" signal (0V)</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 0.5 second.</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>Fixed at 4th gear.</li> </ul>	

### Specification

Measuring Position	Resistance (20°C)
Signal - Ground	11 ~ 16 Ω

### Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### Signal Waveform & Data

Refer to DTC P0973 : Shift Control Solenoid Valve "A" Circuit Low(S1).

### Monitor Scantool Data

Refer to DTC P0973 : Shift Control Solenoid Valve "A" Circuit Low(S1).

### Terminal and 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.
- 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.

# Automatic Transmission System

## AT-325

### Signal Circuit Inspection

1. Engine "OFF" IG KEY "OFF".
2. Disconnect solenoid valve connector.
3. Engine "OFF" IG KEY "ON"
4. Measure voltage between "Shift control solenoid valve A(S1)" terminal and chassis ground.

**Specification :** Approx. 2V

5. 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 Vehicle Repair" procedure.

### Component Inspection

Refer to DTC P0973 : Shift Control Solenoid Valve "A" Circuit Low(S1).

### Verification of Vehicle Repair

Refer to DTC P0973 : Shift Control Solenoid Valve "A" Circuit Low(S1).



دیجیتال خودرو  
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

**AT-326****Automatic Transmission System****P0976 Shift Control Solenoid Valve "B" Circuit Low(S2)****Component Location**

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

**General Description**

4 shift solenoid valves are installed directly in valve-body. The solenoids operates of ON and OFF by the control signal from TCU.

Combinations of 4 solenoids, S1, S2, S3 and S4, changes gear ranges(1st to 6th)

**DTC Description**

TCM set this code If detected "OFF(0V)" signal When TCM output "ON(12V)" signal to "Shift control solenoid valve B(S2)"

**DTC Detecting Condition**

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Ground short</li> </ul>	<ul style="list-style-type: none"> <li>Wiring harness(S2) short to ground</li> <li>Shift control solenoid valve B(S2)</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> <li>S2 drive output "ON" signal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>To detected "OFF" signal (0V) of the S2 monitor, When S2 drive output "ON" signal (12V)</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 0.5 second.</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>Fixed at 4th gear.</li> </ul>	

**Specification**

Measuring Position	Resistance (20℃)
Signal - Ground	11 ~ 16 Ω

**Diagnostic Circuit Diagram**

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

# Automatic Transmission System

# AT-327

## Signal Waveform & Data

Current Data
☰

Standard Display
Full List
Graph
Items List
Reset Min.Max.
Record
Run
VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9608L

## AT-328

## Automatic Transmission System

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9609L

## Automatic Transmission System

AT-329

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9610L



## AT-330

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9611L

## Automatic Transmission System

AT-331

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9612L

## AT-332

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9613L

## Automatic Transmission System

AT-333

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9614L

## AT-334

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9615L

## Automatic Transmission System

AT-335

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9616L

Fig 1) D Range-1st gear

Fig 2) D Range-2nd gear

Fig 3) Sports mode -1st gear

Fig 4) Sports mode -2nd gear

Fig 5) Sports mode -3rd gear

Fig 6) Sports mode -4th gear

Fig 7) Sports mode -5th gear

Fig 8) Sports mode -6th gear

Fig 9) Reverse

**AT-336****Automatic Transmission System****Monitor Scantool Data**

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

3. Monitor the "Shift control solenoid valve B(S2)" parameters on the scan tool
4. Shift gear at each position .

**Specification :****Solenoid Valve Operation Table**

Shift Gear	S1	S2	S3	S4	SR	SL	SL2
1st	OFF	ON	ON	OFF	ON	OFF	ON
2nd	ON	ON	ON	OFF	ON	OFF	ON
3rd	ON	OFF	ON	OFF	ON	OFF	ON
4th	ON	OFF	OFF	OFF	ON	OFF	ON
5th	ON	OFF	OFF	ON	OFF	ON	OFF
6th	ON	ON	OFF	ON	OFF	ON	OFF

**Normal**

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st	2nd	3rd	4th	5th	6th
S1 ON stuck	2nd	2nd	3rd	4th	5th	6th
S1 OFF stuck	1st	1st	3rd	4th	5th	Neutral
S2 ON stuck	1st	2nd	2nd	4th	6th	6th
S2 OFF stuck	3rd	3rd	3rd	4th	5th	5th
S3 ON stuck	1st	2nd	3rd	4th	Neutral	Neutral
S3 OFF stuck	3rd	4th	4th	4th	5th	6th
S4 OFF stuck	1st	2nd	3rd	4th	4th	4th
1-2 shift valve stuck (1 gear side)	1st	1st	3rd	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st	2nd	3rd	4th	5th	4th

# Automatic Transmission System

# AT-337

## Engine Brake

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st E/B	2nd E/B	3rd E/B	4th	5th	6th
S1 ON stuck	2nd	2nd E/B	3rd E/B	4th	5th	6th
S1 OFF stuck	1st E/B	2nd E/B	3rd E/B	4th	5th	Neutral
S2 ON stuck	1st E/B	2nd E/B	2nd	4th	6th	6th
S2 OFF stuck	3rd E/B	3rd E/B	3rd E/B	4th	5th	5th
S3 ON stuck	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
S3 OFF stuck	1st	6th	4th	4th	5th	6th
S4 ON stuck	2nd E/B	2nd E/B	3rd E/B	4th	5th	6th
S4 OFF stuck	1st E/B	2nd	3rd E/B	4th	4th	4th
1-2 shift valve stuck (1gear side)	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st E/B	2nd	3rd E/B	4th	5th	4th

Current Data ☰

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9608L



## AT-338

## Automatic Transmission System

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9609L

## Automatic Transmission System

AT-339

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9610L

## AT-340

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9611L

## Automatic Transmission System

AT-341

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9612L

## AT-342

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9613L

## Automatic Transmission System

AT-343

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9614L

## AT-344

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9615L

## Automatic Transmission System

## AT-345

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9616L

- Fig 1) D Range-1st gear
- Fig 2) D Range-2nd gear
- Fig 3) Sports mode -1st gear
- Fig 4) Sports mode -2nd gear
- Fig 5) Sports mode -3rd gear
- Fig 6) Sports mode -4th gear
- Fig 7) Sports mode -5th gear
- Fig 8) Sports mode -6th gear
- Fig 9) Reverse

5. Does "Shift control solenoid valve B(S2)" 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 Vehicle Repair" procedure

**NO** ► Go to "W/Harness Inspection " procedure



## AT-346

# Automatic Transmission System

### Terminal and 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. Engine "OFF" IG KEY "OFF".
2. Disconnect solenoid valve connector.
3. Engine "OFF" IG KEY "ON"
4. Measure voltage between "Shift control solenoid valve B(S2)" terminal and chassis ground.

**Specification** : Approx. 2V

5. 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 Vehicle Repair" procedure.

### Component Inspection

1. Engine "OFF" IG KEY "OFF".
2. Disconnect the TCM connector.
3. Measure resistance both terminal of "Shift control solenoid valve B(S2)".

**Specification** : Approx. 11~16 Ω (20°C)

4. Is resistance within specifications?

**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** ▶ Replace "Shift control solenoid valve B(S2)" as necessary and Go to "Verification Vehicle Repair" procedure.

### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C ( 122 °F) and 120°C ( 248 °F). If the ATF temperature is outside this range, work to bring the range.

#### ⚠CAUTION

**Don't raise the oil temperature by stalling the engine.**

(Reference)

If the oil temperature is not between 50°C ( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

#### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

#### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

#### STEP 4) Check learning results

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

# Automatic Transmission System

## AT-347

How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### 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 scan tool, 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-348

# Automatic Transmission System

## P0977 Shift Control Solenoid Valve "B" Circuit High(S2)

### Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### General Description

Refer to DTC P0976 : Shift Control Solenoid Valve "B" Circuit Low(S2).

### DTC Description

TCM set this code If detected "ON(12V)" signal When TCM output "OFF(0V)" signal to "Shift control solenoid valve B(S2)"

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Open/short</li> </ul>	<ul style="list-style-type: none"> <li>Wiring harness(S2) short to Battery or OPen</li> <li>Shift control solenoid valve B(S2)</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> <li>S2 drive output "OFF" signal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>To detected "ON" signal (12V) of the S2 monitor, When S2 drive output "OFF" signal (0V)</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 0.5 second.</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>Fixed at 4th gear.</li> </ul>	

### Specification

Measuring Position	Resistance (20°C)
Signal - Ground	11 ~ 16 Ω

### Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### Signal Waveform & Data

Refer to DTC P0976 : Shift Control Solenoid Valve "B" Circuit Low(S2).

### Monitor Scantool Data

Refer to DTC P0976 : Shift Control Solenoid Valve "B" Circuit Low(S2).

### Terminal and Connector Inspection

Refer to DTC P0976 : Shift Control Solenoid Valve "B" Circuit Low(S2).

### Signal Circuit Inspection

1. Engine "OFF" IG KEY "OFF".
2. Disconnect solenoid valve connector.
3. Engine "OFF" IG KEY "ON"
4. Measure voltage between "Shift control solenoid valve B(S2)" terminal and chassis ground.

Specification : Approx. 2V

5. 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 Vehicle Repair" procedure.

### Component Inspection

Refer to DTC P0976 : Shift Control Solenoid Valve "B" Circuit Low(S2).

### Verification of Vehicle Repair

Refer to DTC P0976 : Shift Control Solenoid Valve "B" Circuit Low(S2).

# Automatic Transmission System

## AT-349

### P0979 Shift Control Solenoid Valve "C" Circuit Low(S3)

#### Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

#### General Description

4 shift solenoid valves are installed directly in valve-body. The solenoids operates of ON and OFF by the control signal from TCU.

Combinations of 4 solenoids, S1, S2, S3 and S4, changes gear ranges(1st to 6th)

#### DTC Description

TCM set this code If detected "OFF(0V)" signal When TCM output "ON(12V)" signal to "Shift control solenoid valve C(S3)"

#### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Ground short</li> </ul>	<ul style="list-style-type: none"> <li>Wiring harness(S3) short to ground</li> <li>Shift control solenoid valve C(S3)</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> <li>S3 drive output "ON" signal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>To detected "OFF" signal (0V) of the S3 monitor, When S3 drive output "ON" signal (12V)</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 0.5 second.</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>Fixed at 4th gear.</li> </ul>	

#### Specification

Measuring Position	Resistance (20℃)
Signal - Ground	11 ~ 16 Ω

#### Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

# AT-350

# Automatic Transmission System

## Signal Waveform & Data

Current Data
☰

Standard Display
Full List
Graph
Items List
Reset Min.Max.
Record
Run
VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9629L

## Automatic Transmission System

AT-351

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9630L

## AT-352

## Automatic Transmission System

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9631L

## Automatic Transmission System

AT-353

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9632L



## AT-354

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9633L

## Automatic Transmission System

AT-355

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9634L

## AT-356

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9635L

## Automatic Transmission System

AT-357

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9636L

## AT-358

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9637L

Fig 1) D Range-1st gear

Fig 2) D Range-2nd gear

Fig 3) Sports mode -1st gear

Fig 4) Sports mode -2nd gear

Fig 5) Sports mode -3rd gear

Fig 6) Sports mode -4th gear

Fig 7) Sports mode -5th gear

Fig 8) Sports mode -6th gear

Fig 9) Reverse

# Automatic Transmission System

## AT-359

### Monitor Scantool Data

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

3. Monitor the "Shift control solenoid valve C(S3)" parameters on the scan tool

4. Shift gear at each position .

### Specification :

#### Solenoid Valve Operation Table

Shift Gear	S1	S2	S3	S4	SR	SL	SL2
1st	OFF	ON	ON	OFF	ON	OFF	ON
2nd	ON	ON	ON	OFF	ON	OFF	ON
3rd	ON	OFF	ON	OFF	ON	OFF	ON
4th	ON	OFF	OFF	OFF	ON	OFF	ON
5th	ON	OFF	OFF	ON	OFF	ON	OFF
6th	ON	ON	OFF	ON	OFF	ON	OFF

### Normal

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st	2nd	3rd	4th	5th	6th
S1 ON stuck	2nd	2nd	3rd	4th	5th	6th
S1 OFF stuck	1st	1st	3rd	4th	5th	Neutral
S2 ON stuck	1st	2nd	2nd	4th	6th	6th
S2 OFF stuck	3rd	3rd	3rd	4th	5th	5th
S3 ON stuck	1st	2nd	3rd	4th	Neutral	Neutral
S3 OFF stuck	3rd	4th	4th	4th	5th	6th
S4 OFF stuck	1st	2nd	3rd	4th	4th	4th
1-2 shift valve stuck (1 gear side)	1st	1st	3rd	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st	2nd	3rd	4th	5th	4th

# AT-360

# Automatic Transmission System

## Engine Brake

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st E/B	2nd E/B	3rd E/B	4th	5th	6th
S1 ON stuck	2nd	2nd E/B	3rd E/B	4th	5th	6th
S1 OFF stuck	1st E/B	2nd E/B	3rd E/B	4th	5th	Neutral
S2 ON stuck	1st E/B	2nd E/B	2nd	4th	6th	6th
S2 OFF stuck	3rd E/B	3rd E/B	3rd E/B	4th	5th	5th
S3 ON stuck	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
S3 OFF stuck	1st	6th	4th	4th	5th	6th
S4 ON stuck	2nd E/B	2nd E/B	3rd E/B	4th	5th	6th
S4 OFF stuck	1st E/B	2nd	3rd E/B	4th	4th	4th
1-2 shift valve stuck (1gear side)	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st E/B	2nd	3rd E/B	4th	5th	4th

**Current Data**

Standard Display | Full List | Graph | Items List | Reset Min.Max. | Record | Run | VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9629L

## Automatic Transmission System

AT-361

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9630L



## AT-362

## Automatic Transmission System

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9631L

## Automatic Transmission System

AT-363

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9632L

## AT-364

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9633L

## Automatic Transmission System

AT-365

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9634L

## AT-366

## Automatic Transmission System

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9635L

## Automatic Transmission System

AT-367

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9636L

## AT-368

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9637L

- Fig 1) D Range-1st gear
- Fig 2) D Range-2nd gear
- Fig 3) Sports mode -1st gear
- Fig 4) Sports mode -2nd gear
- Fig 5) Sports mode -3rd gear
- Fig 6) Sports mode -4th gear
- Fig 7) Sports mode -5th gear
- Fig 8) Sports mode -6th gear
- Fig 9) Reverse

5. Does "Shift control solenoid valve C(S3)" 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 Vehicle Repair" procedure

**NO** ► Go to "W/Harness Inspection " procedure

# Automatic Transmission System

## AT-369

### Terminal and 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. Engine "OFF" IG KEY "OFF".
2. Disconnect solenoid valve connector.
3. Engine "OFF" IG KEY "ON"
4. Measure voltage between "Shift control solenoid valve C(S3)" terminal and chassis ground.

**Specification** : Approx. 2V

5. 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 Vehicle Repair" procedure.

### Component Inspection

1. Engine "OFF" IG KEY "OFF".
2. Disconnect the TCM connector.
3. Measure resistance both terminal of "Shift control solenoid valve C(S3)".

**Specification** : Approx. 11~16 Ω (20°C)

4. Is resistance within specifications?

**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** ▶ Replace "Shift control solenoid valve C(S3)" as necessary and Go to "Verification Vehicle Repair" procedure.

### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C ( 122 °F) and 120°C ( 248 °F). If the ATF temperature is outside this range, work to bring the range.

#### ⚠CAUTION

**Don't raise the oil temperature by stalling the engine.**

(Reference)

If the oil temperature is not between 50°C ( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

#### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

#### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

#### STEP 4) Check learning results

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



## AT-370

# Automatic Transmission System

How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### 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 scan tool, 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 Transmission System

# AT-371

## P0980 Shift Control Solenoid Valve "C" Circuit High(S3)

### Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### General Description

Refer to DTC P0979 : Shift Control Solenoid Valve "C" Circuit Low(S3).

### DTC Description

TCM set this code If detected "ON(12V)" signal When TCM output "OFF(0V)" signal to "Shift control solenoid valve C(S3)"

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Open/short</li> </ul>	<ul style="list-style-type: none"> <li>Wiring harness(S3) short to Battery or OPen</li> <li>Shift control solenoid valve C(S3)</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> <li>S3 drive output "OFF" signal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>To detected "ON" signal (12V) of the S3 monitor, When S3 drive output "OFF" signal (0V)</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 0.5 second.</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>Fixed at 4th gear.</li> </ul>	

### Specification

Measuring Position	Resistance (20℃)
Signal - Ground	11 ~ 16 Ω

### Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### Signal Waveform & Data

Refer to DTC P0979 : Shift Control Solenoid Valve "C" Circuit Low(S3).

### Monitor Scantool Data

Refer to DTC P0979 : Shift Control Solenoid Valve "C" Circuit Low(S3).

### Terminal and Connector Inspection

Refer to DTC P0979 : Shift Control Solenoid Valve "C" Circuit Low(S3).

### Signal Circuit Inspection

- Engine "OFF" IG KEY "OFF".
- Disconnect solenoid valve connector.
- Engine "OFF" IG KEY "ON"
- Measure voltage between "Shift control solenoid valve C(S3)" terminal and chassis ground.

**Specification** : Approx. 2V

- 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 Vehicle Repair" procedure.

### Component Inspection

Refer to DTC P0979 : Shift Control Solenoid Valve "C" Circuit Low(S3).

### Verification of Vehicle Repair

Refer to DTC P0979 : Shift Control Solenoid Valve "C" Circuit Low(S3).

**AT-372****Automatic Transmission System****P0982 Shift Control Solenoid Valve "D" Circuit Low(S4)****Component Location**

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

**General Description**

4 shift solenoid valves are installed directly in valve-body. The solenoids operates of ON and OFF by the control signal from TCU.

Combinations of 4 solenoids, S1, S2, S3 and S4, changes gear ranges(1st to 6th)

**DTC Description**

TCM set this code If detected "OFF(0V)" signal When TCM output "ON(12V)" signal to "Shift control solenoid valve D(S4)"

**DTC Detecting Condition**

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Ground short</li> </ul>	<ul style="list-style-type: none"> <li>Wiring harness(S4) short to ground</li> <li>Shift control solenoid valve D(S4)</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> <li>S4 drive output "ON" signal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>To detected "OFF" signal (0V) of the S4 monitor, When S4 drive output "ON" signal (12V)</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 0.5 second.</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>Fixed at 4th gear.</li> </ul>	

**Specification**

Measuring Position	Resistance (20℃)
Signal - Ground	11 ~ 16 Ω

**Diagnostic Circuit Diagram**

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

# Automatic Transmission System

# AT-373

## Signal Waveform & Data

Current Data
☰

Standard Display
Full List
Graph
Items List
Reset Min.Max.
Record
Run
VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9561L

## AT-374

## Automatic Transmission System

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9562L

## Automatic Transmission System

AT-375

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9563L

## AT-376

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9564L

## Automatic Transmission System

AT-377

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9565L



## AT-378

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9566L

## Automatic Transmission System

AT-379

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9567L

## AT-380

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9568L

## Automatic Transmission System

AT-381

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9569L

Fig 1) D Range-1st gear

Fig 2) D Range-2nd gear

Fig 3) Sports mode -1st gear

Fig 4) Sports mode -2nd gear

Fig 5) Sports mode -3rd gear

Fig 6) Sports mode -4th gear

Fig 7) Sports mode -5th gear

Fig 8) Sports mode -6th gear

Fig 9) Reverse

**AT-382****Automatic Transmission System****Monitor Scantool Data**

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

3. Monitor the "Shift control solenoid valve D(S4)" parameters on the scan tool
4. Shift gear at each position .

**Specification :****Solenoid Valve Operation Table**

Shift Gear	S1	S2	S3	S4	SR	SL	SL2
1st	OFF	ON	ON	OFF	ON	OFF	ON
2nd	ON	ON	ON	OFF	ON	OFF	ON
3rd	ON	OFF	ON	OFF	ON	OFF	ON
4th	ON	OFF	OFF	OFF	ON	OFF	ON
5th	ON	OFF	OFF	ON	OFF	ON	OFF
6th	ON	ON	OFF	ON	OFF	ON	OFF

**Normal**

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st	2nd	3rd	4th	5th	6th
S1 ON stuck	2nd	2nd	3rd	4th	5th	6th
S1 OFF stuck	1st	1st	3rd	4th	5th	Neutral
S2 ON stuck	1st	2nd	2nd	4th	6th	6th
S2 OFF stuck	3rd	3rd	3rd	4th	5th	5th
S3 ON stuck	1st	2nd	3rd	4th	Neutral	Neutral
S3 OFF stuck	3rd	4th	4th	4th	5th	6th
S4 OFF stuck	1st	2nd	3rd	4th	4th	4th
1-2 shift valve stuck (1 gear side)	1st	1st	3rd	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st	2nd	3rd	4th	5th	4th

# Automatic Transmission System

# AT-383

## Engine Brake

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st E/B	2nd E/B	3rd E/B	4th	5th	6th
S1 ON stuck	2nd	2nd E/B	3rd E/B	4th	5th	6th
S1 OFF stuck	1st E/B	2nd E/B	3rd E/B	4th	5th	Neutral
S2 ON stuck	1st E/B	2nd E/B	2nd	4th	6th	6th
S2 OFF stuck	3rd E/B	3rd E/B	3rd E/B	4th	5th	5th
S3 ON stuck	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
S3 OFF stuck	1st	6th	4th	4th	5th	6th
S4 ON stuck	2nd E/B	2nd E/B	3rd E/B	4th	5th	6th
S4 OFF stuck	1st E/B	2nd	3rd E/B	4th	4th	4th
1-2 shift valve stuck (1gear side)	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st E/B	2nd	3rd E/B	4th	5th	4th

Current Data

Standard Display ▾
Full List ▾
Graph ▾
Items List ▾
Reset Min.Max.
Record
Run ▾
VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	1000	mA

Fig.1

SBHAT9561L

## AT-384

## Automatic Transmission System

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9562L

## Automatic Transmission System

AT-385

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9563L



## AT-386

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9564L

## Automatic Transmission System

AT-387

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9565L

## AT-388

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9566L

## Automatic Transmission System

AT-389

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9567L

## AT-390

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9568L

## Automatic Transmission System

## AT-391

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9569L

- Fig 1) D Range-1st gear  
 Fig 2) D Range-2nd gear  
 Fig 3) Sports mode -1st gear  
 Fig 4) Sports mode -2nd gear  
 Fig 5) Sports mode -3rd gear  
 Fig 6) Sports mode -4th gear  
 Fig 7) Sports mode -5th gear  
 Fig 8) Sports mode -6th gear  
 Fig 9) Reverse

5. Does "Shift control solenoid valve D(S4)" 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 Vehicle Repair" procedure

**NO** ► If same error pattern with S4, Go to "Component Inspection" procedure.

## AT-392

# Automatic Transmission System

### Terminal and 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. Engine "OFF" IG KEY "OFF".
2. Disconnect solenoid valve connector.
3. Engine "OFF" IG KEY "ON"
4. Measure voltage between "Shift control solenoid valve D(S4)" terminal and chassis ground.

**Specification** : Approx. 2V

5. 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 Vehicle Repair" procedure.

### Component Inspection

1. Engine "OFF" IG KEY "OFF".
2. Disconnect the TCM connector.
3. Measure resistance both terminal of "Shift control solenoid valve D(S4)".

**Specification** : Approx. 11~16 Ω (20°C)

4. Is resistance within specifications?

**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** ▶ Replace "Shift control solenoid valve D(S4)" as necessary and Go to "Verification Vehicle Repair" procedure.

### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C ( 122 °F) and 120°C ( 248 °F). If the ATF temperature is outside this range, work to bring the range.

#### ⚠CAUTION

**Don't raise the oil temperature by stalling the engine.**

(Reference)

If the oil temperature is not between 50°C ( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

#### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

#### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

#### STEP 4) Check learning results

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

# Automatic Transmission System

## AT-393

How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### 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 scan tool, 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-394

## Automatic Transmission System

## P0983 Shift Control Solenoid Valve "D" Circuit High(S4)

**Component Location**

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

**General Description**

Refer to DTC P0982 : Shift Control Solenoid Valve "D" Circuit Low(S4).

**DTC Description**

TCM set this code If detected "ON(12V)" signal When TCM output "OFF(0V)" signal to "Shift control solenoid valve D(S4)"

**DTC Detecting Condition**

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Open/short</li> </ul>	<ul style="list-style-type: none"> <li>Wiring harness(S4) short to Battery or OPen</li> <li>Shift control solenoid valve D(S4)</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> <li>S4 drive output "OFF" signal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>To detected "ON" signal (12V) of the S4 monitor, When S4 drive output "OFF" signal (0V)</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 0.5 second.</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>Fixed at 4th gear.</li> </ul>	

**Specification**

Measuring Position	Resistance (20℃)
Signal - Ground	11 ~ 16 Ω

**Diagnostic Circuit Diagram**

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

**Signal Waveform & Data**

Refer to DTC P0982 : Shift Control Solenoid Valve "D" Circuit Low(S4).

**Monitor Scantool Data**

Refer to DTC P0982 : Shift Control Solenoid Valve "D" Circuit Low(S4).

**Terminal and Connector Inspection**

Refer to DTC P0982 : Shift Control Solenoid Valve "D" Circuit Low(S4).

**Signal Circuit Inspection**

- Engine "OFF" IG KEY "OFF".
- Disconnect solenoid valve connector.
- Engine "OFF" IG KEY "ON"
- Measure voltage between "Shift control solenoid valve D(S4)" terminal and chassis ground.

**Specification** : Approx. 2V

- 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 Vehicle Repair" procedure.

**Component Inspection**

Refer to DTC P0982 : Shift Control Solenoid Valve "D" Circuit Low(S4).

**Verification of Vehicle Repair**

Refer to DTC P0982 : Shift Control Solenoid Valve "D" Circuit Low(S4).

# Automatic Transmission System

## AT-395

### P0985 Shift Control Solenoid Valve "E" Circuit Low(SR)

#### Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

#### General Description

Shift solenoid valve(SR) is installed directly in Valve-body. The solenoid operates of ON and OFF by the control signal from TCU. Changes C4 clutch and B1 brake.

#### DTC Description

TCM set this code If detected "OFF(0V)" signal When TCM output "ON(12V)" signal to "Shift control solenoid valve D(SR)"

#### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Ground short</li> </ul>	<ul style="list-style-type: none"> <li>Wiring harness(SR) short to ground</li> <li>Shift control solenoid valve E(S-R)</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> <li>S3 drive output "ON" signal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>To detected "OFF" signal (0V) of the SR monitor, When SR drive output "ON" signal (12V)</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 0.5 second.</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>Fixed at 4th gear.</li> </ul>	

#### Specification

Measuring Position	Resistance (20℃)
Signal - Ground	11 ~ 16 Ω

#### Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

# AT-396

# Automatic Transmission System

## Signal Waveform & Data

Current Data
☰

Standard Display
Full List
Graph
Items List
Reset Min.Max.
Record
Run
VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9617L

## Automatic Transmission System

AT-397

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9618L

## AT-398

## Automatic Transmission System

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9619L

## Automatic Transmission System

AT-399

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9620L

## AT-400

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9621L

## Automatic Transmission System

AT-401

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9622L



## AT-402

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9623L

## Automatic Transmission System

AT-403

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9624L

## AT-404

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9625L

- Fig 1) D Range-1st gear
- Fig 2) D Range-2nd gear
- Fig 3) Sports mode -1st gear
- Fig 4) Sports mode -2nd gear
- Fig 5) Sports mode -3rd gear
- Fig 6) Sports mode -4th gear
- Fig 7) Sports mode -5th gear
- Fig 8) Sports mode -6th gear
- Fig 9) Reverse

# Automatic Transmission System

## AT-405

### Monitor Scantool Data

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

3. Monitor the "Shift control solenoid valve 5(SR)" parameters on the scan tool

4. Shift gear at each position .

### Specification :

#### Solenoid Valve Operation Table

Shift Gear	S1	S2	S3	S4	SR	SL	SL2
1st	OFF	ON	ON	OFF	ON	OFF	ON
2nd	ON	ON	ON	OFF	ON	OFF	ON
3rd	ON	OFF	ON	OFF	ON	OFF	ON
4th	ON	OFF	OFF	OFF	ON	OFF	ON
5th	ON	OFF	OFF	ON	OFF	ON	OFF
6th	ON	ON	OFF	ON	OFF	ON	OFF

### Normal

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st	2nd	3rd	4th	5th	6th
S1 ON stuck	2nd	2nd	3rd	4th	5th	6th
S1 OFF stuck	1st	1st	3rd	4th	5th	Neutral
S2 ON stuck	1st	2nd	2nd	4th	6th	6th
S2 OFF stuck	3rd	3rd	3rd	4th	5th	5th
S3 ON stuck	1st	2nd	3rd	4th	Neutral	Neutral
S3 OFF stuck	3rd	4th	4th	4th	5th	6th
S4 OFF stuck	1st	2nd	3rd	4th	4th	4th
1-2 shift valve stuck (1 gear side)	1st	1st	3rd	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st	2nd	3rd	4th	5th	4th

# AT-406

# Automatic Transmission System

## Engine Brake

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st E/B	2nd E/B	3rd E/B	4th	5th	6th
S1 ON stuck	2nd	2nd E/B	3rd E/B	4th	5th	6th
S1 OFF stuck	1st E/B	2nd E/B	3rd E/B	4th	5th	Neutral
S2 ON stuck	1st E/B	2nd E/B	2nd	4th	6th	6th
S2 OFF stuck	3rd E/B	3rd E/B	3rd E/B	4th	5th	5th
S3 ON stuck	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
S3 OFF stuck	1st	6th	4th	4th	5th	6th
S4 ON stuck	2nd E/B	2nd E/B	3rd E/B	4th	5th	6th
S4 OFF stuck	1st E/B	2nd	3rd E/B	4th	4th	4th
1-2 shift valve stuck (1gear side)	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st E/B	2nd	3rd E/B	4th	5th	4th

Current Data
☰

Standard Display ▾
Full List ▾
Graph ▾
Items List ▾
Reset Min.Max.
Record
Run ▾
VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9617L

## Automatic Transmission System

AT-407

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9618L

## AT-408

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9619L

## Automatic Transmission System

AT-409

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9620L



## AT-410

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9621L

## Automatic Transmission System

AT-411

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9622L

## AT-412

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9623L

## Automatic Transmission System

AT-413

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9624L

## AT-414

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9625L

- Fig 1) D Range-1st gear
- Fig 2) D Range-2nd gear
- Fig 3) Sports mode -1st gear
- Fig 4) Sports mode -2nd gear
- Fig 5) Sports mode -3rd gear
- Fig 6) Sports mode -4th gear
- Fig 7) Sports mode -5th gear
- Fig 8) Sports mode -6th gear
- Fig 9) Reverse

5. Does "Shift control solenoid valve 5(SR)" 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 Vehicle Repair" procedure

**NO** ► If same error pattern with S4, Go to "Component Inspection" procedure.

# Automatic Transmission System

## AT-415

### Terminal and 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. Engine "OFF" IG KEY "OFF".
2. Disconnect solenoid valve connector.
3. Engine "OFF" IG KEY "ON"
4. Measure voltage between "Shift control solenoid valve E(SR)" terminal and chassis ground.

**Specification** : Approx. 2V

5. 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 Vehicle Repair" procedure.

### Component Inspection

1. Engine "OFF" IG KEY "OFF".
2. Disconnect the TCM connector.
3. Measure resistance both terminal of "Shift control solenoid valve E(SR)".

**Specification** : Approx. 11~16  $\Omega$  (20°C)

4. Is resistance within specifications?

**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** ▶ Replace "Shift control solenoid valve E(SR)" as necessary and Go to "Verification Vehicle Repair" procedure.

### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C ( 122 °F) and 120°C ( 248 °F). If the ATF temperature is outside this range, work to bring the range.

#### ⚠CAUTION

**Don't raise the oil temperature by stalling the engine.**

(Reference)

If the oil temperature is not between 50°C ( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

#### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

#### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

#### STEP 4) Check learning results

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

## AT-416

## Automatic Transmission System

How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### 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 scan tool, 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 Transmission System

# AT-417

## P0986 Shift Control Solenoid Valve "E" Circuit High(SR)

### Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### General Description

Refer to DTC P0985 : Shift Control Solenoid Valve "E" Circuit Low(SR).

### DTC Description

TCM set this code If detected "ON(12V)" signal When TCM output "OFF(0V)" signal to "Shift control solenoid valve E(SR)"

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Open/short</li> </ul>	<ul style="list-style-type: none"> <li>Wiring harness(SR) short to Battery or OPen</li> <li>Shift control solenoid valve E(SR)</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> <li>SR drive output "OFF" signal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>To detected "ON" signal (12V) of the SR monitor, When SR drive output "OFF" signal (0V)</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 0.5 second.</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>Fixed at 4th gear.</li> </ul>	

### Specification

Measuring Position	Resistance (20℃)
Signal - Ground	11 ~ 16 Ω

### Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### Signal Waveform & Data

Refer to DTC P0985 : Shift Control Solenoid Valve "E" Circuit Low(SR).

### Monitor Scantool Data

Refer to DTC P0985 : Shift Control Solenoid Valve "E" Circuit Low(SR).

### Terminal and Connector Inspection

Refer to DTC P0985 : Shift Control Solenoid Valve "E" Circuit Low(SR).

### Signal Circuit Inspection

- Engine "OFF" IG KEY "OFF".
- Disconnect solenoid valve connector.
- Engine "OFF" IG KEY "ON"
- Measure voltage between "Shift control solenoid valve E(SR)" terminal and chassis ground.

**Specification** : Approx. 2V

- 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 Vehicle Repair" procedure.

### Component Inspection

Refer to DTC P0985 : Shift Control Solenoid Valve "E" Circuit Low(SR).

### Verification of Vehicle Repair

Refer to DTC P0985 : Shift Control Solenoid Valve "E" Circuit Low(SR).



# AT-418

# Automatic Transmission System

## P2762 Torque Converter Clutch Control Solenoid Valve Feedback Current Stuck(SLU)

### Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### General Description

The PCM/TCM controls the locking and unlocking of the Torque Converter Clutch ( or Torque Converter Clutch ), to the input shaft of the transmission, by applying hydraulic pressure. The main purpose of T/C clutch control is to save fuel by decreasing the hydraulic load inside the T/C. The PCM/TCM outputs current to control the Torque Converter Clutch Control Solenoid Valve( TCCSV ) and hydraulic pressure is applied to the TCC according to the TCC current value. When the amount of current is high, high pressure is applied and the Torque Converter Clutch is locked. The normal operating range of the Torque Converter Clutch Control current value is from 200mA(unlocked) to 1000mA(locked).

### DTC Description

TCM control slip amount(Engine rpm - Turbine rpm) of Torque converter clutch and rise up duty ratio of SLU solenoid in order to engage for Torque converter clutch. TCM set this code If feedback current and measured current are not match.

(Warning lamp : continuously 2 driving cycle)

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Stuck</li> </ul>	<ul style="list-style-type: none"> <li>Wiring harness(SLU) short to or OPen</li> <li>Shift control solenoi valve SLU</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Rear current value abnormal compare with target value.</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 2 times</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>No self learning control.</li> <li>No Lock-up/Lock-up slip control.</li> <li>No starting control When cold condition.</li> <li>Inhibited 2nd gear starting with Sports mode.</li> </ul>	

### Specification

Measuring Position	Resistance (20℃)
Signal - Ground	5.0 ~ 5.6 Ω

### Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

# Automatic Transmission System

# AT-419

## Signal Waveform & Data

Current Data
☰

Standard Display
Full List
Graph
Items List
Reset Min.Max.
Record
Run
VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9638L

## AT-420

## Automatic Transmission System

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9639L

## Automatic Transmission System

AT-421

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9640L

## AT-422

## Automatic Transmission System

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9641L

## Automatic Transmission System

AT-423

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9642L

## AT-424

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9643L

## Automatic Transmission System

## AT-425

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9644L



## AT-426

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9645L

## Automatic Transmission System

AT-427

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9646L

Fig 1) D Range-1st gear

Fig 2) D Range-2nd gear

Fig 3) Sports mode -1st gear

Fig 4) Sports mode -2nd gear

Fig 5) Sports mode -3rd gear

Fig 6) Sports mode -4th gear

Fig 7) Sports mode -5th gear

Fig 8) Sports mode -6th gear

Fig 9) Reverse

**AT-428****Automatic Transmission System****Monitor Scantool Data**

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

3. Select "D RANGE" and drive vehicle.

4. Monitor the "TORQUE CONVERTER(DAMPER) CLUTCH" parameter on the scan tool.

**Specification :****Solenoid Valve Operation Table**

Shift Gear	S1	S2	S3	S4	SR	SL	SL2
1st	OFF	ON	ON	OFF	ON	OFF	ON
2nd	ON	ON	ON	OFF	ON	OFF	ON
3rd	ON	OFF	ON	OFF	ON	OFF	ON
4th	ON	OFF	OFF	OFF	ON	OFF	ON
5th	ON	OFF	OFF	ON	OFF	ON	OFF
6th	ON	ON	OFF	ON	OFF	ON	OFF

**Normal**

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st	2nd	3rd	4th	5th	6th
S1 ON stuck	2nd	2nd	3rd	4th	5th	6th
S1 OFF stuck	1st	1st	3rd	4th	5th	Neutral
S2 ON stuck	1st	2nd	2nd	4th	6th	6th
S2 OFF stuck	3rd	3rd	3rd	4th	5th	5th
S3 ON stuck	1st	2nd	3rd	4th	Neutral	Neutral
S3 OFF stuck	3rd	4th	4th	4th	5th	6th
S4 OFF stuck	1st	2nd	3rd	4th	4th	4th
1-2 shift valve stuck (1 gear side)	1st	1st	3rd	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st	2nd	3rd	4th	5th	4th

## Automatic Transmission System

AT-429

## Engine Brake

TCM output gear ratio	1st	2nd	3rd	4th	5th	6th
S1,S2,S3,S4 normal	1st E/B	2nd E/B	3rd E/B	4th	5th	6th
S1 ON stuck	2nd	2nd E/B	3rd E/B	4th	5th	6th
S1 OFF stuck	1st E/B	2nd E/B	3rd E/B	4th	5th	Neutral
S2 ON stuck	1st E/B	2nd E/B	2nd	4th	6th	6th
S2 OFF stuck	3rd E/B	3rd E/B	3rd E/B	4th	5th	5th
S3 ON stuck	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
S3 OFF stuck	1st	6th	4th	4th	5th	6th
S4 ON stuck	2nd E/B	2nd E/B	3rd E/B	4th	5th	6th
S4 OFF stuck	1st E/B	2nd	3rd E/B	4th	4th	4th
1-2 shift valve stuck (1gear side)	1st E/B	2nd E/B	3rd E/B	3rd	Neutral	Neutral
"R" sequence valve stuck (B2 drain side)	1st E/B	2nd	3rd E/B	4th	5th	4th

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.1

SBHAT9638L

## AT-430

## Automatic Transmission System

Current Data

Standard Display ▾ Full List ▾ Graph ▾ Items List ▾ Reset Min.Max. Record Run ▾ VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9639L

## Automatic Transmission System

AT-431

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	1	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	1000	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	200	mA

Fig.3 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9640L

## AT-432

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	2	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	640	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	640	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	190	mA

Fig.4 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9641L

## Automatic Transmission System

AT-433

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	670	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	660	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	190	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	990	mA

Fig.5 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9642L



## AT-434

## Automatic Transmission System

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 [SR]	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5[SR] Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL 2)	1000	mA

Fig.6 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9643L

## Automatic Transmission System

AT-435

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	5	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	600	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	600	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	510	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	500	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	770	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	780	mA

Fig.7 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9644L

## AT-436

## Automatic Transmission System

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	6	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	OFF	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	1000	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	990	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	810	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SI 2)	810	mA

Fig.8 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9645L

## Automatic Transmission System

## AT-437

Current Data		
Standard Display	Full List	Graph
Items List	Reset Min.Max.	Record
Run	VSS	
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Gear Shift Position	R/N/D	-
<input type="checkbox"/> Shift Control Solenoid Valve 1	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 4	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 5 (SR)	ON	-
<input type="checkbox"/> Shift Lock Solenoid Commanded Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 1 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 2 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 3 Feedback Signal	ON	-
<input type="checkbox"/> Shift Control Solenoid Valve 4 Feedback Signal	OFF	-
<input type="checkbox"/> Shift Control Solenoid Valve 5(SR) Feedback Signal	ON	-
<input type="checkbox"/> Shift Lock Solenoid Feedback Signal	ON	-
<input type="checkbox"/> Line Pressure Control Solenoid Current(SLT)	910	mA
<input type="checkbox"/> Line Pressure Control Solenoid Feedback Current(SLT)	910	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Current(SLU)	200	mA
<input type="checkbox"/> Torque Converter Clutch Solenoid Feedback Current(SLU)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SLC1)	200	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Current(SL2)	1000	mA
<input type="checkbox"/> Clutch Pressure Control Solenoid Feedback Current(SL2)	1000	mA

Fig.9 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9646L

- Fig 1) D Range-1st gear
- Fig 2) D Range-2nd gear
- Fig 3) Sports mode -1st gear
- Fig 4) Sports mode -2nd gear
- Fig 5) Sports mode -3rd gear
- Fig 6) Sports mode -4th gear
- Fig 7) Sports mode -5th gear
- Fig 8) Sports mode -6th gear
- Fig 9) Reverse

5. Does "Current of TCC SOLENOID(SLU) " 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 Vehicle Repair" procedure

**NO** ► Go to "W/Harness Inspection" procedure

## AT-438

# Automatic Transmission System

### Terminal and 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 "Control Circuit Inspection" procedure.

### Control Circuit Inspection

1. Engine "OFF" IG KEY "OFF".
2. Disconnect solenoid valve connector.
3. Engine "OFF" IG KEY "ON"
4. Measure voltage between "Torque convertor clutch control solenoid valve (SLU)" terminal and chassis ground.

**Specification** : Approx. 2V

5. 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 Vehicle Repair" procedure.

### Ground Circuit Inspection

1. IG KEY "OFF" .
2. Disconnect TCM connector.
3. IG KEY "ON" & Engine "OFF"
4. Measure the voltage between signal wiring of "Torque convertor clutch control solenoid valve (SLU)" and chassis ground..(Test 1)
5. Measure the voltage between signal wiring of "Torque convertor clutch control solenoid valve (SLU)" and ground circuit..(Test 2)

**Specification** : Teat1 - Test2 = below 200mV

6. 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 Vehicle Repair" procedure.

### Component Inspection

1. Engine "OFF" IG KEY "OFF".
2. Disconnect the TCU.
3. Measure resistance both terminal of "Torque convertor clutch control solenoid valve (SLU)".

**Specification** : Approx. 5.0~5.6  $\Omega$  (20°C)

4. Is resistance within specifications?

**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** ▶ Replace "Torque convertor clutch control solenoid valve (SLU)" as necessary and Go to "Verification Vehicle Repair" procedure.

### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C ( 122 °F) and 120°C ( 248 °F). If the ATF temperature is outside this range, work to bring the range.

#### **CAUTION**

**Don't raise the oil temperature by stalling the engine.**

# Automatic Transmission System

## AT-439

(Reference)

If the oil temperature is not between 50°C ( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

### STEP 4) Check learning results

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

### اولین سامانه دیجیتال تعییرکارت برای پارک

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### 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 scan tool, 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-440

## Automatic Transmission System

## P2763 Torque Converter Clutch Control Solenoid Valve Circuit High (SLU)

**Component Location**

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

**General Description**

Refer to DTC P2762 : Torque Converter Clutch Control Solenoid Valve Feedback Current Stuck(SLU).

**DTC Description**

TCM set this code If measured feedback current over 1.358mA .

**DTC Detecting Condition**

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Open/short</li> </ul>	<ul style="list-style-type: none"> <li>Wiring harness(SLU) short to Battery</li> <li>Shift control solenoid valve SLU</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Feedback current &gt; 1.358mA</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 0.5 second.</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>No self learning control.</li> <li>No Lock-up/Lock-up slip control.</li> <li>Inhibited 2nd gear starting with Sports mode.</li> </ul>	

**Specification**

Measuring Position	Resistance (20℃)
Signal - Ground	5.0 ~ 5.6 Ω

**Diagnostic Circuit Diagram**

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

**Signal Waveform & Data**

Refer to DTC P2762 : Torque Converter Clutch Control Solenoid Valve Feedback Current Stuck(SLU).

**Monitor Scantool Data**

Refer to DTC P2762 : Torque Converter Clutch Control Solenoid Valve Feedback Current Stuck(SLU).

**Terminal and Connector Inspection**

Refer to DTC P2762 : Torque Converter Clutch Control Solenoid Valve Feedback Current Stuck(SLU).

**Control Circuit Inspection**

Refer to DTC P2762 : Torque Converter Clutch Control Solenoid Valve Feedback Current Stuck(SLU).

**Ground Circuit Inspection**

- IG KEY "OFF" .
- Disconnect TCM connector.
- IG KEY "ON" & Engine "OFF"

4. Measure the voltage between signal wiring of "Torque convertor clutch control solenoid valve (SLU)" and chassis ground..(Test 1)

5. Measure the voltage between signal wiring of "Torque convertor clutch control solenoid valve (SLU)" and ground circuit..(Test 2)

**Specification :** Test1 - Test2 = below 200mV

6. 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 Vehicle Repair" procedure.

**Component Inspection**

Refer to DTC P2762 : Torque Converter Clutch Control Solenoid Valve Feedback Current Stuck(SLU).

**Verification of Vehicle Repair**

Refer to DTC P2762 : Torque Converter Clutch Control Solenoid Valve Feedback Current Stuck(SLU).

# Automatic Transmission System

# AT-441

## P2764 Torque Converter Clutch Control Solenoid Valve Circuit Low (SLU)

### Component Location

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### General Description

Refer to DTC P2762 : Torque Converter Clutch Control Solenoid Valve Feedback Current Stuck(SLU).

### DTC Description

TCM set this code If measured feedback current below 0.92mA .

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Open/short</li> </ul>	<ul style="list-style-type: none"> <li>Wiring harness(SLU) short or open</li> <li>Shift control solenoid valve SLU</li> <li>TCM</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>10.2V &lt; Battery voltage &lt; 14V</li> <li>Not error in system</li> <li>CAN communication : normal</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Feedback current &lt; 0.92mA</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 0.5 second.</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>No self learning control.</li> <li>No Lock-up/Lock-up slip control.</li> <li>Inhibited 2nd gear starting with Sports mode.</li> </ul>	

### Specification

Measuring Position	Resistance (20°C)
Signal - Ground	5.0 ~ 5.6 Ω

### Diagnostic Circuit Diagram

Refer to DTC P0741 : Torque Converter Clutch Circuit Performance or Stuck Off.

### Signal Waveform & Data

Refer to DTC P2762 : Torque Converter Clutch Control Solenoid Valve Feedback Current Stuck(SLU).

### Monitor Scantool Data

Refer to DTC P2762 : Torque Converter Clutch Control Solenoid Valve Feedback Current Stuck(SLU).

### Terminal and Connector Inspection

Refer to DTC P2762 : Torque Converter Clutch Control Solenoid Valve Feedback Current Stuck(SLU).

### Control Circuit Inspection

Refer to DTC P2762 : Torque Converter Clutch Control Solenoid Valve Feedback Current Stuck(SLU).

### Ground Circuit Inspection

1. IG KEY "OFF" .
2. Disconnect TCM connector.
3. IG KEY "ON" & Engine "OFF"

4. Measure the voltage between signal wiring of "Torque convertor clutch control solenoid valve (SLU)" and chassis ground..(Test 1)

5. Measure the voltage between signal wiring of "Torque convertor clutch control solenoid valve (SLU)" and ground circuit..(Test 2)

**Specification :** Teat1 - Test2 = below 200mV

6. 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 Vehicle Repair" procedure.

### Component Inspection

Refer to DTC P2762 : Torque Converter Clutch Control Solenoid Valve Feedback Current Stuck(SLU).

### Verification of Vehicle Repair

Refer to DTC P2762 : Torque Converter Clutch Control Solenoid Valve Feedback Current Stuck(SLU).

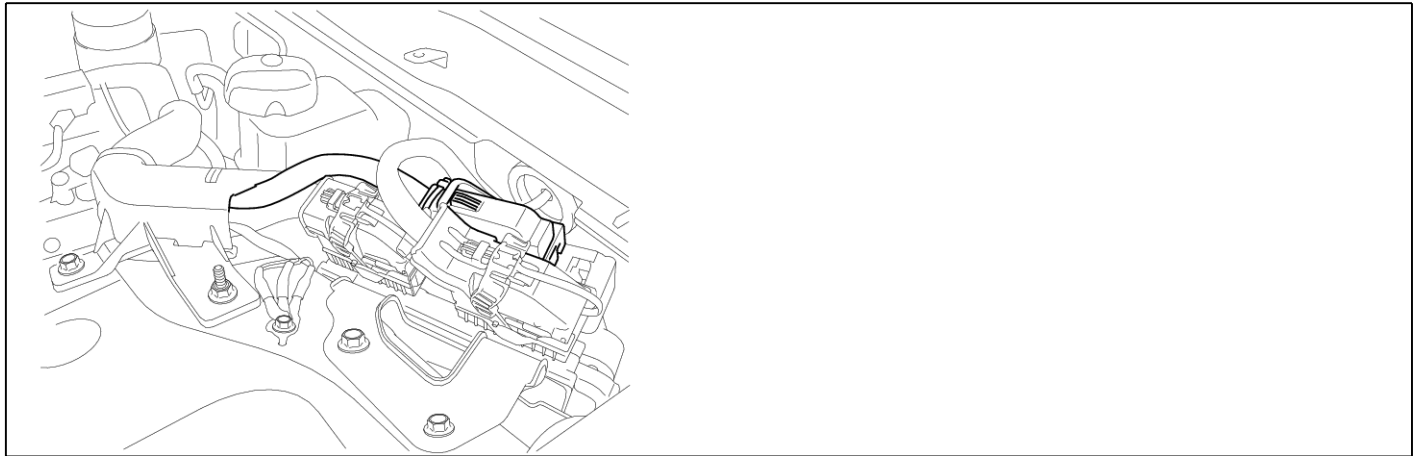


# AT-442

# Automatic Transmission System

## U0001 High Speed CAN Communication Bus off

### Component Location



SBHAT8499D

### 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 ABSECM by using CAN communication. The CAN communication is one of the vehicle communications method, which is now widely used to transfer the vehicle data.

### DTC Description

When the TCM cannot read the data from the ECU through the CAN-BUS line, the TCM sets this code.

CAN-BUS circuit malfunctioning or ECU can be a possible cause of this DTC.

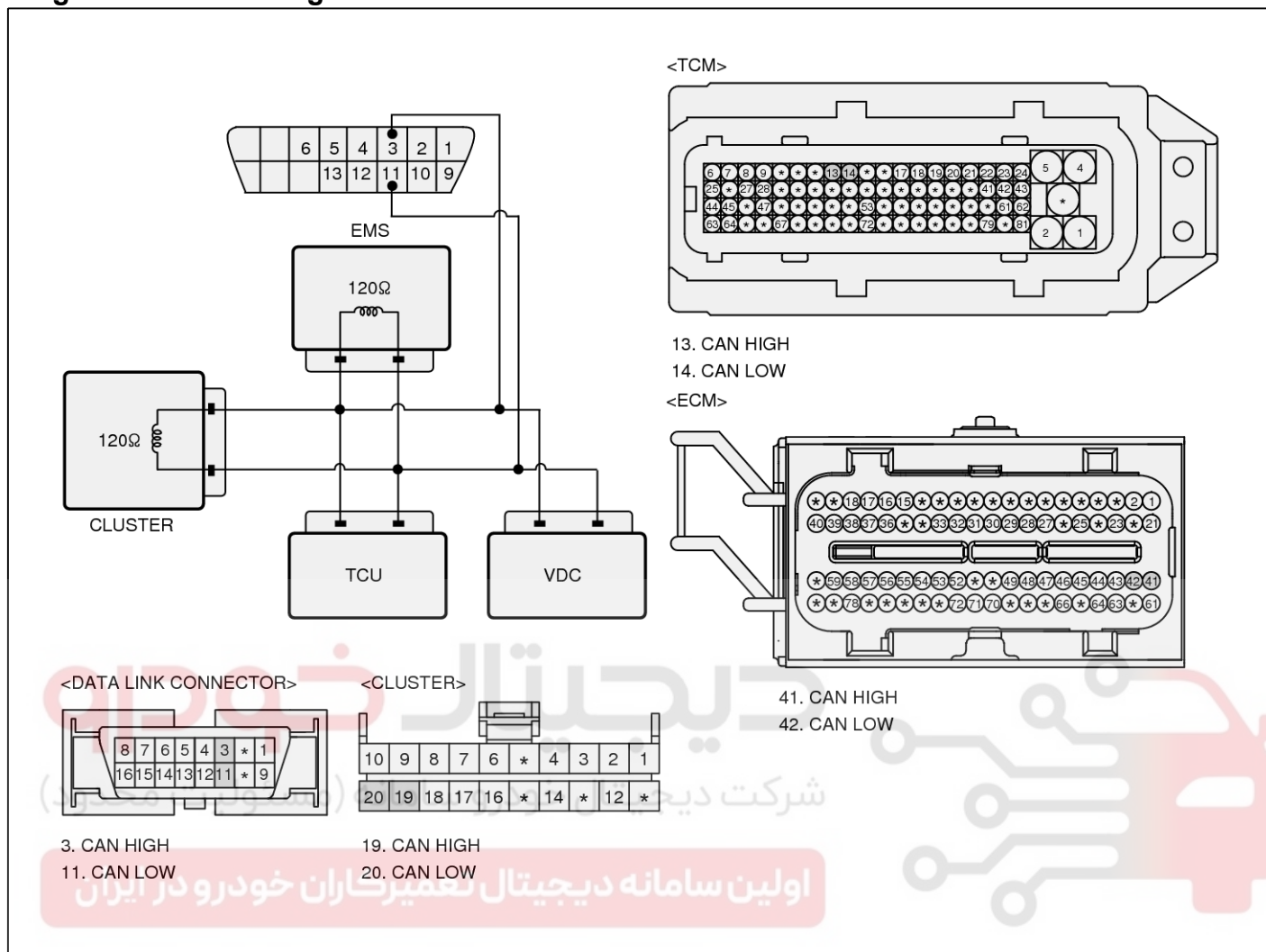
### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Check the communication</li> </ul>	<ul style="list-style-type: none"> <li>Short or Open in CAN communication circuit</li> <li>Faulty in ECU</li> <li>Faulty in cluster</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>IG ON</li> <li>10.2V &lt; Battery voltage &lt; 15.5V</li> <li>No fail in system</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Detect CAN BUS OFF signal</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 0.5sec</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>No self learning control</li> <li>Engine speed = 7000rpm</li> <li>Accel = 0%</li> <li>Engine torque = maximum torque</li> <li>Fixed at 3rd gear</li> <li>Kick-down = "OFF"</li> <li>Brake switch = "ON"</li> <li>Wheel speed sensor = Output speed sensor</li> <li>Engine coolant temperature = 80°C</li> </ul>	

# Automatic Transmission System

# AT-443

## Diagnostic Circuit Diagram



SBHAT9707L

## AT-444

## Automatic Transmission System

## Signal Waveform &amp; Data

Current Data

Standard Display  Full List  Graph  Items List  Reset Min.Max.  Record  Run  VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Engine Speed	1084	RPM
<input checked="" type="checkbox"/> Vehicle Speed	14	MPH
<input checked="" type="checkbox"/> Throttle Position	7.5	%
<input checked="" type="checkbox"/> A/C Switch	ON	-
<input checked="" type="checkbox"/> Engine Torque	20.8	%
<input type="checkbox"/> Output Speed	718	RPM
<input type="checkbox"/> Damper Clutch Slip	70	RPM
<input type="checkbox"/> Oil Temperature Sensor	180	'F
<input type="checkbox"/> Gear Ratio	1.41	-
<input type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Select Level Switch	D	-
<input type="checkbox"/> Idle Switch	OFF	-
<input type="checkbox"/> Brake Switch	OFF	-
<input type="checkbox"/> Auto Cruise Switch	OFF	-
<input type="checkbox"/> Sports Mode Select	OFF	-
<input type="checkbox"/> Sports Mode Up	OFF	-
<input type="checkbox"/> Sports Mode Down	OFF	-
<input type="checkbox"/> Lock-Up	OFF	-
<input type="checkbox"/> Next Gear Position	3	-
<input type="checkbox"/> Number of DTC	0	-
<input type="checkbox"/> A/T Relay Voltage	14.5	V

Fig.1

SBHAT9626L

## Automatic Transmission System

AT-445

Current Data

Standard Display Full List Graph Items List Reset Min.Max. Record Run VSS

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Engine Speed	3107	RPM
<input checked="" type="checkbox"/> Vehicle Speed	43	MPH
<input checked="" type="checkbox"/> Throttle Position	14.5	%
<input checked="" type="checkbox"/> A/C Switch	ON	-
<input checked="" type="checkbox"/> Engine Torque	21.2	%
<input type="checkbox"/> Output Speed	2181	RPM
<input type="checkbox"/> Damper Clutch Slip	54	RPM
<input type="checkbox"/> Oil Temperature Sensor	180	'F
<input type="checkbox"/> Gear Ratio	1.40	-
<input type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Select Level Switch	D	-
<input type="checkbox"/> Idle Switch	OFF	-
<input type="checkbox"/> Brake Switch	OFF	-
<input type="checkbox"/> Auto Cruise Switch	OFF	-
<input type="checkbox"/> Sports Mode Select	OFF	-
<input type="checkbox"/> Sports Mode Up	OFF	-
<input type="checkbox"/> Sports Mode Down	OFF	-
<input type="checkbox"/> Lock-Up	OFF	-
<input type="checkbox"/> Next Gear Position	4	-
<input type="checkbox"/> Number of DTC	0	-
<input type="checkbox"/> A/T Relay Voltage	14.0	V

Fig.2 اولین سامانه دیجیتال خودرو

SBHAT9627L

Fig 1) Input element of CAN : low speed driving

Fig 2) Input element of CAN : high speed driving

## AT-446

## Automatic Transmission System

## 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 scan tool.

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Engine Speed	1084	RPM
<input checked="" type="checkbox"/> Vehicle Speed	14	MPH
<input checked="" type="checkbox"/> Throttle Position	7.5	%
<input checked="" type="checkbox"/> A/C Switch	ON	-
<input checked="" type="checkbox"/> Engine Torque	20.8	%
<input type="checkbox"/> Output Speed	718	RPM
<input type="checkbox"/> Damper Clutch Slip	70	RPM
<input type="checkbox"/> Oil Temperature Sensor	180	'F
<input type="checkbox"/> Gear Ratio	1.41	-
<input type="checkbox"/> Gear Shift Position	3	-
<input type="checkbox"/> Select Level Switch	D	-
<input type="checkbox"/> Idle Switch	OFF	-
<input type="checkbox"/> Brake Switch	OFF	-
<input type="checkbox"/> Auto Cruise Switch	OFF	-
<input type="checkbox"/> Sports Mode Select	OFF	-
<input type="checkbox"/> Sports Mode Up	OFF	-
<input type="checkbox"/> Sports Mode Down	OFF	-
<input type="checkbox"/> Lock-Up	OFF	-
<input type="checkbox"/> Next Gear Position	3	-
<input type="checkbox"/> Number of DTC	0	-
<input type="checkbox"/> A/T Relay Voltage	14.5	V

Fig.1

SBHAT9626L

## Automatic Transmission System

## AT-447

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Engine Speed	3107	RPM
<input checked="" type="checkbox"/> Vehicle Speed	43	MPH
<input checked="" type="checkbox"/> Throttle Position	14.5	%
<input checked="" type="checkbox"/> A/C Switch	ON	-
<input checked="" type="checkbox"/> Engine Torque	21.2	%
<input type="checkbox"/> Output Speed	2181	RPM
<input type="checkbox"/> Damper Clutch Slip	54	RPM
<input type="checkbox"/> Oil Temperature Sensor	180	'F
<input type="checkbox"/> Gear Ratio	1.40	-
<input type="checkbox"/> Gear Shift Position	4	-
<input type="checkbox"/> Select Level Switch	D	-
<input type="checkbox"/> Idle Switch	OFF	-
<input type="checkbox"/> Brake Switch	OFF	-
<input type="checkbox"/> Auto Cruise Switch	OFF	-
<input type="checkbox"/> Sports Mode Select	OFF	-
<input type="checkbox"/> Sports Mode Up	OFF	-
<input type="checkbox"/> Sports Mode Down	OFF	-
<input type="checkbox"/> Lock-Up	OFF	-
<input type="checkbox"/> Next Gear Position	4	-
<input type="checkbox"/> Number of DTC	0	-
<input type="checkbox"/> A/T Relay Voltage	14.0	V

Fig.2 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

SBHAT9627L

Fig 1) Input element of CAN : low speed driving

Fig 2) Input element of CAN : high speed driving

4. Does "CAN BUS LINE DATA " 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 Vehicle Repair" procedure

**NO** ► Go to "W/Harness Inspection" procedure

### Terminal and 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.

## AT-448

# Automatic Transmission System

### Signal Circuit Inspection

#### ■ System check

1. Ignition "OFF" & Engine "OFF".
2. Measure Resistance between "CAN HIGH" terminal and "CAN LOW" terminal of "Data link connector"

**Specification :** Approx.  $60 \pm 10\Omega$

3. Is measured resistance within specifications ?

**YES** ▶ 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 Vehicle Repair" procedure

**NO** ▶ Go to "Cluster check" procedure.

#### ■ Cluster check

1. Ignition "OFF" & Engine "OFF".
2. Disconnect "ECM & TCM" connector.
3. Measure Resistance between "CAN HIGH" terminal and "CAN LOW" terminal of ECM wiring side.

**Specification :** Approx.  $120 \pm 10\Omega$

4. Is measured resistance within specifications ?

**YES** ▶ Go to "ECM check" procedure.

**NO** ▶ Check for short to ground in harness. Repair as necessary and Go to "Verification Vehicle Repair" procedure.  
▶ Substitute with a known-good Cluster and check for proper operation. If the problem is corrected, replace Cluster as necessary and then go to "Verification of Vehicle Repair" procedure

#### ■ ECM Check

1. Ignition "OFF" & Engine "OFF".
2. Disconnect "Cluster & TCM" connector.
3. Measure Resistance between "CAN HIGH" terminal and "CAN LOW" terminal of Cluster wiring side.

**Specification :** Approx.  $120 \pm 10\Omega$

4. Is measured resistance within specifications ?

**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 Vehicle Repair" procedure.

**NO** ▶ Check for short to ground in harness. Repair as necessary and Go to "Verification Vehicle Repair" procedure.

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

### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between  $50^{\circ}\text{C}$  (  $122^{\circ}\text{F}$  ) and  $120^{\circ}\text{C}$  (  $248^{\circ}\text{F}$  ). If the ATF temperature is outside this range, work to bring the range.

#### ⚠ CAUTION

**Don't raise the oil temperature by stalling the engine.**

# Automatic Transmission System

## AT-449

(Reference)

If the oil temperature is not between 50°C ( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

### STEP 4) Check learning results

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

### اولین سامانه دیجیتال تعییر کار با این خودرو

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, asseble the SST with alingning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### 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 scan tool, 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-450

# Automatic Transmission System

## U0100 Lost Communication With ECM/PCM "A"

### Component Location

Refer to DTC U0001 : High Speed CAN Communication Bus off.

### General Description

Refer to DTC U0001 : High Speed CAN Communication Bus off.

### DTC Description

Refer to DTC U0001 : High Speed CAN Communication Bus off.

### DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Check the communication</li> </ul>	<ul style="list-style-type: none"> <li>Short or Open in CAN communication circuit</li> <li>Faulty in ECU</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>IG ON</li> <li>10.2V &lt; Battery voltage &lt; 15.5V</li> <li>No fail in system</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Detecting abnormal information.</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 0.5sec</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>No self learning control</li> <li>Engine speed = 7000rpm</li> <li>Accel = 0%</li> <li>Engine torque = maximum torque</li> <li>Fixed at 3rd gear</li> <li>Kick-down = "OFF"</li> <li>Brake switch = "ON"</li> <li>Wheel speed sensor = Output speed sensor</li> <li>Engine coolant temperature = 80°C</li> </ul>	

### Diagnostic Circuit Diagram

Refer to DTC U0001 : High Speed CAN Communication Bus off.

### Signal Waveform & Data

Refer to DTC U0001 : High Speed CAN Communication Bus off.

### Monitor Scantool Data

Refer to DTC U0001 : High Speed CAN Communication Bus off.

### Terminal and Connector Inspection

Refer to DTC U0001 : High Speed CAN Communication Bus off.

### Signal Circuit Inspection

#### ■ System check

- Ignition "OFF" & Engine "OFF".
- Measure Resistance between "CAN HIGH" terminal and "CAN LOW" terminal of "Data link connector"

**Specification** : Approx. 60 ± 10Ω

- Is measured resistance within specifications ?

**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 Vehicle Repair" procedure.

**NO** ► Go to "ECM check" procedure.

# Automatic Transmission System

# AT-451

## ■ ECM Check

1. Ignition "OFF" & Engine "OFF".
2. Disconnect "Cluster & TCM" connector.
3. Measure Resistance between "CAN HIGH" terminal and "CAN LOW" terminal of Cluster wiring side.

**Specification :** Approx.  $120 \pm 10\Omega$

4. Is measured resistance within specifications ?

**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 Vehicle Repair" procedure.

**NO** ▶ Check for short to ground in harness. Repair as necessary and Go to "Verification Vehicle Repair" procedure.  
▶ Substitute with a known-good ECM and check for proper operation. If the problem is corrected, replace ECM as necessary and then go to "Verification of Vehicle Repair" procedure.

## How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between  $50^{\circ}\text{C}$  (  $122^{\circ}\text{F}$  ) and  $120^{\circ}\text{C}$  (  $248^{\circ}\text{F}$  ). If the ATF temperature is outside this range, work to bring the range.

### ⚠ CAUTION

**Don't raise the oil temperature by stalling the engine.**

(Reference)

If the oil temperature is not between  $50^{\circ}\text{C}$  (  $122^{\circ}\text{F}$  ) and  $120^{\circ}\text{C}$  (  $248^{\circ}\text{F}$  ), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

### STEP 4) Check learning results

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

## How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

## Verification of Vehicle Repair

Refer to DTC U0001 : High Speed CAN Communication Bus off.

## AT-452

## Automatic Transmission System

## U0122 Lost Communication With Vehicle Dynamics Control Module

**Component Location**

Refer to DTC U0001 : High Speed CAN Communication Bus off.

**General Description**

Refer to DTC U0001 : High Speed CAN Communication Bus off.

**DTC Description**

Refer to DTC U0001 : High Speed CAN Communication Bus off.

**DTC Detecting Condition**

Item	Detecting Condition	Possible Cause
DTC Strategy	<ul style="list-style-type: none"> <li>Check the communication</li> </ul>	<ul style="list-style-type: none"> <li>Short or Open in CAN communication circuit</li> <li>Faulty in ECU</li> </ul>
Enable Conditions	<ul style="list-style-type: none"> <li>TCM communication is normal with ESP</li> <li>10.2V &lt; Battery voltage &lt; 15.5V</li> <li>No fail in system</li> </ul>	
Threshold Value	<ul style="list-style-type: none"> <li>Detecting abnormal information.</li> </ul>	
Diagnostic Time	<ul style="list-style-type: none"> <li>More than 0.5sec</li> </ul>	
Fail Safe	<ul style="list-style-type: none"> <li>No self learning control</li> <li>Wheel speed sensor = Output speed sensor</li> </ul>	

**Diagnostic Circuit Diagram**

Refer to DTC U0001 : High Speed CAN Communication Bus off.

**Signal Waveform & Data**

Refer to DTC U0001 : High Speed CAN Communication Bus off.

**Monitor Scantool Data**

Refer to DTC U0001 : High Speed CAN Communication Bus off.

**Terminal and Connector Inspection**

Refer to DTC U0001 : High Speed CAN Communication Bus off.

**Signal Circuit Inspection****■ System check**

- Ignition "OFF" & Engine "OFF".
- Measure Resistance between "CAN HIGH" terminal and "CAN LOW" terminal of "Data link connector"

**Specification :** Approx. 60 ± 10Ω

3. Is measured resistance within specifications ?

**YES**

▶ 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 Vehicle Repair" procedure

**NO**

▶ Go to "Cluster check" procedure.

**■ Cluster check**

- Ignition "OFF" & Engine "OFF".
- Disconnect "ECM & TCM" connector.
- Measure Resistance between "CAN HIGH" terminal and "CAN LOW" terminal of ECM wiring side.

**Specification :** Approx. 120 ± 10Ω

# Automatic Transmission System

## AT-453

4. Is measured resistance within specifications ?

**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 Vehicle Repair" procedure.

**NO** ▶ Check for short to ground in harness. Repair as necessary and Go to "Verification Vehicle Repair" procedure.  
▶ Substitute with a known-good ECM and check for proper operation. If the problem is corrected, replace ECM as necessary and then go to "Verification of Vehicle Repair" procedure.

### How to perform Initial Learning

If you replace the automatic transmission or TCU, or if you overwrite the TCU software, be sure to initialize the learned values and perform initial learning.

#### Step 1) Warm-up

Raise the ATF temperature by leaving the vehicle idling or performing city drive. Check the ATF temperature using the Scan-tool and make sure it is between 50°C ( 122 °F) and 120°C ( 248 °F). If the ATF temperature is outside this range, work to bring the range.

#### **CAUTION**

**Don't raise the oil temperature by stalling the engine.**

(Reference)

If the oil temperature is not between 50°C ( 122 °F) and 120°C ( 248 °F), initial learning can not be performed. Before learning, check for variable speed shock or shift shock.

#### STEP 2) Garage shift learning("N→R", "N→D")

With the vehicle standing still, depress the brake and keep the shift lever in "N" for 3seconds. Then, shift from "N" into "D", and maintain this condition for 3seconds.

Repeat this procedure 5 times. Then repeat it 5 times in the same way for "R".

#### STEP 3) Garage shift control learning

In "D", with the throttle opening between 25 and 35%, drive until you reach 6th gear and a vehicle speed at 80Km/h or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in 60 seconds minimum. Repeat this procedure 10 times.

#### STEP 4) Check learning results

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

#### How to perform "N" position learning

If you replace the automatic transmission or TCU, be sure to perform 'N' position learning.

Step 1) Shift to P range so that vehicle is in standstill. Turn IG ON but Engine is OFF.

Step 2) After releasing shift lock, shift the shift lever to "N" position.

Step 3) Install the SST on the shaft of inhibitor switch, and then, assemble the SST with aligning neutral line on the SST with neutral line on the inhibitor switch.

Step 4) Tighten the bolt after confirm the Neutral lines are aligned with.

### Verification of Vehicle Repair

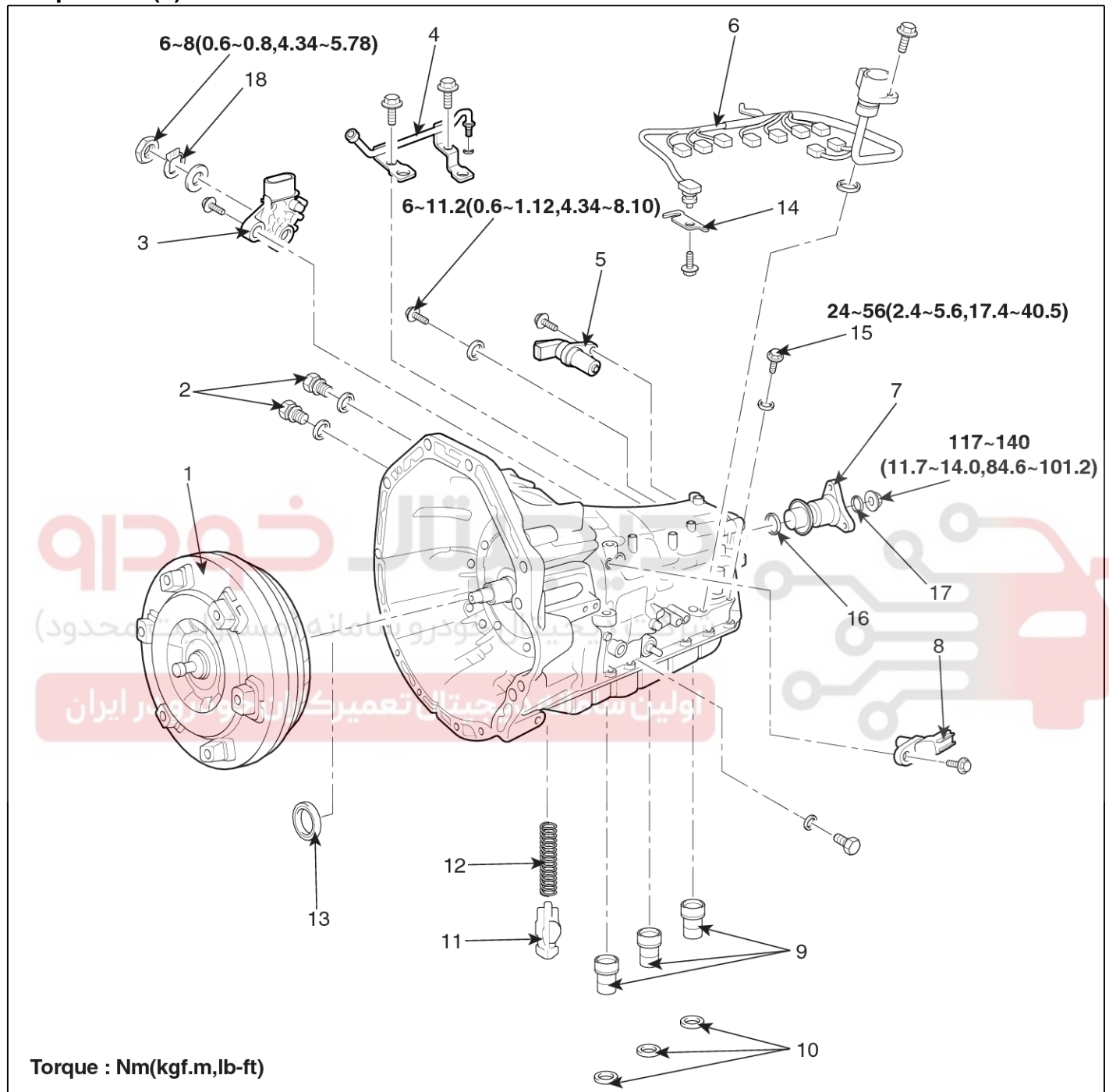
Refer to DTC U0001 : High Speed CAN Communication Bus off.

# AT-454

# Automatic Transmission System

## Automatic Transmission

### Components(1)



SBHAT9020L

- 1. Torque converter assembly
- 2. Adaptor
- 3. Neutral start switch
- 4. Breather tube
- 5. Output speed sensor
- 6. Wiring assembly

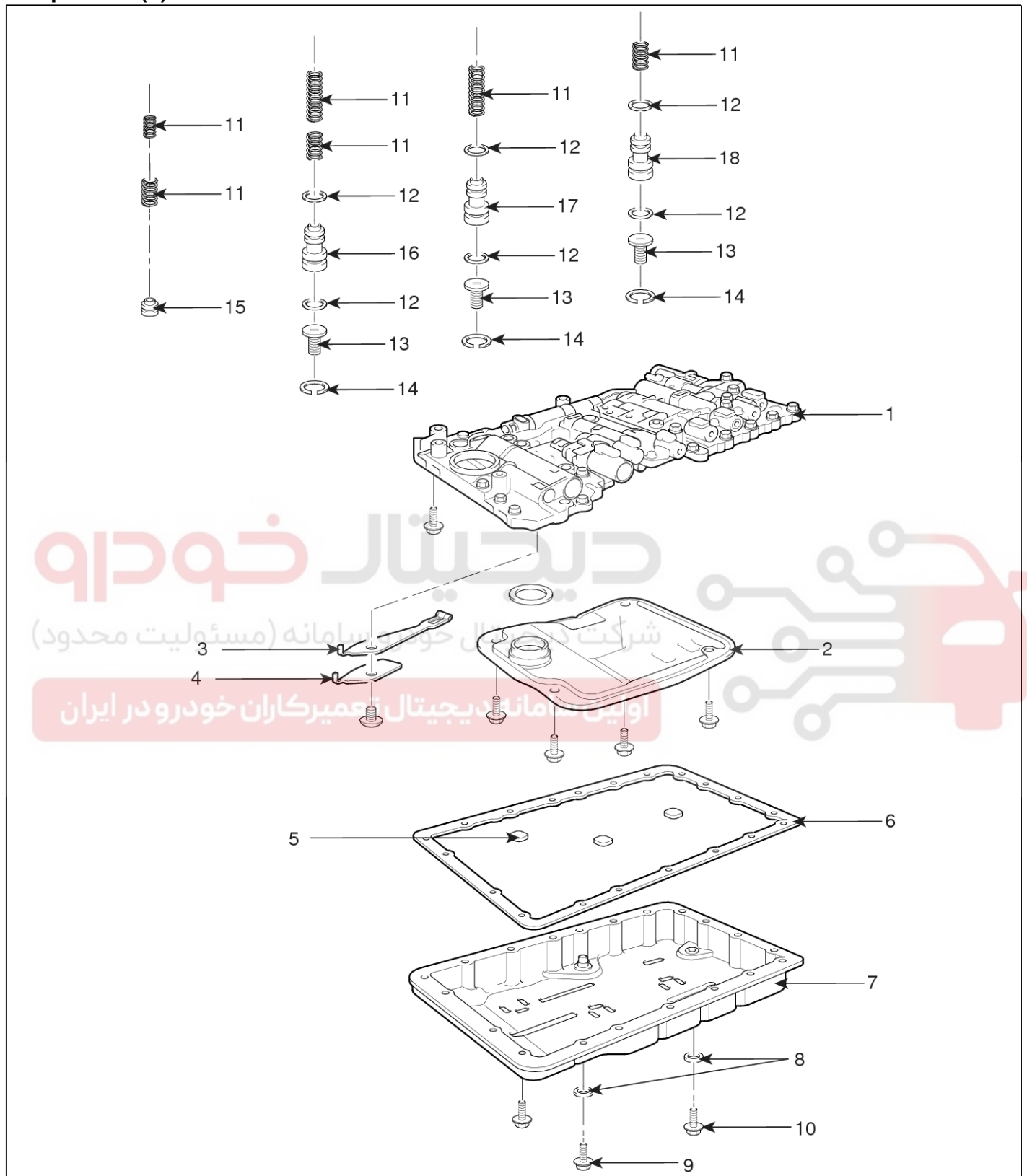
- 7. Flange yolk
- 8. Input speed sensor
- 9. Gasket (Brake drum)
- 10. Gasket (Transmission case)
- 11. Check valve sub assembly
- 12. Compression spring

- 13. Oil seal (Oil pump)
- 14. Locking plate
- 15. Filler plug
- 16. Oil seal (Extension housing)
- 17. Oil seal (Flange yolk)
- 18. Locking washer

# Automatic Transmission System

# AT-455

## Components(2)



SBHAT8021D

# AT-456

# Automatic Transmission System

1. Valve body assembly
2. Oil strainer
3. Manual detent spring
4. Manual detent spring cover
5. Oil cleaner magnet
6. Oil pan gasket
7. Oil pan
8. Gasket
9. Overflow plug

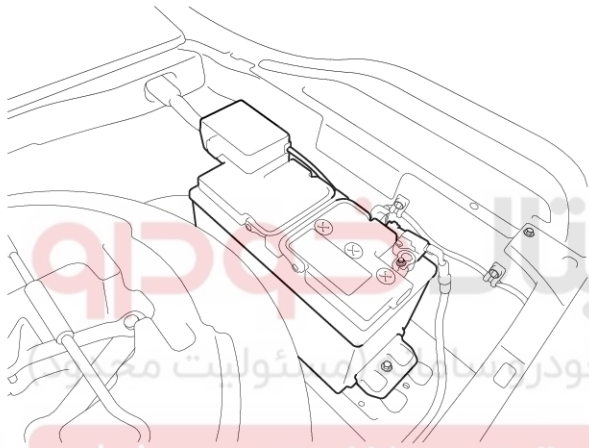
10. Drain plug
11. Compression spring
12. O-ring
13. Compression spring
14. Snap ring
15. Accumulator valve (B-1)
16. Accumulator valve (C-3)
17. Accumulator valve (B-3)
18. Accumulator valve (C-2)

## Removal

1. Disconnect (-) terminal from the battery.

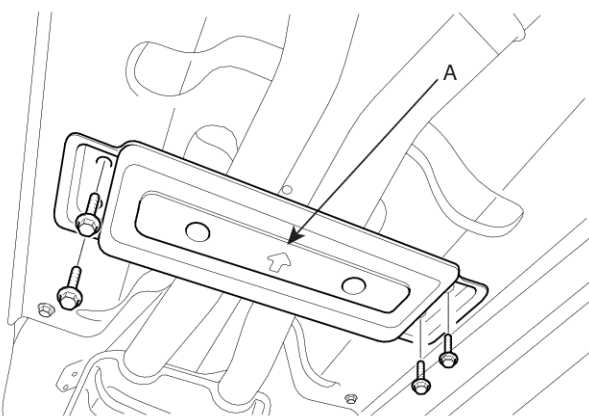
### NOTICE

The battery is placed right side of the temporary tire in the trunk.



SBHAT8014D

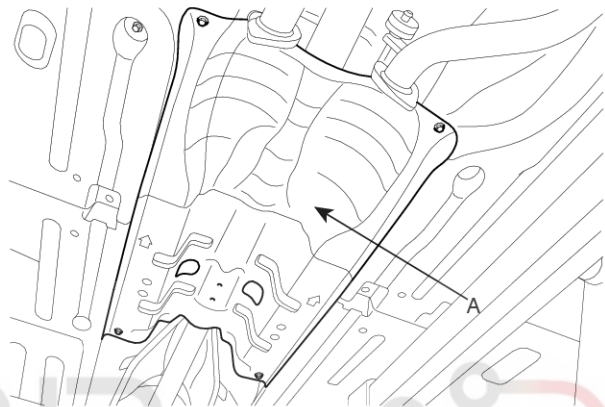
2. Remove the muffler guard (A).



SBHAT8001D

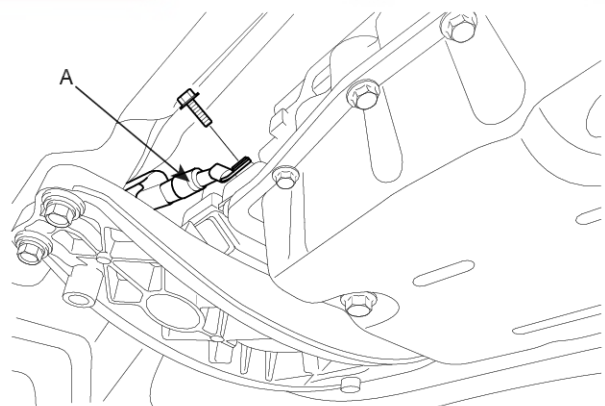
3. Remove the center muffler assembly. (refer to Intake And Exhaust system in EM group)

4. Remove the heat protector (A).



SBHAT8002D

5. Remove the propellar shaft assembly. (refer to Propellar shaft in DS group)
6. Disconnect the ground wire (A) by removing the bolt.



SBHAT8004D

# Automatic Transmission System

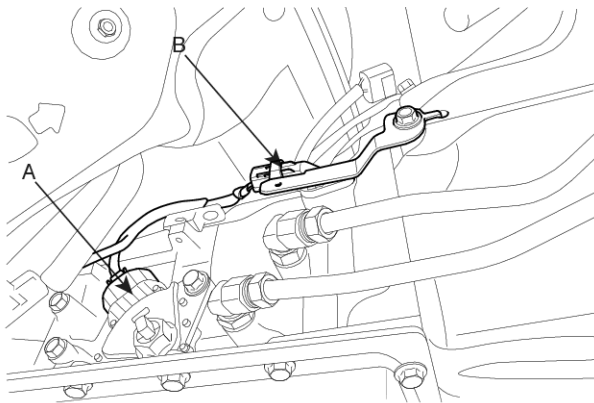
# AT-457

7. Remove the oil cooler tubes.

**NOTICE**

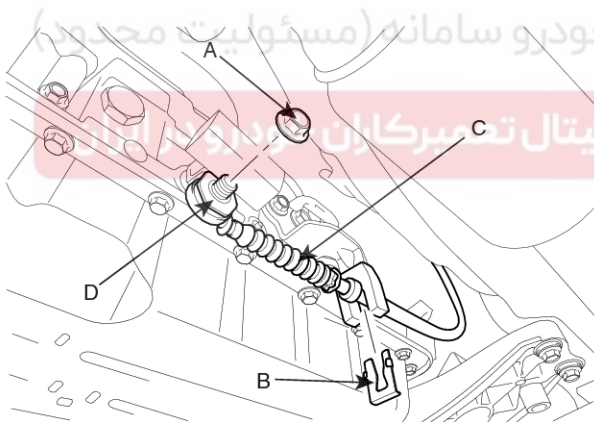
Remove the two mounting bolts from the engine block in order to move out the tubes.

8. Disconnect the neutral switch connector (A) and the output speed sensor connector (B).



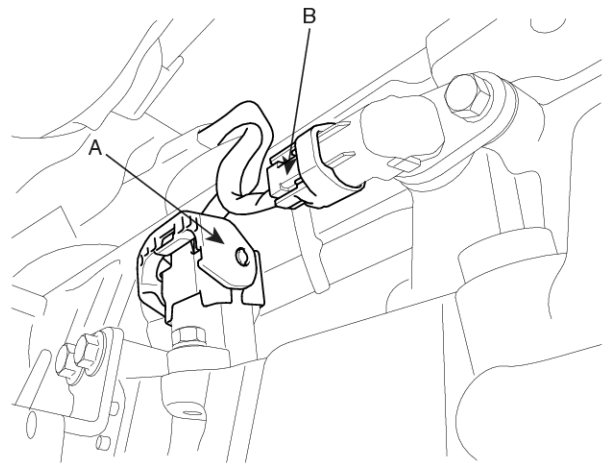
SBHAT8003D

9. Disconnect the shift cable assembly (C) by holding the washer (D) and removing the nut (A) and take off the clip (B).



SBHAT8005D

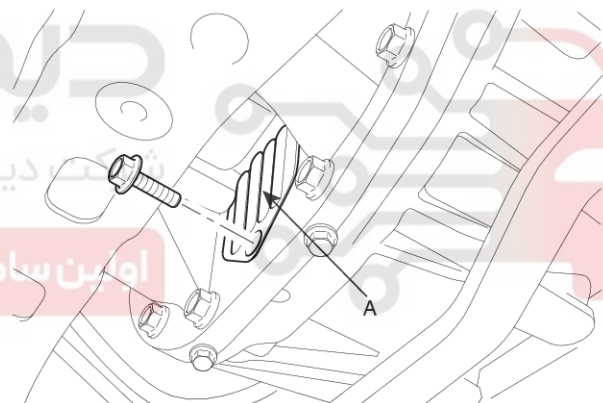
10. Disconnect the solenoid connector (A) and input speed sensor connector (B).



SBHAT8012D

11. Remove the CKP sensor itself and the brackets for wire.

12. Remove the dust cover (A).



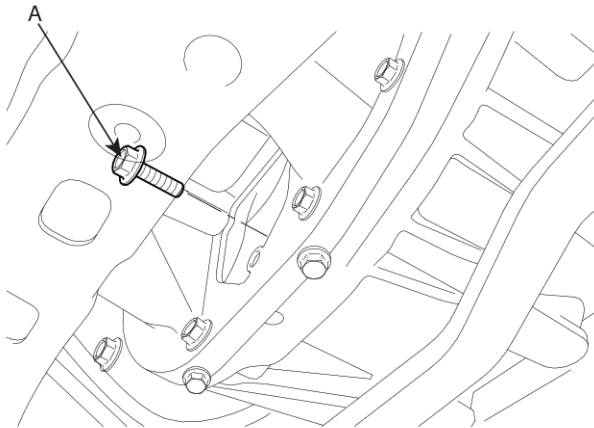
SBHAT8007D



# AT-458

# Automatic Transmission System

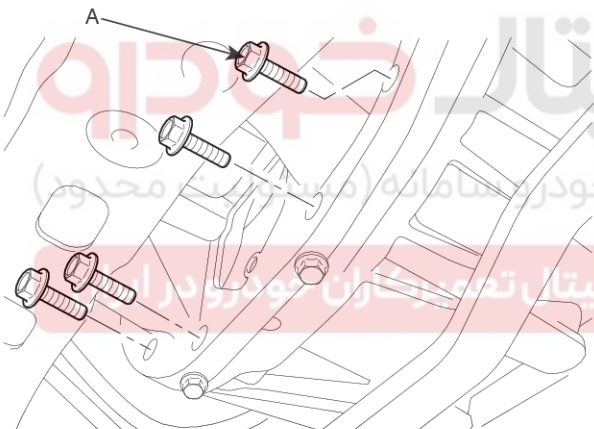
13. Remove the torque converter mounting bolts (A-6ea) by rotating the crank shaft.



SBHAT8008D

14. Using a jack support the transmission assembly.

15. Remove the mounting bolts (A-4ea) lower in the engine side.



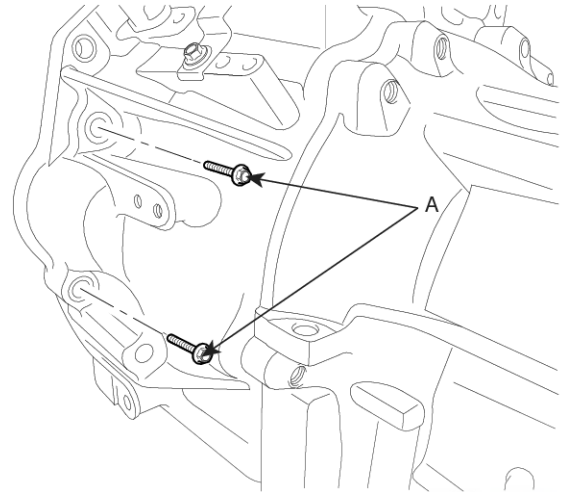
SBHAT8013D

16. Remove the mounting bolt right in the engine side.

17. Remove the mounting bolts (A-2ea) for the starter motor.

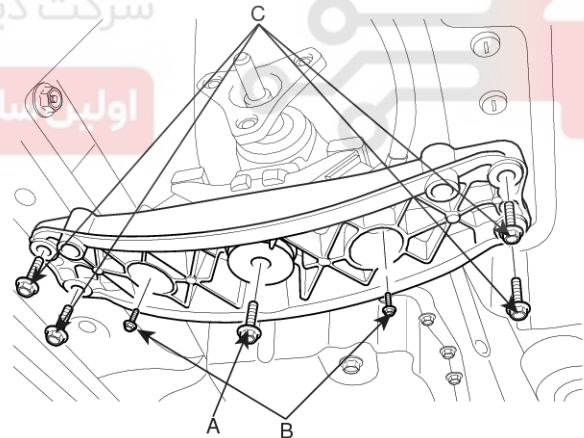
**NOTICE**

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



SBHAT8011D

18. Remove the cross member by removing the seven bolts (A,B,C).



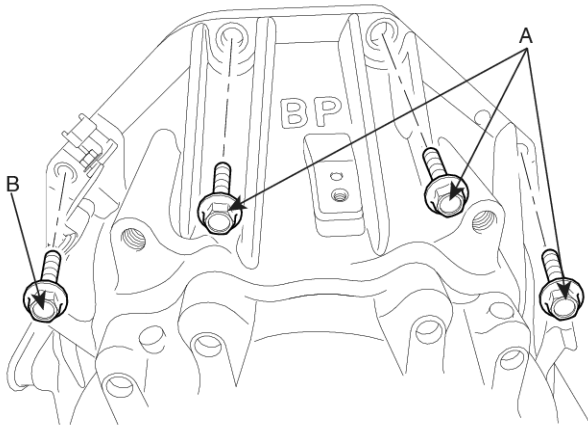
SBHAT8009D

19. Remove the insulator support brackets.

# Automatic Transmission System

## AT-459

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



SBHAT8010D

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

### CAUTION

Be careful not to damage tubes, hoses or wire.

### Installation

1. Temporarily install the transmission assembly by lifting the supporting jack.

### CAUTION

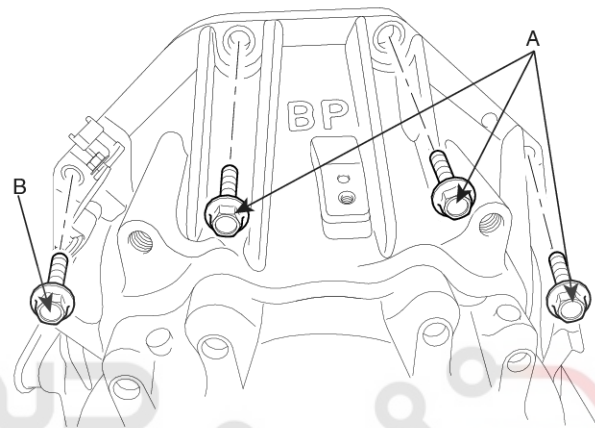
Be careful not to damage tubes, hoses or wire.

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

### Tightening torque

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

[B] 35~47 Nm(3.5~4.7 kgf.m, 25.3~34.0 lb-ft)



SBHAT8010D

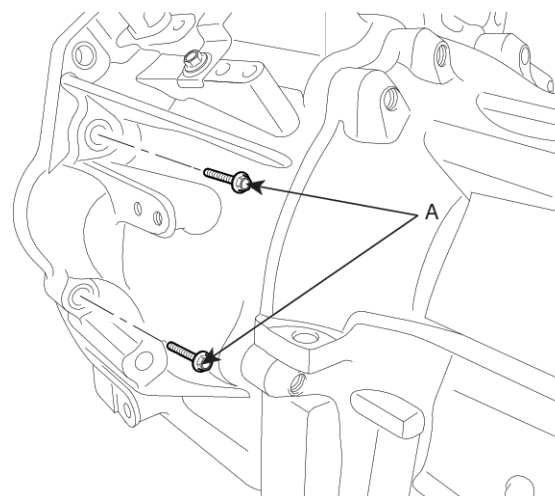
3. Install the mounting bolts (A-2ea) for the starter motor.

### Tightening torque :

50~65 Nm(5.0~6.5 kgf.m, 36.2~47.0 lb-ft)

### NOTICE

Install one mounting bolt on the transmission side and the other bolt for the starter motor, while lowering the transmission assembly.



SBHAT8011D

## AT-460

## Automatic Transmission System

4. Install the mounting bolt right in the engine side.

**Tightening torque :**

80~100 Nm(8.0~10.0 kgf.m, 57.9~72.3 lb-ft)

5. Install the CKP sensor and the brackets for wire.

**NOTICE**

While lowering the transmission assembly, install the brackets.

6. Install the insulator support brackets by tightening each four bolts.

**Tightening torque :**

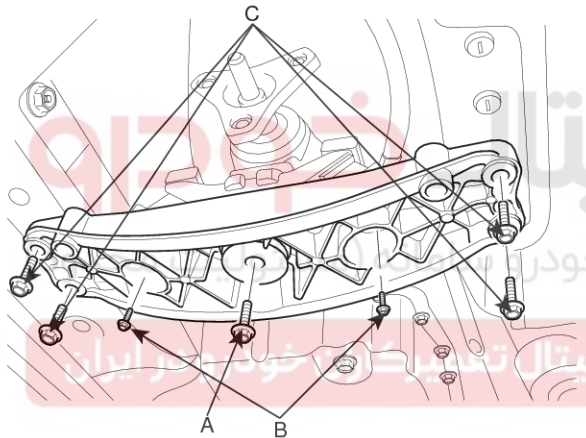
30~35 Nm(3.0~3.5 kgf.m, 21.7~25.3 lb-ft)

7. Install the cross member by installing the seven bolts (A,B,C).

**Tightening torque :**

[A,B] 30~35 Nm(3.0~3.5 kgf.m, 21.7~25.3 lb-ft)

[C] 50~65 Nm(5.0~6.5 kgf.m, 36.2~47.0 lb-ft)

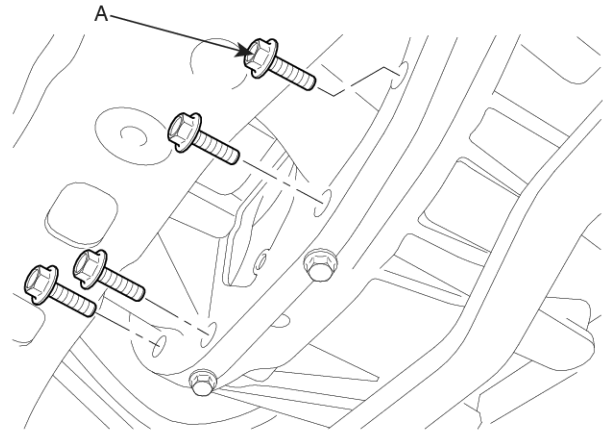


SBHAT8009D

8. Install the mounting bolts (A-4ea) lower in the engine side.

**Tightening torque :**

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



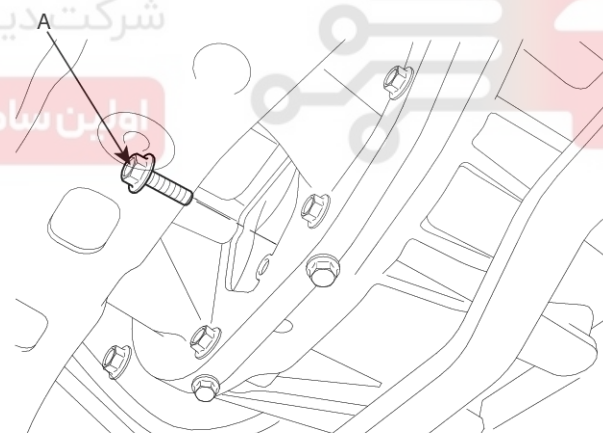
SBHAT8013D

9. Put aside the jack.

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

**Tightening torque :**

34~41 Nm(3.4~4.1 kgf.m, 24.6~29.6 lb-ft)

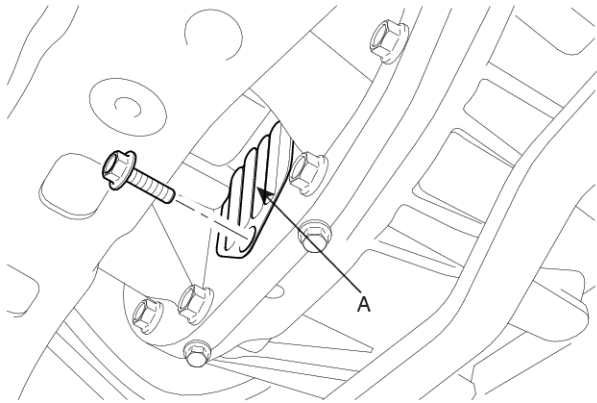


SBHAT8008D

# Automatic Transmission System

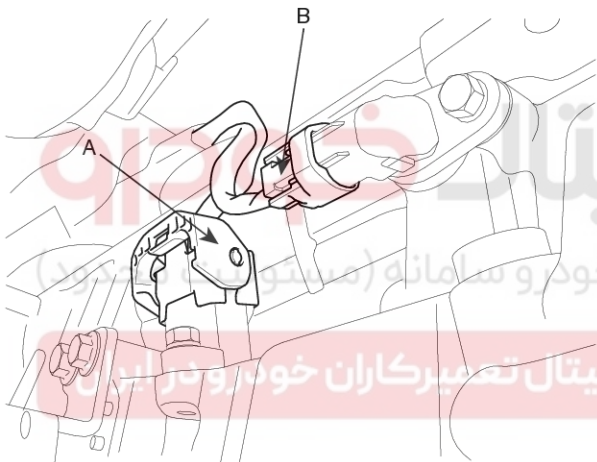
# AT-461

11. Install the dust cover (A).



SBHAT8007D

12. Connect the solenoid connector (A) and input speed sensor connector (B).

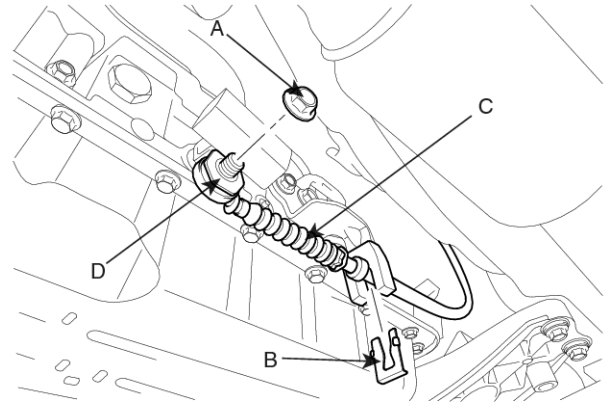


SBHAT8012D

13. Connect the shift cable assembly (C) by holding the washer (D) tightening the nut (A) and insert the clip (B).

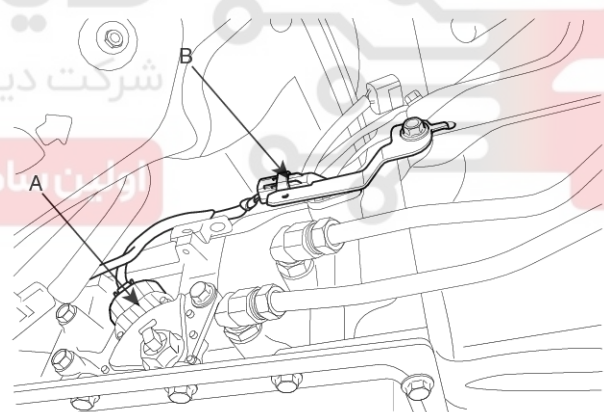
**Tightening torque :**

13~16 Nm(1.3~1.6 kgf.m, 9.40~11.57 lb-ft)



SBHAT8005D

14. Connect the neutral switch connector (A) and the output speed sensor connector (B).



SBHAT8003D

15. Install the oil cooler tubes.

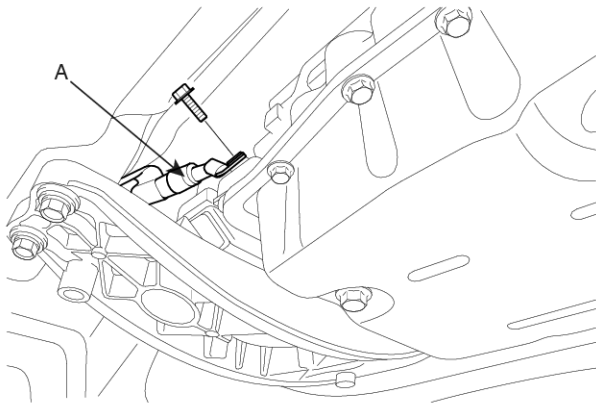
**NOTICE**

*Install the two mounting bolts from the engine block.*

# AT-462

# Automatic Transmission System

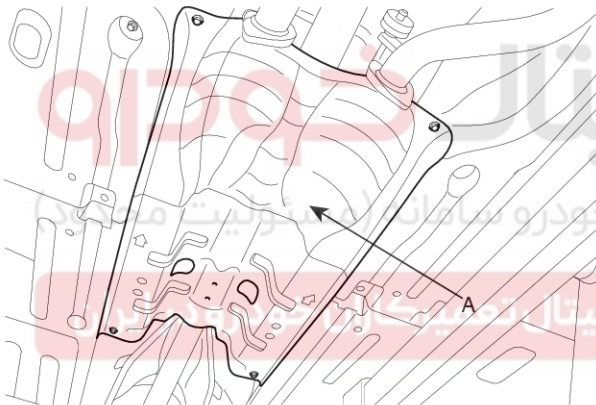
16. Connect the ground wire (A) by removing the bolt.



SBHAT8004D

17. Install the propellar shaft assembly (refer to Propellar shaft in DS group)

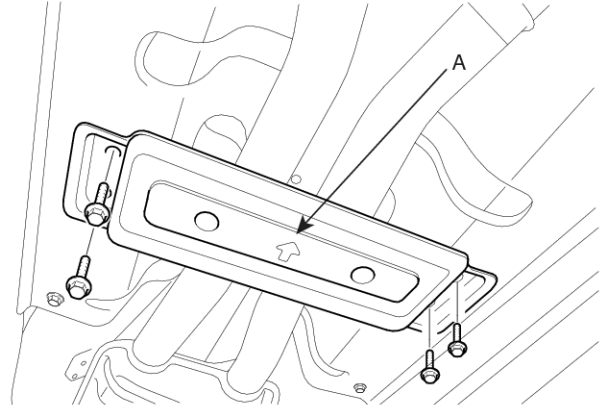
18. Install the heat shield (A).



SBHAT8002D

19. Install the center muffler assembly. (refer to Intake And Exhaust system in EM group)

20. Install the muffler guard (A).

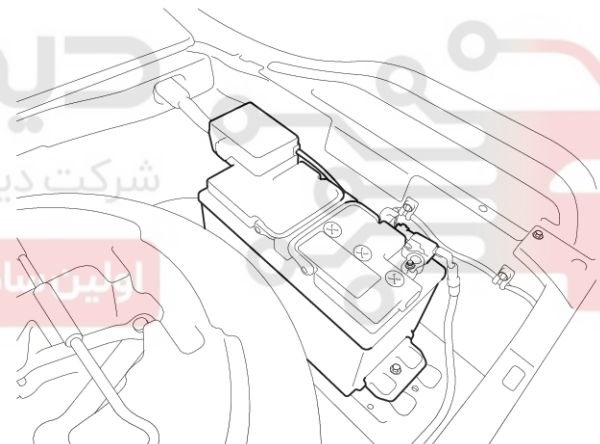


SBHAT8001D

21. Connect (-) terminal to the battery.

**NOTICE**

*The battery is placed right side of the temporary tire in the trunk.*



SBHAT8014D

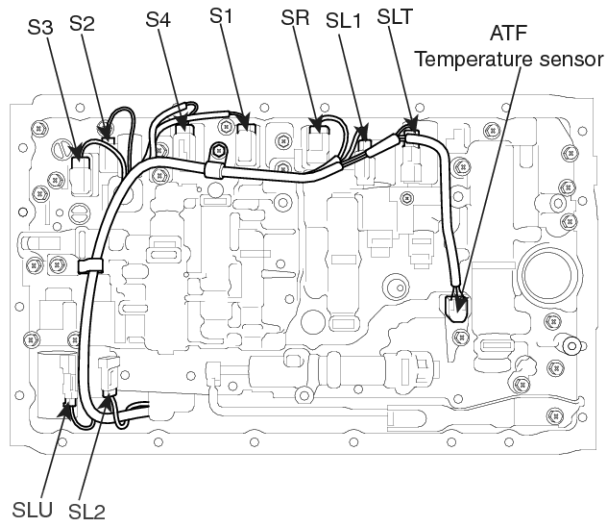
# Valve Body System

# AT-463

## Valve Body System

### Solenoid valve

#### Component Location



SBHAT9200L

#### Description

##### Shift solenoid No.1, No.2, No.3 No.4 (S1, S2, S3, S4)

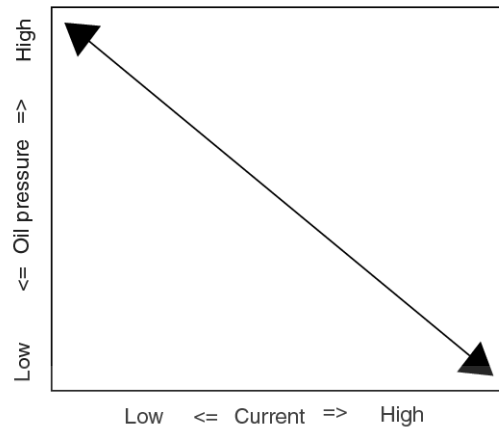
4 shift solenoids are installed directly in V/B. The solenoids operates of ON and OFF by the control signal from TCU. Combinations of 4 solenoids, S1, S2, S3 and S4, changes gear ranges (1st to 6th).

##### Shift solenoid SR (SR)

Shift solenoid (SR) is installed directly in V/B. The solenoid operates of ON and OFF by the control signal from TCU. Changes C4 clutch and B1 brake.

#### Line pressure control solenoid (SLT)

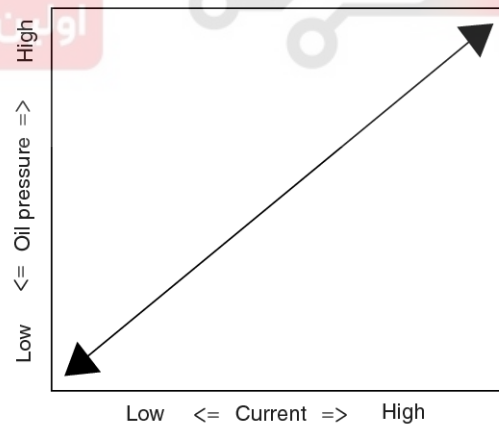
SLT controls linear throttle pressure by control signal from TCU and line pressure for clutched and brakes to reduce shift shock.



SBHAT9301L

#### Lock-up control solenoid (SLU)

SLU controls linear SLU pressure by control signal from TCU and hydraulic pressure for L-up clutch to reduce shift shock.



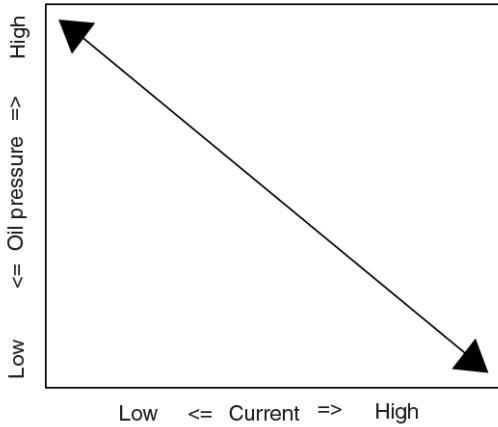
SBHAT9302L

# AT-464

# Automatic Transmission System

## Clutch pressure control solenoid No.1, No.2 (SL1, SL2)

SL1, SL2 controls linear pressure by control signal from TCU and controls C3 clutch directly and B2 brake directly under 5th to 6th.

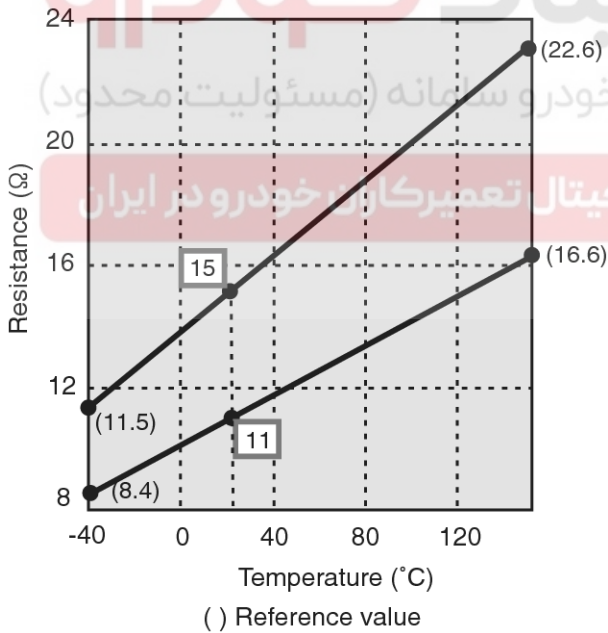


SBHAT9301L

## Specifications

### Solenoids (S1,S2,S3,S4,SR)

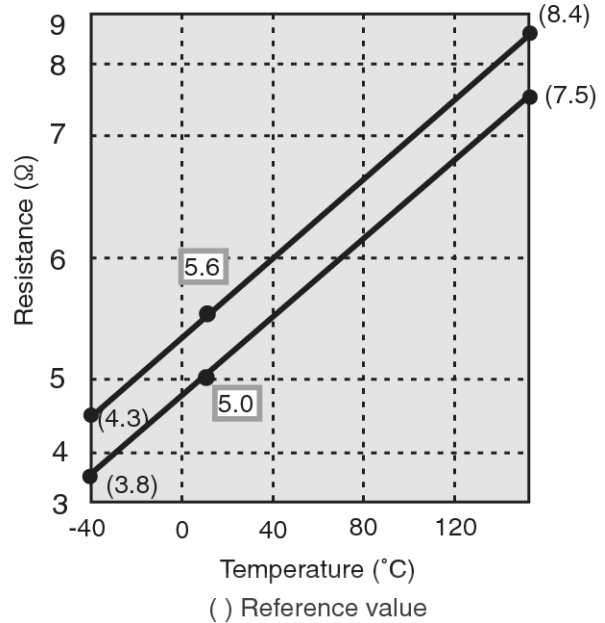
Resistance (at 20°C) : 11~15 Ω



SBHAT9304L

## Solenoids (SLT,SLU,SL1,SL2)

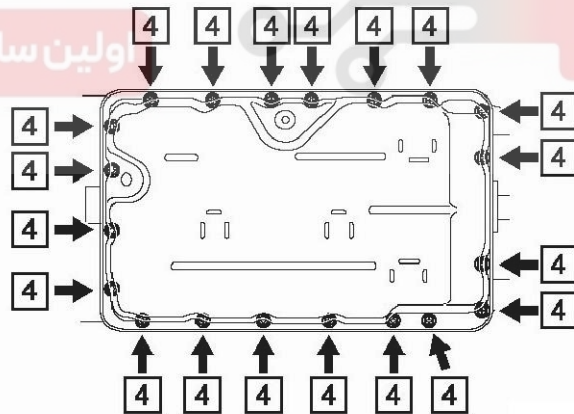
Resistance (at 20°C) : 5.0~5.6 Ω



SBHAT9305L

## Removal

1. Remove the drain plug and the gasket from the oil pan to drain ATF.
2. Remove the 20 bolts.



SBHAT8306D

3. Take off the oil pan by using the special service tool(09215-3C000) or a plastic hammer with care.

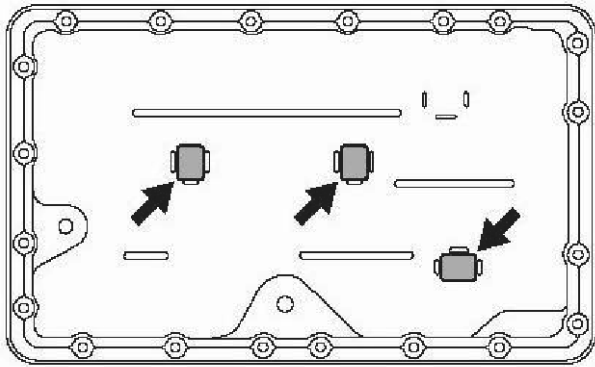
### CAUTION

- Be careful not to damage the fitting surfaces of the transmission case and the oil pan.
- Be careful not to deform the oil pan.

# Valve Body System

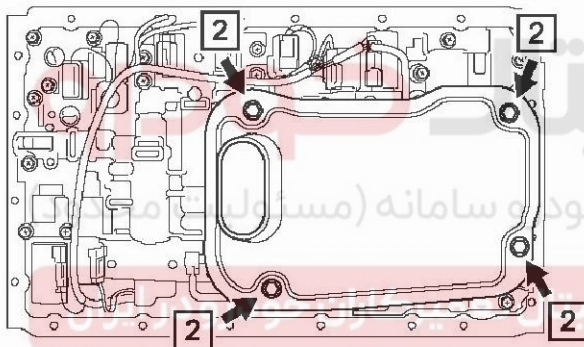
# AT-465

4. Remove the 3 oil cleaner magnets from the oil pan.



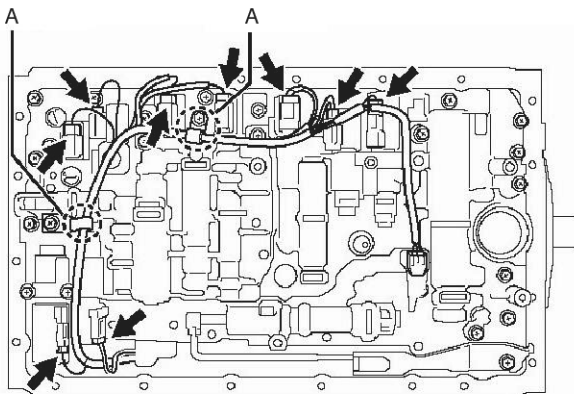
SBHAT8307D

5. Remove the 4 bolts to remove the oil strainer from the valve body assembly.



SBHAT8308D

6. Disconnect the 9 solenoid connectors from the solenoids and the transmission wire from the 2 clamps (A).

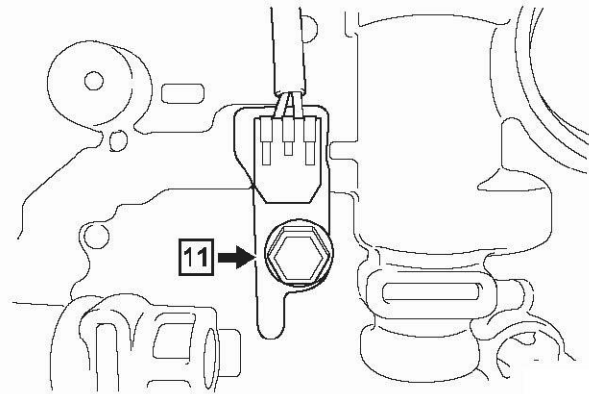


SBHAT8309D

7. Remove the bolt to remove the locking plate from the valve body assembly.

**NOTICE**

The ATF oil temperature sensor is place in the locking plate.

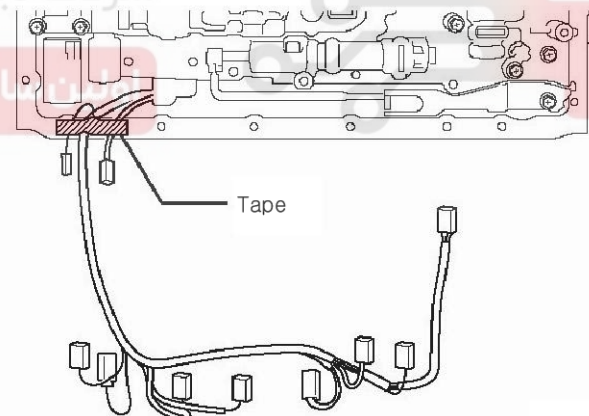


SBHAT8310D

8. Secure transmission wire with tape to the transmission case as shown in the figure.

**NOTICE**

Be sure that the transmission wire does not interfere with the valve body assembly when installing.



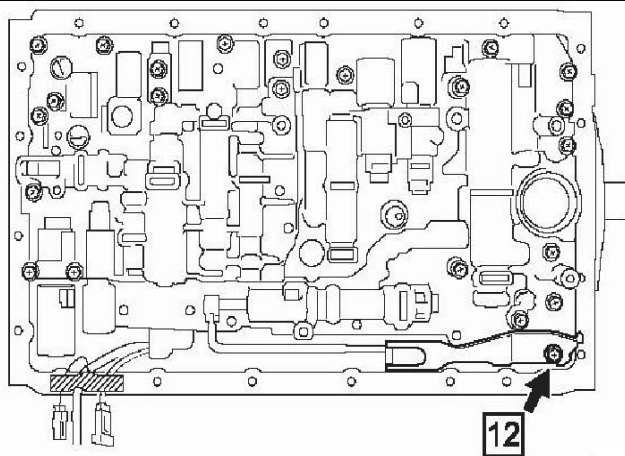
SBHAT9311L



# AT-466

# Automatic Transmission System

9. Remove the bolt to remove the manual detent spring cover and manual detent spring.

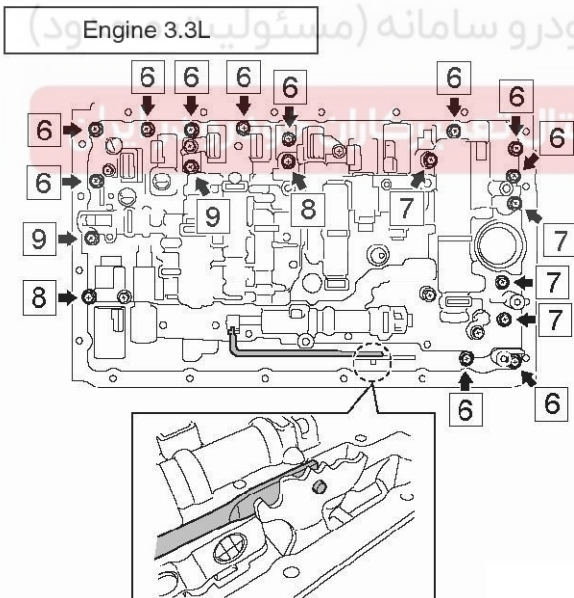


SBHAT8312D

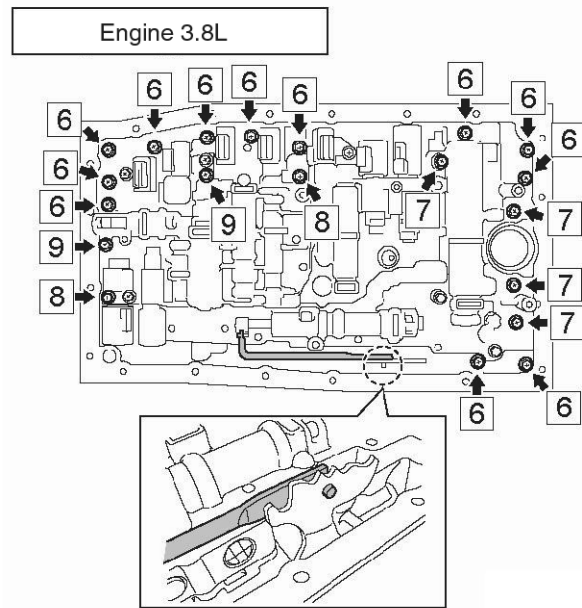
10. Remove the bolts (3.3L-19ea, 3.8L-20ea) from the transmission case as shown in the figure.

**Bolt size :**

- (6) :M6x1.0x25mm
- (7) :M6x1.0x36mm
- (8) :M6x1.0x45mm
- (9) :M6x1.0x50mm



SBHAT9313L



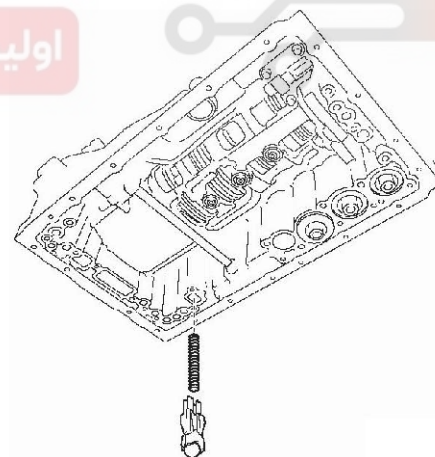
SBHAT9314L

11. Disconnect the manual valve link and remove the valve body assembly.

**CAUTION**

**Be careful not to drop the valve body assembly.**

12. Remove the check valve sub-assembly and the compression spring from the transmission case as shown in the figure.

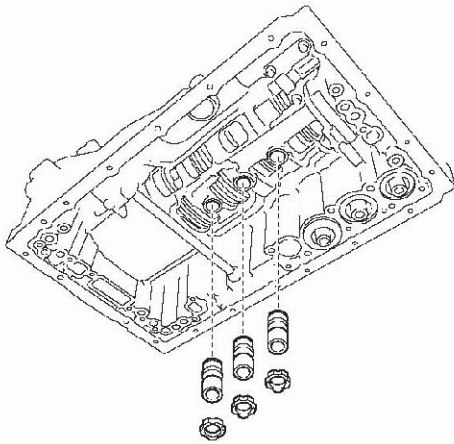


SBHAT8315D

# Valve Body System

# AT-467

13. Remove the 3 transmission case gaskets and the 3 brake drum gaskets from the transmission case as shown in the figure.

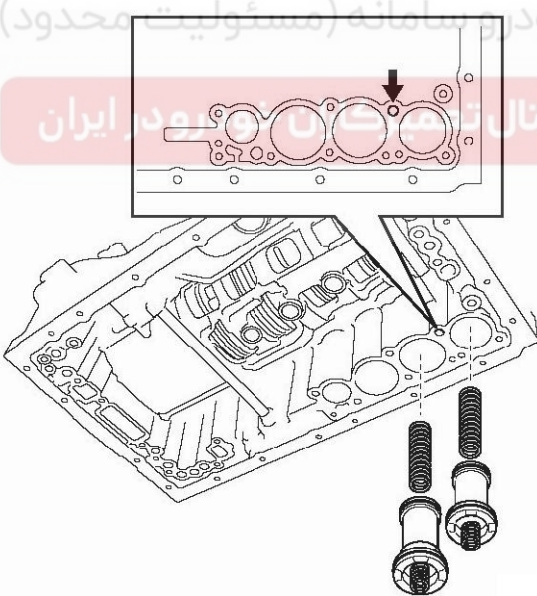


SBHAT8316D

14. Apply compressed air into the oil passage as shown in the figure and remove the 2 accumulator pistons and 2 compression springs from the transmission case.

**CAUTION**

Take care as the C-2 and B-3 accumulator piston may eject.

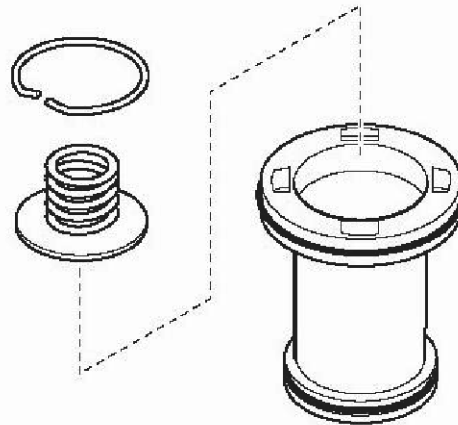


SBHAT8317D

15. Using screwdriver, remove the 2 snap rings from the 2 accumulator pistons.

**CAUTION**

Be careful not to damage the accumulator pistons (C-2,B-3).



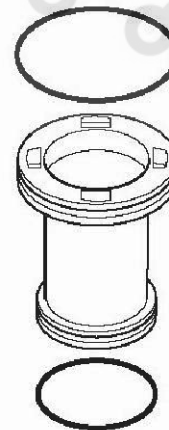
SBHAT8318D

16. Remove the 2 compression springs from the 2 accumulator pistons.

17. Using screwdriver, remove the 4 "O" rings from the 2 accumulator pistons.

**CAUTION**

Be careful not to damage the accumulator piston (C-2,B-3).



SBHAT8319D

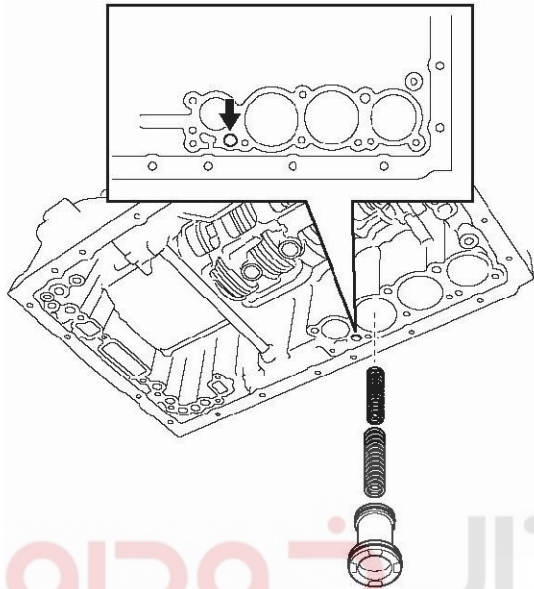
# AT-468

# Automatic Transmission System

18. Apply compressed air into the oil passage as shown in the figure and remove the accumulator piston and 2 compression springs from the transmission case.

**CAUTION**

Take care as the C-3 accumulator piston may eject.

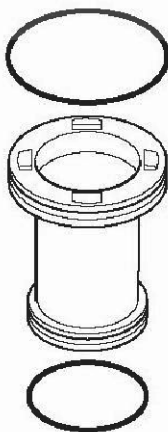


SBHAT8320D

19. Using screwdriver, remove the 2 "O" rings from the accumulator piston.

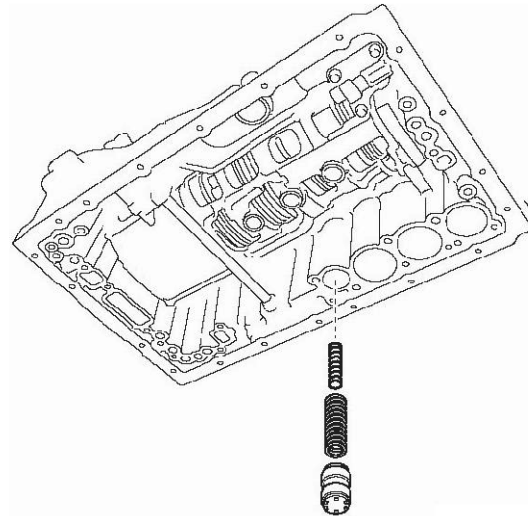
**CAUTION**

Be careful not to damage the accumulator piston.



SBHAT8321D

20. Remove the accumulator valve and 2 compression springs from the transmission case.



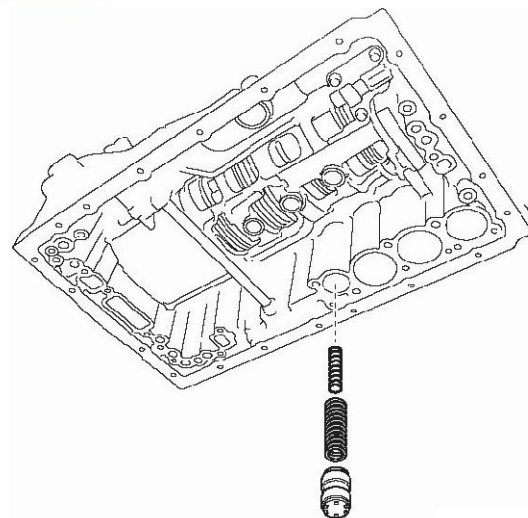
SBHAT8322D

**Installation**

1. Install the accumulator valve and the 2 compression springs to the transmission case as shown in the figure.

**SIZE: Compression spring**

Valve	Free (mm)	Outer (mm)	Color
Accumulator	44.98	11.30	-
Valve	46.36	17.10	-



SBHAT8322D

# Valve Body System

# AT-469

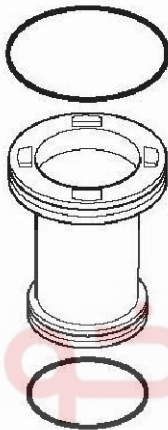
2. Coat the 2 new "O" rings with ATF, and install it to the accumulator piston.

**SIZE:"O"ring**

Piston	Inner (mm)	Thickness (mm)
C-3 Piston	26.75	2.62
	34.29	2.62

**CAUTION**

Be careful not to damage the "O" ring and accumulator piston.

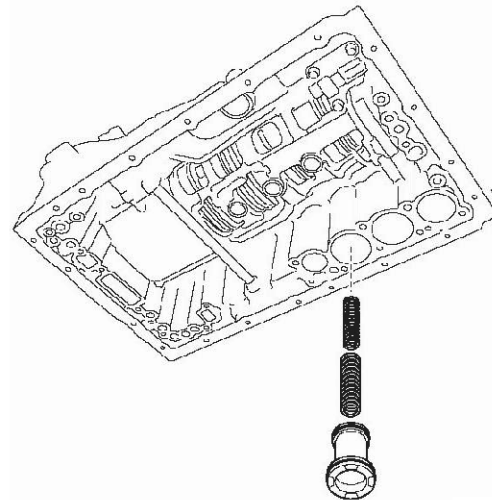


SBHAT8321D

3. Install the accumulator piston and the compression spring to the transmission case as shown in the figure.

**SIZE:Compression spring**

Piston	Free (mm)	Outer (mm)	Color
C-3 Piston	44.00	14.00	Yellow
	76.65	20.10	White



SBHAT8323D

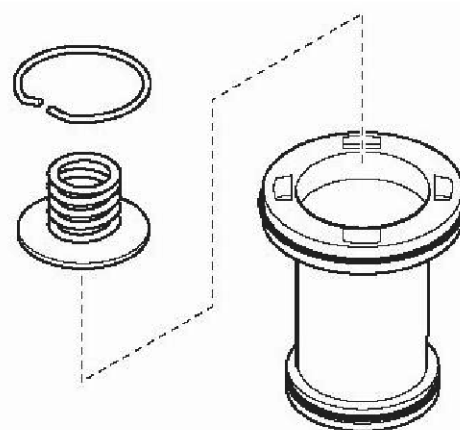
4. Coat the 4 new "O" rings with ATF, and install it to the 2 accumulator pistons.

**SIZE:"O"ring**

Piston	Inner (mm)	Thickness (mm)
C-2 Piston	20.00	2.62
	28.73	2.62
B-3 Piston	23.55	2.62
	34.29	2.62

**CAUTION**

Be careful not to damage the "O" ring and accumulator piston.



SBHAT8318D

# AT-470

# Automatic Transmission System

5. Using screwdriver, install the 2 compression springs and the 2 snap rings to the 2 accumulator pistons.

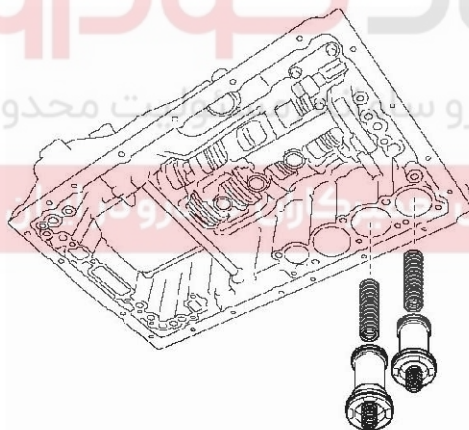
**SIZE:Compression spring**

Piston	Free (mm)	Outer (mm)	Color
C-2 Piston	17.50	14.00	Green
B-3 Piston	29.00	16.20	White

6. Install the 2 accumulator pistons and the 2 compression springs to the transmission case as shown in the figure.

**SIZE:Compression spring**

Piston	Free (mm)	Outer (mm)	Color
C-2 Piston	65.07	16.20	Pink
B-3 Piston	64.50	19.50	Orange

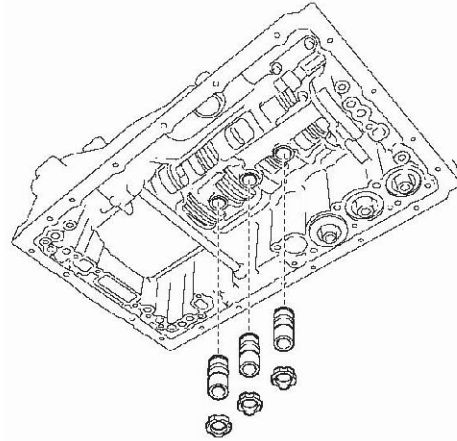


SBHAT8324D

7. Coat the 3 new transmission case gaskets and 3 new brake drum gaskets with ATF, and install it to the transmission case as shown in the figure.

**CAUTION**

Be careful not to damage the gasket.

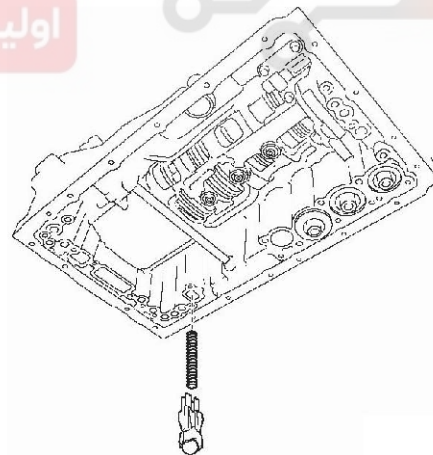


SBHAT8316D

8. Install the check valve sub-assembly and the compression spring to the transmission case as shown in the figure.

**SIZE:Compression spring**

Free (mm)	Outer(mm)
38.55	4.86



SBHAT8315D

# Valve Body System

# AT-471

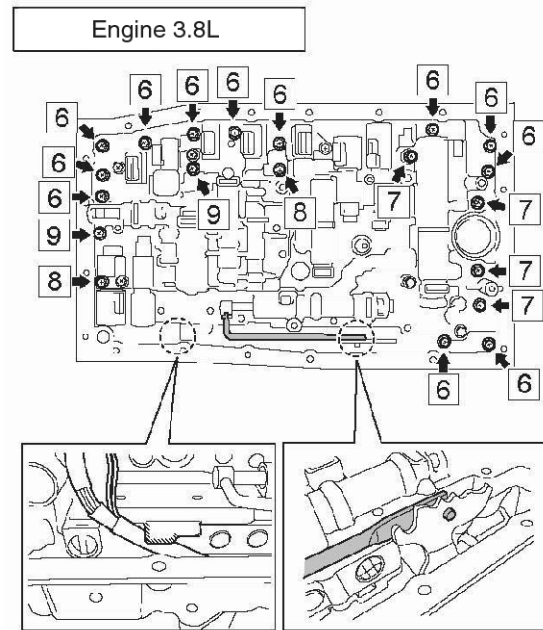
9. Connect the manual valve link and temporarily install the valve body assembly with the bolts (3.3L-19ea, 3.8L-20ea).

**CAUTION**

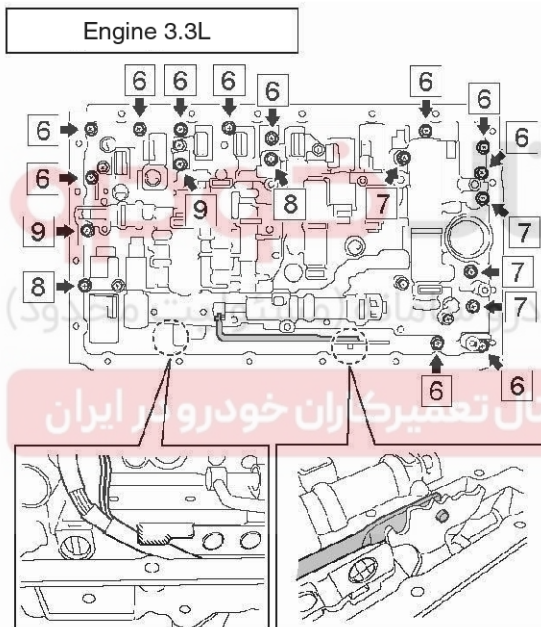
- When installing, be sure to put the transmission wire in the concave portion of the separator plate in the valve body assembly as shown in the figure.
- Do not pinch the transmission wire between the separator plate and the valve body assembly.

**Bolt size :**

- (6) :M6x1.0x25mm
- (7) :M6x1.0x36mm
- (8) :M6x1.0x45mm
- (9) :M6x1.0x50mm



SBHAT9326L



SBHAT9325L

# AT-472

# Automatic Transmission System

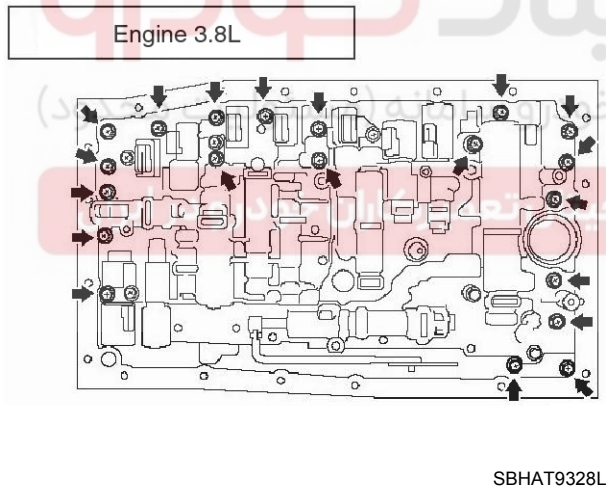
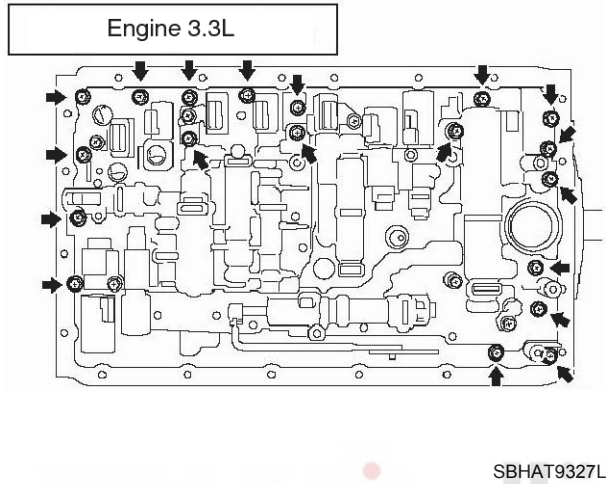
10. Tighten the bolts(3.3L-19ea, 3.8L-20ea) with the specified torque.

**Tightening torque :**

10.2~12.2 Nm(1.02~1.22 kgf.m, 7.38~8.82lb-ft)

**CAUTION**

Be sure to tighten the inner bolts first.



11. Install the manual detent spring cover and manual detent spring with the bolt to the valve body assembly.

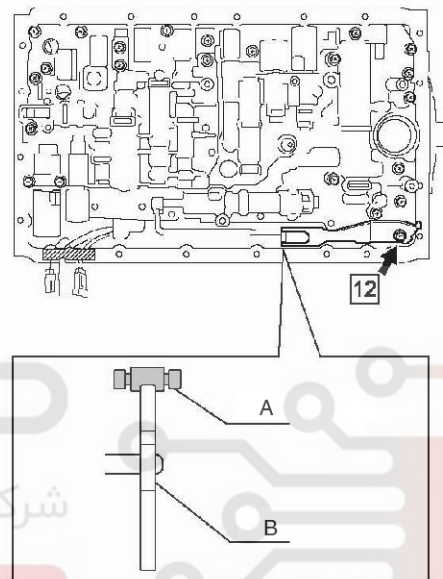
**Tightening torque :**

8.2~12.2 Nm(0.82~1.22 kgf.m, 5.93~8.82 lb-ft)

**Bolt size(12) :** M6x1.0x14mm

**CAUTION**

When installing, ensure that the center of the detent springs (A) roller fits the center of the manual valve lever (B).

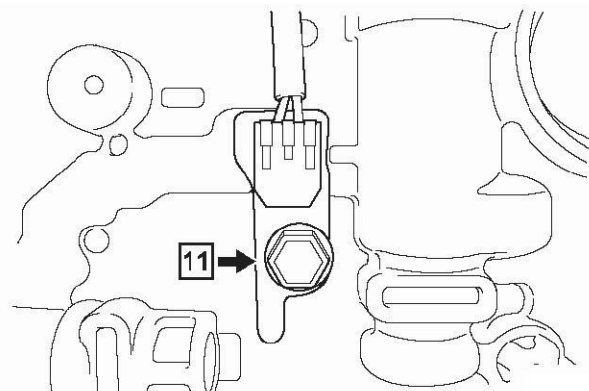


12. Install the ATF temperature sensor and the lock plate with the bolt to the valve body assembly.

**Tightening torque :**

8.2~12.0 Nm(0.82~1.20 kgf.m, 5.93~8.68 lb-ft)

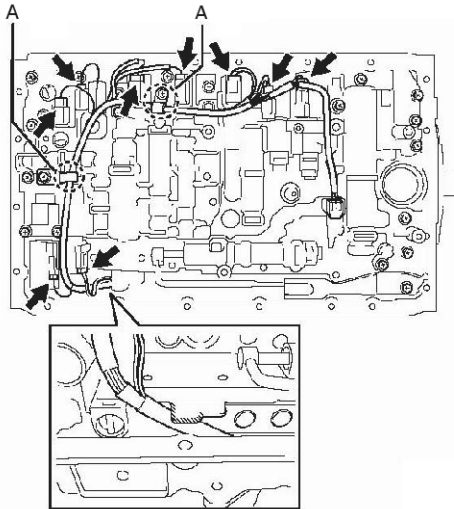
**Bolt size(11) :** M6x1.0x12mm



# Valve Body System

# AT-473

13. Connect the transmission wire to the 2 clamps (A) and the 9 solenoid connectors to the solenoids.



SBHAT8330D

14. Coat a new "O" ring with ATF and install it to the oil stariner.

**O-ring size:**

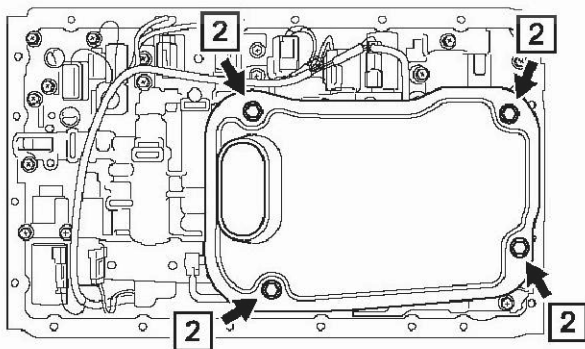
inner dia.-31.00mm(1.22in), thickness-2.72mm(0.107in)

15. Install the oil stariner with the 4 bolts to the valve body assembly.

**Tightening torque :**

8.2~12.2 Nm(0.82~1.22 kgf.m, 5.93~8.82 lb-ft)

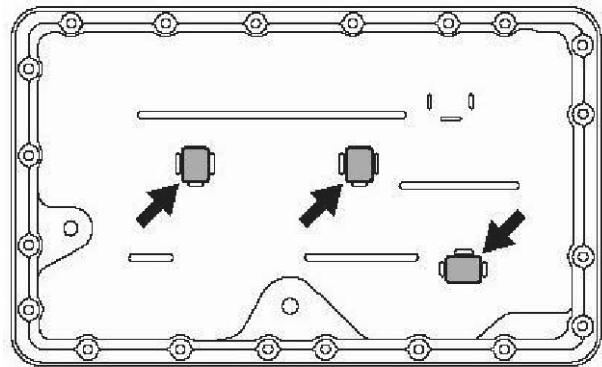
**Bolt size(11) :** M6x1.0x16mm



SBHAT8308D

16. Clean the contact surfaces of oil pan and transmission case.

17. Install the 3 oil cleaner magnets to the oil pan.



SBHAT8307D

18. Install a new oil pan gasket (A) and the oil pan to the transmission case by tightening the 20 bolts.

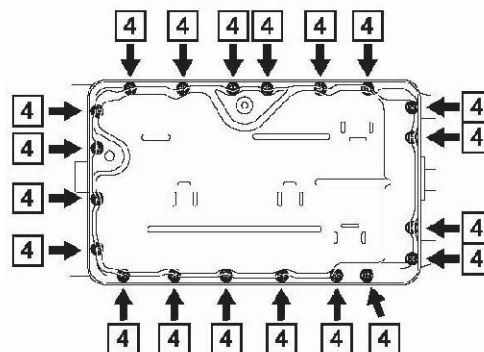
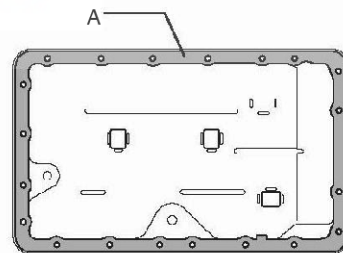
**Tightening torque :**

6~8 Nm(0.6~0.8 kgf.m, 4.34~5.78 lb-ft)

**Bolt size(4) :** M6x1.0x14.5mm

**CAUTION**

- Be careful not to damage the fitting surfaces of the transmission case and the oil pan.
- Be careful not to deform the oil pan.
- Be reminded that bolts might be damaged if tightened too much since the gasket is cork-made and there is little tightening sense.



SBHAT8331D



## AT-474

## Automatic Transmission System

19. Install a new gasket and the drain plug to the oil pan.

**Tightening torque :**

17.9~23.0Nm(1.79~2.30 kgf.m, 12.95~16.63 lb-ft)

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

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



# Automatic Transmission Control System

# AT-475

## Automatic Transmission Control System

### Transaxle Control Module (TCM)

#### Description

#### Funtion of TCU

##### 1. Shift control and L-up control

According to each shift schedule, TCU sends signals to the S1, S2, S3, S4, SR, SL1, SL2 which operates control "Shift Control" and the SLU which operates linear control "L-up Control" on the basis of the vehicle speed and the throttle opening.

The TB-60SN and TB-65SN have a "AUTO CLIUSE MODE" switch. Other mode does not have a driving mode selector switch that allows drivers to select a mode themselves. The vehicle is ordinarily in Economy mode. However, when specific conditions are met, the TCU selects a shifting pattern appropriate to driving conditions from all of the shifting patterns and switches automatically.

##### A. ECONOMY MODE

Used during normal driving. ECONOMY mode is basic shift schedule and the ideal shift schedule to be consistent with fuel economy and acceleration performance. This mode is normally selected where no other higher priority shift mode is activated. Full shift schedule map is available including lockup for this mode.

##### B. HIGH OIL TEMPERATURE MODE

This mode is protect the gearbox from the overheating. This mode is activated where the T/M oil temperature is too high, and will prevent the T/M oil temperature increasing by torque converter slipping. HIGH OIL TEMPERATURE MODE shift schedule map is available including lockup depending on the T/M oil temperature area for this mode.

##### C. UP SLOPE MODE 1, 2

The UP-SLOPE 1, 2 detect up hill road condition and change the shift map to powerful map to avoid busy shifting at up hill condition. When start condition of upslope mode is detected, shift map is changed upslope1 or upslope2 map depending on slope gradient if no higher priority mode is activated.

##### D. AUTO CRUISE MODE

The AUTO CRUISE CONTROL detects "ACC ON" signal and use specific point to prevent shift hunting during ACC ON. When cruise control is ON, gears are fixed to perform smooth driving.

##### E. GEAR HOLD MODE

The GEAR HOLD according to the request by TCS/VDC in order to support the vehicle stability. This function can be activated in every shift mode except for MANUAL MODE. When start condition is fulfilled, gear is held to current gear. The gear hold is performed after shift control finished if start condition is fulfilled during shifting.

##### 2. Sports mode

Driver oneself can select favorite gear and enjoy sports driving of manual transmission sense by shifting shift lever from "D" to manual gear position and shift gate or steering switch M+(Up shift)/M-(Down shift). But L-up control is operated automatically. Shift control is operated again by shifting from manual gear position to "D". Following control is operated when Sports shift mode.

##### 3. L-up control

Based on rpm signals, signals from the engine control unit (engine rpm and throttle opening) and vehicle speed, smooth lock-up control is achieved through linear control of the lock-up control solenoid (SLU).

##### 4. L-up cut control

This control cuts L-up operation at shift down or idle condition and avoid engine stall by depressing brake pedal at low speed driving.

##### 5. Inhibit 5-6 shifting (low engine temp)

When engine water temperature signal detects cold, TCU prohibits 5-6 shifting.

##### 6. Torque reduction control and line pressure control

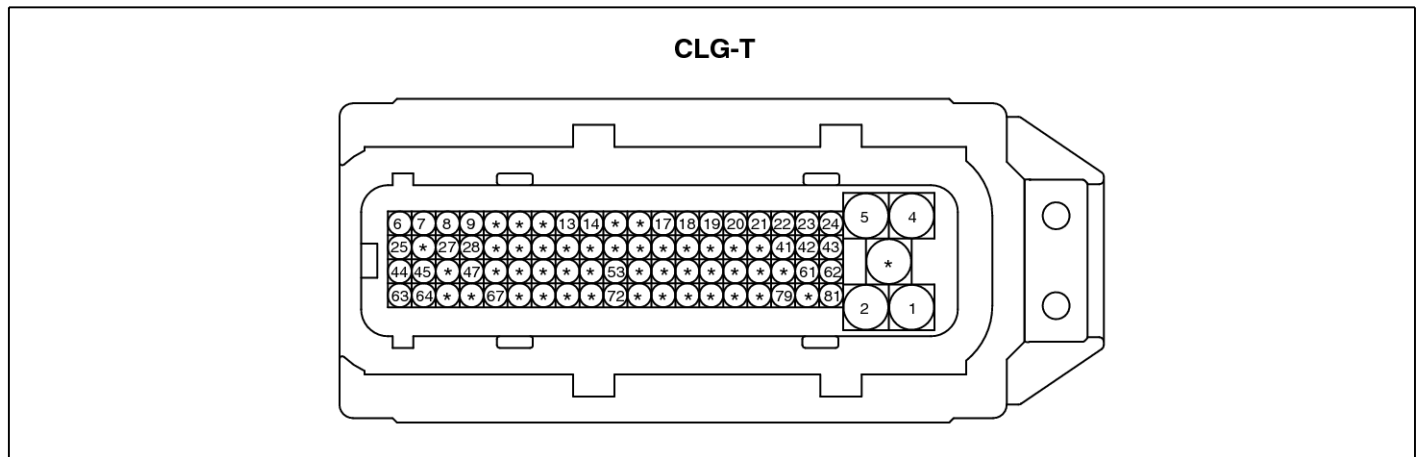
This control improves the shift quality due to sending torque reduction request signal from TCU to PCM and cutting engine torque increase of shift at 1↔2↔3↔4↔5↔6.

Line pressure control improves the shift quality due to controllable line pressure at 1↔2↔3↔4↔5↔6.

# AT-476

# Automatic Transmission System

## Terminal of TCU



SBHAT8205D

Terminal	Signal	Name	Terminal	Signal	Name
1	+B	Battery voltage (+)	28	R	Neutral start switch "R"
2	GND	TCU Ground (-)	29-40	-	-
3	-	-	41	S4	Shift solenoid S4
4	IG	Ignition switch	42	SR	Shift solenoid SR
5	IG	Ignition switch	43	SL2	Clutch pressure control solenoid No.2 (+)
6	SPG	Output speed sensor (-)	44	NT	Input speed sensor (+)
7	TIP DOWN	Manual shift switch (Down)	45	SG1	Output speed sensor ground
8	TIP UP	Manual shift switch (Up)	46	-	-
9	P	Neutral start switch "P"	47	N	Neutral start switch "N"
10-12	-	-	48-52	-	-
13	CAN H	CAN communication (CAN-H)	53	OT	Oil temperature sensor (+)
14	CAN L	CAN communication (CAN-L)	54-60	-	-
15-16	-	-	61	S1	Shift solenoid S1
17	SL1G	Clutch pressure control solenoid No.1 (-)	62	S2	Shift solenoid S2
18	SL2G	Clutch pressure control solenoid No.2 (-)	63	NTG	Input speed sensor (-)
19	SLTG	Line pressure control solenoid (-)	64	SG2	Input speed sensor Ground
20	SLUG	Lock-up control solenoid (-)	65-66	-	-
21	GND	TCU Ground (-)	67	D	Neutral start switch "D"
22	SLT	Line pressure control solenoid (+)	68-71	-	-
23	SLU	Lock-up control solenoid (+)	72	OTG	Oil temperature sensor (-)
24	SL1	Clutch pressure control solenoid No.1 (+)	73-78	-	-

# Automatic Transmission Control System

# AT-477

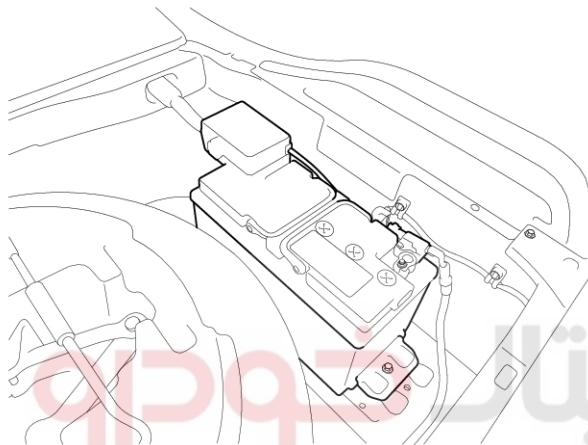
Terminal	Signal	Name	Terminal	Signal	Name
25	SP	Output speed sensor (+)	79	SFL	Shift lock solenoid
26	-	-	80	-	-
27	TIP M	Manual shift operation switch (M)	81	S3	Shift solenoid S3

## Removal

1. Disconnect (-) terminal from the battery.

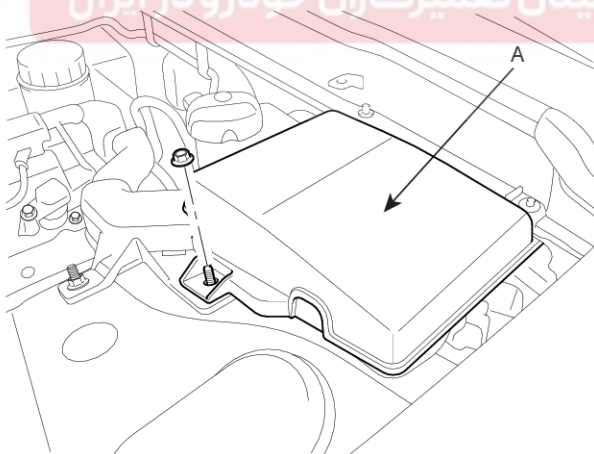
### NOTICE

The battery is placed right side of the temporary tire in the trunk.



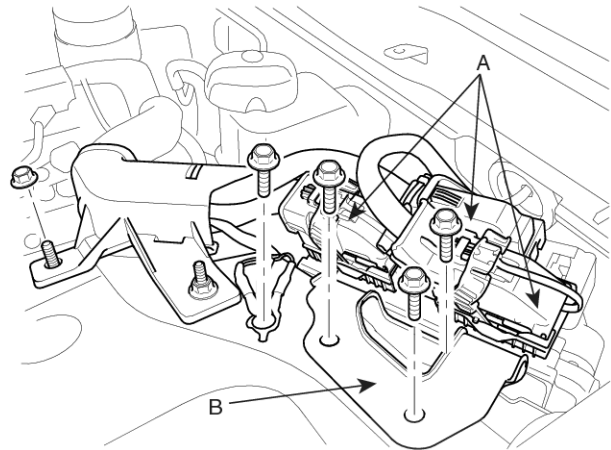
SBHAT8204D

2. Remove the plastic cover (A) from the driver's side of the engine room.



SBHAT8201D

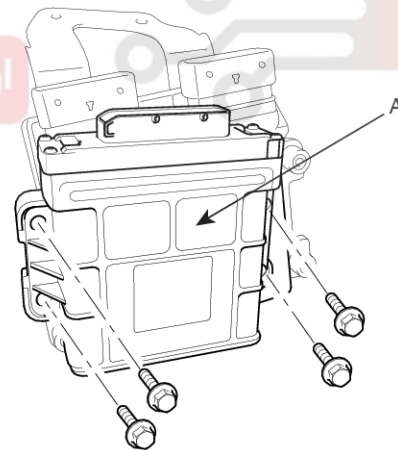
3. Disconnect the connectors (A) of ECU and TCU.



SBHAT8202D

4. Remove the ECU and TCU with the bracket (B) by removing the four bolts and the nut.

5. Remove the TCU (A) from the ECU by removing the four bolts.



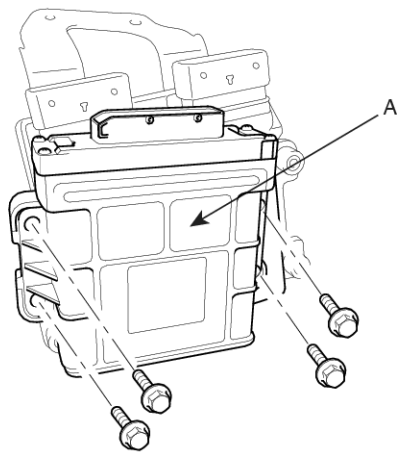
SBHAT8203D

## AT-478

## Automatic Transmission System

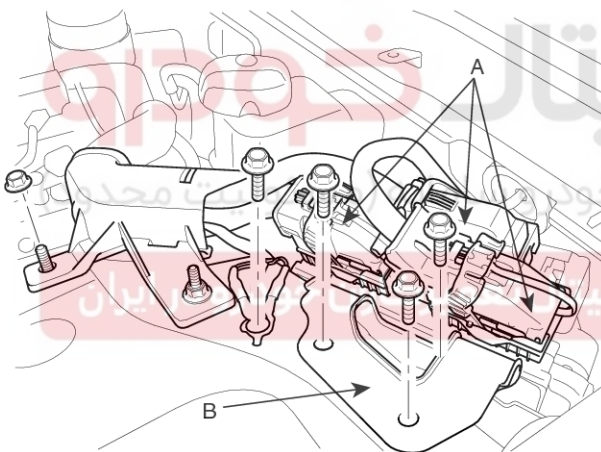
## Installation

1. Install the TCU (A) to the ECU by tightening the four bolts.



SBHAT8203D

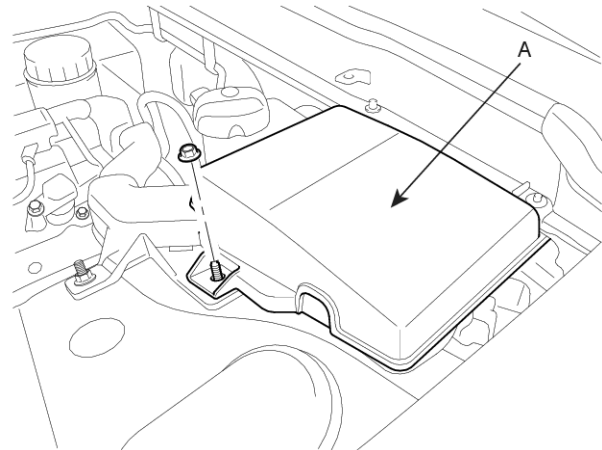
2. Install the ECU and TCU with the bracket (B) by tightening the four bolts and the nut.



SBHAT8202D

3. Connect the connectors (A) of ECU and TCU.

4. Install the plastic cover (A) to the driver's side of the engine room.

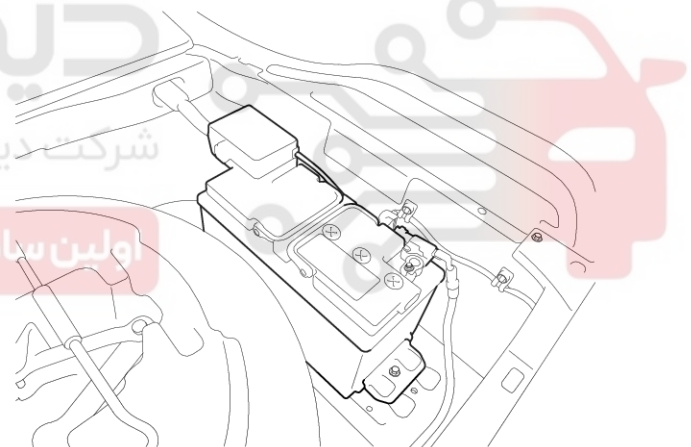


SBHAT8201D

5. Connect (-) terminal to the battery.

**NOTICE**

*The battery is placed right side of the temporary tire in the trunk.*



SBHAT8204D

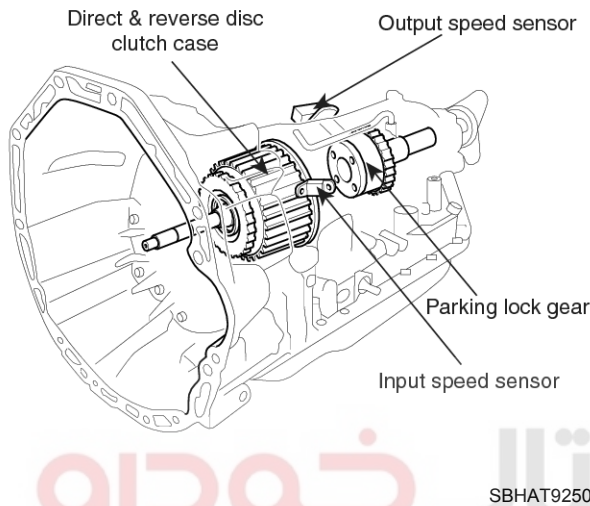
# Automatic Transmission Control System

# AT-479

## Input Speed Sensor

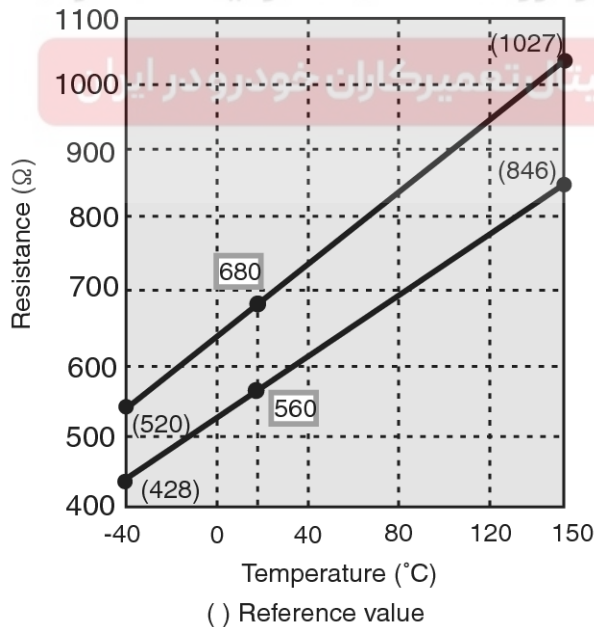
### Description

- Input speed sensor detects Input speed from rotation number of direct & reverse disc clutch case. and transmit to TCU as a signal.
- Adoption of electromagnetic pick sensor of high detection precision.



### Specification

Resistance (at 20 °C) : 560~680 Ω



SBHAT9251L

### Inspection

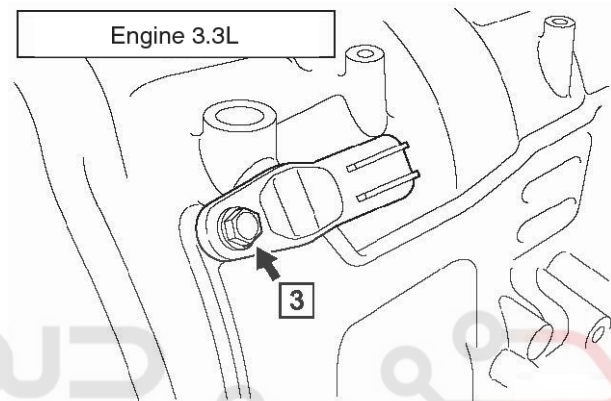
Check that the resistance between the 2 pins of the sensor is within the standard value.

### Standard value

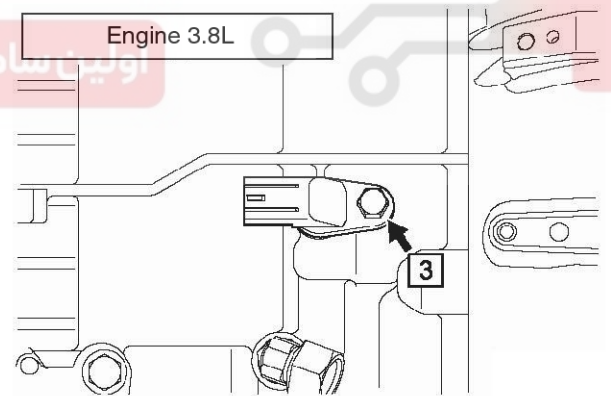
Resistance (at 20 °C) : 560~680 Ω

### Replacement

1. Remove the bolt to remove the input speed sensor from the ATM.



SBHAT9252L



SBHAT9253L

2. Install the input speed sensor with the bolt to the ATM.

### Tightening torque :

4~7 Nm(0.4~0.7 kgf.m, 2.89~5.06 lb-ft)

**Bolt size(3) :** M6x1.0x14mm

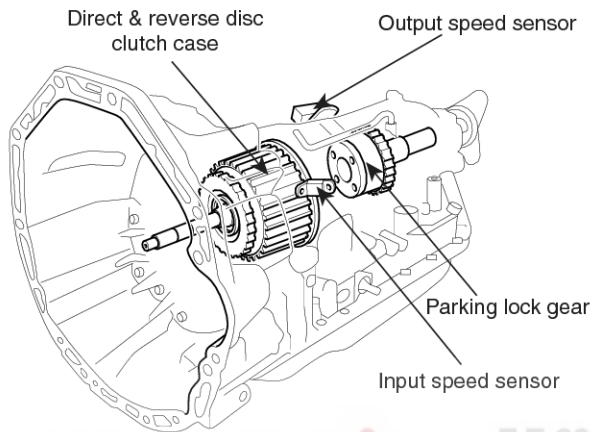
# AT-480

# Automatic Transmission System

## Output Speed Sensor

### Description

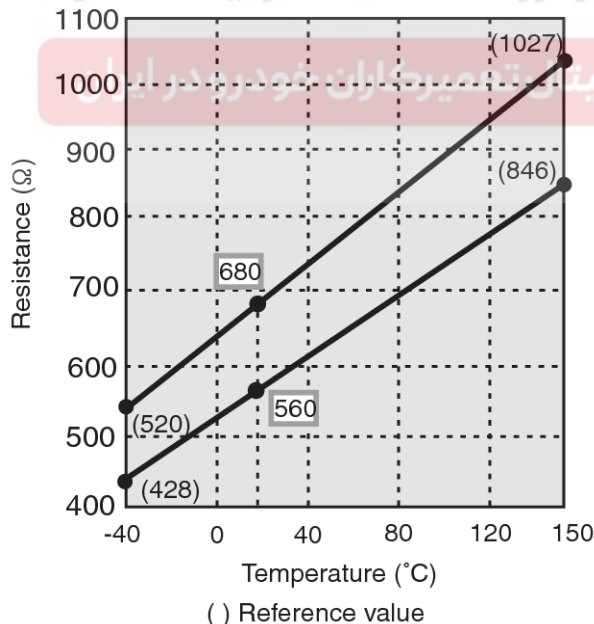
- Output speed sensor detects vehicle speed from rotation number of parking lock gear and transmit to TCU as a signal.
- Adoption of electromagnetic pick sensor of high detection precision.



SBHAT9250L

### Specification

Resistance (at 20 °C) : 560~680 Ω



SBHAT9251L

### Inspection

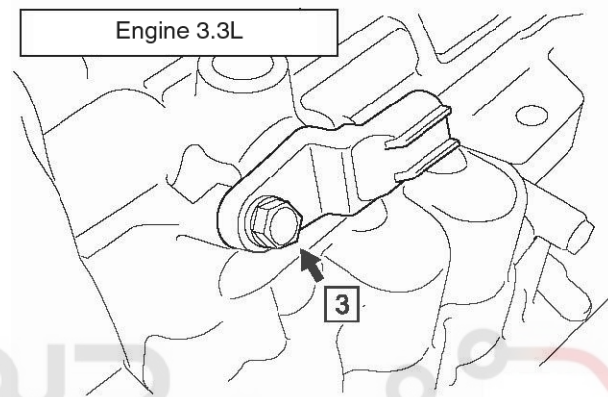
Check that the resistance between the 2 pins of the sensor is within the standard value.

### Standard value

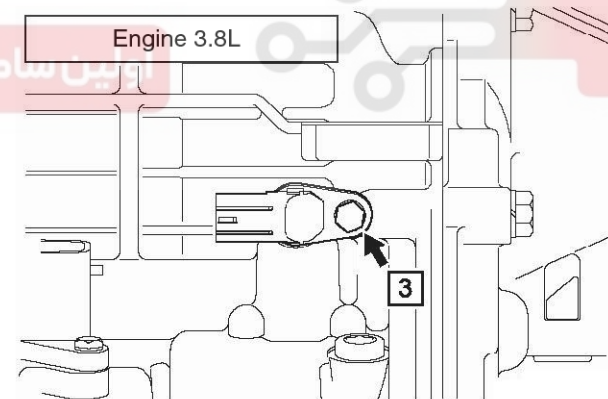
Resistance (at 20 °C) : 560~680 Ω

### Replacement

1. Remove the bolt to remove the input speed sensor from the ATM.



SBHAT9254L



SBHAT9255L

2. Install the input speed sensor with the bolt to the ATM.

### Tightening torque :

4~7 Nm(0.4~0.7 kgf.m, 2.89~5.06 lb-ft)

**Bolt size(3) :** M6x1.0x14mm

# Automatic Transmission Control System

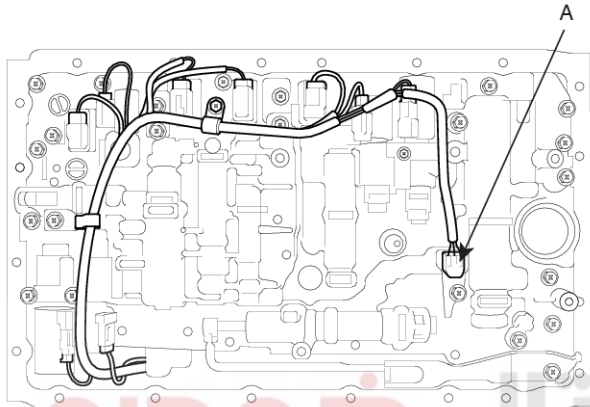
# AT-481

## Transaxle Oil Temperature Sensor

### Description

- The oil temperature sensor (A), which is integrated with the transmission wires, is installed on the front valve body.

It directly detects the oil temperature within the hydraulic pressure control circuit and transmits a signal based on that temperature to the TCU.



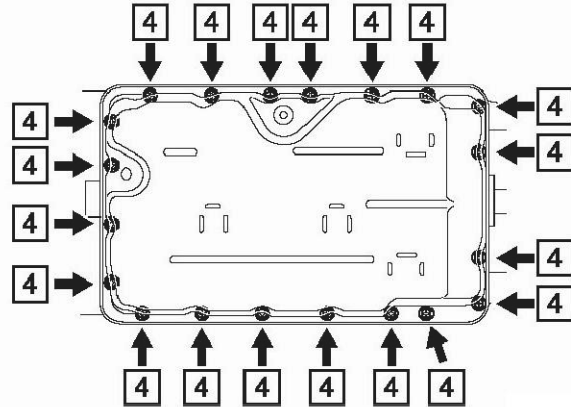
SBHAT8270D

### Specification

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

### Removal

- Remove the drain plug and the gasket from the oil pan to drain ATF.
- Remove the 20 bolts.



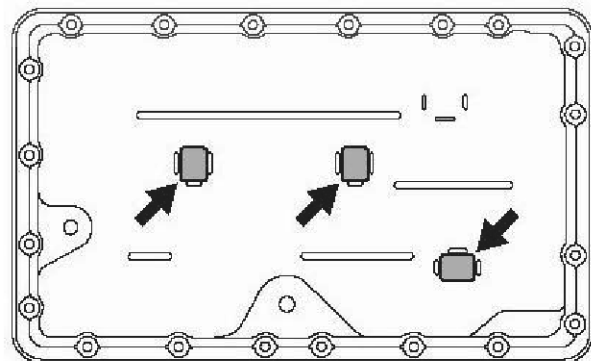
SBHAT8271D

- Take off the oil pan by using the special service tool(09215-3C000) or a plastic hammer with care.

### CAUTION

- Be careful not to damage the fitting surfaces of the transmission case and the oil pan.
- Be careful not to deform the oil pan.

- Remove the 3 oil cleaner magnets from the oil pan.



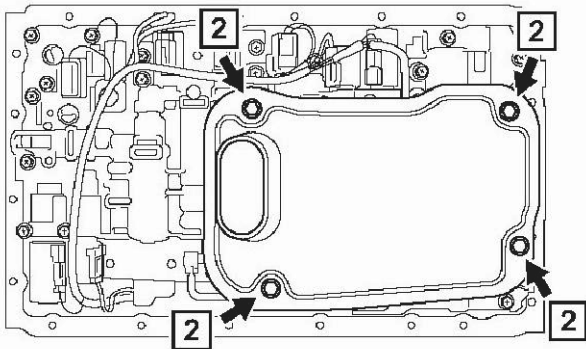
SBHAT8272D



# AT-482

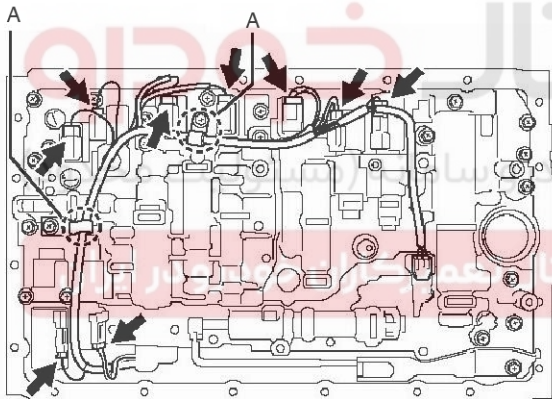
# Automatic Transmission System

- Remove the 4 bolts to remove the oil strainer from the valve body assembly.



SBHAT8273D

- Disconnect the 9 solenoid connectors from the solenoids and the transmission wire from the 2 clamps (A).

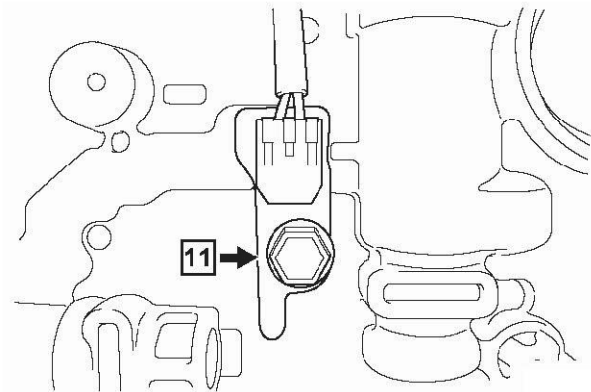


SBHAT8274D

- Remove the bolt to remove the locking plate from the valve body assembly.

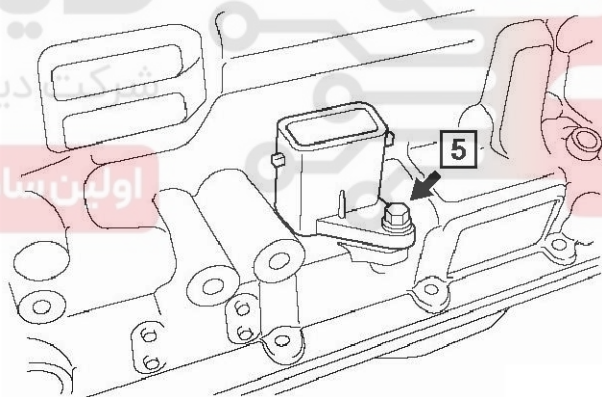
**NOTICE**

The ATF oil temperature sensor is placed in the locking plate.



SBHAT8275D

- Pull out solenoid valve connector and the O-ring after removing the bolt.



SBHAT8276D

- Pull out the transmission wire through the hole for the connector.

**CAUTION**

Be careful not to damage the connector and sensor on the wire.

# Automatic Transmission Control System

# AT-483

## Installation

1. Insert a new "O" ring to the transmission wire and install the wire through the hole on the transmission case.

### O-ring size:

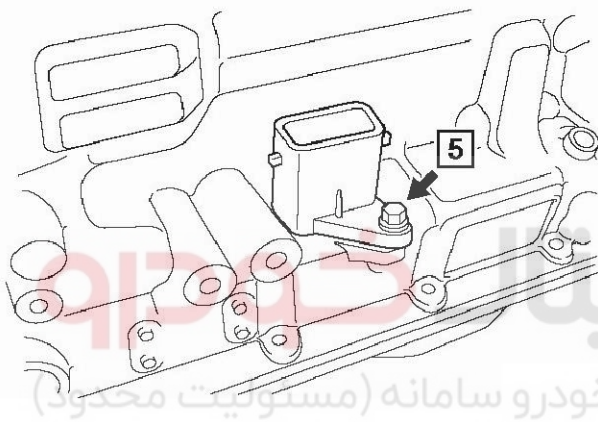
inner dia.-21.80mm(0.858in),  
thickness-2.40mm(0.0945in)

2. Install the bolt to place the connector on the transmission case.

### Tightening torque :

4~7 Nm(0.4~0.7 kgf.m, 2.89~5.06 lb-ft)

**Bolt size(5) :** M6x1.0x21mm



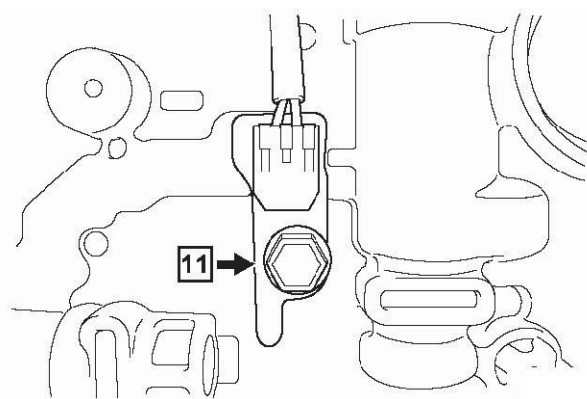
SBHAT8276D

3. Install the ATF temperature sensor and the lock plate with the bolt to the valve body assembly.

### Tightening torque :

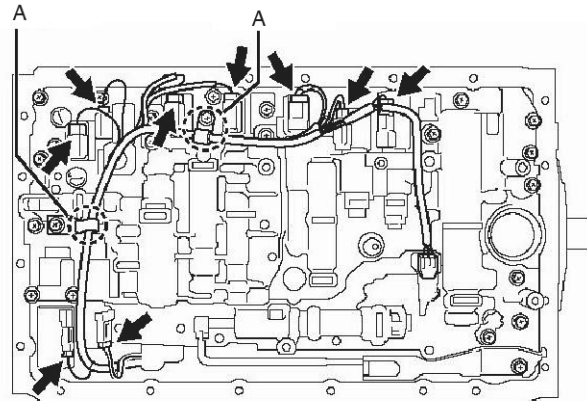
8.2~12.0 Nm(0.82~1.20 kgf.m, 5.93~8.68 lb-ft)

**Bolt size(11) :** M6x1.0x12mm



SBHAT8275D

4. Connect the transmission wire to the 2 clamps (A) and the 9 solenoid connectors to the solenoids.



SBHAT8274D

5. Coat a new "O" ring with ATF and install it to the oil strainer.

### O-ring size:

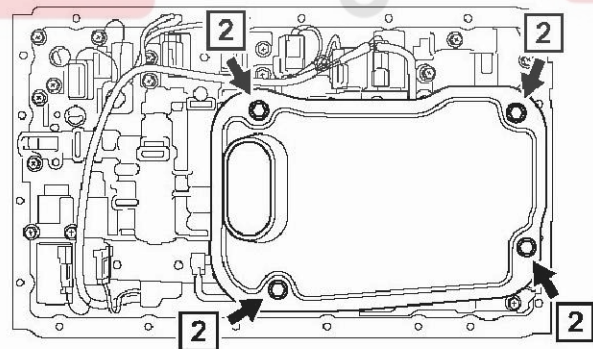
inner dia.-31.00mm(1.22in), thickness-2.72mm(0.107in)

6. Install the oil strainer with the 4 bolts to the valve body assembly.

### Tightening torque :

8.2~12.2 Nm(0.82~1.22 kgf.m, 5.93~8.82 lb-ft)

**Bolt size(11) :** M6x1.0x16mm



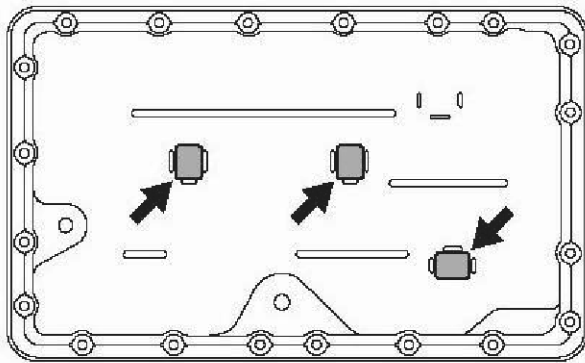
SBHAT8273D

7. Clean the contact surfaces of oil pan and transmission case.

# AT-484

# Automatic Transmission System

8. Install the 3 oil cleaner magnets to the oil pan.



SBHAT8272D

9. Install a new oil pan gasket (A) and the oil pan to the transmission case by tightening the 20 bolts.

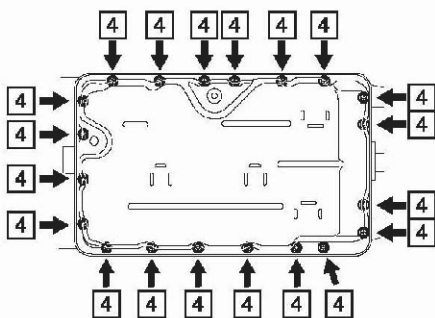
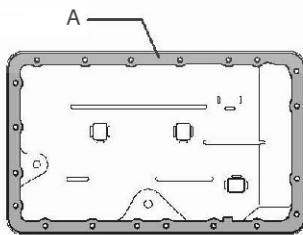
**Tightening torque :**

6~8 Nm(0.6~0.8 kgf.m, 4.34~5.78 lb-ft)

**Bolt size(4) :** M6x1.0x14.5mm

**CAUTION**

- Be careful not to damage the fitting surfaces of the transmission case and the oil pan.
- Be careful not to deform the oil pan.
- Be reminded that bolts might be damaged if tightened too much since the gasket is cork-made and there is little tightening sense.



SBHAT8277D

10. Install a new gasket and the drain plug to the oil pan.

**Tightening torque :**

17.9~23.0Nm(1.79~2.30 kgf.m, 12.95~16.63 lb-ft)

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

# Automatic Transmission Control System

# AT-485

## Inhibiter Switch

### Description

NSW transmits the information which range includes shift lever of A/T to TCU by combination of a position circuit terminal.

- 1 It is possible for NSW to start an engine in only "P" and "N".  
(Prevention of reckless driving)
- 2 It is used for NSW to shift control.

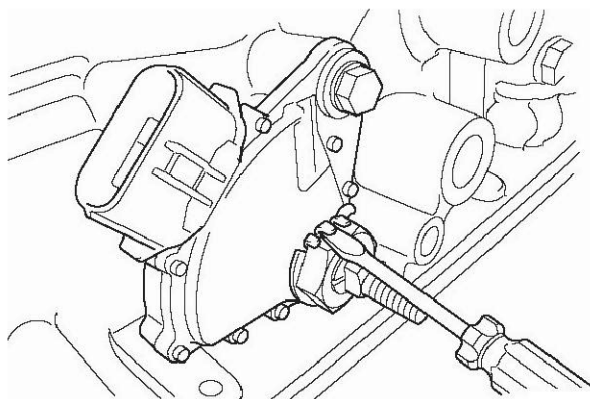


	Starter		Lever position				
	ST+	ST-	IG	P	R	N	D
P	○	○	○	○			
R			○		○		
N	○	○	○			○	
D			○				○

SBHAT9260L

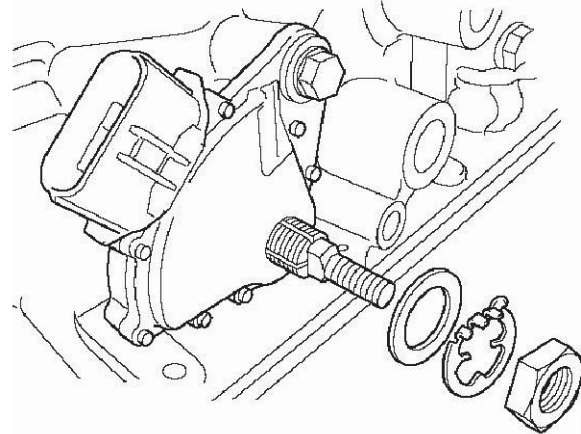
### Removal

1. Remove the shift control cable assembly and the connector from the neutral start switch.
2. Using a screwdriver, pry off the lock washer.



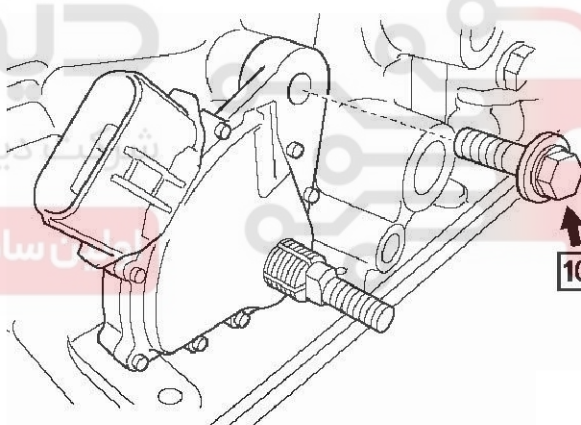
SBHAT8261D

3. Remove the nut to remove the lock washer and the washer.



SBHAT8262D

4. Remove the seal bolt to remove the neutral start switch.



SBHAT8263D

# AT-486

# Automatic Transmission System

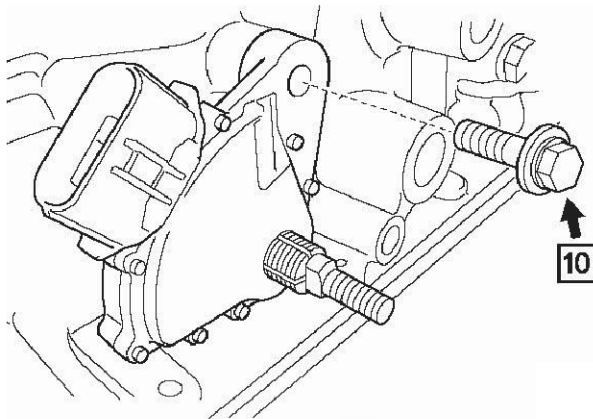
## Installation

1. Temporarily install the neutral start switch with the new seal bolt.

**Bolt size(10) :** M8x1.25x30mm (Seal bolt)

**CAUTION**

Tighten the bolt after adjusting the neutral start switch to "N" position.

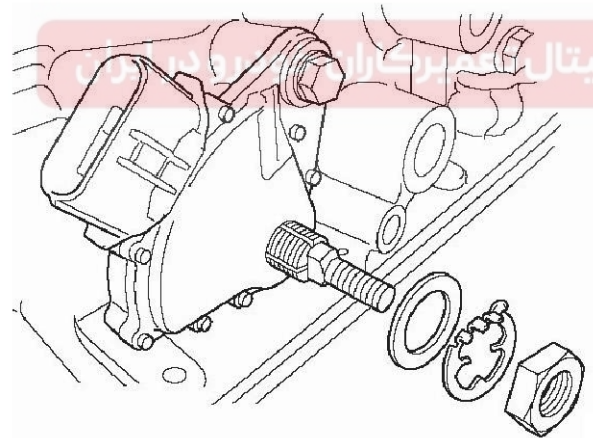


SBHAT8263D

2. Install the washer and the lock washer with the nut.

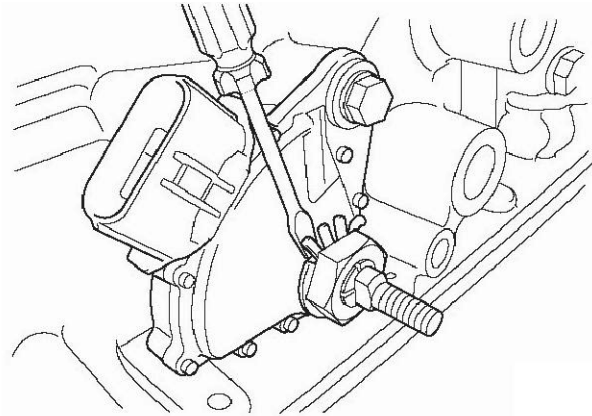
**Tightening torque :**

6~8 Nm(0.6~0.8 kgf.m, 4.34~5.78 lb-ft)



SBHAT8262D

3. Using a screwdriver, stake the lock washer.

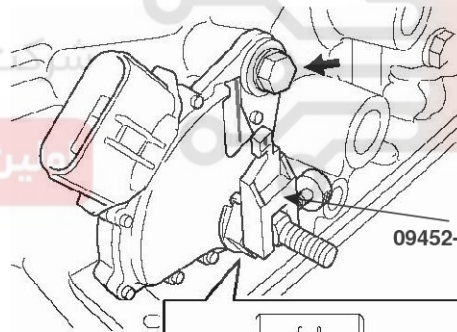


SBHAT8264D

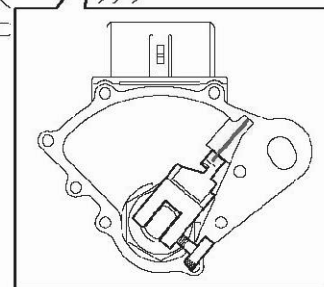
4. Adjust the manual valve lever shaft to "N" position.
5. Set SST to the manual valve lever shaft.
6. Align the reference line of the special service tool(09452-3M400) with the neutral reference line of the neutral start switch, and tighten the bolt.

**Tightening torque :**

10~16 Nm(1.0~1.6 kgf.m, 7.23~11.57 lb-ft)



09452-3M400



SBHAT8265D

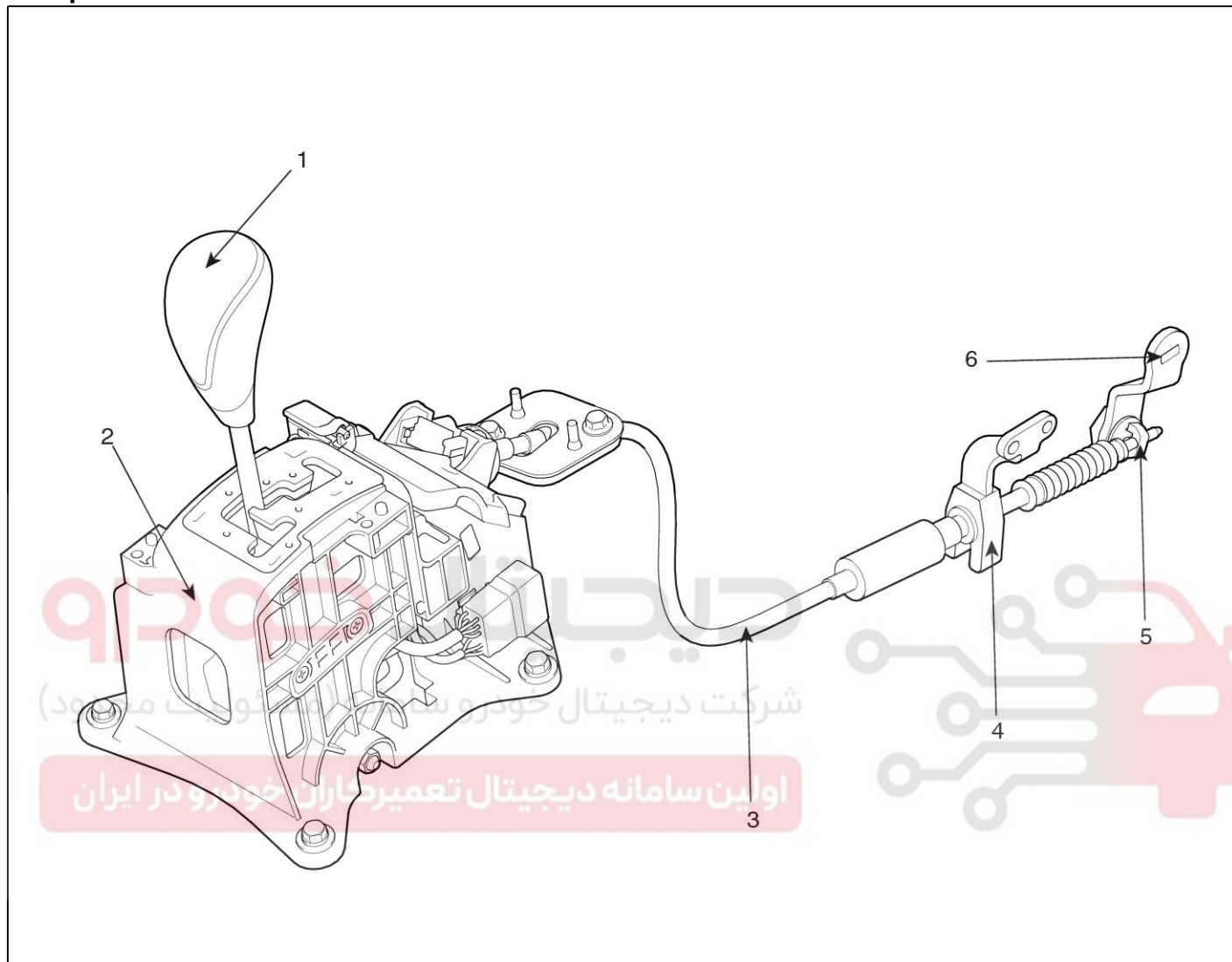
7. Adjust the manual valve lever shaft to "P" position.
8. Install the shift control cable assembly and the connector to the neutral start switch.

# Automatic Transmission Control System

## AT-487

### Shift Lever

#### Components



SBHAT8100D

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

4. Bracket
5. Special bolt
6. Manual lever

# AT-488

# Automatic Transmission System

## Inspection

### How To Adjust Shift Cable

1. Insert the shift cable to the bracket and hold it with a new clip.
2. Align the manual lever hole to the hole on the transmission case and hold the position with a bar.
3. Eliminate shift cable free play of the shift cable.
4. Firmly hold the special bolt with a spanner and tighten the nut with the specified torque.

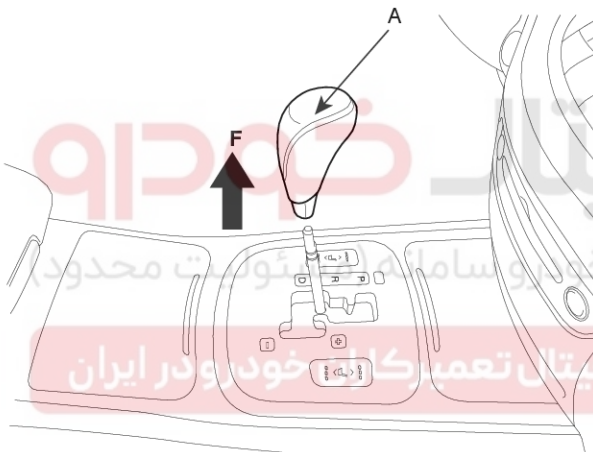
### Tightening torque :

13~16 Nm(1.3~1.6 kgf.m, 9.40~11.57 lb-ft)

5. Take off the bar holding the manual lever.
6. Shifting the each position, check that the shift lever moves smoothly.

## Removal

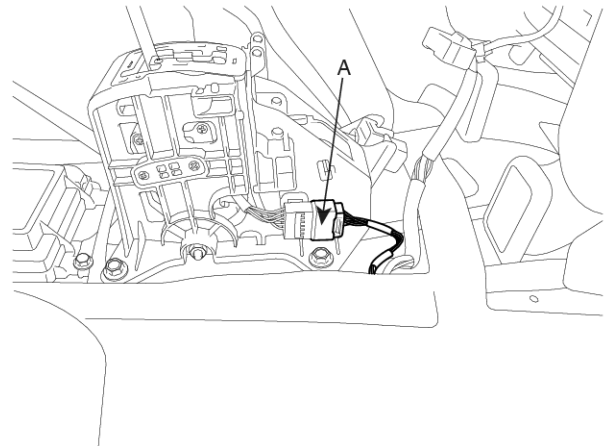
1. Pull the shift lever knob (A) upward to remove.



SBHAT8101D

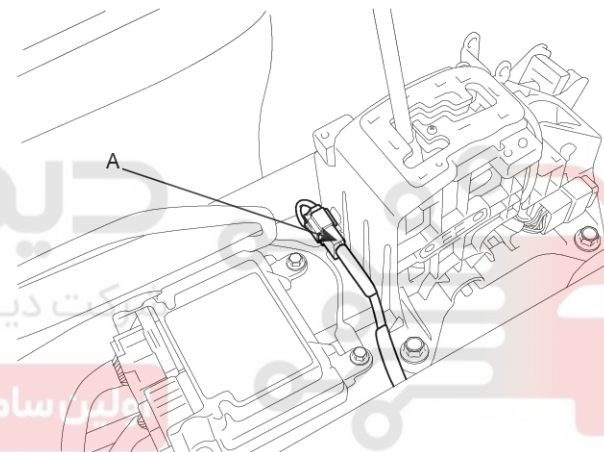
2. Remove the center console. (refer to Console in DS group)

3. Disconnect the sport mode connector (A).



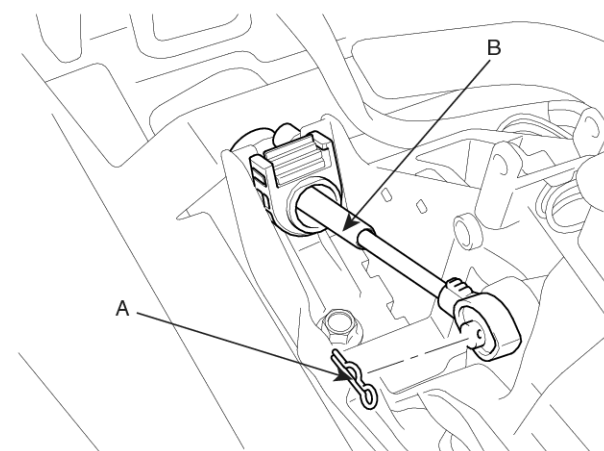
SBHAT8102D

4. Disconnect the wire (A) for the airbag assembly.



SBHAT8103D

5. Take off the clip (A) and remove the shift cable assembly (B).

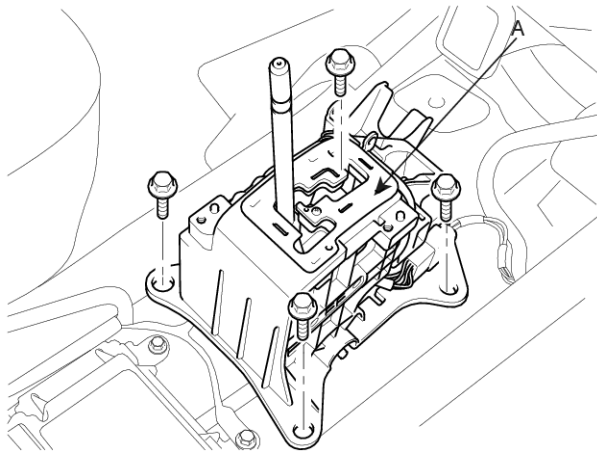


SBHAT8104D

# Automatic Transmission Control System

# AT-489

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



SBHAT8105D

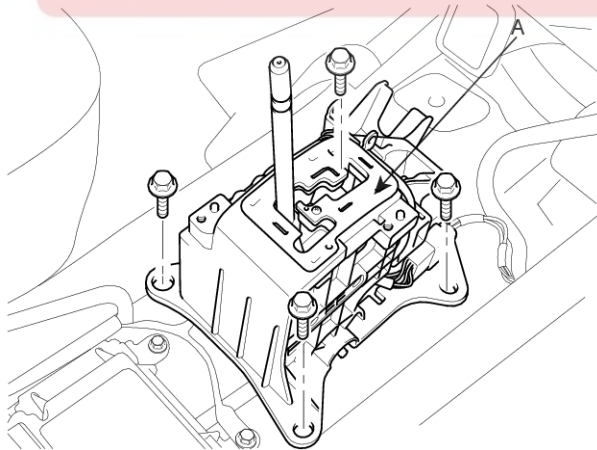
- Remove the shift cable assembly from the transmission (refer to Transmission Removal)
- Pull the rubber plug on the floor and pull out the shift cable assembly.

## Installation

- Insert the shift cable assembly and place the rubber plug on the floor.
- Install the shift lever assembly (A) by tightening the four bolts.

### Tightening torque :

9~14 Nm(0.9~1.4 kgf.m, 6.51~10.12 lb-ft)

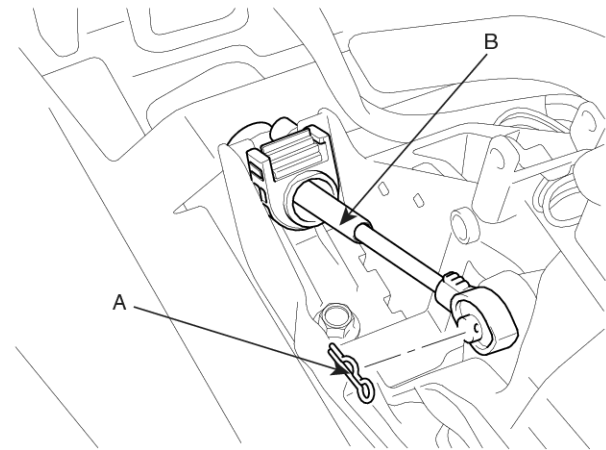


SBHAT8105D

- Install the shift cable assembly (B) and insert the clip (A).

### CAUTION

Place the waving shape end of the shift cable upward.



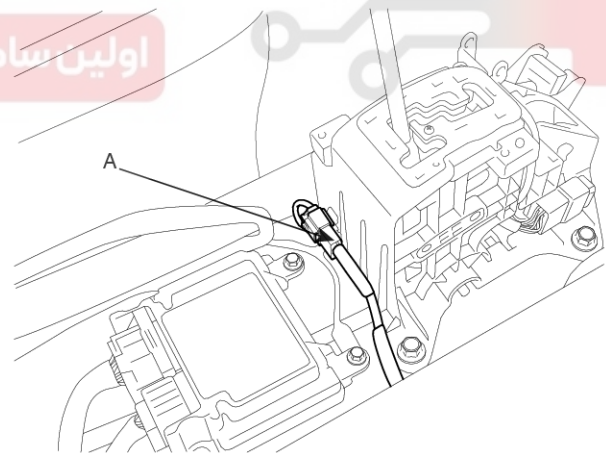
SBHAT8104D

- Install the shift cable assembly to the transmission (refer to Transmission Installation)

### CAUTION

Check that the shift cable is installed properly referring to 'How to adjust the shift cable'.

- Connect the wire (A) for the airbag assembly.

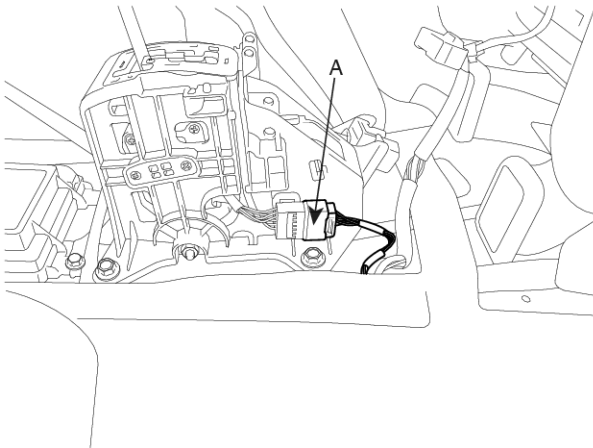


SBHAT8103D



**AT-490****Automatic Transmission System**

6. Connect the sport mode connector (A).



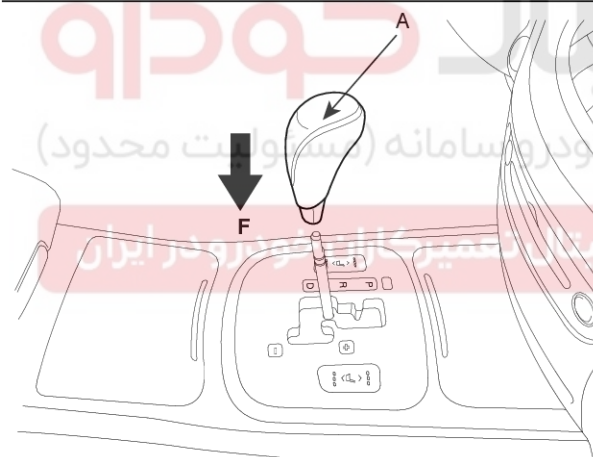
SBHAT8102D

7. Install the center console. (refer to Console in DS group)

8. Insert the shift lever knob (A) with the specified force.

**Specification :**

2.2~3.6 N (22~36 kgf, 48.5~79.4 lb)



SBHAT8106D

