GROUP 23A

AUTOMATIC TRANSMISSION (FF)

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SERVICE SPECIFICATIONS

M1231000300412

Item		Standard value
A/T fluid temperature sensor resistance kΩ	At 0°C	16.7 – 20.5
	At 20°C	7.3 – 8.9
	At 40°C	3.4 – 4.2
	At 60°C	1.9 – 2.2
	At 80°C	1.0 – 1.2
	At 100°C	0.57 – 0.69
Damper clutch control (DCC) solenoid valve coil resistance (at 20°C) Ω		2.7 – 3.4
Low & reverse (LR) solenoid valve coil resistance (at 20°C) Ω		2.7 – 3.4
Second (2ND) solenoid valve coil resistance (at 20°C) Ω		2.7 – 3.4
Underdrive (UD) solenoid valve coil resistance (at 20°C) Ω		2.7 – 3.4
Overdrive (OD) solenoid valve coil resistance (at 20°C) Ω		2.7 – 3.4
Stall speed r/min		2,300 – 2,800
Line pressure MPa		1,01 – 1,05

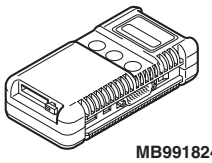
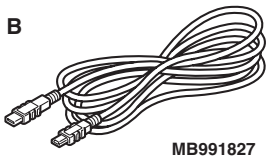
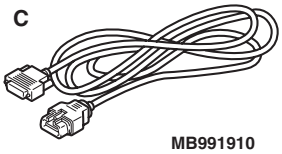
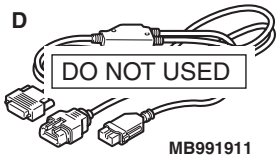
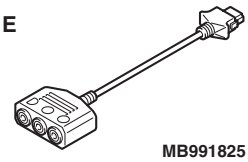
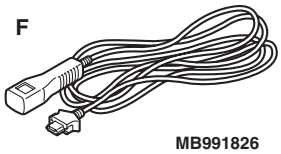
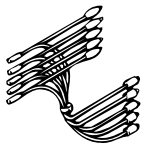
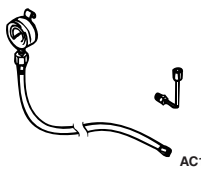
LUBRICANTS

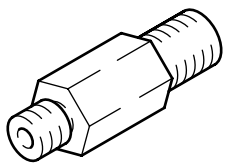
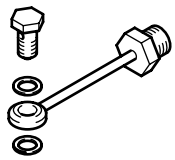
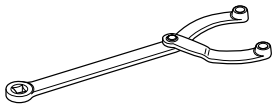
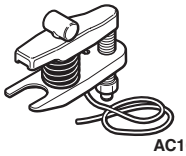
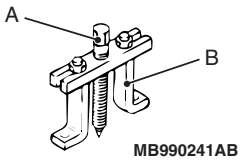
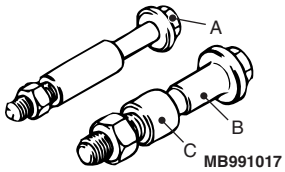
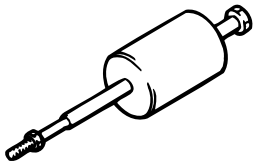
M1231000400475

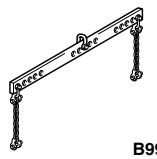
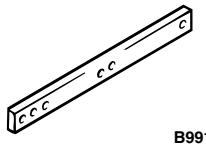
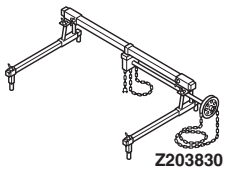
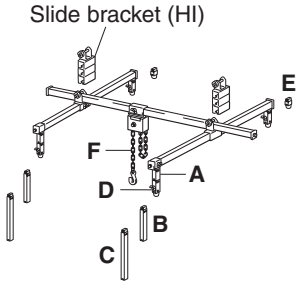
Item	Specified lubricants	Capacity L
A/T fluid	DIA QUEEN ATF SP III	7.7

SPECIAL TOOL(S)

M1231000600509

Tools	No.	Name	Application
A  MB991824 B  MB991827 C  MB991910 D  MB991911 E  MB991825 F  MB991826 MB991955	MB991955 A: MB991824 B: MB991827 C: MB991910 D: MB991911 E: MB991825 F: MB991826	MUT-III sub-assembly A: Vehicle Communication Interface (V.C.I.) B: MUT-III USB cable C: MUT-III main harness A (Vehicles with CAN communication system) D: MUT-III main harness B (Vehicles without CAN communication system) E: MUT-III measurement adapter F: MUT-III trigger harness	Checking the A/T **⚠ CAUTION** **For vehicles with CAN communication, use MUT-III main harness A to send simulated vehicle speed. If you connect MUT-III main harness B instead, the CAN communication does not function correctly.**
 MB991658	MD991658	Test harness	Voltage measurement
 AC103525	MD998330 (including MD998331)	Oil pressure gauge (3.0 MPa)	Hydraulic pressure measurement

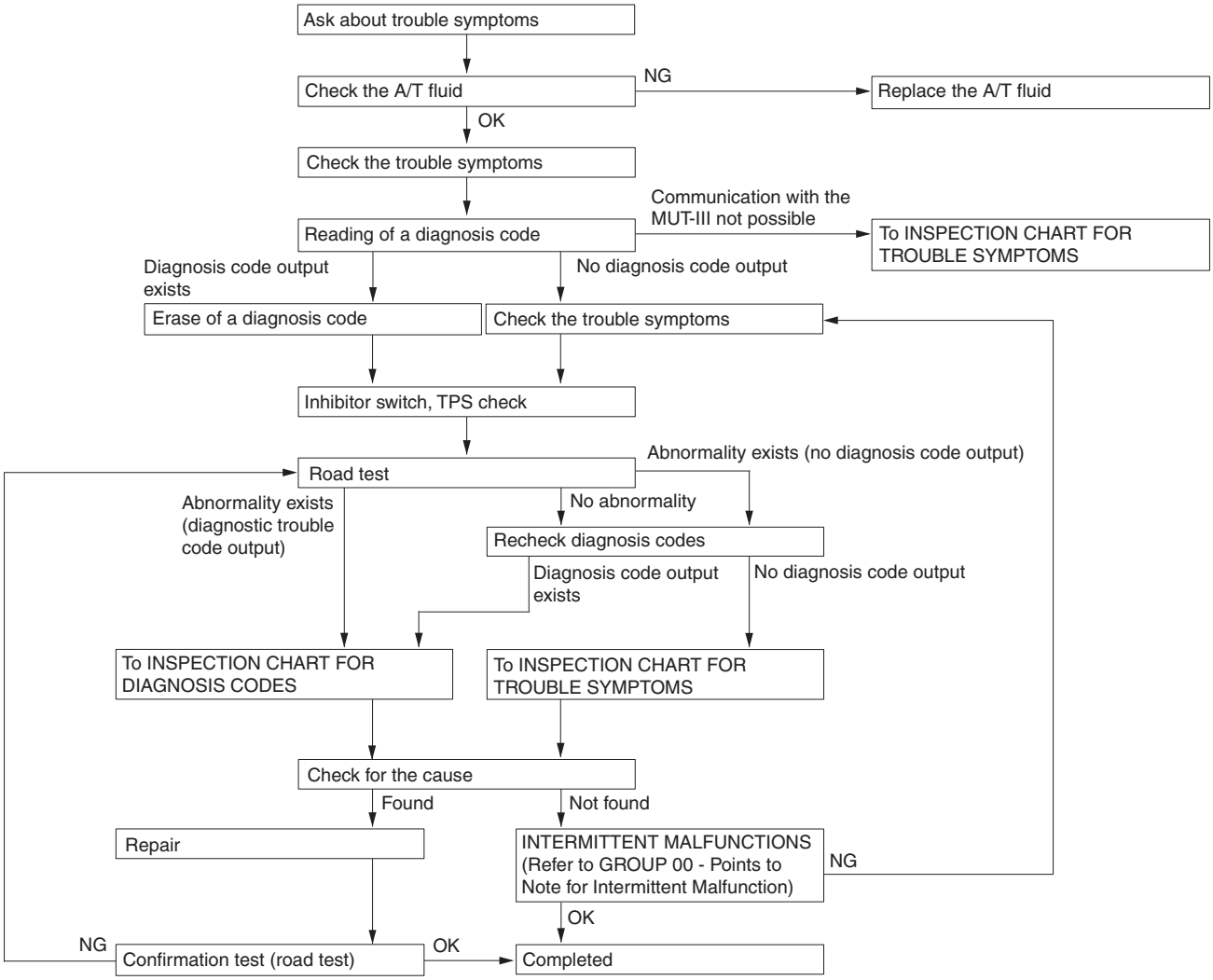
Tools	No.	Name	Application
	MD998332	Adapter	Oil pressure gauge connection
	MD998900		
 B990767	MB990767	End yoke holder	Fixing of the hub
 AC106827	MB991897	Ball joint remover	Knuckle and tie rod end ball joint disconnection *NOTE: Steering linkage puller (MB990635 or MB991113)is also used to disconnect knuckle and tie rod end ball joint.*
 MB990241AB	MB990241 A:MB990242 B:MB990244	Axle shaft puller A: Puller shaft B: Puller bar	• Drive shaft removal • Hub assembly removal
 MB991017	A:MB991017 B:MB990998 C:MB991000	A, B: Front hub remover and installer C: Spacer	Wheel bearing temporarily fixing *NOTE: Use MB991000 (a part of MB990998) for spacer*
	MB991721	Sliding hammer	Output shaft removal

Tools	No.	Name	Application
 B991454	MB991454	Engine hanger balancer	When the engine hanger is used: Supporting the engine assembly during removal and installation of the transmission assembly *NOTE: Special tool MB991454 is a part of engine hanger attachment set MB991453.*
 B991527	MB991527	Hanger	
 Z203830	MB991895	Engine hanger	
 B991928	MB991928 A: MB991929 B: MB991930 C: MB991931 D: MB991932 E: MB991933 F: MB991934	Engine hanger A: Joint (50) × 2 B: Joint (90) × 2 C: Joint (140) × 2 D: Foot (standard) × 4 E: Foot (short) × 2 F: Chain and hook assembly	

TROUBLESHOOTING <A/T>

STANDARD FLOW OF DIAGNOSIS TROUBLESHOOTING

M1231013500472

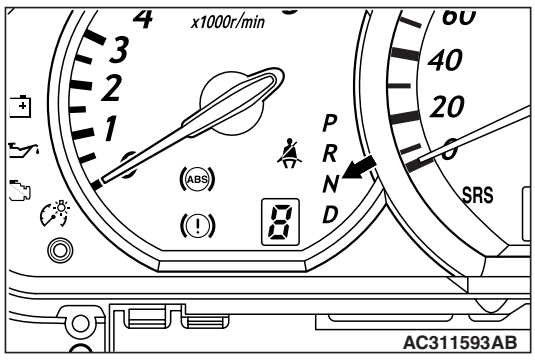


AC212495

DIAGNOSIS FUNCTION

M1231019000237

N RANGE LAMP SYSTEM



AC311593AB

If there is a problem with any of the A/T system, the N range lamp will flash at a rate of approximately once per second.
If the N range lamp is flashing at a rate of approximately once per second, check the diagnosis output.

N range lamp flashing item

- Input shaft speed sensor system
- Output shaft speed sensor system
- Solenoid valve system
- Non-synchronization at various shift ranges
- A/T control relay system

NOTE: If the "N" range lamp is flushing approximately twice per second, the A/T fluid temperature is high. (It flushes when the fluid is approximately 125°C or more and goes off when the fluid is approximately 115°C or less).

METHOD OF READING THE DIAGNOSIS CODE

Use the MUT-III to read the diagnosis code (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points P.00-5).

METHOD OF ERASING THE DIAGNOSIS CODE

Use the MUT-III to erase the diagnosis code (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points P.00-5).

HOW TO INITIALISE A/T LEARNING VALUE

M1231022600024

AIM

The use of EEPROM has enabled the A/T learned value to be retained even after the battery terminals are disconnected. However, the learned value should be initialised if the A/T assembly, the engine assembly, the valve body assembly or the solenoid valves are replaced. The initialization procedure is as below:

INITIALIZATOIN PROCEDURE

1. Shift the selector lever to the P range and turn the ignition switch to the LOCK (OFF) position. Then, connect the MUT-III to the diagnosis connector.
2. Initialize the learned value on the initializaion screen.
3. After this initialization, make the system learn the idling in accordance with "Learning procedure for idling in MPI engine" (Refer to GROUP 00 – Precautions before Service P.00-18).

ROAD TEST

M1231007800485

Procedure	Pre-test/operation conditions	Test/operation	Judgment value	Check item	Diagnosis code No.	Inspection procedure if there is an abnormality
1	Ignition switch: LOCK (OFF) position	Ignition switch (1) ON	Data List No.54 (1) System voltage [V]	A/T control relay	54	A/T control relay system

Procedure	Pre-test/operation conditions	Test/operation	Judgment value	Check item	Diagnosis code No.	Inspection procedure if there is an abnormality
2	Ignition switch: ON Engine: Stopped Selector lever position: P	Selector lever position (1) P (2) R (3) N (4) D	Data List No.61 (1) P (2) R (3) N (4) D	Inhibitor switch	27, 28	Inhibitor switch system
		Selector lever position (1) D (2) Select the sport mode (3) Upshift and hold the selector lever in that position (2nd gear) (4) Downshift and hold the selector lever in that position (1st gear)	Data List No.67 (1) OFF (2) ON (3) ON (4) ON	Select switch	–	Sport mode switch system
			Data List No.68 (1) OFF (2) OFF (3) ON (4) OFF	Upshift switch		
			Data List No.69 (1) OFF (2) OFF (3) OFF (4) ON	Downshift switch		
			Shift indicator lamp (1) Only D illuminates (2) Only 1 illuminates (3) Only 2 illuminates (4) Only 1 illuminates	Shift indicator lamp		
		Accelerator pedal (1) Fully closed (2) Depressed (3) Fully opened	Data List No.11 (1) 300 – 700 mV (2) Gradually increases from (1) (3) 4,000 mV or more	TPS	–	TPS system
		Brake pedal (1) Depressed (2) Released	Data List No.26 (1) ON (2) OFF	Stop lamp switch	26	Stop lamp switch system
3	Ignition switch: START	Starting test at P or N position	Starting should be possible	Starting possible/not possible	–	Starting not possible

Procedure	Pre-test/operation conditions	Test/operation	Judgment value	Check item	Diagnosis code No.	Inspection procedure if there is an abnormality
4	Driving after engine has warmed up	Drive for 15 minutes or more until the A/T fluid temperature rises to 70 – 80 °C.	Data List No.15 Gradually rises to 70 – 80 °C	A/T fluid temperature sensor	15, 16	A/T fluid temperature sensor system

Procedure	Pre-test/operation conditions	Test/operation	Judgment value	Check item	Diagnosis code No.	Inspection procedure if there is an abnormality
5	Engine: idle Selector lever position: N	Brake pedal (re-test) (1) Depressed (2) Released	Data List No.26 (1) ON (2) OFF	Stop lamp switch	26	Stop lamp switch system
		A/Cswitch (1) ON (2) OFF	Data List No.65 (1) ON (2) OFF	A/C compressor relay	–	A/C compressor relay system
		Accelerator pedal (1) Fully closed (2) Depressed	Data List No.0000 (1) The engine speed displayed on the tachometer is identical to the engine speed displayed on MUT-III. (2) Gradually increases from (1)	Crank angle sensor	21	Crank angle sensor system
		Selector lever position (1) N to D (2) N to R	No abnormal shock during shifting Within 2 seconds of time lag	Malfunction when starting off	–	Engine stalls during shifting
					–	N to D shocks, large time lag
					–	N to R shocks, large time lag
					–	N to D, N to R shocks, large time lag
				Driving not possible	–	Does not move forward
					–	Does not reverse
					–	Does not move (forward or reverse)

Procedure	Pre-test/operation conditions	Test/operation	Judgment value	Check item	Diagnosis code No.	Inspection procedure if there is an abnormality
6	Selector lever position: Sport mode (Must be done on a level and straight road.)	Selector lever position and vehicle speed (Each condition should be maintained for 10 seconds or more.) (1) Engine idling in 1st gear (vehicle stopped) (2) Driving at constant speed of 10 km/h in 1st gear (3) Driving at constant speed of 20 km/h in 2nd gear (4) Driving at constant speed of 30 km/h in 3rd gear (5) Driving at constant speed of 50 km/h in 4th gear	Data List No.63 (2) 1st (3) 2nd (4) 3rd (5) 4th	Shift position	–	–
			Data List No.31 (2) 0 % (3) 100 % (4) 100 % (5) 100 %	LR solenoid valve duty %	31	LR solenoid valve system
			Data List No.32 (2) 0 % (3) 0 % (4) 0 % (5) 100 %	UD solenoid valve duty %	32	UD solenoid valve system
			Data List No.33 (2) 100 % (3) 0 % (4) 100 % (5) 0 %	2NDsolenoid valve duty %	33	2ND solenoid valve system
			Data List No.34 (2) 100 % (3) 100 % (4) 0 % (5) 0 %	OD solenoid valve duty %	34	OD solenoid valve system
			Data List No.29 (1) 0 km/h (4) 50 km/h	Vehicle speed signal	–	Vehicle speed signal system
			Data List No.0001 (4) 1,600 – 1,900 r/min	Input shaft speed sensor	22	Input shaft speed sensor system
			Data List No.0002 (4) 1,600 – 1,900 r/min	Output shaft speed sensor	23	Output shaft speed sensor system

Procedure	Pre-test/operation conditions	Test/operation	Judgment value	Check item	Diagnosis code No.	Inspection procedure if there is an abnormality
7	Selector lever position: Sport mode (Must be done on a level and straight road.)	Selector lever position and vehicle speed (1) Driving at constant speed 60 km/h in 3rd gear (2) Driving at 60 km/h in 3rd gear, then fully close the accelerator pedal	Data List No.36 (1) 70 – 99.6 % (2) 70 – 99.6 % to 0%	DCC solenoid valve duty %	36, 52	DCC solenoid valve system
			Data List No.52 (1) –10 – 10 r/min (2) The value changes from (1)	DCC amount of slippage		
8	Suspends the INVECS-II function using MUT-III Selector lever position: D (Must be done on a level and straight road)	(1) Accelerate to 4th range at a TPS output of 1.5 V (opening angle 20%). (2) Slowly decelerate and stop. (3) Accelerate to 4th range at a TPS output of 2.5 V (opening angle 50%).	Data List No.11, 0002 The shifting points correspond with the MUT-III display and the TPS voltage (opening angle) and output shaft speed, which are described in the standard shift pattern.	Problem during shifting	–	Shocks, engine racing
				Incorrect shift points	–	All points
					–	Some points
				No shifting	–	No diagnosis codes
					22	Input shaft speed sensor system
					23	Output shaft speed sensor system

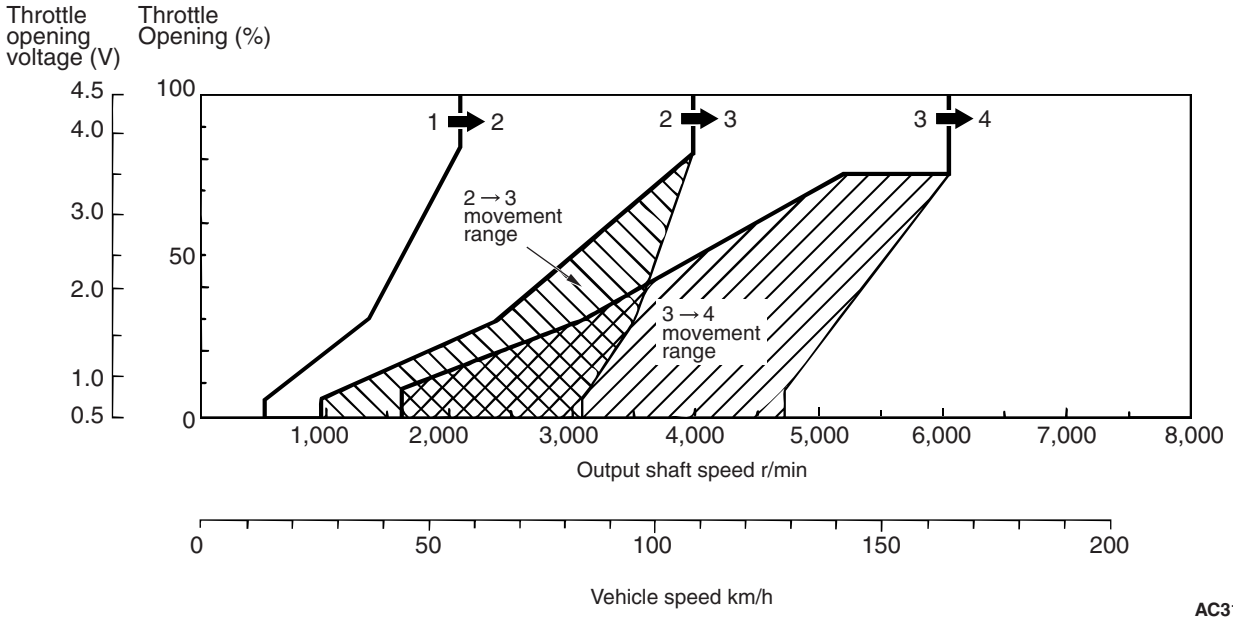
Procedure	Pre-test/operation conditions	Test/operation	Judgment value	Check item	Diagnosis code No.	Inspection procedure if there is an abnormality
8	Suspends the INVECS-II function using MUT-III Selector lever position: D (Must be done on a level and straight road)	(1) Accelerate from 1st gear to 4th gear. (2) Downshift to 3rd gear at speed of 50 km/h in 4th gear. (3) Downshift to 2nd gear at speed of 30 km/h in 3rd gear. (4) Downshift to 1st gear at speed of 20 km/h in 2nd gear.	Data List No.63 (1) 1st → 2nd → 3rd → 4th (2) 4th → 3rd (3) 3rd → 2nd (4) 2nd → 1st	No shifting from 1st to 2nd, or no shifting from 2nd to 1st	31	LR solenoid valve system
					33	2ND solenoid valve system
					41	1ST without completion of shifting
					42	2ND without completion of shifting
				No shifting from 2nd to 3rd, or no shifting from 3rd to 2nd	33	2ND solenoid valve system
					34	OD solenoid valve system
					42	2ND without completion of shifting
					43	3RD without completion of shifting
				No shifting from 3rd to 4th, or no shifting from 4th to 3rd	32	UD solenoid valve system
					33	2ND solenoid valve system
					43	3RD without completion of shifting
					44	4TH without completion of shifting

Procedure	Pre-test/operation conditions	Test/operation	Judgment value	Check item	Diagnosis code No.	Inspection procedure if there is an abnormality
9	Selector lever position: N (Must be done on a level and straight road)	Selector lever position and vehicle speed (1) Select R and drive at 10 km/h	The ration of data list No.0001 and No.0002 should be the same as the transmission ratio when reversing	No shifting	22	Input shaft speed sensor system
					23	Output shaft speed sensor system
					46	Reverse without completion of shifting

SHIFT PATTERN

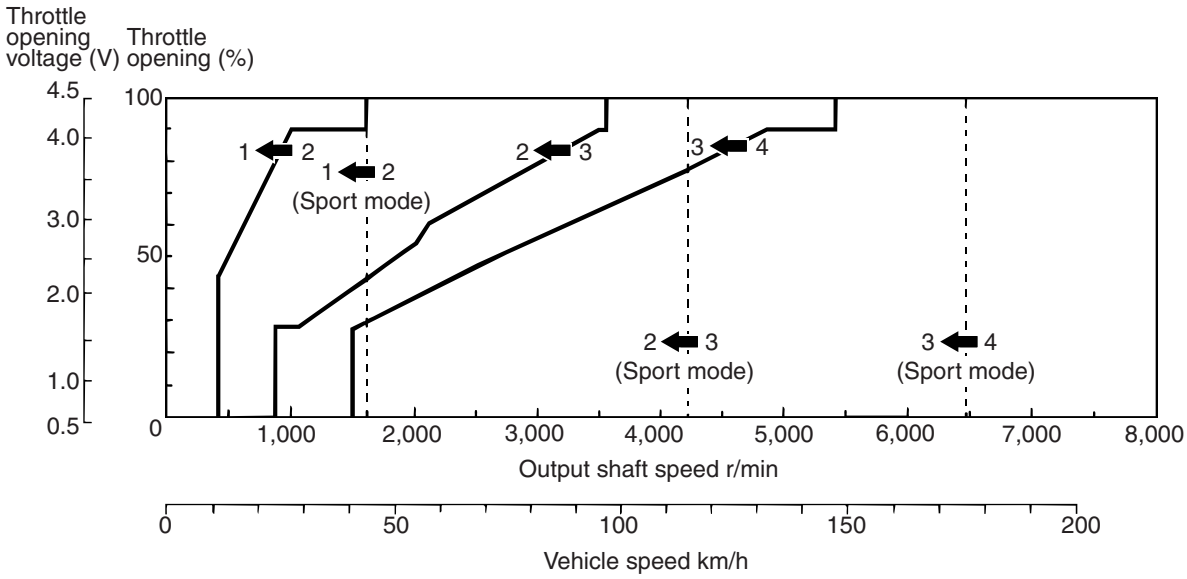
M1231028400211

UPSHIFT PATTERN



AC311757AC

DOWNSHIFT PATTERN

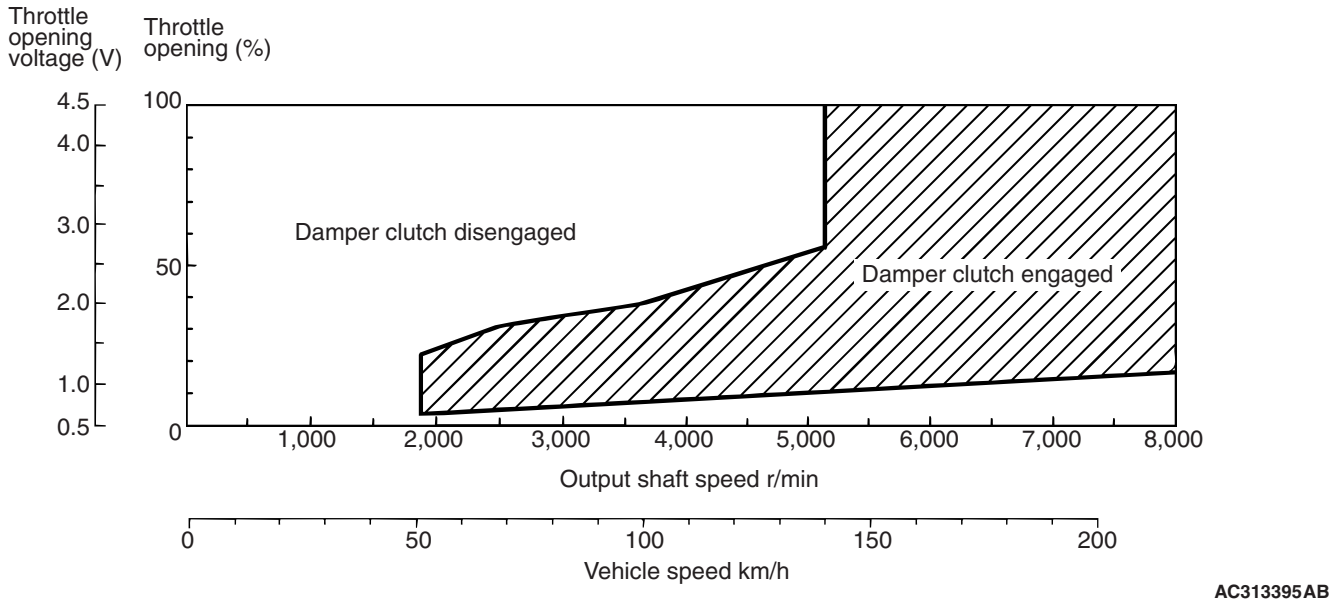


AC311758AB

DAMPER CLUTCH CONTROL

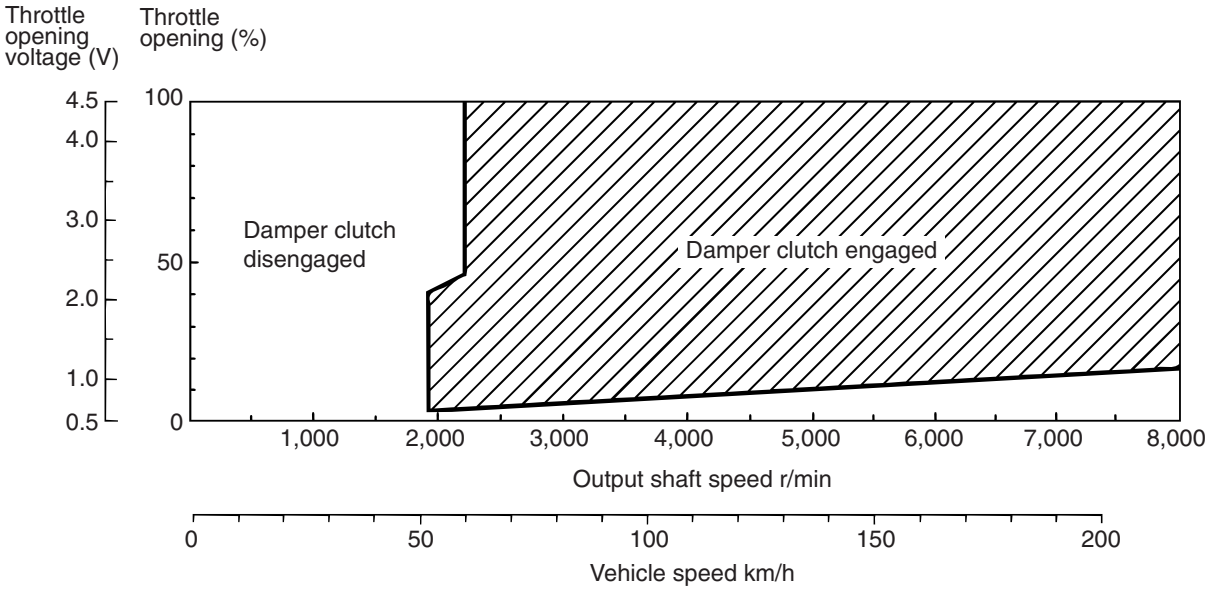
M1231021300086

In 4th range



AC313395AB

In 3rd range



AC313394 AB

INSPECTION CHART FOR DIAGNOSIS CODE

M1231007900404

A/T diagnosis code No.	MPI diagnosis code No.	Diagnosis item	Reference page
15	P0710	A/T fluid temperature sensor system	P.23A-18
16			P.23A-23
21	–	Crank angle sensor system	Refer to GROUP 13A, TroubleshootingP.13A-157.
22	P0715	Input shaft speed sensor system	P.23A-27
23	P0720	Output shaft speed sensor system	P.23A-37
26	–	Stop lamp switch system	P.23A-47
27	P0705	Inhibitor switch system	P.23A-52
28			P.23A-59
31	P0750	LR solenoid valve system	P.23A-62
32	P0755	UD solenoid valve system	P.23A-65
33	P0760	2ND solenoid valve system	P.23A-68
34	P0765	OD solenoid valve system	P.23A-71
36	P0740	DCC solenoid valve system	P.23A-74
41	–	1st gear ratio does not meet the specification	P.23A-78
42	–	2nd gear ratio does not meet the specification	P.23A-78
43	–	3rd gear ratio does not meet the specification	P.23A-78
44	–	4th gear ratio does not meet the specification	P.23A-78

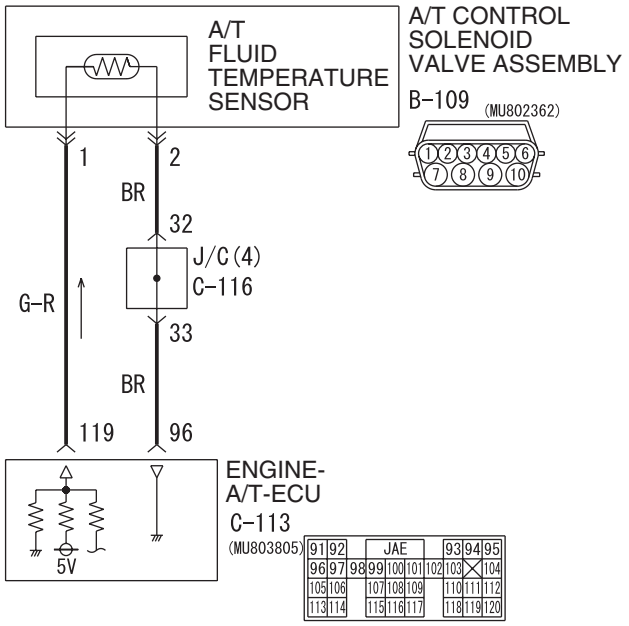
A/T diagnosis code No.	MPI diagnosis code No.	Diagnosis item	Reference page
46	–	Reverse gear ratio does not meet the specification	P.23A-78
52	P0740	DCC solenoid valve system	P.23A-80
54	P1751	A/T control relay system	P.23A-82

NOTE: The MPI diagnostic trouble codes are the codes which are set when item "MPI" is selected on MUT-III. However, the codes above indicate failure in the automatic transmission.

DIAGNOSTIC TROUBLE CODE PROCEDURES

Code No.15: A/T fluid temperature sensor system

A/T fluid temperature sensor system circuit



Wire colour code
B : Black LG : Light green G : Green L : Blue W : White Y : Yellow SB : Sky blue
BR : Brown O : Orange GR : Gray R : Red P : Pink V : Violet

W4X23E000A

OPERATION

- The A/T fluid temperature sensor converts the automatic fluid temperature to voltage, and send the information to the engine-A/T-ECU.
- The A/T fluid temperature rises, the resistance decreases. Thus, the sensor output voltage depends on the automatic fluid temperature. As the A/T fluid temperature rises, the output voltage will decrease.

DIAGNOSIS CODE SET CONDITIONS

If the A/T fluid temperature sensor output voltage is 4.5 volts or more after driving for 10 minutes or more, there is an open circuit in the A/T fluid temperature sensor and diagnosis code 15 is set.

POSSIBLE CAUSES

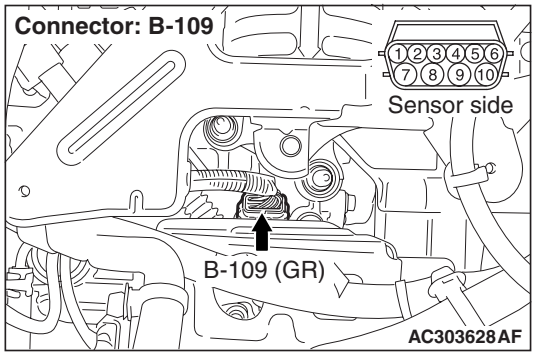
- Malfunction of the A/T fluid temperature sensor
- Damaged harness wires and connectors
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. MUT-III data list
Item 15: A/T fluid temperature sensor (Refer to Data List Table P.23A-117).

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Go to Step 2.

STEP 2. Measure the resistance at A/T control solenoid valve assembly connector B-109.

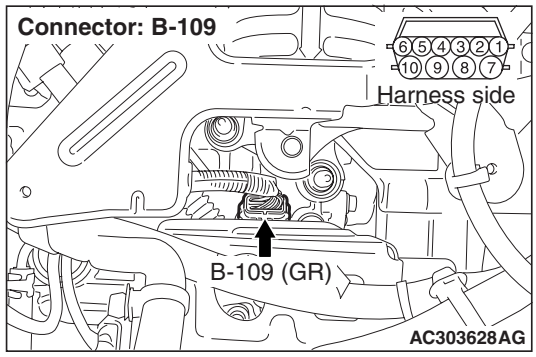


Disconnect the connector, and measure the resistance between terminal 1 and 2 at the sensor side.

OK:
- **16.7 – 20.5 kΩ (at 0°C)**
- **7.3 – 8.9 kΩ (at 20°C)**
- **3.4 – 4.2 kΩ (at 40°C)**
- **1.9 – 2.2 kΩ (at 60°C)**
- **1.0 – 1.2 kΩ (at 80°C)**
- **0.57 – 0.69 kΩ (at 100°C)**

Q: Is the check result normal?
YES : Go to Step 3.
NO : Replace the A/T fluid temperature sensor.

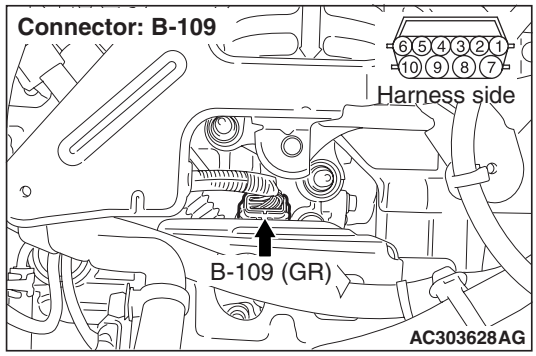
STEP 3. Connector check: B-109 A/T control solenoid valve assembly



Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the defective connector.

STEP 4. Measure the resistance at A/T control solenoid valve assembly connector B-109.



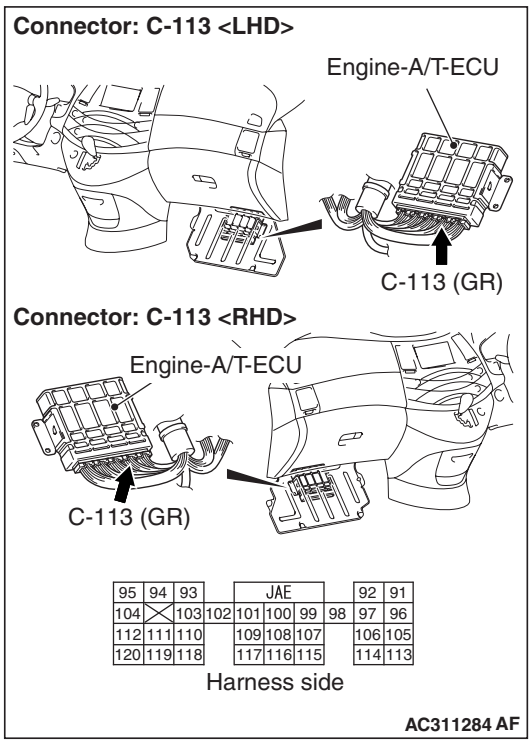
Disconnect the connector, and measure the resistance between terminal 2 and earth at the wiring harness side.

OK: 2 Ω or less

Q: Is the check result normal?
YES : Go to Step 9.
NO : Go to Step 5.

STEP 5. Measure the voltage at engine-A/T-ECU connector C-113.
(1) Connect A/T control solenoid valve assembly connector B-109.

(2) Turn the ignition switch to the ON position.

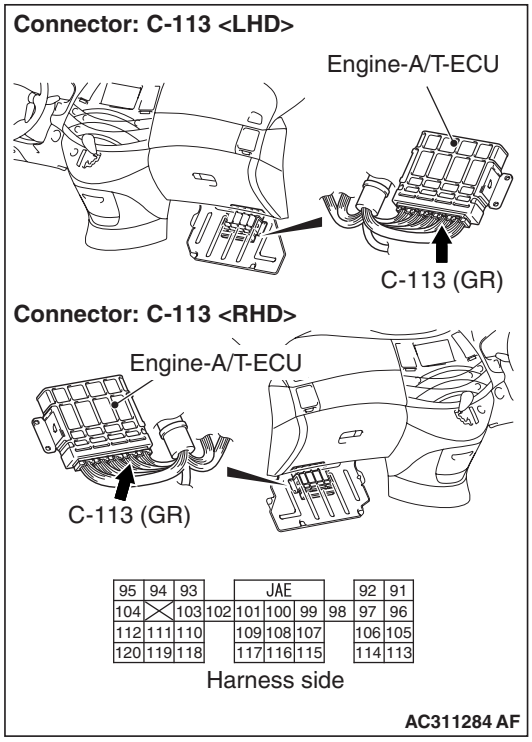


(3) Measure the voltage between engine-A/T-ECU connector C-113 terminal No.96 and earth.

OK: 0.5 V or less

Q: Is the check result normal?
YES : Go to Step 8.
NO : Go to Step 6.

STEP 6. Connector check: C-113 engine-A/T-ECU connector



Check for the contact with terminals.

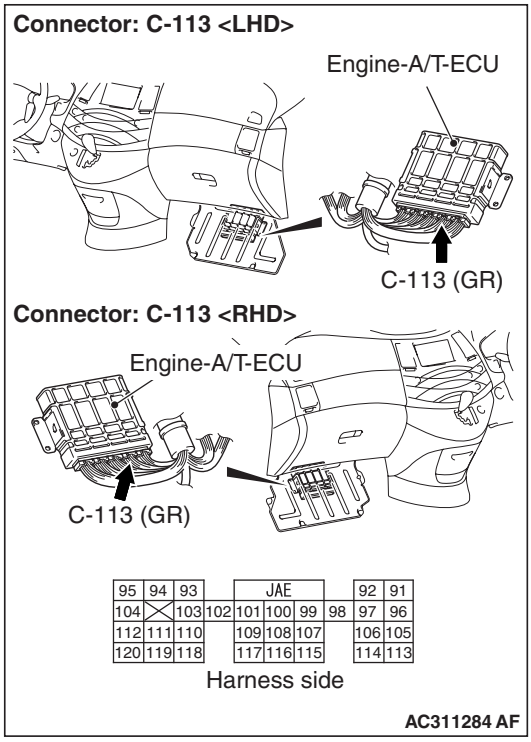
Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the defective connector.

STEP 7. MUT-III data list

Item 15: A/T fluid temperature sensor (Refer to Data List Table P.23A-117).

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Replace the engine-A/T-ECU.

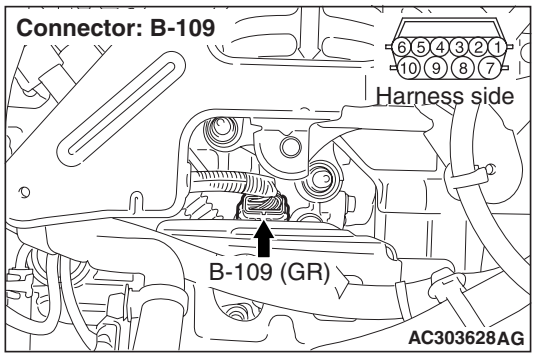
STEP 8. Connector check: C-113 engine-A/T-ECU connector



Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 14.
NO : Repair the defective connector.

STEP 9. Measure the voltage at A/T control solenoid valve assembly connector B-109.



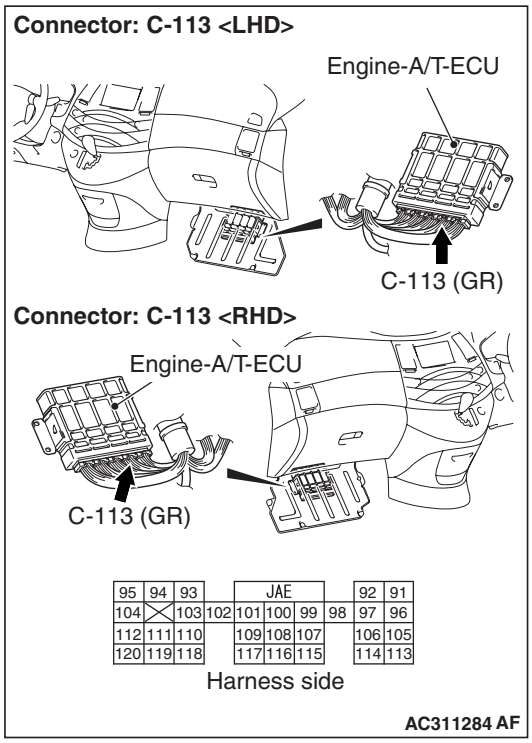
(1) Disconnect the connector, and measure the voltage between terminal 1 and earth at the wiring harness side.
(2) Turn the ignition switch to the ON position.

OK: 4.5 – 4.9 V

Q: Is the check result normal?
YES : Go to Step 7.
NO : Go to Step 10.

STEP 10. Measure the voltage at engine-A/T-ECU connector C-113.

(1) Connect A/T control solenoid valve assembly connector B-109.
(2) Turn the ignition switch to the ON position.

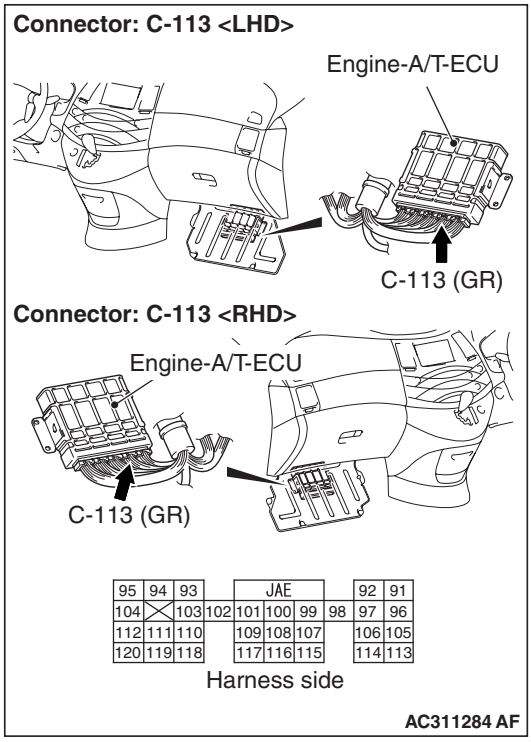


(3) Measure the voltage between engine-A/T-ECU connector C-113 terminal No.119 and earth.

OK:
- **3.8 – 4.0 V (at 20°C)**
- **3.2 – 3.4 V (at 40°C)**
- **1.7 – 1.9 V (at 80°C)**

Q: Is the check result normal?
YES : Go to Step 12.
NO : Go to Step 11.

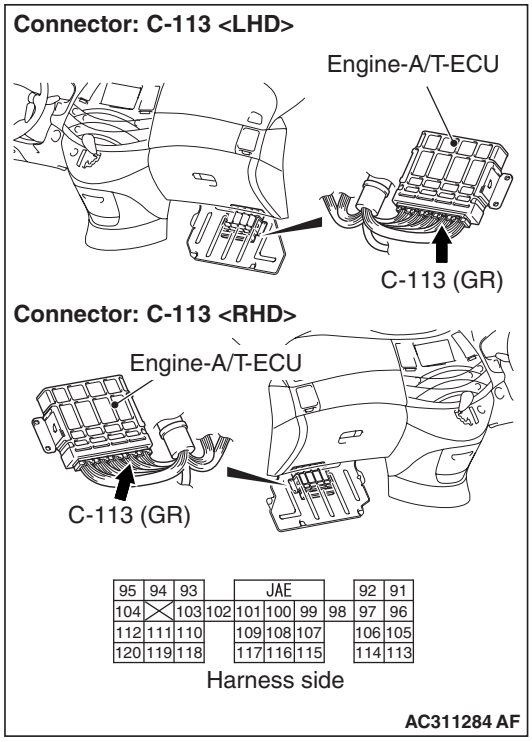
STEP 11. Connector check: C-113 engine-A/T-ECU connector



Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the defective connector.

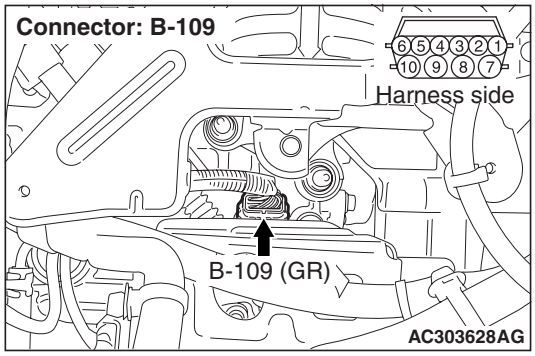
STEP 12. Connector check: C-113 engine-A/T-ECU connector

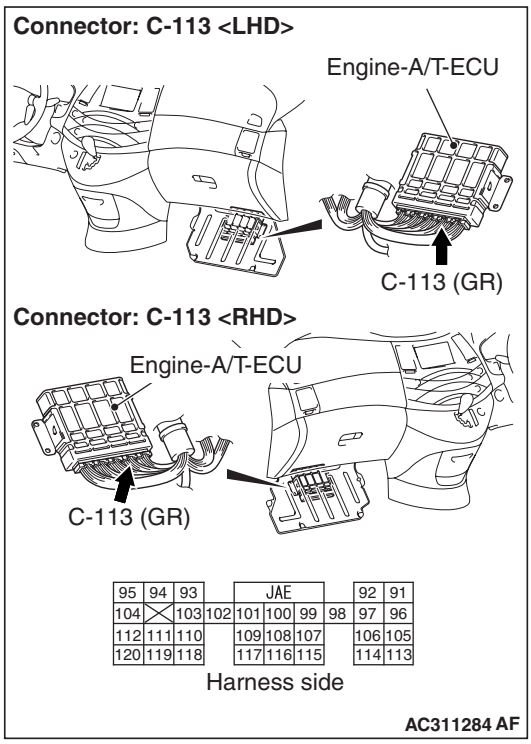


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 13.
NO : Repair the defective connector.

STEP 13. Check the harness between A/T control solenoid valve assembly connector B-109 terminal No.1 and engine-A/T-ECU connector C-113 terminal No.119.

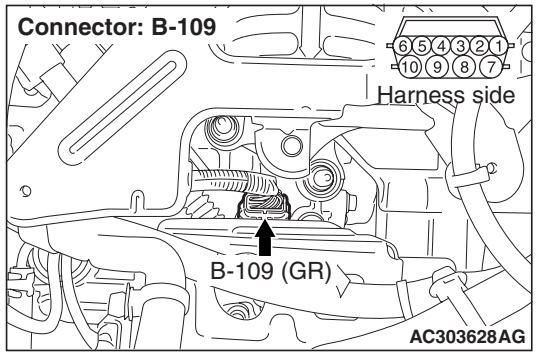


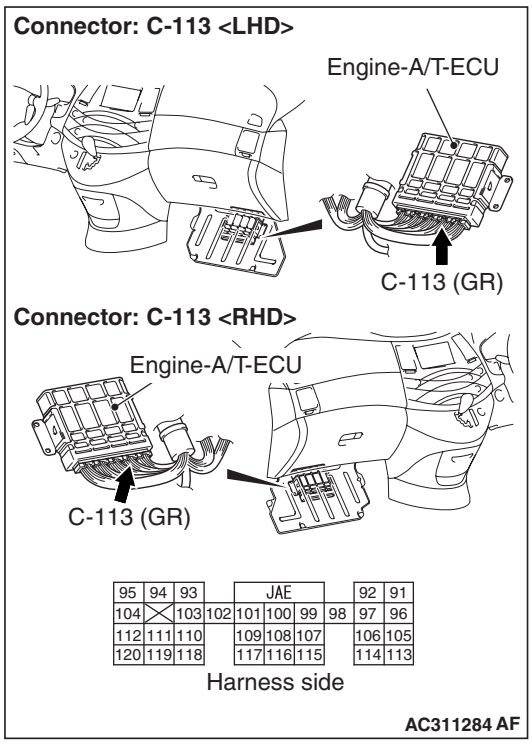


Check the output line for short-circuited or open circuit.

Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the wiring harness.

STEP 14. Check the harness between A/T control solenoid valve assembly connector B-109 terminal No.2 and engine-A/T-ECU connector C-113 terminal No.96.





Check the earth line for open circuit.

Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the wiring harness.

Code No.16: A/T fluid temperature sensor system (short circuit)

A/T FLUID TEMPERATURE SENSOR SYSTEM CIRCUIT

Refer to P.23A-18.

OPERATION

Refer to P.23A-18.

DIAGNOSIS CODE SET CONDITION

If the A/T fluid temperature sensor output voltage has been approximately 0 V for at least one second (indicating abnormally high oil temperature), it indicates that the A/T fluid temperature sensor circuit is shorted and diagnosis code No.16 will be set.

POSSIBLE CAUSES

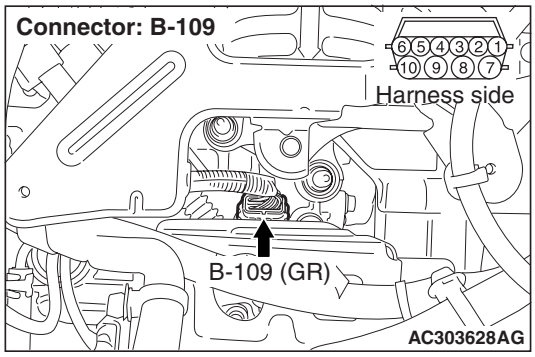
- Malfunction of the A/T fluid temperature sensor
- Damaged harness wires and connectors
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. MUT-III data list
Item 15: A/T fluid temperature sensor (Refer to Data List Table P.23A-117).

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Go to Step 2.

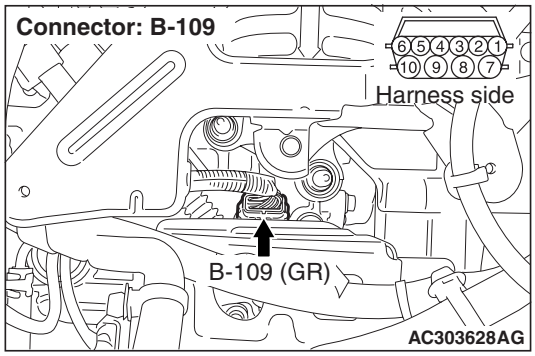
STEP 2. Connector check: B-109 A/T control solenoid valve assembly



Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 3.
NO : Repair the defective connector.

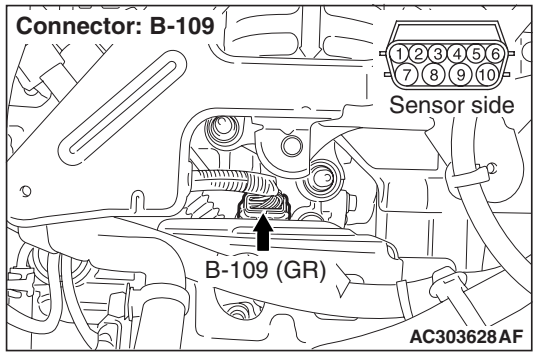
STEP 3. Measure the voltage at A/T control solenoid valve assembly connector B-109.



(1) Disconnect the connector, and measure the voltage between terminal 1 and earth at the wiring harness side.
(2) Turn the ignition switch to the ON position.
OK: 4.5 – 4.9 V

Q: Is the check result normal?
YES : Go to Step 4.
NO : Go to Step 6.

STEP 4. Measure the resistance at A/T control solenoid valve assembly connector B-109.



Disconnect the connector, and measure the resistance between terminal 1 and 2 at the sensor side.

OK:
- **16.7 – 20.5 kΩ (at 0°C)**
- **7.3 – 8.9 kΩ (at 20°C)**
- **3.4 – 4.2 kΩ (at 40°C)**
- **1.9 – 2.2 kΩ (at 60°C)**
- **1.0 – 1.2 kΩ (at 80°C)**
- **0.57 – 0.69 kΩ (at 100°C)**

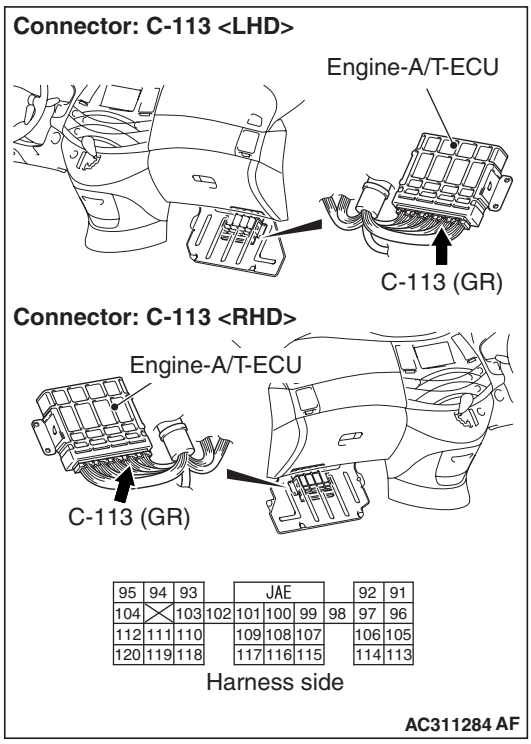
Q: Is the check result normal?
YES : Go to Step 5.
NO : Replace the A/T fluid temperature sensor.

STEP 5. MUT-III data list
Item 15: A/T fluid temperature sensor (Refer to Data List Table P.23A-117).

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Replace the engine-A/T-ECU.

STEP 6. Measure the voltage at engine-A/T-ECU connector C-113.
(1) Connect A/T control solenoid valve assembly connector B-109.

(2) Turn the ignition switch to the ON position.



(3) Measure the voltage between engine-A/T-ECU connector C-113 terminal No.119 and earth.

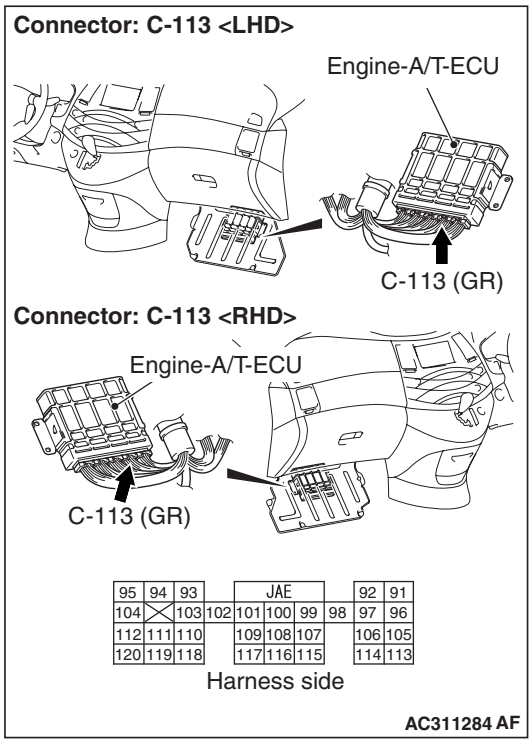
OK:

- **3.8 – 4.0 V (at 20°C)**
- **3.2 – 3.4 V (at 40°C)**
- **1.7 – 1.9 V (at 80°C)**

Q: Is the check result normal?

YES : Go to Step 5.
NO : Go to Step 7.

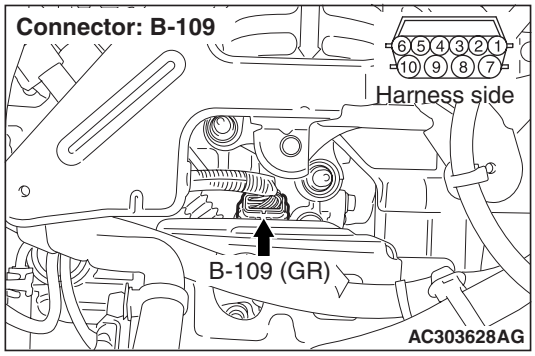
STEP 7. Connector check: C-113 engine-A/T-ECU connector

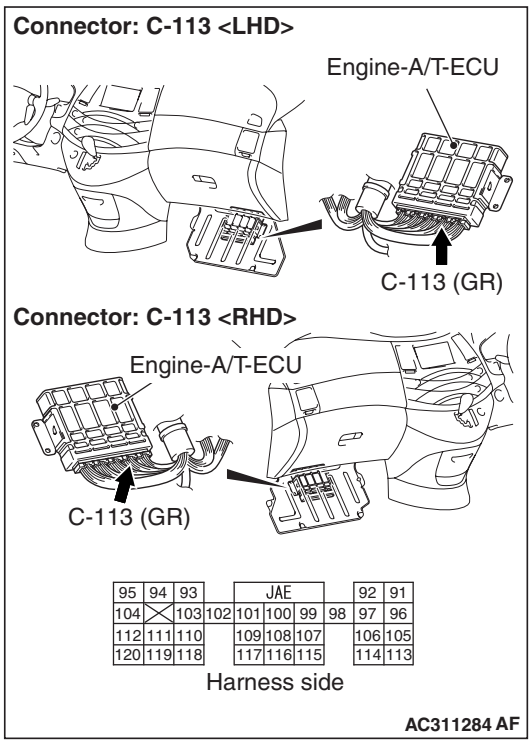


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair the defective connector.

STEP 8. Check the harness between A/T control solenoid valve assembly connector B-109 terminal No.1 and engine-A/T-ECU connector C-113 terminal No.119.





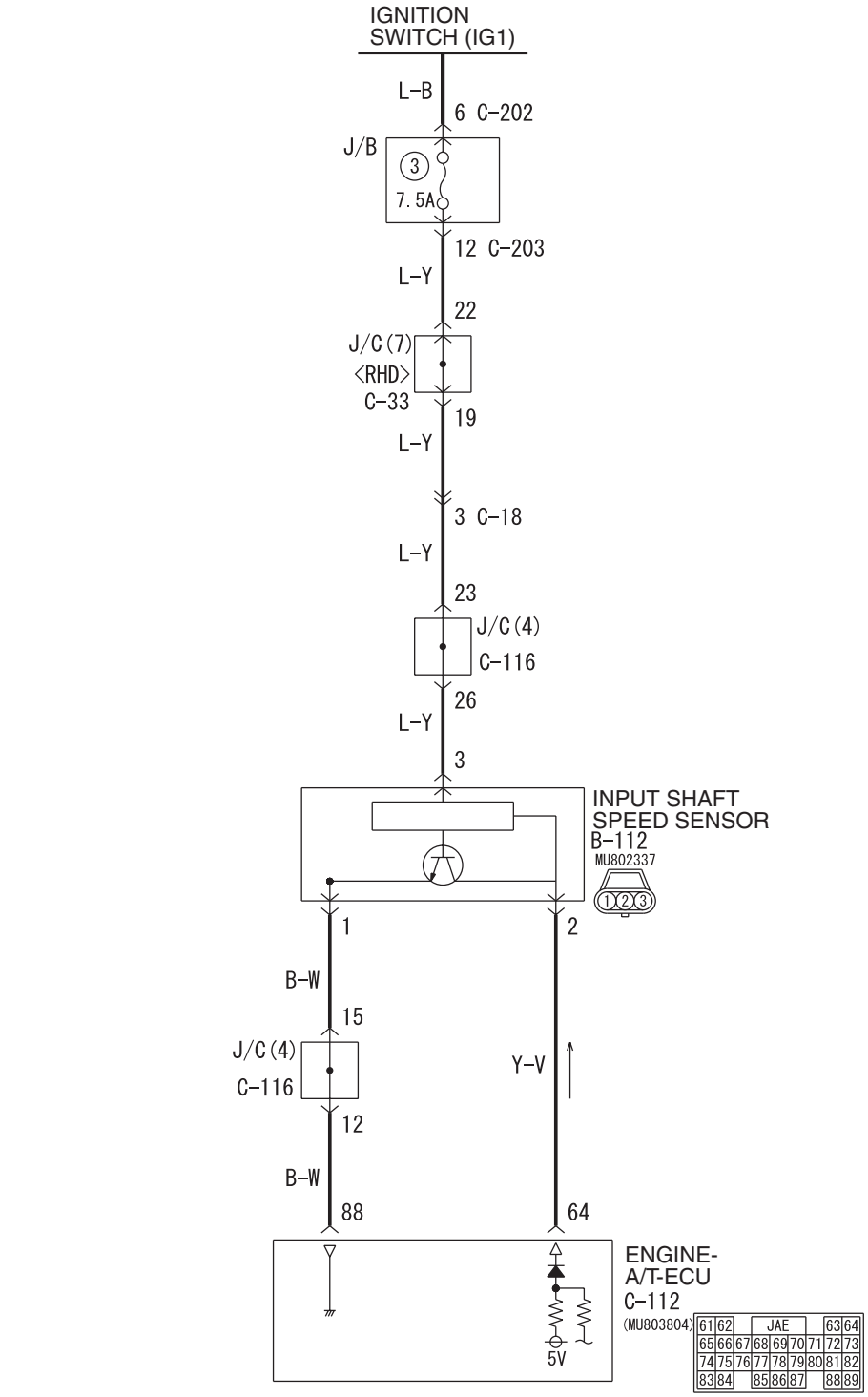
Check the output line for short-circuited or open circuit.

Q: Is the check result normal?

YES : Go to Step 5.
NO : Repair the wiring harness.

Code No.22: Input shaft speed sensor system

Input shaft speed sensor system circuit



Wire colour code
B : Black LG : Light green G : Green L : Blue W : White Y : Yellow SB : Sky blue
BR : Brown O : Orange GR : Gray R : Red P : Pink V : Violet

W4X23E001A

OPERATION

The input shaft speed sensor detects the speed of the underdrive clutch retainer, and sends the information to the engine-A/T-ECU as a pulse signal.

DIAGNOSIS CODE SET CONDITIONS

The diagnosis code No.22 will be set if the input shaft speed sensor does not send a pulse signal for one second or more while the 3rd gears are engaged and the vehicle speed is 40 km/h or more (the output shaft speed sensor speed is 1000 r/min or more).
If the code No.22 is set four times, the transmission will be fixed in 3rd gear as a fail-safe measure. However, the transmission can be downshifted to 2nd gear by operating the selector lever.

POSSIBLE CAUSES

- Malfunction of input shaft speed sensor
- Malfunction of underdrive clutch retainer
- Damaged harness wires and connectors
- Malfunction of the engine-A/T-ECU

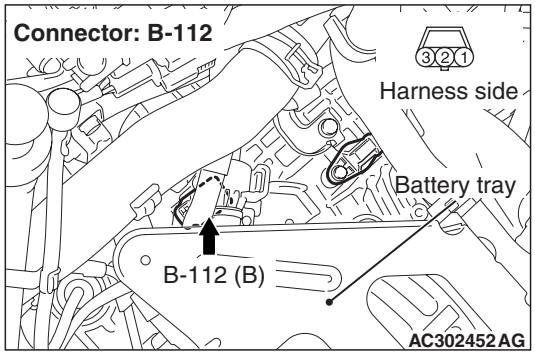
DIAGNOSIS

STEP 1. MUT-III data list

Item 0001: Input shaft speed sensor (Refer to data list reference table P.23A-117).

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Go to Step 2.

STEP 2. Connector check: B-112 input shaft speed sensor connector

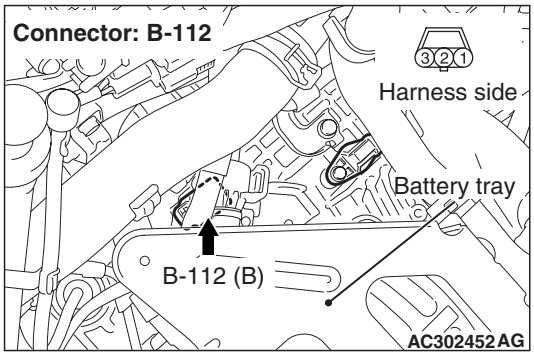


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 3.
NO : Repair the defective connector.

YES : Go to Step 7.

STEP 3. Measure the resistance at input shaft speed sensor connector B-112.



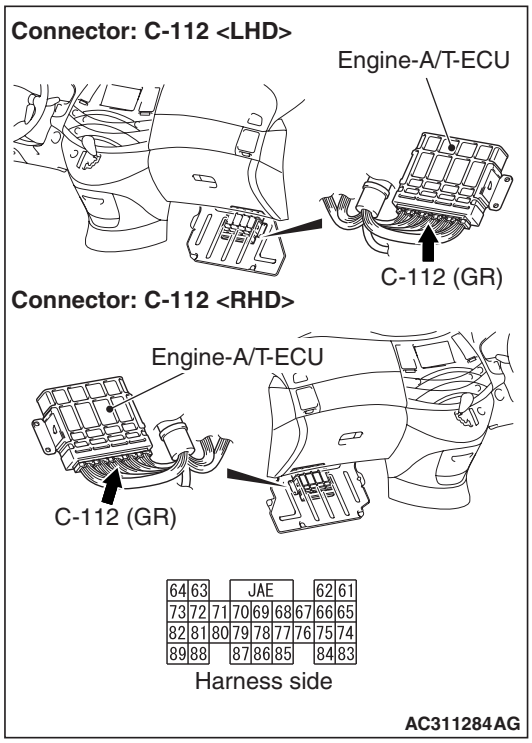
Disconnect the connector, and measure the resistance between terminal 1 and earth at the wiring harness side.

OK: 2 Ω or less

Q: Is the check result normal?
YES : Go to Step 9.
NO : Go to Step 4.

STEP 4. Measure the voltage at engine-A/T-ECU connector C-112.

(1) Connect input shaft speed sensor connector B-112.
(2) Turn the ignition switch to the ON position.

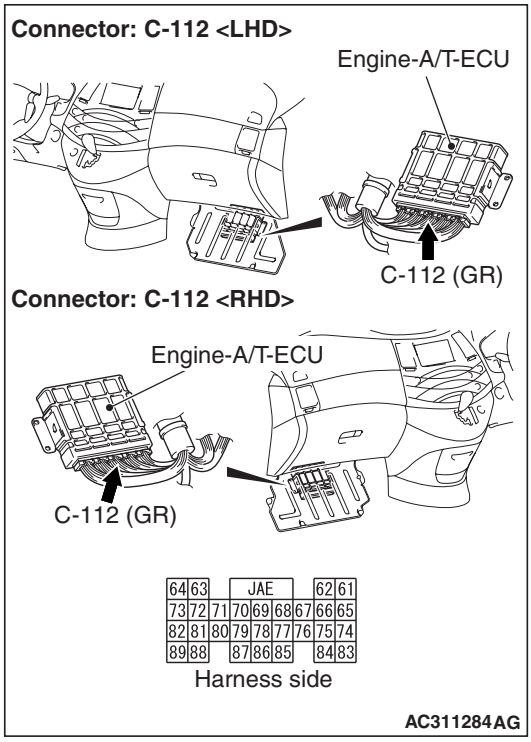


(3) Measure the voltage between engine-A/T-ECU connector C-112 terminal No.88 and earth.

OK: 0.5 V or less

Q: Is the check result normal?
NO : Go to Step 5.

STEP 5. Connector check: C-112 engine-A/T-ECU connector



Check for the contact with terminals.

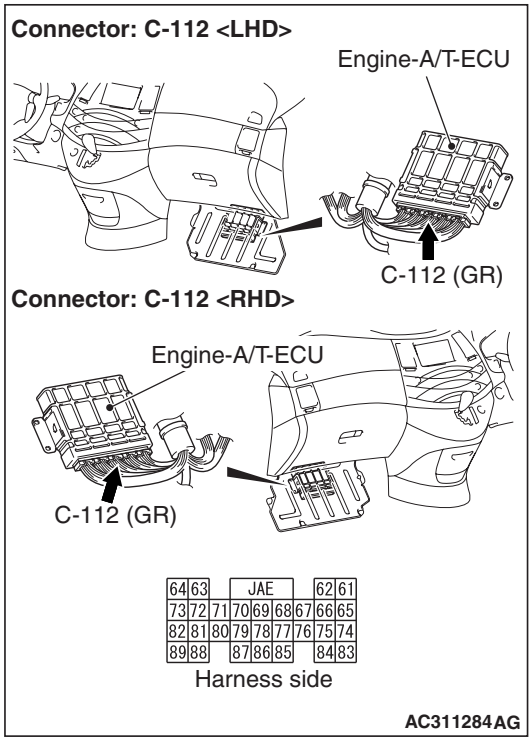
Q: Is the check result normal?
YES : Go to Step 6.
NO : Repair the defective connector.

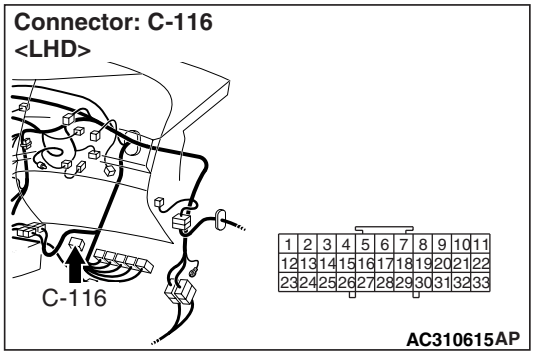
STEP 6. MUT-III data list

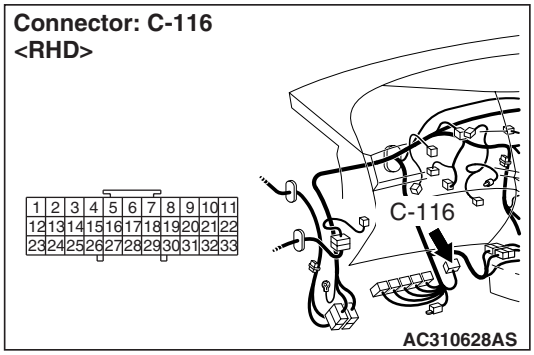
Item 0001: Input shaft speed sensor (Refer to data list reference table P.23A-117).

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Replace the engine-A/T-ECU.

STEP 7. Connector check: C-112 engine-A/T-ECU connector, C-116 J/C (4)



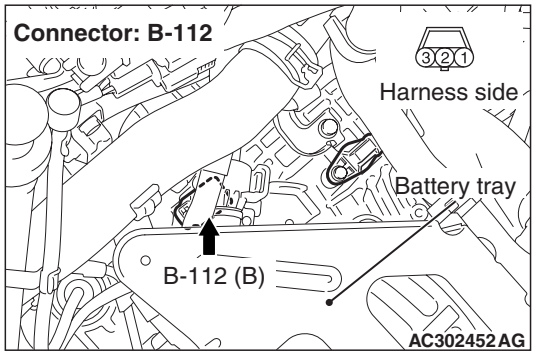


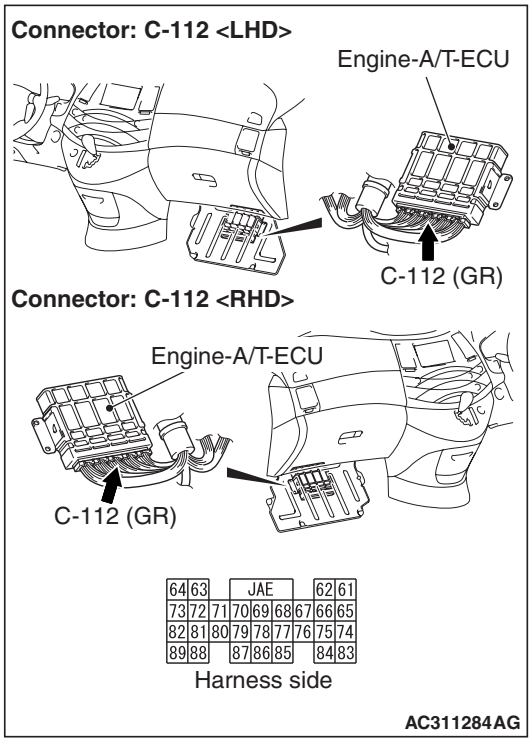


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair the defective connector.

STEP 8. Check the harness between input shaft speed sensor connector B-112 terminal No.1 and engine-A/T-ECU connector C-112 terminal No.88.



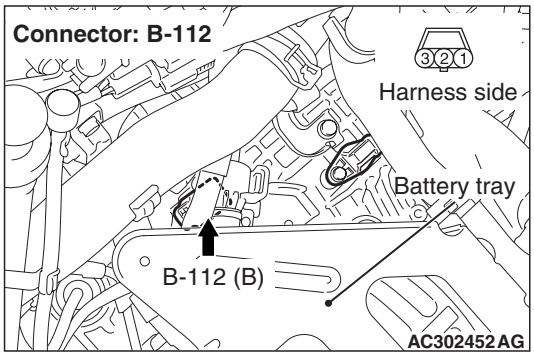


Check the earth line for open circuit.

Q: Is the check result normal?

YES : Go to Step 6.
NO : Repair the wiring harness.

STEP 9. Measure the voltage at input shaft speed sensor connector B-112.

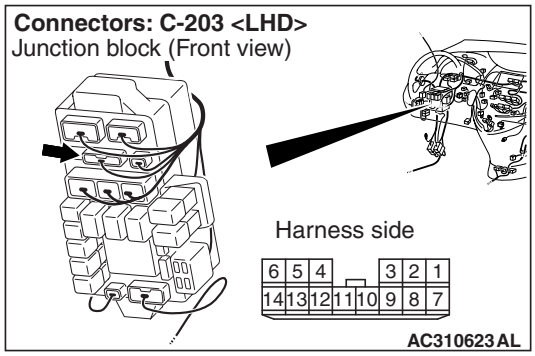


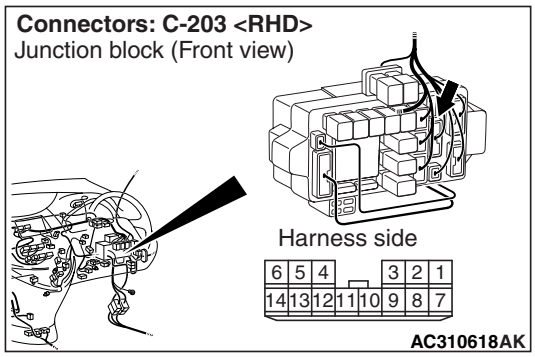
(1) Disconnect the connector, and measure the voltage between terminal 3 and earth at the wiring harness side.
(2) Turn the ignition switch to the ON position.

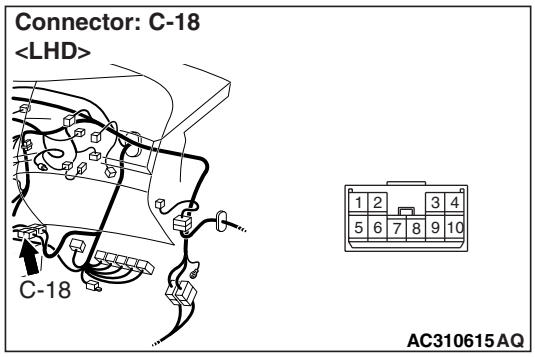
OK: System voltage

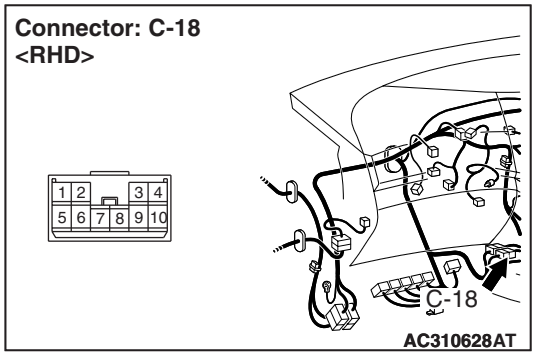
Q: Is the check result normal?
YES : Go to Step 12.
NO : Go to Step 10.

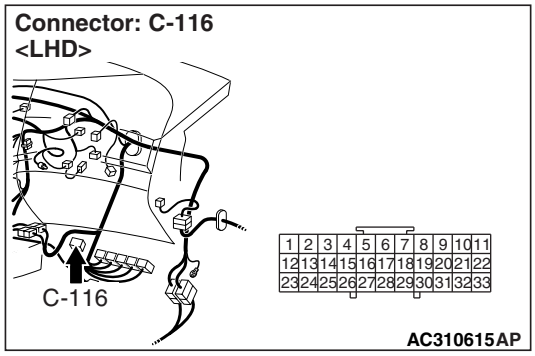
STEP 10. Connectors check: C-203 J/B connector, C-18 intermediate connector, C-116 J/C (4), C-33 J/C (7) <RHD>

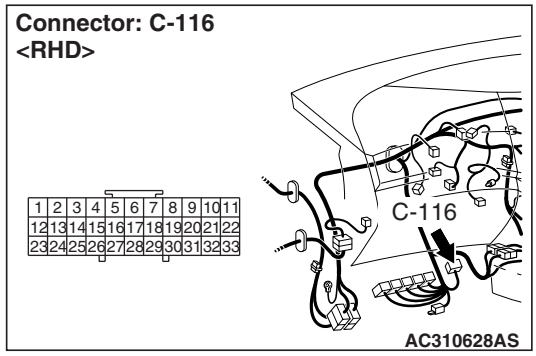


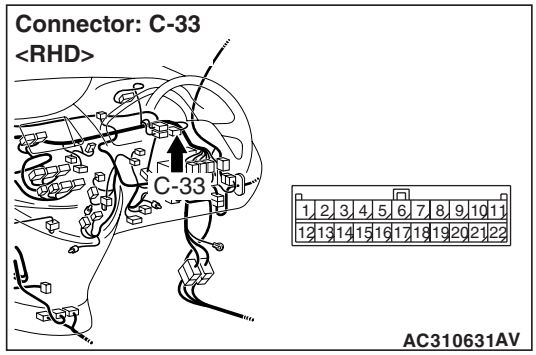








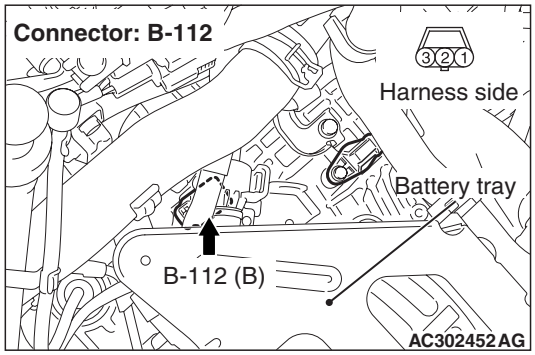


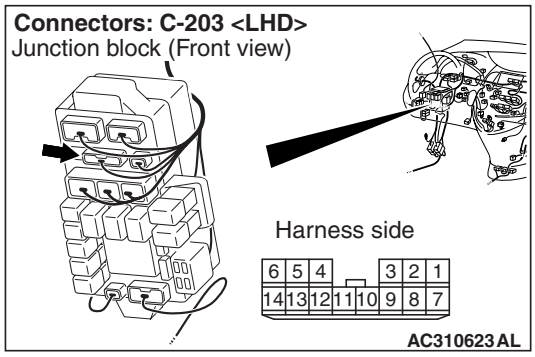


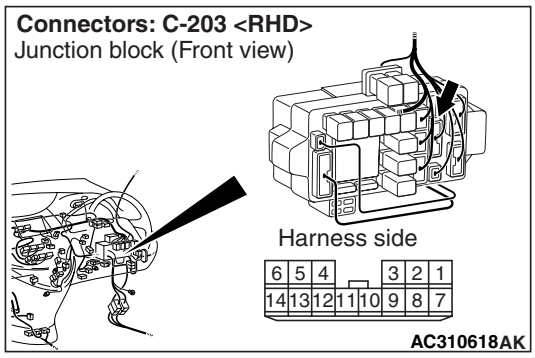
Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 11.
NO : Repair the defective connector.

STEP 11. Check the harness between input shaft speed sensor connector B-112 terminal No.3 and junction block connector C-203 terminal No.12.



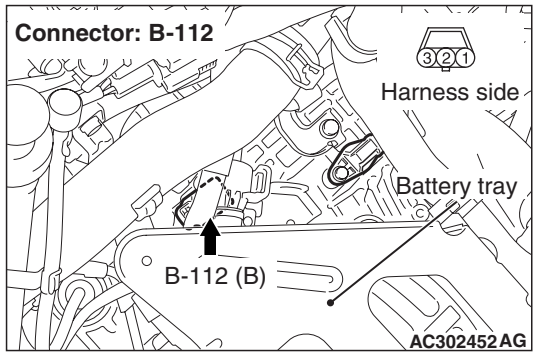




Check the power supply line for short or open circuit.

Q: Is the check result normal?
YES : Go to Step 6.
NO : Repair the wiring harness.

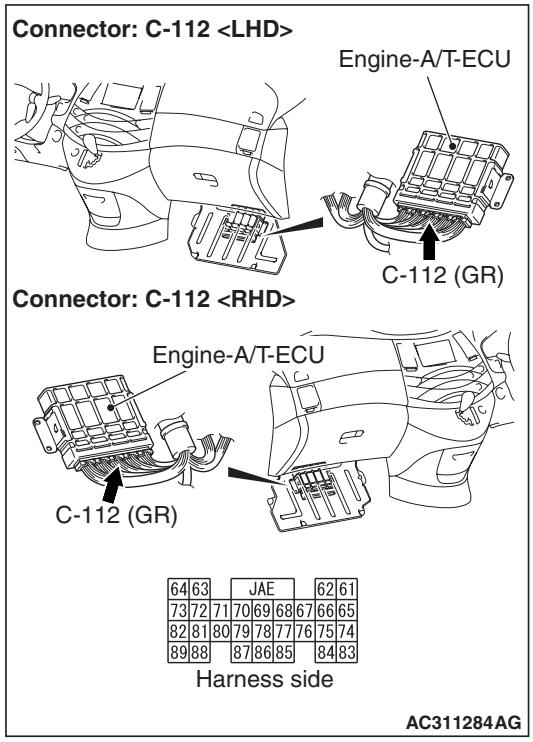
STEP 12. Measure the voltage at input shaft speed sensor connector B-112.



(1) Disconnect the connector, and measure the voltage between terminal 2 and earth at the wiring harness side.
(2) Turn the ignition switch to the ON position.
OK: 4.9 – 5.1 V

Q: Is the check result normal?
YES : Go to Step 18.
NO : Go to Step 13.

STEP 13. Measure the voltage at engine-A/T-ECU connector C-112.
(1) Disconnect input shaft speed sensor connector B-112.
(2) Turn the ignition switch to the ON position.

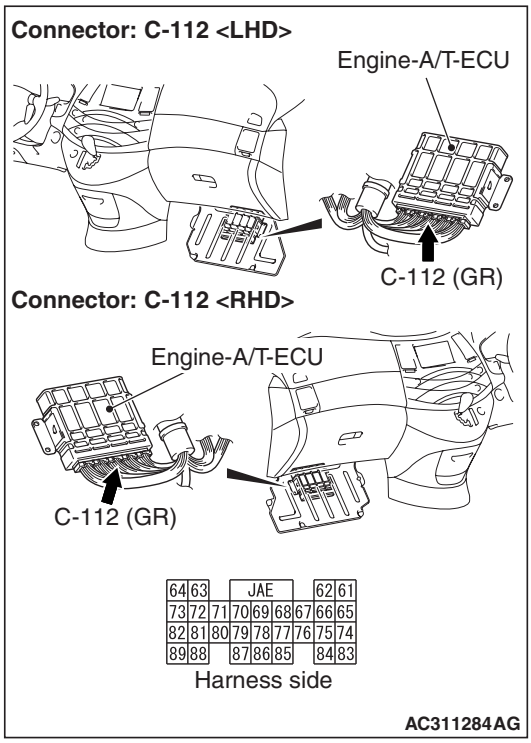


(3) Measure the voltage between engine-A/T-ECU connector C-112 terminal No.64 and earth.
OK: 4.9 – 5.1 V

Q: Is the check result normal?

YES : Go to Step 16.
NO : Go to Step 14.

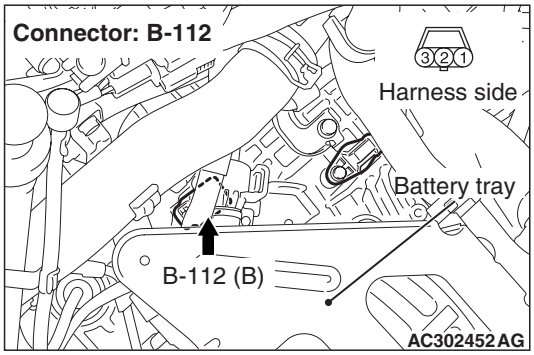
STEP 14. Connector check: C-112 engine-A/T-ECU connector

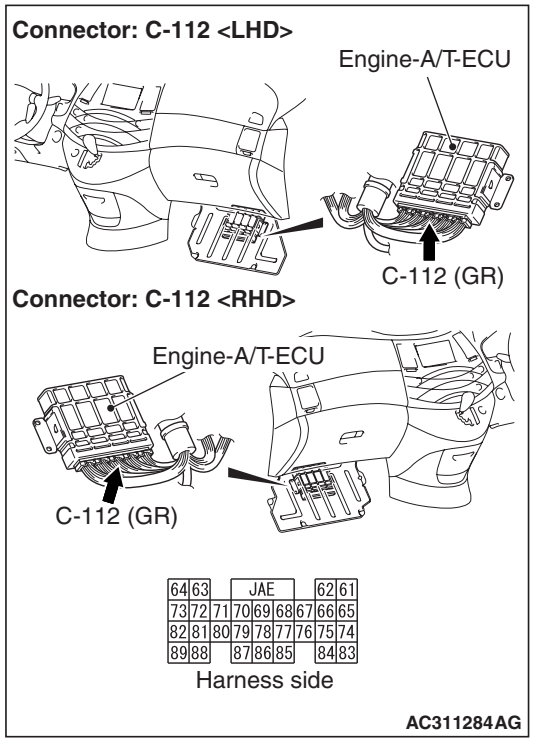


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 15.
NO : Repair the defective connector.

STEP 15. Check the harness between input shaft speed sensor connector B-112 terminal No.2 and engine-A/T-ECU connector C-112 terminal No.64.

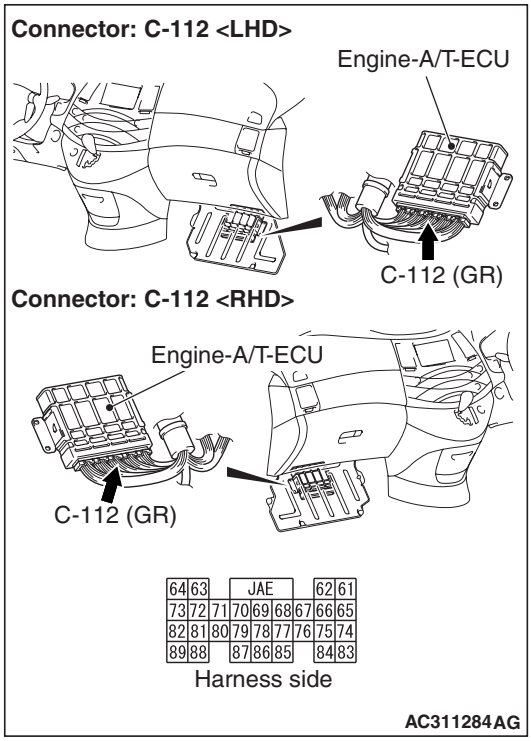




Check the output line for short circuit.

Q: Is the check result normal?
YES : Go to Step 6.
NO : Repair the wiring harness.

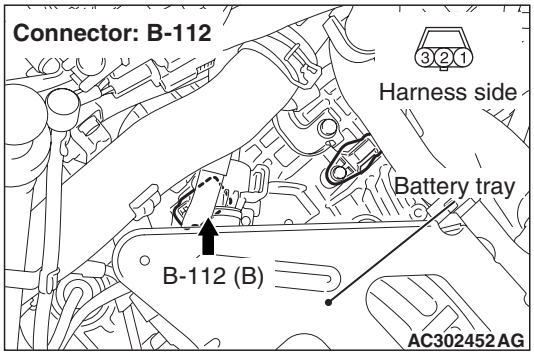
STEP 16. Connector check: C-112 engine-A/T-ECU connector

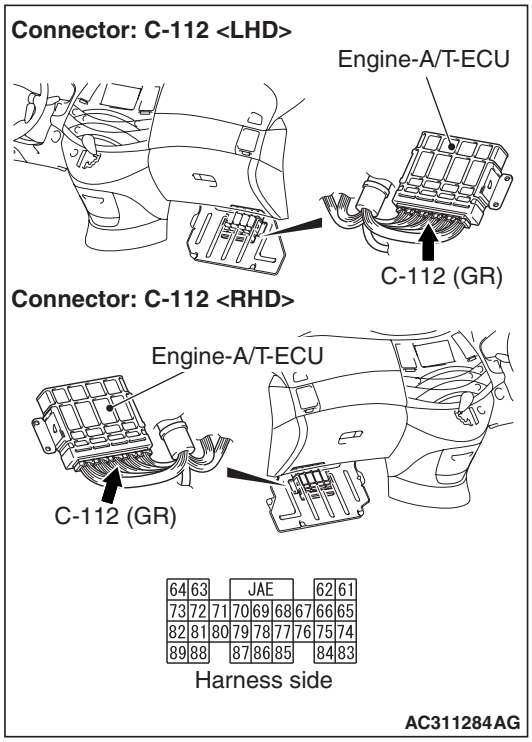


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 17.
NO : Repair the defective connector.

STEP 17. Check the harness between input shaft speed sensor connector B-112 terminal No.2 and engine-A/T-ECU connector C-112 terminal No.64.



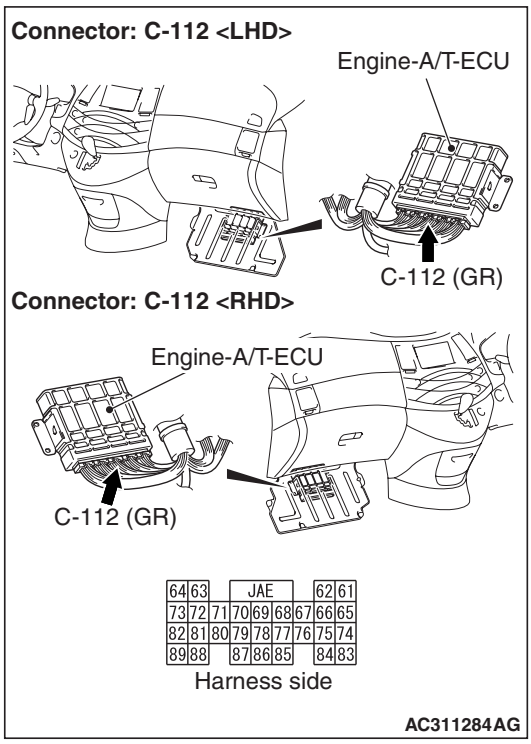


Check the output line for open circuit.

Q: Is the check result normal?
YES : Go to Step 6.
NO : Repair the wiring harness.

STEP 18. Measure the output wave pattern of the input shaft speed sensor at engine-A/T-ECU connector C-112 (using an oscilloscope).
(1) Shift the selector lever to the D range.
(2) Accelerate the vehicle to approximately 50 km/h

(shift range; 3rd).

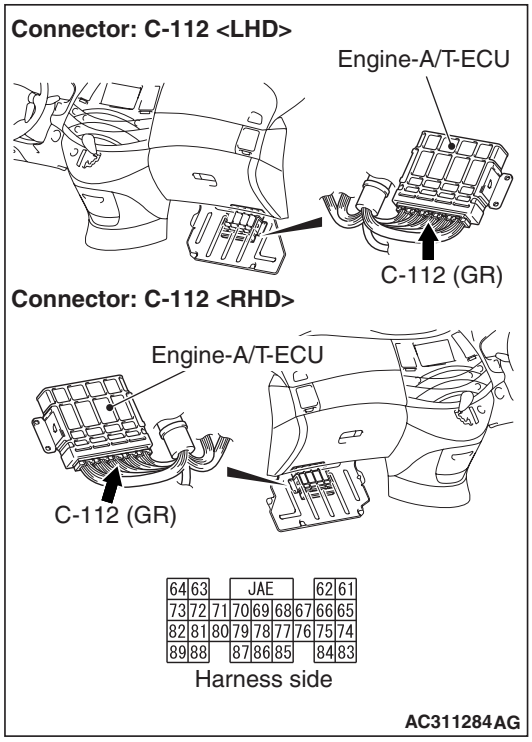


(3) Connect an oscilloscope, and measure the voltage between engine-A/T-ECU connector C-112 terminal No.64 and earth.

OK: A wave pattern such as the one shown on P.23A-123 (Check Procedure Using an Oscilloscope) should be output, and the maximum value should be 4.8 V or more and the minimum value should be 0.8 V or less. There should be no noise in the output wave pattern.

Q: Is the check result normal?
YES : Go to Step 6.
NO : Go to Step 19.

STEP 19. Connector check: C-112 engine-A/T-ECU connector



Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 20.
NO : Repair the defective connector.

STEP 20. Replace the input shaft speed sensor and then recheck the diagnosis code.

(1) Replace the input shaft speed sensor.
(2) Test drive the vehicle.
(3) Check if the diagnosis code is set.

Q: Is diagnosis code 22 set?
YES : Go to Step 21.
NO : The inspection is complete.

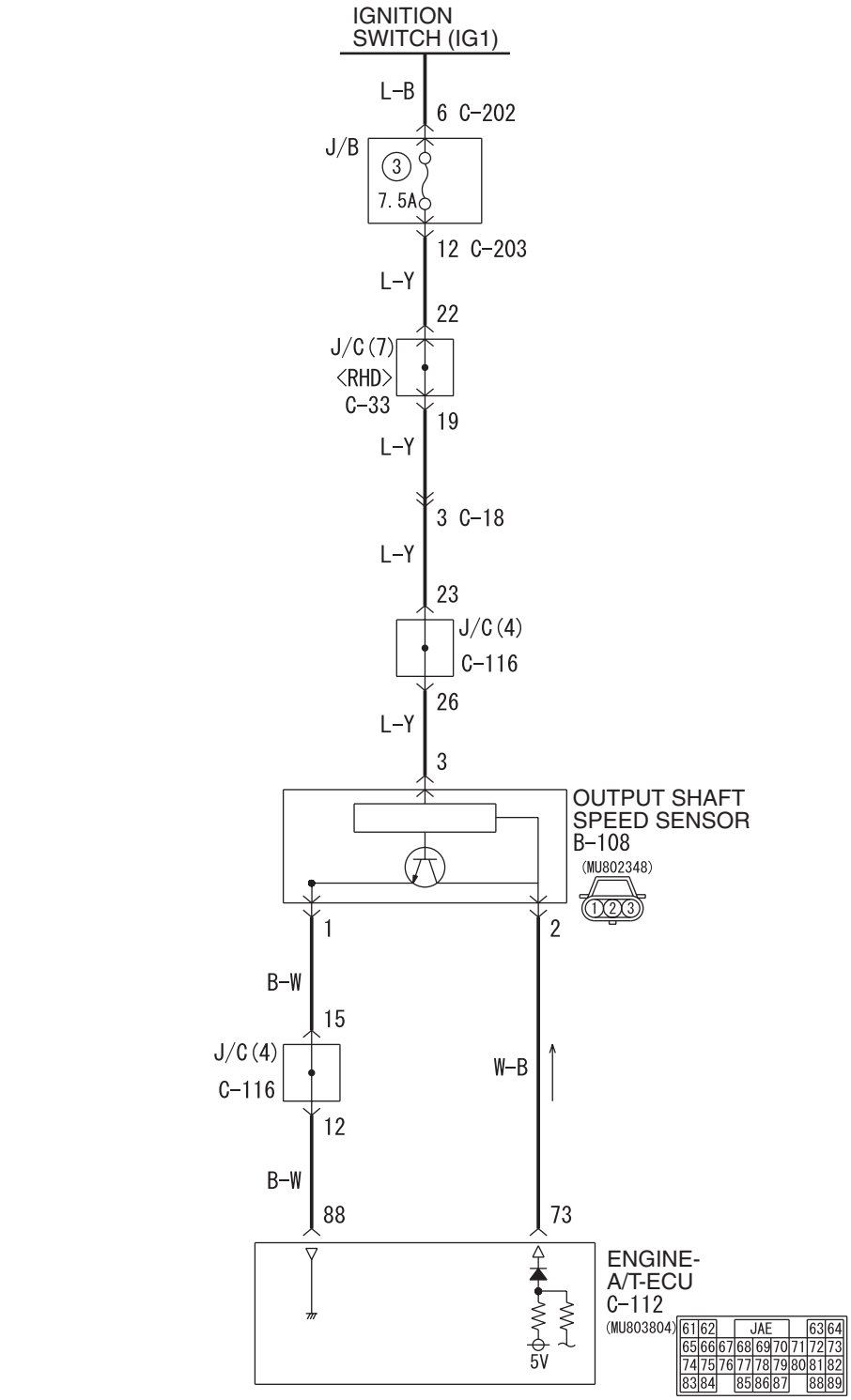
STEP 21. Underdrive clutch retainer inspection

Visually check the underdrive clutch retainer for damage.

Q: Is the check result normal?
YES : Eliminate the cause of the noise.
NO : Replace the underdrive clutch retainer.

Code No.23: Output shaft speed sensor system

Output shaft speed sensor system circuit



Wire colour code
B : Black LG : Light green G : Green L : Blue W : White Y : Yellow SB : Sky blue
BR : Brown O : Orange GR : Gray R : Red P : Pink V : Violet

W4X23E002A

OPERATION

The output shaft speed sensor detects the speed of the transfer drive gear, and sends the information to the engine-A/T-ECU as a pulse signal.

DIAGNOSIS CODE SET CONDITIONS

If the output pulse from the output shaft speed sensor has been lost for one second or more while the vehicle is being driven, it is judged that there is an open circuit or short circuit in the output shaft speed sensor, and diagnosis code 23 is set.
If the code No.23 is set four times, the transmission will be fixed in 3rd gear as a fail-safe measure. However, the transmission can be downshifted to 2nd gear by operating the selector lever.

POSSIBLE CAUSES

- Malfunction of output shaft speed sensor
- Malfunction of transfer drive gear or driven gear
- Damaged harness wires and connectors
- Malfunction of the engine-A/T-ECU

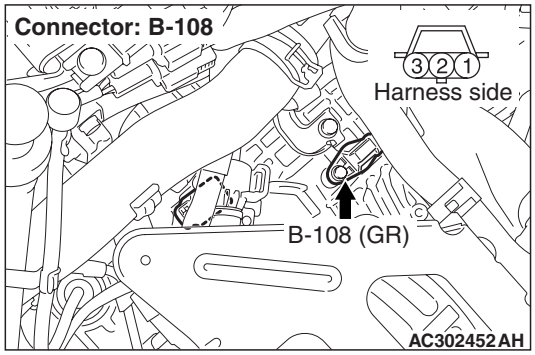
DIAGNOSIS

STEP 1. MUT-III data list

Item 0002: Output shaft speed sensor (Refer to data list reference table P.23A-117).

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Go to Step 2.

STEP 2. Connector check: B-108 output shaft speed sensor connector

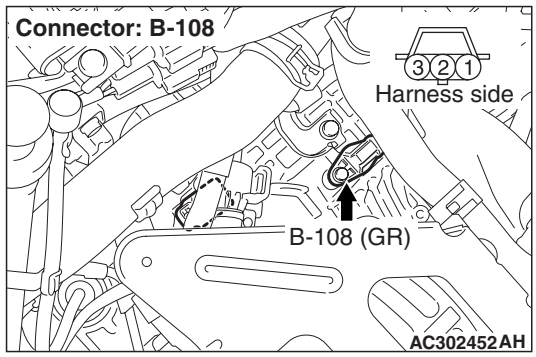


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 3.
NO : Repair the defective connector.

YES : Go to Step 7.

STEP 3. Measure the resistance at output shaft speed sensor connector B-108.



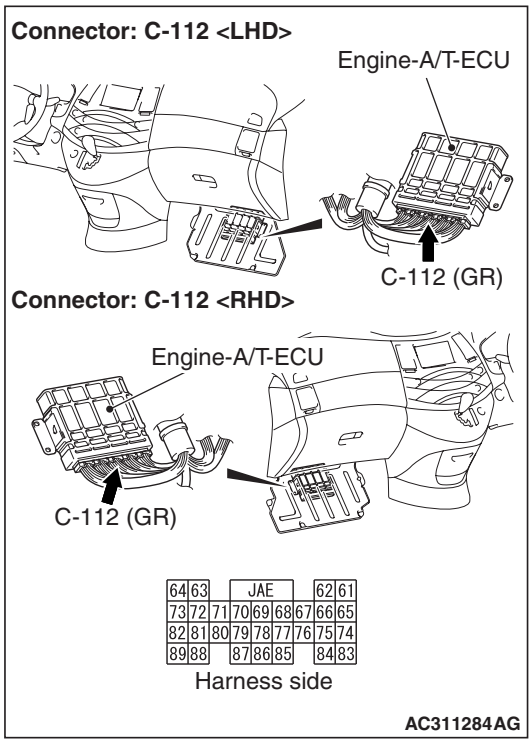
Disconnect the connector, and measure the resistance between terminal 1 and earth at the wiring harness side.

OK: 2 Ω or less

Q: Is the check result normal?
YES : Go to Step 9.
NO : Go to Step 4.

STEP 4. Measure the voltage at engine-A/T-ECU connector C-112.

(1) Connect output shaft speed sensor connector B-108.
(2) Turn the ignition switch to the ON position.

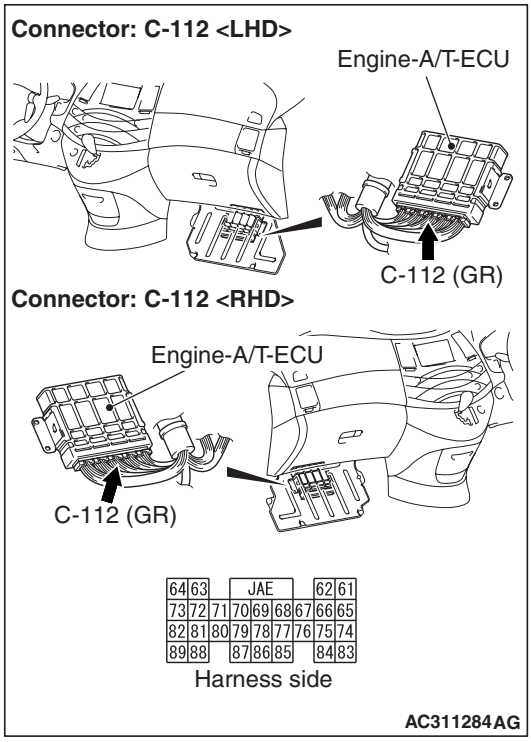


(3) Measure the voltage between engine-A/T-ECU connector C-112 terminal No.88 and earth.

OK: 0.5 V or less

Q: Is the check result normal?
NO : Go to Step 5.

STEP 5. Connector check: C-112 engine-A/T-ECU connector



Check for the contact with terminals.

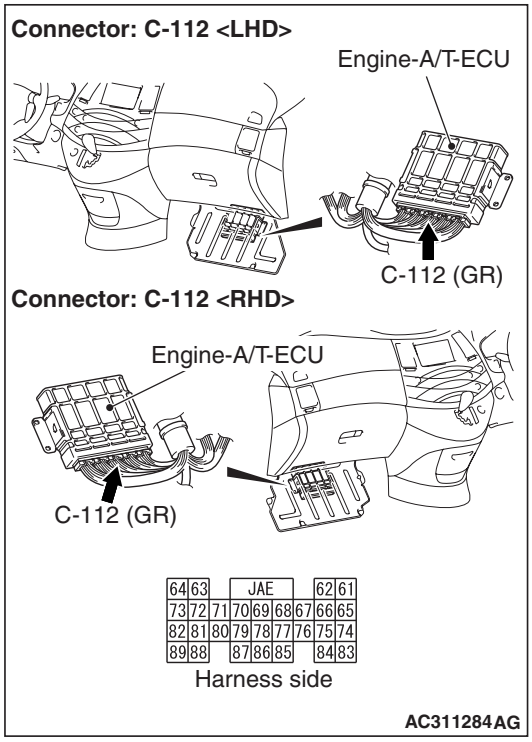
Q: Is the check result normal?
YES : Go to Step 6.
NO : Repair the defective connector.

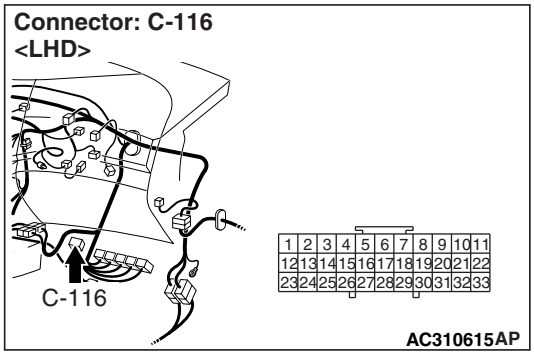
STEP 6. MUT-III data list

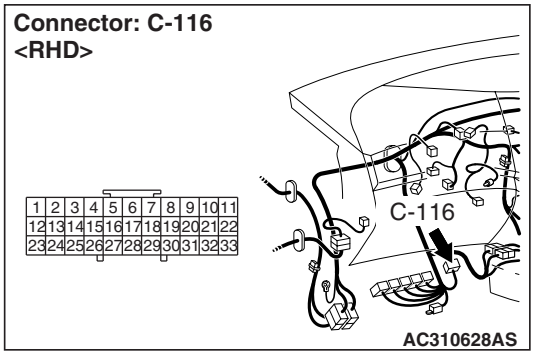
Item 0002: Output shaft speed sensor (Refer to data list reference table P.23A-117).

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Replace the engine-A/T-ECU.

STEP 7. Connector check: C-112 engine-A/T-ECU connector, C-116 J/C (4)



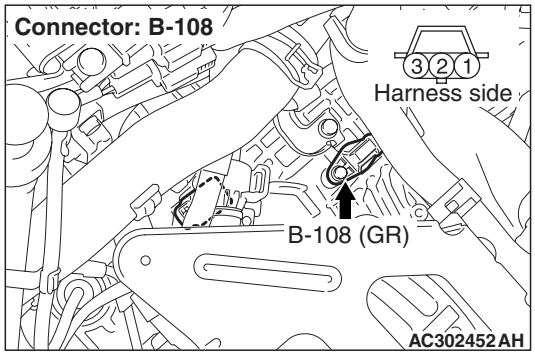


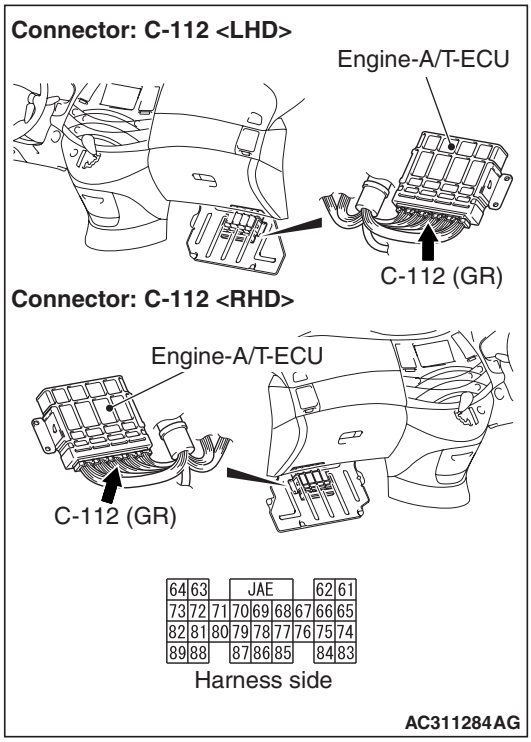


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair the defective connector.

STEP 8. Check the harness between output shaft speed sensor connector B-108 terminal No.1 and engine-A/T-ECU connector C-112 terminal No.88.



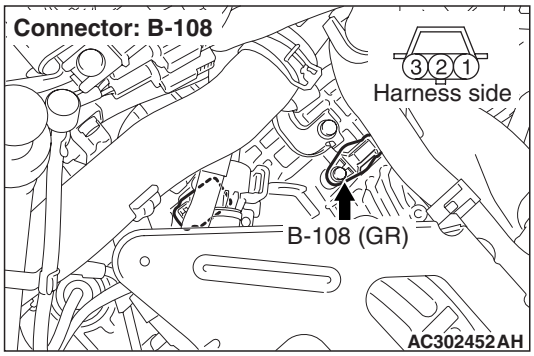


Check the earth line for open circuit.

Q: Is the check result normal?

YES : Go to Step 6.
NO : Repair the wiring harness.

STEP 9. Measure the voltage at output shaft speed sensor connector B-108.

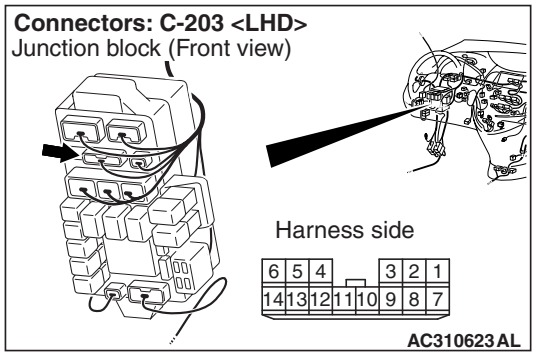


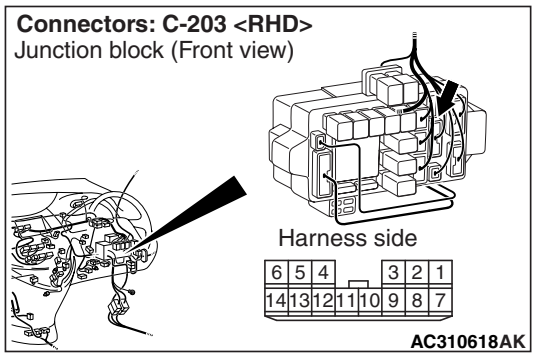
(1) Disconnect the connector, and measure the voltage between terminal 3 and earth at the wiring harness side.
(2) Turn the ignition switch to the ON position.

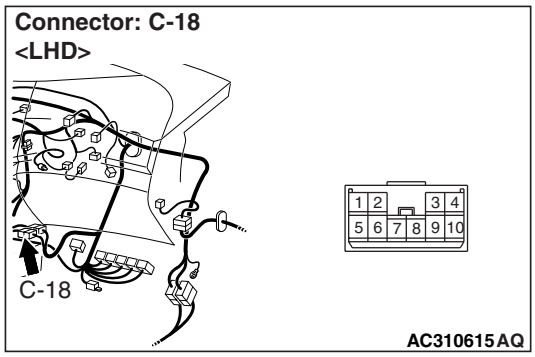
OK: System voltage

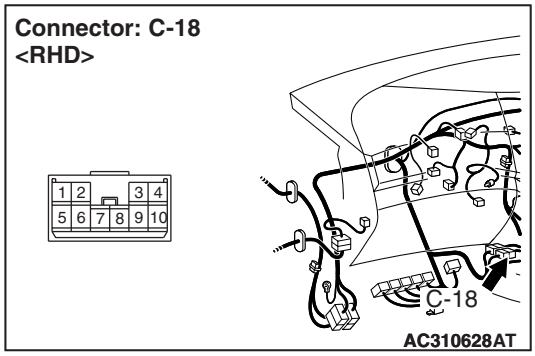
Q: Is the check result normal?
YES : Go to Step 12.
NO : Go to Step 10.

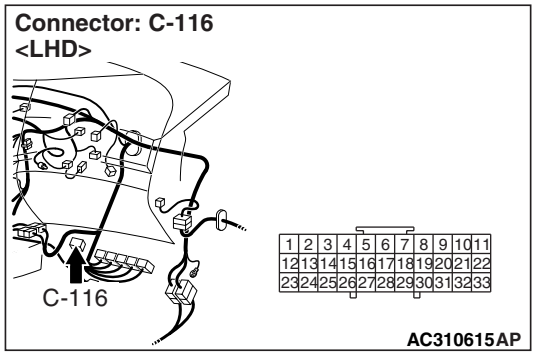
STEP 10. Connectors check: C-203 J/B connector, C-18 intermediate connector, C-116 J/C (4), C-33 J/C (7) <RHD>

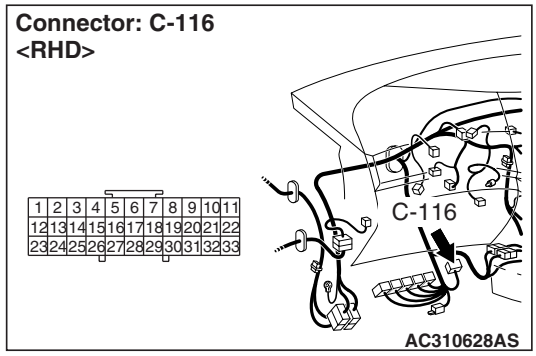


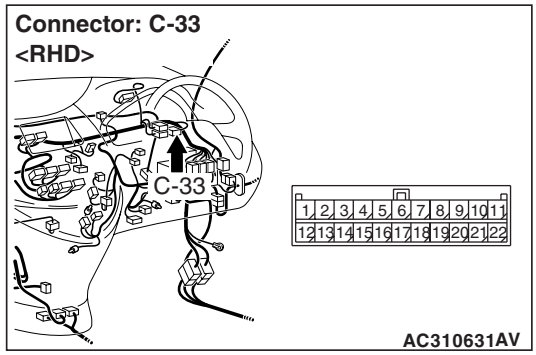








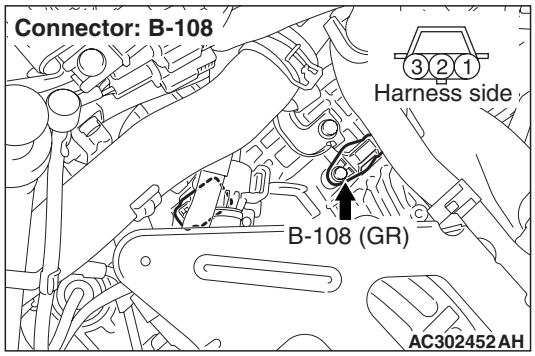


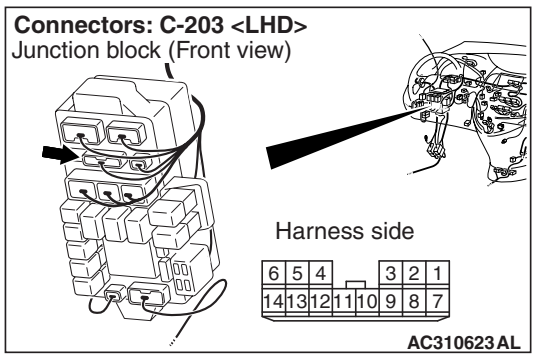


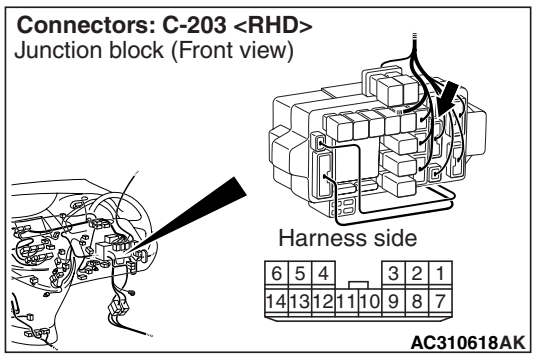
Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 11.
NO : Repair the defective connector.

STEP 11. Check the harness between output shaft speed sensor connector B-108 terminal No.3 and junction block connector C-203 terminal No.12.



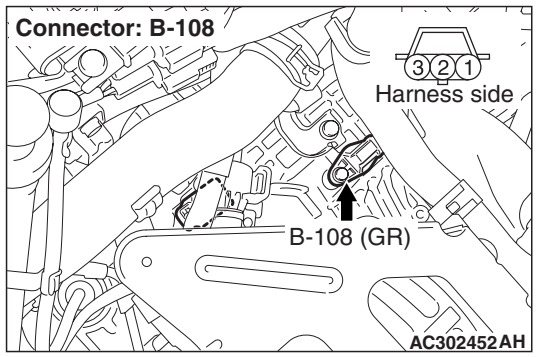




Check the power supply line for short or open circuit.

Q: Is the check result normal?
YES : Go to Step 6.
NO : Repair the wiring harness.

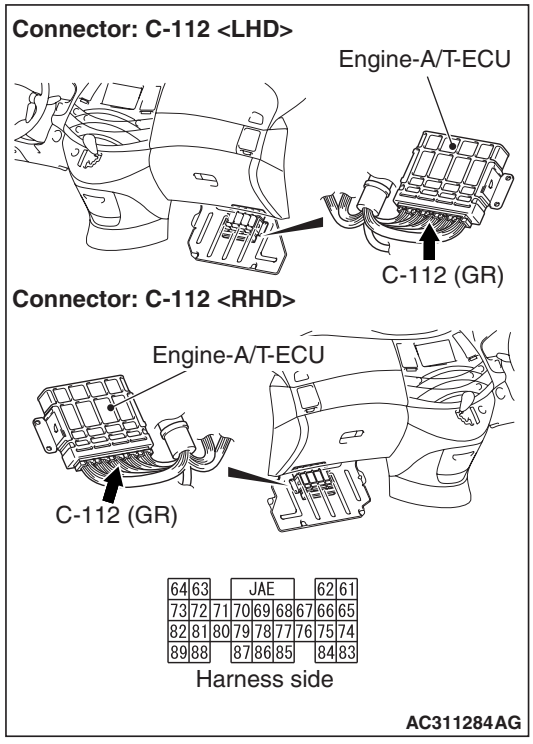
STEP 12. Measure the voltage at output shaft speed sensor connector B-108.



(1) Disconnect the connector, and measure the voltage between terminal 2 and earth at the wiring harness side.
(2) Turn the ignition switch to the ON position.
OK: 4.9 – 5.1 V

Q: Is the check result normal?
YES : Go to Step 18.
NO : Go to Step 13.

STEP 13. Measure the voltage at engine-A/T-ECU connector C-112.
(1) Disconnect output shaft speed sensor connector B-108.
(2) Turn the ignition switch to the ON position.

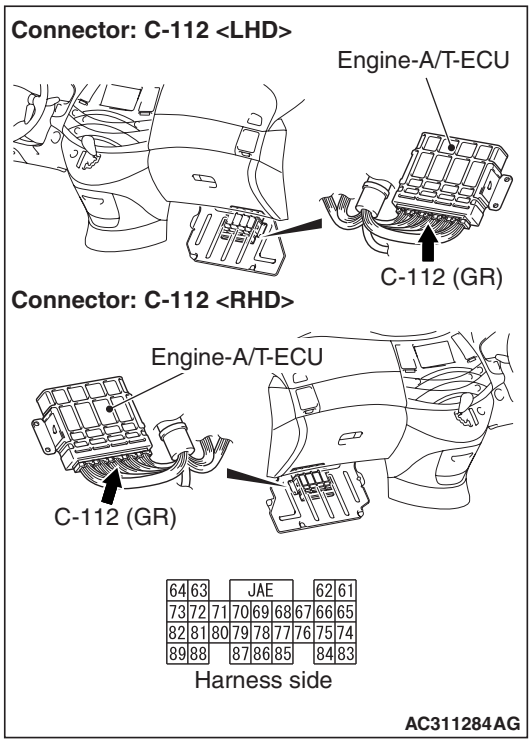


(3) Measure the voltage between engine-A/T-ECU connector C-112 terminal No.73 and earth.
OK: 4.9 – 5.1 V

Q: Is the check result normal?

YES : Go to Step 16.
NO : Go to Step 14.

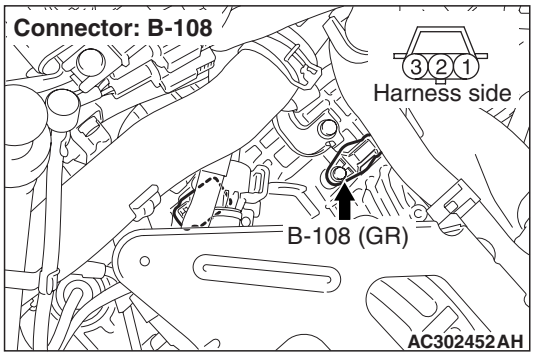
STEP 14. Connector check: C-112 engine-A/T-ECU connector

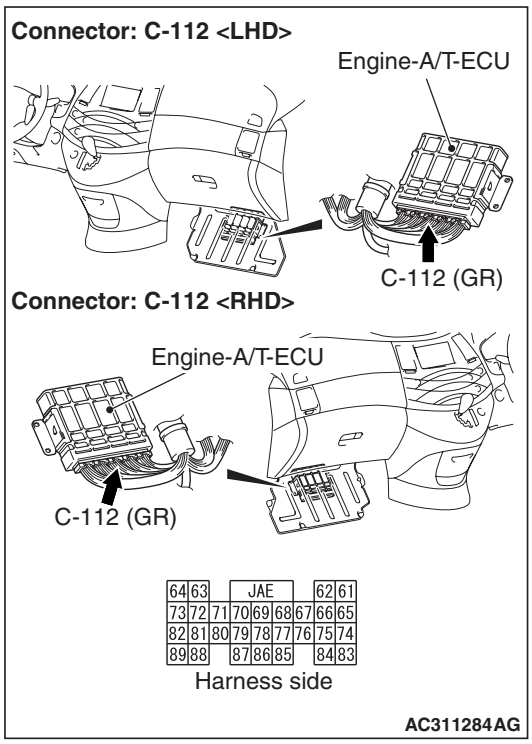


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 15.
NO : Repair the defective connector.

STEP 15. Check the harness between output shaft speed sensor connector B-108 terminal No.2 and engine-A/T-ECU connector C-112 terminal No.73.

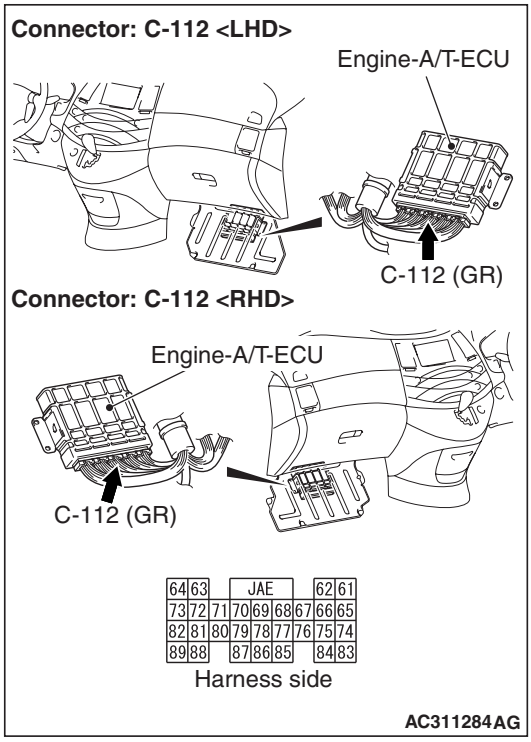




Check the output line for short circuit.

Q: Is the check result normal?
YES : Go to Step 6.
NO : Repair the wiring harness.

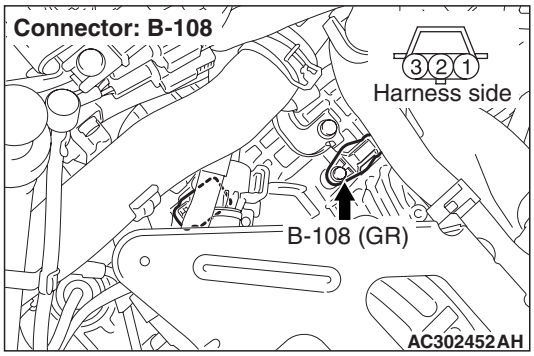
STEP 16. Connector check: C-112 engine-A/T-ECU connector

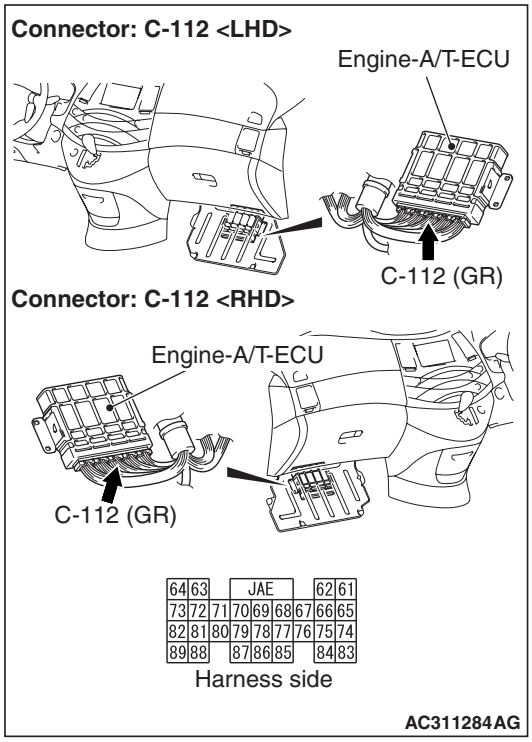


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 17.
NO : Repair the defective connector.

STEP 17. Check the harness between output shaft speed sensor connector B-108 terminal No.2 and engine-A/T-ECU connector C-112 terminal No.73.



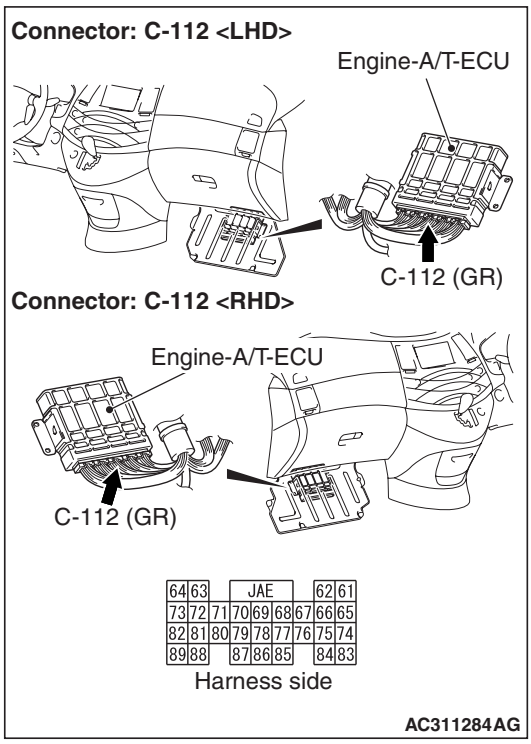


Check the output line for open circuit.

Q: Is the check result normal?
YES : Go to Step 6.
NO : Repair the wiring harness.

STEP 18. Measure the output wave pattern of the output shaft speed sensor at engine-A/T-ECU connector C-112 (using an oscilloscope).
(1) Shift the selector lever to the D range.
(2) Accelerate the vehicle to approximately 50 km/h

(shift range; 3rd).

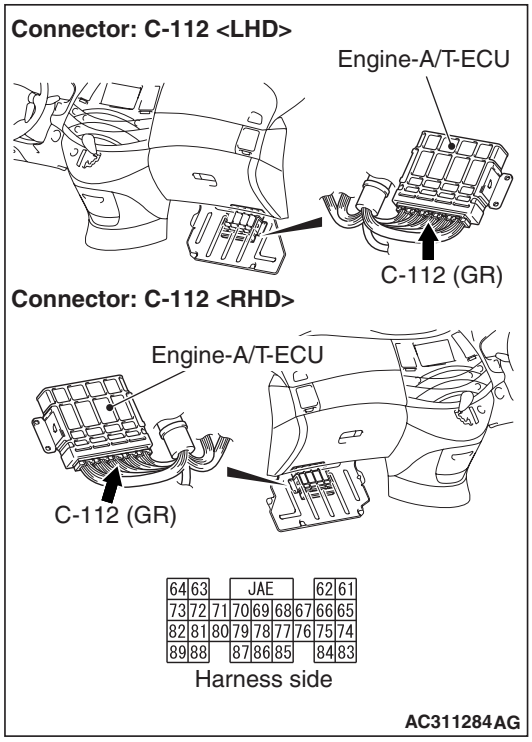


(3) Connect an oscilloscope, and measure the voltage between engine-A/T-ECU connector C-112 terminal No.73 and earth.

OK: A wave pattern such as the one shown on P.23A-123 (Check Procedure Using an Oscilloscope) should be output, and the maximum value should be 4.8 V or more and the minimum value should be 0.8 V or less. There should be no noise in the output wave pattern.

Q: Is the check result normal?
YES : Go to Step 6.
NO : Go to Step 19.

STEP 19. Connector check: C-112 engine-A/T-ECU connector



Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 20.
NO : Repair the defective connector.

STEP 20. Replace the output shaft speed sensor and then recheck the diagnosis code.
(1) Replace the output shaft speed sensor.
(2) Test drive the vehicle.
(3) Check if the diagnosis code is set.

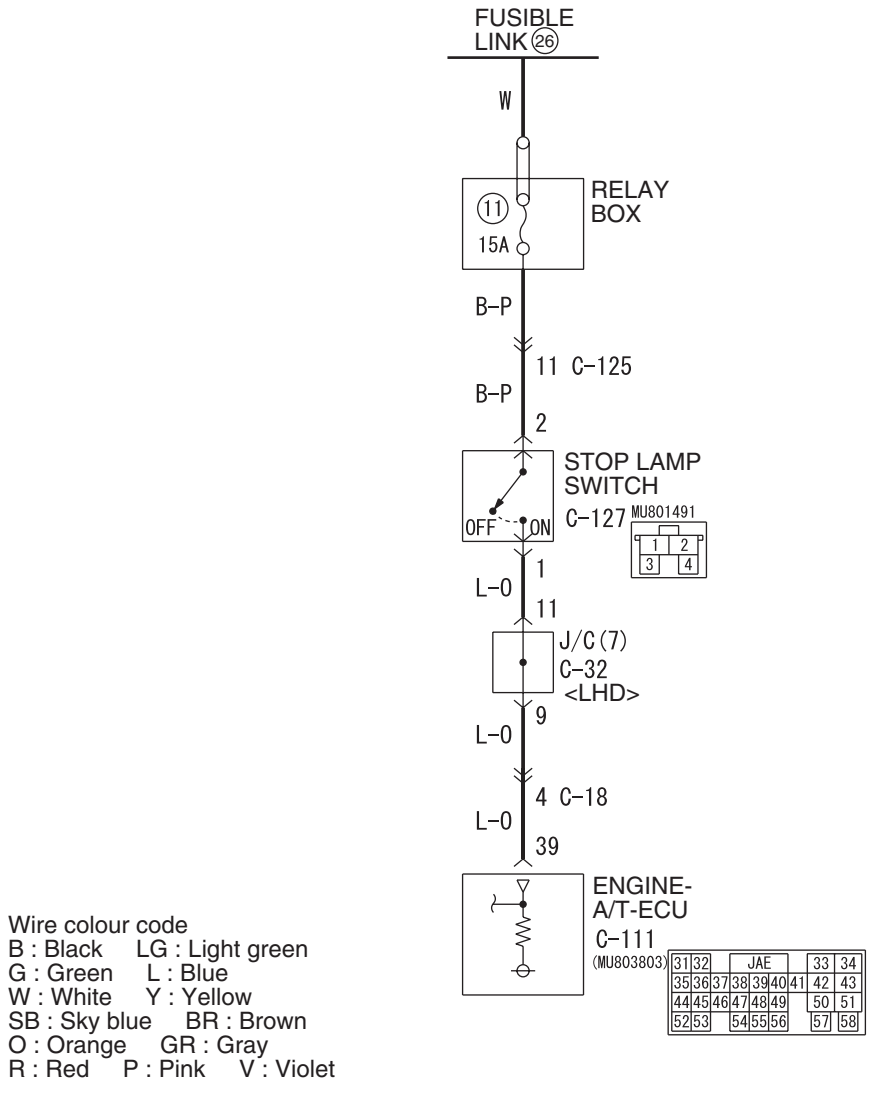
Q: Is diagnosis code 23 set?
YES : Go to Step 21.
NO : The inspection is complete.

STEP 21. Check the transfer drive gear and driven gear.
Visually check the transfer drive gear and driven gear for damage.

Q: Is the check result normal?
YES : Eliminate the cause of the noise.
NO : Replace the transfer drive gear and driven gear.

Code No.26: Stop lamp switch system

Stop lamp switch system circuit



Wire colour code
B : Black LG : Light green
G : Green L : Blue
W : White Y : Yellow
SB : Sky blue BR : Brown
O : Orange GR : Gray
R : Red P : Pink V : Violet

W4X23E003A

OPERATION

The stop lamp switch judges whether the brake pedal is depressed or released, and sends the information to the engine-A/T-ECU.

DIAGNOSIS CODE SET CONDITIONS

If the stop lamp remains on for consecutively five minutes or more while the vehicle is being driven or all the stop lamp bulbs are blown, it is judged that there is a short or open circuit in the stop lamp switch and diagnosis code 26 is set.

POSSIBLE CAUSES

- Malfunction of brake pedal
- Malfunction of stop lamp switch
- Damaged harness wires and connectors
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. Check that the stop lamps illuminate and extinguish normally.

The stop lamps should illuminate when the brake pedal is depressed, and extinguish when released.

Q: Is the check result normal?
YES : Go to Step 7.
NO : Go to Step 2.

STEP 2. Check the brake pedal height.
Refer to GROUP 35A – On-vehicle Service, Brake Pedal Check and Adjustment (Refer to P.35A-4).

Q: Is the check result normal?
YES : Go to Step 3.
NO : Adjust the brake pedal height.

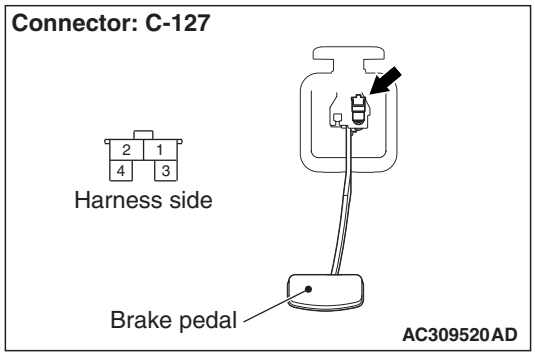
STEP 3. Check the stop lamp switch.
Refer to GROUP 35A – Brake Pedal and Stop Lamp Switch Continuity Check (Refer to P.35A-13).

Q: Is the check result normal?
YES : Go to Step 4.
NO : Replace the stop lamp switch.

STEP 4. MUT-III data list
Item 26: Stop lamp switch (Refer to data list reference table P.23A-117).

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Go to Step 5.

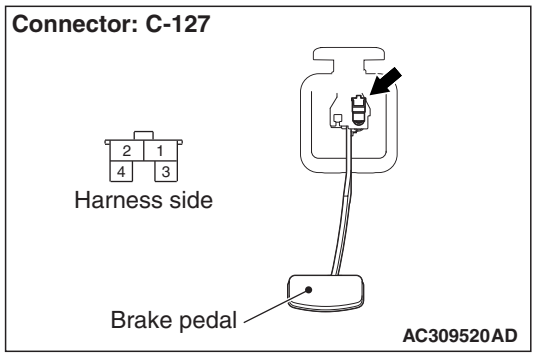
STEP 5. Connector check: C-127 stop lamp switch connector



Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 6.
NO : Repair the defective connector.

STEP 6. Measure the voltage at stop lamp switch connector C-127.

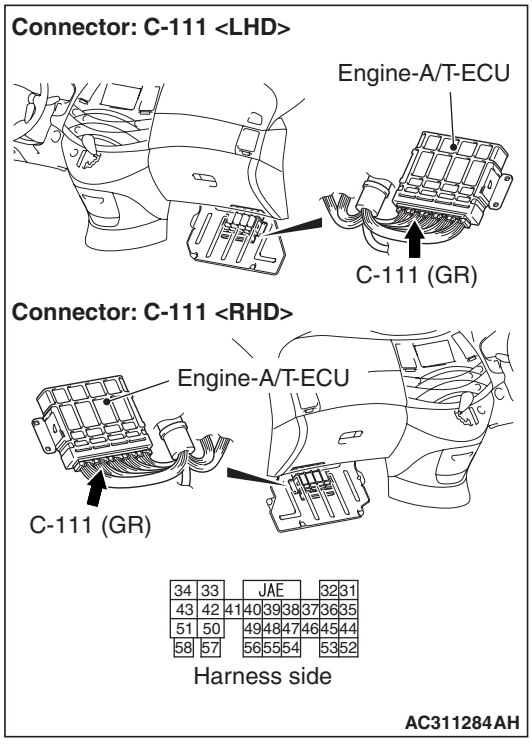


Disconnect the connector, and measure the voltage between terminal No.2 and earth at the harness side.

OK: System voltage

Q: Is the check result normal?
YES : Go to Step 7.
NO : Go to Step 12.

STEP 7. Measure the voltage at engine-A/T-ECU connector C-111.
(1) Connect stop lamp switch connector C-127.

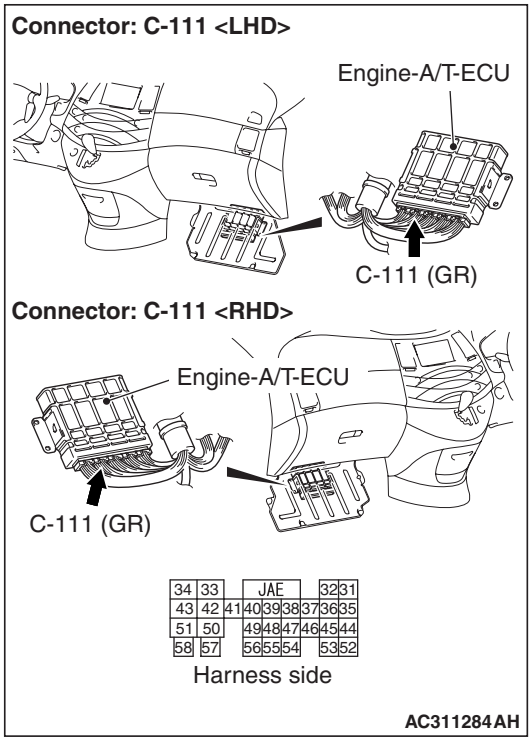


(2) Measure the voltage between engine-A/T-ECU connector C-111 terminal No.39 and earth.

OK:
Brake pedal depressed: System voltage
Brake pedal not depressed: 1 V or less

Q: Is the check result normal?
YES : Go to Step 8.
NO : Go to Step 10.

STEP 8. Connector check: C-111 engine-A/T-ECU connector



Check for the contact with terminals.

Q: Is the check result normal?

YES : Go to Step 9.
NO : Repair the defective connector.

STEP 9. MUT-III data list

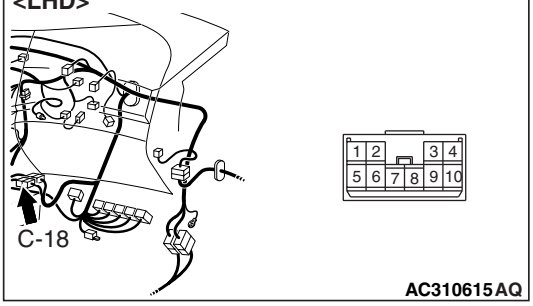
Item 26: Stop lamp switch (Refer to data list reference table P.23A-117).

Q: Is the check result normal?

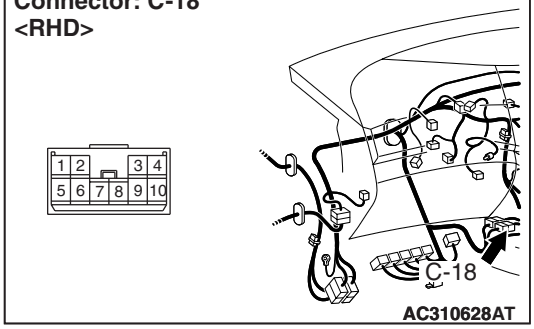
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Replace the engine-A/T-ECU.

STEP 10. Connectors check: C-18 intermediate connector, C-111 engine-A/T-ECU connector, C-32 J/C (7) <LHD>

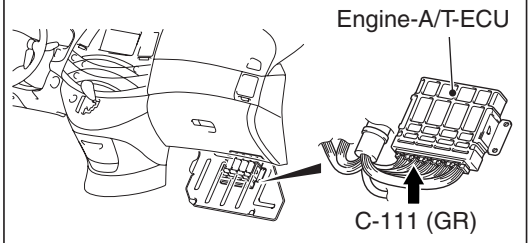
Connector: C-18 <LHD>



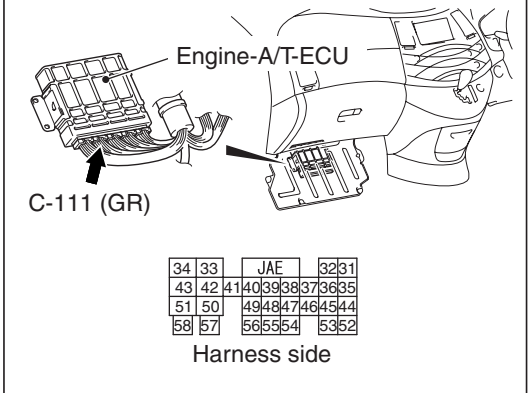
Connector: C-18 <RHD>



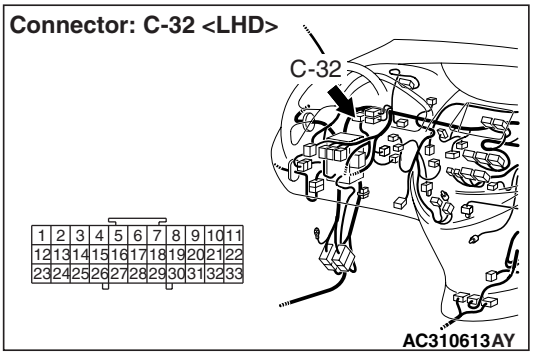
Connector: C-111 <LHD>



Connector: C-111 <RHD>



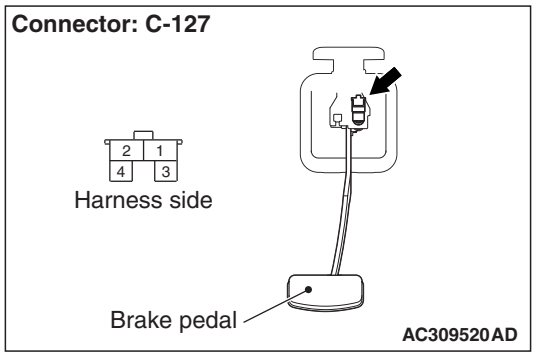
Connector: C-32 <LHD>

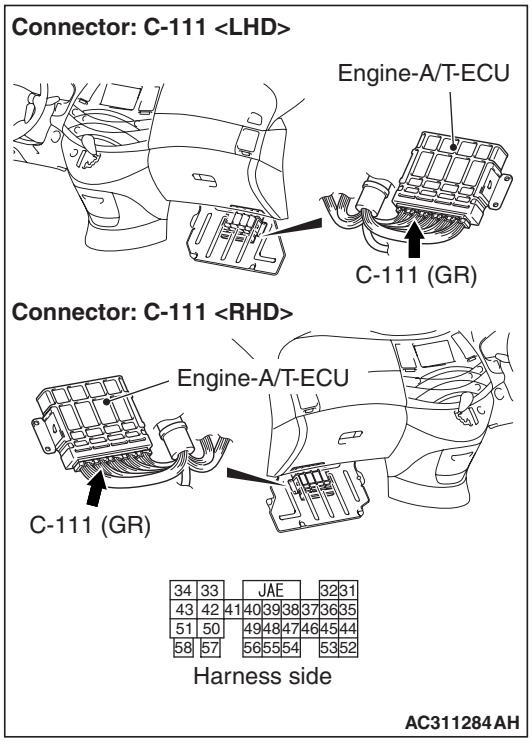


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 11.
NO : Repair the defective connector.

STEP 11. Check the harness between stop lamp switch connector C-127 terminal No.1 and engine-A/T-ECU connector C-111 terminal No.39.

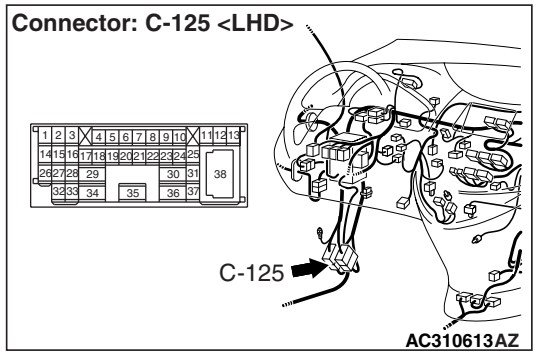


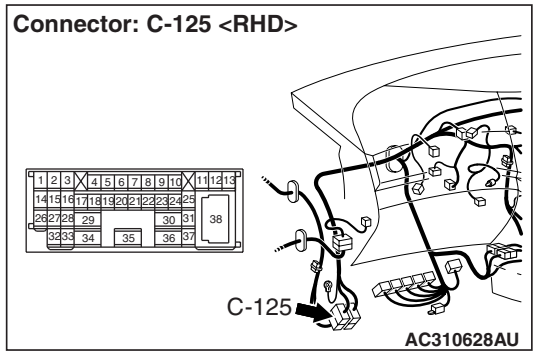


Check the output line for short or open circuit.

Q: Is the check result normal?
YES : Go to Step 9.
NO : Repair the wiring harness.

STEP 12. Connector check: C-125 intermediate connector

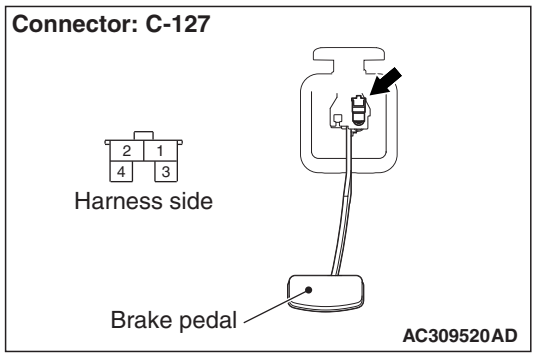




Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 13.
NO : Repair the defective connector.

STEP 13. Check the harness between stop lamp switch connector C-127 terminal No.2 and battery.

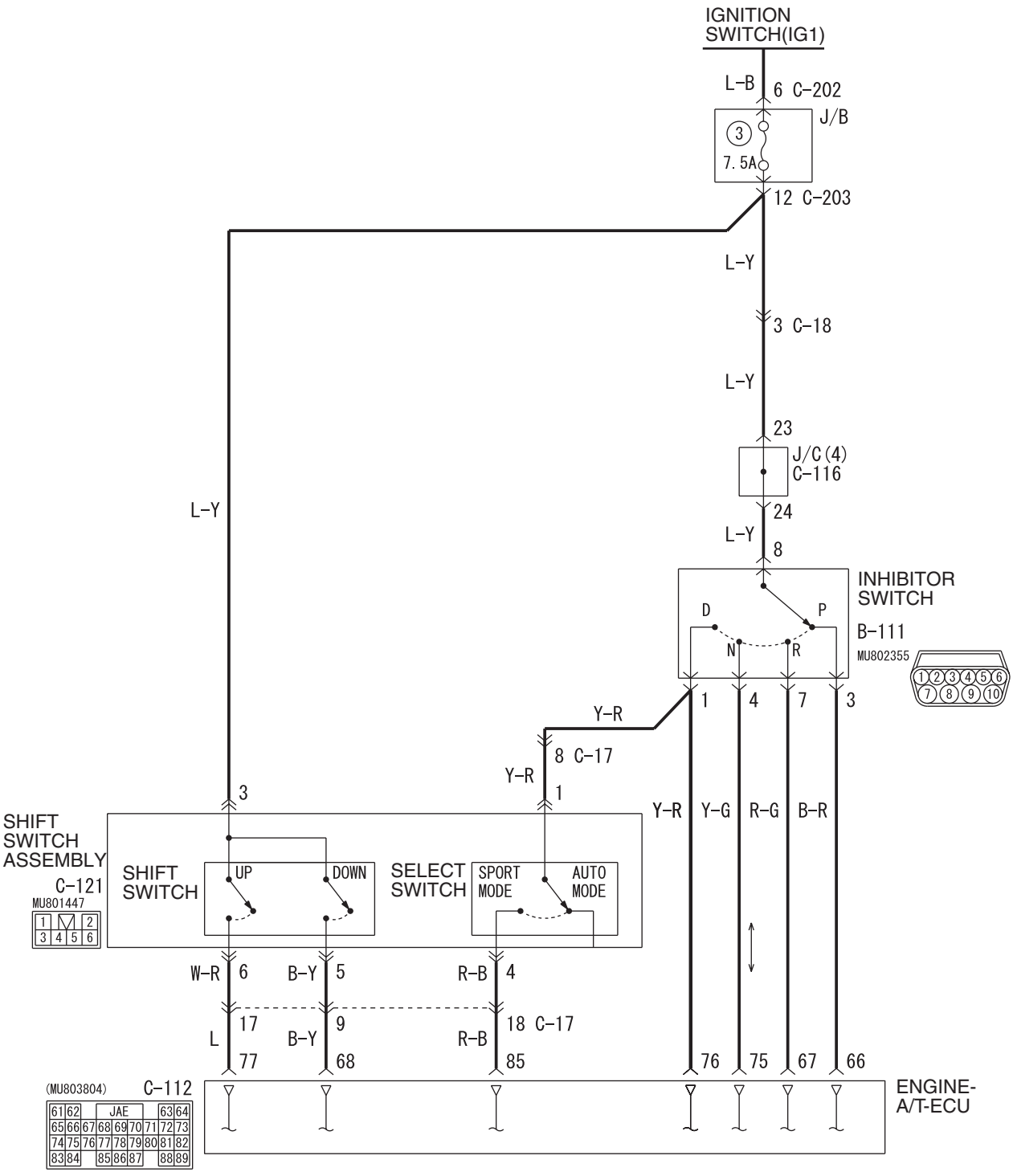


Check the power supply line for short or open circuit.

Q: Is the check result normal?
YES : Go to Step 9.
NO : Repair the wiring harness.

Code No.27: Inhibitor switch system

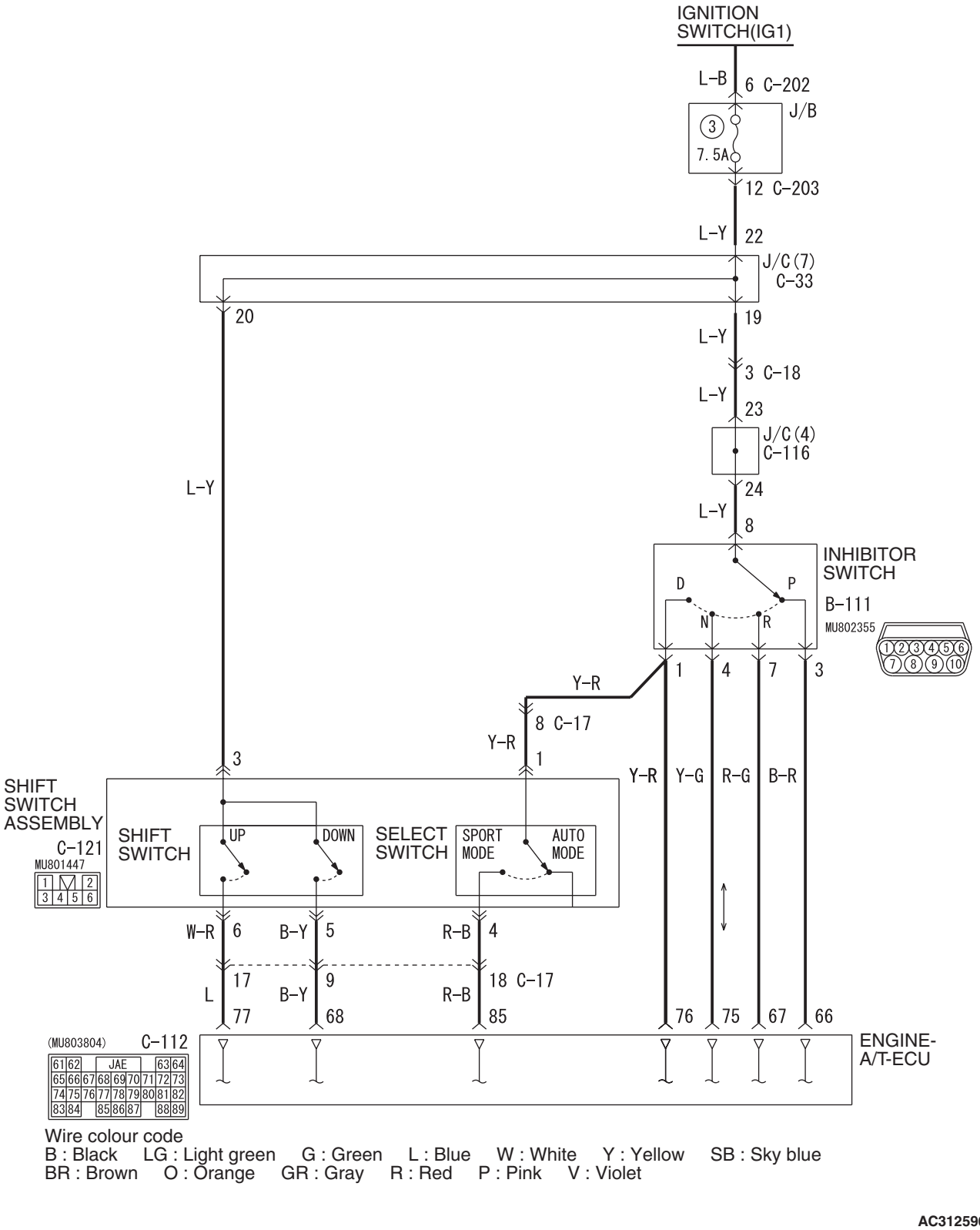
Inhibitor switch system circuit <LHD>



Wire colour code
B : Black LG : Light green G : Green L : Blue W : White Y : Yellow SB : Sky blue
BR : Brown O : Orange GR : Gray R : Red P : Pink V : Violet

W4X23E004A

Inhibitor switch system circuit <RHD>



Wire colour code
B : Black LG : Light green G : Green L : Blue W : White Y : Yellow SB : Sky blue
BR : Brown O : Orange GR : Gray R : Red P : Pink V : Violet

AC312596AB

OPERATION

The inhibitor switch detects the selector lever position (P, R, N or D) which the driver has selected, and sends the information to the engine-A/T-ECU.

DIAGNOSIS CODE SET CONDITIONS

If the inhibitor switch has not been sending any signal for at least 30 seconds, an open circuit may be present and dianosis code No.27 will be set.

POSSIBLE CAUSES

- Malfunction of the inhibitor switch
- Damaged harness wires and connectors
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. MUT-III data list

Item 61: Inhibitor switch (Refer to data list reference table P.23A-117).

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).

NO <none of the selector lever positions are displayed on MUT-III> : Go to Step 2.

NO <only one of the selector lever positions is not displayed on MUT-III> : Go to Step 6.

STEP 2. Check the inhibitor switch.

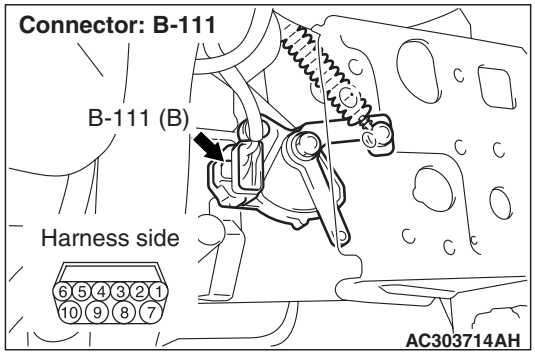
Refer to P.23A-128.

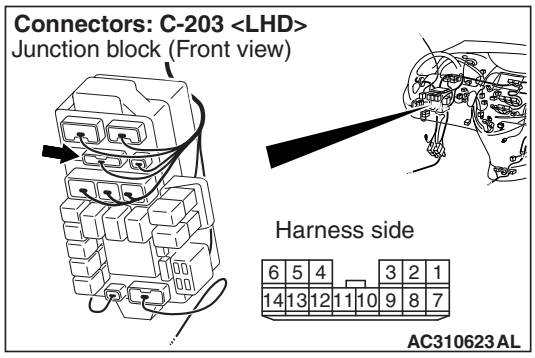
Q: Is the check result normal?

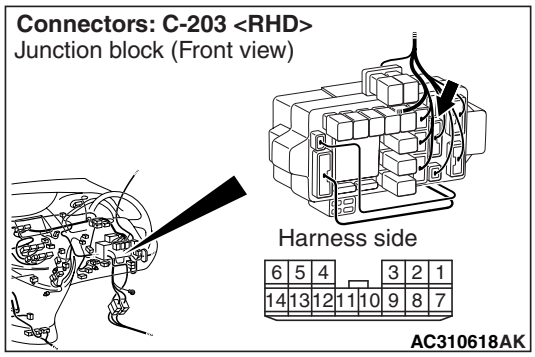
YES : Go to Step 3.

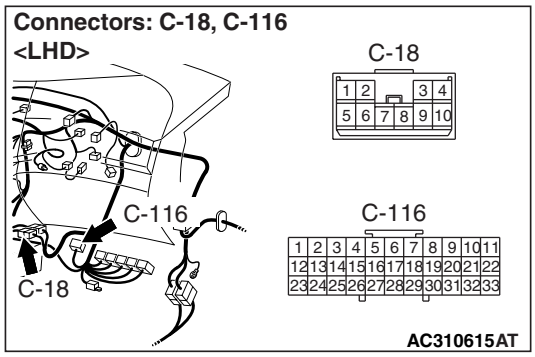
NO : Replace the inhibitor switch.

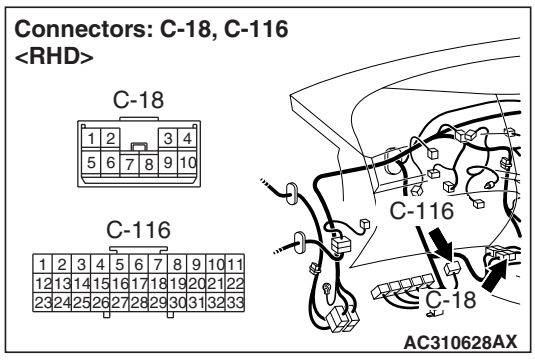
STEP 3. Connector check: B-111 Inhibitor switch connector, C-203 J/B connector, C-18 intermediate connector, C-116 J/C (4), C-33 J/C (7) <RHD>

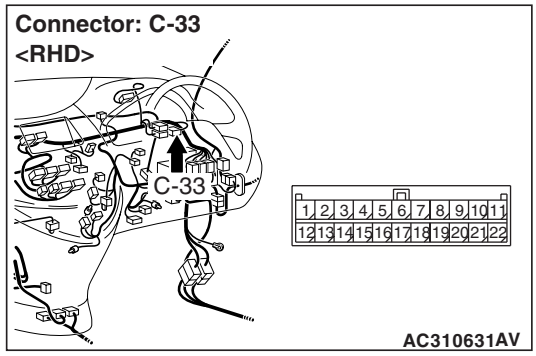








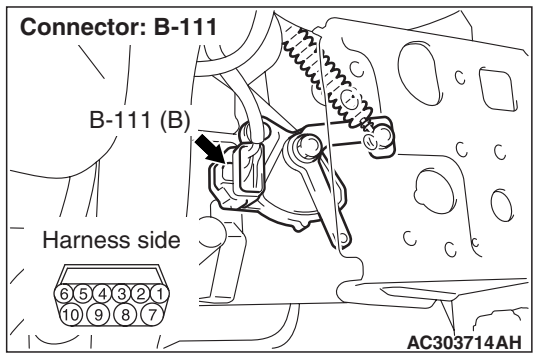


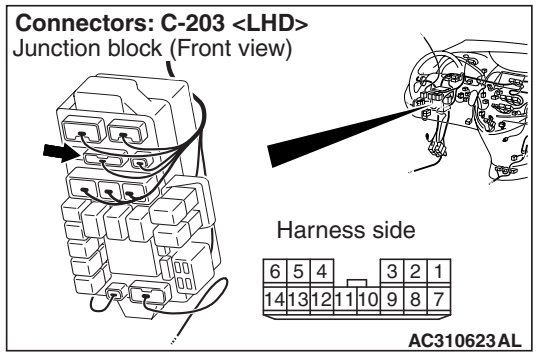


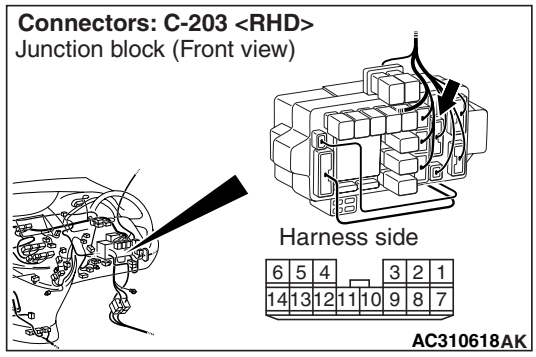
Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the defective connector.

STEP 4. Check the harness between inhibitor switch connector B-111 terminal No.8 and J/B connector C-203 terminal No.12.







Check the power supply line for open circuit.

Q: Is the check result normal?

YES : Go to Step 5.
NO : Repair the wiring harness.

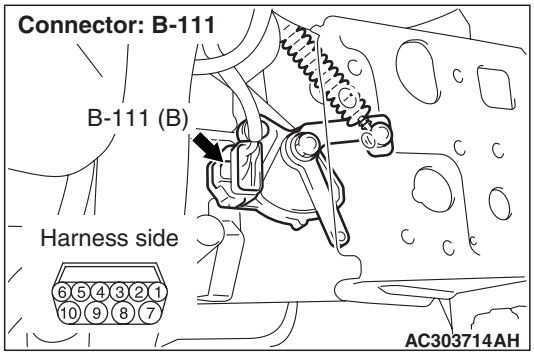
STEP 5. MUT-III data list
Item 61: Inhibitor switch (Refer to data list reference table P.23A-117).

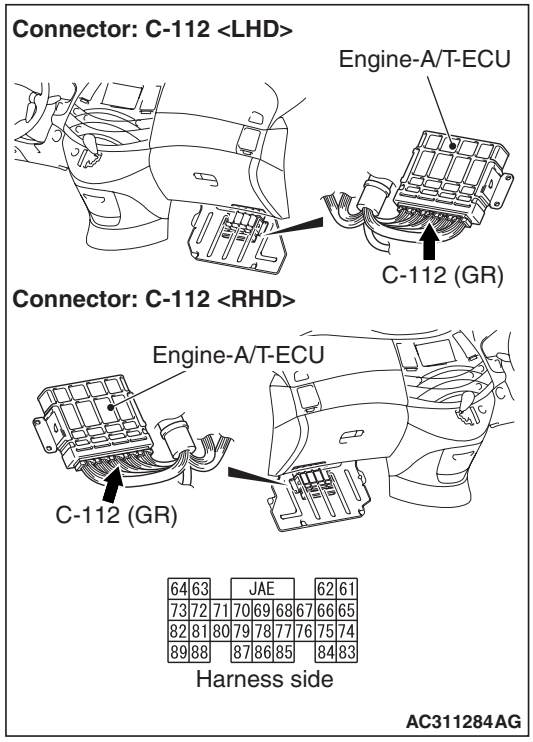
Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Replace the engine-A/T-ECU.

STEP 6. Check the inhibitor switch.
Refer to P.23A-128.

Q: Is the check result normal?
YES : Go to Step 7.
NO : Replace the inhibitor switch.

STEP 7. Connector check: B-111 inhibitor switch connector, C-112 engine-A/T-ECU connector

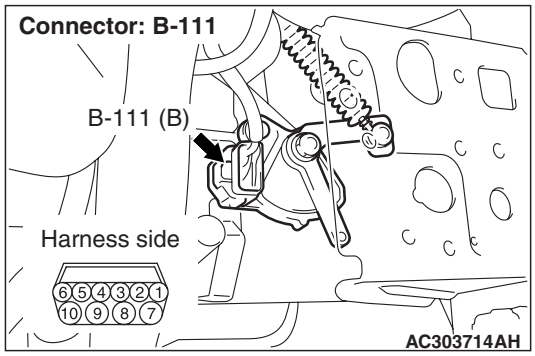


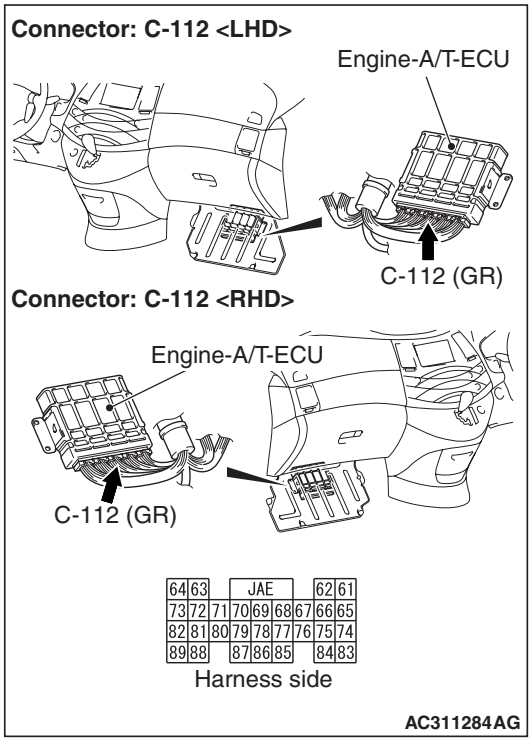


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair the defective connector.

STEP 8. Check the harness between inhibitor switch connector B-111 terminal No.3, 7, 4, 1 and engine-A/T-ECU connector C-112 terminal No.66, 67, 75, 76.

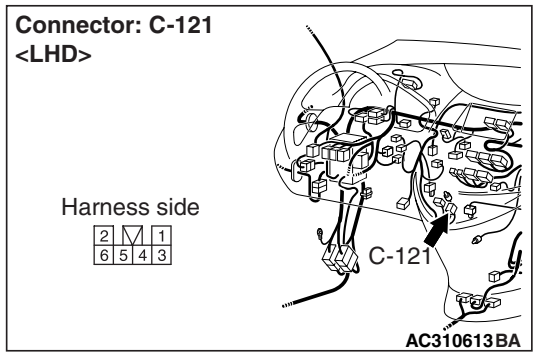


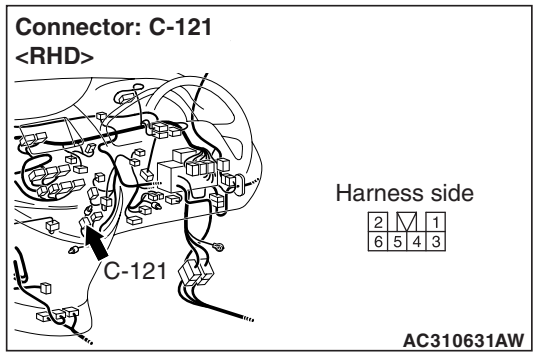


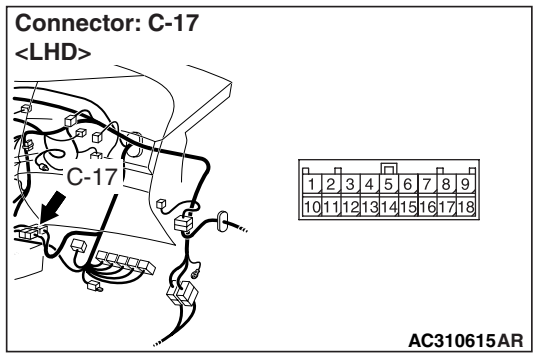
Check the output line for open circuit.

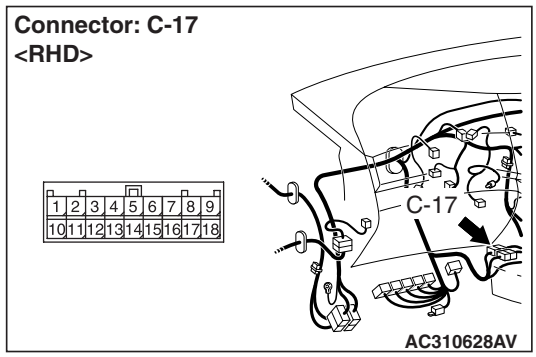
Q: Is the check result normal?
YES : Go to Step 9.
NO : Repair the wiring harness.

STEP 9. Connector check: C-121 shift switch assembly connector, C-17 intermediate connector





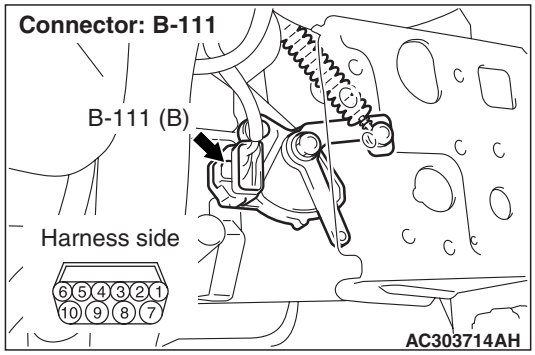


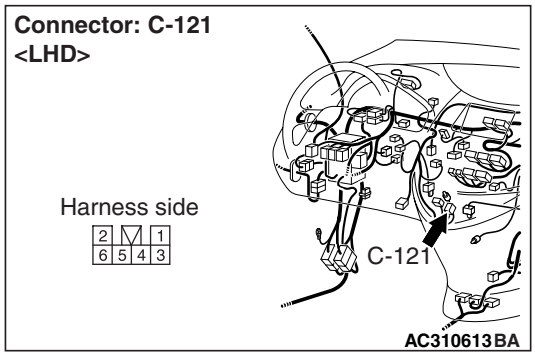


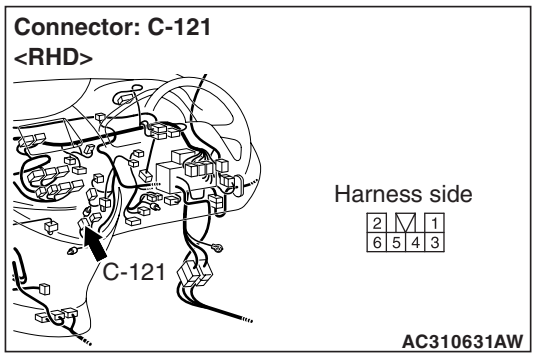
Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 10.
NO : Repair the defective connector.

STEP 10. Check the harness between inhibitor switch connector B-111 terminal No.1 and shift switch assembly connector C-121 terminal No.1.







Check the output line for short circuit.

Q: Is the check result normal?

YES : Go to Step 5.
NO : Repair the wiring harness.

Code No.28: Inhibitor switch system

INHIBITOR SWITCH SYSTEM CIRCUIT

Refer to P.23A-52.

OPERATION

Refer to P.23A-52.

DIAGNOSIS CODE SET CONDITIONS

If the inhibitor switch has been sending multiple signals for at least 30 seconds, the circuit may be open and diagnosis code No.28 will be set.

YES : Go to Step 2.

POSSIBLE CAUSES

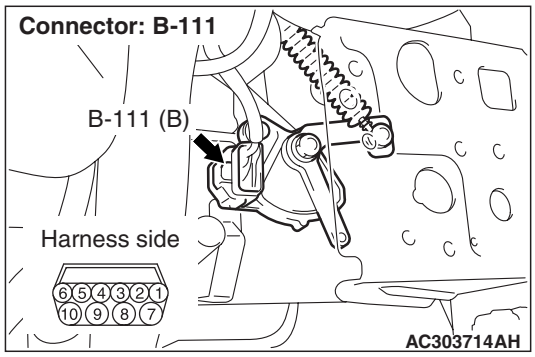
- Malfunction of the inhibitor switch
- Damaged harness wires and connectors
- Malfunction of the engine-A/T-ECU

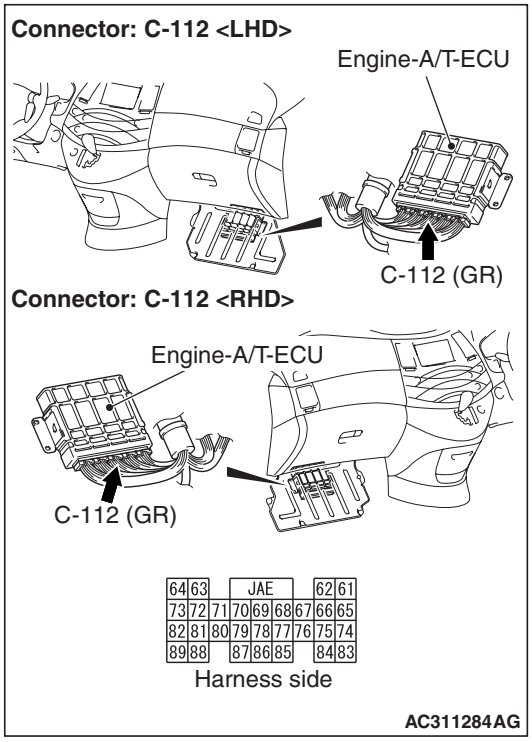
DIAGNOSIS

STEP 1. Check the inhibitor switch.
Refer to P.23A-128.

Q: Is the check result normal?
NO : Replace the inhibitor switch.

STEP 2. Connector check: B-111 Inhibitor switch connector, C-112 engine-A/T-ECU connector

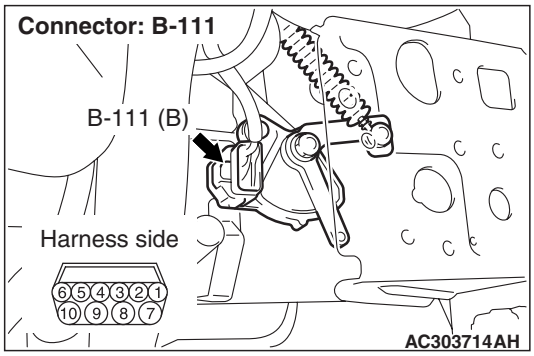


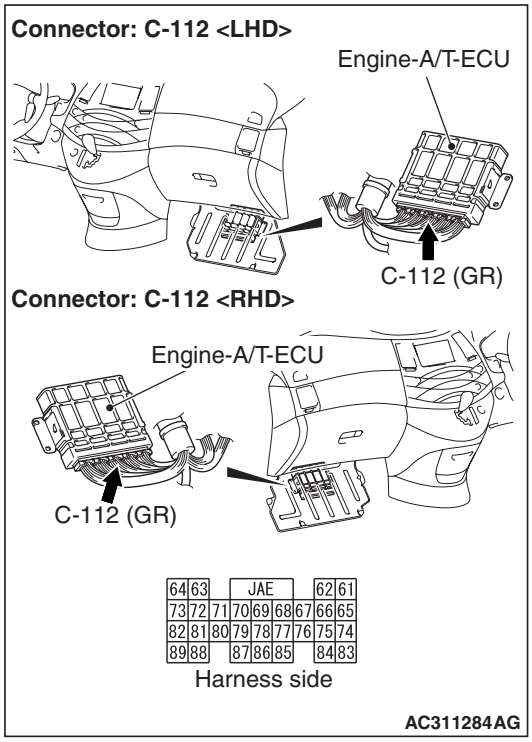


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 3.
NO : Repair the defective connector.

STEP 3. Check the harness between inhibitor switch connector B-111 terminal No.3, 7, 4, 1 and engine-A/T-ECU connector C-112 terminal No.66, 67, 75, 76.

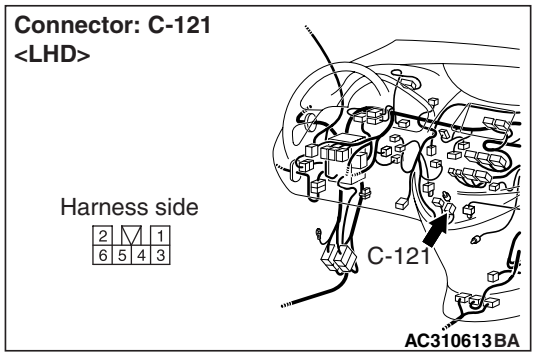


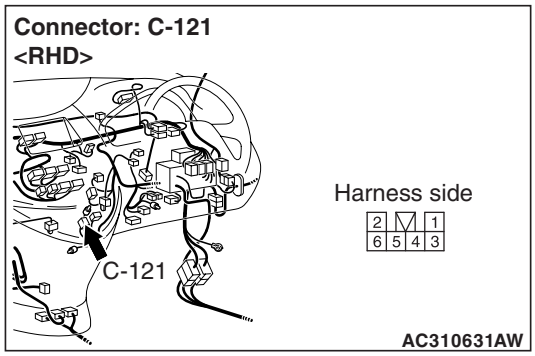


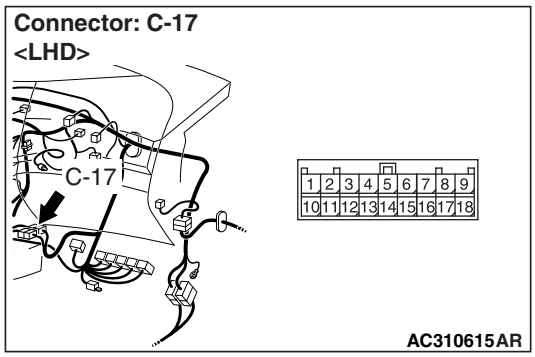
Check the output line for short circuit.

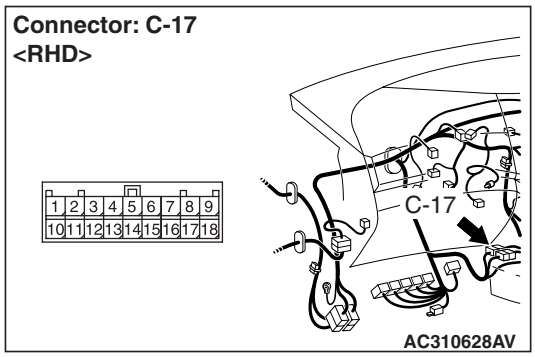
Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the wiring harness.

STEP 4. Connector check: C-121 shift switch assembly connector, C-17 intermediate connector





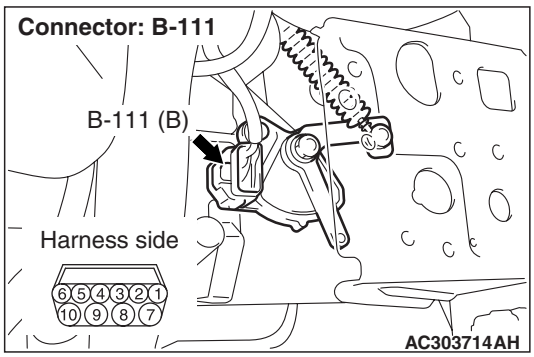


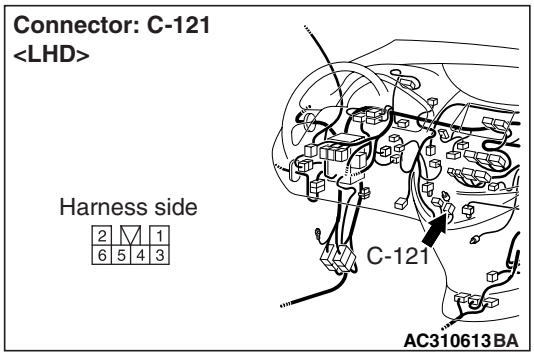


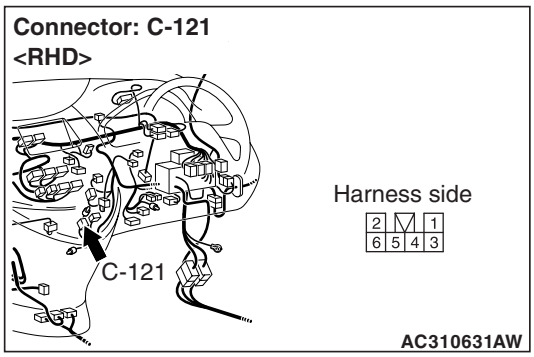
Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 5.
NO : Repair the defective connector.

STEP 5. Check the harness between inhibitor switch connector B-111 terminal No.1 and shift switch assembly connector C-121 terminal No.1.







Check the output line for short circuit.

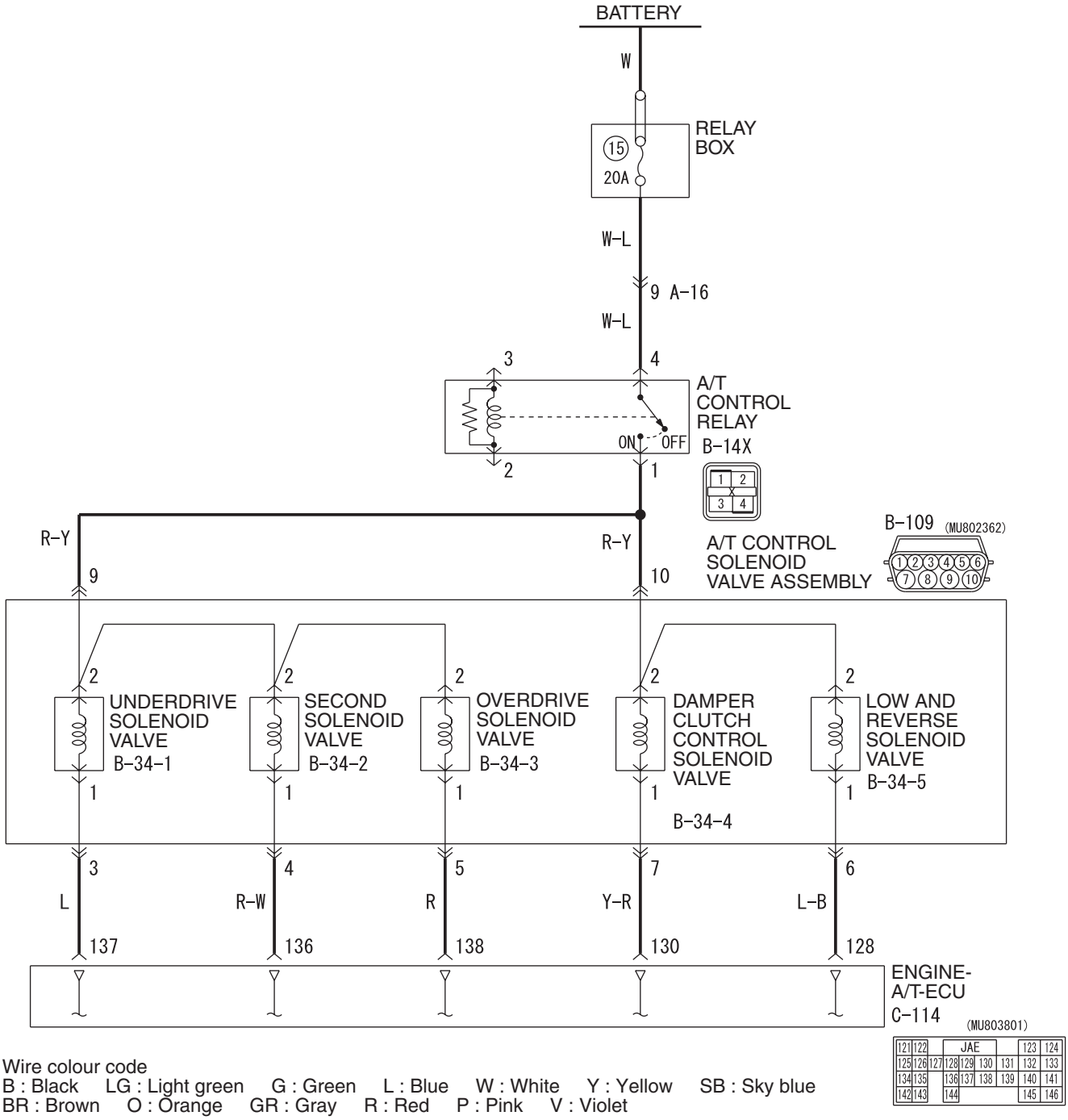
Q: Is the check result normal?
YES : Go to Step 6.
NO : Repair the wiring harness.

STEP 6. MUT-III data list
Item 61: Inhibitor switch (Refer to data list reference table P.23A-117).

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Replace the engine-A/T-ECU.

Code No.31: Low-reverse solenoid valve system

Solenoid valve system circuit



Wire colour code
B : Black LG : Light green G : Green L : Blue W : White Y : Yellow SB : Sky blue
BR : Brown O : Orange GR : Gray R : Red P : Pink V : Violet

W4X23E005A

OPERATION

- Solenoid valve closes or opens according to the signals from the engine-A/T-ECU.

- The engine-A/T-ECU energises or deenergises solenoid valve, based on input signals such as throttle position sensor opening angle, inhibitor switch, etc.

DIAGNOSIS CODE SET CONDITIONS

If the drive terminal voltage of the low-reverse solenoid valve is 3.0 V or less, it is judged that there is a short circuit or open circuit in the low-reverse solenoid valve, and diagnosis code 31 is set.
If diagnosis code 31 is set 4 times, the transmission is fixed in 3rd as a fail-safe measure.

POSSIBLE CAUSES

- Malfunction of low-reverse solenoid valve
- Damaged harness wires and connectors
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. MUT-III diagnosis code

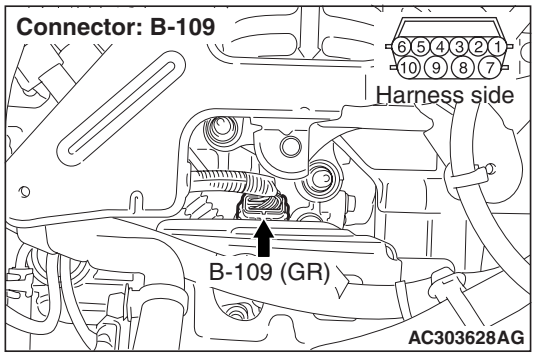
Q: Is diagnosis code 36 set?
YES : Go to Step 9.
NO : Go to Step 2.

STEP 2. MUT-III actuator test
Item 01: Low-reverse solenoid valve

OK: Operating sound can be heard.

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Go to Step 3.

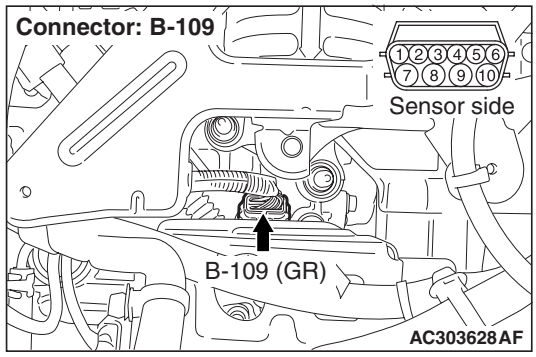
STEP 3. Connector check: B-109 A/T control solenoid valve assembly connector



Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the defective connector.

STEP 4. Measure the resistance at A/T control solenoid valve assembly connector B-109.

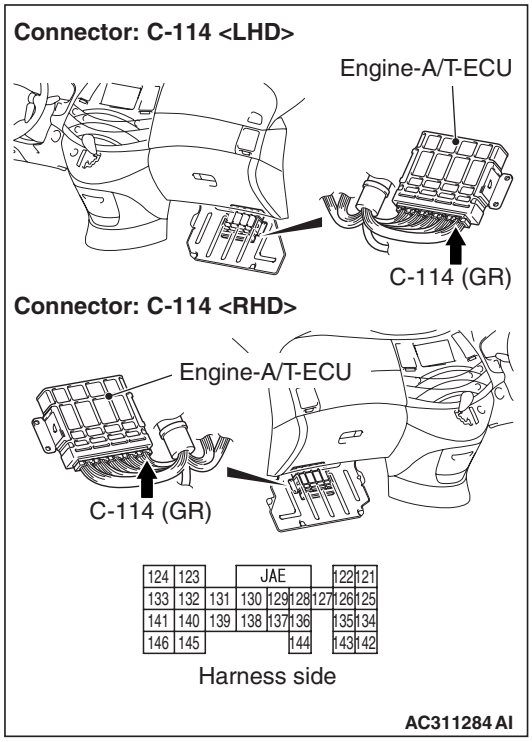


Disconnect the connector, and measure the resistance between terminal No.6 and No.10 at the solenoid valve side.

OK: 2.7 – 3.4 Ω (A/T fluid temperature 20°C)

Q: Is the check result normal?
YES : Go to Step 5.
NO : Check the low-reverse solenoid valve and solenoid valve harness.

STEP 5. Measure the voltage at engine-A/T-ECU connector C-114.
(1) Connect A/T control solenoid valve assembly connector B-109.
(2) Turn the ignition switch to the ON position.



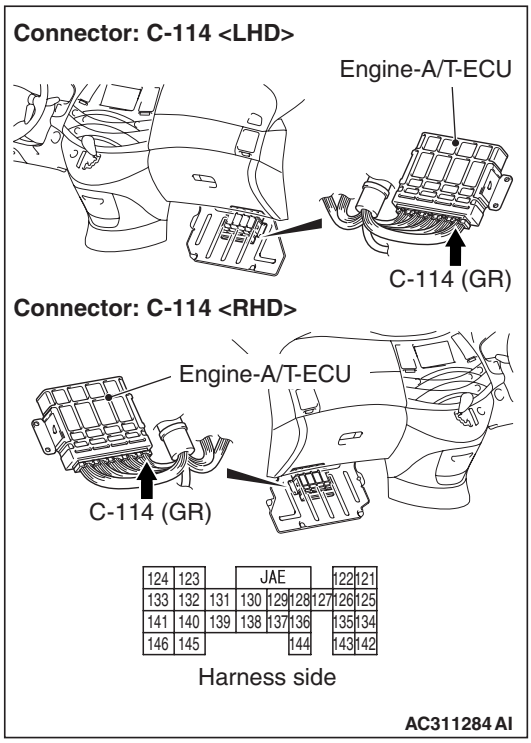
(3) Measure the voltage between engine-A/T-ECU connector C-114 terminal No.128 and earth.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 8.
NO : Go to Step 6.

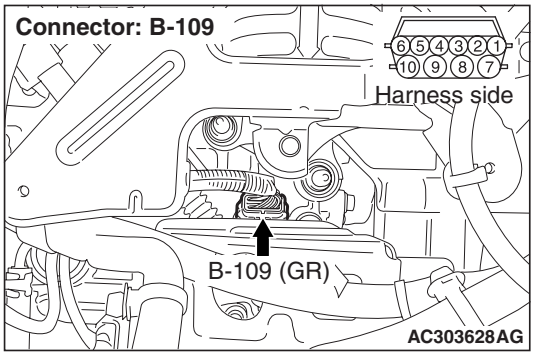
STEP 6. Connector check: C-114 engine-A/T-ECU connector

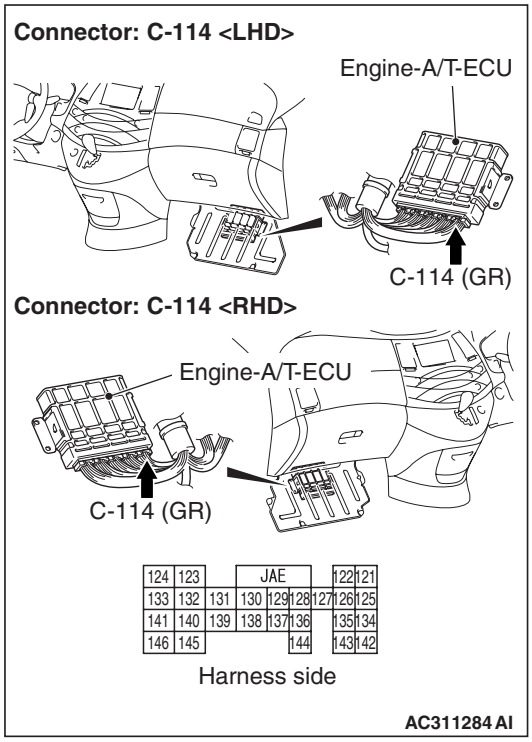


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the defective connector.

STEP 7. Check the harness between A/T control solenoid valve assembly connector B-109 terminal No.6 and engine-A/T-ECU connector C-114 terminal No.128.





Check the output line for short or open circuit.

Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair the wiring harness.

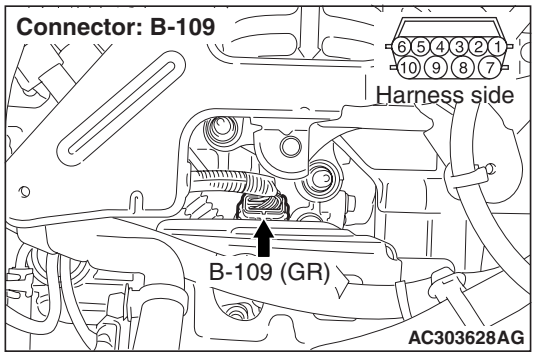
STEP 8. MUT-III actuator test

- Item 01: Low-reverse solenoid valve

OK: Operating sound can be heard.

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Replace the engine-A/T-ECU.

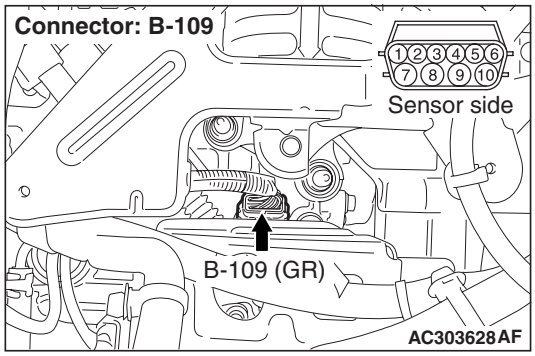
STEP 9. Connector check: B-109 A/T control solenoid valve assembly connector



Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 10.
NO : Repair the defective connector.

STEP 10. Measure the resistance at A/T control solenoid valve assembly connector B-109.

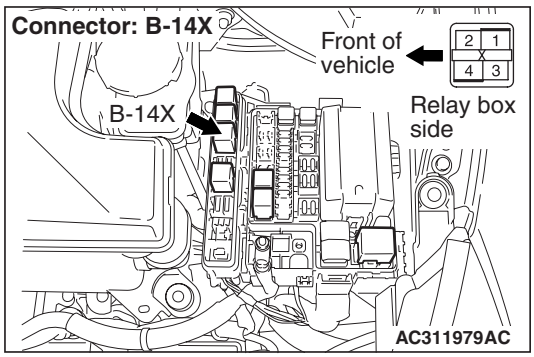


Disconnect the connector, and measure the resistance between terminal No.6 and No.10 at the solenoid valve side.

OK: 2.7 – 3.4 Ω (A/T fluid temperature 20°C)

Q: Is the check result normal?
YES : Go to Step 11.
NO : Check the solenoid valve harness.

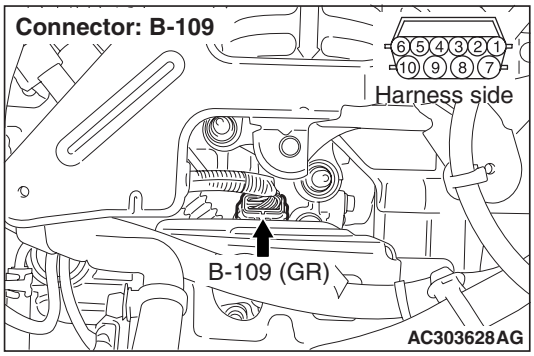
STEP 11. Connector check: B-14X A/T control relay connector

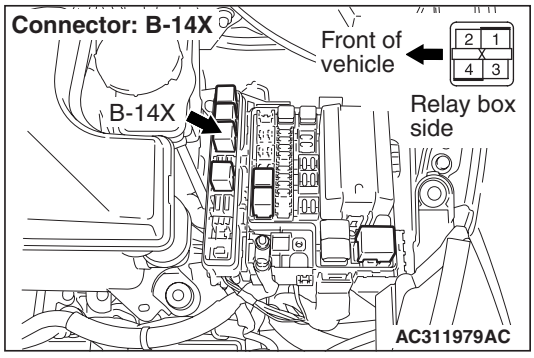


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 12.
NO : Repair the defective connector.

STEP 12. Check the harness between A/T control solenoid valve assembly connector B-109 terminal No.10 and A/T control relay connector B-14X terminal No.1.





Check the power supply line for short or open circuit.

Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair the wiring harness.

Code No.32: Underdrive solenoid valve system

SOLENOID VALVE SYSTEM CIRCUIT

Refer to P.23A-62.

OPERATION

- Solenoid valve closes or opens according to the signals from the engine-A/T-ECU.
- The engine-A/T-ECU energises or deenergises solenoid valve, based on input signals such as throttle position sensor opening angle, inhibitor switch, etc.

DIAGNOSIS CODE SET CONDITIONS

If the drive terminal voltage of the underdrive solenoid valve is 3.0 V or less, it is judged that there is a short-circuit or open circuit in the solenoid valve, and diagnosis code 32 is set.
If diagnosis code 32 is set 4 times, the transmission is fixed in 3rd as a fail-safe measure.

POSSIBLE CAUSES

- Malfunction of underdrive solenoid valve
- Damaged harness wires and connectors
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. MUT-III diagnosis code

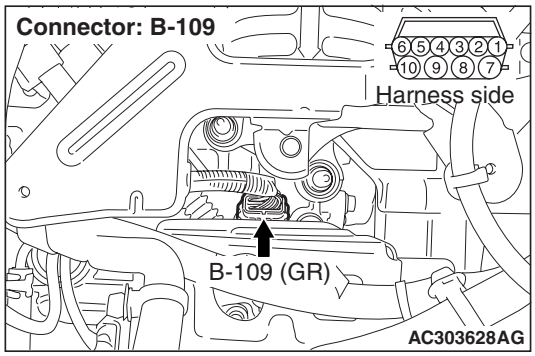
Q: Are diagnosis codes 33 and 34 set?
YES : Go to Step 9.
NO : Go to Step 2.

STEP 2. MUT-III actuator test
Item 02: Underdrive solenoid valve

OK: Operating sound can be heard.

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Go to Step 3.

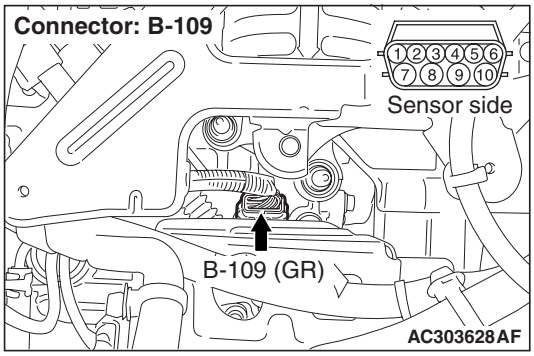
STEP 3. Connector check: B-109 A/T control solenoid valve assembly connector



Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the defective connector.

STEP 4. Measure the resistance at A/T control solenoid valve assembly connector B-109.

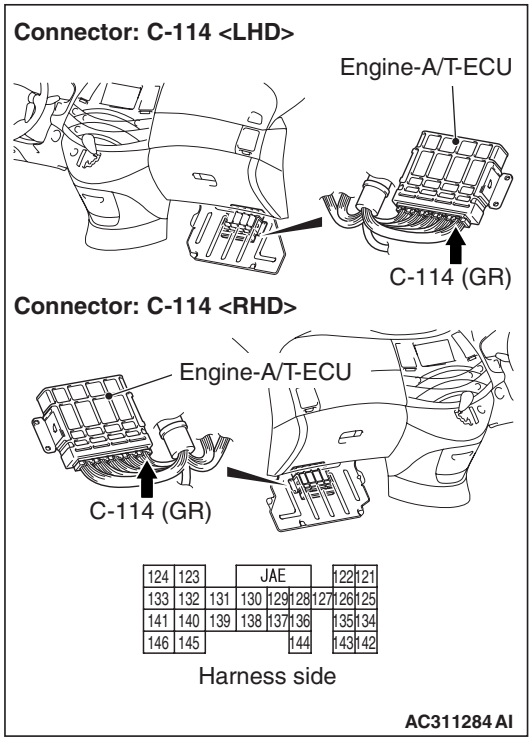


Disconnect the connector, and measure the resistance between terminal No.3 and No.9 at the solenoid valve side.

OK: 2.7 – 3.4 Ω (A/T fluid temperature 20°C)

Q: Is the check result normal?
YES : Go to Step 5.
NO : Check the underdrive solenoid valve.

STEP 5. Measure the voltage at engine-A/T-ECU connector C-114.
(1) Connect A/T control solenoid valve assembly connector B-109.
(2) Turn the ignition switch to the ON position.



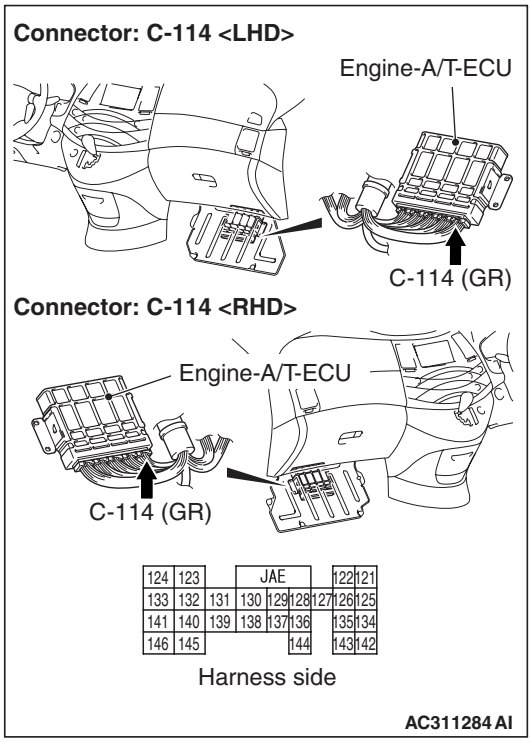
(3) Measure the voltage between engine-A/T-ECU

connector C-114 terminal No.137 and earth.

OK: 6–9 V

Q: Is the check result normal?
YES : Go to Step 8.
NO : Go to Step 6.

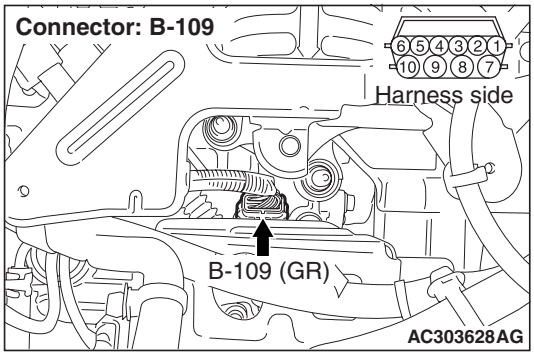
STEP 6. Connector check: C-114 engine-A/T-ECU connector

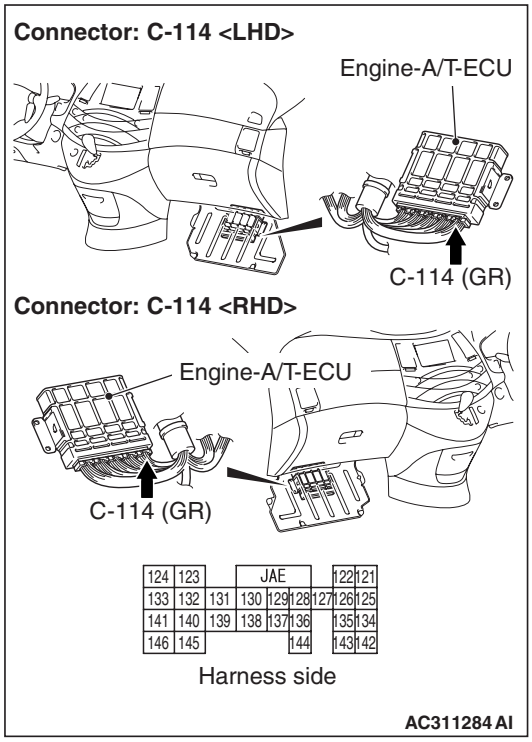


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the defective connector.

STEP 7. Check the harness between A/T control solenoid valve assembly connector B-109 terminal No.3 and engine-A/T-ECU connector C-114 terminal No.137.





Check the output line for short or open circuit.

Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair the wiring harness.

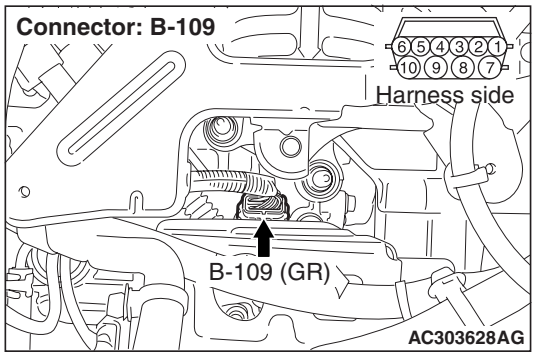
STEP 8. MUT-III actuator test

Item 02: Underdrive solenoid valve

OK: Operating sound can be heard.

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Replace the engine-A/T-ECU.

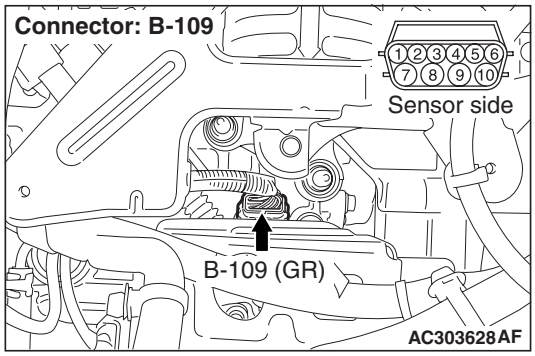
STEP 9. Connector check: B-109 A/T control solenoid valve assembly connector



Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 10.
NO : Repair the defective connector.

STEP 10. Measure the resistance at A/T control solenoid valve assembly connector B-109.

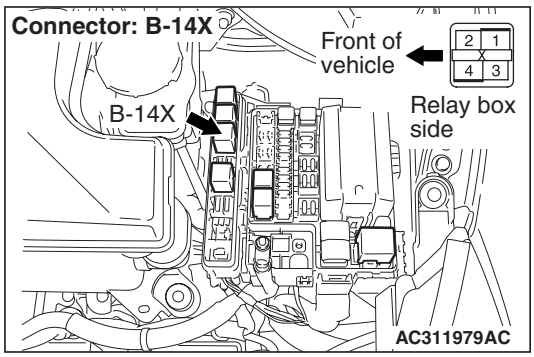


Disconnect the connector, and measure the resistance between terminal No.3 and No.9 at the solenoid valve side.

OK: 2.7 – 3.4 Ω (A/T fluid temperature 20°C)

Q: Is the check result normal?
YES : Go to Step 11.
NO : Check the solenoid valve harness.

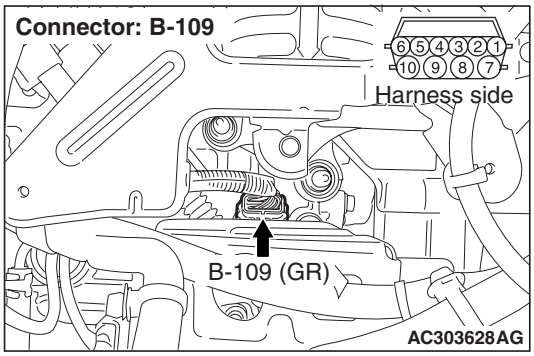
STEP 11. Connector check: B-14X A/T control relay connector

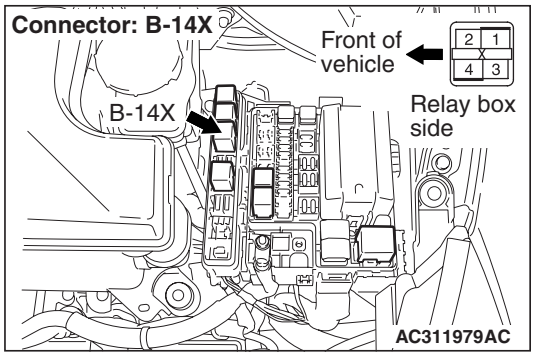


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 12.
NO : Repair the defective connector.

STEP 12. Check the harness between A/T control solenoid valve assembly connector B-109 terminal No.9 and A/T control relay connector B-14X terminal No.1.





Check the power supply line for short or open circuit.

Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair the wiring harness.

Code No.33: Second solenoid valve system

SOLENOID VALVE SYSTEM CIRCUIT Refer to P.23A-62.

OPERATION

- Solenoid valve closes or opens according to the signals from the engine-A/T-ECU.
- The engine-A/T-ECU energises or deenergises solenoid valve, based on input signals such as throttle position sensor opening angle, inhibitor switch, etc.

DIAGNOSIS CODE SET CONDITIONS

If the drive terminal voltage of the second solenoid valve is 3.0 V or less, it is judged that there is a short circuit or open circuit in the second solenoid valve, and diagnosis code 33 is set.
If diagnosis code 33 is set 4 times, the transmission is fixed in 3rd as a fail-safe measure.

POSSIBLE CAUSES

- Malfunction of second solenoid valve
- Damaged harness wires and connectors
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. MUT-III diagnosis code.

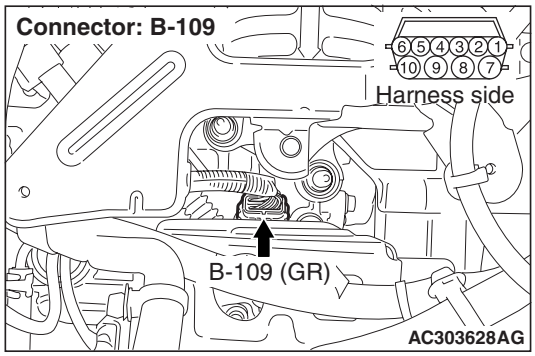
Q: Are diagnosis code 32 and 34 set?
YES : Go to Step 9.
NO : Go to Step 2.

STEP 2. MUT-III actuator test
Item 03: Second solenoid valve

OK: Operating sound can be heard.

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Go to Step 3.

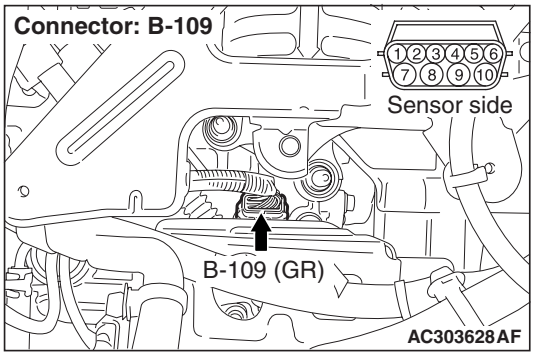
STEP 3. Connector check: B-109 A/T control solenoid valve assembly connector



Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the defective connector.

STEP 4. Measure the resistance at A/T control solenoid valve assembly connector B-109.



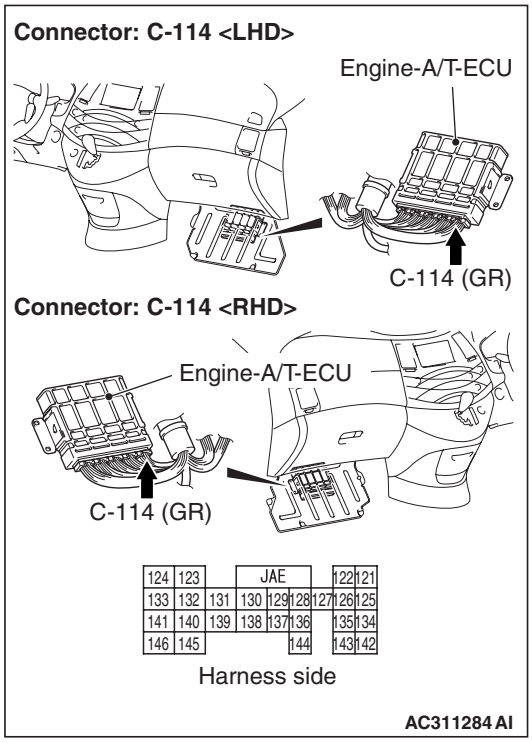
Disconnect the connector, and measure the resistance between terminal No.4 and No.9 at the solenoid valve side.

OK: 2.7 – 3.4 Ω (A/T fluid temperature 20°C))

Q: Is the check result normal?
YES : Go to Step 5.
NO : Check the second solenoid valve and solenoid valve harness.

STEP 5. Measure the voltage at engine-A/T-ECU connector C-114.

(1) Connect A/T control solenoid valve assembly connector B-109.
(2) Turn the ignition switch to the ON position.



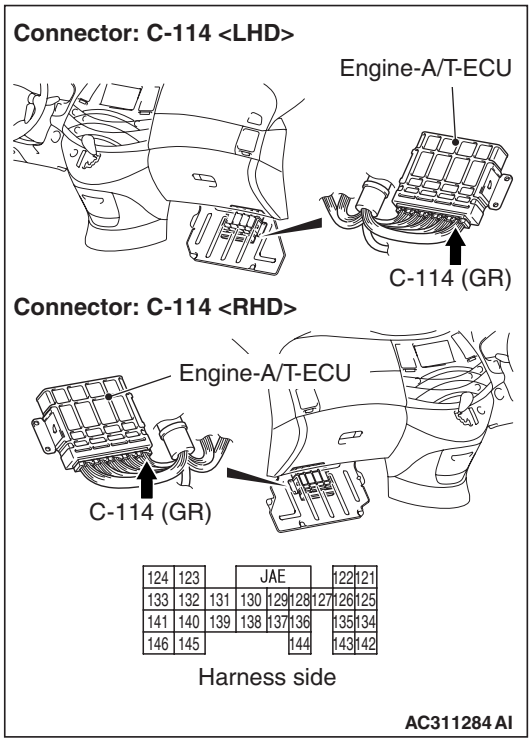
(3) Measure the voltage between engine-A/T-ECU

connector C-114 terminal No.136 and earth.

OK: 6–9 V

Q: Is the check result normal?
YES : Go to Step 8.
NO : Go to Step 6.

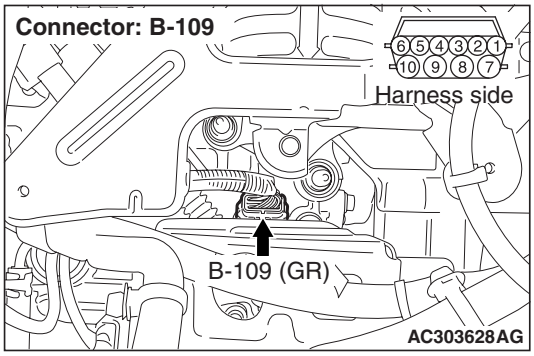
STEP 6. Connector check: C-114 engine-A/T-ECU connector

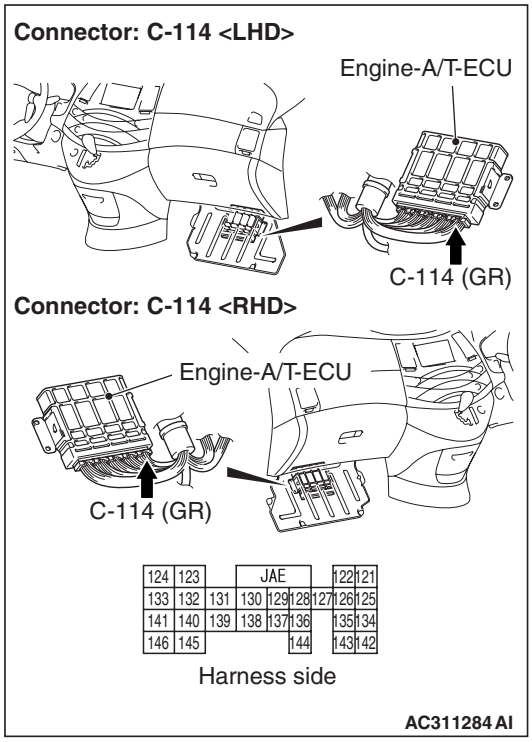


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the defective connector.

STEP 7. Check the harness between A/T control solenoid valve assembly connector B-109 terminal No.4 and engine-A/T-ECU connector C-114 terminal No.136.





Check the output line for short or open circuit.

Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair the wiring harness.

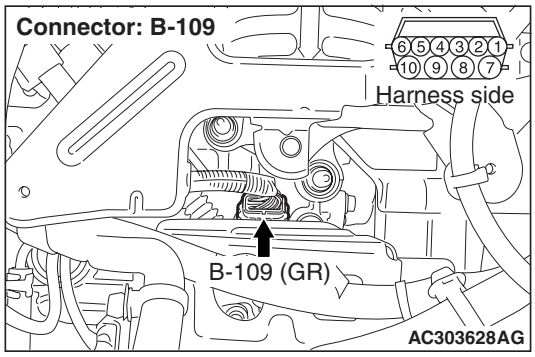
STEP 8. MUT-III actuator test

Item 03: Second solenoid valve

OK: Operating sound can be heard.

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Replace the engine-A/T-ECU.

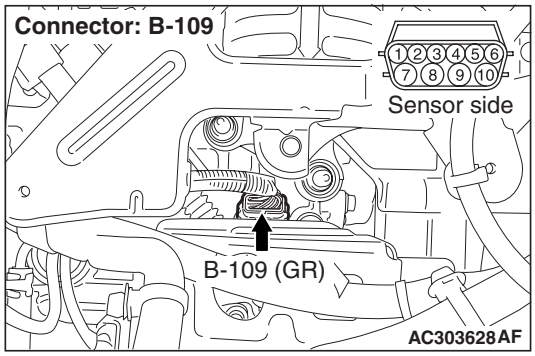
STEP 9. Connector check: B-109 A/T control solenoid valve assembly connector



Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 10.
NO : Repair the defective connector.

STEP 10. Measure the resistance at A/T control solenoid valve assembly connector B-109.

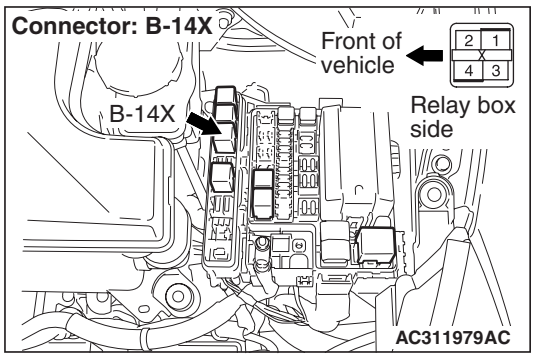


Disconnect the connector, and measure the resistance between terminal No.4 and No.9 at the solenoid valve side.

OK: 2.7 – 3.4 Ω (A/T fluid temperature 20°C))

Q: Is the check result normal?
YES : Go to Step 11.
NO : Check the solenoid valve harness.

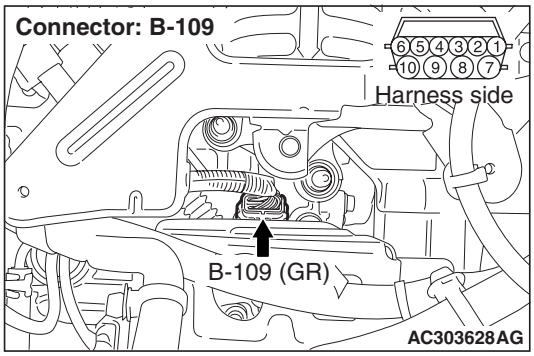
STEP 11. Connector check: B-14X A/T control relay connector

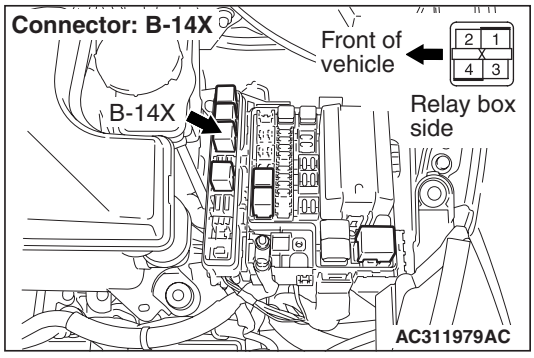


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 12.
NO : Repair the defective connector.

STEP 12. Check the harness between A/T control solenoid valve assembly connector B-109 terminal No.9 and A/T control relay connector B-14X terminal No.1.





Check the power supply line for short or open circuit.

Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair the wiring harness.

Code No.34: Overdrive solenoid valve system

SOLENOID VALVE SYSTEM CIRCUIT

Refer to P.23A-62.

OPERATION

- Solenoid valve closes or opens according to the signals from the engine-A/T-ECU.
- The engine-A/T-ECU energises or deenergises solenoid valve, based on input signals such as throttle position sensor opening angle, inhibitor switch, etc.

DIAGNOSIS CODE SET CONDITIONS

If the drive terminal voltage of the overdrive solenoid valve is 3.0 V or less, it is judged that there is a short circuit or open circuit in the overdrive solenoid valve, and diagnosis code 34 is set.
If diagnosis code 34 is set 4 times, the transmission is fixed in 3rd as a fail-safe measure.

POSSIBLE CAUSES

- Malfunction of overdrive solenoid valve
- Damaged harness wires and connectors
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. MUT-III diagnosis code

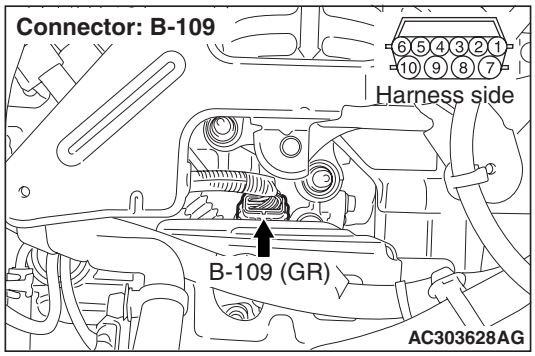
Q: Are diagnosis codes 32 and 33 set?
YES : Go to Step 9.
NO : Go to Step 2.

STEP 2. MUT-III actuator test
Item 04: Overdrive solenoid valve

OK: Operating sound can be heard.

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Go to Step 3.

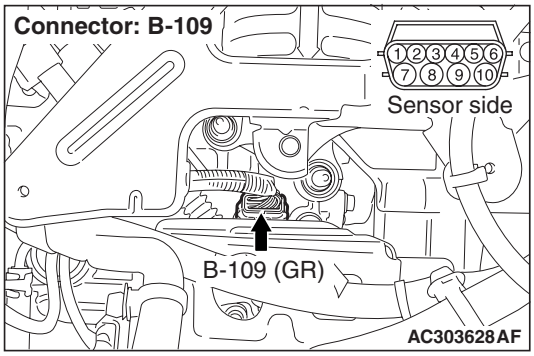
STEP 3. Connector check: B-109 A/T control solenoid valve assembly connector



Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the defective connector.

STEP 4. Measure the resistance at A/T control solenoid valve assembly connector B-109.

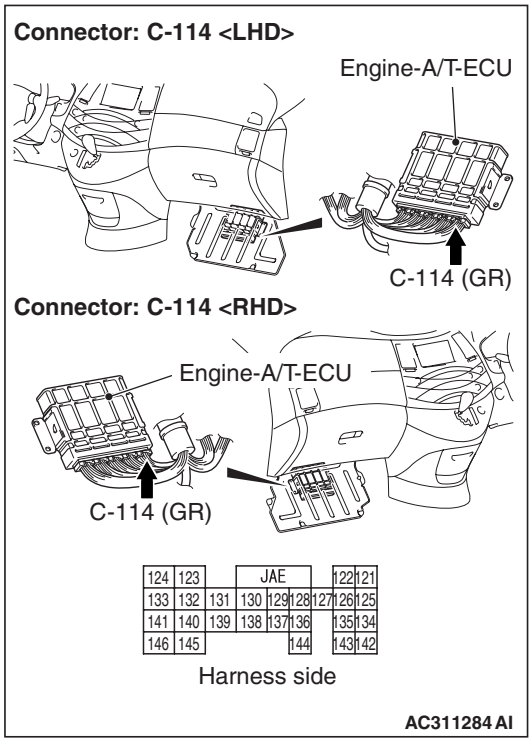


Disconnect the connector, and measure the resistance between terminal No.5 and No.9 at the solenoid valve side.

OK: 2.7 – 3.4 Ω (A/T fluid temperature 20°C)

Q: Is the check result normal?
YES : Go to Step 5.
NO : Check the overdrive solenoid valve and solenoid valve harness.

STEP 5. Measure the voltage at engine-A/T-ECU connector C-114.
(1) Connect A/T control solenoid valve assembly connector B-109.
(2) Turn the ignition switch to the ON position.



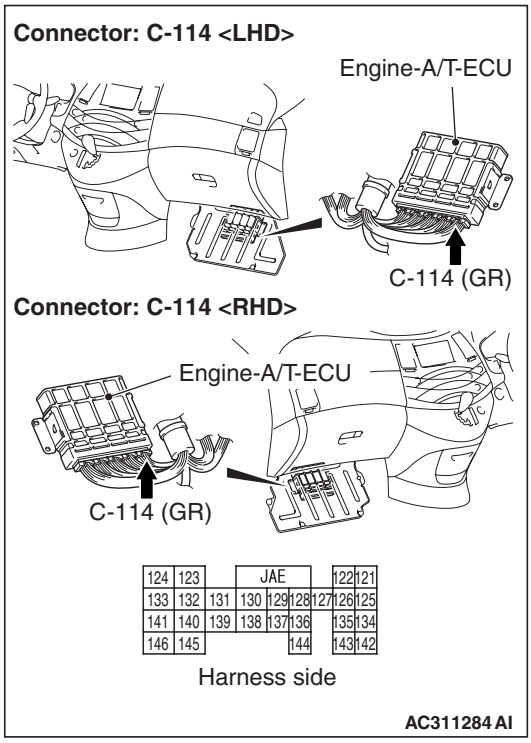
(3) Measure the voltage between engine-A/T-ECU

connector C-114 terminal No.138 and earth.

OK: 6–9 V

Q: Is the check result normal?
YES : Go to Step 8.
NO : Go to Step 6.

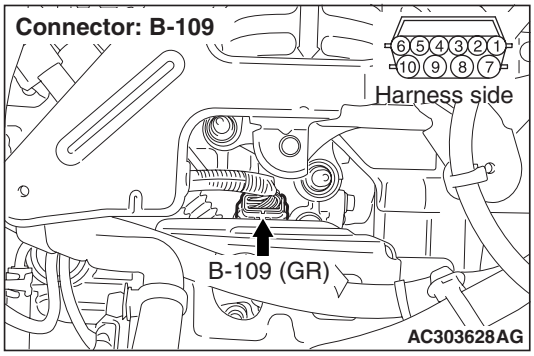
STEP 6. Connector check: C-114 engine-A/T-ECU connector

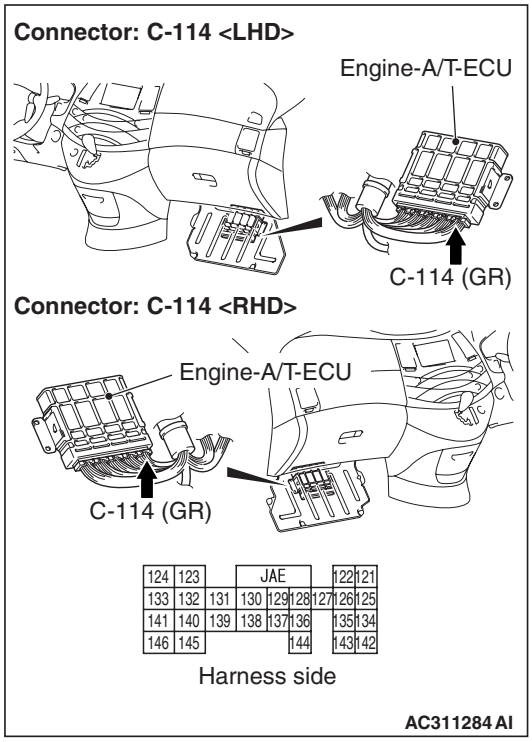


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the defective connector.

STEP 7. Check the harness between A/T control solenoid valve assembly connector B-109 terminal No.5 and engine-A/T-ECU connector C-114 terminal No.138.





Check the output line for short or open circuit.

Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair the wiring harness.

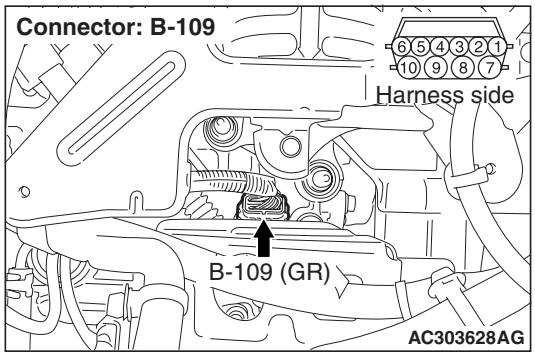
STEP 8. MUT-III actuator test

Item 04: Overdrive solenoid valve

OK: Operating sound can be heard.

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Replace the engine-A/T-ECU.

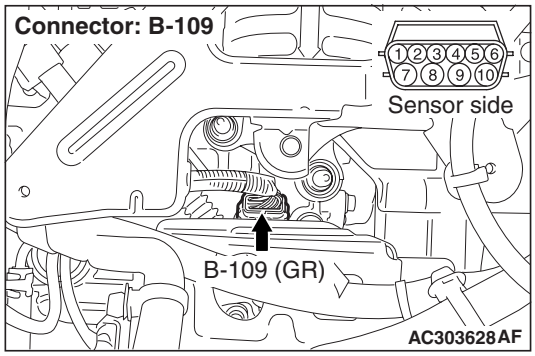
STEP 9. Connector check: B-109 A/T control solenoid valve assembly connector



Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 10.
NO : Repair the defective connector.

STEP 10. Measure the resistance at A/T control solenoid valve assembly connector B-109.

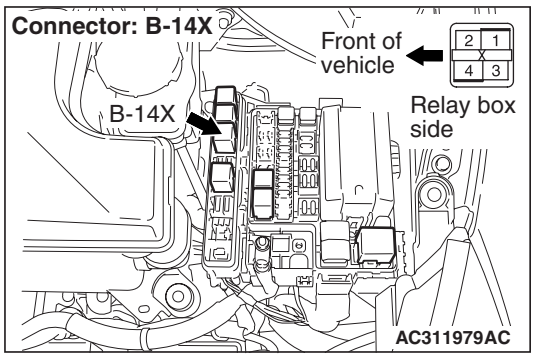


Disconnect the connector, and measure the resistance between terminal No.5 and No.9 at the solenoid valve side.

OK: 2.7 – 3.4 Ω (A/T fluid temperature 20°C))

Q: Is the check result normal?
YES : Go to Step 11.
NO : Check the solenoid valve harness.

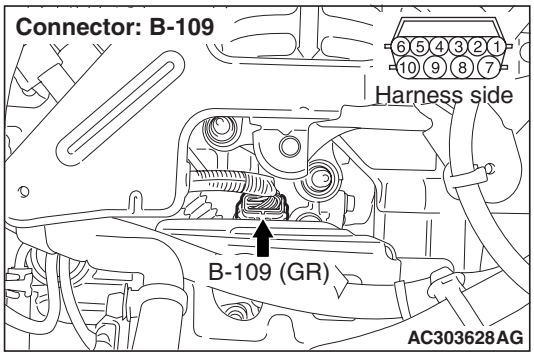
STEP 11. Connector check: B-14X A/T control relay connector

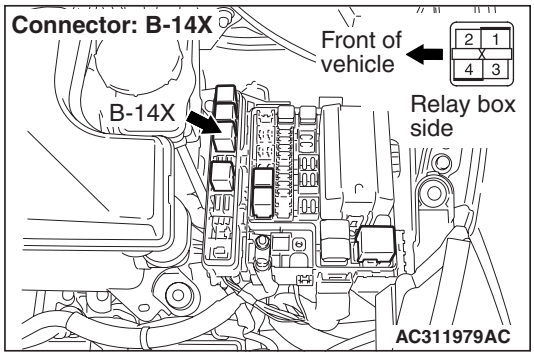


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 12.
NO : Repair the defective connector.

STEP 12. Check the harness between A/T control solenoid valve assembly connector B-109 terminal No.9 and A/T control relay connector B-14X terminal No.1.





Check the power supply line for short or open circuit.

Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair the wiring harness.

Code No.36: DCC solenoid valve system

SOLENOID VALVE SYSTEM CIRCUIT Refer to P.23A-62.

OPERATION

- Solenoid valve closes or opens according to the signals from the engine-A/T-ECU.
- The engine-A/T-ECU energises or deenergises solenoid valve, based on input signals such as throttle position sensor opening angle, inhibitor switch, etc.

DIAGNOSIS CODE SET CONDITIONS

If the drive terminal voltage of the torque converter control clutch solenoid valve is 3.0 V or less, it is judged that there is a short circuit or open circuit in the torque converter control clutch solenoid valve, and diagnosis code 36 is set.
If diagnosis code 36 is set 4 times, the transmission is fixed in 3rd as a fail-safe measure.

POSSIBLE CAUSES

- Malfunction of damper clutch solenoid valve
- Damaged harness wires and connectors
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. MUT-III diagnosis code

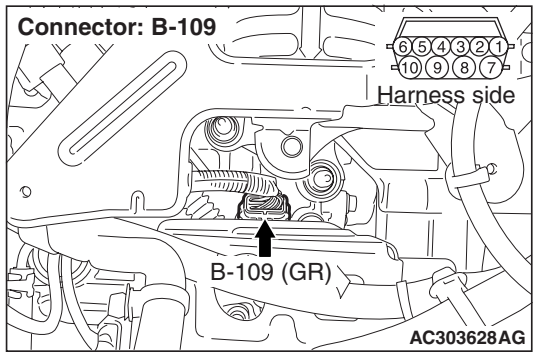
Q: Is diagnosis code 31 set?
YES : Go to Step 9.
NO : Go to Step 2.

STEP 2. MUT-III actuator test
Item 06: Damper clutch solenoid valve

OK: Operating sound can be heard.

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Go to Step 3.

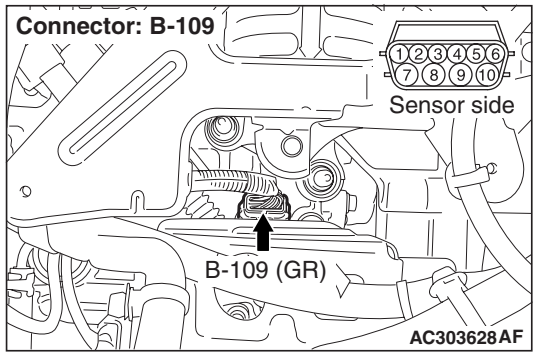
STEP 3. Connector check: B-109 A/T control solenoid valve assembly connector



Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the defective connector.

STEP 4. Measure the resistance at A/T control solenoid valve assembly connector B-109.



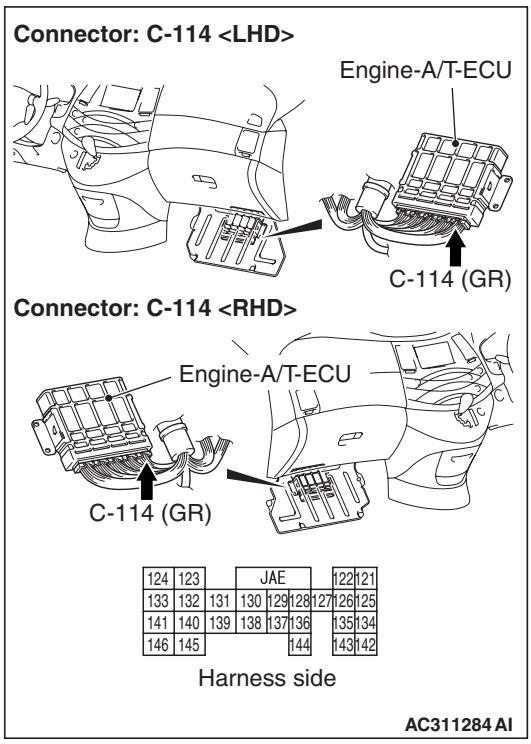
Disconnect the connector, and measure the resistance between terminal No.7 and No.10 at the solenoid valve side.

OK: 2.7 – 3.4 Ω (A/T fluid temperature 20°C)

Q: Is the check result normal?
YES : Go to Step 5.
NO : Check the damper clutch solenoid valve and solenoid valve harness.

STEP 5. Measure the voltage at engine-A/T-ECU connector C-114.
(1) Connect A/T control solenoid valve assembly connector B-109.

(2) Turn the ignition switch to the ON position.

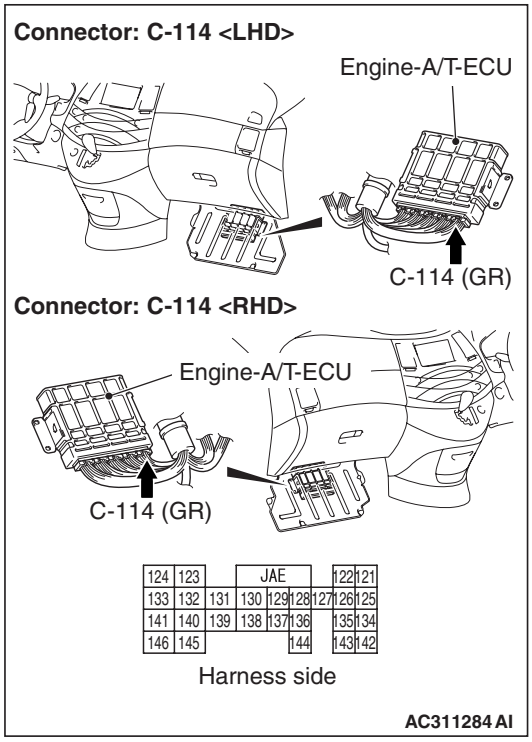


(3) Measure the voltage between engine-A/T-ECU connector C-114 terminal No.130 and earth.

OK: 6–9 V

Q: Is the check result normal?
YES : Go to Step 8.
NO : Go to Step 6.

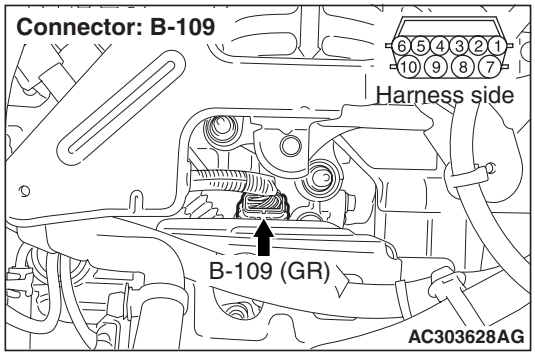
STEP 6. Connector check: C-114 engine-A/T-ECU connector

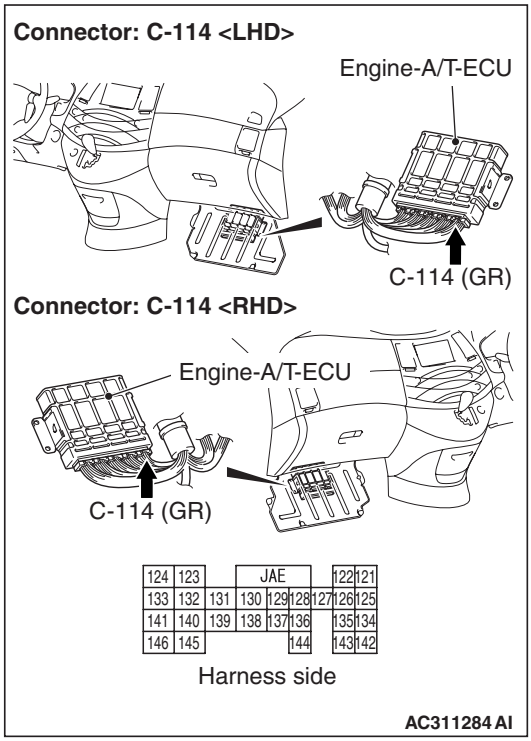


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the defective connector.

STEP 7. Check the harness between A/T control solenoid valve assembly connector B-109 terminal No.7 and engine-A/T-ECU connector C-114 terminal No.130.





Check the output line for short or open circuit.

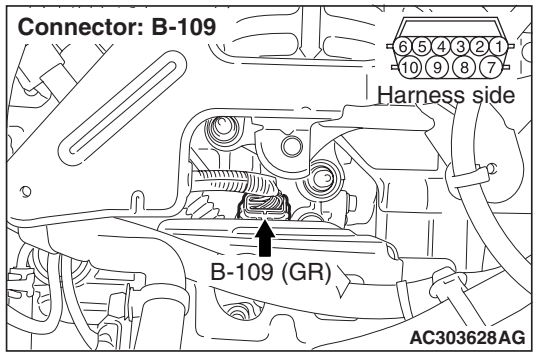
Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair the wiring harness.

STEP 8. MUT-III actuator test
Item 06: Damper clutch solenoid valve

OK: Operating sound can be heard.

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Replace the engine-A/T-ECU.

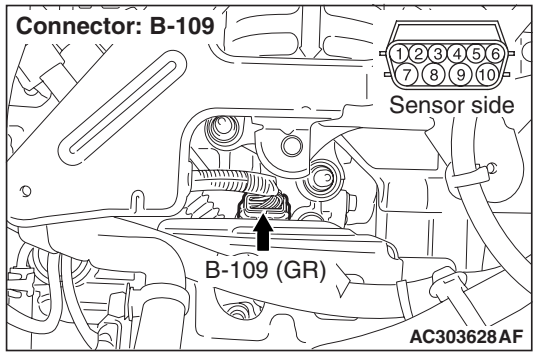
STEP 9. Connector check: B-109 A/T control solenoid valve assembly connector



Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 10.
NO : Repair the defective connector.

STEP 10. Measure the resistance at A/T control solenoid valve assembly connector B-109.

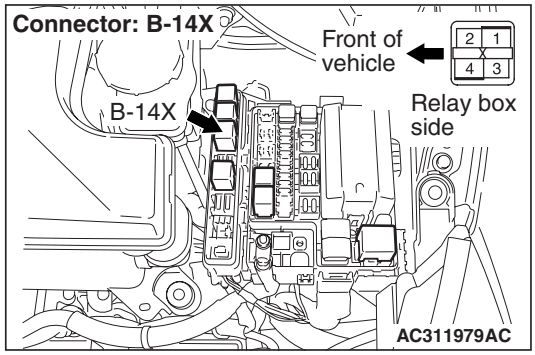


Disconnect the connector, and measure the resistance between terminal No.7 and No.10 at the solenoid valve side.

OK: 2.7 – 3.4 Ω (A/T fluid temperature 20°C)

Q: Is the check result normal?
YES : Go to Step 11.
NO : Check the solenoid valve harness.

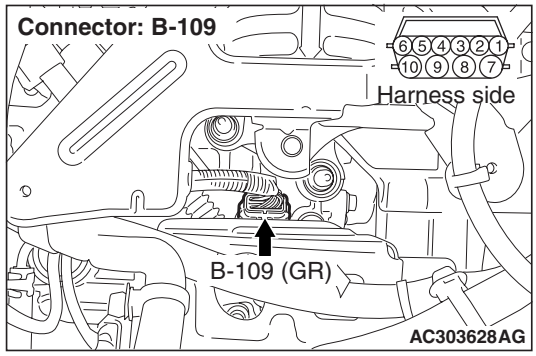
STEP 11. Connector check: B-14X A/T control relay connector

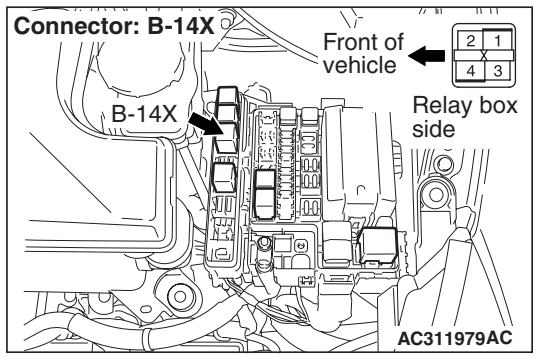


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 12.
NO : Repair the defective connector.

STEP 12. Check the harness between A/T control solenoid valve assembly connector B-109 terminal No.10 and A/T control relay connector B-14X terminal No.1.





Check the power supply line for short or open circuit.

Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair the wiring harness.

Code No.41 (1st), 42 (2nd), 43 (3rd), 44 (4th), 46 (reverse): Gear incorrect ratio

OPERATION

The engine-A/T-ECU detects the current gear/speed according to the output signals from the input and output shaft speed sensor.

DIAGNOSIS CODE SET CONDITIONS

If the output from the output shaft speed sensor multiplied by the gear ratio is not the same as the output from the input shaft speed sensor after completing of shifting, the corresponding diagnosis code is set.
If each diagnosis code is set 4 times, the transmission is fixed in 3rd as a fail-safe measure.

POSSIBLE CAUSES

- Malfunction of input shaft speed sensor
- Malfunction of output shaft speed sensor
- Damaged harness wires and connectors
- Malfunction of the engine-A/T-ECU
- Malfunction of solenoid valve
- Malfunction of underdrive clutch retainer
- Malfunction of valve body
- Malfunction of transfer drive gear or driven gear
- Malfunction of low-reverse brake system (for diagnosis codes 41, 46)
- Malfunction of underdrive clutch system (for diagnosis codes 41, 42, 43)
- Malfunction of second brake system (for diagnosis codes 42, 44)
- Malfunction of overdrive clutch system (for diagnosis codes 43, 44)
- Malfunction of reverse clutch system (for diagnosis code 46)
- Malfunction of one-way clutch system (for diagnosis code 41)

DIAGNOSIS

STEP 1. MUT-III diagnosis code
Either of diagnosis codes 41, 42, 43, 44 or 46 is set, the input shaft speed sensor or output shaft speed sensor is defective.

Q: Are diagnosis codes 22 or 23 output?
YES <diagnosis code 22 is set> : Refer to diagnosis code 22 input shaft speed sensor system P.23A-27.
YES <diagnosis code 23 is set> : Refer to diagnosis code 23 output shaft speed sensor system P.23A-37.
NO : Go to Step 2.

STEP 2. MUT-III diagnosis code
Either of diagnosis codes 41, 42, 43, 44 or 46 is set, the corresponding solenoid valve is defective.

Q: Is either of diagnosis code 31, 32, 33, 34 output?
YES <diagnosis code 31 is set> : Refer to diagnosis code 31: Low-reverse solenoid valve system P.23A-62.
YES <diagnosis code 32 is set> : Refer to diagnosis code 32: Underdrive solenoid valve system P.23A-65.
YES <diagnosis code 33 is set> : Refer to diagnosis code 33: Second solenoid valve system P.23A-68.
YES <diagnosis code 34 is set> : Refer to diagnosis code 34: Overdrive solenoid valve system P.23A-71.
NO : Go to Step 3.

STEP 3. Hydraulic pressure test
Each hydraulic pressure of the elements below, which diagnosis codes indicate, should be within the standard value.
- diagnosis code 41: Underdrive clutch, low-reverse brake
- diagnosis code 42: Underdrive clutch, second brake
- diagnosis code 43: Underdrive clutch, overdrive clutch
- diagnosis code 44: Overdrive clutch, second brake
- diagnosis code 46: Reverse clutch, low-reverse brake

OK: Refer to Hydraulic Pressure Test P.23A-133.

Q: Is the check result normal?
YES : Go to Step 6.
NO <some hydraulic pressures are abnormal> : Go to Step 5.
NO <all hydraulic pressure are abnormal> : Go to Step 4.

STEP 4. Adjust the line pressure and recheck the diagnosis code.
(1) Adjust the line pressure (Refer to P.23A-138).
(2) Test drive the vehicle.
(3) Check the diagnosis code.

Q: Is the diagnosis code set?
YES : Go to Step 5.
NO : The inspection is complete.

STEP 5. Disassemble, clean and assemble the valve body and recheck the diagnosis code.
(1) Check the mounting bolts for looseness, and the O-ring, solenoid valve and valve body for damage.
Replace the valve body assembly if the damages are thought to be irreparable.
(2) Test drive the vehicle.
(3) Check the diagnosis code.

Q: Is the diagnosis code set?
YES : Go to Step 7.
NO : The inspection is complete.

STEP 6. Replace the engine-A/T-ECU and then recheck the diagnosis code.
(1) Replace the engine-A/T-ECU.
(2) Test drive the vehicle.
(3) Check the diagnosis code.

Q: Is the diagnosis code set?
YES : Go to Step 7.
NO : The inspection is complete.

STEP 7. Check the A/T internal clutch and brake, and then recheck the diagnosis code.
(1) Check the following clutches or brakes according to the output diagnosis codes, replace if

necessary.
- If diagnosis code 41, 42, 43 are set individually or in a group, replace the underdrive clutch.
- If diagnosis code 43, 44 are set individually or in a group, replace the overdrive clutch.
- If diagnosis code 46 is set, replace the reverse clutch.
- If diagnosis code 41, 46 are set individually or in a group, replace the low-reverse brake.
- If diagnosis code 42, 44 are set individually or in a group, replace the second brake.
- If diagnosis code 41 is set, replace the one-way clutch.

(2) Test drive the vehicle.
(3) Check the diagnosis code.

Q: Is the diagnosis code set?
YES : Eliminate the cause of the noise.
NO : The inspection is complete.

Code No.52: Damper clutch system

OPERATION
The engine-A/T-ECU engages and disengages the damper clutch (incorporated in the torque converter) by operating the DCC solenoid valve in response to driving conditions.

DIAGNOSIS CODE SET CONDITIONS
If the damper clutch solenoid valve drive duty ratio is 100% for a continuous period of 4 seconds or more when the damper clutch starts operating, diagnosis code 52 is set.

POSSIBLE CAUSES
- Malfunction of input shaft speed sensor
- Damaged harness wires and connectors
- Malfunction of the engine-A/T-ECU
- Malfunction of damper clutch solenoid valve
- Malfunction of valve body assembly
- Malfunction of torque converter

DIAGNOSIS

STEP 1. MUT-III diagnosis code
If diagnosis code 52 is set, the input shaft speed sensor may be defective.

Q: Is diagnosis code 22 set?
YES : Refer to diagnosis code 22: Input shaft speed sensor system P.23A-27.
NO : Go to Step 2.

STEP 2. MUT-III diagnosis code
If diagnosis code 52 is set, the damper clutch solenoid valve may be defective.

Q: Is diagnosis code 36 set?
YES : Refer to diagnosis code 36: Damper clutch solenoid valve system P.23A-74.
NO : Go to Step 3.

STEP 3. MUT-III data list
- Item 36: Damper clutch solenoid valve duty ratio (Refer to data list reference table P.23A-117).
- Item 52: Damper clutch slip amount (Refer to data list reference table P.23A-117).

Q: Is the check result normal?
YES : Go to Step 6.
NO : Go to Step 4.

STEP 4. Hydraulic pressure test
Measure the torque converter hydraulic pressure (Refer to P.23A-133).

OK: Refer to Hydraulic Pressure Test P.23A-133.

Q: Is the check result normal?
YES : Go to Step 6.
NO : Go to Step 5.

STEP 5. Adjust the line pressure and recheck the diagnosis code.
(1) Adjust the line pressure (Refer to P.23A-138).
(2) Test drive the vehicle.
(3) Check the diagnosis code.

Q: Is the diagnosis code set?
YES : Go to Step 7.
NO : The inspection is complete.

STEP 6. Replace the engine-A/T-ECU and then recheck the diagnosis code.
(1) Replace the engine-A/T-ECU.
(2) Test drive the vehicle.
(3) Check the diagnosis code.

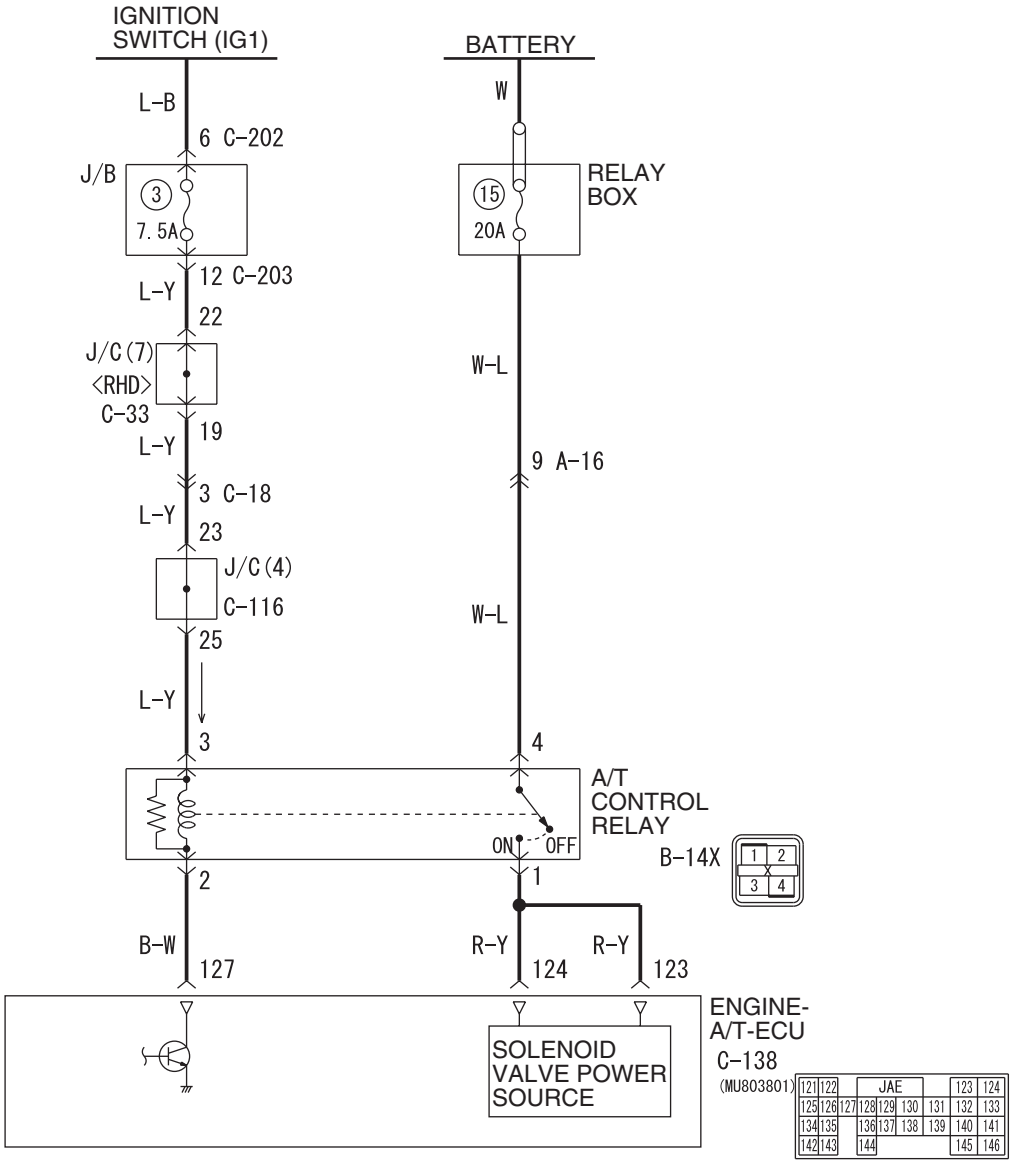
Q: Is the diagnosis code set?
YES : Go to Step 7.
NO : The inspection is complete.

STEP 7. Disassemble, clean and assemble the valve body and recheck the diagnosis code.
(1) Check the mounting bolts for looseness, and the O-ring, solenoid valve and valve body for damage.
Replace the valve body assembly if the damages are thought to be irreparable.
(2) Test drive the vehicle.
(3) Check the diagnosis code.

Q: Is the diagnosis code set?
YES : Check the torque converter and replace it if necessary.
NO : The inspection is complete.

Code No.54: A/T control relay system

A/T control relay system circuit



Wire colour code
B : Black LG : Light green G : Green L : Blue W : White Y : Yellow SB : Sky blue
BR : Brown O : Orange GR : Gray R : Red P : Pink V : Violet

W4X23E006A

OPERATION

If a fail-safe operation is activated, the A/T control relay shuts off the power supply to the solenoid valve in accordance with the signal from the engine-A/T-ECU.

DIAGNOSIS CODE SET CONDITIONS

Code No.54 will be set if the A/T control voltage is less than 7 V after the ignition switch is turned on.

If code No.54 is set, the transmission will be held in 3rd gear.

POSSIBLE CAUSES

- Malfunction of A/T control relay
- Damaged harness wires and connectors
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

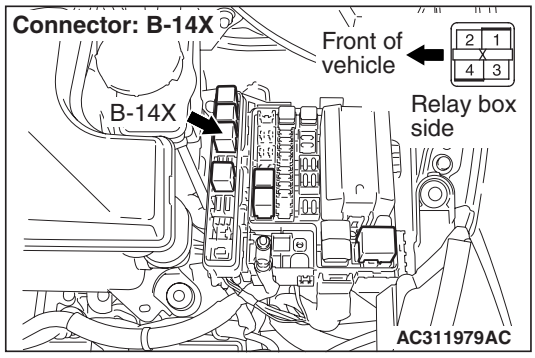
STEP 1. MUT-III data list
Item 54: Relay voltage (Refer to data list reference table P.23A-117).

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Go to Step 2.

STEP 2. Check the A/T control relay connector
Refer to P.23A-130.

Q: Is the check result normal?
YES : Go to Step 3.
NO : Replace the A/T control relay.

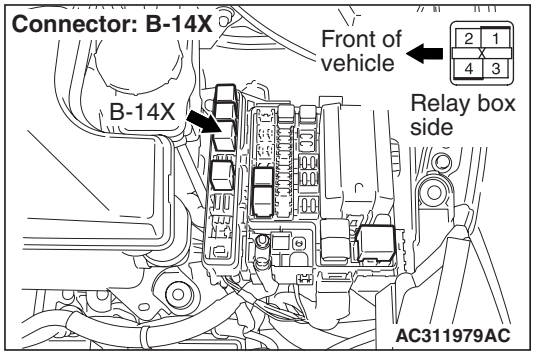
STEP 3. Connector check: B-14X A/T control relay connector



Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the defective connector.

STEP 4. Measure the voltage at A/T control relay connector B-14X.

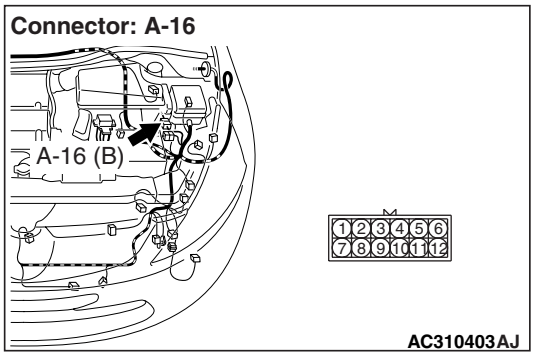


Disconnect the A/T control relay, and measure the voltage between terminal No.4 and earth at the relay box side.

OK: System voltage

Q: Is the check result normal?
YES : Go to Step 8.
NO : Go to Step 5.

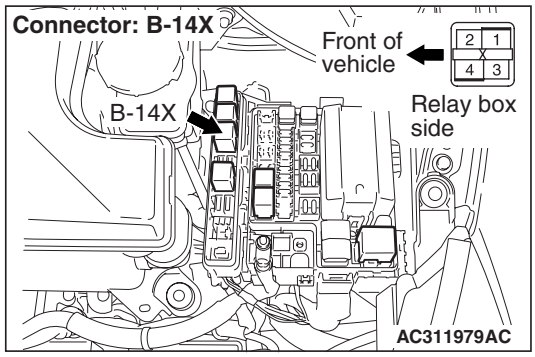
STEP 5. Connector check: A-16 intermediate connector



Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 6.
NO : Repair the defective connector.

STEP 6. Check the harness between A/T control relay connector B-14X terminal No.4 and battery.



Check the power supply line for short or open circuit.

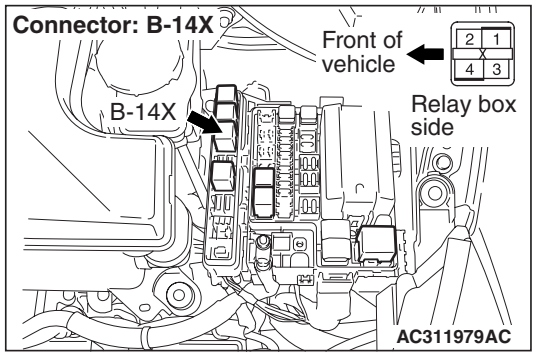
Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the wiring harness.

STEP 7. MUT-III data list
Item 54: Relay voltage (Refer to data list reference table P.23A-117).

Q: Is the check result normal?
YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Replace the engine-A/T-ECU.

STEP 8. Measure the voltage at the A/T control relay connector B-14X.

(1) Turn the ignition switch to the ON position.



(2) Disconnect the A/T control relay, and measure the voltage between terminal No.3 and earth at the relay box side.

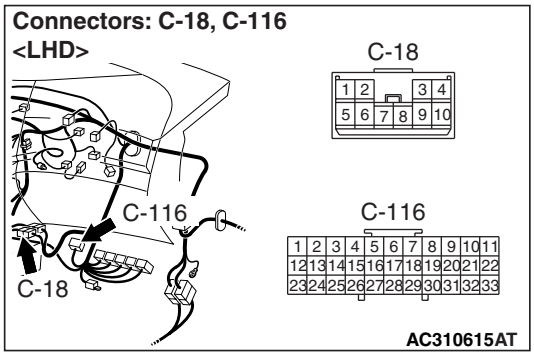
OK: System voltage

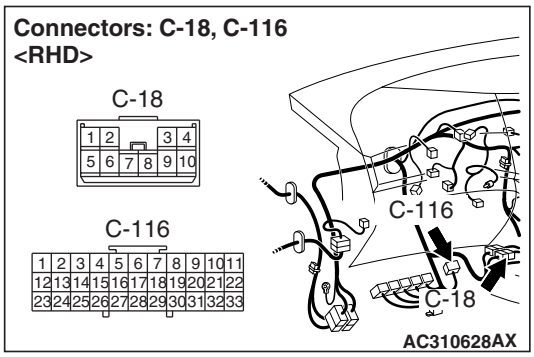
Q: Is the check result normal?

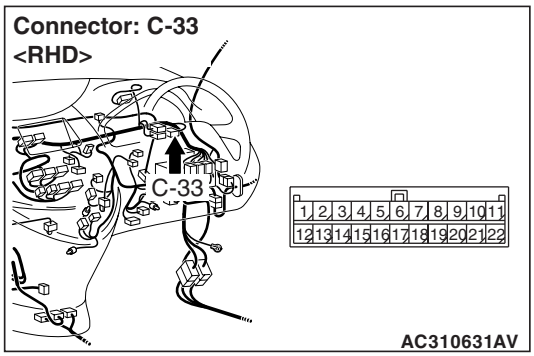
YES : Go to Step 11.

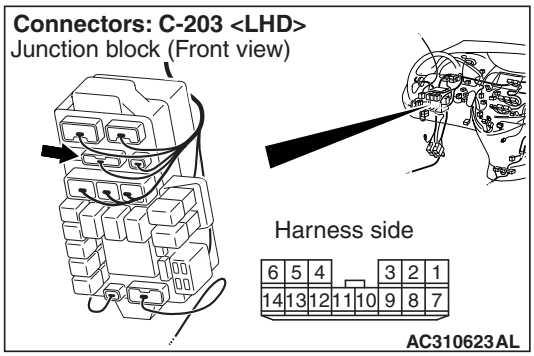
NO : Go to Step 9.

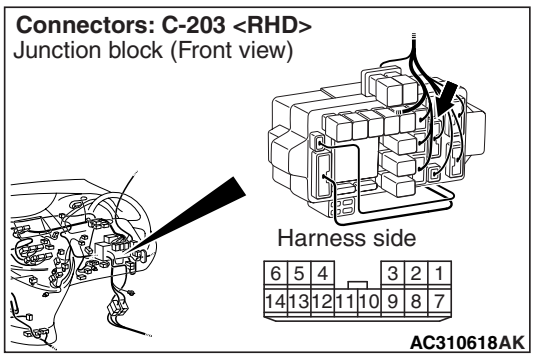
STEP 9. Connectors check: C-116 J/C (4), C-33 J/C (7) <RHD>, C-18 intermediate connector, C-203 J/B connector







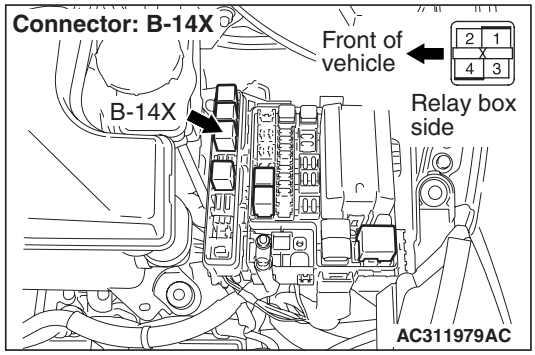


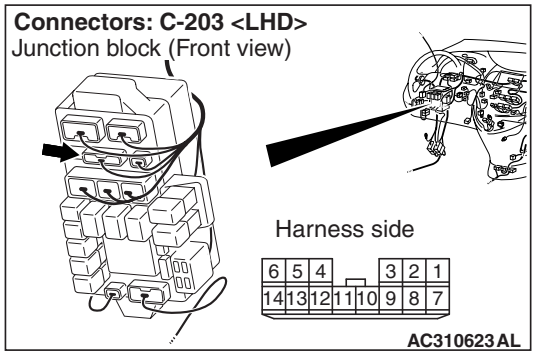


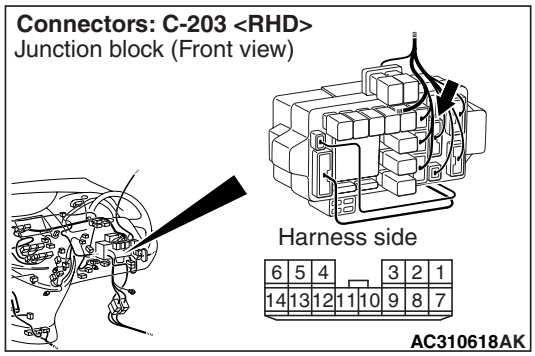
Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 10.
NO : Repair the defective connector.

STEP 10. Check the wiring harness between A/T control relay connector B-14X terminal No.3 and junction block connector C-203 terminal No.12.



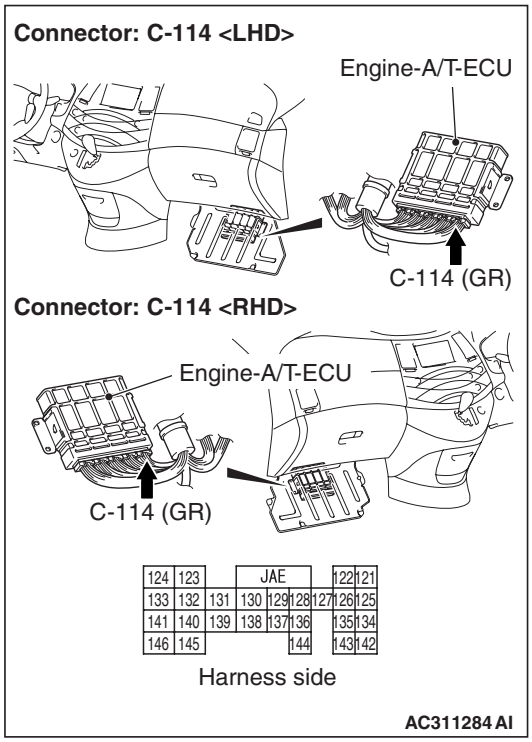




Check the power supply line for short or open circuit.

Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the wiring harness.

STEP 11. Measure the voltage at engine-A/T-ECU connector C-114.
(1) Install the A/T control relay.
(2) Turn the ignition switch to the ON position.

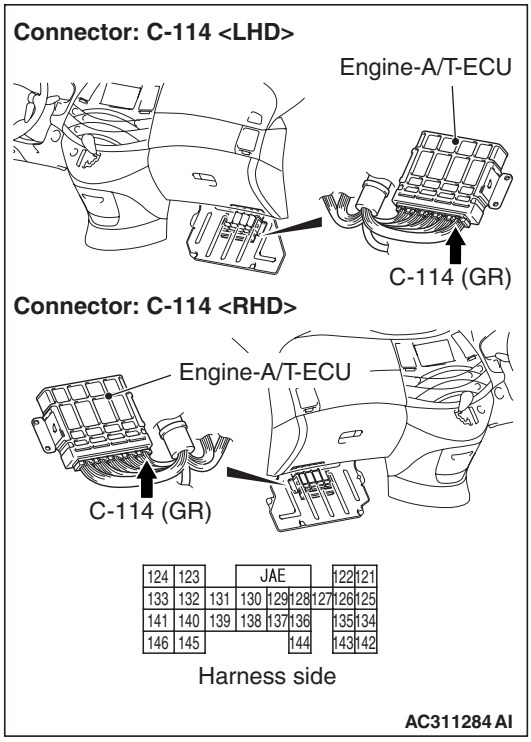


(3) Measure the voltage between engine-A/T-ECU connector C-114 terminal No.123, No.124 and earth.

OK: System voltage

Q: Is the check result normal?
YES : Go to Step 14.
NO : Go to Step 12.

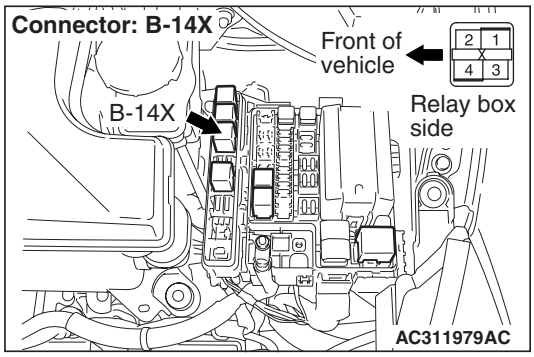
STEP 12. Connector check: C-114 engine-A/T-ECU connector

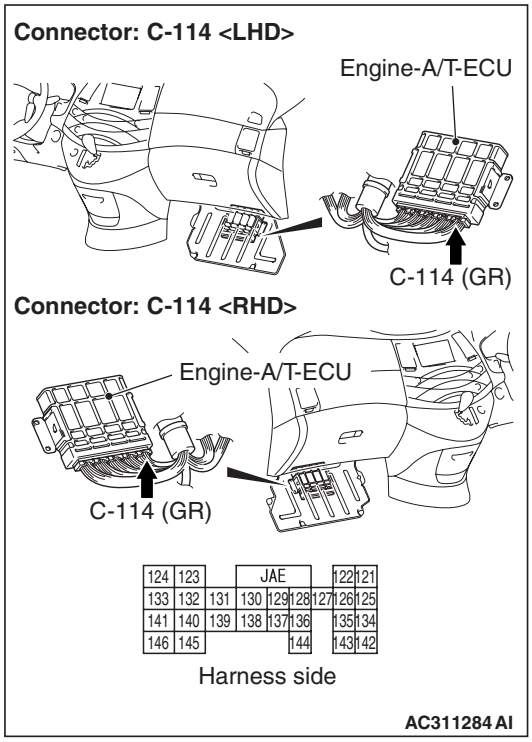


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 13.
NO : Repair the defective connector.

STEP 13. Check the harness between A/T control relay connector B-14X terminal No.1 and engine-A/T-ECU connector C-114 terminal No.123, 124.

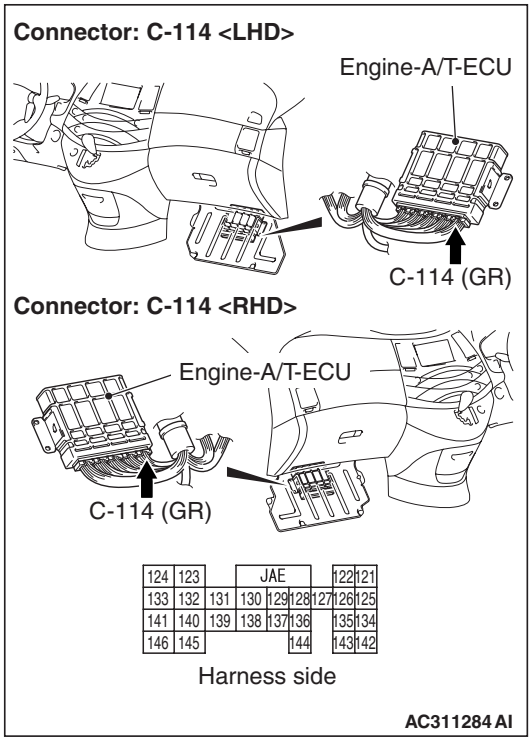




Check the power supply line for short or open circuit.

Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the wiring harness.

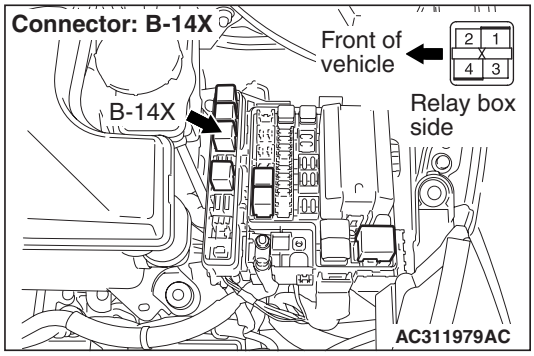
STEP 14. Connector check: C-114 engine-A/T-ECU connector

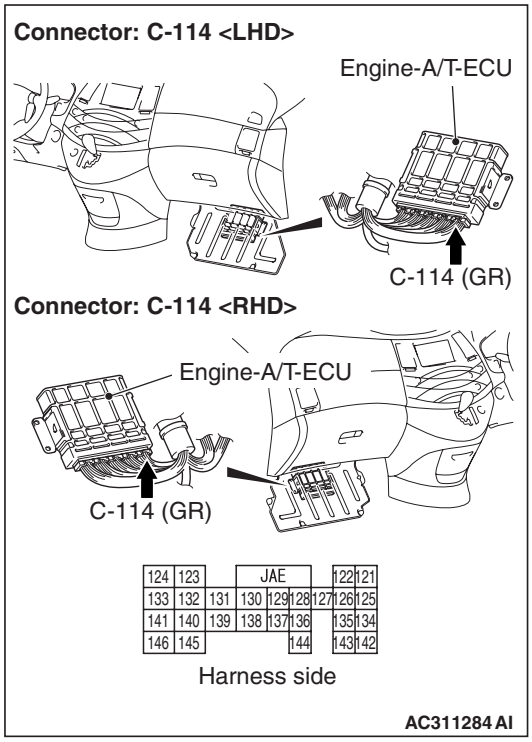


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 15.
NO : Repair the defective connector.

STEP 15. Check the harness between A/T control relay connector B-14X terminal No.2 and engine-A/T-ECU connector C-114 terminal No.127.





Check the output line for short or open circuit.

Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the wiring harness.

INSPECTION CHART FOR TROUBLE SYMPTOMS

M1231008000341

Trouble symptom		Inspection procedure No.	Reference page
Communication with the MUT-III is not possible		1	Refer to GROUP 13, Troubleshooting P.13A-283.
Driving not possible	Engine does not start	2	P.23A-89
	Does not move forward	3	P.23A-90
	Does not move backward	4	P.23A-91
	Does not move (forward or backward)	5	P.23A-92
Malfunction when starting off	Engine stalls during shifting	6	P.23A-93
	Shift shock when shifting from N to D and long delay	7	P.23A-93
	Shift shock when shifting from N to R and long delay	8	P.23A-94
	Shift shock when shifting from N to D, N to R and long delay	9	P.23A-95
Problem during shifting	Shift shock and slipping	10	P.23A-96
Incorrect shift points	Does not shift properly (all point)	11	P.23A-97
	Does not shift properly (some point)	12	P.23A-98
No shifting	Does not shift (no diagnosis code)	13	P.23A-98
Problem during driving	Poor acceleration	14	P.23A-98
	Vibration	15	P.23A-99
Shift switch assembly system		16	P.23A-100
Abnormal shift indicator display		17	P.23A-116

SYMPTOM PROCEDURES

INSPECTION PROCEDURE 2: Engine does not start

COMMENTS ON TROUBLE SYMPTOM

If the engine does not start when the selector lever is in P or N position, the cause is probably a malfunction of inhibitor switch system, transmission control cable, engine system, torque converter or oil pump.

POSSIBLE CAUSES

- Malfunction of inhibitor switch
- Malfunction of transmission control cable
- Malfunction of engine system
- Malfunction of torque converter
- Malfunction of oil pump
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. MUT-III diagnosis code

Either of diagnosis codes 27 or 28 is set, inhibitor switch is defective.

Q: Are diagnosis codes 27 or 28 output?

YES <diagnosis code 27 is set> : Refer to diagnosis code 27: Inhibitor switch system P.23A-52.
YES <diagnosis code 28 is set> : Refer to diagnosis code 28: Inhibitor switch system P.23A-59.
NO : Go to Step 2.

STEP 2. Transmission control cable check
Check the transmission control cable and inhibitor switch for installation condition.

Q: Is the check result normal?
YES : Go to Step 3.
NO : Adjust the positions of the transmission control cable and inhibitor switch (Refer to P.23A-128).

STEP 3. Engine system check

Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the engine system.

STEP 4. Engine-A/T-ECU replacement
(1) Replace the engine-A/T-ECU.
(2) Test drive the vehicle.
(3) Verify that the condition described by the customer exists.

Q: Does a malfunction take place again?
YES : Go to Step 5.
NO : The inspection is complete.

STEP 5. Torque converter check
Check for damaged drive plate, incorrect installation in the input shaft (inserted at an angle) or damaged splines.

Q: Is the check result normal?
YES : Check the oil pump for incorrect installation, damage and etc., and replace the oil pump assembly if necessary (The oil pump cannot be disassembled).
NO : If repair is possible, repair the damaged part. If repair is not possible because the splines on the drive plate or torque converter are damaged, replace it.

INSPECTION PROCEDURE 3: Does not move forward

COMMENTS ON TROUBLE SYMPTOM
If the vehicle does not move forward when the selector lever is shifted sport mode 1, or 2 range while the engine is idling, the cause is probably abnormal line pressure or a malfunction of the underdrive clutch or valve body.

POSSIBLE CAUSES
- Malfunction of underdrive solenoid valve
- Malfunction of inhibitor switch
- Abnormal line pressure
- Malfunction of the underdrive clutch
- Malfunction of the valve body
- Malfunction of the oil pump
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. MUT-III actuator test
Item 02: Underdrive solenoid valve

OK: Operating sound can be heard.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Replace the underdrive solenoid valve.

STEP 2. MUT-III diagnosis code
Either of diagnosis codes 27 or 28 is set, inhibtor switch is defective.

Q: Are diagnosis codes 27 or 28 output?
YES <diagnosis code 27 is set> : Refer to diagnosis code 27: Inhibitor switch system P.23A-52.
YES <diagnosis code 28 is set> : Refer to diagnosis code 28: Inhibitor switch system P.23A-59.
NO : Go to Step 3.

STEP 3. Underdrive solenoid valve check
(1) Turn the ignition switch to the ON position.
(2) Shift the selector lever from N to D range.
(3) Confirm the operating sound of the underdrive solenoid valve.

OK: Operating sound can be heard.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Replace the engine-A/T-ECU.

STEP 4. Hydraulic pressure test
Measure the hydraulic pressure of the underdrive clutch when the selector lever is at the L range.

OK: Refer to P.23A-133.

Q: Is the check result normal?
YES : Go to Step 7.
NO : Go to Step 5.

STEP 5. Engine-A/T-ECU replacement
(1) Replace the engine-A/T-ECU.
(2) Test drive the vehicle.
(3) Verify that the condition described by the customer exists.

Q: Does a malfunction take place again?
YES : Go to Step 6.
NO : The inspection is complete.

STEP 6. Valve body disassembly, cleaning, check and assembly
(1) Check the bolts for looseness and the O-ring, solenoid valves, springs and valve body for damage.
Replace the valve body assembly if the damages are thought to be irreparable.
(2) Test drive the vehicle.
(3) Verify that the condition described by the customer exists.

Q: Does a malfunction take place again?
YES : Go to Step 7.
NO : The inspection is complete.

STEP 7. Oil pump check
(1) If the damage is in the oil pump assembly, replace the oil pump assembly.
(2) Test drive the vehicle.
(3) Verify that the condition described by the customer exists.

Q: Is the check result normal?
YES : Go to Step 8.
NO : The inspection is complete.

STEP 8. Underdrive clutch check
(1) Check the facing for seizure and the piston seal ring for damage and interference with the retainer.
(2) Test drive the vehicle.
(3) Verify that the condition described by the customer exists.

Q: Is the check result normal?
YES : The inspection is complete.
NO : Repair or replace the underdrive clutch.

INSPECTION PROCEDURE 4: Does not move backward

COMMENTS ON TROUBLE SYMPTOM
If the vehicle does not move backward when the selector lever is shifted to R range while the engine is idling, the cause is probably abnormal pressure of the reverse clutch and low-reverse brake or a malfunction of the reverse clutch, low-reverse brake, or valve body.

POSSIBLE CAUSES
- Abnormal reverse clutch pressure
- Abnormal low-reverse brake pressure
- Malfunction of low-reverse solenoid valve
- Malfunction of the reverse clutch
- Malfunction of low-reverse brake
- Malfunction of valve body
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. MUT-III actuator test
Item 01: Low-reverse solenoid valve

OK: Operating sound can be heard.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Replace the low-reverse solenoid valve.

STEP 2. Hydraulic pressure test
Measure the hydraulic pressure for reverse clutch and low-reverse brake when the selector lever is at the R range (Refer to P.23A-133).

OK: Refer to P.23A-133.

Q: Is the check result normal?
YES : Go to Step 5.
NO : Go to Step 3.

STEP 3. Engine-A/T-ECU replacement
(1) Replace the engine-A/T-ECU.
(2) Test drive the vehicle.
(3) Verify that the condition described by the customer exists.

Q: Does a malfunction take place again?
YES : Go to Step 4.
NO : The inspection is complete.

STEP 4. Valve body disassembly clean and assembly
(1) Check the bolts for looseness and the O-ring, solenoid valves, springs and valve body for damage.
Replace the valve body assembly if the damages are thought to be irreparable.
(2) Test drive the vehicle.
(3) Verify that the condition described by the customer exists.

Q: Does a malfunction take place again?
YES : Go to Step 5.
NO : The inspection is complete.

STEP 5. Reverse clutch and low-reverse brake check
Check the facing for seizure and the piston seal ring for damage and interference with the retainer.

Q: Is the check result normal?
YES : The inspection is complete.
NO : Repair or replace the reverse clutch and low-reverse brake.

INSPECTION PROCEDURE 5: Does not move (forward or backward)

COMMENTS ON TROUBLE SYMPTOM
If the vehicle does not move forward or backward when the selector lever is shifted to any position while the engine is idling, the cause is probably an abnormal line pressure, a malfunction of the power train components, oil pump or valve body.

POSSIBLE CAUSES
- Abnormal line pressure
- Malfunction of valve body
- Malfunction of torque converter
- Malfunction of oil pump
- Malfunction of each element
- Malfunction of power train components

DIAGNOSIS

STEP 1. Hydraulic pressure test
Measure the hydraulic pressure of each element when the selector lever is in 1st, 2nd gear or reverse.

OK: Refer to P.23A-133.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Go to Step 2.

STEP 2. Valve body disassembly clean and assembly
(1) Check the bolts for looseness and the O-ring, solenoid valves, springs and valve body for damage.
Replace the valve body assembly if the damages are thought to be irreparable.
(2) Test drive the vehicle.
(3) Verify that the condition described by the customer exists.

Q: Does a malfunction take place again?
YES : Go to Step 3.
NO : The inspection is complete.

STEP 3. Torque converter check
Check for damaged drive plate, incorrect installation in the input shaft (inserted at an angle) or damaged splines.

Q: Is the check result normal?
YES : Check the oil pump for incorrect installation, damage and etc., and replace the oil pump assembly if necessary (The oil pump cannot be disassembled).
NO : If repair is possible, repair the damaged part. If repair is not possible because the splines on the drive plate or torque converter are damaged, replace it.

STEP 4. Power train components check
Disassemble the transmission and check the input shaft, planetary carrier, output shaft differential and each element, etc.

Q: Is the check result normal?
YES : The inspection is complete.
NO : Repair or replace each power train components.

INSPECTION PROCEDURE 6: Engine stalls during shifting

COMMENTS ON TROUBLE SYMPTOM

If the engine stalls when the selector lever is shifted from N to D or R range while the engine is idling, the cause is probably a malfunction of the engine system, damper clutch solenoid valve, valve body or torque converter (damper clutch).

POSSIBLE CAUSES

- Malfunction of engine system
- Malfunction of damper clutch solenoid valve
- Malfunction of valve body
- Malfunction of torque converter (damper clutch)
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. MUT-III actuator test

Item 06: Damper clutch solenoid valve

OK: Operating sound can be heard.

Q: Is the check result normal?

YES : Go to Step 2.

NO : Replace the damper clutch solenoid valve.

STEP 2. Valve body disassembly clean and assembly

(1) Check the bolts for looseness and the O-ring, solenoid valves, spring and valve body for damage.
Replace the valve body assembly if the damages are thought to be irreparable.
(2) Test drive the vehicle.
(3) Verify that the condition described by the customer exists.

Q: Does a malfunction take place again?

YES : Go to Step 3.

NO : The inspection is complete.

STEP 3. Torque converter check

Check for damaged drive plate, incorrect installation in the input shaft (inserted at an angle), damaged splines or damper clutch sealing.

Q: Is the check result normal?

YES : Go to Step 4.

NO : If repair is possible, repair the damaged part. If repair is not possible because the splines on the drive plate or torque converter are damaged, replace it.

STEP 4. Engine system check

Q: Is the check result normal?

YES : Replace the engine-A/T-ECU.

NO : Repair the engine system.

INSPECTION PROCEDURE 7: Shift shock when shifting from N to D and long delay

COMMENTS ON TROUBLE SYMPTOM

If abnormal shock or delay of two seconds or more occurs when the selector lever is shifted from N to D range while the engine is idling, the cause is probably abnormal underdrive clutch pressure or a malfunction of the underdrive clutch, valve body or throttle position sensor.

POSSIBLE CAUSES

- Malfunction of underdrive solenoid valve
- Malfunction of input shaft speed sensor
- Abnormal underdrive clutch pressure
- Malfunction of throttle position sensor
- Malfunction of the underdrive clutch
- Malfunction of valve body
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. MUT-III actuator test

Item 02: Underdrive solenoid valve

OK: Operating sound can be heard.

Q: Is the check result normal?

YES : Go to Step 2.

NO : Replace the underdrive solenoid valve.

STEP 2. MUT-III data list

Item 0001: Input shaft speed sensor (Refer to data list reference table P.23A-117).

Q: Is the check result normal?

YES : Go to Step 3.

NO : Refer to diagnosis code 22: Input shaft speed sensor system P.23A-27.

STEP 3. MUT-III data list
Item 32: Underdrive solenoid valve duty ratio.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Replace the engine-A/T-ECU.

STEP 4. Check when shift shock occurs.

Q: Does the shift shock occur when the vehicle starts moving?
YES : Go to Step 6.
NO : Go to Step 5.

STEP 5. Hydraulic pressure test
Measure the hydraulic pressure for underdrive clutch when the selector lever is shifted from N to D range (Refer to P.23A-133).

OK: Refer to P.23A-133.

Q: Is the check result normal?
YES : Go to Step 9.
NO : Go to Step 8.

STEP 6. Check when shift shock occurs.

Q: Does the shift shock always occur?
YES : Go to Step 8.
NO : Go to Step 7.

STEP 7. MUT-III data list
Item 11: Throttle position sensor (Refer to data list reference table P.23A-117).

Q: Is the check result normal?
YES : Go to Step 8.
NO : Check the throttle position sensor system (Refer to GROUP 13, Troubleshooting P.13A-20).

STEP 8. Valve body disassembly clean and assembly
(1) Check the bolts for looseness and the O-ring, solenoid valves, springs and valve body for damage.
Replace the valve body assembly if the damages are thought to be irreparable.
(2) Test drive the vehicle.
(3) Verify that the condition described by the customer exists.

Q: Does a malfunction take place again?
YES : Go to Step 9.
NO : The inspection is complete.

STEP 9. Underdrive clutch check
Check the facing for seizure and the piston seal ring for damage and interference with the retainer.

Q: Is the check result normal?
YES : The inspection is complete.
NO : Repair or replace the underdrive clutch.

INSPECTION PROCEDURE 8: Shift shock when shifting from N to R and long delay

COMMENTS ON TROUBLE SYMPTOM
If abnormal shock or delay of two seconds or more occurs when the selector lever is shifted from N to R range while the engine is idling, the cause is probably abnormal pressure in reverse clutch and low-reverse clutch or a malfunction of the reverse clutch, low-reverse brake, valve body or throttle position sensor.

POSSIBLE CAUSES
- Malfunction of low-reverse solenoid valve
- Malfunction of input shaft speed sensor
- Malfunction of the inhibitor switch
- Abnormal reverse clutch pressure
- Abnormal low-reverse brake pressure
- Malfunction of throttle position sensor
- Malfunction of the reverse clutch
- Malfunction of low-reverse brake
- Malfunction of valve body
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. MUT-III actuator test
Item 01: Low-reverse solenoid valve

OK: Operating sound can be heard.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Replace the low-reverse solenoid valve.

STEP 2. MUT-III data list
Item 0001: Input shaft speed sensor (Refer to data list reference table P.23A-117).

Q: Is the check result normal?

YES : Go to Step 3.
NO : Refer to diagnosis code 22: Input shaft speed sensor system P.23A-27.

STEP 3. MUT-III diagnosis code
Either of diagnosis codes 27 or 28 is set, inhibtor switch is defective.

Q: Are diagnosis codes 27 or 28 output?
YES <diagnosis code 27 is set> : Refer to diagnosis code 27: Inhibitor switch system P.23A-52.
YES <diagnosis code 28 is set> : Refer to diagnosis code 28: Inhibitor switch system P.23A-59.
NO : Go to Step 4.

STEP 4. MUT-III data list
Item 31: Low-reverse solenoid valve duty ratio (Refer to data list reference table P.23A-117).

Q: Is the check result normal?
YES : Go to Step 5.
NO : Replace the engine-A/T-ECU.

STEP 5. Check when shift shock occurs.

Q: Does the shift shock occur when the vehicle starts moving?
YES : Go to Step 7.
NO : Go to Step 6.

STEP 6. Hydraulic pressure test
Measure the hydraulic pressure for reverse clutch and low-reverse clutch when the selector lever is shifted from N to R range.

OK: Refer to P.23A-133.

Q: Is the check result normal?
YES : Go to Step 10.
NO : Go to Step 9.

STEP 7. Check when shift shock occurs.

Q: Does the shift shock always occur?
YES : Go to Step 9.
NO : Go to Step 8.

STEP 8. MUT-III data list
Item 11: Throttle position sensor (Refer to data list reference table P.23A-117).

Q: Is the check result normal?
YES : Go to Step 9.
NO : Check the throttle position sensor system (Refer to GROUP 13, Troubleshooting P.13A-20).

STEP 9. Valve body disassembly clean and assembly
(1) Check the bolts for looseness and the O-ring, solenoid valve, springs and valve body for damage.
Replace the valve body assembly if the damages are thought to be irreparable.
(2) Test drive the vehicle.
(3) Verify that the condition described by the customer exists.

Q: Does a malfunction take place again?
YES : Go to Step 10.
NO : The inspection is complete.

STEP 10. Reverse clutch and low-reverse brake check
Check the facing for seizure and the piston seal ring for damage and interference with the retainer.

Q: Is the check result normal?
YES : The inspection is complete.
NO : Repair or replace the reverse clutch and low-reverse brake.

INSPECTION PROCEDURE 9: Shift shock when shifting from N to D, N to R and long delay

COMMENTS ON TROUBLE SYMPTOM
If abnormal shock or delay of two seconds or more occurs when the selector lever is shifted from N to D range and from N to R range while the engine is idling, the cause is probably abnormal line pressure or a malfunction of the oil pump, valve body.

POSSIBLE CAUSES
- Abnormal line pressure
- Malfunction of throttle position sensor
- Malfunction of oil pump
- Malfunction of valve body
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. Hydraulic pressure test
Measure the hydraulic pressure of each element when the selector lever is in L, 2nd or reverse.

OK: Refer to P.23A-133.

Q: Is the check result normal?
YES : Go to Step 3.
NO : Go to Step 2.

STEP 2. Line pressure adjustment
(1) Adjust the line pressure (Refer to P.23A-138).
(2) Test drive the vehicle.
(3) Verify that the condition described by the customer exists.

Q: Does a malfunction take place again?
YES : Go to Step 3.
NO : The inspection is complete.

STEP 3. Check when shift shock occurs.

Q: Does the shift shock occur when the vehicle starts moving?
YES : Go to Step 4.
NO : Replace the oil pump assembly (Oil pump cannot be repaired).

STEP 4. Check when shift shock occurs.

Q: Does the shift shock always occur?
YES : Go to Step 7.
NO : Go to Step 5.

STEP 5. MUT-III data list
Item 11: Throttle position sensor (Refer to data list reference table P.23A-117).

Q: Is the check result normal?
YES : Go to Step 6.
NO : Check the throttle position sensor system (Refer to GROUP 13, Troubleshooting P.13A-20).

STEP 6. Engine-A/T-ECU replacement
(1) Replace the engine-A/T-ECU.
(2) Test drive the vehicle.
(3) Verify that the condition described by the customer exists.

Q: Does a malfunction take place again?
YES : Go to Step 7.
NO : The inspection is complete.

STEP 7. Valve body disassembly clean and assembly
Check the bolts for looseness and the O-ring, solenoid valve s, springs and valve body for damage.

Q: Is the check result normal?
YES : The inspection is complete.
NO : Replace the valve body assembly if the damages are thought to be irreparable.

INSPECTION PROCEDURE 10: Shift shock and slipping

COMMENTS ON TROUBLE SYMPTOM
If shift shock when driving are due to upshifting or downshifting and the transmission speed become higher than the engine speed, the cause is probably abnormal line pressure or a malfunction of a solenoid valve, oil pump, valve body or of a brake or clutch.

POSSIBLE CAUSES
- Malfunction of each solenoid valve
- Abnormal line pressure
- Malfunction of valve body
- Malfunction of oil pump
- Malfunction of each brake or each clutch
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. MUT-III actuator test
- Item 01: Low-reverse solenoid valve
- Item 02: Underdrive solenoid valve
- Item 03: Second solenoid valve
- Item 04: Overdrive solenoid valve

OK: Operating sound can be heard.

Q: Is the check result normal?
YES : Go to Step 2.
NO : Replace the defective solenoid valve.

STEP 2. MUT-III data list
- Item 63: Shift position (Refer to data list reference table P.23A-117).
- Item 31, 32, 33, 34: Each solenoid valve duty ratio (Refer to data list reference table P.23A-117).

Q: Is the check result normal?
YES : Go to Step 3.
NO : Replace the engine-A/T-ECU.

STEP 3. Hydraulic pressure test
Check all hydraulic pressures within the standard value.

OK: Refer to P.23A-133.

Q: Is the check result normal?
YES : Go to Step 6.
NO : Go to Step 4.

STEP 4. Line pressure adjustment
(1) Adjust the line pressure (Refer to P.23A-138).
(2) Test drive the vehicle.
(3) Verify that the condition described by the customer exists.

Q: Does a malfunction take place again?
YES : Go to Step 5.
NO : The inspection is complete.

STEP 5. Valve body disassembly clean and assembly
(1) Check the bolts for looseness and the O-ring, solenoid valves, springs and valve body for damage.
Replace the valve body assembly if the damages are thought to be irreparable.
(2) Test drive the vehicle.
(3) Verify that the condition described by the customer exists.

Q: Does a malfunction take place again?
YES : Check the oil pump for incorrect installation, damage and etc., and replace the oil pump assembly if necessary (The oil pump cannot be disassembled).
NO : The inspection is complete.

STEP 6. Each clutch and brake check
Check the facing for seizure and the piston seal ring for damage and interference with the retainer.

Q: Is the check result normal?
YES : The inspection is complete.
NO : Repair or replace each clutch and brake.

INSPECTION PROCEDURE 11: Does not shift properly (all points)

COMMENTS ON TROUBLE SYMPTOM
If all shift points are early or late while driving, the cause is probably a malfunction of the output shaft speed sensor, throttle position sensor, or engine-A/T-ECU.

POSSIBLE CAUSES
- Malfunction of output shaft speed sensor
- Malfunction of throttle position sensor
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. MUT-III data list
Item 0002: Output shaft speed sensor (Refer to data list reference table P.23A-117).

Q: Is the check result normal?
YES : Go to Step 2.
NO : Refer to diagnosis code 23: Output shaft speed sensor system P.23A-37.

STEP 2. MUT-III data list
Item 11: Throttle position sensor (Refer to data list reference table P.23A-117).

Q: Is the check result normal?
YES : Go to Step 3.
NO : Check the throttle position sensor system (Refer to GROUP 13, Troubleshooting P.13A-20).

STEP 3. MUT-III actuator test
(1) Item 14: INVECS-II cancel command
(2) Test drive the vehicle (Refer to Road Test, Inspection procedure 8 P.23A-8).
(3) Check that the gear shifting corresponds to the standard shift line of the shift pattern diagram.

Q: Is the check result normal?
YES : The inspection is complete.
NO : Replace the engine-A/T-ECU.

INSPECTION PROCEDURE 12: Does not shift properly (some point)

COMMENTS ON TROUBLE SYMPTOM
If some of the shift points are early or late when driving, the cause is probably a malfunction of valve body, or it is due to the characteristics of the INVECS-II system but is not an abnormality.

POSSIBLE CAUSES
- Malfunction of valve body
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. Check when the shift points early or late.

Q: Are the shift points early or late only when A/T fluid is −20°C or less, or 125°C or more?

YES : The symptom is due to characteristics of the INVECS-II system, but is not abnormal.
NO : Go to Step 2.

STEP 2. MUT-III actuator test
(1) Item 14: INVECS-II cancel command
(2) Test drive the vehicle (Refer to Road Test, Inspection procedure 8 P.23A-8).
(3) Check that the gear shifting corresponds to the standard shift line of the shift pattern diagram.

Q: Is the check result normal?
YES : The inspection is complete.
NO : Replace the engine-A/T-ECU.

INSPECTION PROCEDURE 13: Does not shift (no diagnosis code)

COMMENTS ON TROUBLE SYMPTOM
The gear shifting does not occur while driving. If no diagnosis codes are set, the cause is probably a malfunction of the shift switch assembly or engine-A/T-ECU .

POSSIBLE CAUSES
- Malfunction of Shift switch assembly
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. MUT-III data list
Item 54: A/T control relay (Refer to Data List Reference Table P.23A-117).

Q: Is the check result normal?

YES : Go to Step 2.
NO : Replace the engine-A/T-ECU.

STEP 2. MUT-III data list
Item 67: Select switch (Refer to Data List Reference Table P.23A-117).

Q: Is the check result normal?
YES : Replace the engine-A/T-ECU.
NO : INSPECTION PROCEDURE 16: Shift switch assembly system check (Refer to P.23A-100).

INSPECTION PROCEDURE 14: Poor acceleration

COMMENTS ON TROUBLE SYMPTOM
If acceleration is poor when downshifting occurs while driving, the cause is probably a malfunction of the engine system.

POSSIBLE CAUSES
- Malfunction of engine system
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. Engine system check

Q: Is the check result normal?
YES : Go to Step 2.
NO : Repair the engine system.

STEP 2. Engine-A/T-ECU replacement
(1) Replace the engine-A/T-ECU.
(2) Test drive the vehicle.
(3) Verify that the condition described by the customer exists.

Q: Does a malfunction take place again?
YES : Go to Step 1.
NO : The inspection is complete.

INSPECTION PROCEDURE 15: Vibration

COMMENTS ON TROUBLE SYMPTOM

If vibration occurs when driving at constant speed or when acceleration in high range, the cause is probably an abnormal torque converter pressure, or a malfunction of the engine system, damper clutch solenoid valve, valve body or torque converter.

POSSIBLE CAUSES

- Malfunction of damper clutch solenoid valve
- Malfunction of engine system
- Abnormal torque converter pressure
- Malfunction of valve body
- Malfunction of torque converter
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. Check when the vibration occurs.

Q: Does the vibration occur when the damper clutch is operating?
YES : Go to Step 3.
NO : Go to Step 2.

STEP 2. Engine system check

Q: Is the check result normal?
YES : The inspection is complete.
NO : Repair the engine system.

STEP 3. Engine-A/T-ECU replacement
(1) Replace the engine-A/T-ECU.
(2) Test drive the vehicle.
(3) Verify that the condition described by the customer exists.

Q: Does a malfunction take place again?
YES : Go to Step 4.
NO : The inspection is complete.

STEP 4. Torque converter check
Check for damaged drive plate, incorrect installation in the input shaft (inserted at an angle), damaged splines or damper clutch sealing.

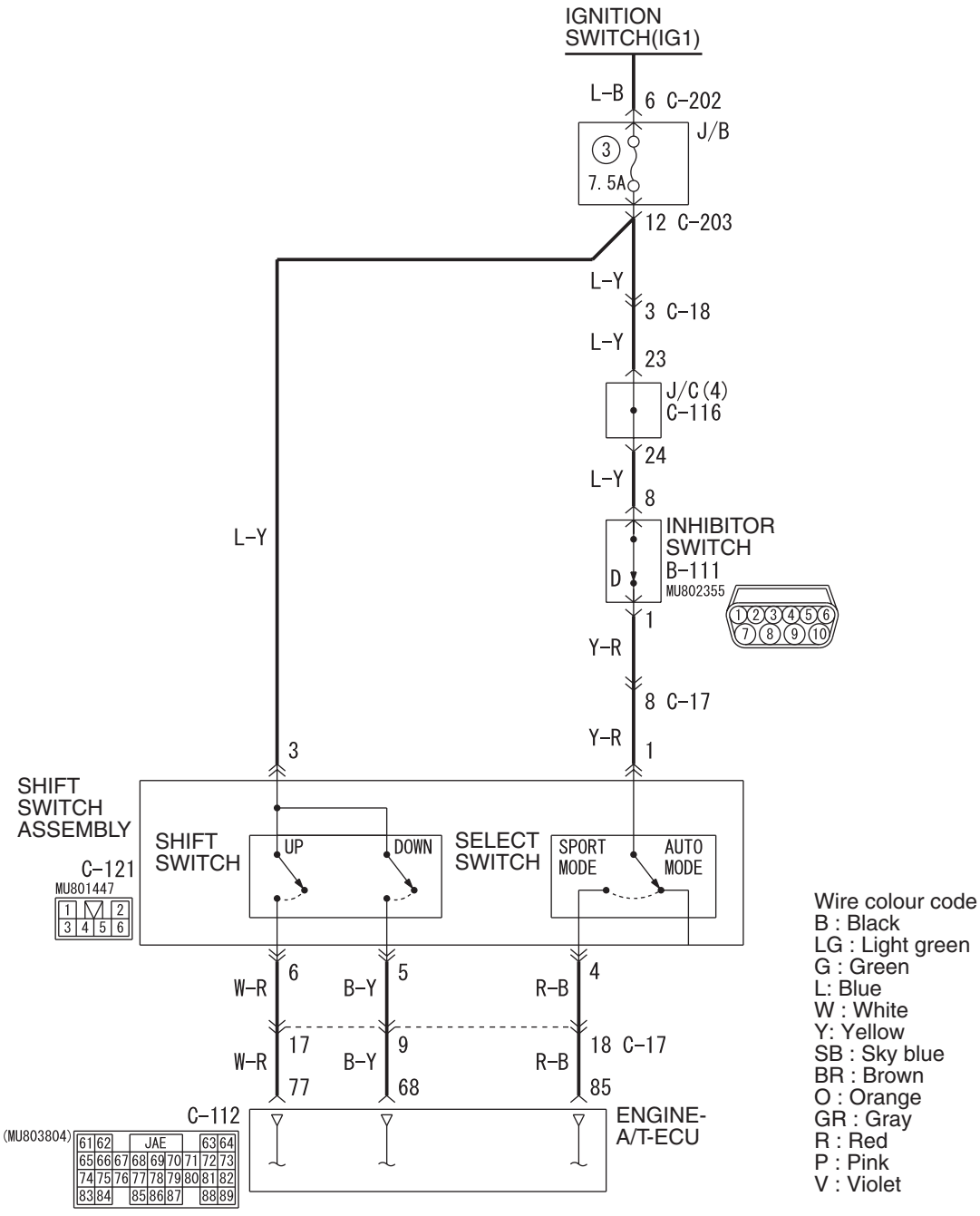
Q: Is the check result normal?
YES : Go to Step 5.
NO : If repair is possible, repair the damaged part. If repair is not possible because the splines on the drive plate or torque converter are damaged, replace it.

STEP 5. Valve body disassembly clean and assembly
Check the bolts for looseness and the O-ring, solenoid valves, springs and valve body for damage.

Q: Is the check result normal?
YES : The inspection is complete.
NO : Replace the valve body assembly if the damages are thought to be irreparable.

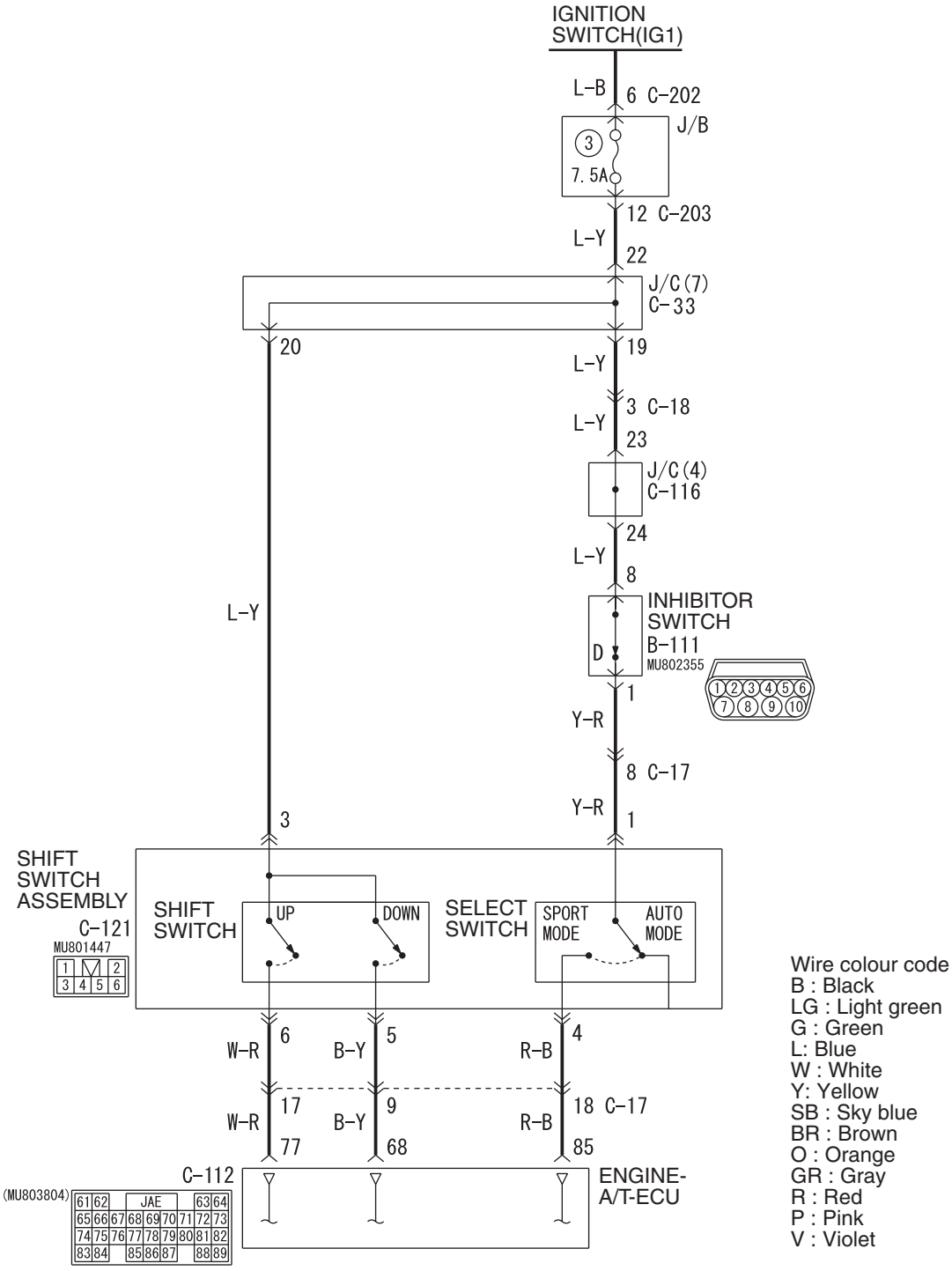
INSPECTION PROCEDURE 16: Shift switch assembly system

Shift switch assembly system circuit <LHD>



W4X23E007A

Shift switch assembly system circuit <RHD>



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OPERATION

The shift switch assembly detects the shift range (sport mode) which the driver has selected, and sends the information to the engine-A/T-ECU.

COMMENTS ON TROUBLE SYMPTOM

The cause is probably a malfunction of the shift switch and engine-A/T-ECU.

Possible causes

- Malfunction of shift switch assembly
- Damaged harness wires and connectors

- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. MUT-III diagnosis code
Either of diagnosis codes 27 or 28 is set, inhibtor switch is defective.

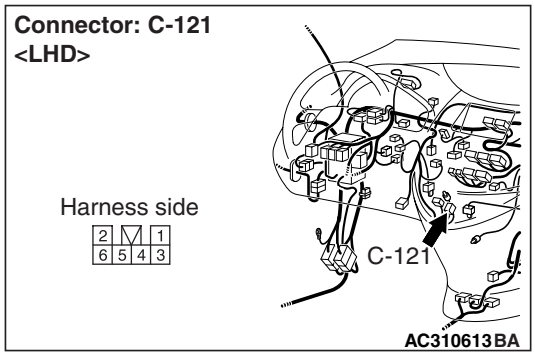
Q: Are diagnosis codes 27 or 28 output?
YES <diagnosis code 27 is set> : Refer to diagnosis code 27: Inhibitor switch system P.23A-52.
YES <diagnosis code 28 is set> : Refer to diagnosis code 28: Inhibitor switch system P.23A-59.
NO : Go to Step 2.

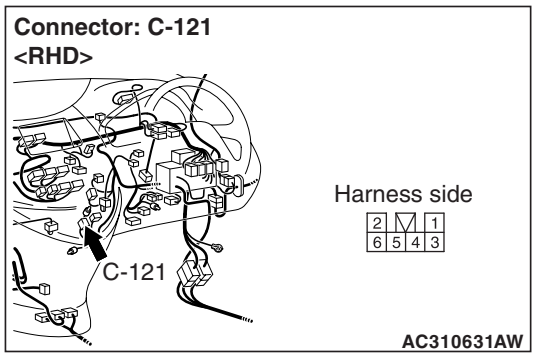
STEP 2. MUT-III data list
- Item 67: Select switch
- Item 68: Upshift switch
- Item 69: Downshift switch

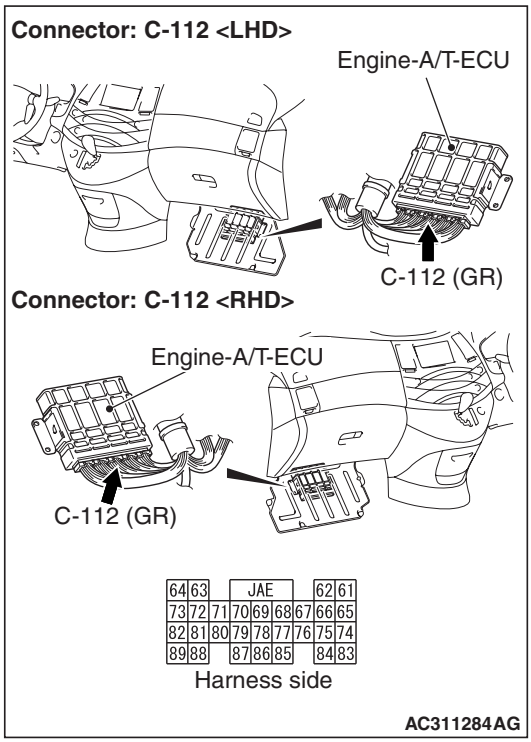
Check the above data list (Refer to data list reference table P.23A-117).

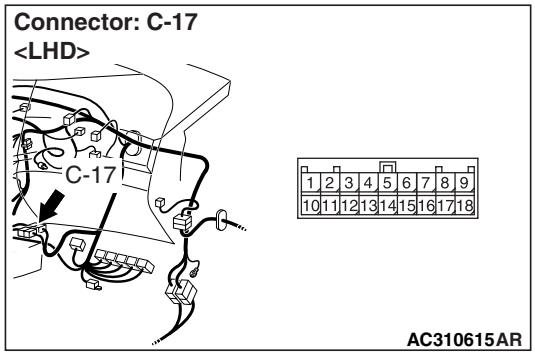
Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO <"NG" for all items> : Go to Step 3.
NO <"NG" for items 68 and 69> : Go to Step 5.
NO <"NG" for item 67> : Go to Step 10.
NO <"NG" for item 68> : Go to Step 17.
NO <"NG" for item 69> : Go to Step 20.

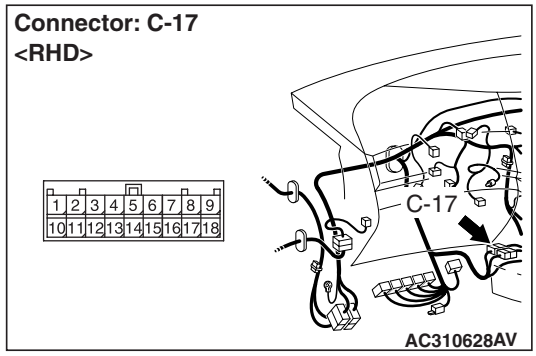
STEP 3. Connectors check: C-121 shift switch assembly connector, C-112 engine-A/T-ECU connector, C-17 intermediate connector











Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the defective connector.

STEP 4. MUT-III data list

- Item 67: Select switch
- Item 68: Upshift switch
- Item 69: Downshift switch

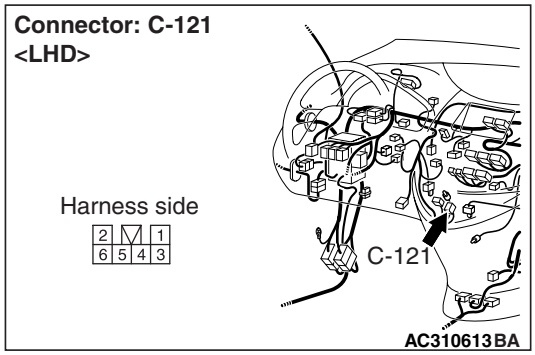
Check the above data list (Refer to data list reference table P.23A-117).

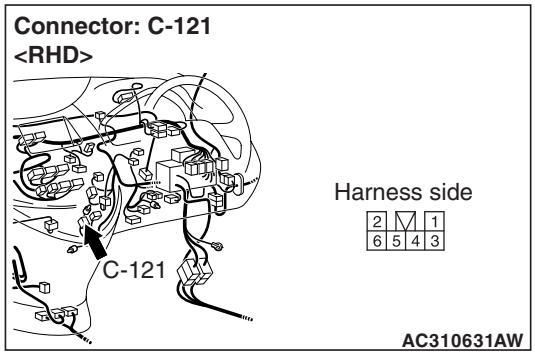
Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-5).
NO : Replace the engine-A/T-ECU.

STEP 5. Check the shift switch assembly.
Refer to P.23A-145.

Q: Is the check result normal?
YES : Go to Step 6.
NO : Replace the shift switch assembly.

STEP 6. Connector check: C-121 shift switch assembly connector



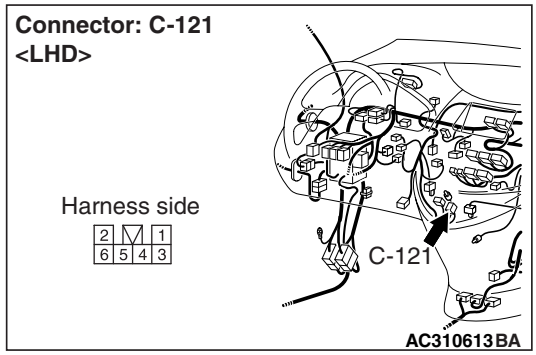


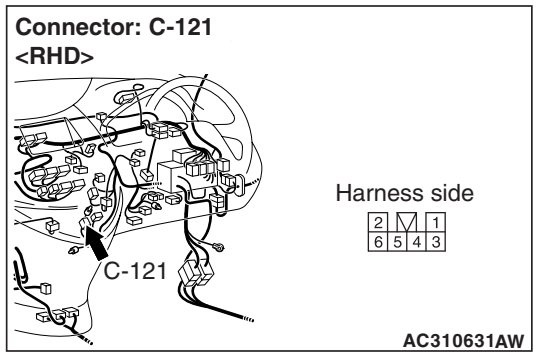
Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the defective connector.

STEP 7. Measure the voltage at shift switch assembly connector C-121

(1) Disconnect the connector, and measure the voltage between terminal 3 and earth at the wiring harness side.



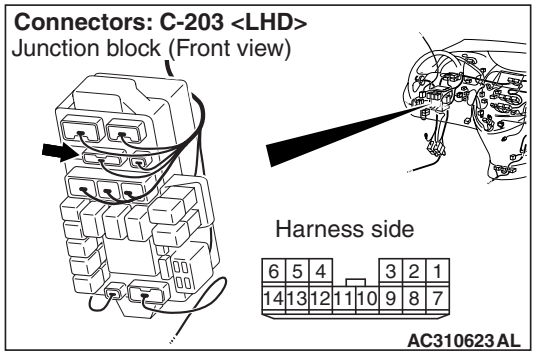


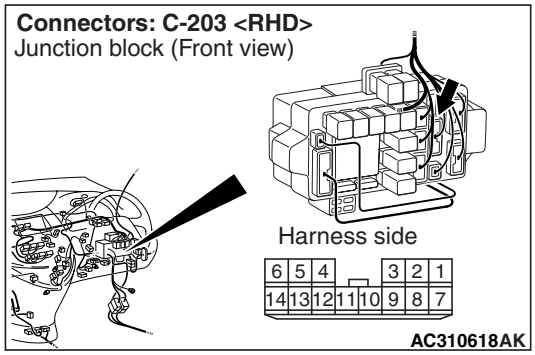
(2) Ignition switch: ON

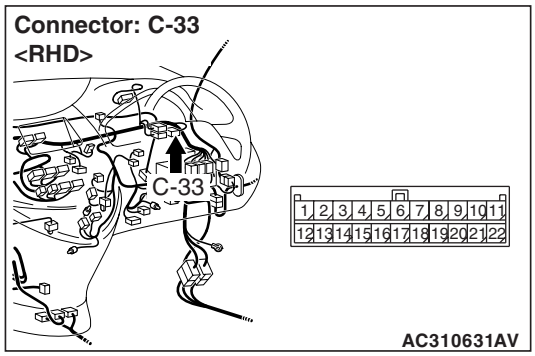
OK: System voltage

Q: Is the check result normal?
YES : Go to Step 4.
NO : Go to Step 8.

STEP 8. Connectors check: C-203 J/B connector, C-33 J/C (7) <RHD>



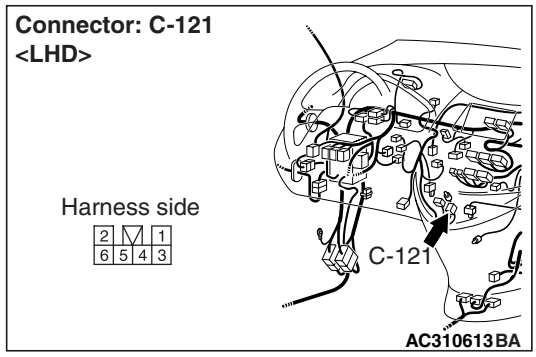


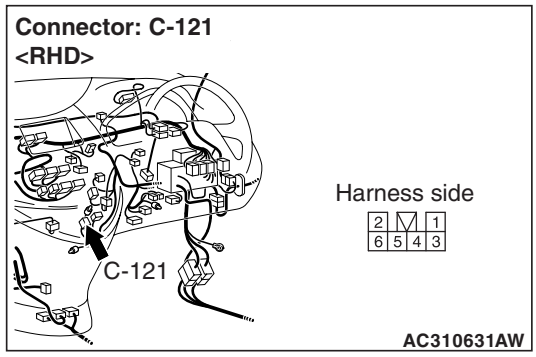


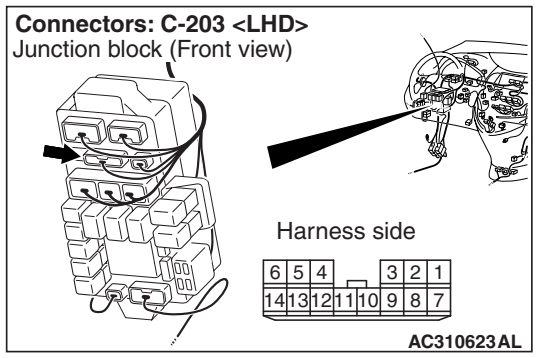
Check for the contact with terminals.

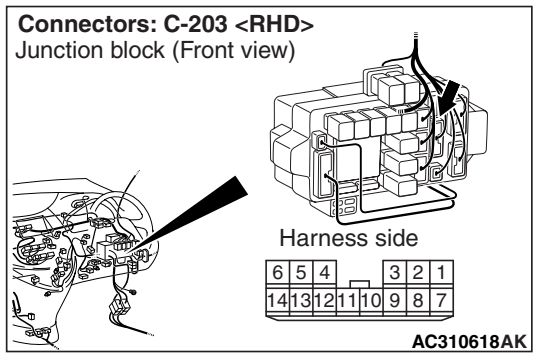
Q: Is the check result normal?
YES : Go to Step 9.
NO : Repair the defective connector.

STEP 9. Check the harness between shift switch assembly connector C-121 terminal No.3 and J/B connector C-203 terminal No.12.









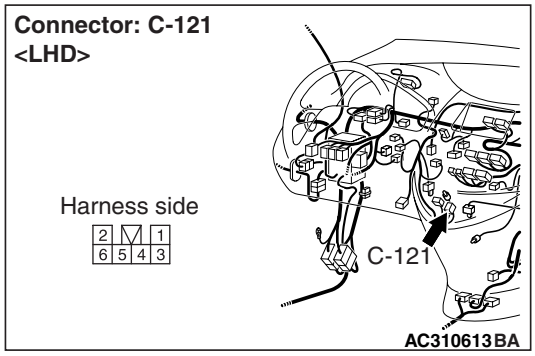
Check the power supply line for short or open circuit.

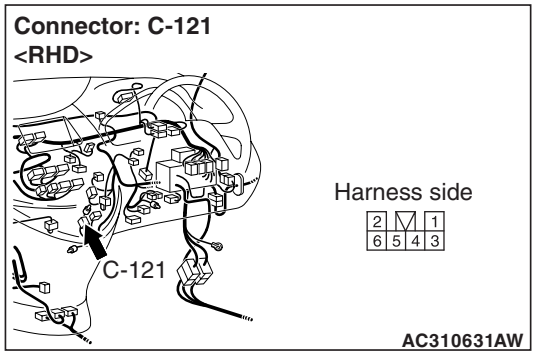
Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the wiring harness.

STEP 10. Check the shift switch assembly.
Refer to P.23A-145.

Q: Is the check result normal?
YES : Go to Step 11.
NO : Replace the shift switch assembly.

STEP 11. Connector check: C-121 shift switch assembly connector

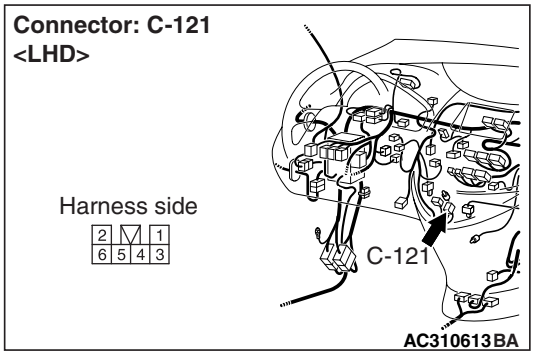


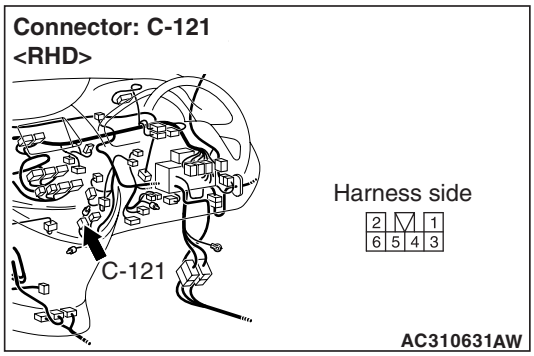


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 12.
NO : Repair the defective connector.

STEP 12. Measure the voltage at shift switch assembly connector C-121
(1) Disconnect the connector, and measure the voltage between terminal 1 and earth at the wiring harness side.



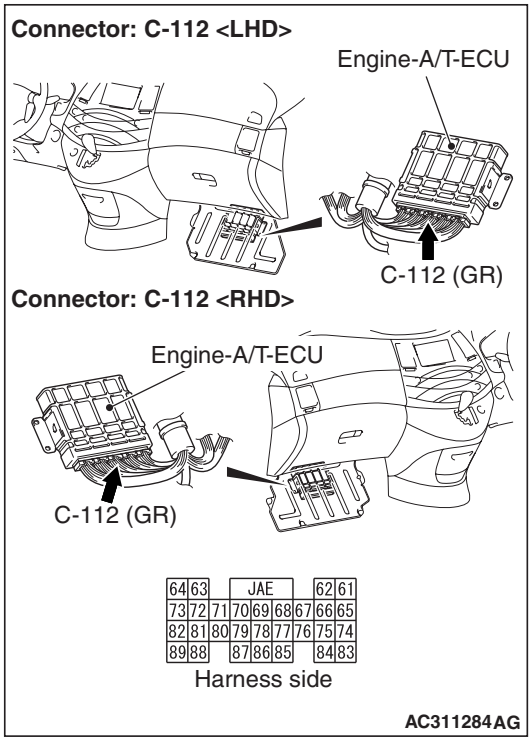


(2) Selector lever position: D
(3) Ignition switch: ON

OK: System voltage

Q: Is the check result normal?
YES : Go to Step 13.
NO : Go to Step 15.

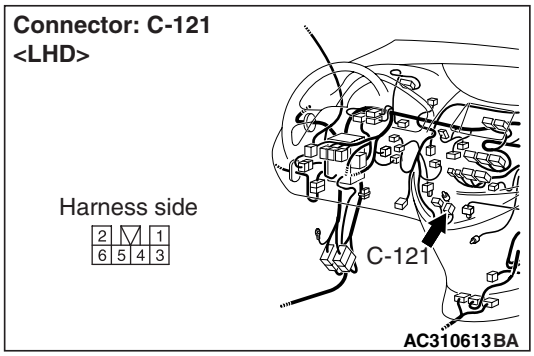
STEP 13. Connectors check: C-112 engine-A/T-ECU connector

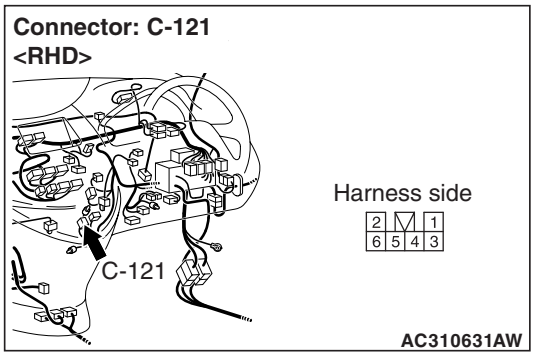


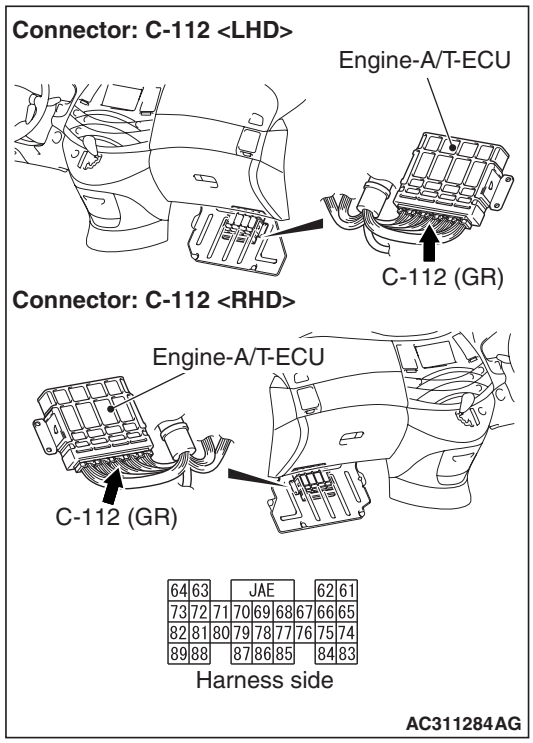
Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 14.
NO : Repair the defective connector.

STEP 14. Check the harness between shift switch assembly connector C-121 terminal No.4 and engine-A/T-ECU connector C-112 terminal No.85.



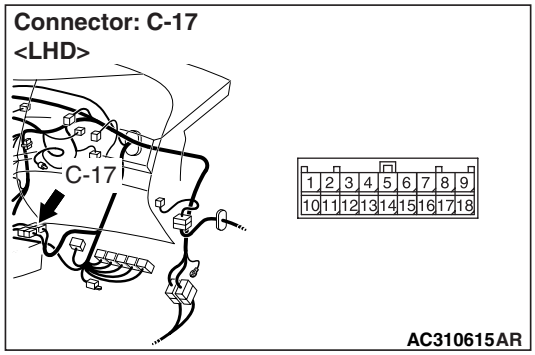


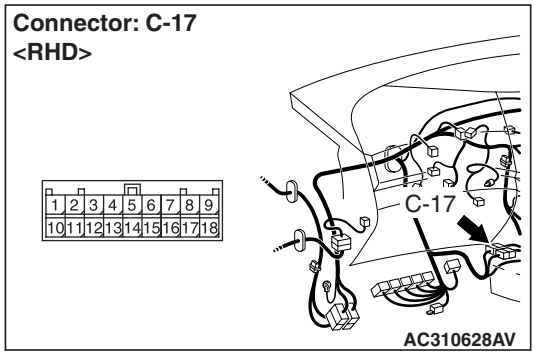


Check the output line for short-circuited or open circuit.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the wiring harness.

STEP 15. Connector check: C-17 intermediate connector

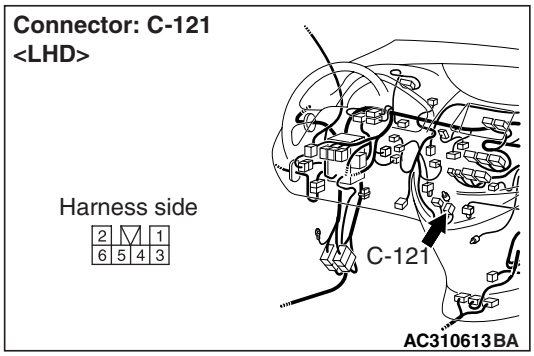


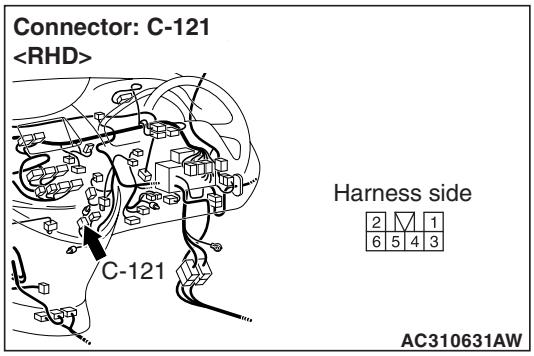


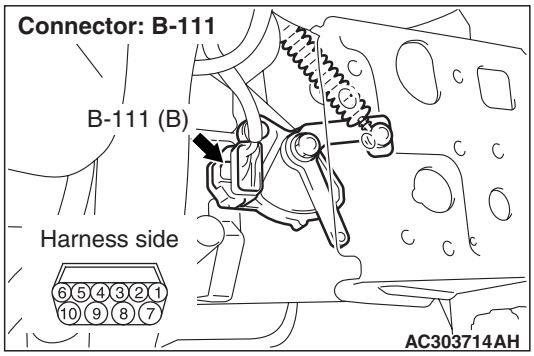
Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 16.
NO : Repair the defective connector.

STEP 16. Check the harness between shift switch assembly connector C-121 terminal No.1 and inhibitor switch connector B-111 terminal No.1.







Check the power supply line for short or open circuit.

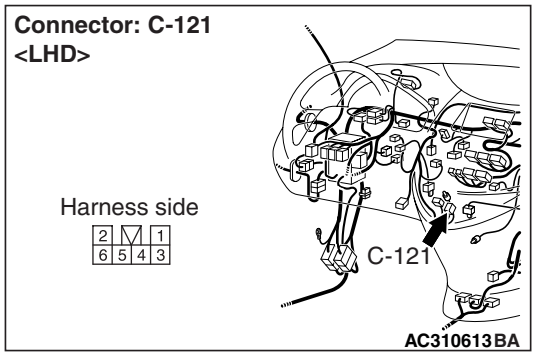
Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the wiring harness.

STEP 17. Check the shift switch assembly.
Refer to P.23A-145.

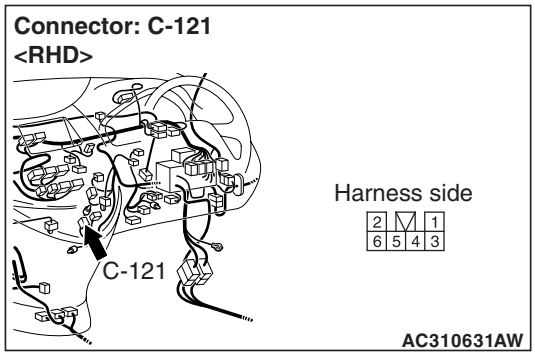
Q: Is the check result normal?
YES : Go to Step 18.
NO : Replace the shift switch assembly.

STEP 18. Connectors check: C-121 shift switch assembly connector, C-112 engine-A/T-ECU connector, C-17 intermediate connector

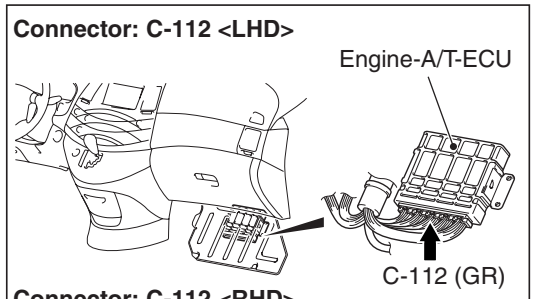
Connector: C-121
<LHD>



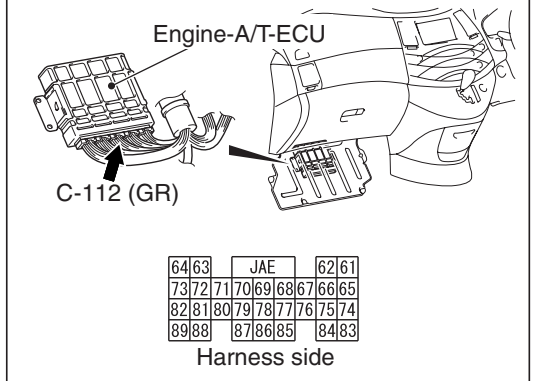
Connector: C-121
<RHD>



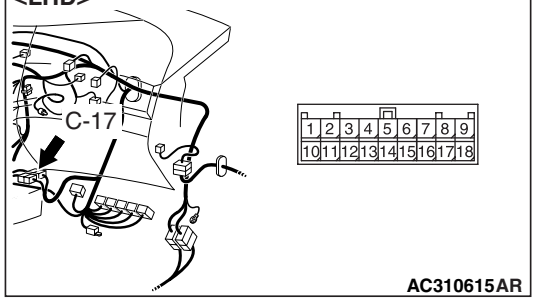
Connector: C-112 <LHD>



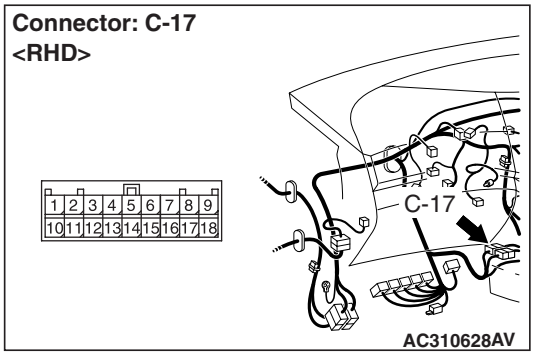
Connector: C-112 <RHD>



Connector: C-17
<LHD>



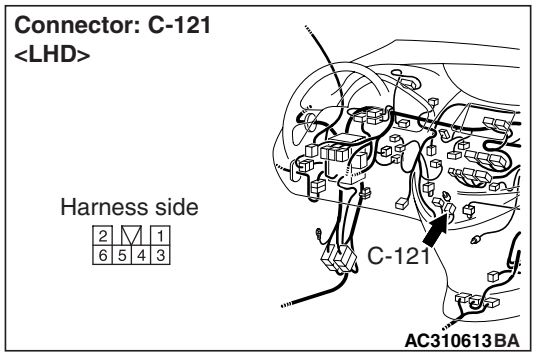
Connector: C-17
<RHD>

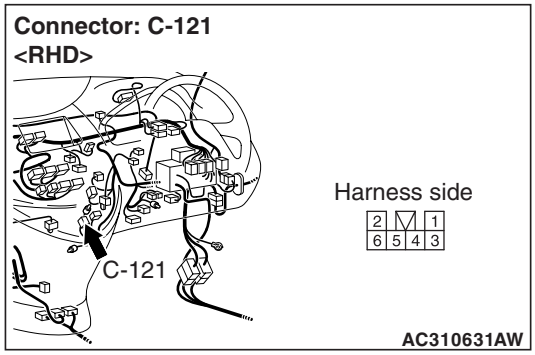


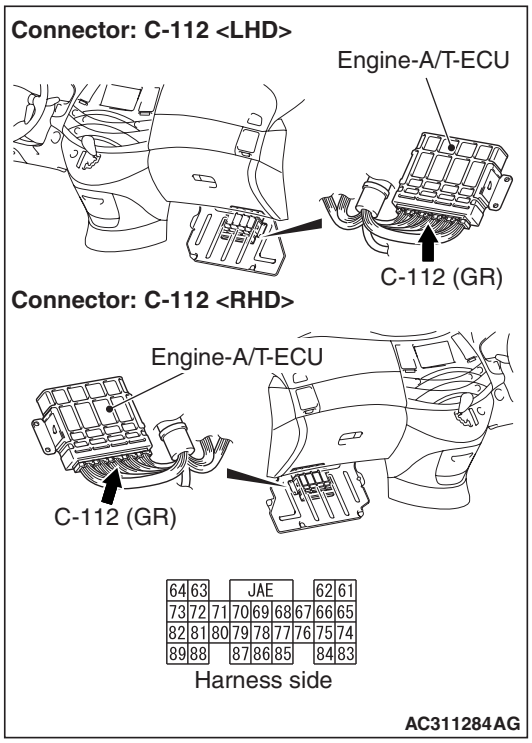
Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 19.
NO : Repair the defective connector.

STEP 19. Check the harness between shift switch assembly connector C-121 terminal No.6 and engine-A/T-ECU connector C-112 terminal No.77.







Check the output line for short-circuited or open circuit.

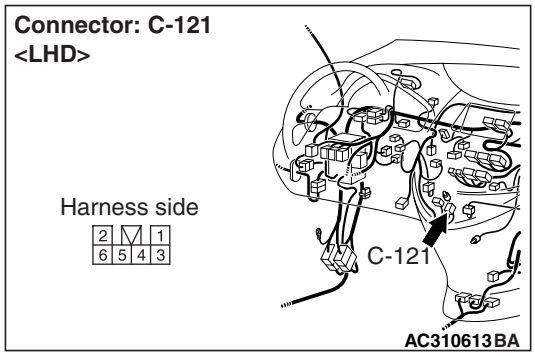
Q: Is the check result normal?

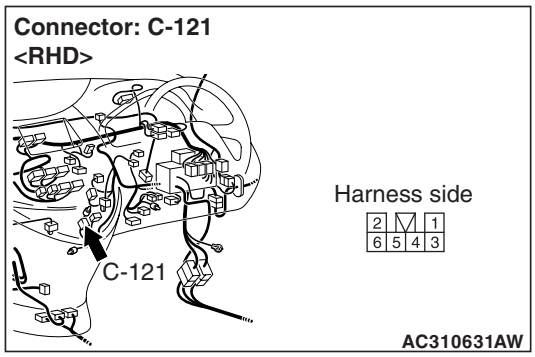
YES : Go to Step 4.
NO : Repair the wiring harness.

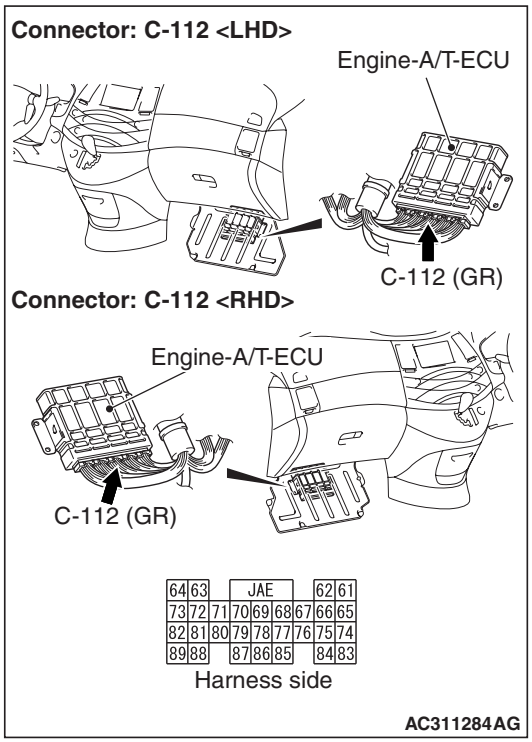
STEP 20. Check the shift switch assembly.
Refer to P.23A-145.

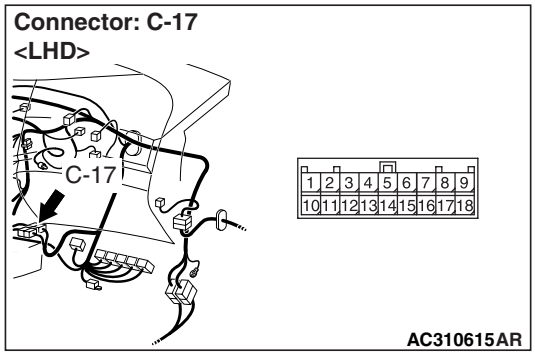
Q: Is the check result normal?
YES : Go to Step 21.
NO : Replace the shift switch assembly.

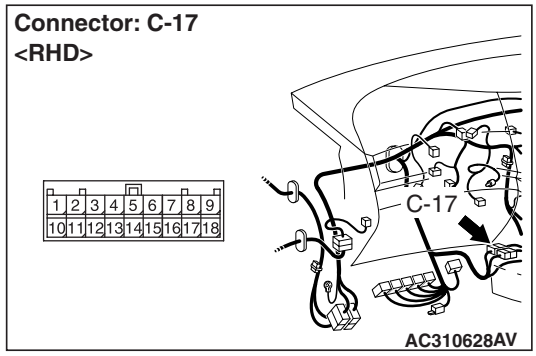
STEP 21. Connectors check: C-121 shift switch assembly connector, C-112 engine-A/T-ECU connector, C-17 intermediate connector







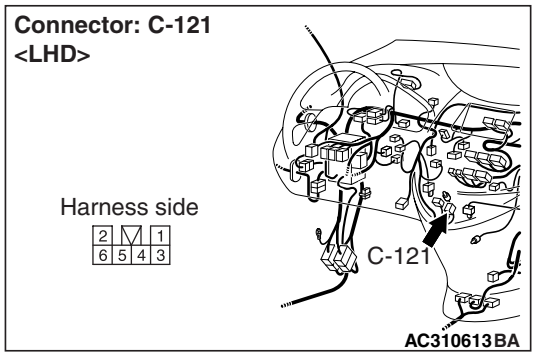


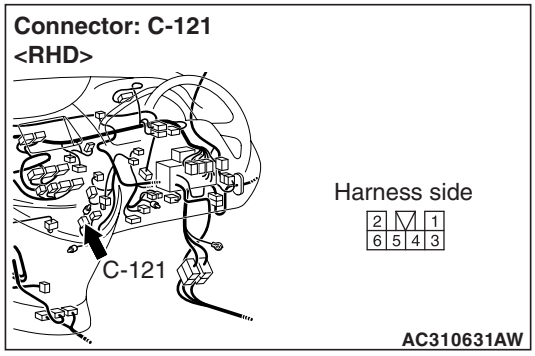


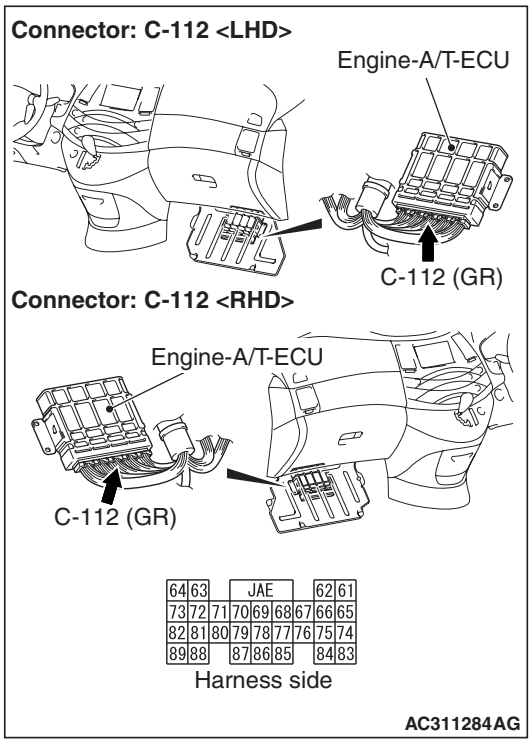
Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 22.
NO : Repair the defective connector.

STEP 22. Check the harness between shift switch assembly connector C-121 terminal No.5 and engine-A/T-ECU connector C-112 terminal No.68.







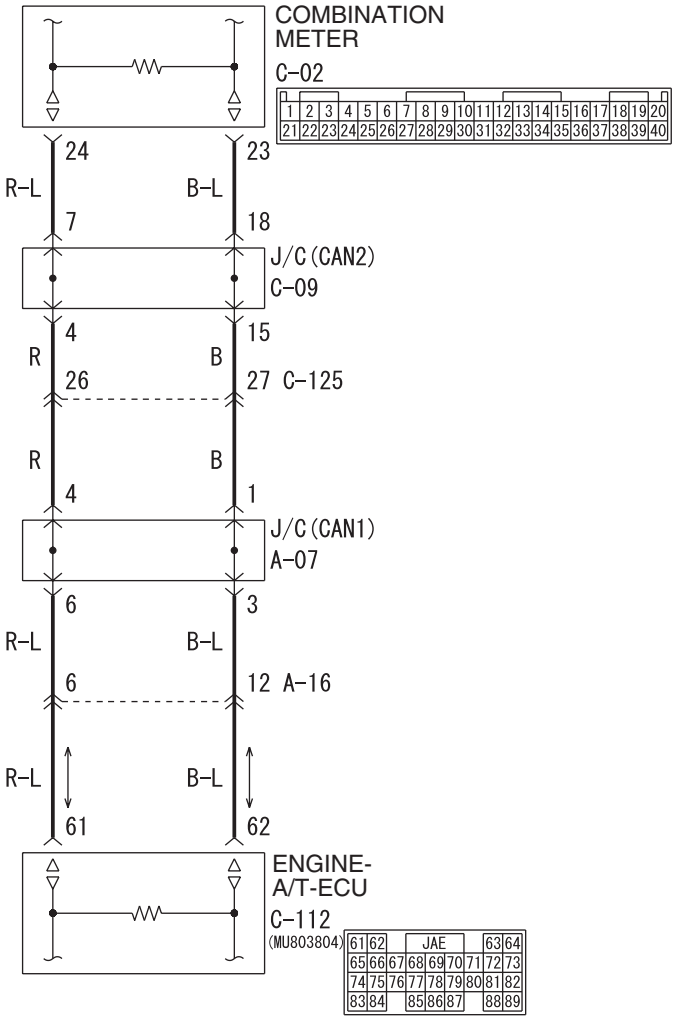
Check the output line for short-circuited or open circuit.

Q: Is the check result normal?

YES : Go to Step 4.
NO : Repair the wiring harness.

INSPECTION PROCEDURE 17: Abnormal shift indicator display

Communication circuit (CAN communication line) between engine-A/T-ECU and combination meter



Wire colour code
B : Black LG : Light green G : Green L : Blue W : White Y : Yellow SB : Sky blue
BR : Brown O : Orange GR : Gray R : Red P : Pink V : Violet

W4X23E009A

OPERATION

The engine-A/T-ECU detects the shift range (sport mode) which the driver has selected, and sends the information to the combination meter.

COMMENTS ON TROUBLE SYMPTOM

Connector(s) or wiring harness in the CAN bus lines between the engine-A/T-ECU and the combination meter, the power supply system to the engine-A/T-ECU, the combination meter, or the engine-A/T-ECU may be defective.

Possible causes

- The communication line is defective.
- Malfunction of shift switch assembly
- Malfunction of the combination meter
- Malfunction of the engine-A/T-ECU

DIAGNOSIS

STEP 1. MUT-III diagnosis code

Either of diagnosis codes 27 or 28 is set, inhibitor switch is defective.

Q: Are diagnosis codes 27 or 28 output?

YES <diagnosis code 27 is set> : Refer to diagnosis code 27: Inhibitor switch system P.23A-52.
YES <diagnosis code 28 is set> : Refer to diagnosis code 28: Inhibitor switch system P.23A-59.
NO : Go to Step 2.

STEP 2. MUT-III data list
- Item 67: Select switch
- Item 68: Upshift switch
- Item 69: Downshift switch

Check the above data list. (Refer to data list reference table P.23A-117.)

Q: Is the check result normal?
YES : Go to Step 3.
NO : Refer to inspection procedure 16: shift switch assembly system P.23A-100.

STEP 3. MUT-III CAN bus diagnostics
Use the MUT-III to diagnose the CAN bus lines.

Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the CAN bus lines.(Refer to G.54D – DiagnosisP.54D-16)

STEP 4. MUT-III actuator test
Execute combination meter actuator test.
- Item A2: All shift position indicator lamps illuminate.
- Item A3: All shift position indicator lamps go out.

OK: All shift position indicator lamps illuminate or go out.

Q: Is the check result normal?
YES : Go to Step 5.
NO : Replace the combination meter.

STEP 5. Replace the engine-A/T-ECU.
Replace the engine-A/T-ECU and check the trouble symptom.

Q: Is the check result normal?
YES : The inspection is complete.
NO : Replace the combination meter.

DATA LIST REFERENCE TABLE

M1231008100393

Data list No.	Check item	Inspection conditions		Normal condition
0000	Crank angle sensor	Engine: Idling Selector lever position: P	Compare the engine speeds displayed on the tachometer and the MUT-III.	Identical
0001	Input shaft speed sensor	Driving at a constant speed of 50 km/h in 3rd		1,800 – 2,100 r/min
0002	Output shaft speed sensor	Driving at a constant speed of 50 km/h in 3rd		1,800 – 2,100 r/min
11	TPS	Ignition switch: ON Engine: Stopped	Accelerator pedal: Fully closed	300 – 700 mV
			Accelerator pedal: Depressed	Gradually increases from the above value.
			Accelerator pedal: Fully open	4,000 mV or more
15	A/T fluid temperature sensor	Driving after engine has warmed up		Gradually increases.
26	Stop lamp switch	Brake pedal: Depressed		ON
		Brake pedal: Released		OFF
29	Vehicle speed signal	Idling in 1st (Vehicle stopped)		0 km/h
		Driving at a constant speed of 50 km/h in 3rd		50 km/h

Data list No.	Check item	Inspection conditions		Normal condition
31	LR solenoid valve duty ratio	Driving at a constant speed of 10 km/h in 1st		0 %
		Driving at a constant speed of 20 km/h in 2nd		100 %
		Driving at a constant speed of 30 km/h in 3rd		100 %
		Driving at a constant speed of 50 km/h in 4th		100 %
32	UD solenoid valve duty ratio	Driving at a constant speed of 10 km/h in 1st		0 %
		Driving at a constant speed of 20 km/h in 2nd		0 %
		Driving at a constant speed of 30 km/h in 3rd		0 %
		Driving at a constant speed of 50 km/h in 4th		100 %
33	2ND solenoid valve duty ratio	Driving at a constant speed of 10 km/h in 1st		100 %
		Driving at a constant speed of 20 km/h in 2nd		0 %
		Driving at a constant speed of 30 km/h in 3rd		100 %
		Driving at a constant speed of 50 km/h in 4th		0 %
34	OD solenoid valve duty ratio	Driving at a constant speed of 10 km/h in 1st		100 %
		Driving at a constant speed of 20 km/h in 2nd		100 %
		Driving at a constant speed of 30 km/h in 3rd		0 %
		Driving at a constant speed of 50 km/h in 4th		0 %
36	DCC solenoid valve duty ratio	Driving at a constant speed 60 km/h in 3rd gear		70 – 99.6 %
		Driving at 60 km/h in 3rd gear, then fully close the accelerator pedal		70 – 99.6 % to 0 %
40	INVECS-II cancel command	INVECS-II activated		ON
		INVECS-II not activated		OFF
52	Damper clutch amount of slippage	Driving at a constant speed 60 km/h in 3rd gear		–10 to 10 r/min
		Driving at 60 km/h in 3rd gear, then fully close the accelerator pedal		The value changes from the above value.
54	A/T control relay output voltage	Ignition switch: ON		System voltage
58	Engine intake manifold negative pressure	Engine: Idling Selector lever position: N, P	Accelerator pedal: fully closed to depressed	Data changes
61	Inhibitor switch	Ignition switch: ON Engine: Stopped	Selector lever position: P	P
			Selector lever position: R	R
			Selector lever position: N	N
			Selector lever position: D	D

Data list No.	Check item	Inspection conditions		Normal condition
63	Shift position	Selector lever position: Sport mode	Driving at a constant speed of 10 km/h in 1st	1st
			Driving at a constant speed of 20 km/h in 2nd	2nd
			Driving at a constant speed of 50 km/h in 3th	3rd
			Driving at a constant speed of 60 km/h in 4th	4th
		Selector lever position: P	Driving at a constant speed of 5 km/h in reverse	P, N
		Selector lever position: R	Driving at a constant speed of 5 km/h in reverse	REV
		Selector lever position: N	Driving at a constant speed of 5 km/h in reverse	P, N
65	A/C compressor relay	Engine: Idling	A/C switch: ON	ON
			A/C switch: OFF	OFF
67	Select switch	Ignition switch: ON Engine: Stopped	Selector lever position: D	OFF
			Selector lever position: Select sport mode	ON
			Selector lever position: Upshift and hold the selector lever	ON
			Selector lever position: Downshift and hold the selector lever	ON
68	Upshift switch	Ignition switch: ON Engine: Stopped	Selector lever position: D	OFF
			Selector lever position: Select sport mode	OFF
			Selector lever position: Upshift and hold the selector lever	ON
			Selector lever position: Downshift and hold the selector lever	OFF
69	Downshift switch	Ignition switch: ON Engine: Stopped	Selector lever position: D	OFF
			Selector lever position: Select sport mode	OFF
			Selector lever position: Upshift and hold the selector lever	OFF
			Selector lever position: Downshift and hold the selector lever	ON

ACTUATOR TEST JUDGMENT VALUE

M1231008200367

Item No.	Inspection item	Test description	Inspection condition	Normal status
01	LR solenoid valve	Actuate solenoid valve indicated by MUT-III for 5 seconds at duty ratio of 50%. Other remaining solenoid valve are not ON.	Ignition switch: ON Selector lever position: P Engine: Stopped Accelerator pedal: Released	When solenoid valve is actuated, operating sound is audible.
02	UD solenoid valve			
03	2ND solenoid valve			
04	OD solenoid valve			
06	DCC solenoid valve			
07	1st indicator lamp	Illuminate shift indicator indicated by MUT-III for 3 seconds		Shift indicator is displayed.
08	2nd indicator lamp			
09	3rd indicator lamp			
10	4th indicator lamp			
12	A/T control relay	A/T control relay is OFF for three seconds.		Data list No.54 During test: 0 V Normal: System voltage (V)

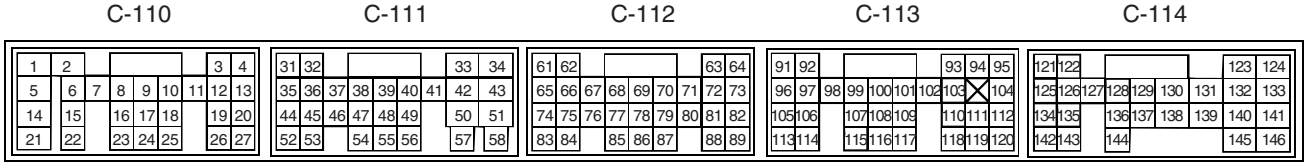
INVECS-II CANCEL COMMAND

M1231009500349

Item No.	Item	Contents	NOTE
14	INVECS-II	Stop the INVECS-II control and changes gear according to the standard shift pattern.	Use this procedure when carrying out road test procedure 8. If the ignition switch is turned from OFF to ON to OFF, this function restores the INVECS-II control.

CHECK AT ENGINE-A/T-ECU TERMINALS

M1231008400372



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Terminal No.	Check item	Inspection condition	Standard value
39	Stoplamp switch	• Brake pedal: Depressed	System voltage
		• Brake pedal: Released	1 V or less
64	Input shaft speed sensor	• Measure between terminals 64 and 88 with an oscilloscope. • Engine: 2,000 r/min • Selector lever position: Sport mode (3rd gear)	Refer to P.23A-123, Inspection Procedure Using an Oscilloscope.

Terminal No.	Check item	Inspection condition	Standard value
66	Inhibitor switch: P	• Ignition switch: ON • Selector lever position: P	System voltage
		• Ignition switch: ON • Selector lever position: Other than above	1 V or less
67	Inhibitor switch: R	• Ignition switch: ON • Selector lever position: R	System voltage
		• Ignition switch: ON • Selector lever position: Other than above	1 V or less
68	Shift switch (Down)	• Ignition switch: ON • Selector lever operation: Downshift and hold the selector lever	System voltage
		• Ignition switch: ON • Selector lever operation: Other than above	1 V or less
70	Crankshaft position sensor	Engine: Idling	1.5 – 2.5 V
73	Output shaft speed sensor	• Measure between terminals 73 and 88 with an oscilloscope. • Engine: 2,000 r/min • Selector lever position: Sport mode (3rd gear)	Refer to P.23A-123, Inspection Procedure Using an Oscilloscope.
75	Inhibitor switch: N	• Ignition switch: ON • Selector lever position: N	System voltage
		• Ignition switch: ON • Selector lever position: Other than above	1 V or less
76	Inhibitor switch: D	• Ignition switch: ON • Selector lever position: D	System voltage
		• Ignition switch: ON • Selector lever position: Other than above	1 V or less
77	Shift switch (Up)	• Ignition switch: ON • Selector lever operation: Upshift and hold the selector lever	System voltage
		• Ignition switch: ON • Selector lever operation: Other than above	1 V or less
79	Vehicle speed signal	• Measure between terminals 79 and earth with an oscilloscope. • Engine: 2,000 r/min • Selector lever position: Sport mode (3rd gear)	Refer to P.23A-123, Inspection Procedure Using an Oscilloscope.

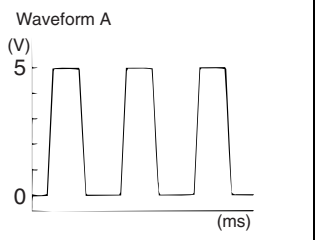
Terminal No.	Check item	Inspection condition	Standard value
85	Select switch	• Ignition switch: ON • Selector lever position: Sport mode	System voltage
		• Ignition switch: ON • Selector lever position: Other than above	1 V or less
119	A/T fluid temperature sensor	• Ignition switch: ON • A/T fluid temperature: 20°C	3.8 – 4.0 V
		• Ignition switch: ON • A/T fluid temperature: 40°C	3.2 – 3.4 V
		• Ignition switch: ON • A/T fluid temperature: 80°C	1.7 – 1.9 V
123	Solenoid valve power supply	Ignition switch: LOCK (OFF)	1 V or less
		Ignition switch: ON	System voltage
124	Solenoid valve power supply	Ignition switch: LOCK (OFF)	1 V or less
		Ignition switch: ON	System voltage
127	A/T control relay	Always	1 V or less
128	LR solenoid valve	• Engine: Idling • Selector lever position: P	System voltage
		• Engine: Idling • Selector lever position: Sport mode (2nd gear)	6 – 9 V
130	DCC clutch solenoid valve	• Engine: Idling • Selector lever position: P	System voltage
131	Earth	Always	1 V or less
136	2ND solenoid valve	• Engine: Idling • Selector lever position: Sport mode (2nd gear)	System voltage
		• Engine: Idling • Selector lever position: P	6 – 9 V
137	UD solenoid valve	• Engine: Idling • Selector lever position: Sport mode (1st gear)	System voltage
		• Engine: Idling • Selector lever position: P	6 – 9 V
138	OD solenoid valve	• Engine: Idling • Selector lever position: Sport mode (3rd gear)	System voltage
		• Engine: Idling • Selector lever position: P	6 – 9 V
139	Earth	Always	1 V or less

OSCILLOSCOPE INSPECTION PROCEDURE

M1231008500379

Terminal No.	Check item	Inspection conditions		Normal condition (Waveform sample)
70	Crank angle sensor	Selector lever position: P	Engine: Idling (vehicle stopped)	Waveform A
79	Vehicle speed signal	Selector lever position: Sport mode (3rd gear)	Driving at constant speed of 50 km/h in 3rd gear (1,400 – 1,700 r/min)	
64	Input shaft speed sensor			Waveform B
73	Output shaft speed sensor			
128	LR solenoid valve	• Ignition switch: ON • Selector lever position: P • Engine: Stopped • Throttle (Accelerator) opening voltage: 1 V or less	Force drive each solenoid valve (Actuator test)	Waveform C
137	UD solenoid valve			
136	2ND solenoid valve			
138	OD solenoid valve			
130	DCC solenoid valve			

WAVEFORM SAMPLE



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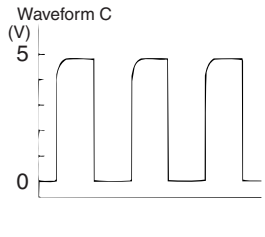

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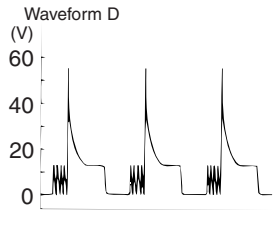

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TROUBLESHOOTING <A/T KEY INTERLOCK AND SHIFT LOCK MECHANISMS>

TROUBLE SYMPTOM CHART

M1232001800510

Symptom	Inspection procedure number	Reference page
When the ignition key is at a position other than the LOCK (OFF) position, the selector lever can be moved from the P to the R position even though the brake pedal is not depressed.	1	P.23A-124
When the ignition key is at a position other than the LOCK (OFF) position, the selector lever cannot be moved from the P to the R position even though the brake pedal is being depressed.	2	P.23A-124
The ignition key is at the LOCK (OFF) position, but the selector lever can be moved from the P to the R position when the brake pedal is depressed.	3	P.23A-124

Symptom	Inspection procedure number	Reference page
The selector lever cannot be easily moved from the P to the R position.	4	P.23A-125
The selector lever cannot be moved from the R to the P position.	5	P.23A-125
The ignition key cannot be turned to the LOCK (OFF) position when the selector lever is at the P position.	6	P.23A-125
The ignition key can be turned to the LOCK (OFF) position when the selector lever is at a position other than the P position.	7	P.23A-125

SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1: When the ignition key is at a position other than the LOCK (OFF) position, the selector lever can be moved from the P to the R position even though the brake pedal is not depressed.

COMMENTS ON TROUBLE SYMPTOM
The cause is probably a malfunction of the selector lever assembly lock cam or shift lock cable.

POSSIBLE CAUSES
- Malfunction of lock cam
- Malfunction of shift lock cable

DIAGNOSIS
Check by referring to the possible causes.

INSPECTION PROCEDURE 2: When the ignition key is at a position other than the LOCK (OFF) position, the selector lever cannot be moved from the P to the R position even though the brake pedal is being depressed.

COMMENTS ON TROUBLE SYMPTOM
The cause is probably a malfunction of the selector lever assembly, transmission control cable, shift lock cable, key interlock cable or engine starting switch assembly.

POSSIBLE CAUSES
- Malfunction of selector lever assembly
- Malfunction of transmission control cable
- Malfunction of shift lock cable
- Malfunction of key interlock cable
- Malfunction of engine starting switch assembly

DIAGNOSIS
Check by referring to the possible causes.

INSPECTION PROCEDURE 3: The ignition key is at the LOCK (OFF) position, but the selector lever can be moved from the P to the R position when the brake pedal is depressed.

COMMENTS ON TROUBLE SYMPTOM
The cause is probably a malfunction of the key interlock cable, selector lever assembly or engine starting switch assembly.

POSSIBLE CAUSES
- Malfunction of key interlock cable
- Malfunction of selector lever assembly
- Malfunction of engine starting switch assembly

DIAGNOSIS
Check by referring to the possible causes.

INSPECTION PROCEDURE 4: The selector lever cannot be easily moved from the P to the R position.

COMMENTS ON TROUBLE SYMPTOM
The cause is probably a malfunction of the selector lever assembly, transmission control cable, shift lock cable, key interlock cable or engine starting switch assembly.

POSSIBLE CAUSES
- Malfunction of selector lever assembly
- Malfunction of transmission control cable
- Malfunction of shift lock cable
- Malfunction of key interlock cable
- Malfunction of engine starting switch assembly

DIAGNOSIS
Check by referring to the possible causes.

INSPECTION PROCEDURE 5: The selector lever cannot be moved from the R to the P position.

COMMENTS ON TROUBLE SYMPTOM
The cause is probably a malfunction of the selector lever assembly or transmission control cable.

POSSIBLE CAUSES
- Malfunction of selector lever assembly
- Malfunction of transmission control cable

DIAGNOSIS
Check by referring to the possible causes.

INSPECTION PROCEDURE 6: The ignition key cannot be turned to the LOCK (OFF) position when the selector lever is at the P position.

COMMENTS ON TROUBLE SYMPTOM
The cause is probably a malfunction of the selector lever assembly, key interlock cable or engine starting switch assembly.

POSSIBLE CAUSES
- Malfunction of selector lever assembly
- Malfunction of key interlock cable
- Malfunction of engine starting switch assembly

DIAGNOSIS
Check by referring to the possible causes.

INSPECTION PROCEDURE 7: The ignition key can be turned to the LOCK (OFF) position when the selector lever is at a position other than the P position.

COMMENTS ON TROUBLE SYMPTOM
The cause is probably a malfunction of the key interlock cable or engine starting switch assembly.

POSSIBLE CAUSES
- Malfunction of key interlock cable
- Malfunction of engine starting switch assembly

DIAGNOSIS
Check by referring to the possible causes.

ON-VEHICLE SERVICE

ESSENTIAL SERVICE

AUTOMATIC TRANSMISSION FLUID (ATF) CHECK

M1231000900362

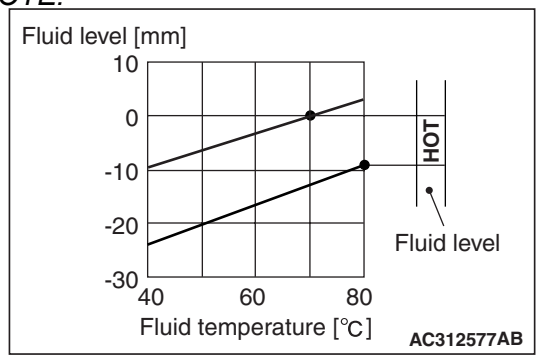
⚠ CAUTION

When replacing the transmission with a new one, overhauling the existing transmission, or driving in a harsh condition, the A/T fluid cooler line should always be flushed out and A/T fluid should be replaced with a new one.

1. Drive the vehicle until the A/T fluid temperature reaches the normal temperature (70 – 80°C)

   NOTE: Measure A/T fluid temperature using MUT-III.

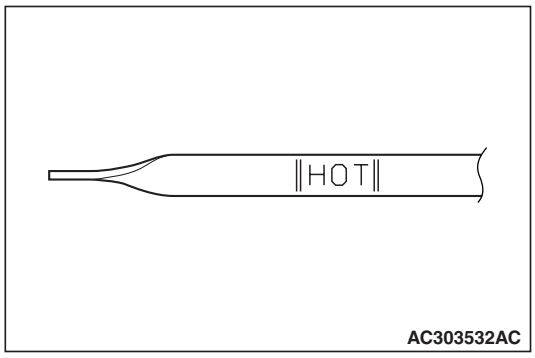
   NOTE:



   Check the oil level referring to the characteristics chart shown at left if it takes some time to reach the normal operation temperature of A/T fluid (70 – 80°C).

2. Park the vehicle on a level surface.
3. Move the selector lever to all positions to fully charge the torque converter and the fluid lines with A/T fluid, and then move the selector lever to the N position.
4. After wiping away any dirt from around the oil level gauge, pull out the oil level gauge and check the level of A/T fluid.

   NOTE: If the A/T fluid has a burnt smell, or if it has become very contaminated or dirty, it means that the A/T fluid has become contaminated by minute particles form bushings (metal) or worn parts. In such a case, the transmission needs to be overhauled and the A/T fluid cooler line needs to be flushed out.



5. Check that the A/T fluid level is between the HOT marks on the oil level gauge. If the A/T fluid level is too low, add more A/T fluid until the level reaches between the HOT marks.

   Automatic transmission fluid: DIA QUEEN ATF SP III

   NOTE: If the A/T fluid level is too low, the oil pump draws air into the system along with the A/T fluid, and air bubbles will thus from in the fluid circuit. This will cause a drop in fluid pressure and cause the shift points to change and the clutches and brakes to slip. If the A/T fluid level is too high, the gear will churn the A/T fluid and cause bubbles to develop, which can then cause the same problems as when the A/T fluid is too low. In either case, the air bubbles can cause overheating and oxidation of the A/T fluid, and also prevent the valves, clutches and brakes from operating normally. In addition, if bubbles develop in the A/T fluid, the A/T fluid can overflow from the transmission vent holes and be mistaken for leaks.

6. Securely re-insert the oil level gauge.

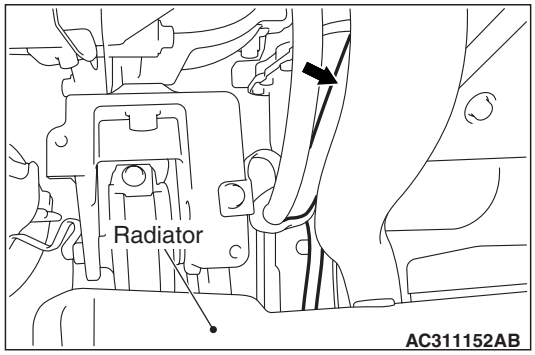
AUTOMATIC TRANSMISSION FLUID (ATF) REPLACEMENT

M1231001000351

⚠ CAUTION

Before replacing the transmission with a new one, overhauling the existing transmission, or connecting the cooler pipe to the transmission, the A/T fluid cooler line should always be flushed out.

In you have an A/T fluid changer, use the A/T fluid changer to flush the A/T fluid. If you do not have an A/T fluid changer, follow the procedure given below.



1. Remove the hose shown in the illustration which allows the A/T fluid to flow from the A/T fluid cooler (built into the radiator) to the transmission.

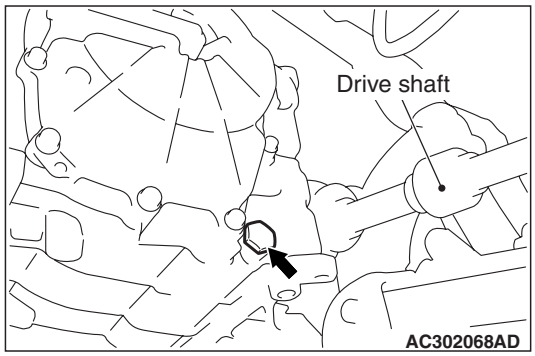
⚠ CAUTION

The engine should be stopped within one minute of it being started. If the A/T fluid has all been discharged before this, stop the engine at that point.

2. Start the engine and discharge the A/T fluid.

   Driving conditions: N range, idling

   Discharge amount: Approx. 3.5 L



3. Remove the drain plug at the bottom of the transmission case to drain out the remaining A/T fluid.

   Discharge amount: Approx. 2.0 L

4. Install the drain plug with a gasket in between, and tighten it to the specified torque.

   Tightening torque: 32 ± 2 N·m

⚠ CAUTION

Stop pouring in the A/T fluid once 5.5 L has been poured in.

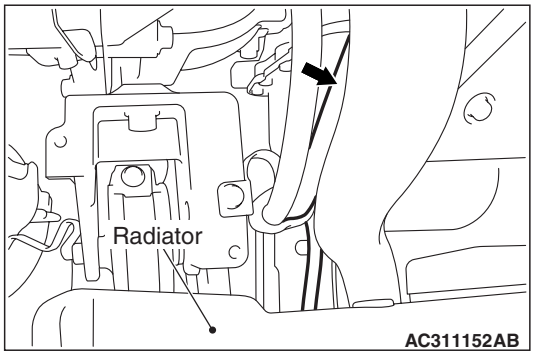
5. Pour in new A/T fluid through the oil filler tube.

   Amount to add: Approx. 5.5 L

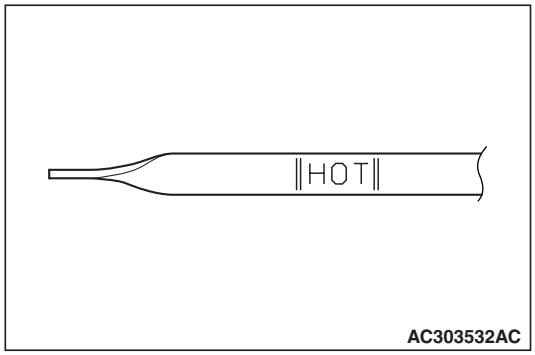
6. Repeat the operation in step 2.
7. Pour in new A/T fluid through the oil filler tube.

   Amount to add: Approx. 3.5 L

   NOTE: Carry out steps 2 and 7 so that at least 8.0 L has been discharged from the cooler hose. After this, discharge a small quantity of A/T fluid and check for contamination. If the A/T fluid is contaminated, repeat steps 6 and 7.



8. Connect the hose which was disconnected in step 1, and then securely re-insert the oil level gauge.
9. Start the engine, and let it run at idle for 1 – 2 minutes.
10. Move the selector lever to all positions once, and then return it to the N position.

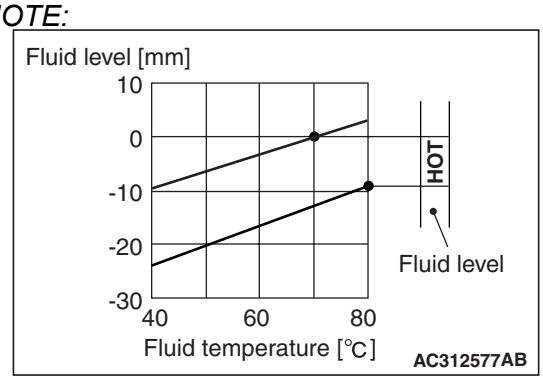


11. Check that the A/T fluid level on the oil level gauge is at the COLD mark. if it is not up to this mark, add more A/T fluid.
12. Drive the vehicle until the A/T Fluid temperature reaches the normal temperature (70 – 80°C), and then re check the A/T fluid level.

    NOTE: The COLD mark is for reference only; the HOT marks should be used as the standard for judgment.

    NOTE: A/T fluid temperature using MUT-III.

NOTE:



Check the oil level referring to the characteristics chart shown at left if it takes some time until reaching the normal operation temperature of A/T fluid (70 – 80℃.)

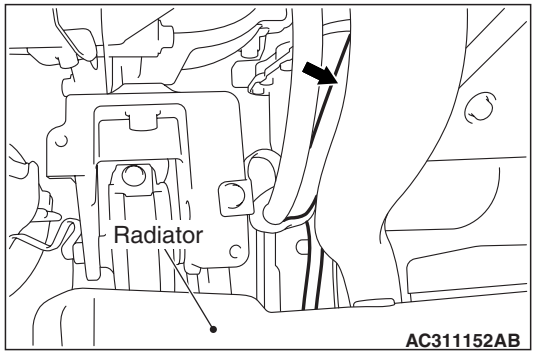
13. When A/T fluid is under the specified level, top up A/T fluid. When A/T fluid is over the specified level, drain the excessive A/T fluid from the drain plug to adjust A/T fluid level to the specified level.
14. Securely insert the oil level gauge into the oil filler tube.

AUTOMATIC TRANSMISSION FLUID COOLER LINE FLUSHING

M1231013000400

⚠ CAUTION

If replacing the transmission with a new one, if overhauling the existing transmission, or if the A/T fluid has deteriorated or is contaminated, the A/T fluid cooler line must always be flushed out.



1. Remove the hose shown in the illustration which allows the A/T fluid to flow from the A/T fluid cooler (built into the radiator) to the transmission.

⚠ CAUTION

The engine should be stopped within one minute of it being started. If the A/T fluid has all been discharged before this, stop the engine at that point.

2. Start the engine and discharge the A/T fluid.

   Driving conditions: N range, idling

   Discharge amount: Approx. 3.5 L

⚠ CAUTION

Stop pouring in the A/T fluid once 3.5 L has been poured in.

3. Pour in new A/T fluid through the oil filler tube.

   Amount to add: Approx. 3.5 L

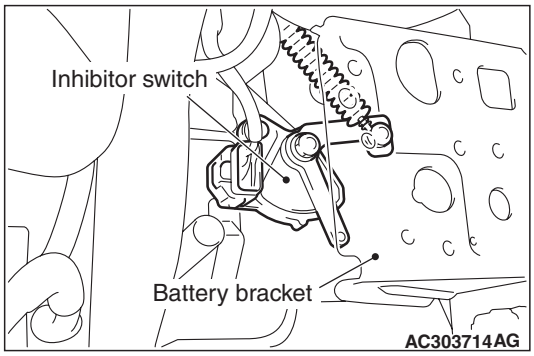
4. Repeat the operation in step 2 and 3.

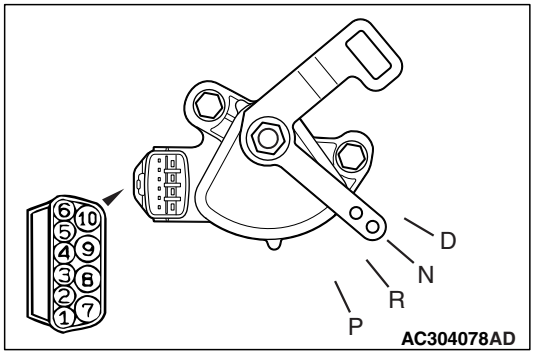
   NOTE: Carry out steps 2 and 3 so that at least 8.0 L has been discharged from the cooler hose. After this, discharge a small quantity of A/T fluid and check for contamination. If the A/T fluid is contaminated, repeat steps 2 and 3.

5. Carry out the procedure in "Automatic Transmission Fluid (ATF) Replacement" from step 2 onwards.

INHIBITOR SWITCH CONTINUITY CHECK

M1231001400627





Item	Terminal No.	Resistance
P	3 – 8, 9 – 10	Less than 2 Ω
R	7 – 8	
N	4 – 8, 9 – 10	
D	1 – 8	

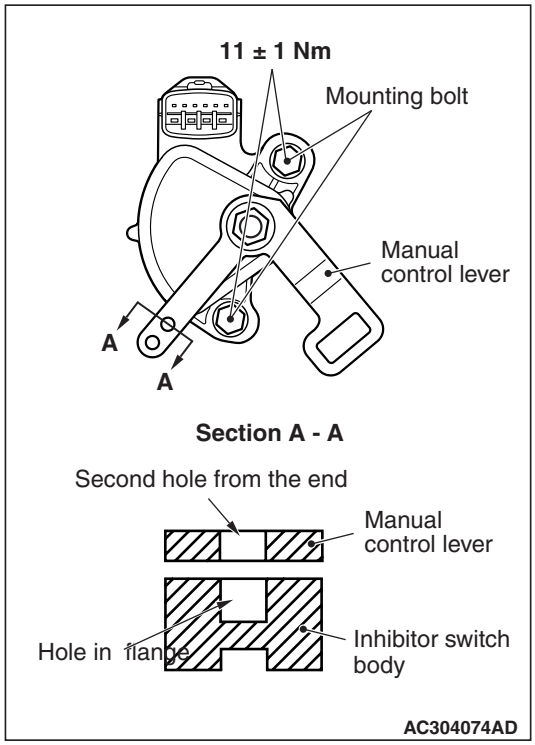
NOTE: The inhibitor switch has 7 positions, but only four positions [P, R, N and D]are used.

INHIBITOR SWITCH AND CONTROL CABLE ADJUSTMENT

M1231010300349

1. Move the selector lever to the N position.

2. Loosen the adjusting nut, and set the manual control lever upper and lower to the free condition.
3. Move the manual control lever lower to the neutral position.



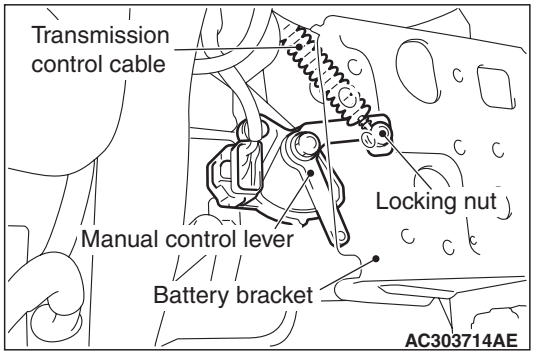
4. Loosen the inhibitor switch body mounting bolts, and then turn the inhibitor switch body to align the second hole from the end of the manual control lever with the hole in the inhibitor switch body flange (section A – A).

NOTE: The inhibitor switch body can be aligned by hand, because the manual control lever end is as wide as the switch body flange. Alternatively, the inhibitor switch can also be aligned by inserting a 5-mm bar in the second hole from the end of the manual control lever and the hole in the inhibitor switch body flange.

⚠ CAUTION
Be careful not let the inhibitor switch body slip out of place.

5. Tighten the inhibitor switch body mounting bolt to the specified torque.

   Tightening torque: 11 ± 1 N·m



6. Tighten the transmission control cable locking nut to the specified torque.

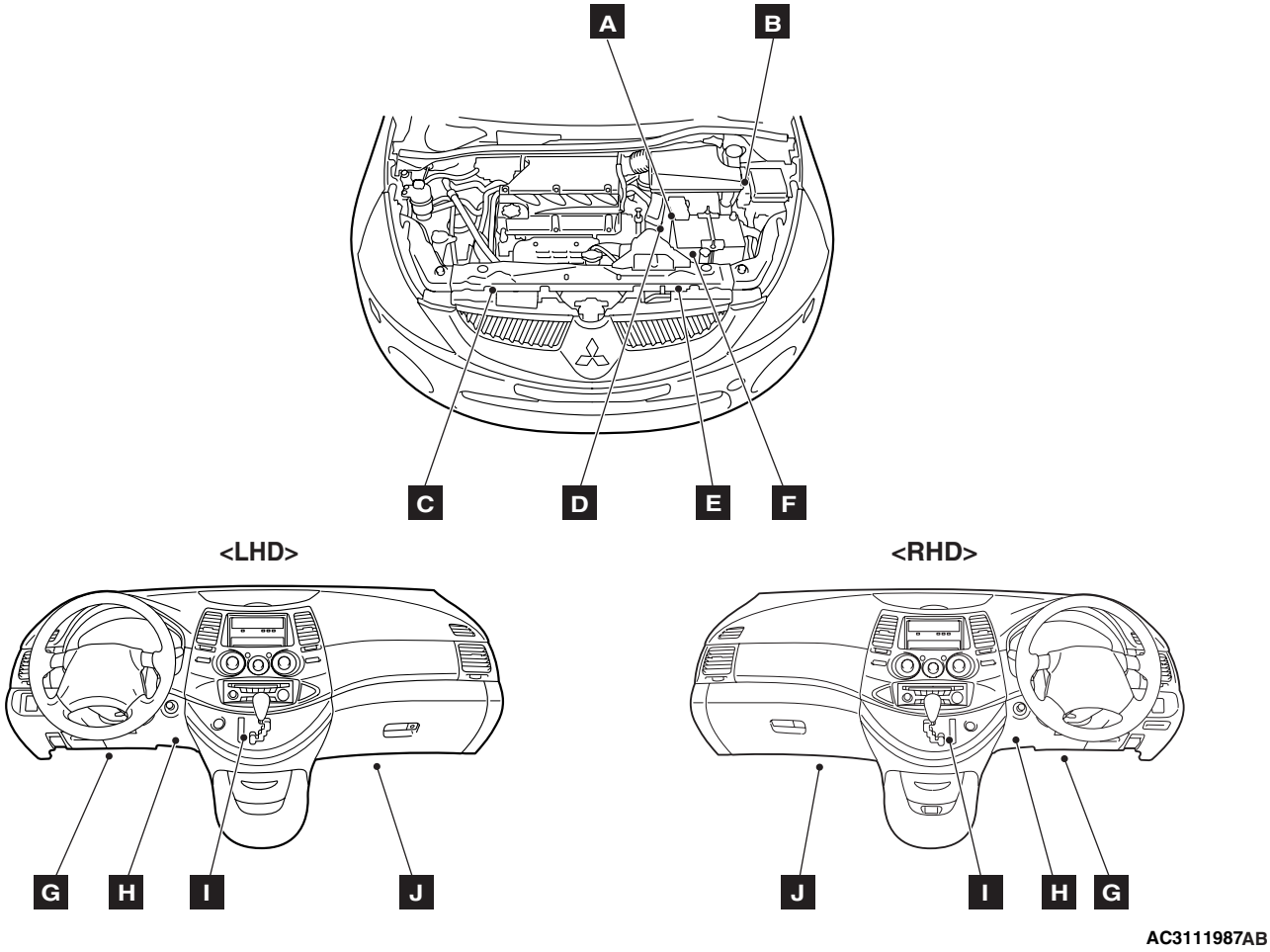
   Tightening torque: 12 ± 2 N·m

7. Check that the selector lever is at the N position.
8. Check that the transmission shifts to the correct range corresponding to the position of the selector lever, and that it functions correctly in that range.

A/T CONTROL COMPONENT LOCATION

M1231008600428

Name	Symbol	Name	symbol
A/C control solenoid valve assembly	E	Inhibitor switch	H
A/T control relay	B	Input shaft speed sensor	E
A/T fluid temperature sensor	E	Output shaft speed sensor	B
Crank angle sensor	F	Shift switch assembly	K
Diagnosis connector	G	Stop lamp switch	H
Engine-A/T-ECU	C		



A/T CONTROL COMPONENT CHECK

INHIBITOR SWITCH CHECK

M1231001400638

Refer to P.23A-128.

CRANK ANGLE SENSOR CHECK

M1231009000430

Refer to GROUP 13 – Troubleshooting, Inspection Procedure using an Oscilloscope P.13A-378.

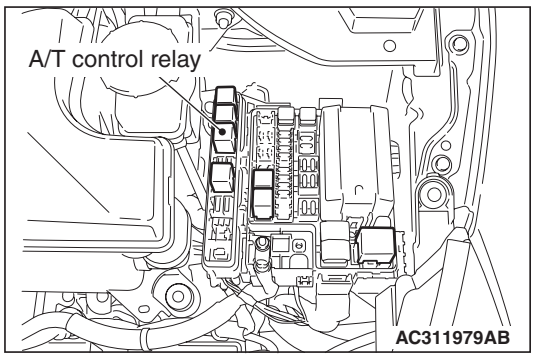
STOP LAMP SWITCH CHECK

M1231010100130

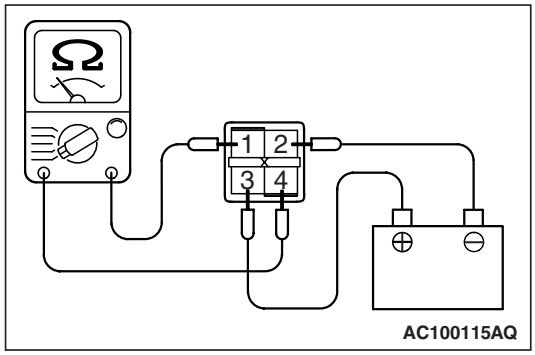
Refer to GROUP 35A – Brake pedal, Inspection P.35A-13.

A/T CONTROL RELAY CHECK

M1231009300301



1. Removal the A/T control relay.



2. Use the jumper leads to connect A/T control relay terminal 2 to the negative battery terminal and terminal 3 to the positive battery terminal.
3. Check the continuity between A/T control relay connector terminals 1 and 4 while alternately connecting and disconnecting the jumper leads from the battery terminals.

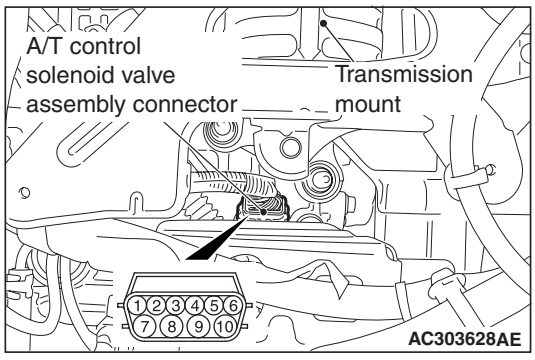
Jumper leads	Continuity between terminals 1 and 4
Connected	Less than 2 Ω
Disconnected	Open circuit

4. If there is a malfunction, replace the A/T control relay.

A/T CONTROL SOLENOID VALVE ASSEMBLY CHECK

M1231009400320

1. Use the MUT-III to measure the ATF temperature and check that the ATF temperature is 20°C.

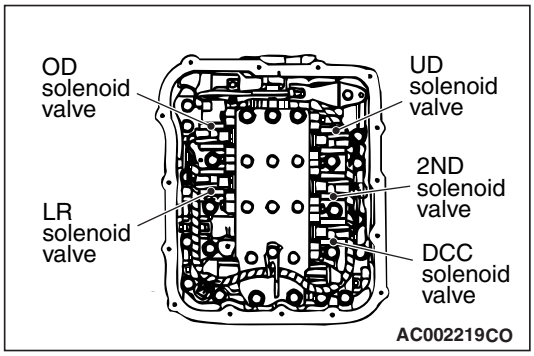


2. Disconnect the A/T control solenoid valve assembly connector.
3. Measure the resistance between the solenoid valve terminals.
4. Check that the measured values are within the standard values at items 1 and 3.

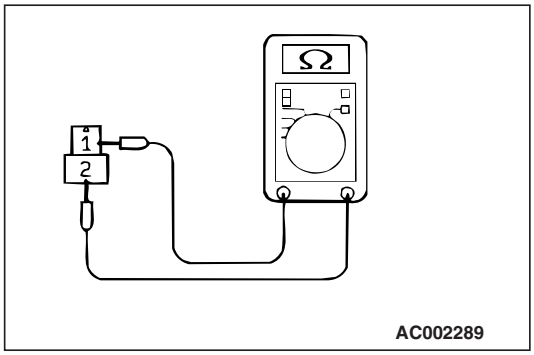
Standard value:

Name	Terminal No.	Resistance value
Damper clutch control solenoid valve	7 – 10	2.7 – 3.4 Ω (A/T fluid temperatur e 20°C)
Low-reverse solenoid valve	6 – 10	
Second solenoid valve	4 – 9	
Underdrive solenoid valve	3 – 9	
Overdrive solenoid valve	5 – 9	

5. If within the standard value, check the power supply and the earth circuits.
6. If not within the standard value, drain the ATF and remove the valve body cover.



7. Disconnect the solenoid valve connectors.



8. Measure the resistance between terminals 1 and 2 at each solenoid valve side.

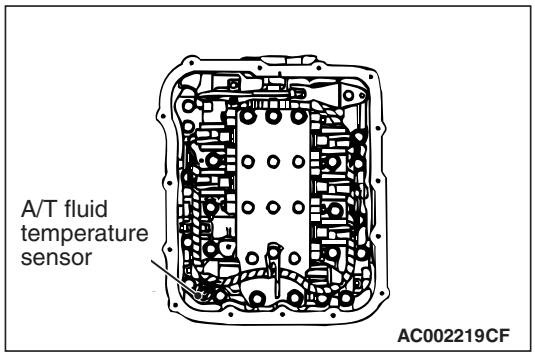
   Standard value: 2.7 – 3.4 Ω (A/T fluid temperature 20°C)

9. If not within the standard value, replace the solenoid valve.
10. If within the standard value, check the harness wire between A/T control solenoid valve assembly connector and each solenoid valve connector. If a problem is not found at the steps above, check the solenoid valve O-rings and replace if necessary.

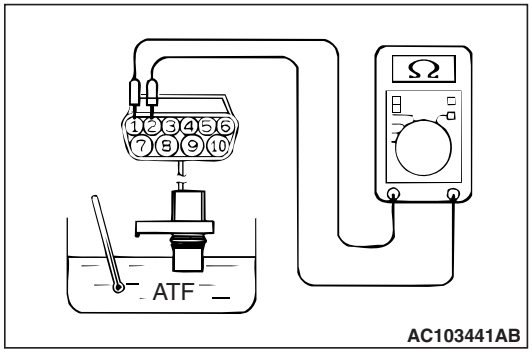
A/T FLUID TEMPERATURE SENSOR CHECK

M1231004500300

1. Drain the ATF and remove the valve body cover.



2. Remove the A/T fluid temperature sensor.



3. Measure the resistance between A/T control solenoid valve assembly connector terminals 1 and 2.

Standard value:

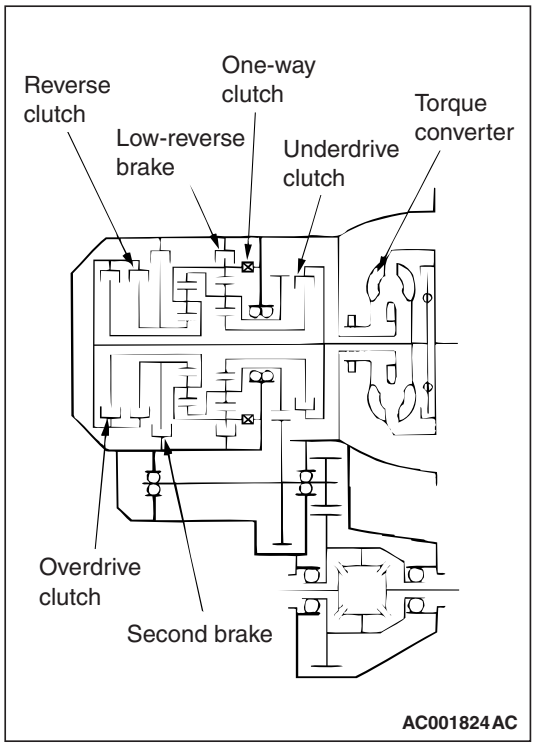
Fluid temperature (°C)	Resistance value (Ω)
0	16.7 – 20.5
20	7.3 – 8.9
40	3.4 – 4.2
60	1.9 – 2.2
80	1.0 – 1.2
100	0.57 – 0.69

NOTE: The A/T fluid temperature warning lamp on the combination meter flashes when the temperature reaches approximately 125 °C or higher and then stops flashing when the temperature drops below approximately 115 °C.

4. If the A/T fluid temperature sensor resistance and the temperature when the N range indicator is flashing or switched off are outside the standard value ranges, replace the A/T fluid temperature sensor.

TORQUE CONVERTER STALL TEST

M1231005400425



The purpose of this test is to measure the maximum engine speed when the torque converter stalls in D or R ranges in order to check the torque converter (Stator and one-way clutch operation) and the holding performance of the clutches and brakes which are built into the transmission.

⚠ *WARNING*

For safety, the front and rear of the vehicle should be kept clear of other people while this test is being carried out.

1. Check the A/T fluid level, the A/T fluid temperature and the engine coolant temperature.
   - A/T fluid level: HOT position on oil level gauge
   - A/T fluid temperature: 70 – 80°C
   - Engine coolant temperature: 80 – 100°C

   NOTE: The A/T fluid temperature is measured with MUT-III.
2. Place wheel locks on both the left and right front wheels.
3. Pull the parking brake lever to apply the parking brake and depress the brake pedal fully.
4. Start the engine.

⚠ CAUTION

- **Do not keep the throttle fully open for any longer than 5 seconds.**
- **If you repeat the stall test when the A/T fluid temperature is greater than 80°C, move the selector lever to the "N" position and let the engine run at approximately 1,000 r/min for at least one minute. Wait until the A/T fluid temperature returns to 80°C or less.**

5. Move the selector lever to the D position, fully depress the accelerator pedal and quickly take a reading of the maximum engine speed at this time.

   Standard stalling engine speed: 2, 300 – 2, 800 r/min

6. Move the selector lever to the R position and repeat the test described above.

   Standard stalling engine speed: 2, 300 – 2, 800 r/min

TORQUE CONVERTER STALL TEST JUDGMENT RESULTS

1. Stall speed is too high in both D and R ranges
   - Malfunction of the torque converter (Slippage on the splines of the torque converter and the input shaft)
   - Low line pressure
   - Low-reverse brake slippage and malfunction of the one-way clutch
2. Stall speed is too high in D range only
   - Underdrive clutch slippage
3. Stall speed is too high in R range only
   - Reverse clutch slippage
4. Stall speed is too low in both D and R ranges
   - Malfunction of the torque converter (Slippage of the one-way clutch)
   - Low line pressure
   - Poor engine output

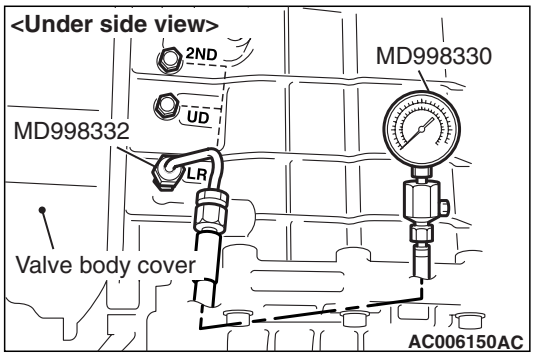
HYDRAULIC PRESSURE TESTS

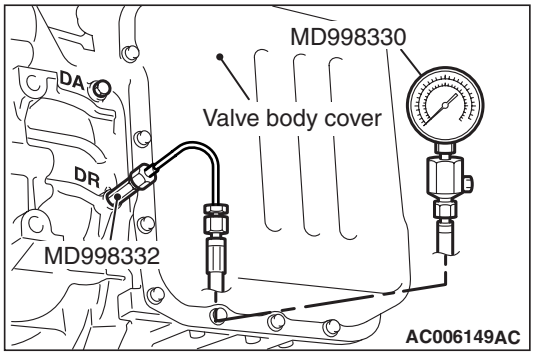
M1231005500455

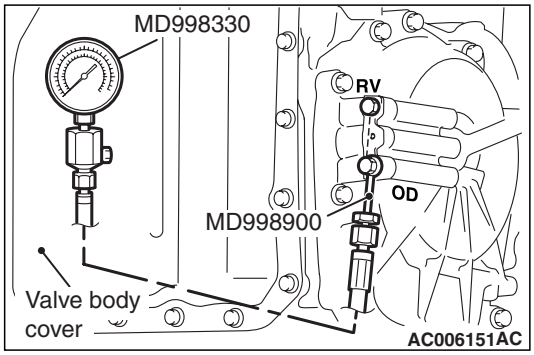
⚠ CAUTION

The transmission fluid temperature should be between 70 – 80°C during the test.

1. Check the transmission fluid level, temperature and engine coolant temperature.
   - Transmission fluid level: HOT mark on the dipstick
   - Transmission fluid temperature: 70 – 80°C
   - Engine coolant temperature: 80 – 100°C
2. Raise the vehicle so that the wheels are free to turn.







3. Connect the special tools (oil pressure gauge (3.0 MPa) [MD998330] and adapters [MD998332, MD998900]) to each pressure discharge port.

   NOTE:
   - *2ND: Second brake pressure port*
   - *UD: Underdrive clutch pressure port*
   - *LR: Low-reverse brake pressure port*
   - *DR: Torque converter release pressure port*
   - *DA: Torque converter apply pressure port*
   - *RV: Reverse clutch pressure port*
   - *OD: Overdrive clutch pressure port*

4. Restart the engine.
5. Check that there are no leaks around the special tool port adapters.
6. Measure the hydraulic pressure at each port under the conditions given in the standard hydraulic pressure table, and check that the measured values are within the standard value ranges.

7. If the pressure is not within the standard value, stop the engine and refer to the hydraulic pressure test diagnosis table.
8. Remove the O-ring from the port plug and replace it.
9. Remove the special tool, and install the plugs to the hydraulic pressure ports.
10. Start the engine and check that there are no leaks around the plugs.

STANDARD HYDRAULIC PRESSURE TABLE

Measurement condition			Standard hydraulic pressure MPa					
Selector lever position	Shift position	Engine speed (r/min)	Underdrive clutch pressure [UD]	Reverse clutch pressure [RV]	Overdrive clutch pressure [OD]	Low-reverse brake pressure [LR]	Second brake pressure [2ND]	Torque converter pressure [DR]
P	–	2,500	–	–	–	0.31 – 0.39	–	0.22 – 0.36
R	Reverse	2,500	–	1.27 – 1.77	–	1.27 – 1.77	–	0.50 – 0.70
N	–	2,500	–	–	–	0.31 – 0.39	–	0.22 – 0.36
Sport mode	1st gear	2,500	0.95 – 1.06	–	–	0.95 – 1.06	–	0.50 – 0.70
	2nd gear	2,500	0.95 – 1.06	–	–	–	0.95 – 1.06	0.50 – 0.70
	3rd gear	2,500	0.78 – 0.88	–	0.78 – 0.88	–	–	–
	4th gear	2,500	–	–	0.78 – 0.88	–	0.78 – 0.88	–

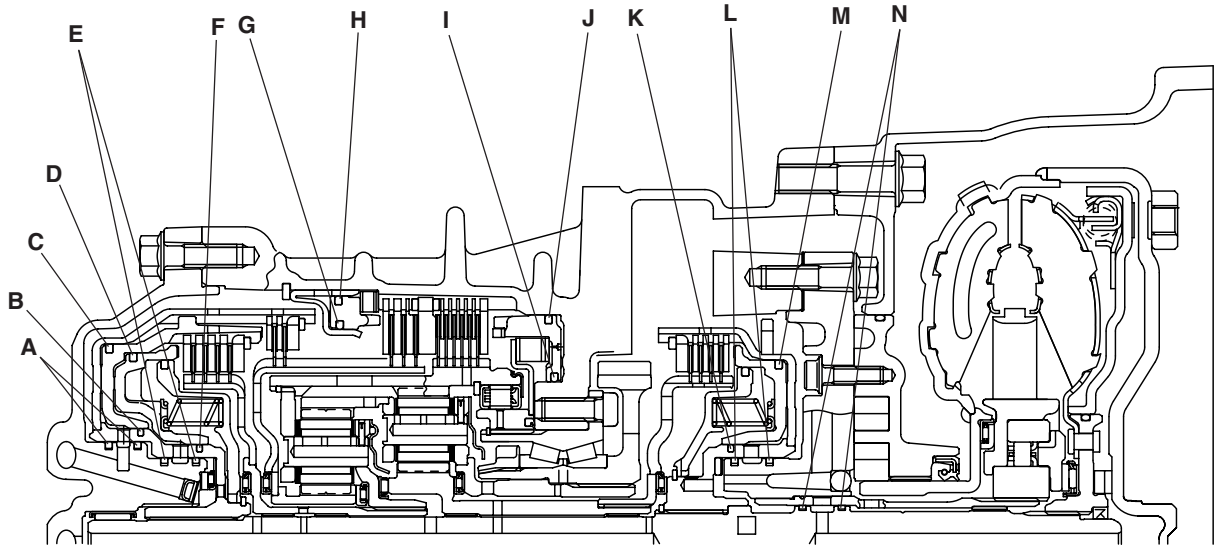
NOTE: When the torque converter pressure is measured, the engine speed should be 1,500 r/min or less.

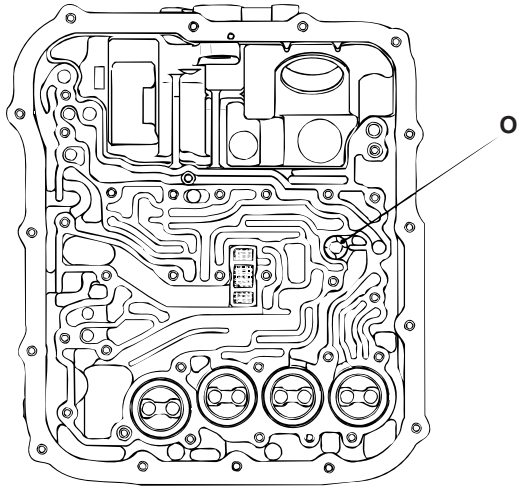
HYDRAULIC PRESSURE TEST DIAGNOSIS TABLE

Trouble symptom	Probable cause
All hydraulic pressures are high.	Malfunction of the regulator valve
All hydraulic pressures are low.	Malfunction of the oil pump
	Clogged internal oil filter
	Clogged oil cooler
	Malfunction of the regulator valve
	Malfunction of the relief valve
	Incorrect valve body installation
	Improperly installed solenoid valves
	Damaged solenoid valve O-rings
Hydraulic pressure is abnormal in 3rd or 4th gear only.	Malfunction of the overdrive solenoid valve
	Malfunction of the overdrive pressure control valve
	Malfunction of the regulator valve
	Malfunction of the switch valve
	Clogged orifice
	Incorrect valve body installation
Only underdrive clutch hydraulic pressure is abnormal.	Malfunction of the oil seal K, L, M
	Malfunction of the underdrive solenoid valve
	Malfunction of the underdrive pressure control valve
	Malfunction of the check ball
	Clogged orifice
	Incorrect valve body installation
	Malfunction of the accumulator for underdrive clutch

Trouble symptom	Probable cause
Only reverse clutch hydraulic pressure is abnormal.	Malfunction of the oil seal A, B, C
	Clogged orifice
	Incorrect valve body installation
	Malfunction of the check ball
Only overdrive clutch hydraulic pressure is abnormal.	Malfunction of the oil seal D, E, F
	Malfunction of the overdrive solenoid valve
	Malfunction of the overdrive pressure control valve
	Malfunction of the check ball
	Clogged orifice
	Incorrect valve body installation
	Malfunction of the accumulator for overdrive clutch
Only low-reverse brake hydraulic pressure is abnormal.	Malfunction of the oil seal I, J
	Malfunction of the low-reverse solenoid valve
	Malfunction of the low-reverse pressure control valve
	Malfunction of the switch valve
	Malfunction of the fail safe valve A
	Malfunction of all the check balls
	Clogged orifice
	Incorrect valve body installation
	Malfunction of the accumulator for low-reverse brake
Only second brake hydraulic pressure is abnormal.	Malfunction of the oil seal G, H, Q
	Malfunction of the second solenoid valve
	Malfunction of the second pressure control valve
	Malfunction of the fail safe valve B
	Clogged orifice
	Incorrect valve body installation
	Malfunction of the accumulator for second brake
Only torque converter pressure is abnormal.	Clogged oil cooler
	Malfunction of the oil seal N
	Malfunction of the damper clutch control solenoid
	Malfunction of the damper clutch pressure control valve
	Clogged orifice
	Incorrect valve body installation
Pressure applied to element which should not receive pressure.	Incorrect transmission control cable adjustment
	Malfunction of the manual valve
	Malfunction of the check ball
	Incorrect valve body installation

OIL SEAL LAYOUT

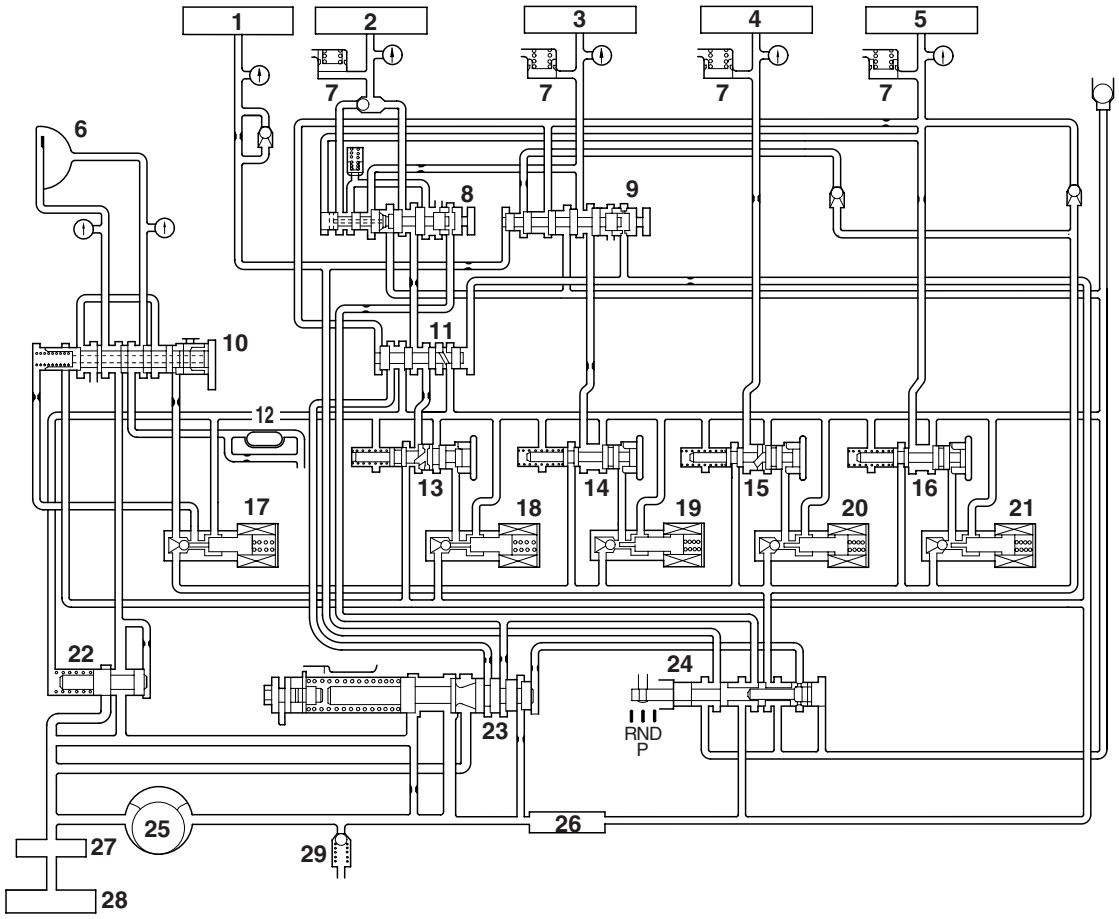




AC103760

HYDRAULIC CIRCUIT

M1231008800392



AC311873AB

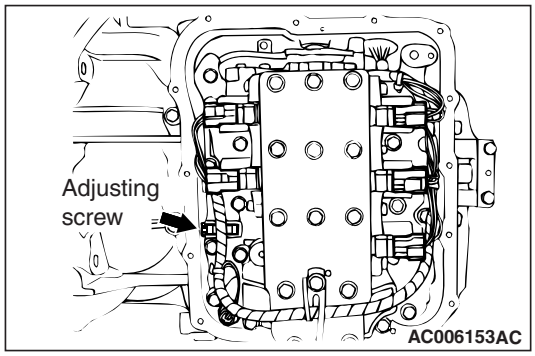
1. Reverse clutch
2. Low-reverse brake
3. Second brake
4. Underdrive clutch
5. Overdrive clutch
6. Damper clutch
7. Accumulator
8. Fail-safe valve A
9. Fail-safe valve B
10. Damper clutch control valve
11. Switch valve
12. Cooler
13. Low-reverse pressure control valve
14. Second pressure control valve
15. Underdrive pressure control valve
16. Overdrive pressure control valve
17. Damper clutch control solenoid valve
18. Low-reverse solenoid valve
19. Second solenoid valve
20. Underdrive solenoid valve
21. Overdrive solenoid valve
22. Torque converter pressure control valve
23. Regulator valve
24. Manual valve
25. Oil pump
26. Oil strainer
27. Oil filter
28. Oil pan
29. Relief valve

LINE PRESSURE ADJUSTMENT

M1231001700424

1. Drain the transmission fluid.

   NOTE: The hydraulic pressure test must be performed before attempting any adjustments.
2. Remove the valve body cover.



3. Turn the adjusting screw shown in the illustration to adjust the line pressure to the standard value. The pressure increases when the screw is turned anticlockwise.

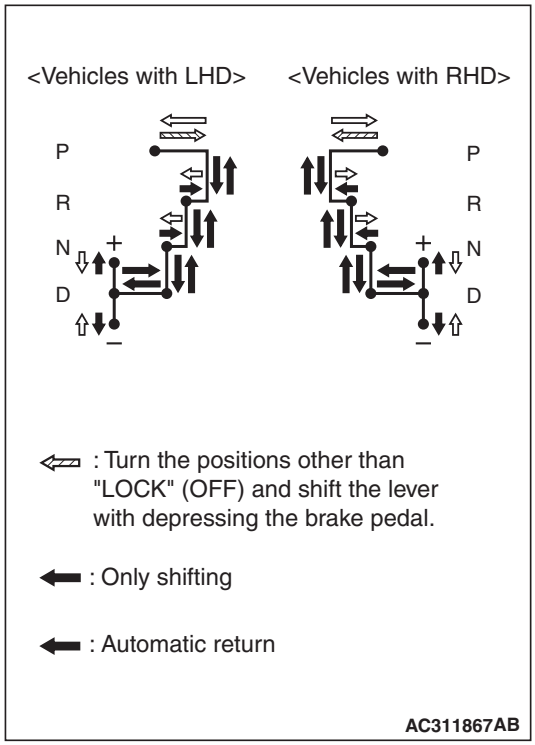
   NOTE: When adjusting the line pressure, adjust to the middle of the standard value range.

   Standard value: 1.01 – 1.05 MPa (Change in pressure for a single full of the adjusting screw: 0.035 MPa)

4. Install the valve body cover, and then pour in the specified amount of ATF.
5. Repeat the hydraulic pressure test (Refer to P.23A-133). Readjust the line pressure if necessary.

SELECTOR LEVER OPERATION CHECK

M1231001300512



1. Apply the parking brake, and check that the selector lever moves smoothly and accurately to each position.
2. Check that the engine starts when the selector lever is in the N or P position, and that it does not start when the selector lever is in any other position.
3. Start the engine, release the parking brake, and check that the vehicle moves forward when the selector lever is moved from N position to the D position or to 1st to 4th gear in Sport mode, and that the vehicle reverses when the selector lever is moved to the R position.
4. Stop the engine.
5. Turn the ignition switch to the ON position, and check that the backup lamp illuminates when the selector lever is shifted from the P position to the R position.

   NOTE: The A/T mis-operation prevention mechanism prevents movement of the selector lever from the P position if the ignition switch is in a position other than LOCK (OFF) position and the brake pedal is not depressed.

KEY INTERLOCK/SHIFT LOCK MECHANISM CHECK AND ADJUSTMENT

M1232003100261

KEY INTERLOCK SIDE

1. Carry out the following check.

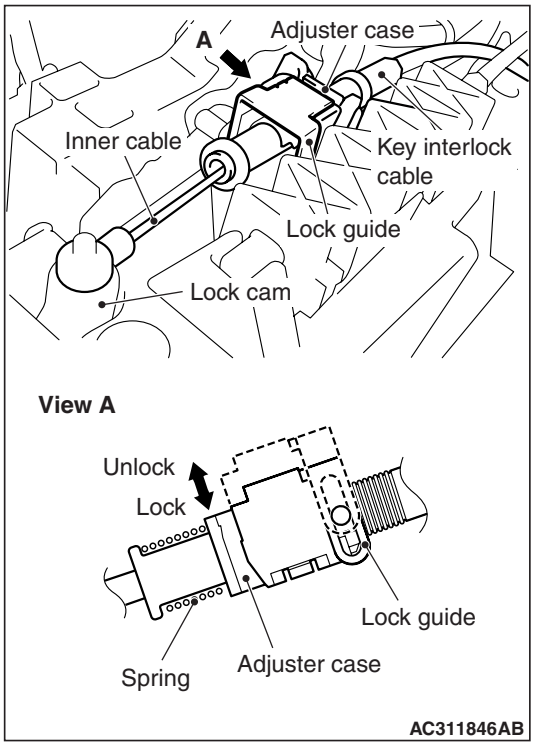
Key interlock side			
Inspection procedure	**Inspection conditions**		**Check details (normal condition)**
1	Brake pedal: Depressed	Ignition key position: LOCK (OFF) or pulled out	The selector lever push button cannot be pushed, and the selector lever should not be moved from P position.
2		Ignition key position: Other than above	The selector lever push button can be pushed, and the selector lever can be moved from P position.
3	Selector lever position: Other than P position		The ignition key cannot turned to LOCK (OFF) position.
4	Selector lever position: P position		The ignition key can be turned to LOCK (OFF) position.

2. If the operations above are abnormal, tighten the key interlock cable in the following procedures. (Automatic adjustment)
   (1) Disconnect the key interlock cable connection (selector lever side). (Refer to P.52A-9).

⚠ WARNING

Leave the ignition switch in the LOCK (OFF) position until the key interlock cable is installed.

   (2) Shift the selector lever to the P position and turn the ignition switch to the LOCK (OFF) position.



   (3) Install the tip of the key interlock cable to the lock cam of the selector lever assembly taking care not to twist the inner cable.
   (4) Lift the lock guide (unlocked position) and then install the adjuster case.
   (5) Lower the lock guide thoroughly and lock it.

NOTE: The lock position of the key interlock cable is automatically adjusted by a spring.

SHIFTLOCK SIDE

Check the following items.

shift lock side			
Inspection procedure	**Inspection conditions**		**Check details (normal condition)**
1	Ignition switch position: ACC	Brake pedal: Depressed	The selector lever push button can be pushed, and the selector lever can be moved from P position.
2		Brake pedal: Not depressed	The selector lever push button cannot be pushed, and the selector lever should not be moved from P position.

NOTE: The shift lock cable is unadjustable.

TRANSMISSION CONTROL

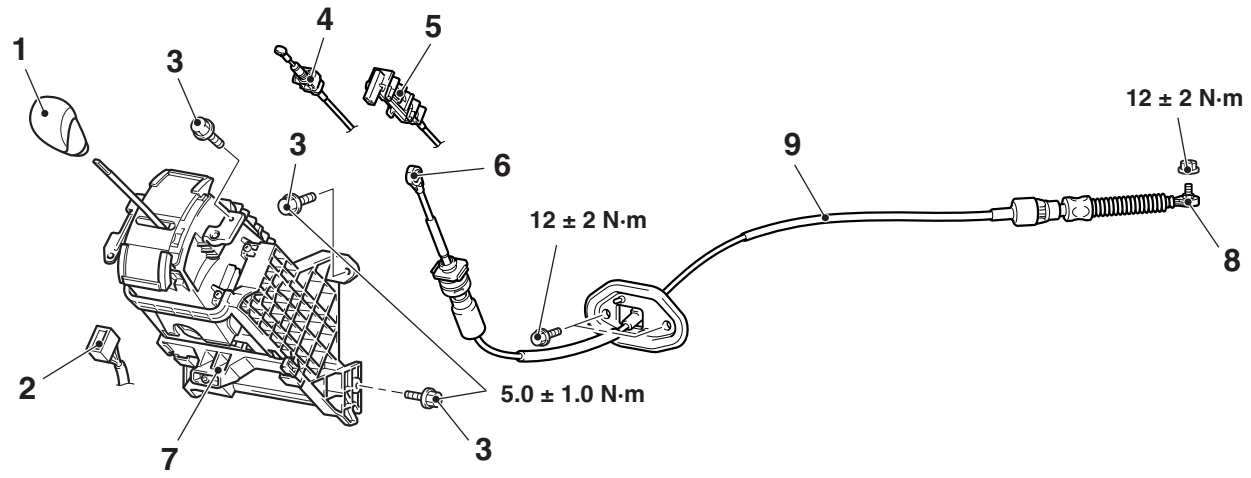
REMOVAL AND INSTALLATION

M1231006600444

⚠ CAUTION

When removing and installing the transmission control cable, shift lock and key ihterlock cable, be careful not to hit the SRS-ECU.

Pre-removal Operation	Post-installation Operation
• Centre Console Removal (Refer to GROUP 52A, Instrument Panel Assembly P.52A-2.)	• Centre Console Installation (Refer to GROUP 52A, Instrument Panel Assembly P.52A-2.) • Key Interlock and Shift Lock Mechanism Check (Refer to P.23A-139.) • Selector Lever Operation Check (Refer to P.23A-139.)



AC3111815AB

Selector lever assembly and transmission control cable assembly removal steps

- Shift the selector lever to the N position.

<<A>>

1. Selector lever knob
- Selector lever panel (Refer to GROUP 52A – Instrument panel assembly P.52A-2.)
2. Shift switch assembly connector connection

Selector lever assembly and transmission control cable assembly removal steps

- SRS-ECU (Refer to GROUP 52B – SRS Air Bag Control Unit P.52B-223).

3. Selector lever assembly coupling bolts connection

>>B<<

4. Key interlock cable connection (selector lever assembly side)
5. Shift lock cable connection (selector lever assembly side)

Selector lever assembly and transmission control cable assembly removal steps

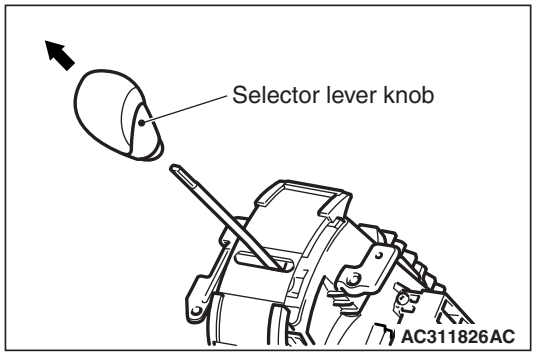
6. Transmission control cable assembly connection (selector lever assembly side)
7. Selector lever assembly

- Battery and battery tray
- Air cleaner body assembly (Refer to GROUP 15 – Air cleaner P.15-3.)

>>A<< 8. Transmission control cable assembly connection (transmission side)
9. Transmission control cable assembly

REMOVAL SERVICE POINTS

<<A>> SELECTOR LEVER KNOB REMOVAL

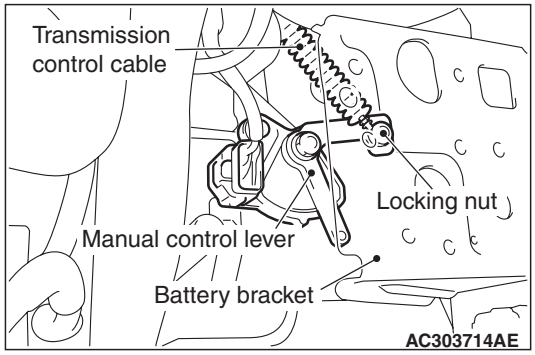


Pull out the selector knob to the direction shown.

INSTALLATION SERVICE POINTS

>>A<< TRANSMISSION CONTROL CABLE ASSEMBLY (TRANSMISSION SIDE) INSTALLATION

1. Place the selector lever and manual control lever in the N position.

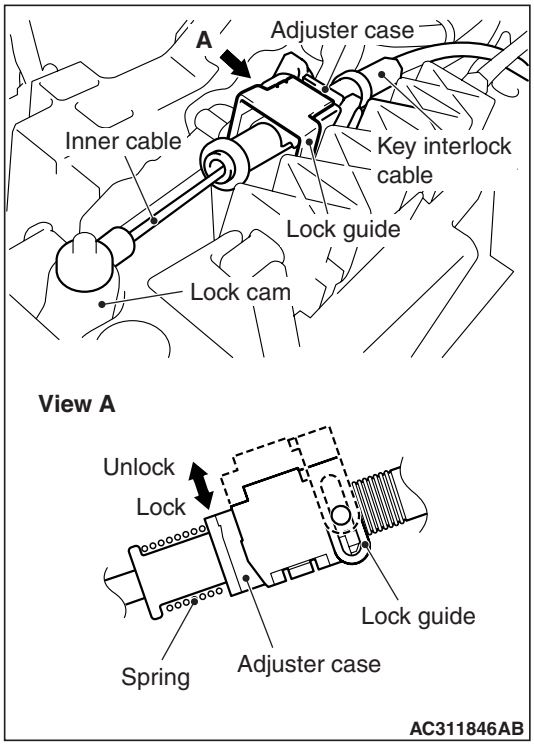


2. Tighten the transmission control cable locking nut to the specified torque.

Tightening torque: 12 ± 2 N·m

>>B<< KEY INTERLOCK CABLE INSTALLATION

1. Selector lever to P position.
2. Turn the ignition key to LOCK (OFF) position.

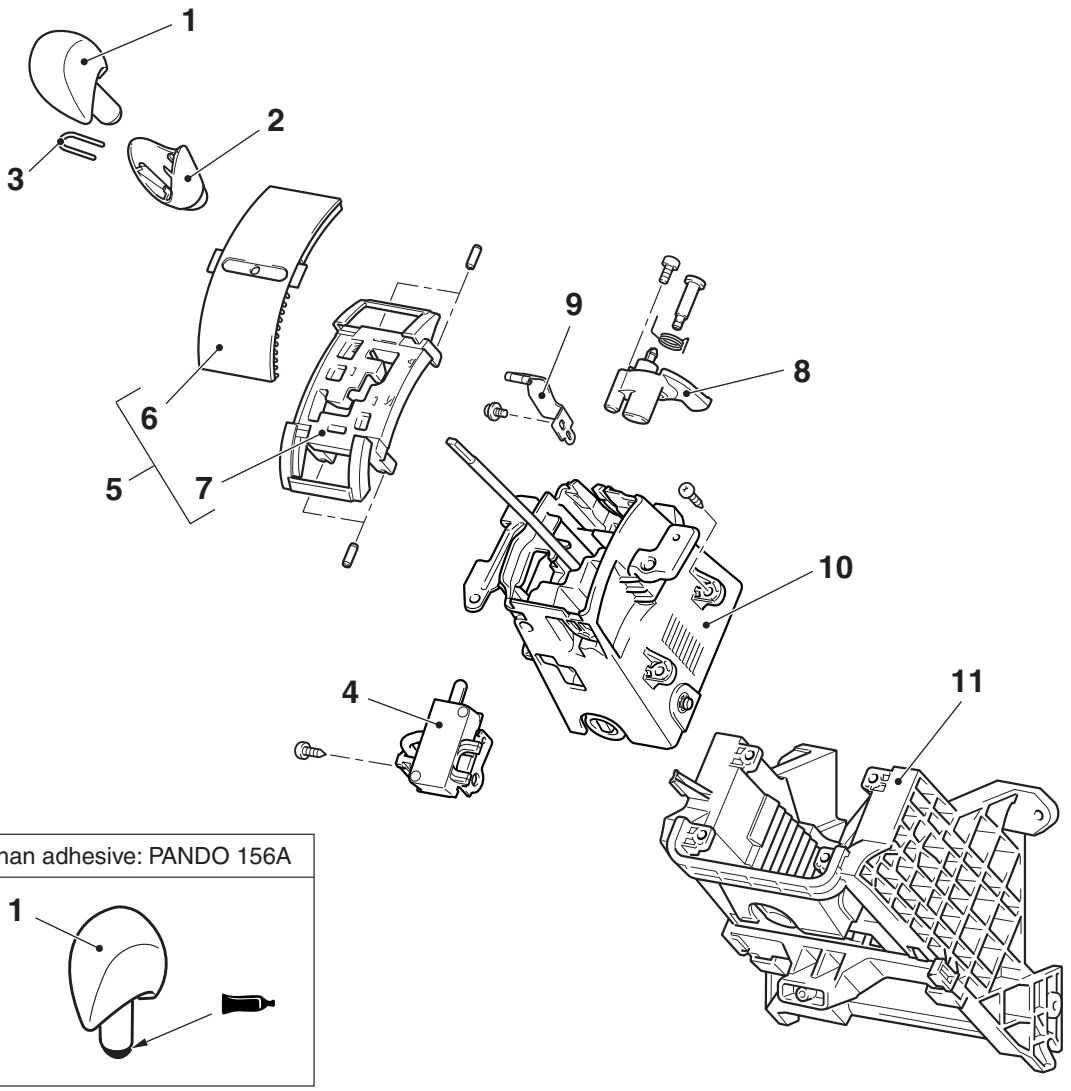


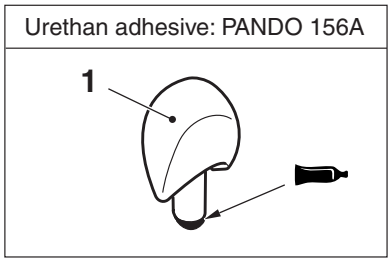
3. Install the tip of the key interlock cable to the lock cam of the selector lever assembly taking care not to twist the inner cable.
4. Lift the lock guide (unlocked position) and then install the adjuster case.
5. Lower the lock guide thoroughly and lock it.

   NOTE: The lock position of the key interlock cable is automatically adjusted by a spring.

DISASSEMBLY AND REASSEMBLY

M1231006800471





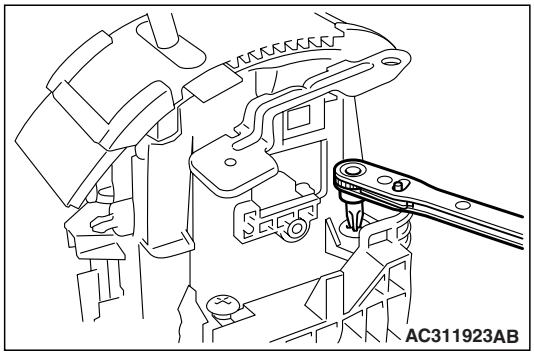
AC311926AB

Disassembly steps

1. Selector lever knob
2. Garnish
3. Pin
4. Shift switch assembly
5. Slider unit
6. Slider
7. Gate upper
8. Lock cam
9. Shift lock spring
10. Selector lever sub assembly
11. Lever mount bracket sub assembly

REMOVAL SERVICE POINTS

<<A>> SELECTOR LEVER SUB ASSEMBLY REMOVAL

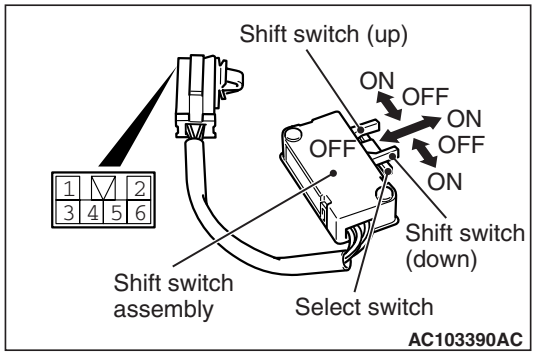


AC311923AB

A commercial plate type ratchet screwdriver is recommended for removing the shift switch assembly side tapping screws (two screws).

INSPECTION

M1231006900241



Switch position		Terminal NO.
Select switch	ON	1 – 4
	OFF	1 – 2
Shift switch (up)	ON	3 – 6
	OFF	–
Shift switch (down)	ON	3 – 5
	OFF	–

A/T KEY INTERLOCK AND SHIFT LOCK MECHANISMS

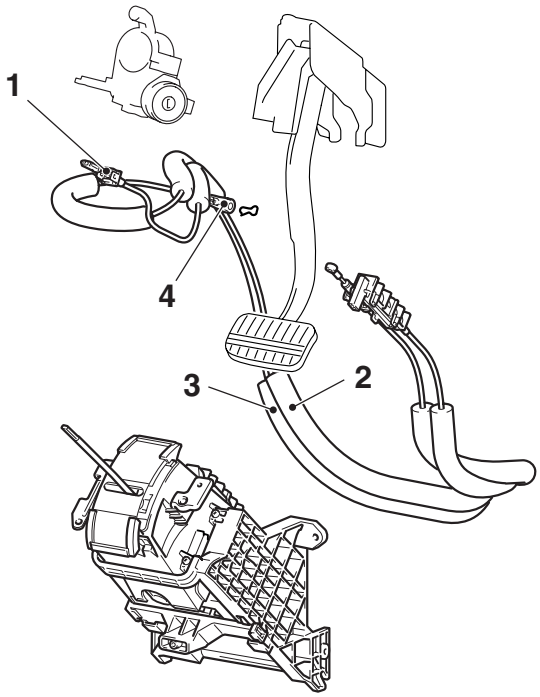
REMOVAL AND INSTALLATION

M1232001200563

⚠ CAUTION

When removing and installing the shift lock and key interlock cable, be careful not to hit the SRS-ECU.

Pre-removal Operation	Post-installation Operation
• Selector Lever Assembly Removal (Refer to P.23A-141.)	• Selector Lever Assembly Installation (Refer to P.23A-141.) • Key Interlock and Shift Lock Mechanism Check (Refer to P.23A-139.) • Selector lever operation check (Refer to P.23A-139.)



Removal steps for key interlock cable

- Lower panel (Refer to GROUP 52A – Instrument Panel P.52A-2).
- Steering column cover lower (Refer to GROUP 37A – Steering Shaft P.37-16).

<<A>> >>A<<

1. Key interlock cable connection (engine starting assembly side).
2. Key interlock cable

Removal steps for shift lock cable

3. Shift lock cable connection (brake pedal side)
4. Shift lock cable

REMOVAL SERVICE POINTS

<<A>> KEY INTERLOCK CABLE (ENGINE STARTING SWITCH ASSEMBLY SIDE) REMOVAL

Turn the ignition switch to the ACC position and then pull the key interlock cable out from the ignition key cylinder.

INSTALLATION SERVICE POINTS

>>A<< KEY INTERLOCK CABLE (ENGINE STARTING SWITCH ASSEMBLY SIDE) INSTALLATION

Turn the ignition switch to the ACC position and then install the key interlock cable to the ignition key cylinder.

TRANSMISSION ASSEMBLY

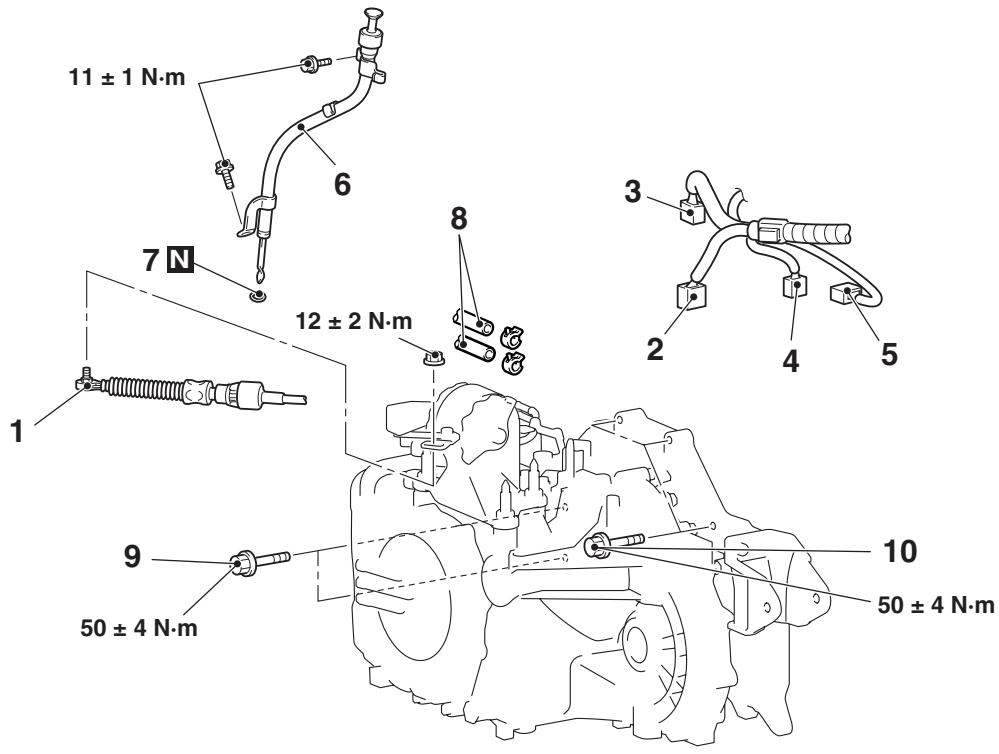
REMOVAL AND INSTALLATION

M1231005700608

⚠ CAUTION

***: Indicates parts which should be temporarily tightened, and then fully tightened after placing the vehicle on the earth and loading the full weight of the engine on the vehicle body.**

Pre-removal Operation	Post-installation Operation
• Under Cover Removal • A/T Fluid Draining (Refer to P.23A-126.) • Air Cleaner Body Assembly, Air cleaner Bracket, Air Intake Hose Removal (Refer to GROUP 15 P.15-3.) • Battery and Battery Tray Removal.	• Under Cover Installation • A/T Fluid Supplying (Refer to P.23A-126.) • Air Cleaner Assembly Installation (Refer to GROUP 15 P.15-3.) • Battery and Battery Tray Installation. • Selector Lever Operation Check (Refer to P.23A-139.) • Front Wheel Alignment Check and Adjustment (Refer to GROUP 33, On-vehicle Service P.33-4.)



AC311484AB

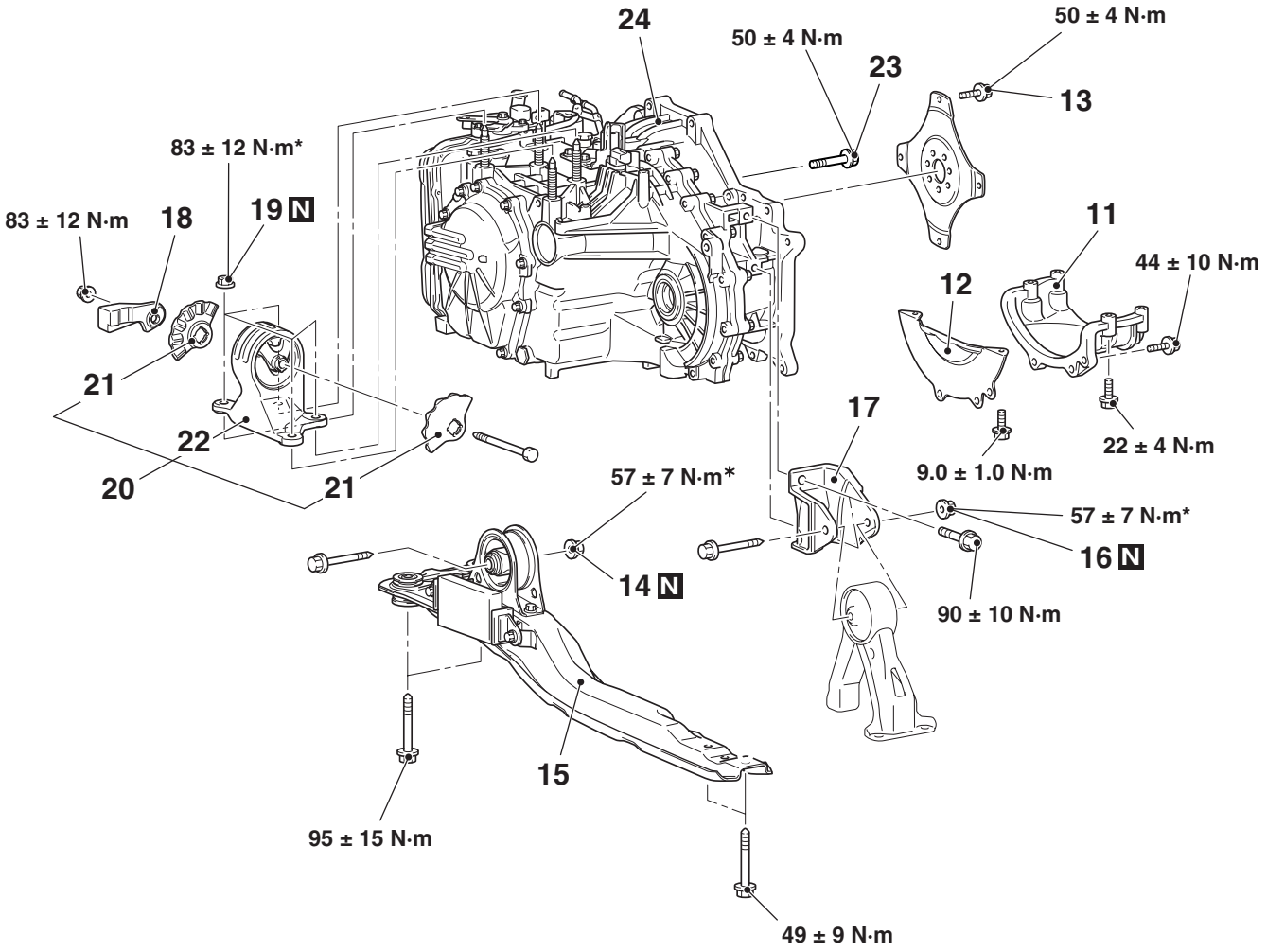
Removal steps

>>D<< 1. Transmission control cable
2. A/T control solenoid valve assembly connector
3. Inhibitor switch connector
4. Input shaft speed sensor connector
5. Output shaft speed sensor connector
6. Oil filler tube

Removal steps (Continued)

7. O ring
8. A/T fluid cooler hose (Transmission side)
   - Radiator lower hose clamp
9. Starter motor installation bolt

<<A>> >>C<< 10. Transmission upper connecting bolts



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Removal steps
- Drive shaft assembly (Refer to Group 26 P.26-11)

11. Transmission stay
12. Bell housing cover
- Front Exhaust Pipe and Exhaust Pre-muffler Connection (Refer to GROUP 15, Exhaust Pipe and Main Muffler P.15-9.)

<<B>> 13. Torque converter and drive plate coupling bolts
14. Self-locking nut
15. Centermember
16. Selflocking nut
17. Transmission case rear roll stopper bracket
18. Transmission mounting bracket pad
19. Self-locking nut

<<C>> 20. Transmission mounting bracket assembly

>>B<< 21. Transmission mounting stopper
22. Transmission mounting body side bracket

Removal steps (Continued)
- Support the transmission assembly with a transmission jack.

23. Transmission lower connecting bolts

>>A<< 24. Transmission assembly

REMOVAL SERVICE POINTS

<<A>> TRANSMISSION UPPER CONNECTING BOLTS

Do not fully unscrew the bolts from the transmission assembly. Only loosen the bolts.

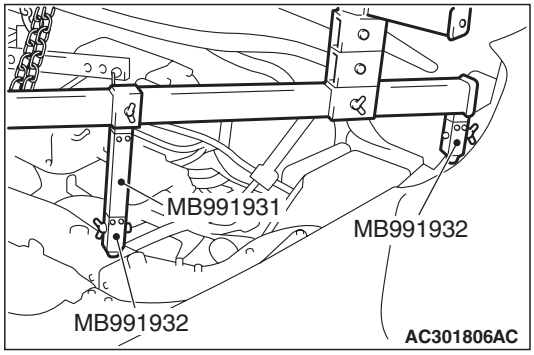
<<B>> TORQUE CONVERTER AND DRIVE PLATE COUPLING BOLTS REMOVAL

1. Turn the crank shaft so that it is positioned to allow the drive plate bolt to be unscrewed.

2. Push in the torque converter into the transmission side and make a point to ensure that the torque converter does not remain on the engine side.

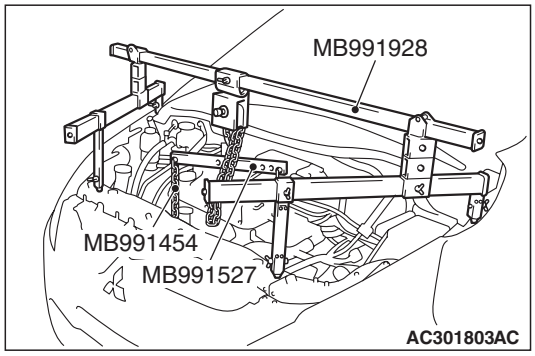
<<C>> TRANSMISSION MOUNT BRACKET ASSEMBLY REMOVAL

1. Use a garage jack to support the engine and transmission assembly. Remove the transmission mounting bracket and then set the engine hanger (special tool MB991895 or MB991928).
2. <Engine hanger (special tool MB991928) is used>
   (1) Assemble special tool MB991928. (Set the components below to the base hanger.)
   - Slide bracket (HI)
   - Special tool MB991931: Joint (140) × 2
   - Special tool MB991932: Foot (standard) × 2



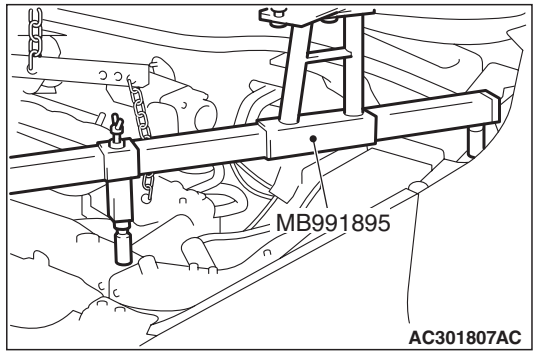
   (2) Set the foot (standard) MB991932 of assembled special tool MB991928 to the front fender assembling bolts as shown.<rear said>
   (3) Set the joint (140) MB991931and foot (standard) MB991932 of assembled special tool MB991928 to the front end upper bar assembling bolts as shown.

   NOTE: Slide the slide bracket (HI) to balance the engine hanger.



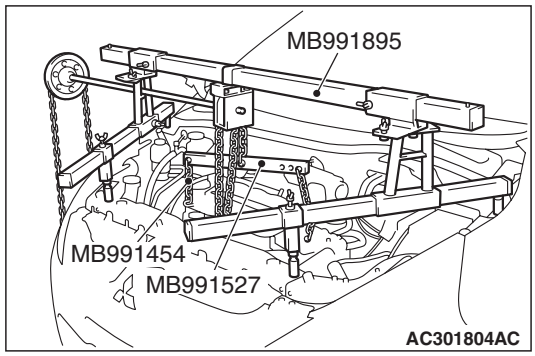
   (4) Hook the chains of special tools MB991527 and MB991454 to support the engine and transmission assembly. Remove the garage jack and then remove the transmission assembly upper fixing bolts.

3. <Engine hanger (special tool MB991895) is used>
   (1) Set a special tool MB991895.



   (2) Set the rear foot of special tool MB991895 to the front fender assembling bolts as shown.
   (3) Set the front foot of special tool MB991895 to the front end upper bar assembling bolts as shown.

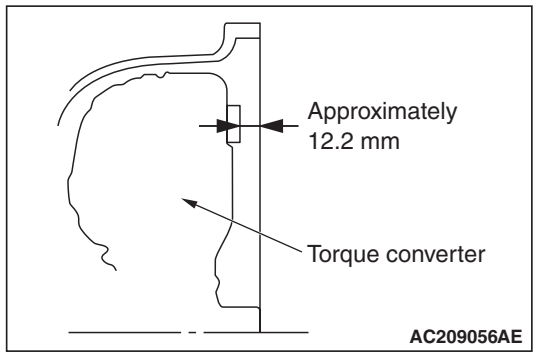
   NOTE: Slide the front foot of special tool MB991895 to balance the engine hanger.



   (4) Hook the chains of special tools MB991527 and MB991454 to support the engine and transmission assembly. Remove the garage jack and then remove the transmission assembly upper fixing bolts.

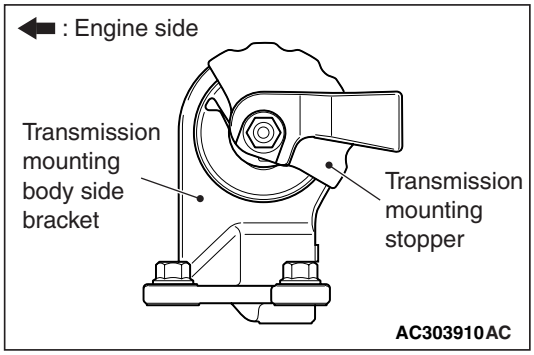
INSTALLATION SERVICE POINTS

>>A<< TRANSMISSION ASSEMBLY INSTALLATION



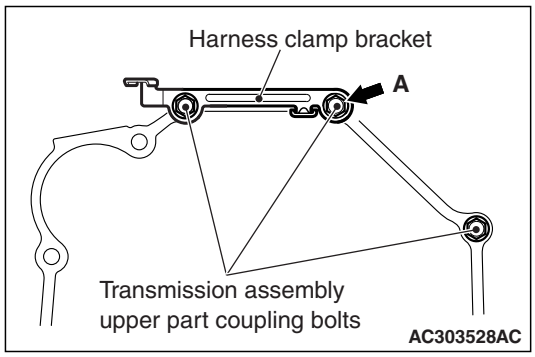
Engage the torque converter into the transmission side securely, and then assemble the transmission assembly on the engine.

>>B<< TRANSMISSION MOUNT STOPPER INSTALLATION



Install the transmission mount stopper so that the arrow mark points as shown in the illustration.

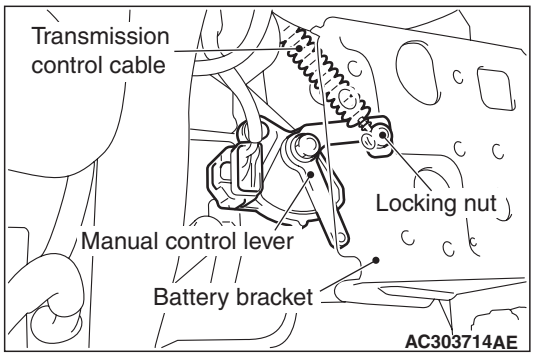
>>C<< TRANSMISSION ASSENBLY UPPER PART COUPLING BOLTS



Tighten the harness clamp bracket towards the direction shown to the transmission assembly upper part coupling bolts.
The bolt A should be tightened with earth line.

>>D<< TRANSMISSION CONTROL CABLE INSTALLATION

1. Place the selector lever and manual control lever in the N position.



2. Tighten the transmission control cable locking nut to the specified torque.

Tightening torque: 12 ± 2 N·m