GROUP 23A

AUTOMATIC TRANSMISSION (FF)

CONTENTS

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WARNINGS REGARDING SERVICING OF SUPPLEMENTAL RESTRAINT SYSTEM (SRS) EQUIPPED VEHICLES

⚠ WARNING

- ***Improper service or maintenance of any component of the SRS, or any SRS-related component, can lead to personal injury or death to service personnel (from inadvertent firing of the air bag) or to the driver and passenger (from rendering the SRS inoperative).***
- ***Service or maintenance of any SRS component or SRS-related component must be performed only at an authorized MITSUBISHI dealer.***
- ***MITSUBISHI dealer personnel must thoroughly review this manual, and especially its GROUP 52B - Supplemental Restraint System (SRS) before beginning any service or maintenance of any component of the SRS or any SRS-related component.***

NOTE
The SRS includes the following components: SRS air bag control unit, SRS warning light, front impact sensors, air bag module, clock spring, and interconnecting wiring. Other SRS-related components (that may have to be removed/installed in connection with SRS service or maintenance) are indicated in the table of contents by an asterisk (*).

SERVICE SPECIFICATIONS

M1231000300393

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

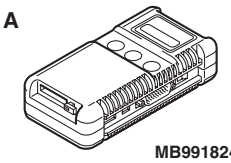
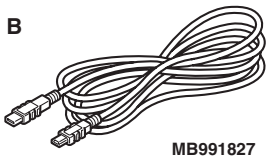
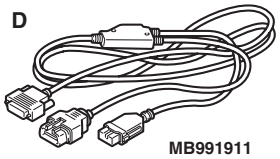
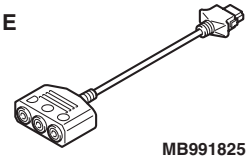
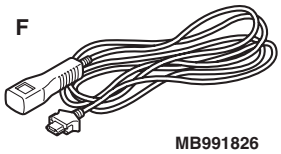
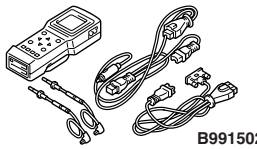
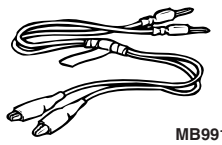
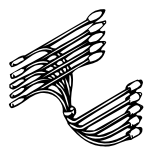
LUBRICANTS

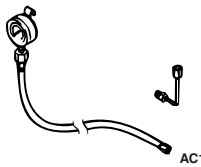
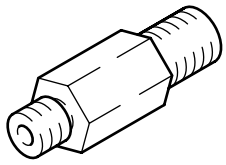
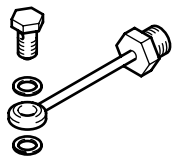
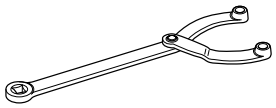
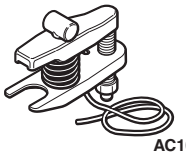
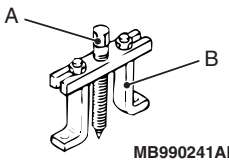
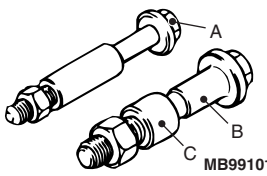
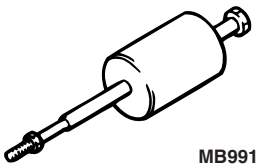
M1231000400453

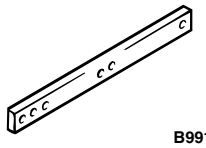
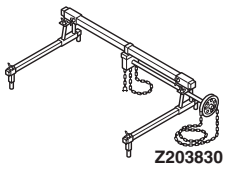
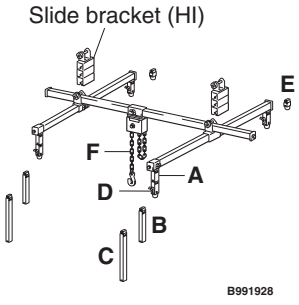
Item	Specified lubricants	Capacity L
A/T fluid	DIA QUEEN ATF SP III	8.1
Transfer oil	Hypoid gear oil API classification GL-5 SAE 90	0.55

SPECIAL TOOLS

M1231000600480

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	M.U.T.-III sub-assembly A: Vehicle Communication Interface (V. C. I.) B: M.U.T.-III USB cable C: M.U.T.-III main harness A (Vehicles with CAN communication system) D: M.U.T.-III main harness B (Vehicles without CAN communication system) E: M.U.T.-III measurement adapter F: M.U.T.-III trigger harness	Checking A/T diagnosis trouble codes **⚠ CAUTION** **If you connect M.U.T.-III main harness A to a vehicle without CAN communication system to use the M.U.T.-III, a pulse signal may interfere with the simulated vehicle speed lines, thus causing the M.U.T.-III inoperative. Therefore, use the M.U.T.-III main harness B (MB991911) instead.**
 B991502	MB991502	M.U.T.-II sub assembly	Diagnosis code checking
 MB991529	MB991529	Diagnosis code checking harness	
 MB991658	MD991658	Test harness	Voltage measurement

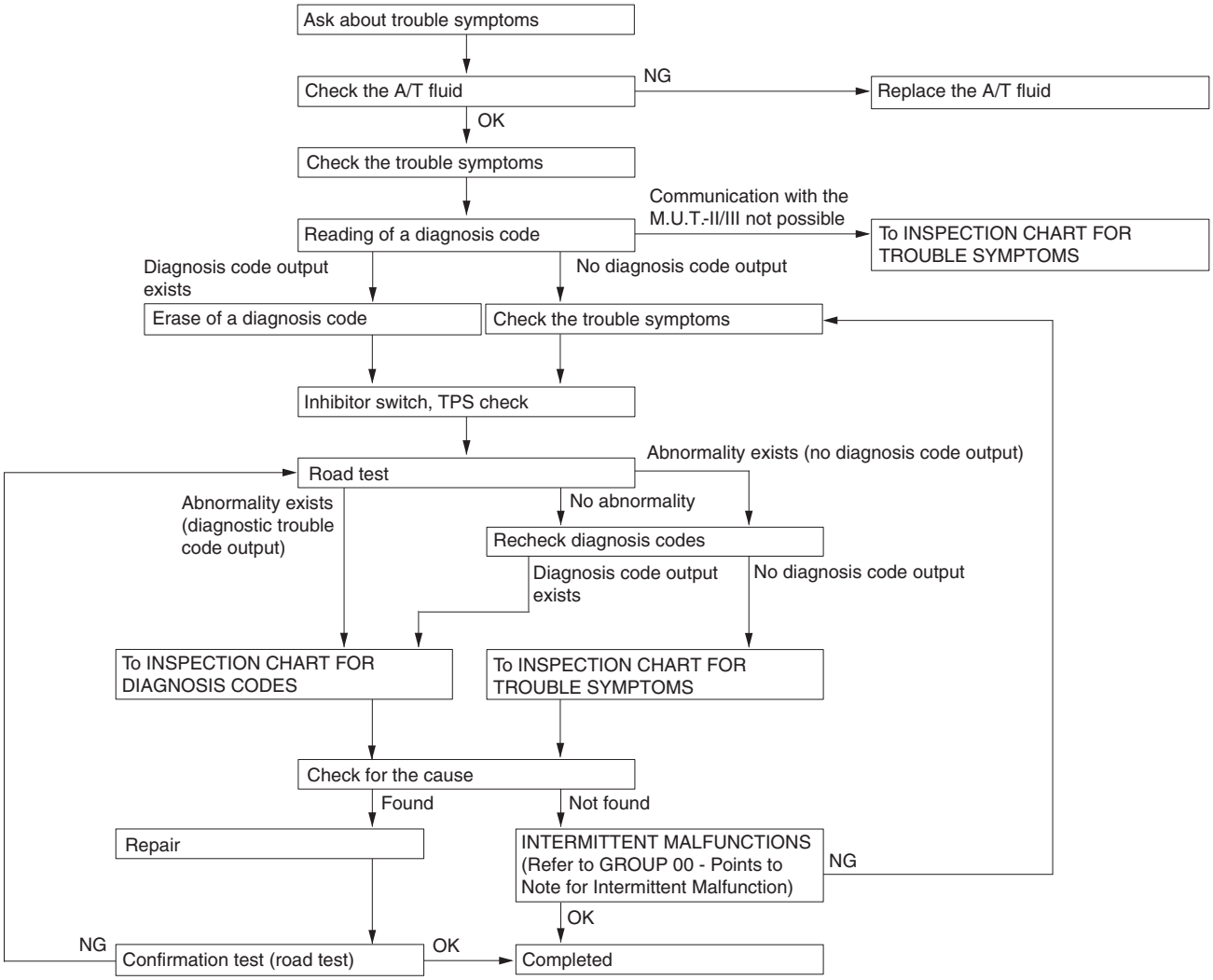
Tools	No.	Name	Application
 AC103525	MD998330 (including MD998331)	Oil pressure gauge (3.0 MPa)	Hydraulic pressure measurement
	MD998332	Adapter	Oil pressure gauge connection
	MD998900		
 B990767	MB990767	End yoke holder	Fixing of the hub
 AC106827	MB991897	Ball joint remover	Knuckle and tie rod end 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	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

M1231013500450



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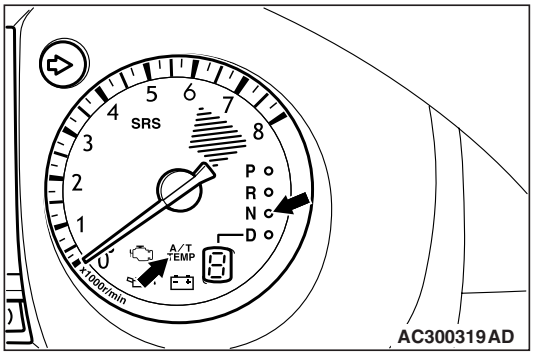
DIAGNOSIS FUNCTION

M1231019000215

N RANGE LAMP SYSTEM



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 A/T fluid warning lamp is illuminating, 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 M.U.T.-II/III to read the diagnosis code. (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points P.00-6.)

METHOD OF ERASING THE DIAGNOSIS CODE

Use the M.U.T.-II/III to erase the diagnosis code. (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points P.00-6.)

ROAD TEST

M1231007800463

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
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	11, 12, 14	TPS system
		Brake pedal (1) Depressed (2) Released	Data List No.26 (1) ON (2) OFF	Stop lamp switch	26	Stop lamp switch system

Procedure	Pre-test/ operation conditions	Test/operation	Judgment value	Check item	Diagnosis code No.	Inspection procedure if there is an abnormality
3	Ignition switch: START	Starting test at P or N position	Starting should be possible	Starting possible/not possible	–	Starting not possible
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 compress or relay	–	A/C compressor relay system
		Accelerator pedal (1) Fully closed (2) Depressed	Data List No.21 (1) The engine speed displayed on the tachometer is identical to the engine speed displayed on M.U.T.-II/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.22 (4) 1,600 – 1,900 r/min	Input shaft speed sensor	22	Input shaft speed sensor system
			Data List No.23 (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 M.U.T.-II/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, 23 The shifting points correspond with the M.U.T.-II/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

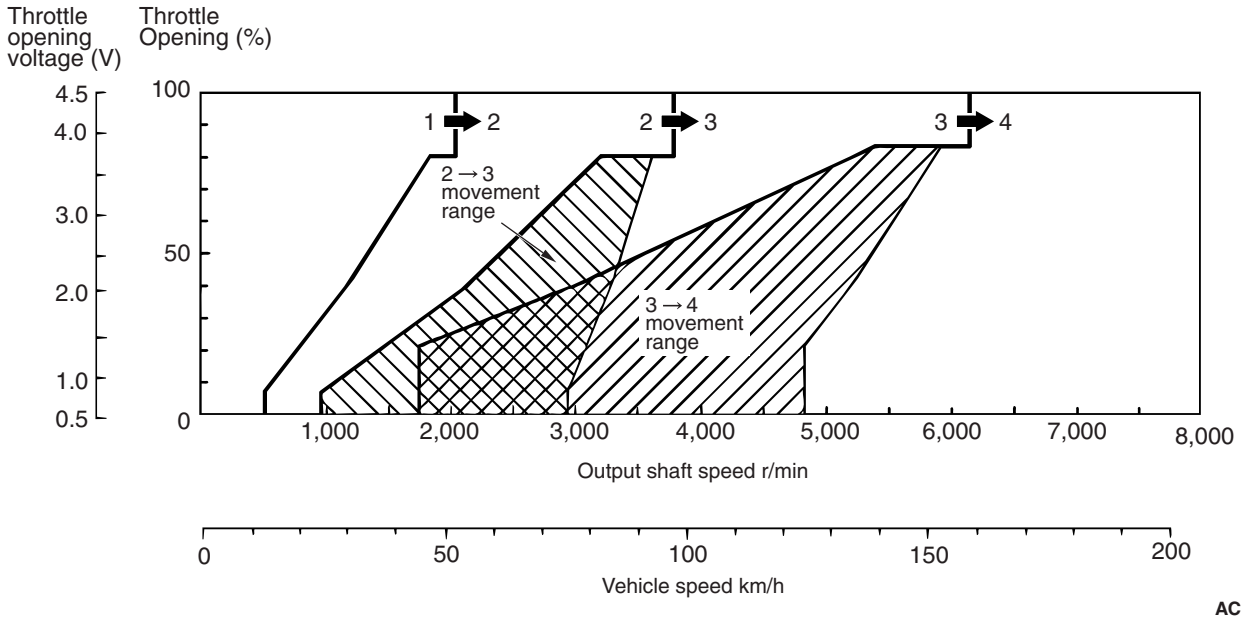
Procedure	Pre-test/ operation conditions	Test/operation	Judgment value	Check item	Diagnosis code No.	Inspection procedure if there is an abnormality
8	Suspends the INVECS-II function using M.U.T.-II/III Selector lever position: D (Must be done on a level and straight road)	(1) Accelerate from 1st gear 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.22 and No.23 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

M1231028400192

UPSHIFT PATTERN



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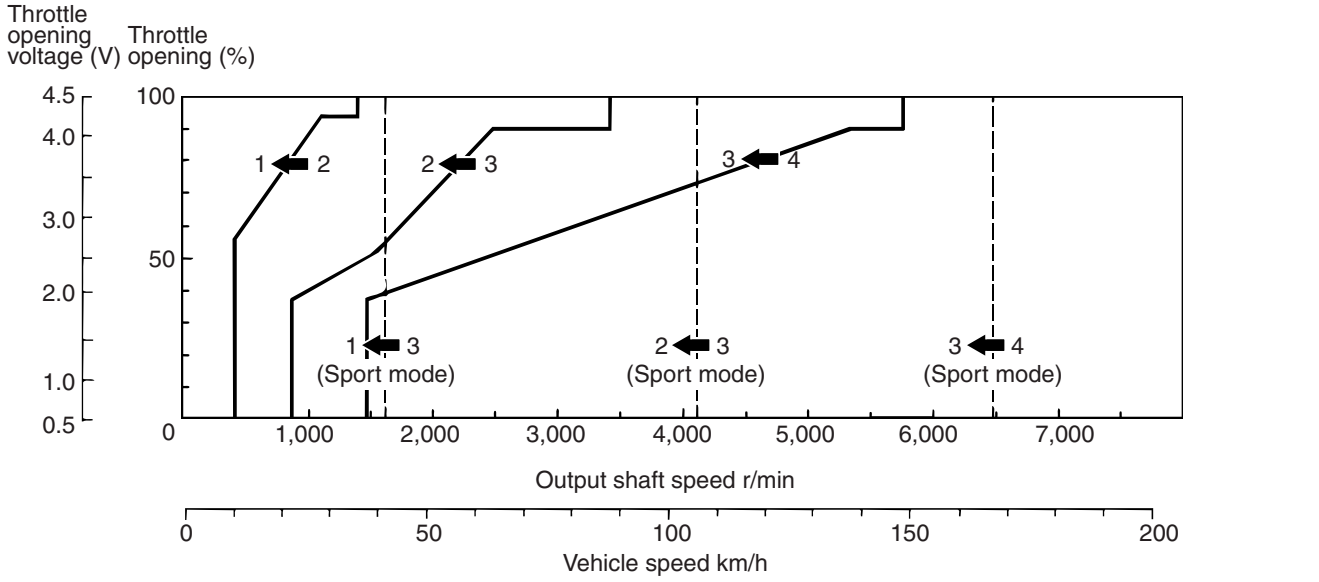
DOWNSHIFT PATTERN



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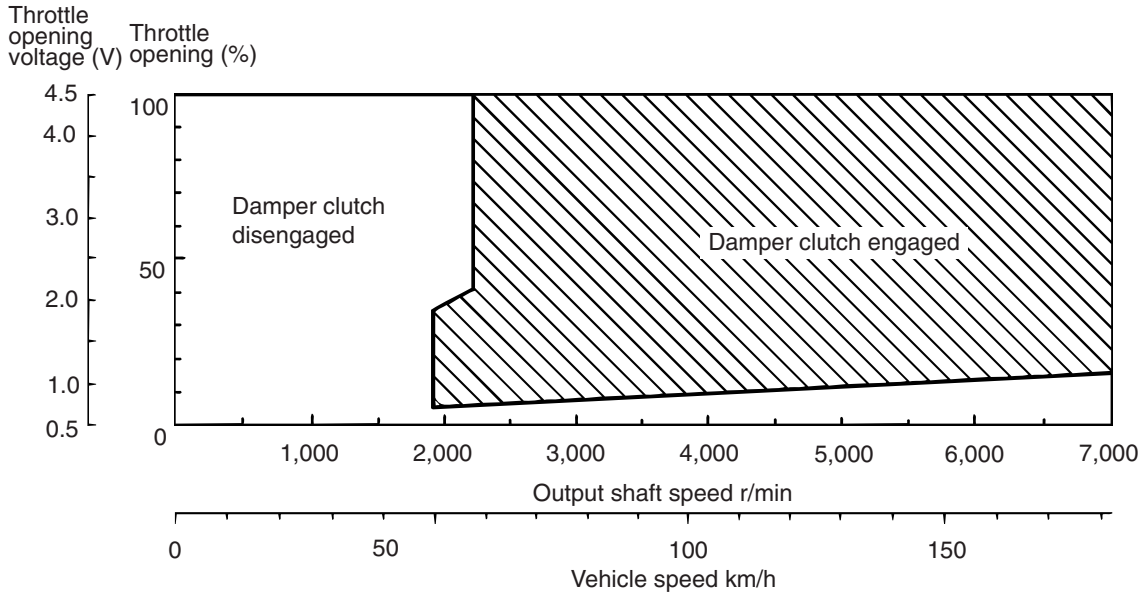
DAMPER CLUTCH CONTROL

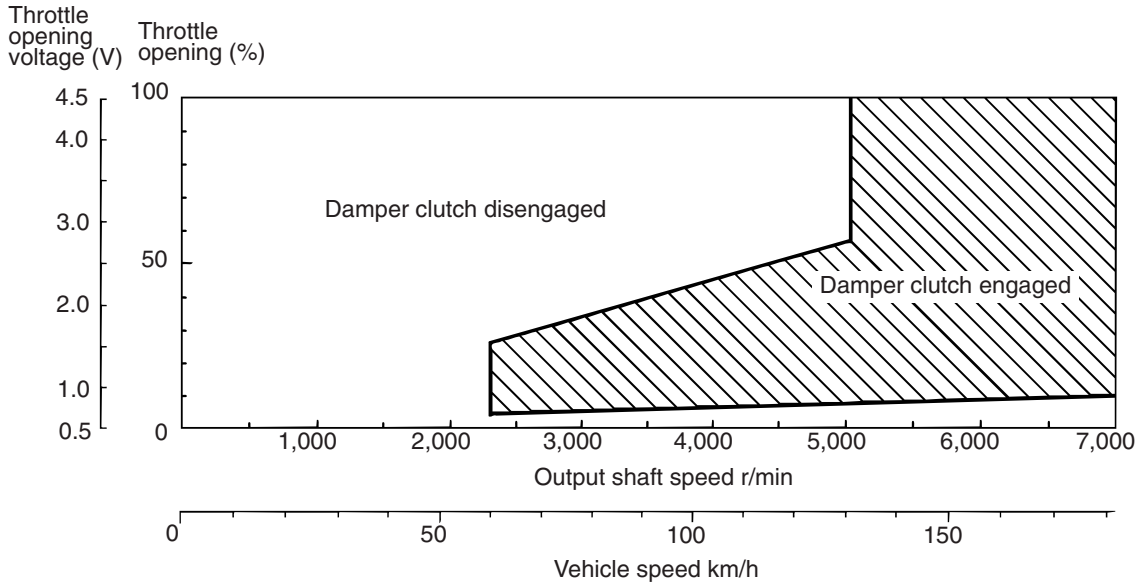
M1231021300064

In 4th range



AC309497 AC

In 3rd range



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INSPECTION CHART FOR DIAGNOSIS CODE

M1231007900512

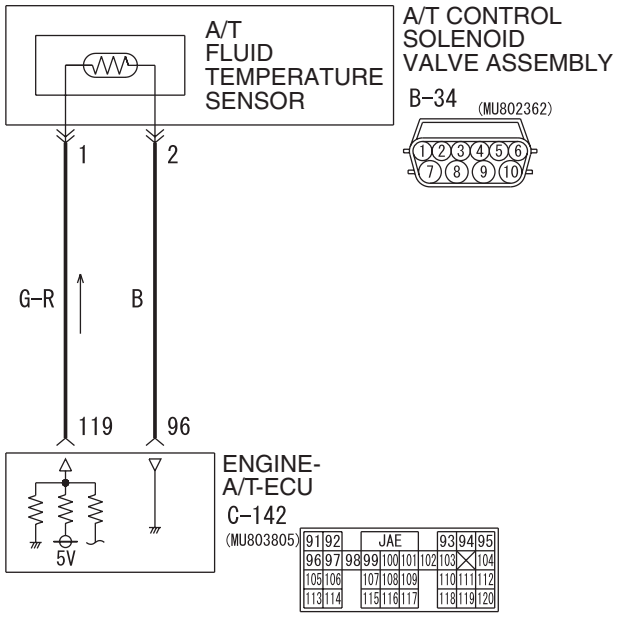
A/T diagnosis code No.	MPI diagnosis code No.	Diagnosis item	Reference page
15	P0710	A/T fluid temperature sensor system	P.23A-19
16			P.23A-25
21	–	Crank angle sensor system	Refer to GROUP 13C, TroubleshootingP.13C-170.
22	P0715	Input shaft speed sensor system	P.23A-28
23	P0720	Output shaft speed sensor system	P.23A-37
26	–	Stop lamp switch system	P.23A-46
27	P0705	Inhibitor switch system	P.23A-50
28			P.23A-55
31	P0750	LR solenoid valve system	P.23A-58
32	P0755	UD solenoid valve system	P.23A-62
33	P0760	2ND solenoid valve system	P.23A-66
34	P0765	OD solenoid valve system	P.23A-69
36	P0740	DCC solenoid valve system	P.23A-73
41	–	1st gear ratio does not meet the specification	P.23A-77
42	–	2nd gear ratio does not meet the specification	P.23A-77
43	–	3rd gear ratio does not meet the specification	P.23A-77
44	–	4th gear ratio does not meet the specification	P.23A-77
46	–	Reverse gear ratio does not meet the specification	P.23A-77
52	–	DCC solenoid valve system	P.23A-79
54	P1751	A/T control relay system	P.23A-80
56	–	N range lamp system	P.23A-86

NOTE: The MPI diagnostic trouble codes are the codes which are set when item "MPI" is selected on M.U.T.-II/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

W4Z23E00AA
AC309562 AC

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.

PROBABLE CAUSES

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

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-II/III data list

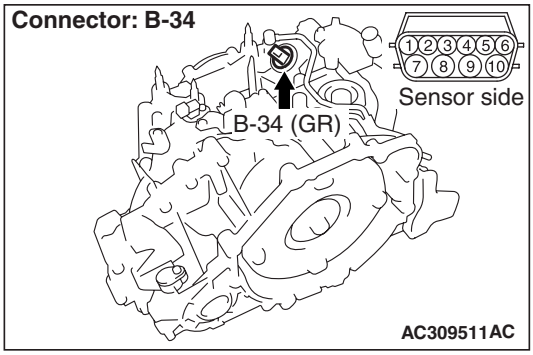
Item 15: A/T fluid temperature sensor (Refer to Data List Table P.23A-114).

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).

NO : Go to Step 2.

STEP 2. Measure the resistance at A/T control solenoid valve assembly connector B-34.



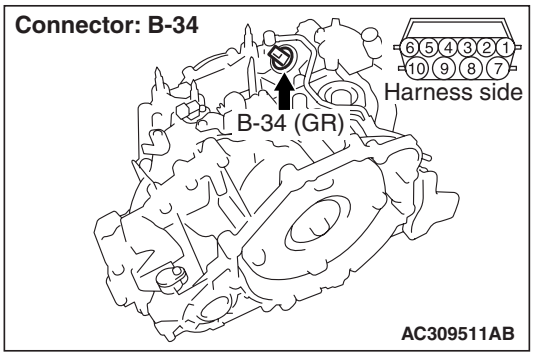
Disconnect the connector, and measure the resistance between terminal 1 and 2 at the sensor side.

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.

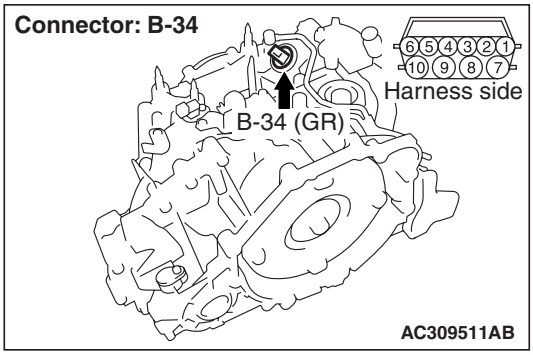
STEP 3. Connector check: B-34 A/T control solenoid valve assembly



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-34.



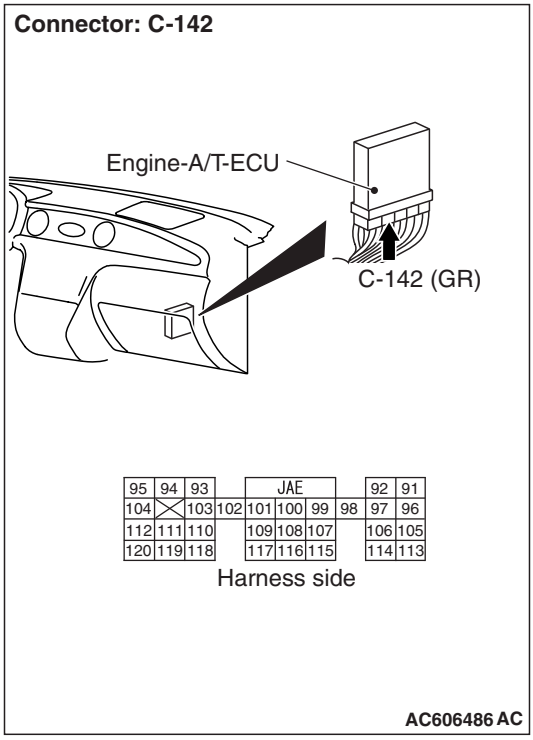
Disconnect the connector, and measure the resistance between terminal 2 and earth at the wiring harness side.

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-142.

(1) Connect A/T control solenoid valve assembly connector B-34.
(2) Turn the ignition switch to the ON position.

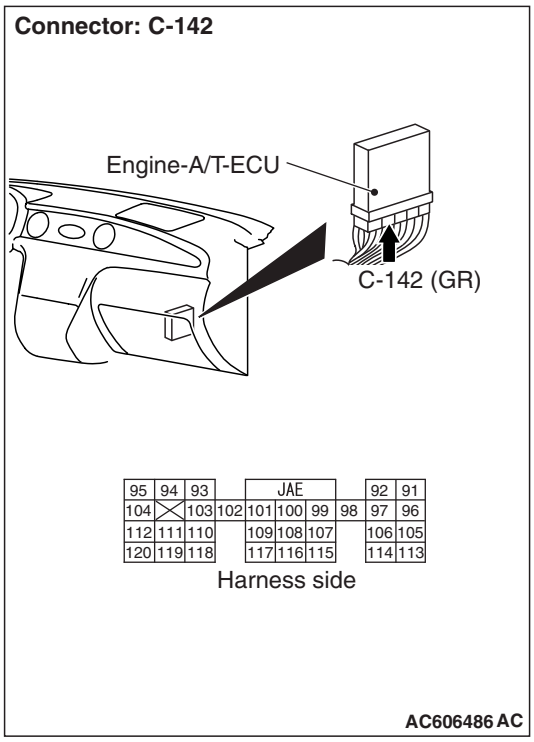


(3) Measure the voltage between engine-A/T-ECU connector C-142 terminal No.96 and earth.

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-142 engine-A/T-ECU connector



Check for the contact with terminals.

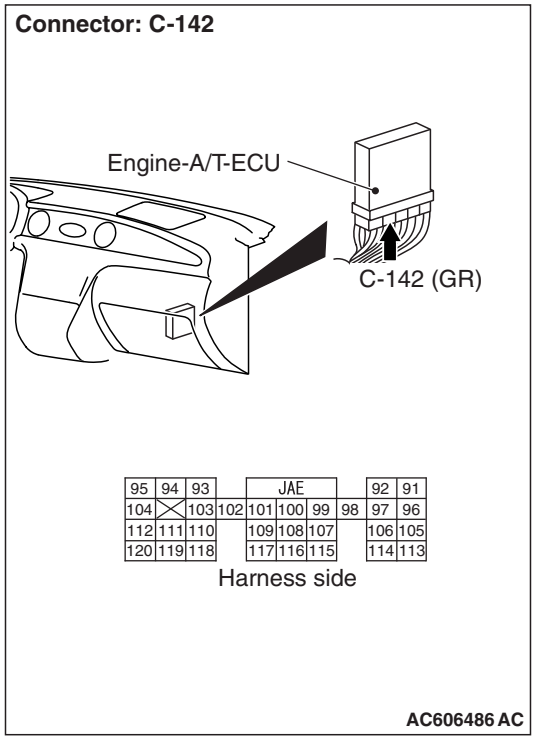
Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the defective connector.

STEP 7. M.U.T.-II/III data list

Item 15: A/T fluid temperature sensor (Refer to Data List Table P.23A-114.)

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).
NO : Replace the engine-A/T-ECU.

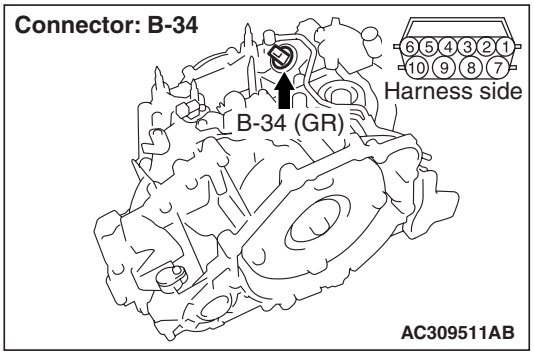
STEP 8. Connector check: C-142 engine-A/T-ECU connector



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-34.



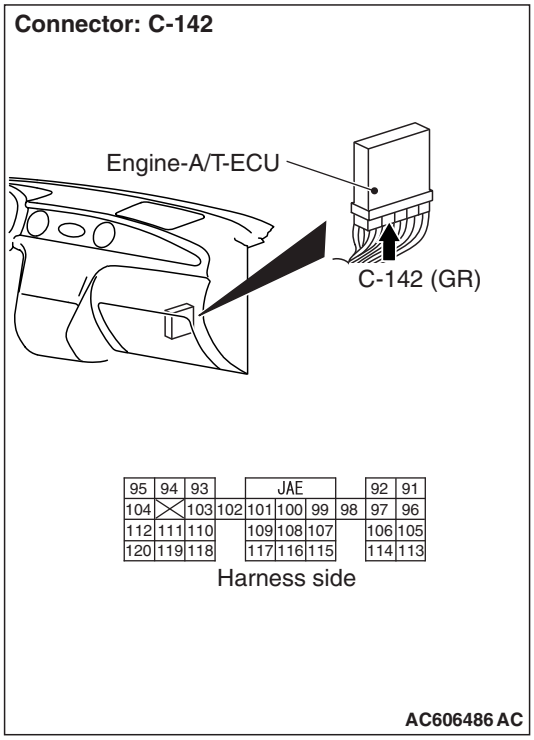
(1) Disconnect the connector, and measure the voltage between terminal 1 and earth at the wiring harness side.
(2) Turn the ignition switch to the ON position.

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-142.

(1) Connect A/T control solenoid valve assembly connector B-34.
(2) Turn the ignition switch to the ON position.



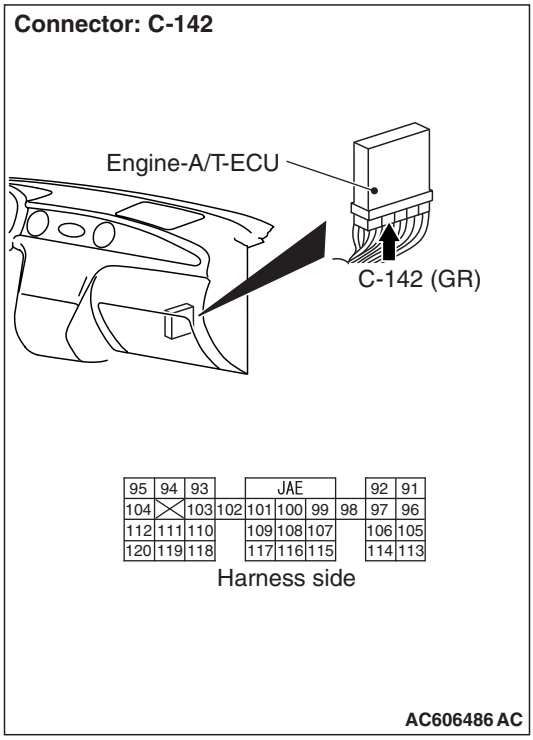
(3) Measure the voltage between engine-A/T-ECU connector C-142 terminal No.119 and earth.

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.

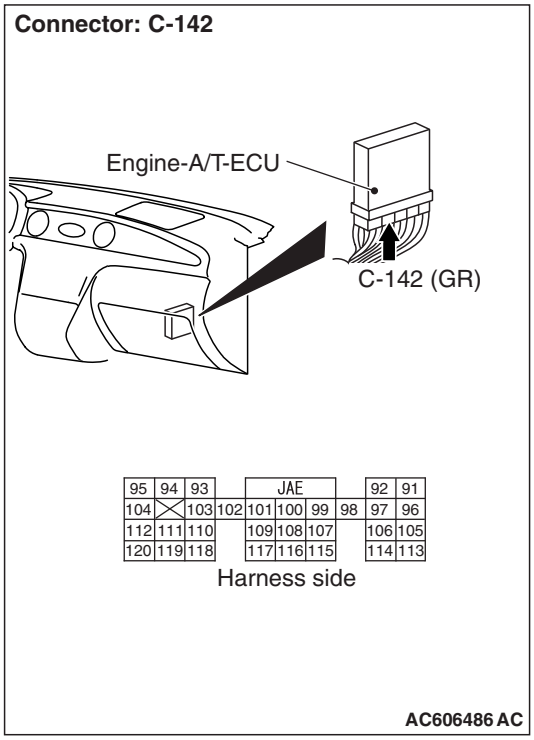
STEP 11. Connector check: C-142 engine-A/T-ECU connector



Check for the contact with terminals.

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

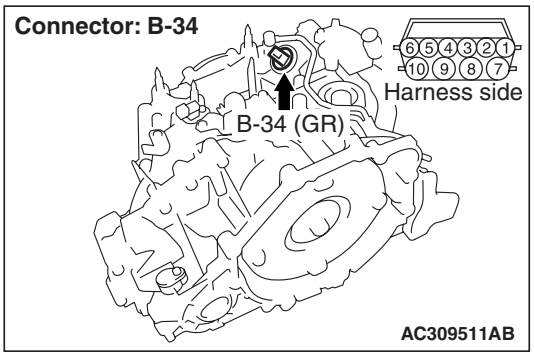
STEP 12. Connector check: C-142 engine-A/T-ECU connector

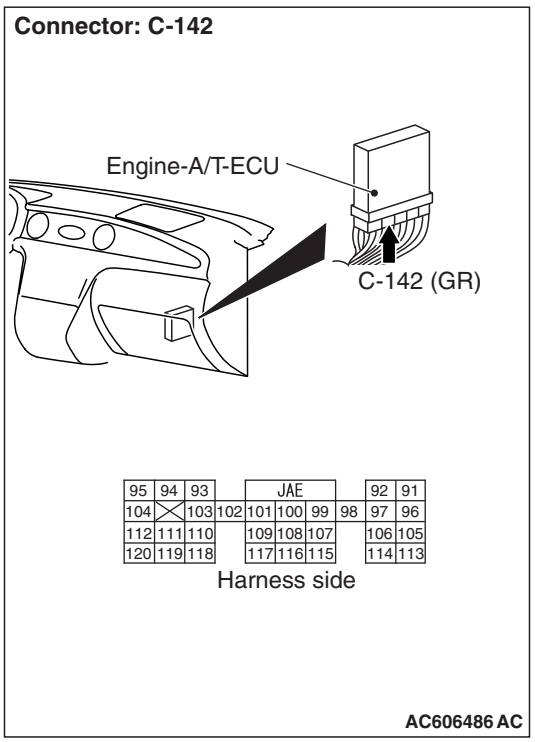


Check for the contact with terminals.

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-34 terminal No.1 and engine-A/T-ECU connector C-142 terminal No.119.

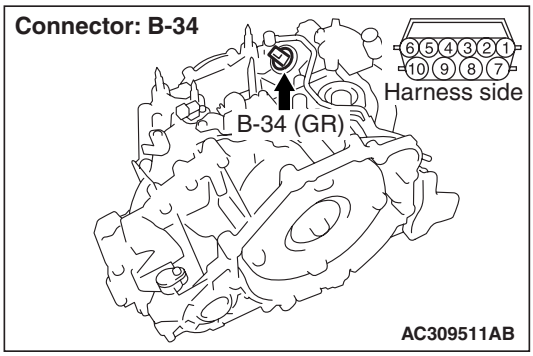


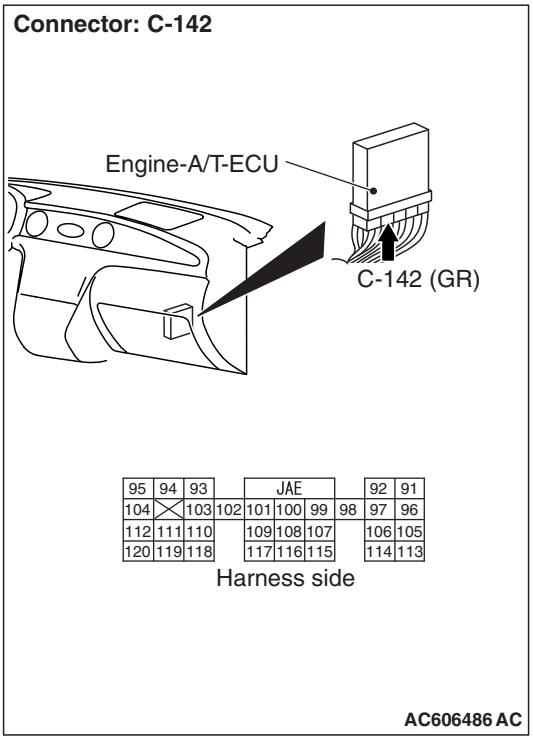


Check the output line for short-circuited or open circuit.

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-34 terminal No.2 and engine-A/T-ECU connector C-142 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-19.

OPERATION

Refer to P.23A-19.

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.

PROBABLE CAUSES

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

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-II/III data list

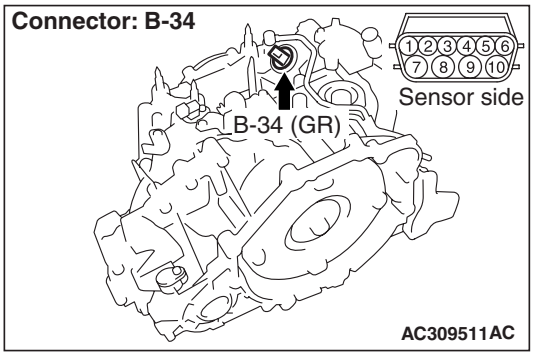
Item 15: A/T fluid temperature sensor (Refer to Data List Table P.23A-114).

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).

NO : Go to Step 2.

STEP 2. Connector check: B-34 A/T control solenoid valve assembly



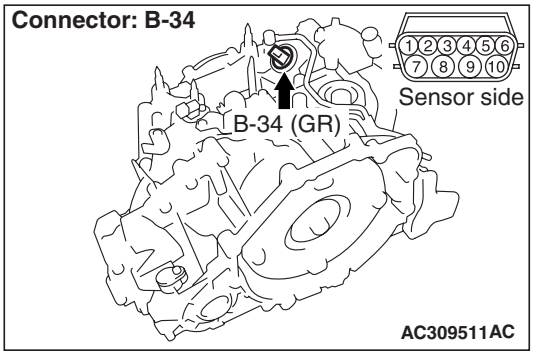
Check for the contact with terminals.

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-34.



(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.

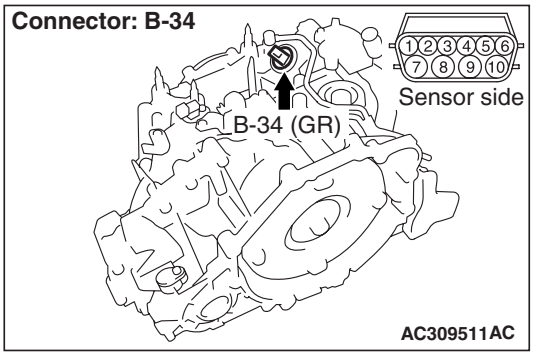
OK: 4.5 – 4.9 V

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-34.



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. M.U.T.-II/III data list

Item 15: A/T fluid temperature sensor (Refer to Data List Table P.23A-114).

Q: Is the check result normal?

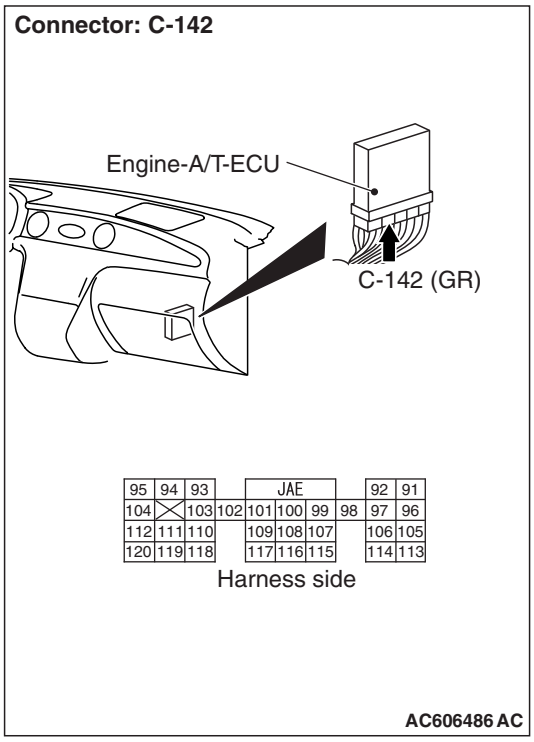
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).

NO : Replace the engine-A/T-ECU.

STEP 6. Measure the voltage at engine-A/T-ECU connector C-142.

(1) Connect A/T control solenoid valve assembly connector B-34.

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



(3) Measure the voltage between engine-A/T-ECU connector C-142 terminal No.119 and earth.

OK:

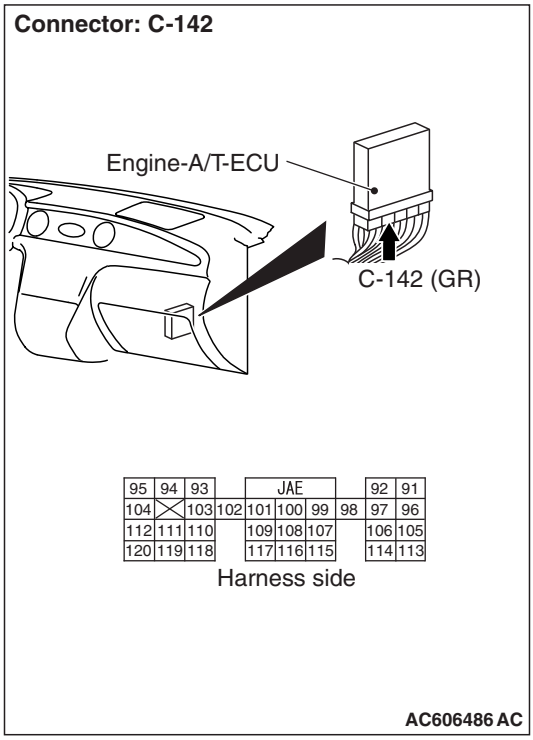
- **3.8 – 4.0 V (at 20°C)**
- **3.2 – 3.4 V (at 40°C)**
- **1.7 – 1.9 V (at 80°C)**

Q: Is the check result normal?

YES : Go to Step 5.

NO : Go to Step 7.

STEP 7. Connector check: C-142 engine-A/T-ECU connector



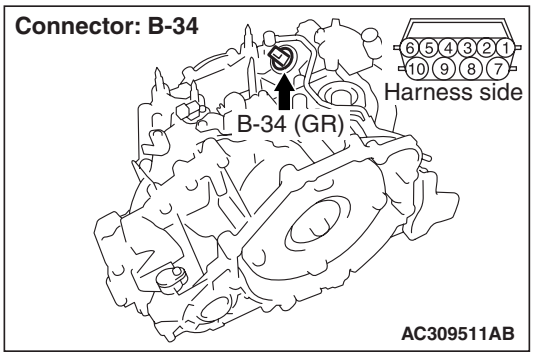
Check for the contact with terminals.

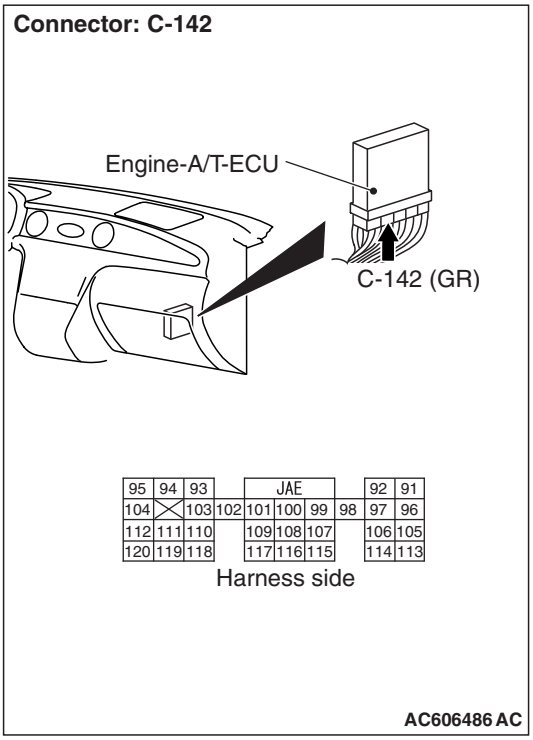
Q: Is the check result normal?

YES : Go to Step 8.

NO : Repair the defective connector.

STEP 8. Check the harness between A/T control solenoid valve assembly connector B-34 terminal No.1 and engine-A/T-ECU connector C-142 terminal No.119.





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

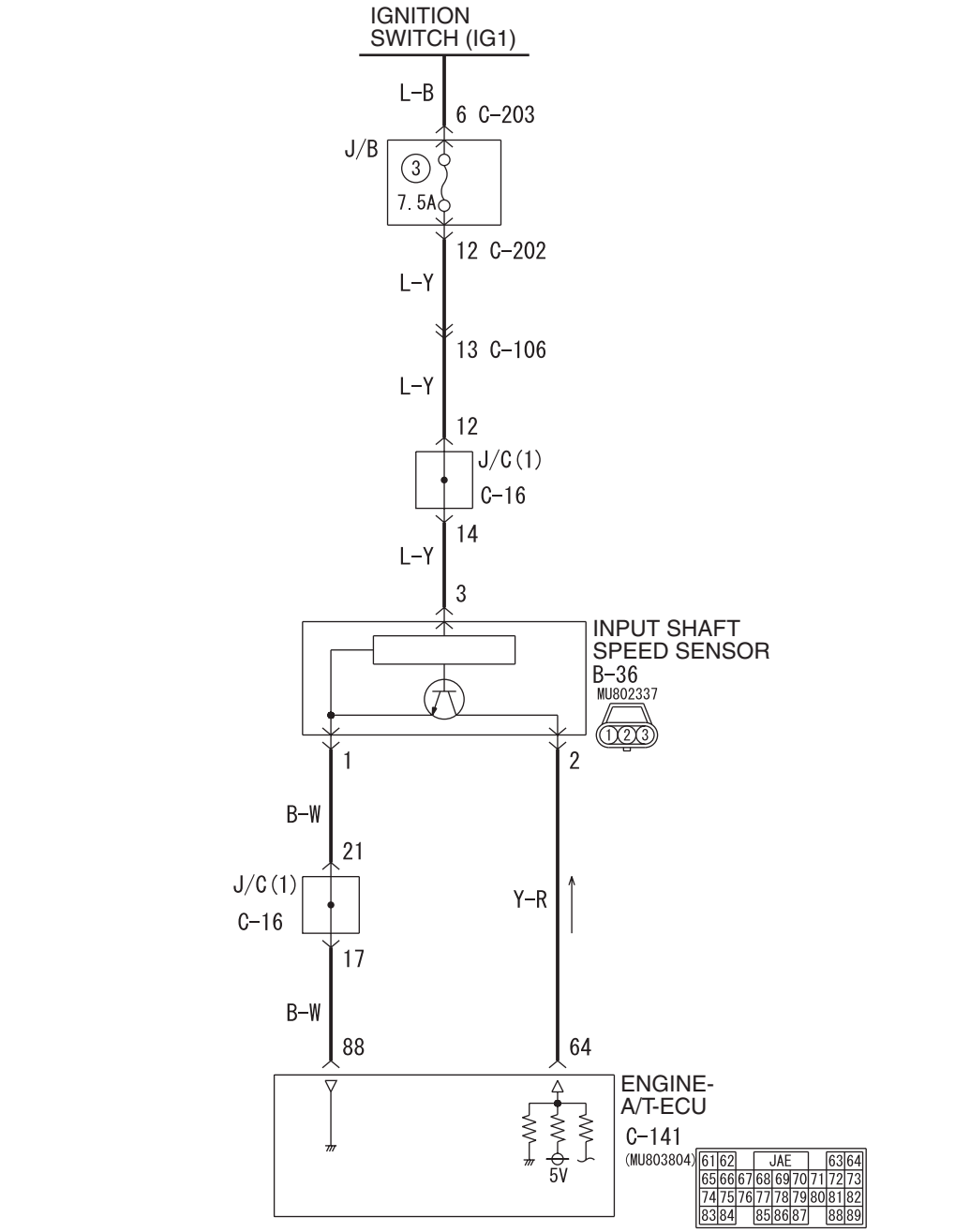
Q: Is the check result normal?

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

W4Z23E01AA
AC309564AC

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.

PROBABLE 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 PROCEDURE

STEP 1. M.U.T.-II/III data list

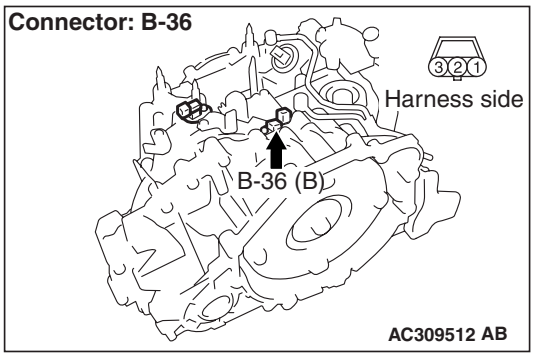
Item 22: Input shaft speed sensor (Refer to data list reference table P.23A-114).

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).

NO : Go to Step 2.

STEP 2. Connector check: B-36 input shaft speed sensor connector



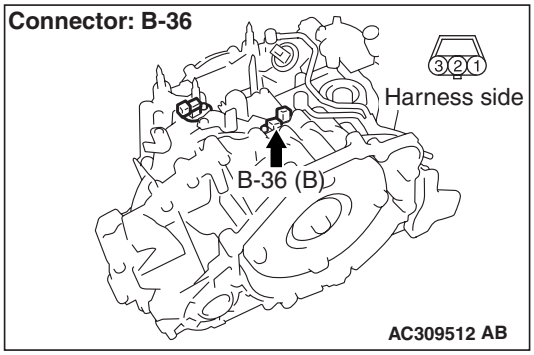
Check for the contact with terminals.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the defective connector.

STEP 3. Measure the resistance at input shaft speed sensor connector B-36.



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

OK: 2 Ω or less

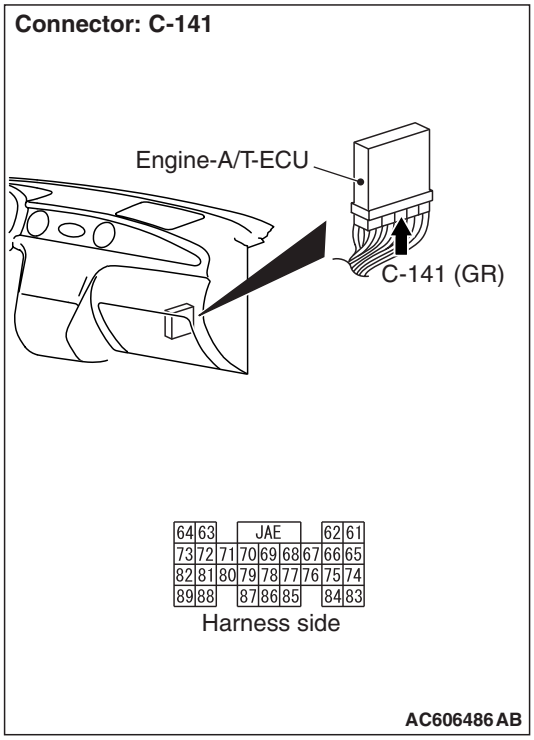
Q: Is the check result normal?

YES : Go to Step 9.

NO : Go to Step 4.

STEP 4. Measure the voltage at engine-A/T-ECU connector C-141.

(1) Connect input shaft speed sensor connector B-36.
(2) Turn the ignition switch to the ON position.

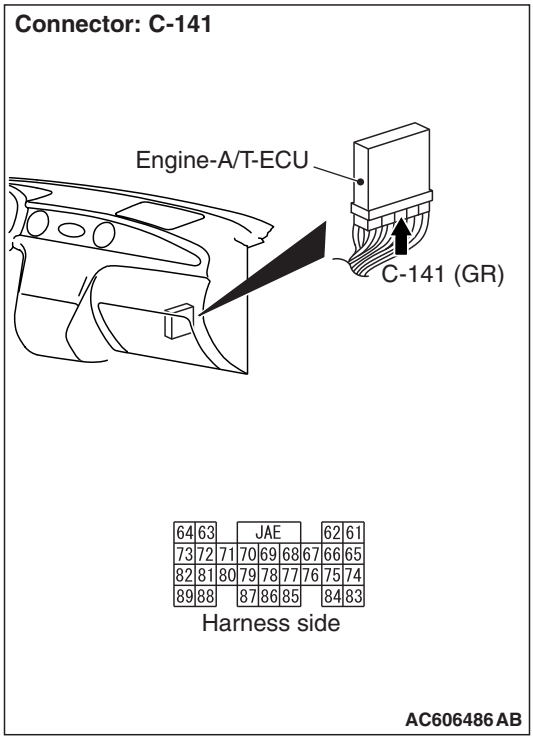


(3) Measure the voltage between engine-A/T-ECU connector C-141 terminal No.88 and earth.

OK: 0.5 V or less

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

STEP 5. Connector check: C-141 engine-A/T-ECU connector



Check for the contact with terminals.

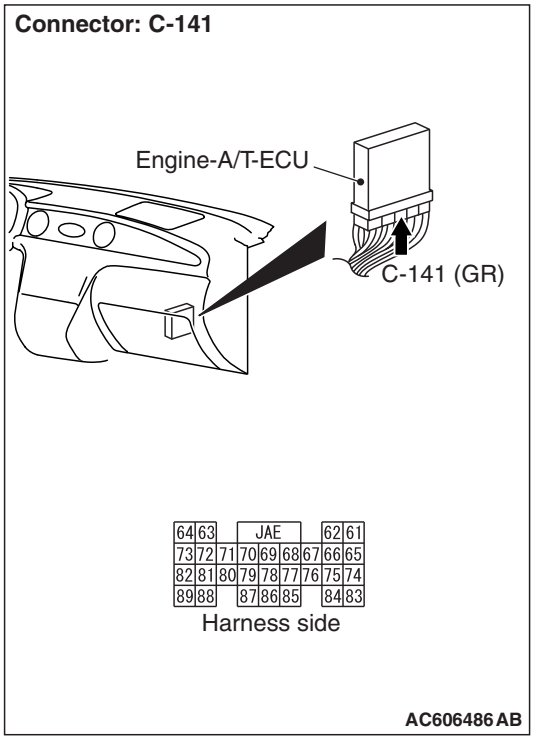
Q: Is the check result normal?
YES : Go to Step 6.
NO : Repair the defective connector.

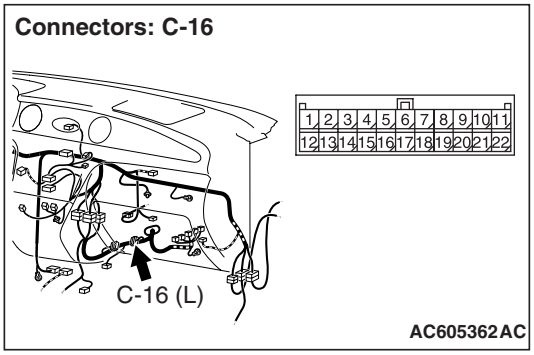
STEP 6. M.U.T.-II/III data list

Item 22: Input shaft speed sensor (Refer to data list reference table P.23A-114).

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).
NO : Replace the engine-A/T-ECU.

STEP 7. Connector check: C-141 engine-A/T-ECU connector, C-16 J/C (1)

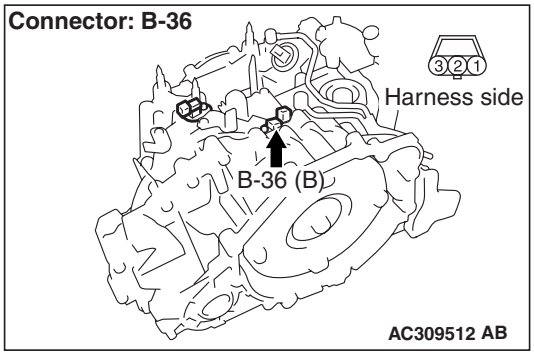


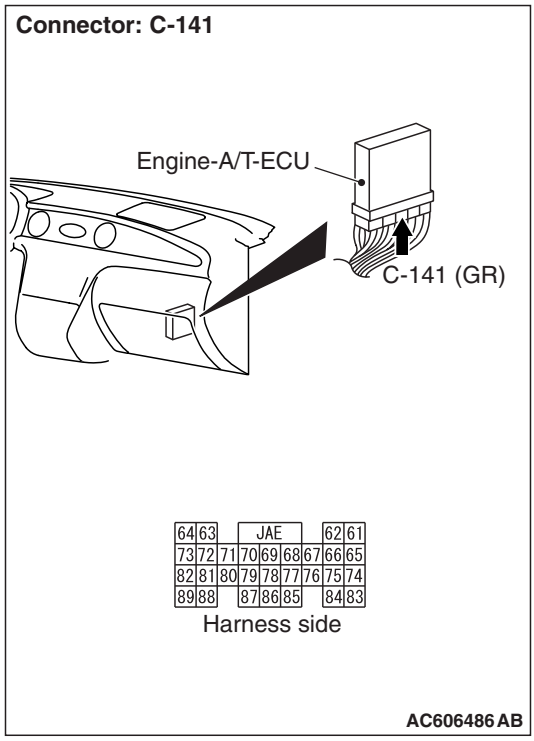


Check for the contact with terminals.

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-36 terminal No.1 and engine-A/T-ECU connector C-141 terminal No.88.

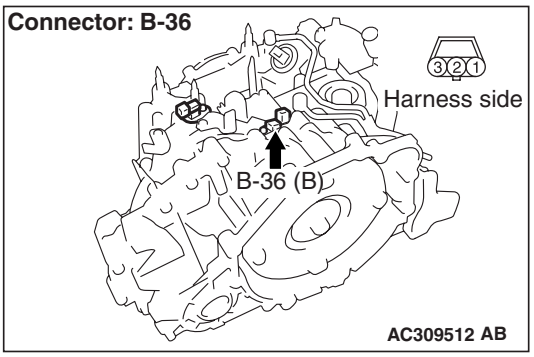




Check the earth line for open circuit.

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-36.

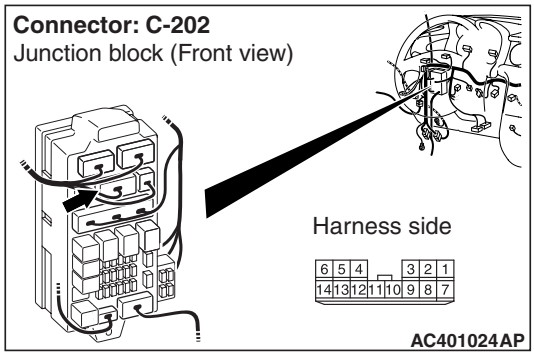


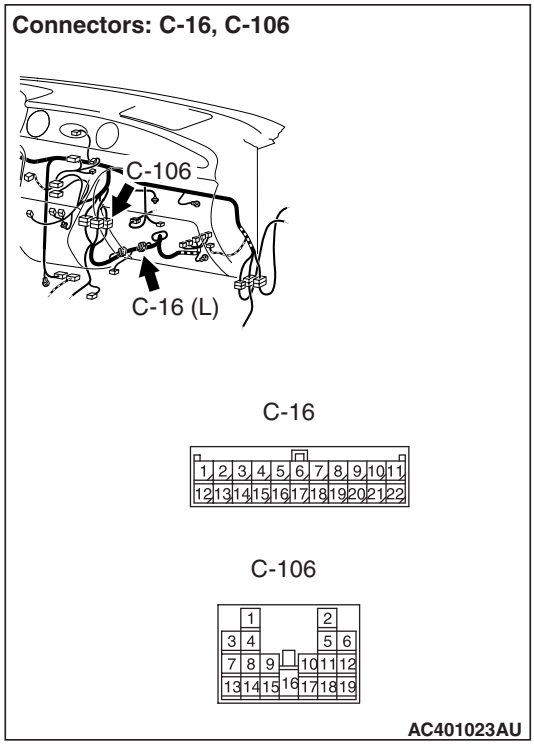
(1) Disconnect the connector, and measure the voltage between terminal 3 and earth at the wiring harness side.
(2) Turn the ignition switch to the ON position.

OK: System voltage

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

STEP 10. Connectors check: C-202 J/B connector, C-106 intermediate connector, C-16 J/C (1)

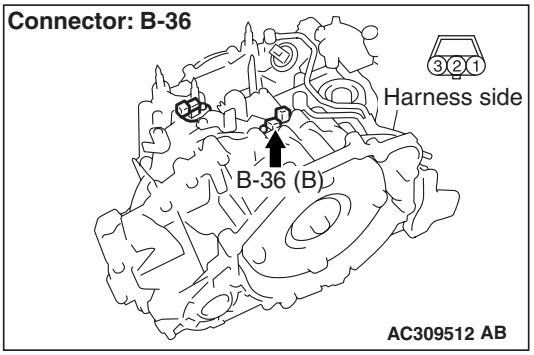


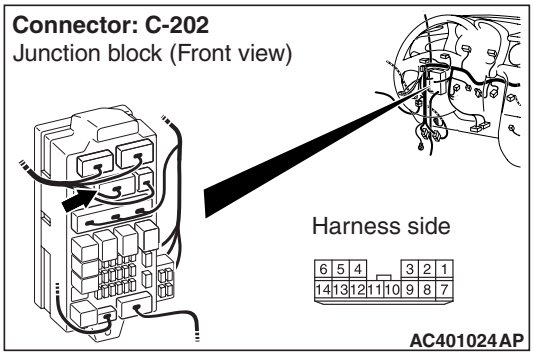


Check for the contact with terminals.

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-36 terminal No.3 and junction block connector C-202 terminal No.12.

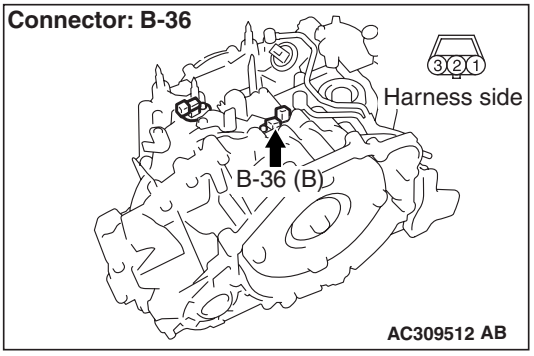




Check the power supply line for short or open circuit.

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-36.



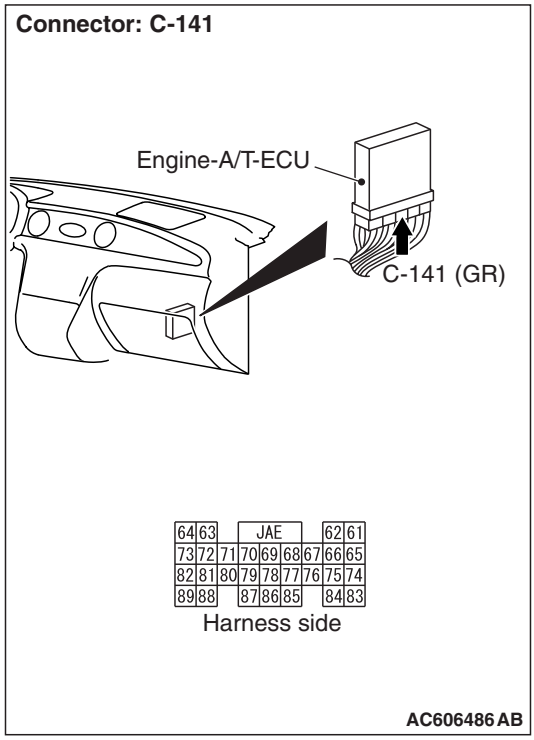
(1) Disconnect the connector, and measure the voltage between terminal 2 and earth at the wiring harness side.
(2) Turn the ignition switch to the ON position.

OK: 4.5 – 4.9 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-141.

(1) Disconnect input shaft speed sensor connector B-36.
(2) Turn the ignition switch to the ON position.

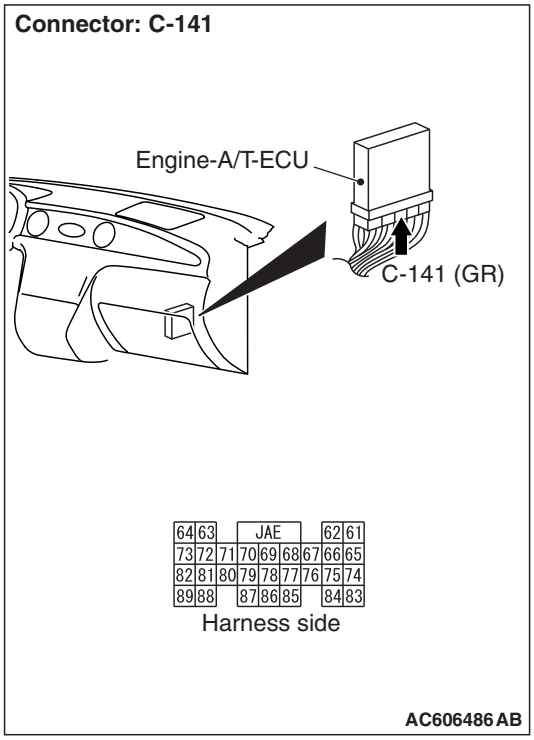


(3) Measure the voltage between engine-A/T-ECU connector C-141 terminal No.64 and earth.

OK: 4.5 – 4.9 V

Q: Is the check result normal?
YES : Go to Step 16.
NO : Go to Step 14.

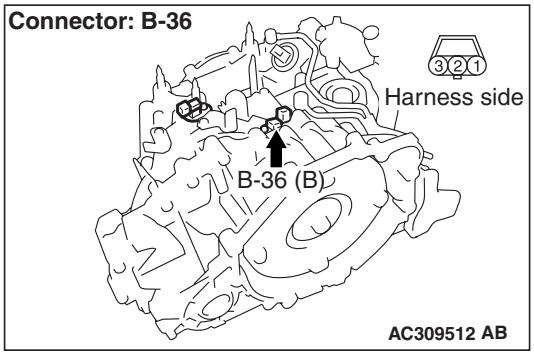
STEP 14. Connector check: C-141 engine-A/T-ECU connector

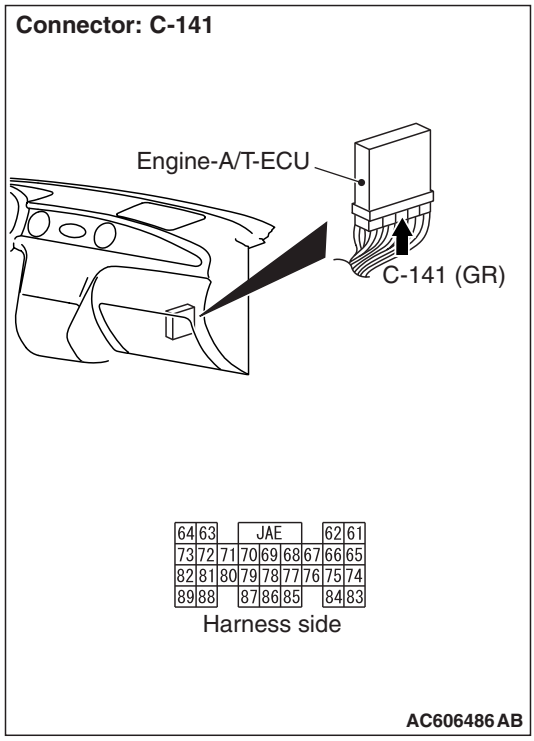


Check for the contact with terminals.

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-36 terminal No.2 and engine-A/T-ECU connector C-141 terminal No.64.

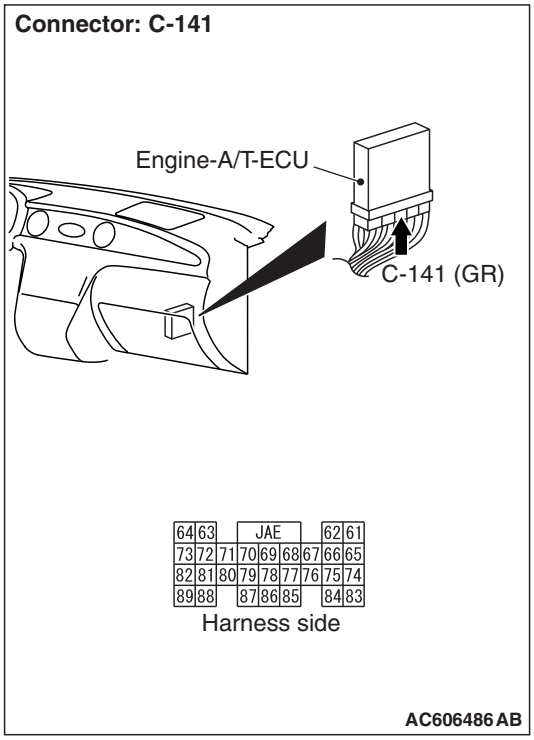




Check the output line for short circuit.

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

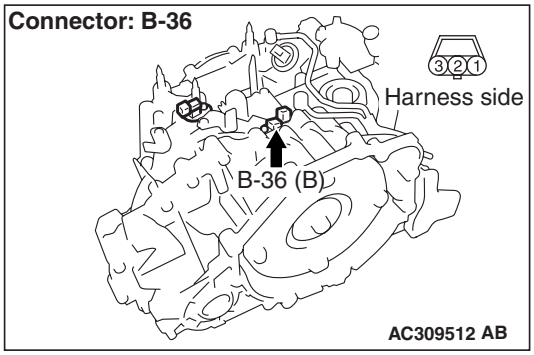
STEP 16. Connector check: C-141 engine-A/T-ECU connector

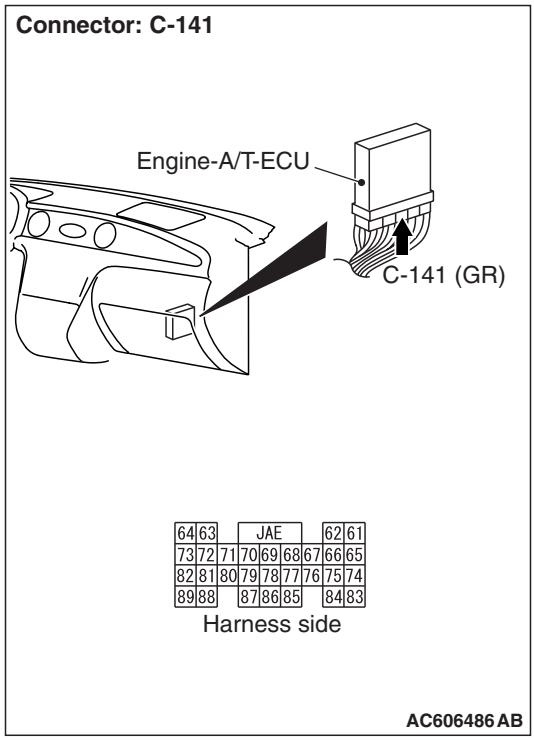


Check for the contact with terminals.

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-36 terminal No.2 and engine-A/T-ECU connector C-141 terminal No.64.



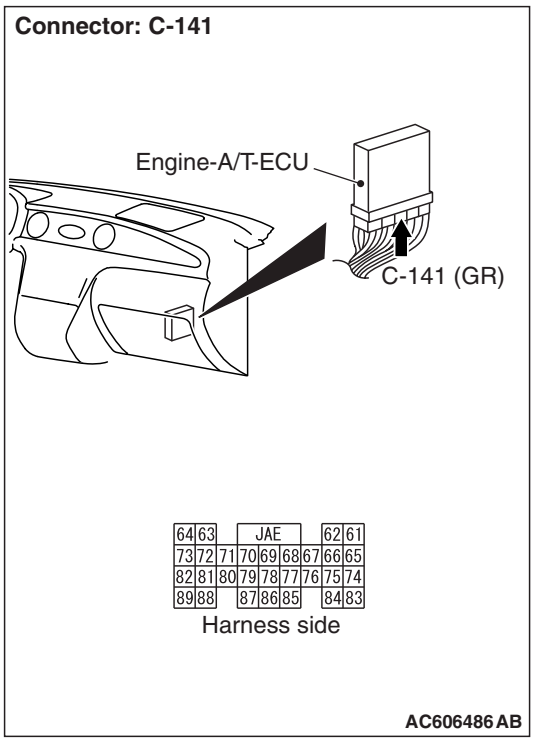


Check the output line for open circuit.

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-141 (using an oscilloscope).

(1) Shift the selector lever to the D range.
(2) Accelerate the vehicle to approximately 50 km/h (shift range; 3rd).

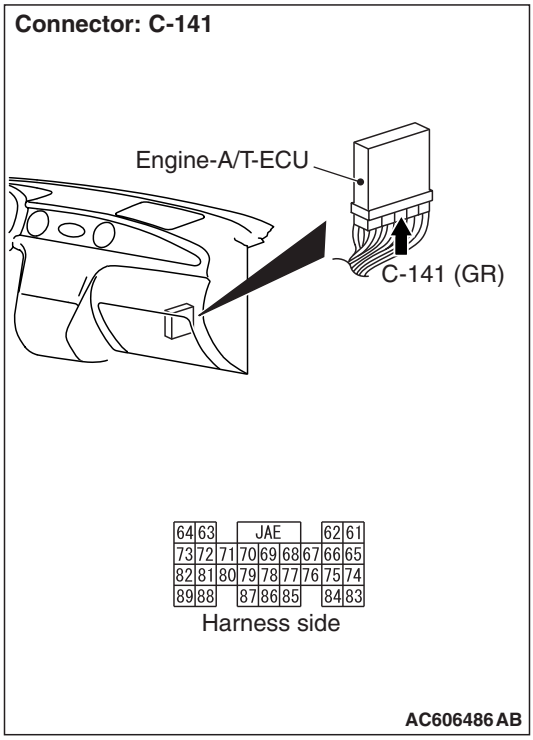


(3) Connect an oscilloscope, and measure the voltage between engine-A/T-ECU connector C-141 terminal No.64 and earth.

OK: A wave pattern such as the one shown on P.23A-120 (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-141 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.

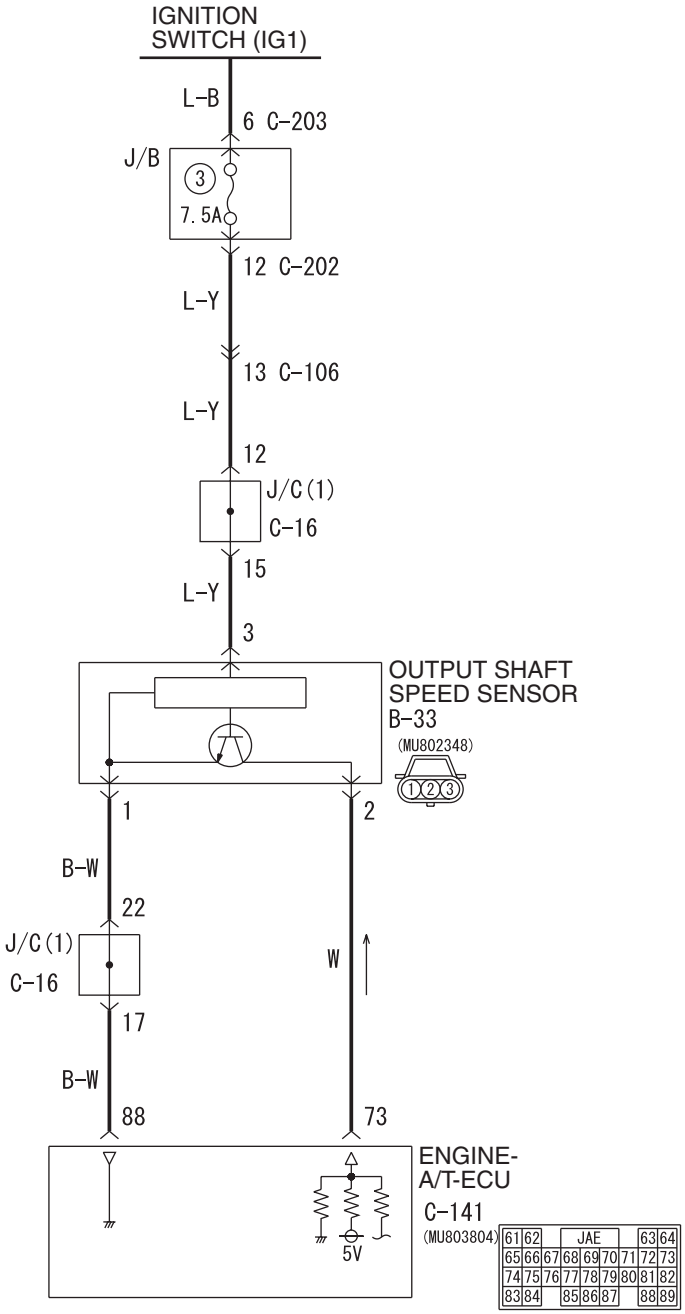
STEP 21. Underdrive clutch retainer inspection

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

W4Z23E02AA
AC309574AC

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.

PROBABLE 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

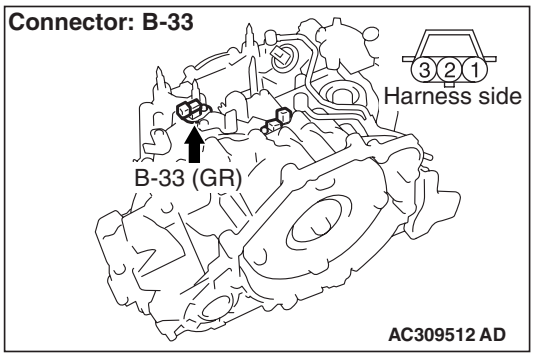
DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-II/III data list

Item 23: Output shaft speed sensor (Refer to data list reference table P.23A-114).

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).
NO : Go to Step 2.

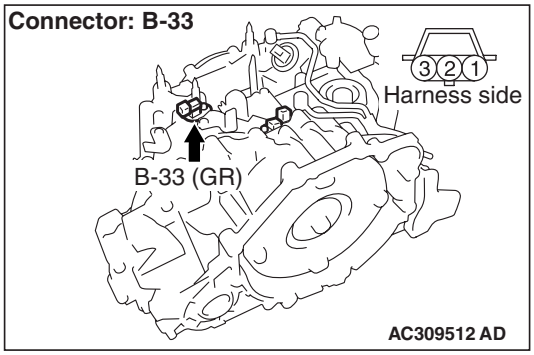
STEP 2. Connector check: B-33 output shaft speed sensor connector



Check for the contact with terminals.

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

STEP 3. Measure the resistance at output shaft speed sensor connector B-33.



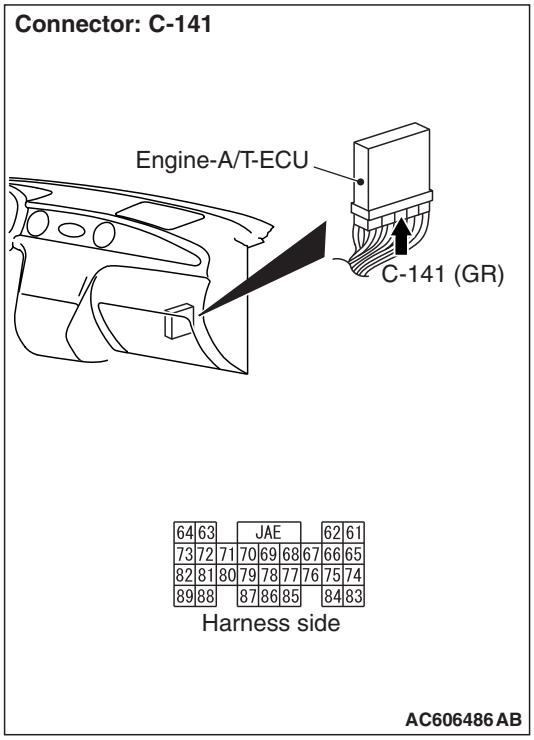
Disconnect the connector, and measure the resistance between terminal 1 and earth at the wiring harness side.

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-141.

(1) Connect output shaft speed sensor connector B-33.
(2) Turn the ignition switch to the "ON" position.

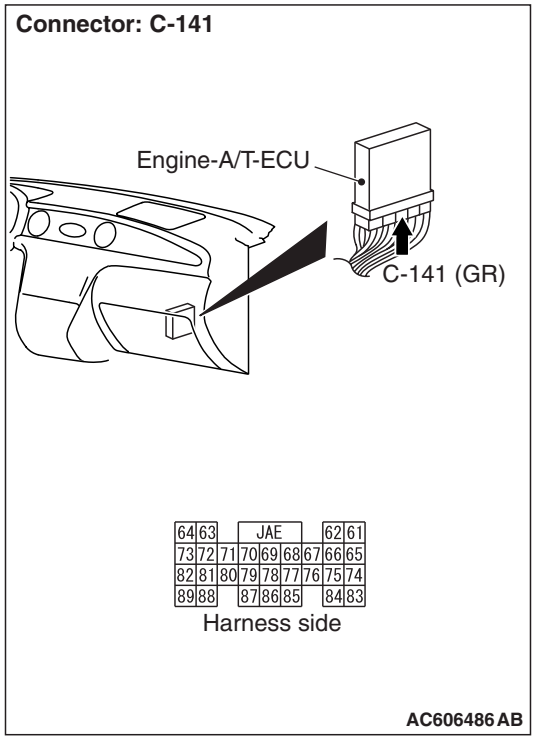


(3) Measure the voltage between engine-A/T-ECU connector C-141 terminal No.88 and earth.

OK: 0.5 V or less

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

STEP 5. Connector check: C-141 engine-A/T-ECU connector



Check for the contact with terminals.

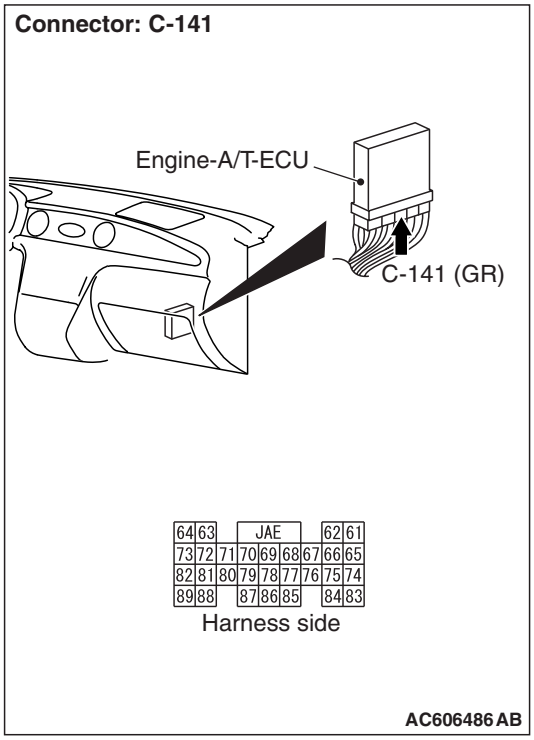
Q: Is the check result normal?
YES : Go to Step 6.
NO : Repair the defective connector.

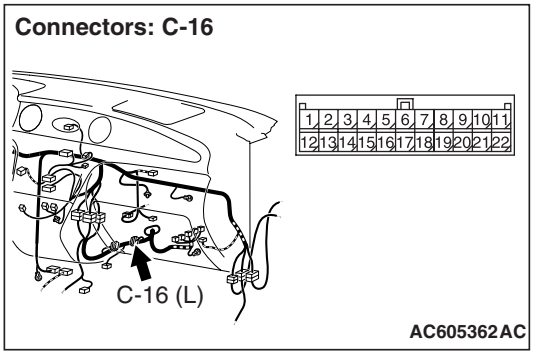
STEP 6. M.U.T.-II/III data list

Item 23: Output shaft speed sensor (Refer to data list reference table P.23A-114).

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).
NO : Replace the engine-A/T-ECU.

STEP 7. Connector check: C-141 engine-A/T-ECU connector, C-16 J/C (1)

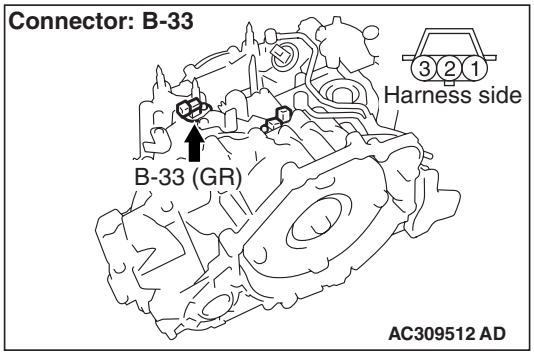


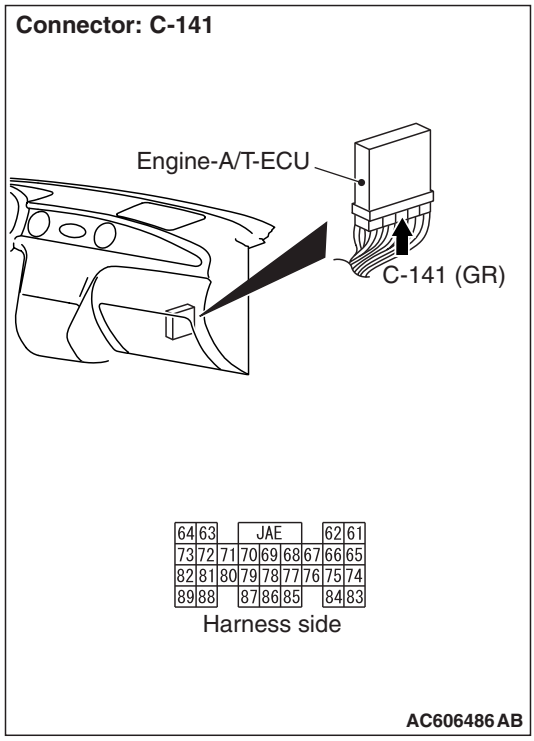


Check for the contact with terminals.

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-33 terminal No.1 and engine-A/T-ECU connector C-141 terminal No.88.

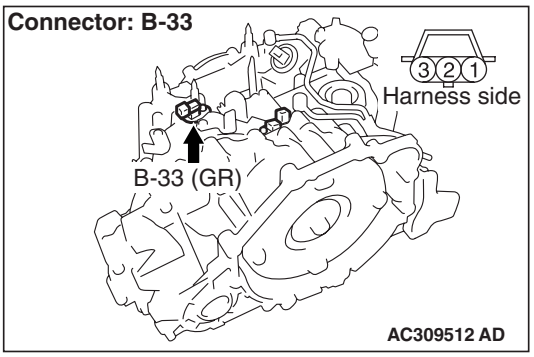




Check the earth line for open circuit.

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-33.

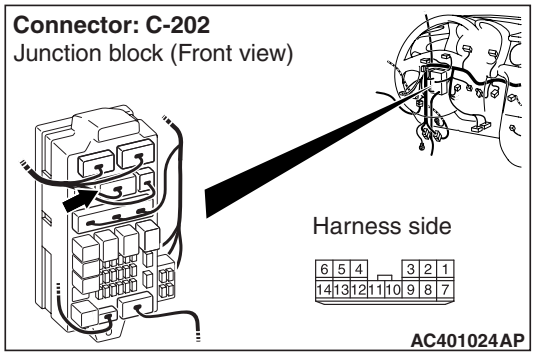


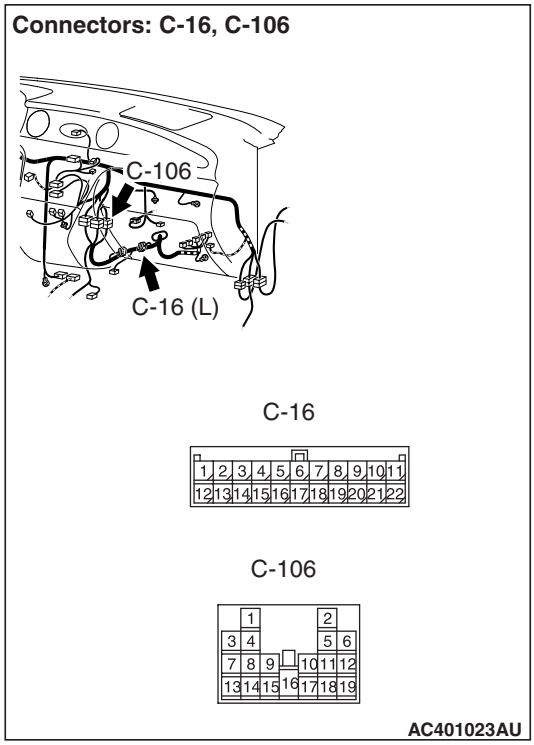
(1) Disconnect the connector, and measure the voltage between terminal 3 and earth at the wiring harness side.
(2) Turn the ignition switch to the ON position.

OK: System voltage

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

STEP 10. Connectors check: C-202 J/B connector, C-106 intermediate connector, C-16 J/C (1)

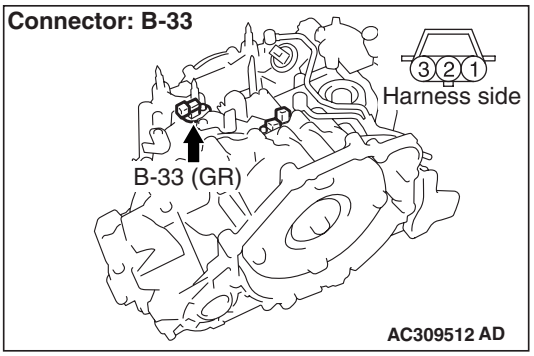


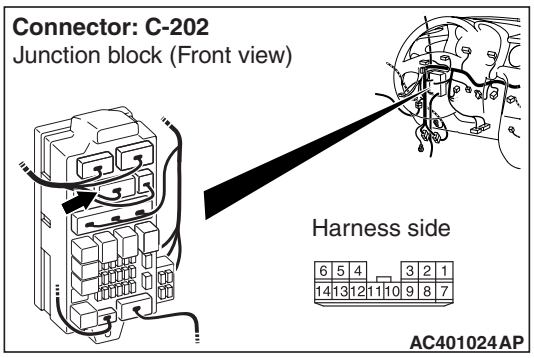


Check for the contact with terminals.

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-33 terminal No.3 and junction block connector C-202 terminal No.12.

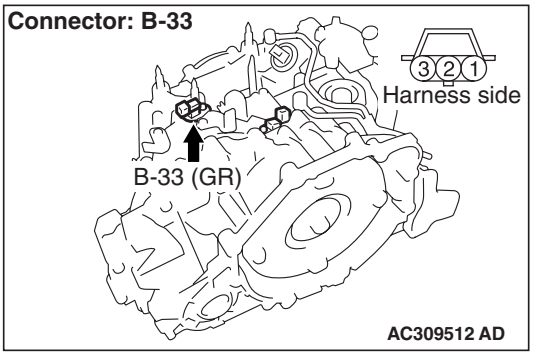




Check the power supply line for short or open circuit.

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-33.



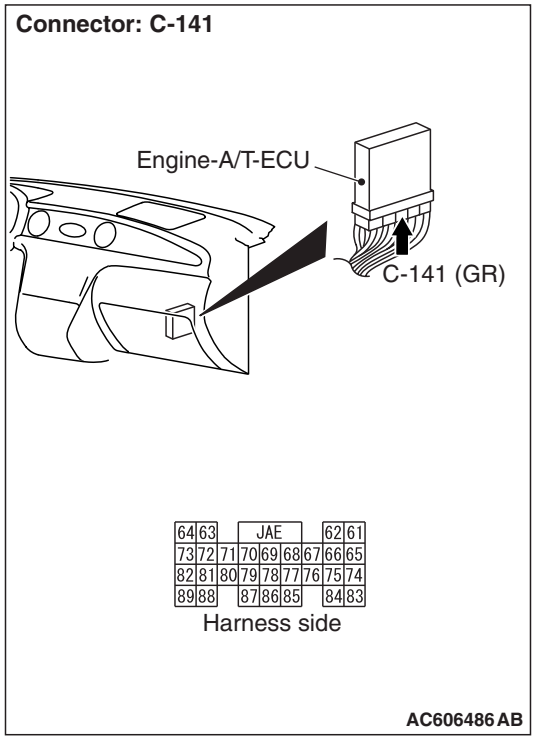
(1) Disconnect the connector, and measure the voltage between terminal 2 and earth at the wiring harness side.
(2) Turn the ignition switch to the ON position.

OK: 4.5 – 4.9 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-141.

(1) Disconnect output shaft speed sensor connector B-33.
(2) Turn the ignition switch to the "ON" position.

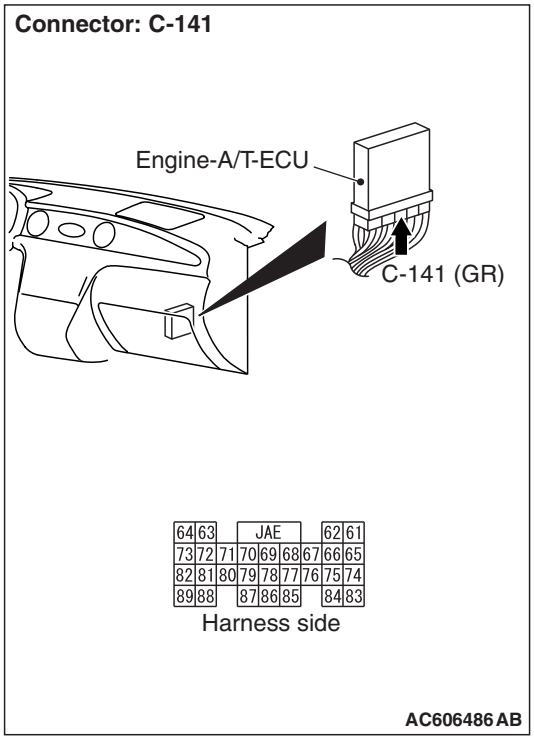


(3) Measure the voltage between engine-A/T-ECU connector C-141 terminal No.73 and earth.

OK: 4.5 – 4.9 V

Q: Is the check result normal?
YES : Go to Step 16.
NO : Go to Step 14.

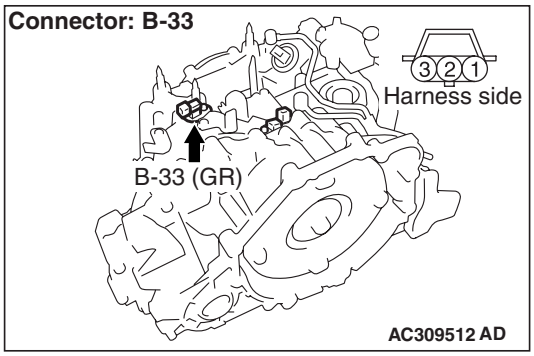
STEP 14. Connector check: C-141 engine-A/T-ECU connector

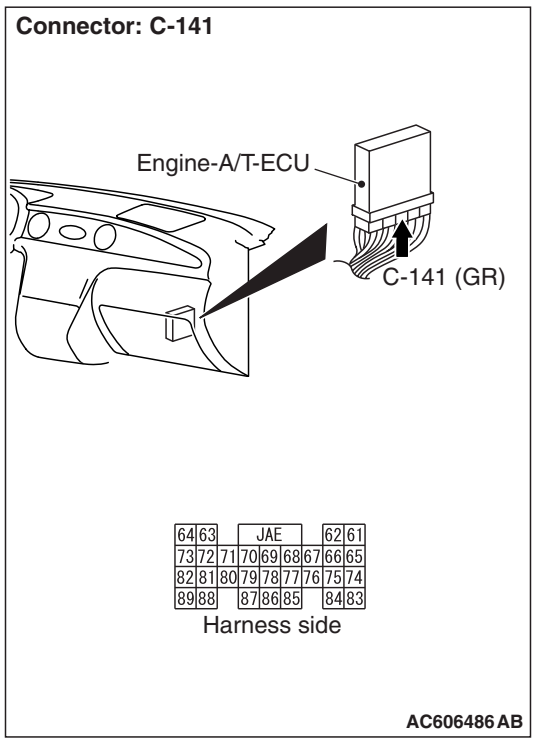


Check for the contact with terminals.

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-33 terminal No.2 and engine-A/T-ECU connector C-141 terminal No.73.

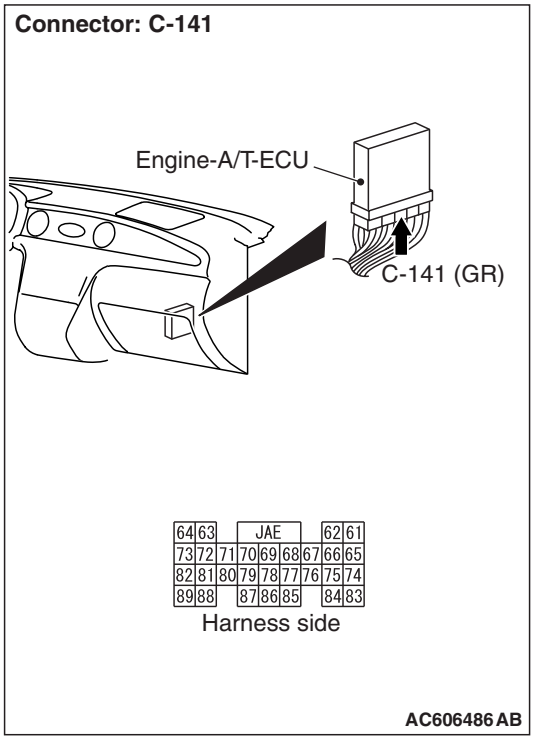




Check the output line for short circuit.

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

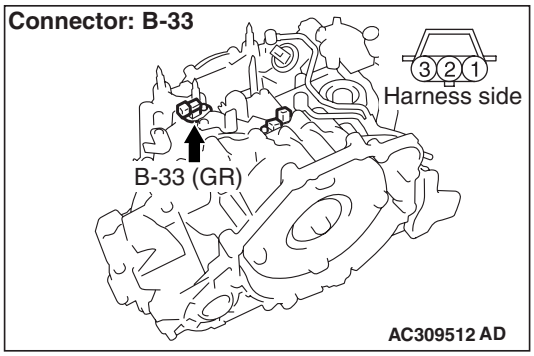
STEP 16. Connector check: C-141 engine-A/T-ECU connector

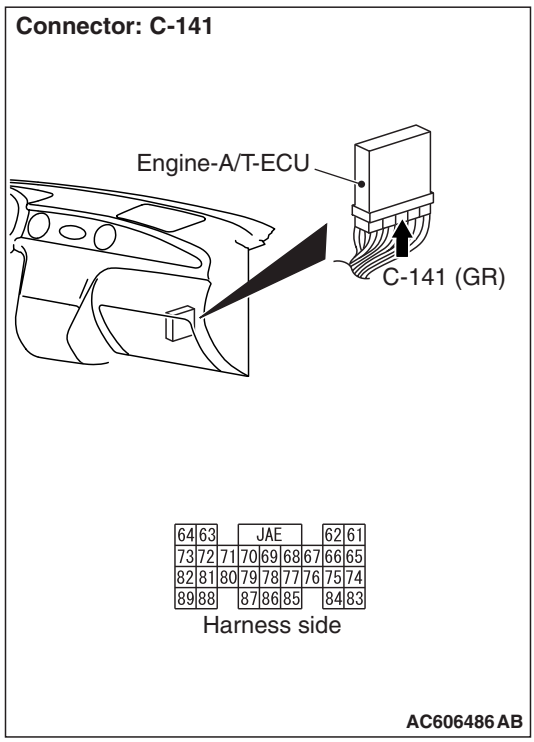


Check for the contact with terminals.

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-33 terminal No.2 and engine-A/T-ECU connector C-141 terminal No.73.



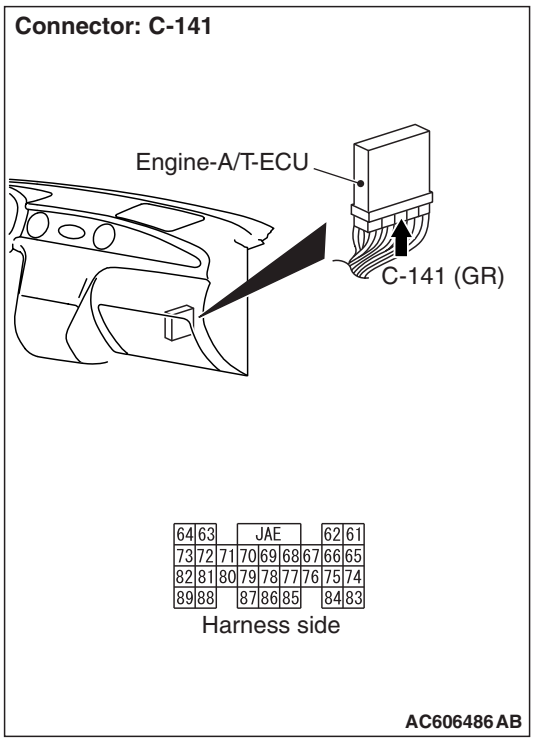


Check the output line for open circuit.

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-141 (using an oscilloscope).

(1) Shift the selector lever to the D range.
(2) Accelerate the vehicle to approximately 50 km/h (shift range; 3rd.)

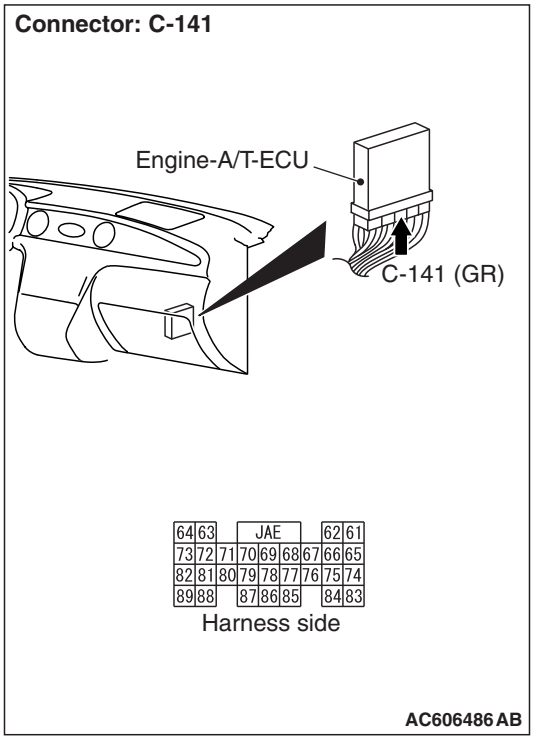


(3) Connect an oscilloscope, and measure the voltage between engine-A/T-ECU connector C-141 terminal No.73 and earth.

OK: A wave pattern such as the one shown on P.23A-120 (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-141 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.

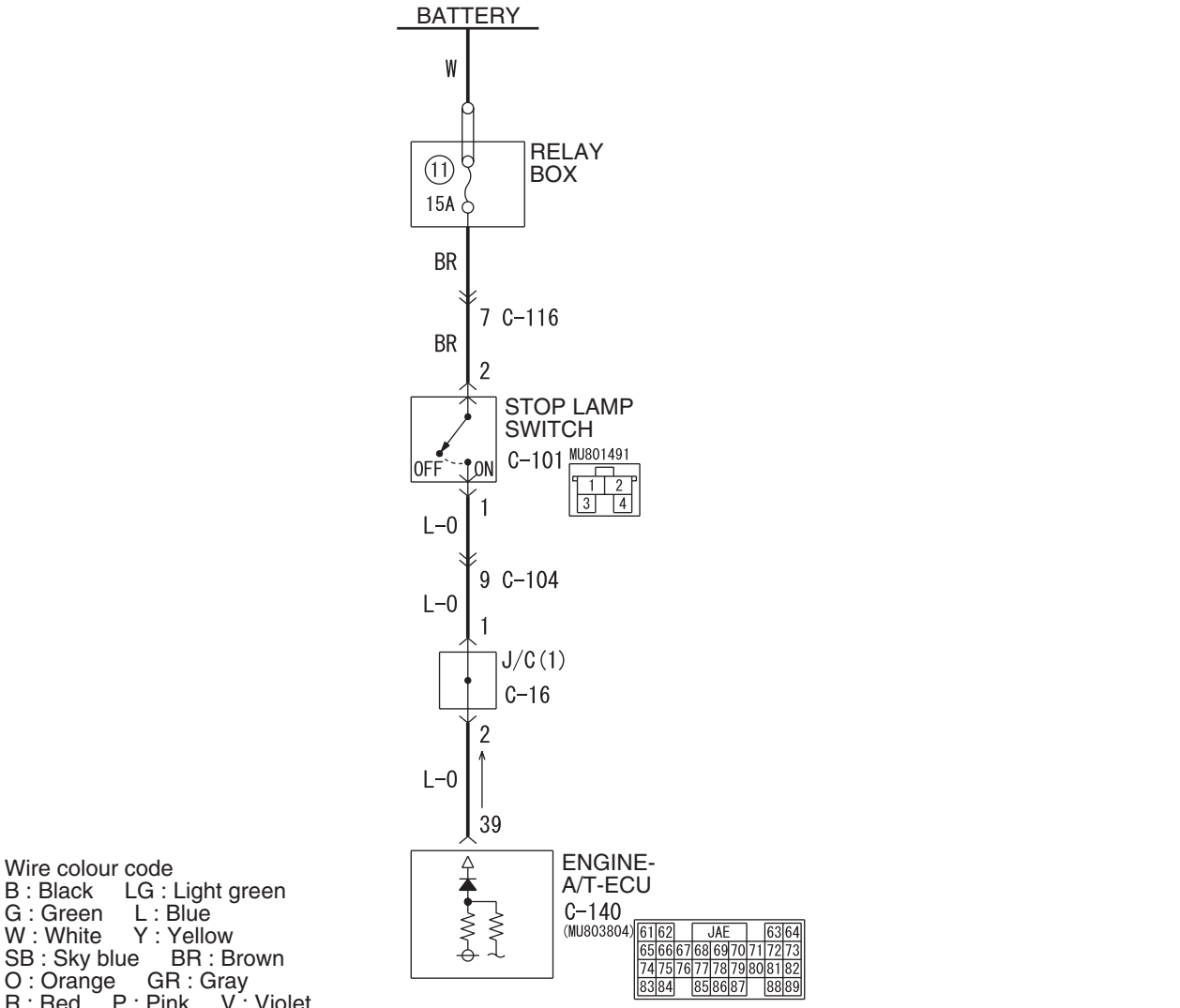
STEP 21. Check the transfer drive gear and driven gear.

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



W4P23E03AA
AC309565AC

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 CONDITION

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.

PROBABLE CAUSES

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

DIAGNOSIS PROCEDURE

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.

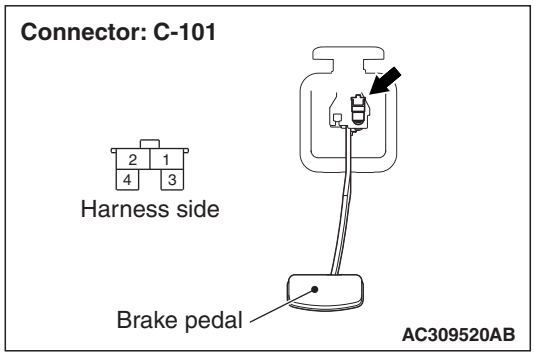
STEP 3. Check the stop lamp switch.
Refer to GROUP 35A – Brake Pedal and Stop Lamp Switch Continuity Check. (Refer to P.35A-13.)

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

STEP 4. M.U.T.-II/III data list
Item 26: Stop lamp switch (Refer to data list reference table P.23A-114.)

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6.)
NO : Go to Step 5.

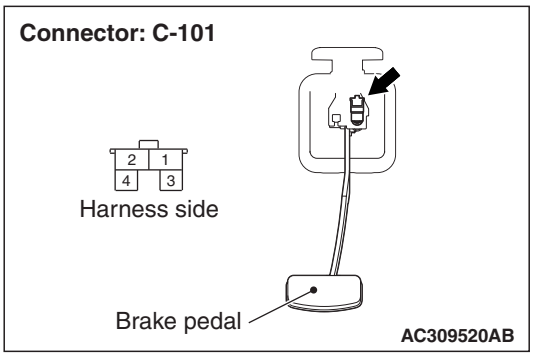
STEP 5. Connector check: C-101 stop lamp switch connector



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-101.

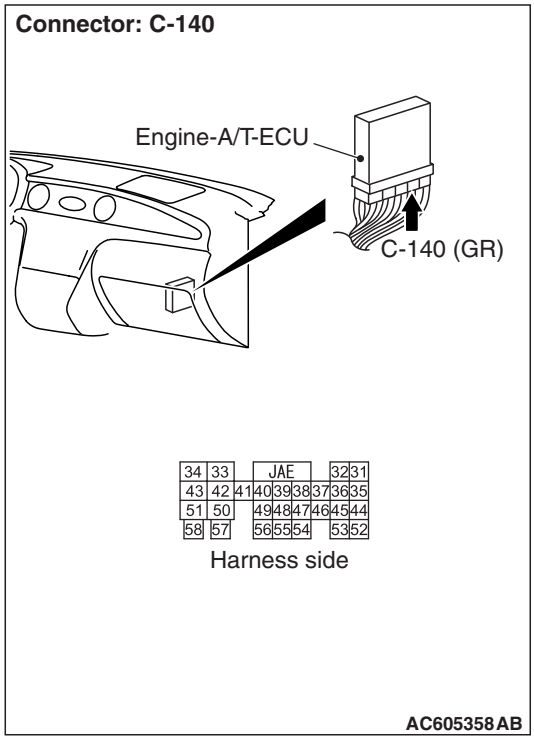


Disconnect the connector, and measure the voltage between terminal No.2 and earth at the harness side.

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-140.
(1) Connect stop lamp switch connector C-101.

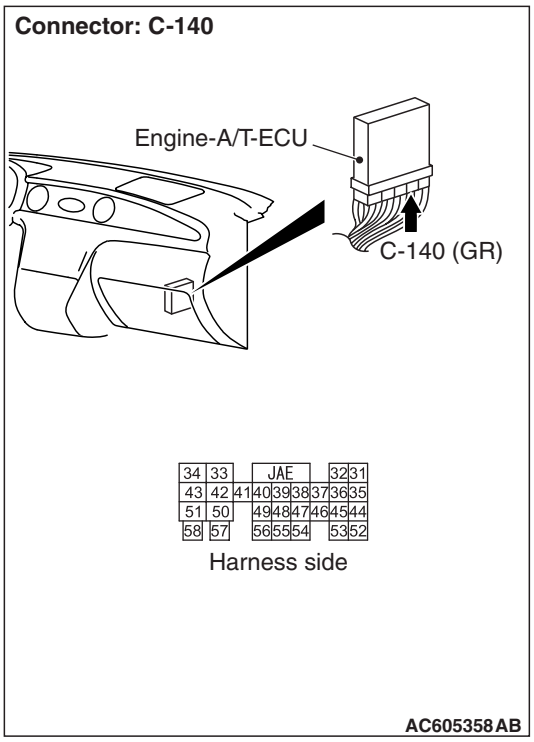


(2) Measure the voltage between engine-A/T-ECU connector C-140 terminal No.39 and earth.

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-140 engine-A/T-ECU connector



Check for the contact with terminals.

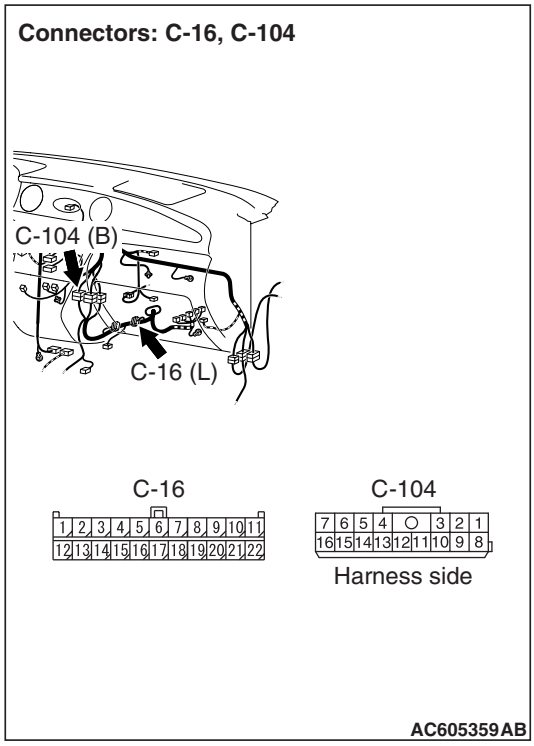
Q: Is the check result normal??
YES : Go to Step 9.
NO : Repair the defective connector.

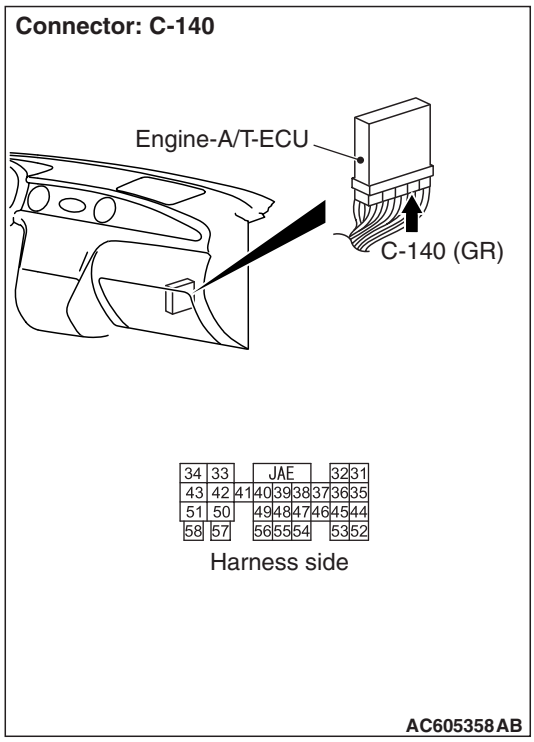
STEP 9. M.U.T.-II/III data list

Item 26: Stop lamp switch (Refer to data list reference table P.23A-114.)

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6.)
NO : Replace the engine-A/T-ECU.

STEP 10. Connectors check: C-104 intermediate connector, C-16 J/C (1), C-140 engine-A/T-ECU connector

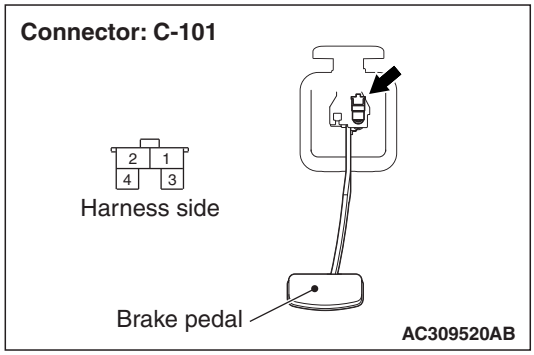


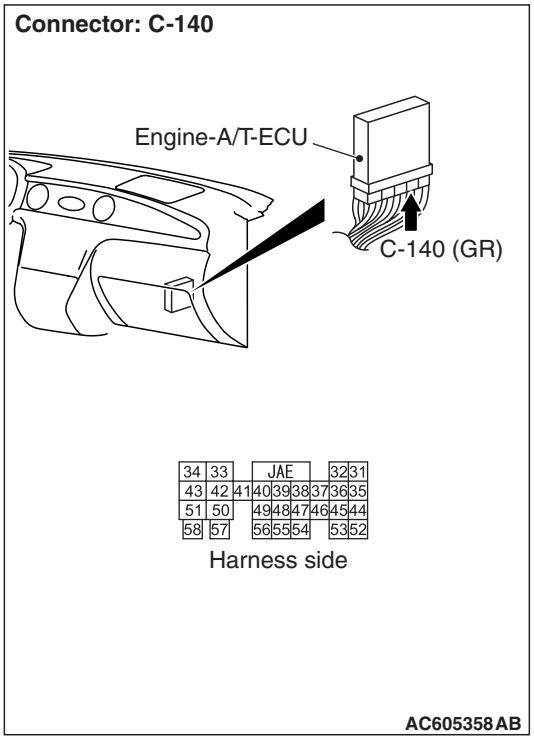


Check for the contact with terminals.

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-101 terminal No.1 and engine-A/T-ECU connector C-140 terminal No.39.

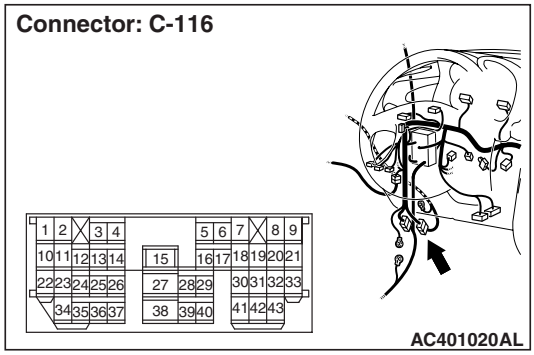




Check the output line for short or open circuit.

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

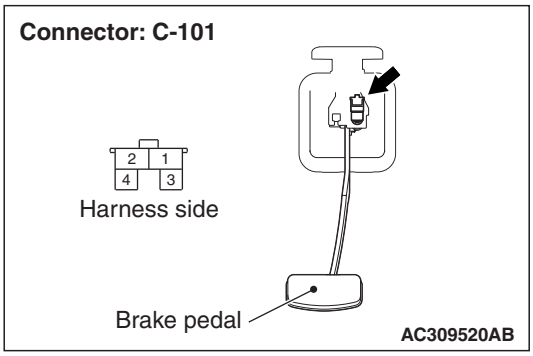
STEP 12. Connector check: C-116 intermediate connector



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-101 terminal No.2 and battery.

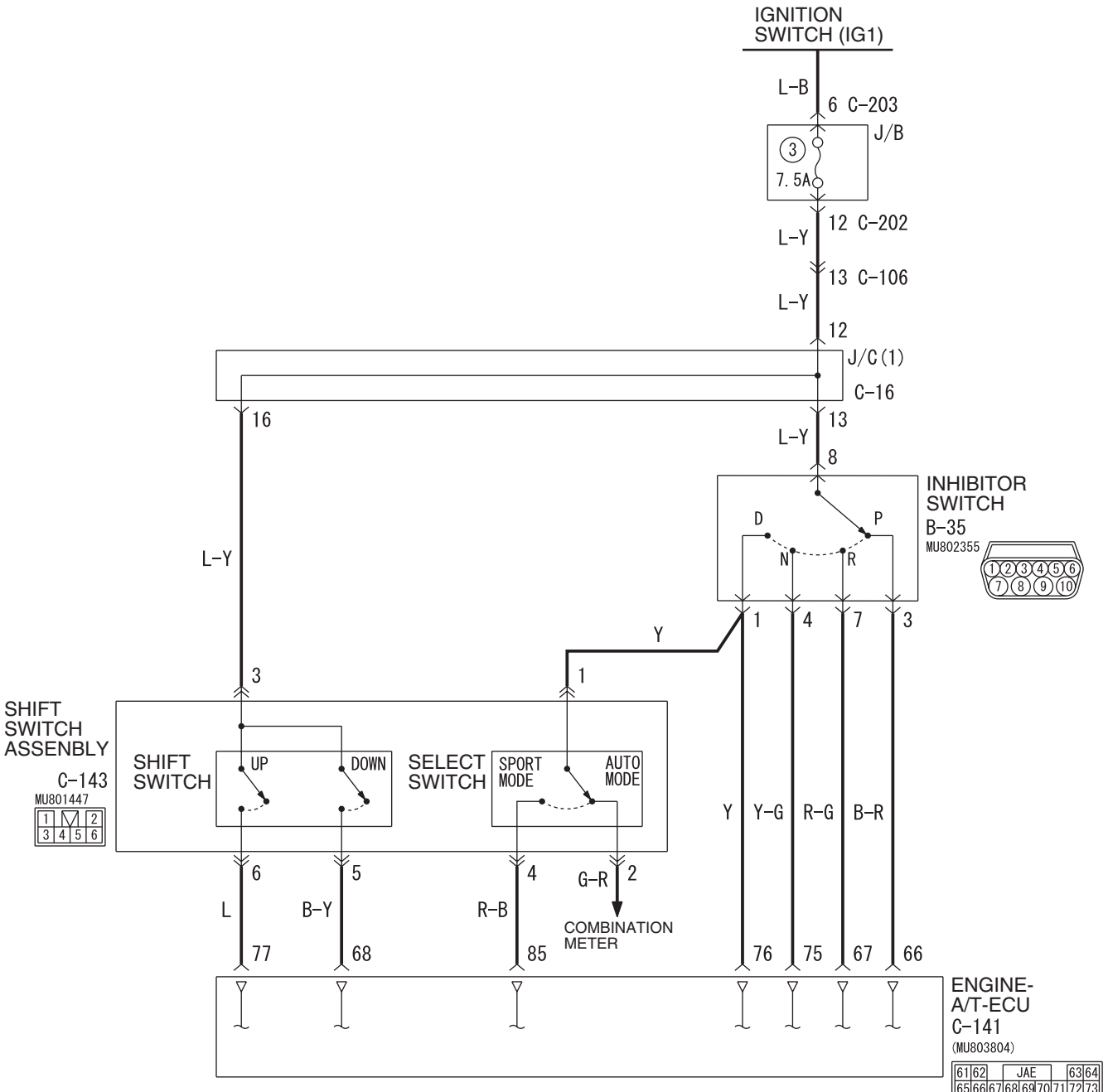


Check the power supply line for short or open circuit.

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



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

W4Z23E04AA
AC309566AD

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 diagnosis code No.27 will be set.

PROBABLE CAUSES

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

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-II/III data list

Item 61: Inhibitor switch P.23A-114 (Refer to data list reference table).

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).

NO <none of the selector lever positions are displayed on M.U.T. II/III> : Go to Step 2.

NO <only one of the selector lever positions is not displayed on M.U.T. II/III> : Go to Step 6.

STEP 2. Check the inhibitor switch.

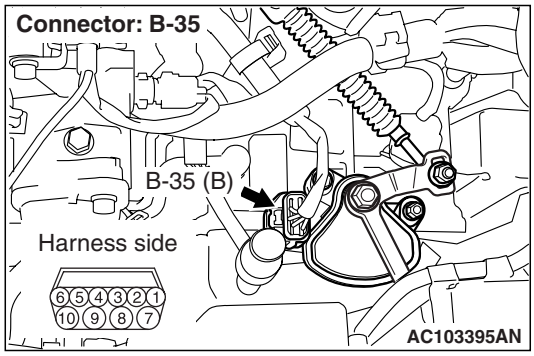
Refer to P.23A-126.

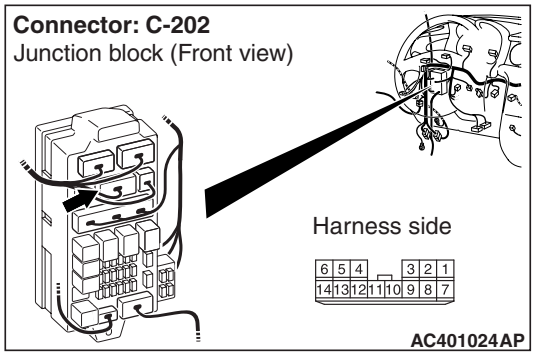
Q: Is the check result normal?

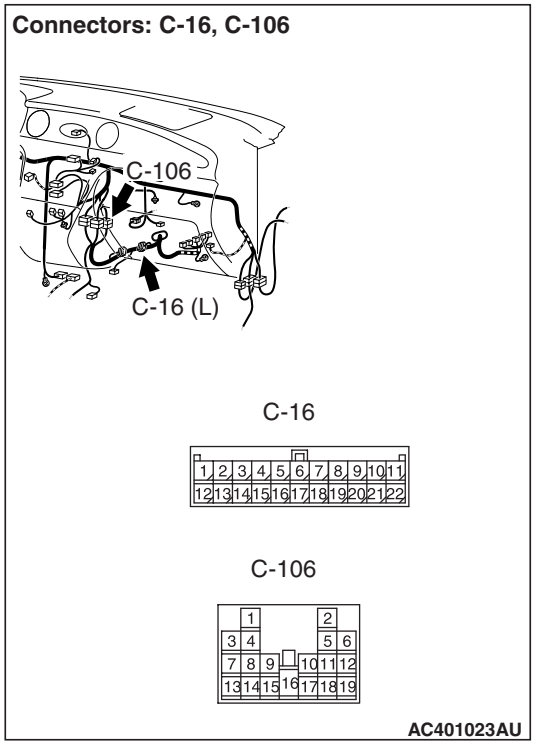
YES : Go to Step 3.

NO : Replace the inhibitor switch.

STEP 3. Connector check: B-35 Inhibitor switch connector, C-202 J/B connector, C-106 intermediate connector, C-16 J/C (1)







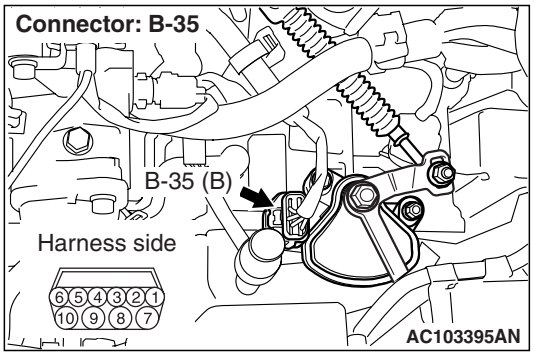
Check for the contact with terminals.

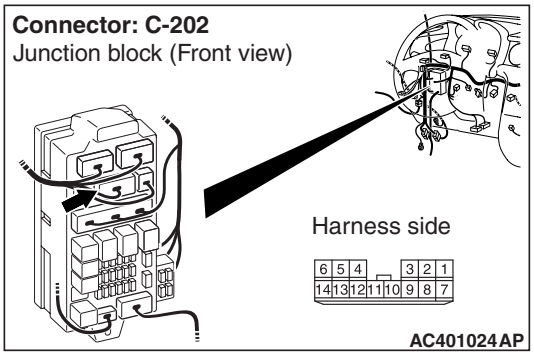
Q: Is the check result normal?

YES : Go to Step 4.

NO : Repair the defective connector.

STEP 4. Check the harness between inhibitor switch connector B-35 terminal No.8 and J/B connector C-202 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. M.U.T.-II/III data list

Item 61: Inhibitor switch P.23A-114 (Refer to data list reference table).

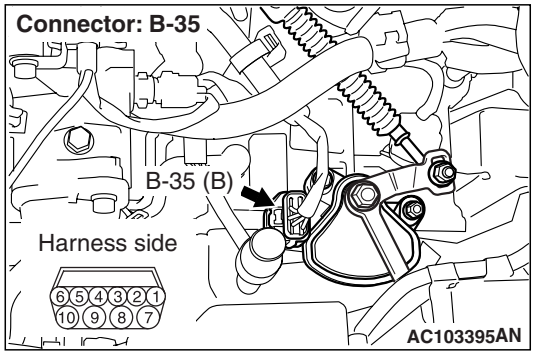
Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).
NO : Replace the engine-A/T-ECU.

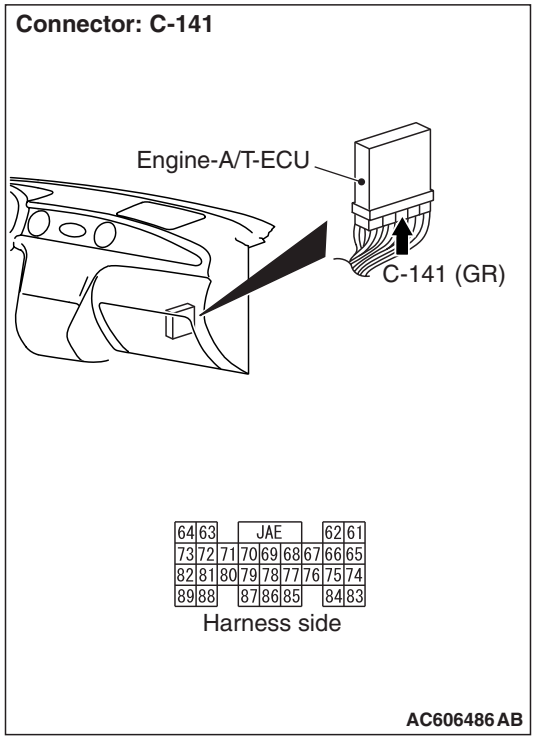
STEP 6. Check the inhibitor switch.

Refer to P.23A-126.

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

STEP 7. Connector check: B-35 inhibitor switch connector, C-141 engine-A/T-ECU connector

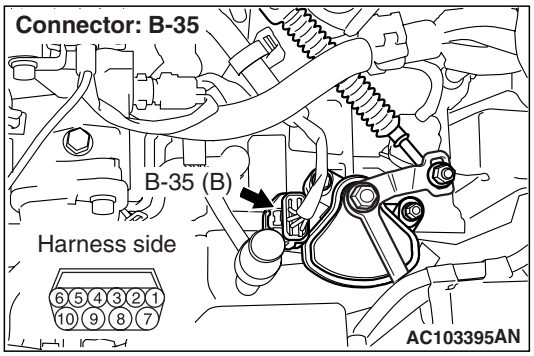


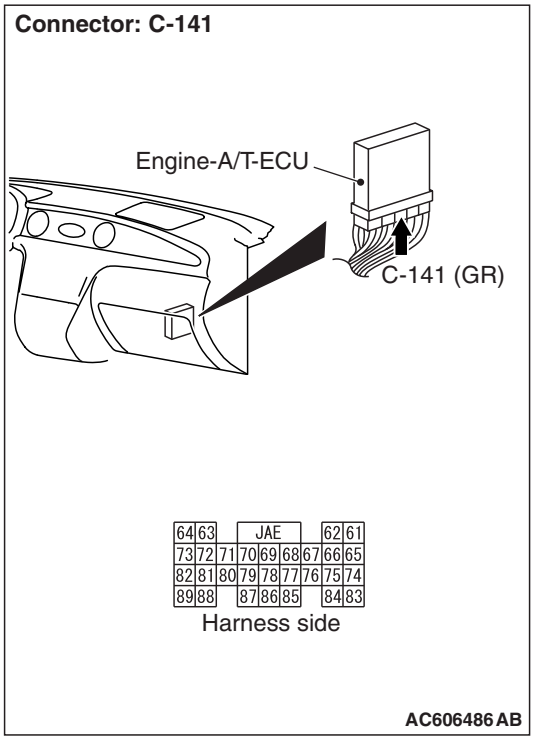


Check for the contact with terminals.

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-35 terminal No.3, 7, 4, 1 and engine-A/T-ECU connector C-141 terminal No.66, 67, 75, 76.

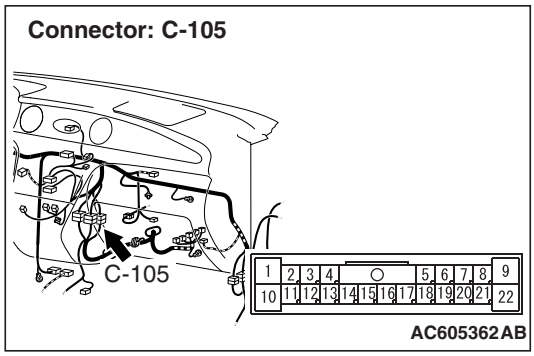


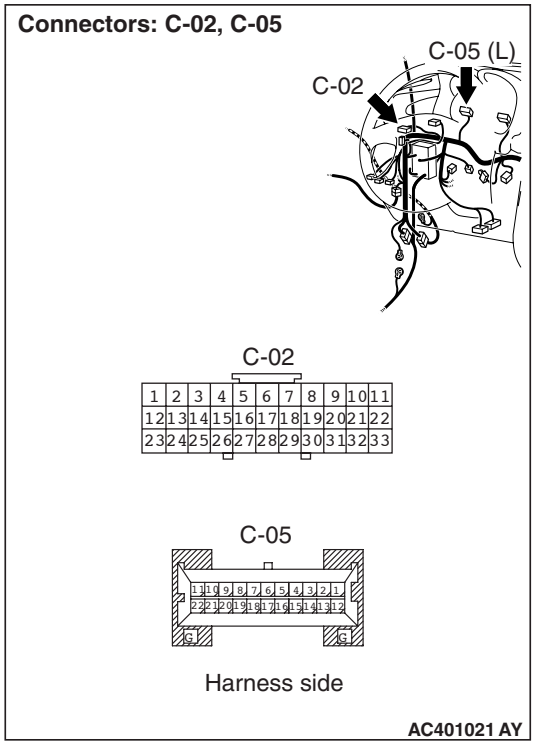


Check the output line for open circuit.

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

STEP 9. Connector check: C-105 intermediate connector, C-02 J/C (3), C-05 combination meter connector

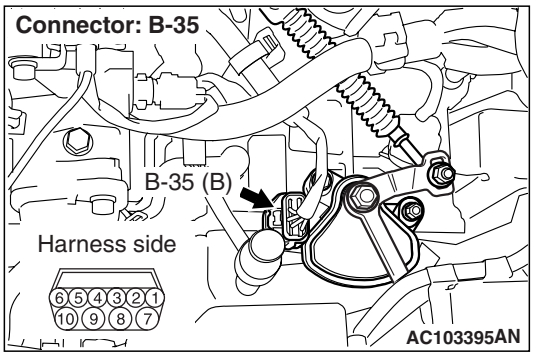


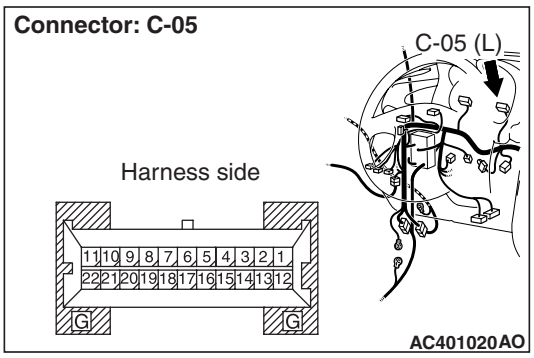


Check for the contact with terminals.

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-35 terminal No.3, 7, 4 and combination meter connector C-05 terminal No.4, 3, 2.

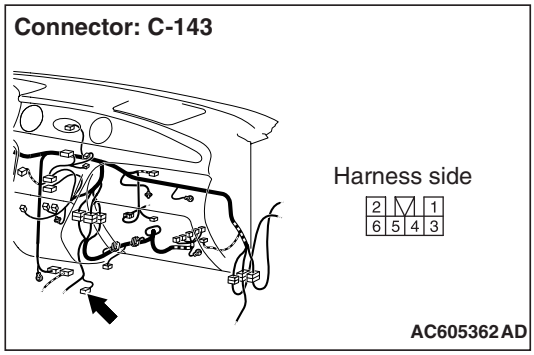




Check the output line for short circuit.

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

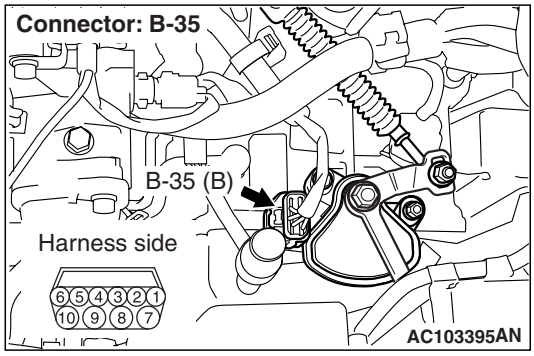
STEP 11. Connector check: C-143 shift switch assembly connector.

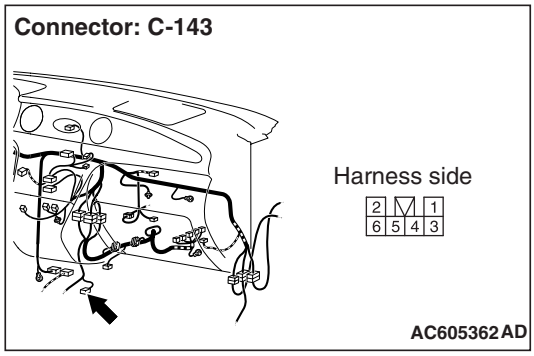


Check for the contact with terminals.

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

STEP 12. Check the harness between inhibitor switch connector B-35 terminal No.1, C-143 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-50.

OPERATION

Refer to P.23A-50.

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.

PROBABLE CAUSES

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

DIAGNOSIS PROCEDURE

STEP 1. Check the inhibitor switch.

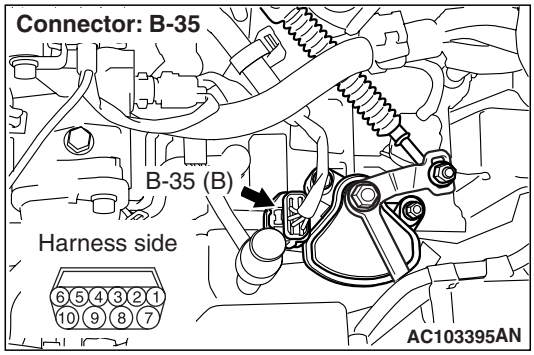
Refer to P.23A-126.

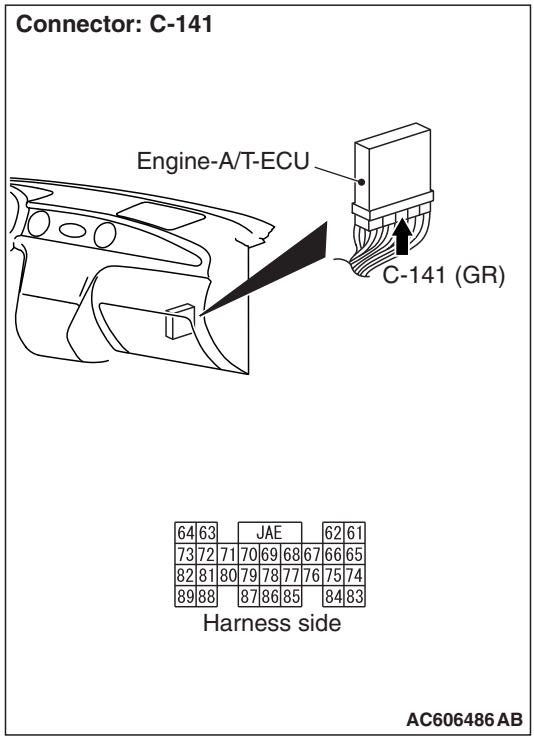
Q: Is the check result normal?

YES : Go to Step 2.

NO : Replace the inhibitor switch.

STEP 2. Connector check: B-35 Inhibitor switch connector, C-141 engine-A/T-ECU connector





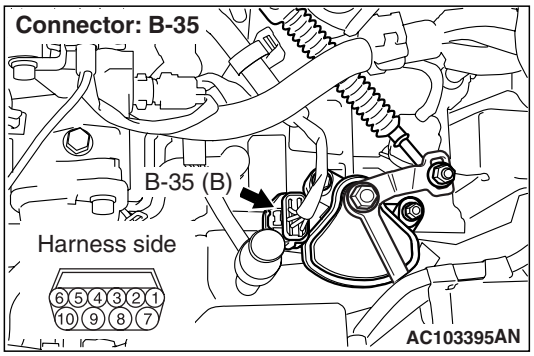
Check for the contact with terminals.

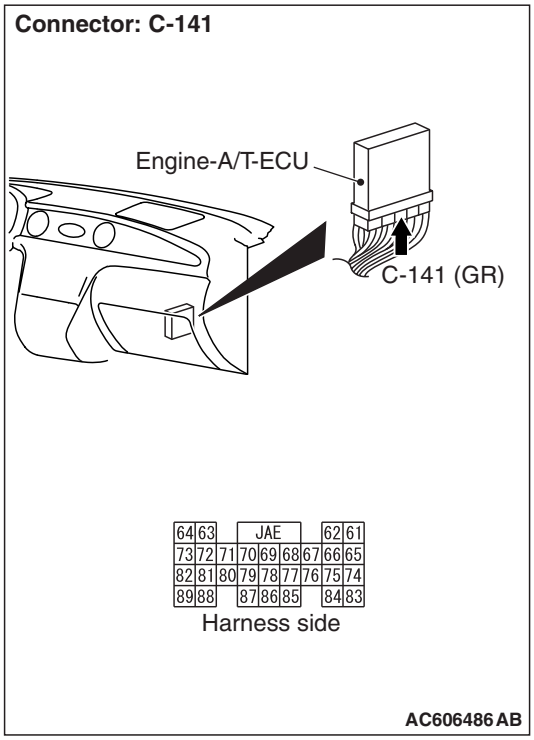
Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the defective connector.

STEP 3. Check the harness between inhibitor switch connector B-35 terminal No.3, 7, 4, 1 and engine-A/T-ECU connector C-141 terminal No.66, 67, 75, 76.

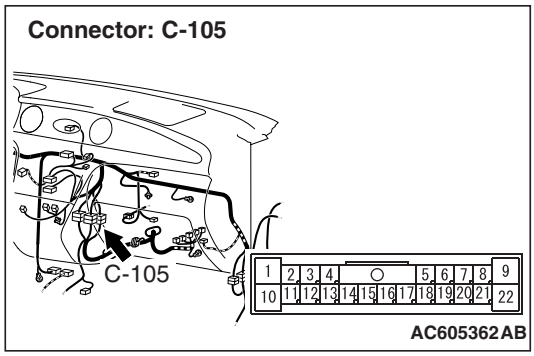


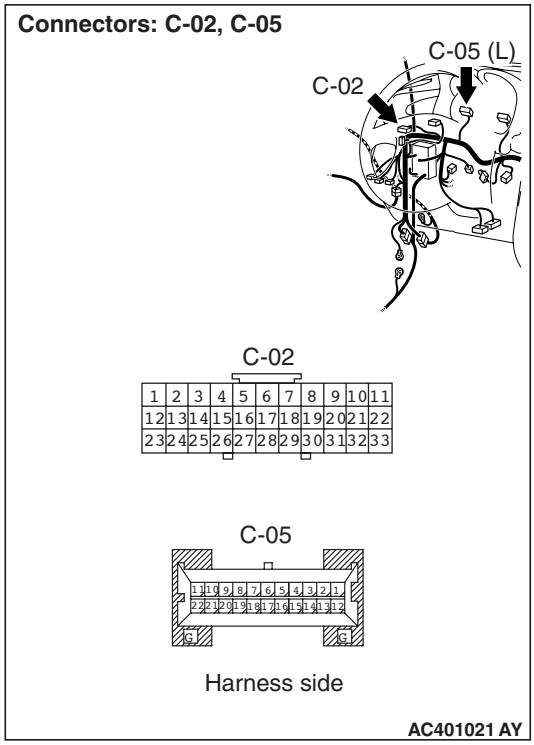


Check the output line for short circuit.

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

STEP 4. Connector check: C-105 intermediate connector, C-02 J/C (3), C-05 combination meter connector

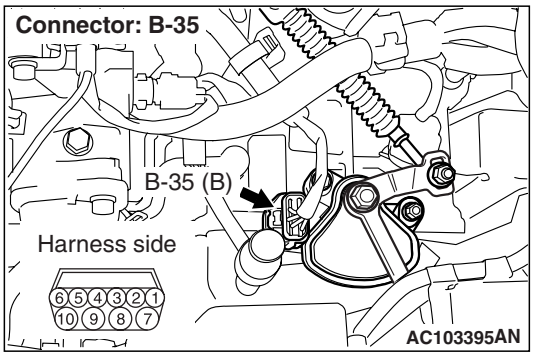


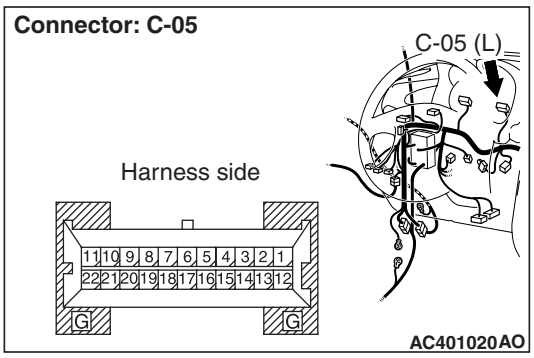


Check for the contact with terminals.

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-35 terminal No.3, 7, 4 and combination meter connector C-05 terminal No.4, 3, 2.

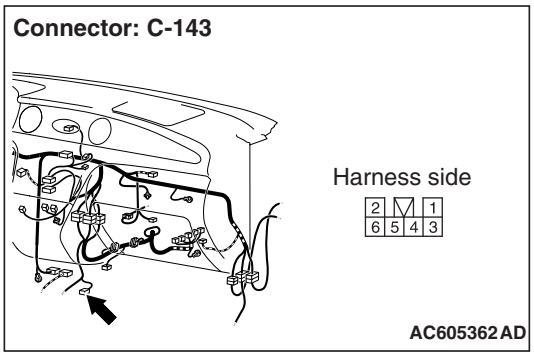




Check the output line for short circuit.

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

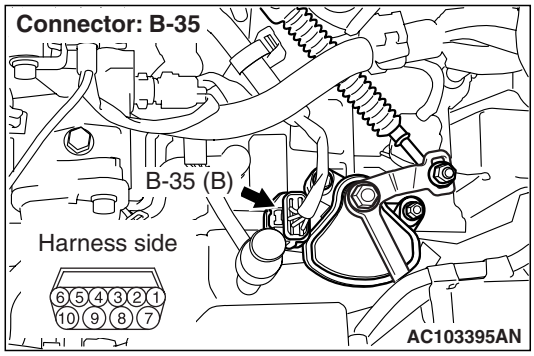
STEP 6. Connector check: C-143 shift switch assembly connector.

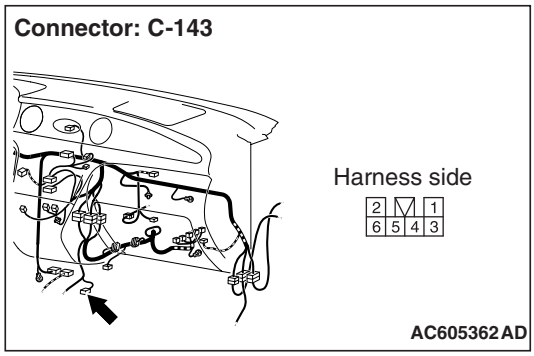


Check for the contact with terminals.

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

STEP 7. Check the harness between inhibitor switch connector B-35 terminal No.1, C-143 terminal No.1.





Check the output line for short circuit.

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

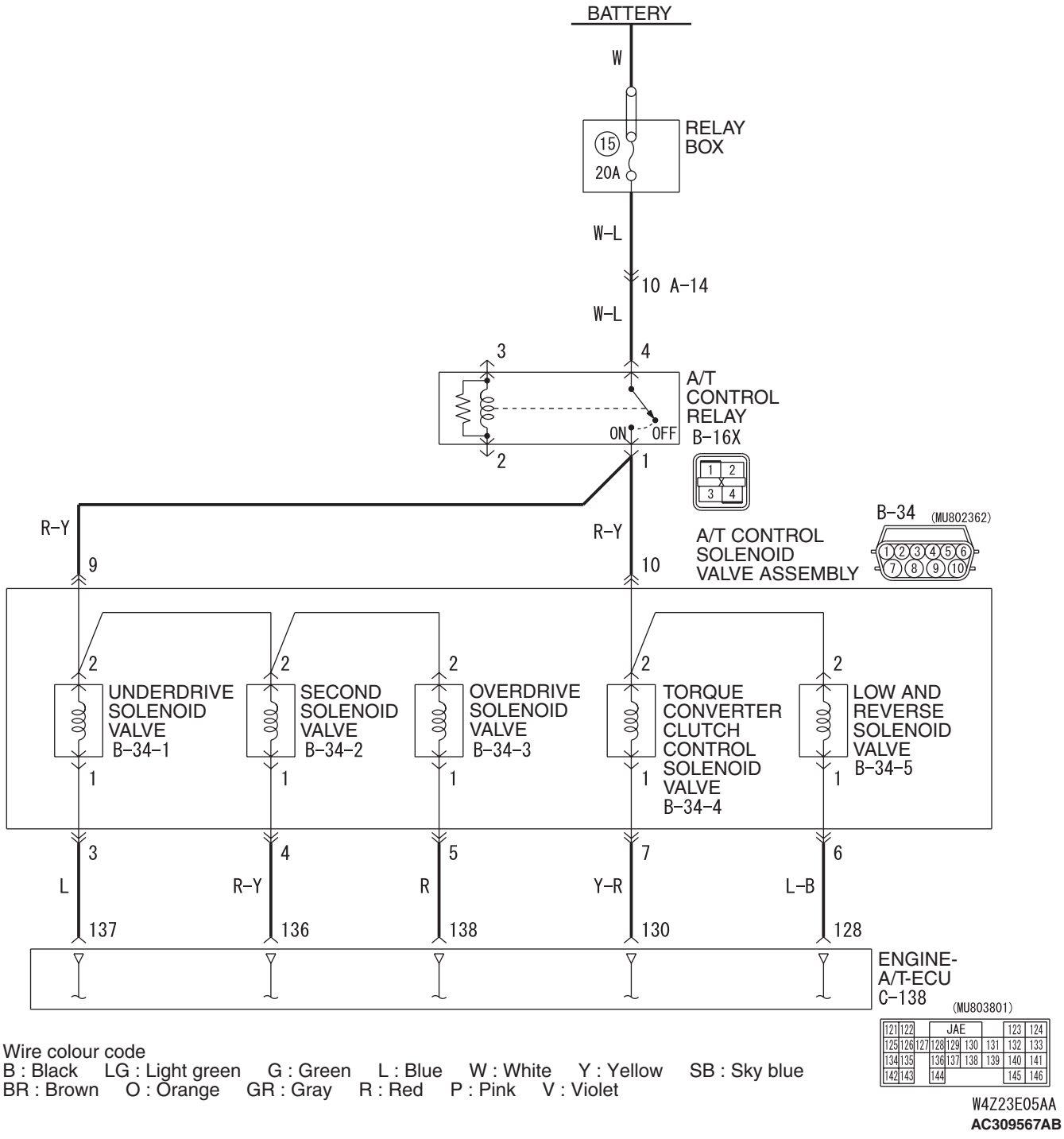
STEP 8. M.U.T.-II/III data list

Item 61: Inhibitor switch P.23A-114 (Refer to data list reference table).

Q: Is the check result normal?
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).
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

W4Z23E05AA
AC309567AB

OPERATION

- Solenoid valve closes or opens according to the signals from the engine-A/T-ECU.
- The engine-A/T-ECU energizes or deenergizes 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 output 4 times, the transmission is fixed in 3rd as a fail-safe measure.

PROBABLE CAUSES

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

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-II/III diagnosis code

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

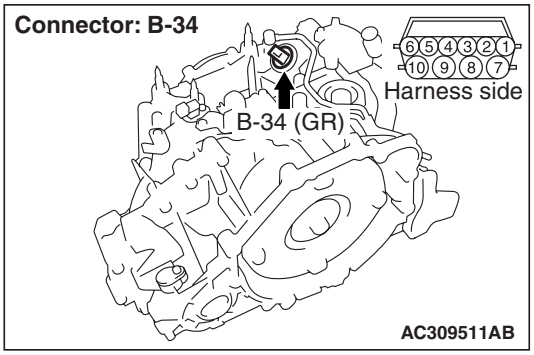
STEP 2. M.U.T.-II/III actuator test

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.00-6.)
NO : Go to Step 3.

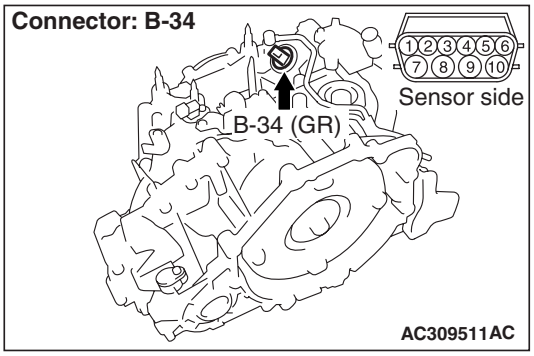
STEP 3. Connector check: B-34 A/T control solenoid valve assembly connector



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-34.



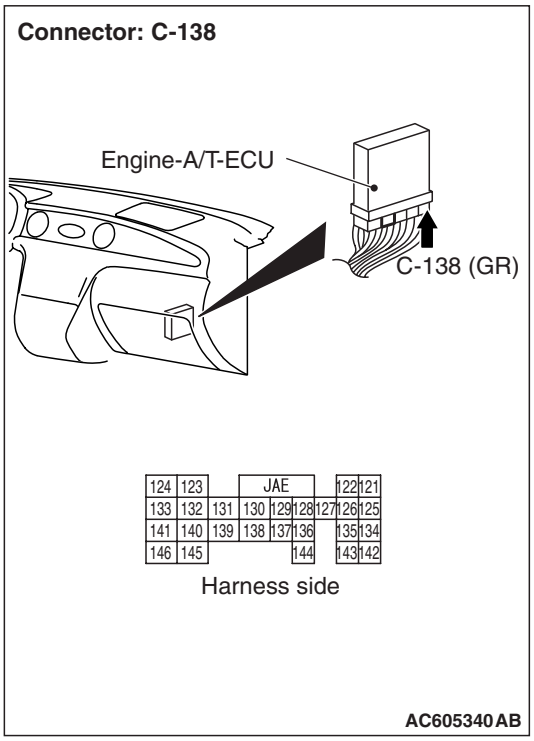
Disconnect the connector, and measure the resistance between terminal No.6 and No.10 at the solenoid valve side.

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-138.

(1) Connect A/T control solenoid valve assembly connector B-34.
(2) Turn the ignition switch to the ON position.

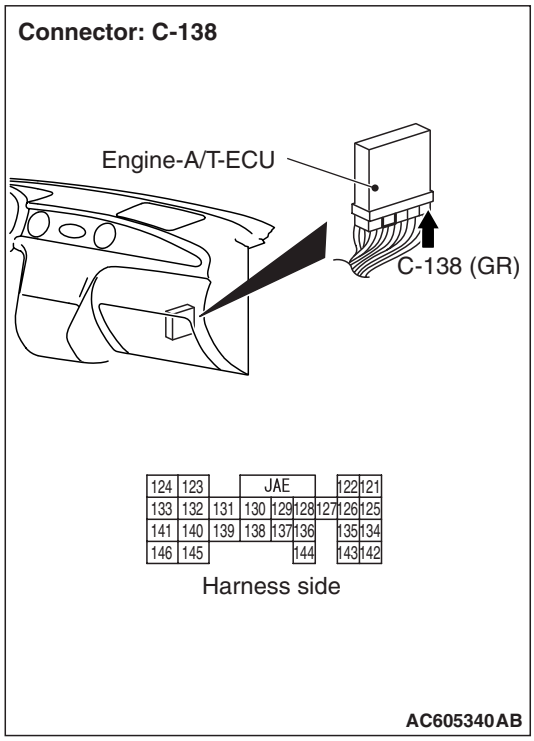


(3) Measure the voltage between engine-A/T-ECU connector C-138 terminal No.128 and earth.

OK: System voltage

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

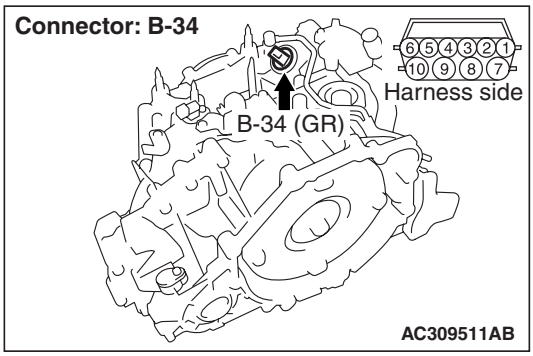
STEP 6. Connector check: C-138 engine-A/T-ECU connector

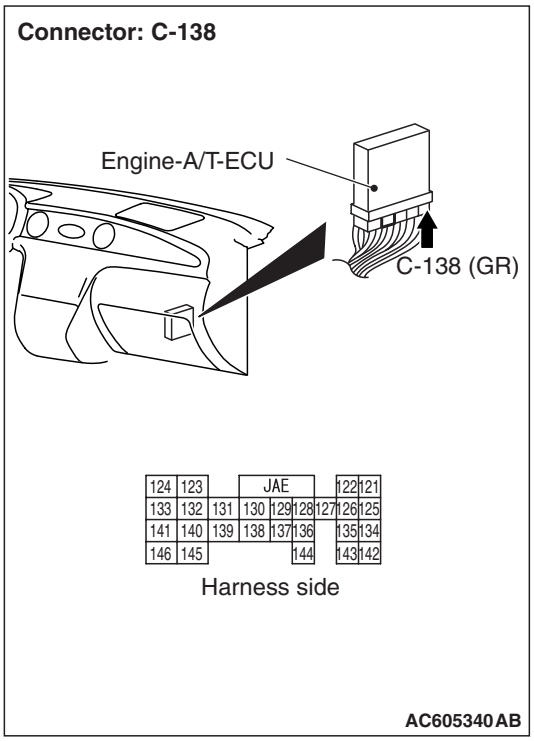


Check for the contact with terminals.

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-34 terminal No.6 and engine-A/T-ECU connector C-138 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.

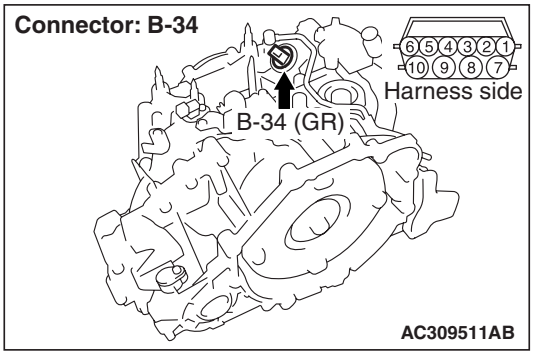
STEP 8. M.U.T.-II/III actuator test

- 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.00-6.)
NO : Replace the engine-A/T-ECU.

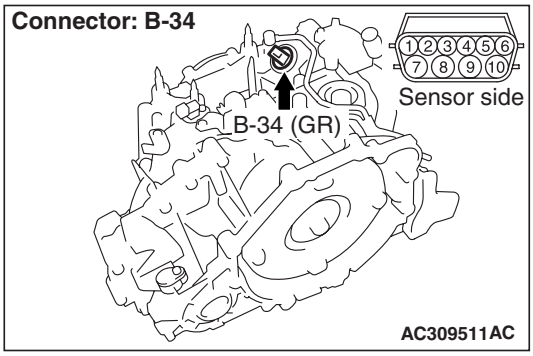
STEP 9. Connector check: B-34 A/T control solenoid valve assembly connector



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-34.

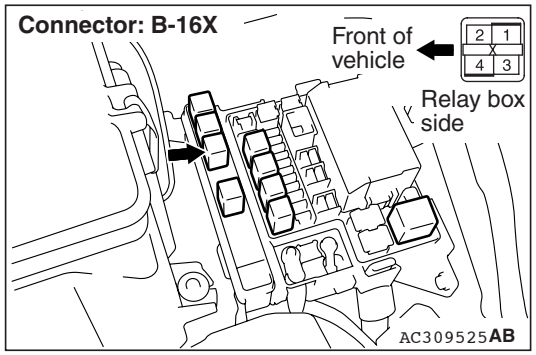


Disconnect the connector, and measure the resistance between terminal No.6 and No.10 at the solenoid valve side.

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.

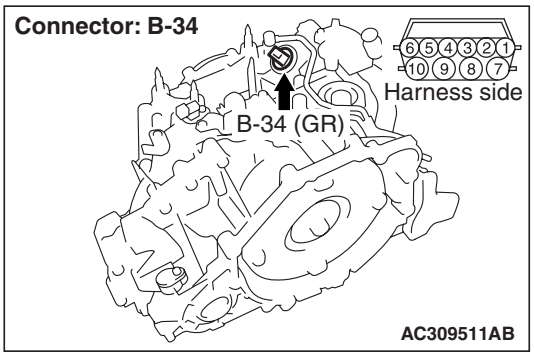
STEP 11. Connector check: B-16X A/T control relay connector

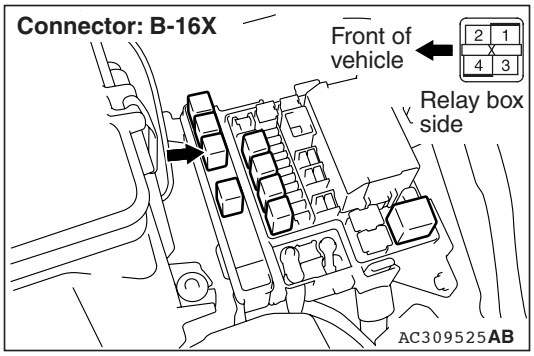


Check for the contact with terminals.

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-34 terminal No.10 and A/T control relay connector B-16X 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-58.

OPERATION

- Solenoid valve closes or opens according to the signals from the engine-A/T-ECU.
- The engine-A/T-ECU energizes or deenergizes 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 output.
If diagnosis code 32 is output 4 times, the transmission is fixed in 3rd as a fail-safe measure.

PROBABLE CAUSES

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

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-II/III diagnosis code

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

STEP 2. M.U.T.-II/III actuator test

Item 02: Underdrive solenoid valve

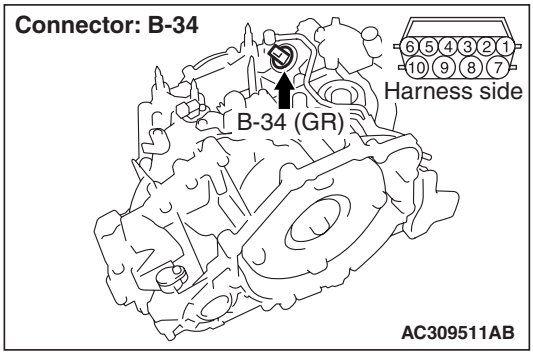
OK: Operating sound can be heard.

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6.)

NO : Go to Step 3.

STEP 3. Connector check: B-34 A/T control solenoid valve assembly connector



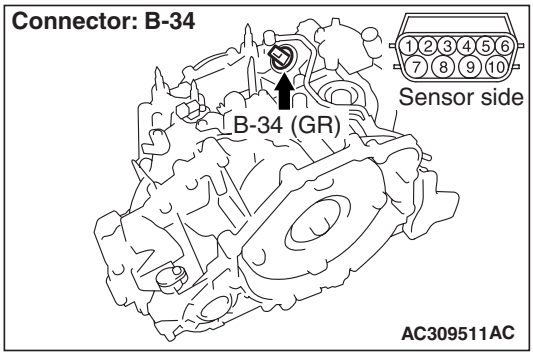
Check for the contact with terminals.

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-34.



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?

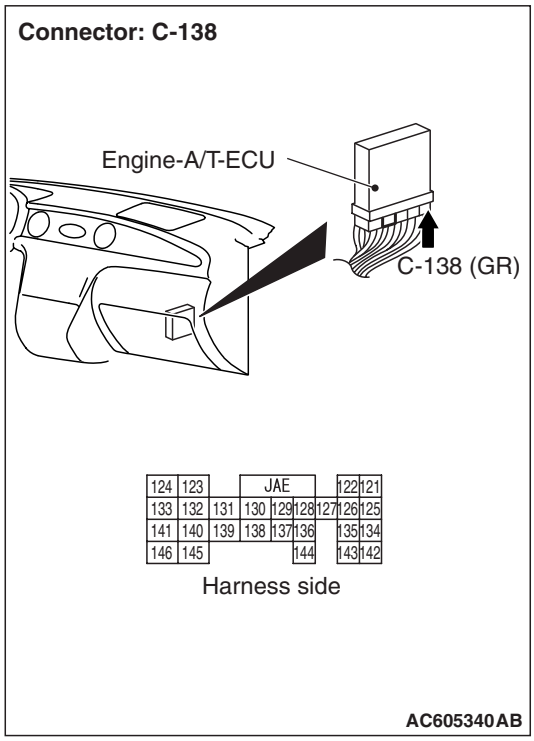
YES : Go to Step 5.

NO : Check the underdrive solenoid valve.

STEP 5. Measure the voltage at engine-A/T-ECU connector C-138.

(1) Connect A/T control solenoid valve assembly connector B-34.

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



(3) Measure the voltage between engine-A/T-ECU connector C-138 terminal No.137 and earth.

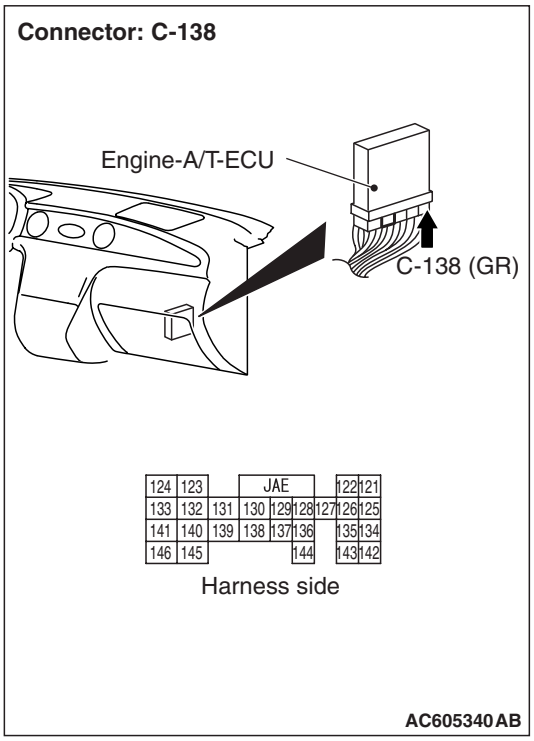
OK: 6–9 V

Q: Is the check result normal?

YES : Go to Step 8.

NO : Go to Step 6.

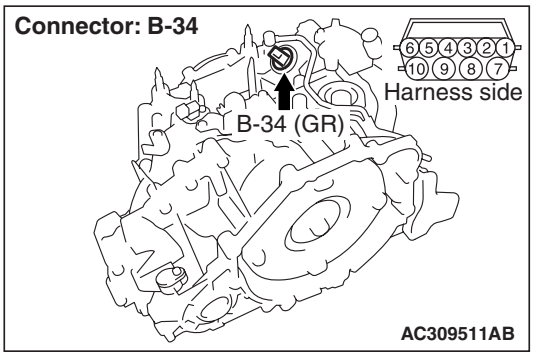
STEP 6. Connector check: C-138 engine-A/T-ECU connector

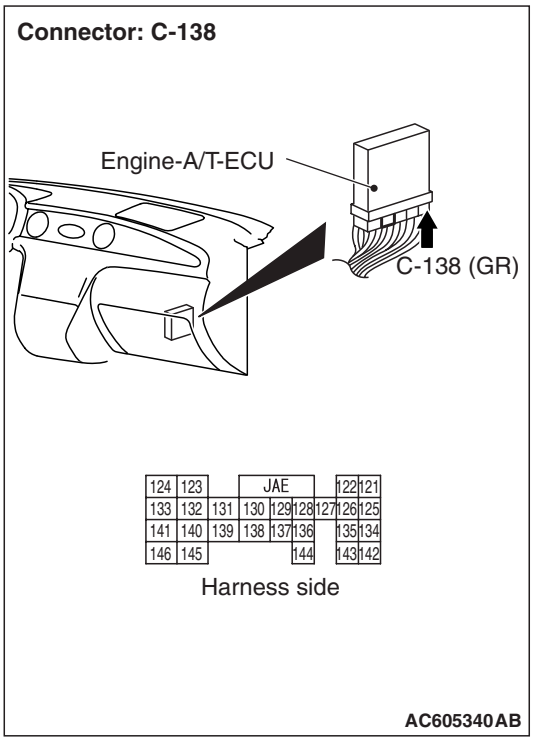


Check for the contact with terminals.

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-34 terminal No.3 and engine-A/T-ECU connector C-138 terminal No.137.





Check the output line for short or open circuit.

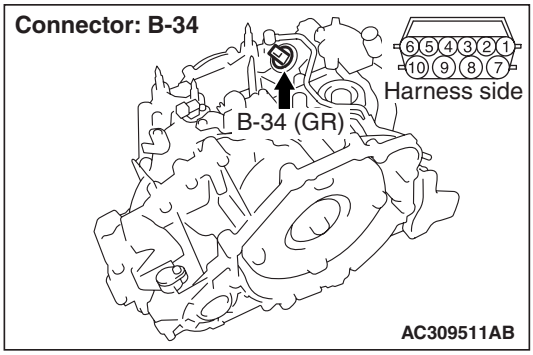
Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair the wiring harness.

STEP 8. M.U.T.-II/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.00-6.)
NO : Replace the engine-A/T-ECU.

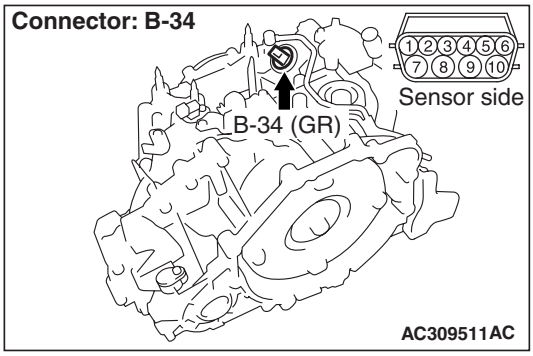
STEP 9. Connector check: B-34 A/T control solenoid valve assembly connector



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-34.

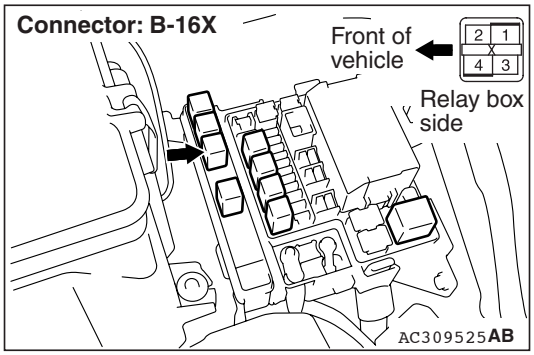


Disconnect the connector, and measure the resistance between terminal No.3 and No.9 at the solenoid valve side.

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.

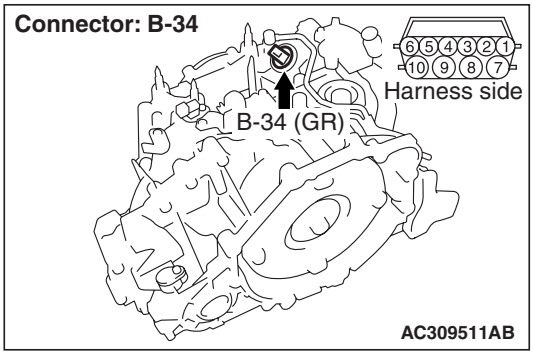
STEP 11. Connector check: B-16X A/T control relay connector

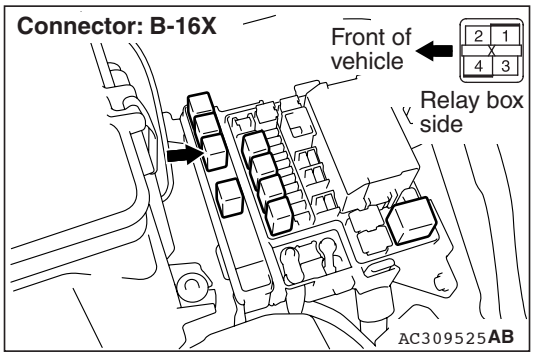


Check for the contact with terminals.

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-34 terminal No.9 and A/T control relay connector B-16X 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-58.

OPERATION

- Solenoid valve closes or opens according to the signals from the engine-A/T-ECU.
- The engine-A/T-ECU energizes or deenergizes 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 output.
If diagnosis code 33 is output 4 times, the transmission is fixed in 3rd as a fail-safe measure.

PROBABLE CAUSES

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

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-II/III diagnosis code.

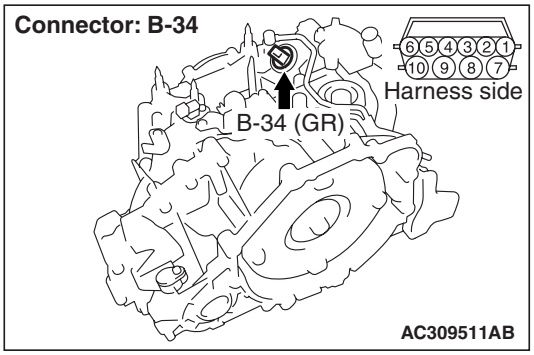
Q: Are diagnosis code 32 and 34 set?
YES : Go to Step 9.
NO : Go to Step 2.

STEP 2. M.U.T.-II/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.00-6.)
NO : Go to Step 3.

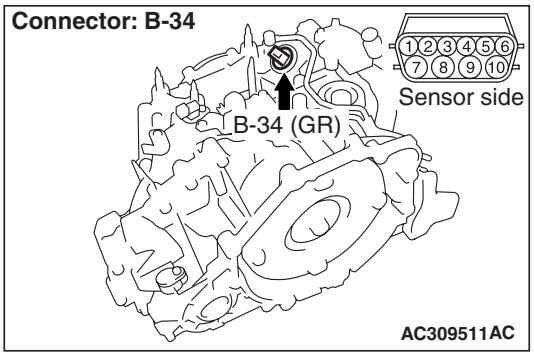
STEP 3. Connector check: B-34 A/T control solenoid valve assembly connector



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-34.



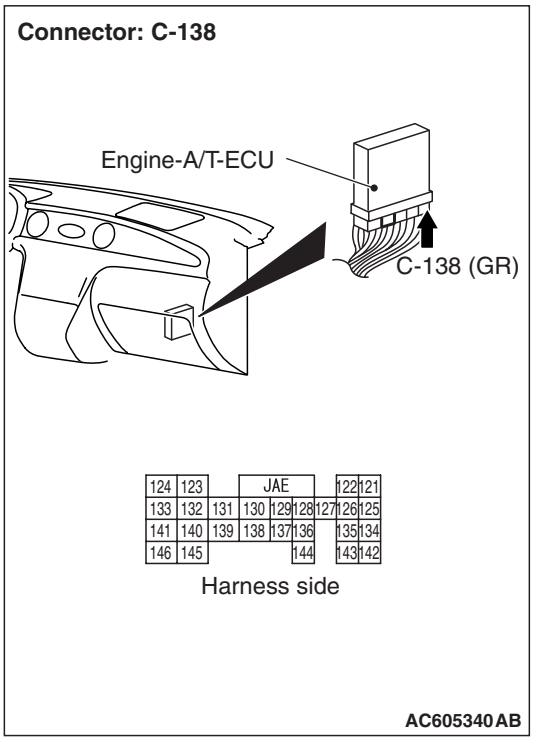
Disconnect the connector, and measure the resistance between terminal No.4 and No.9 at the solenoid valve side.

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-138.

(1) Connect A/T control solenoid valve assembly connector B-34.
(2) Turn the ignition switch to the ON position.

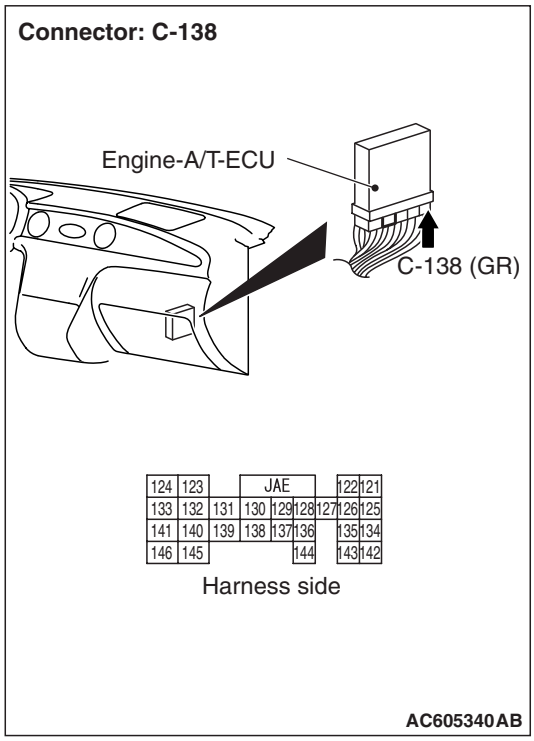


(3) Measure the voltage between engine-A/T-ECU connector C-138 terminal No.136 and earth.

OK: 6–9 V

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

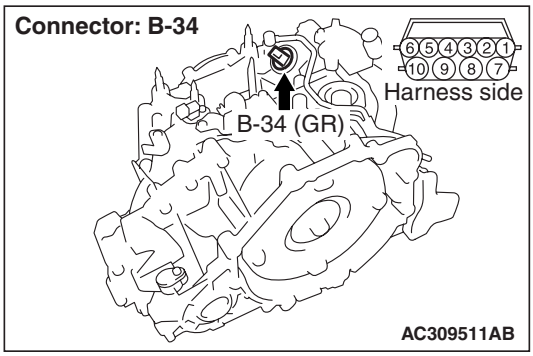
STEP 6. Connector check: C-138 engine-A/T-ECU connector

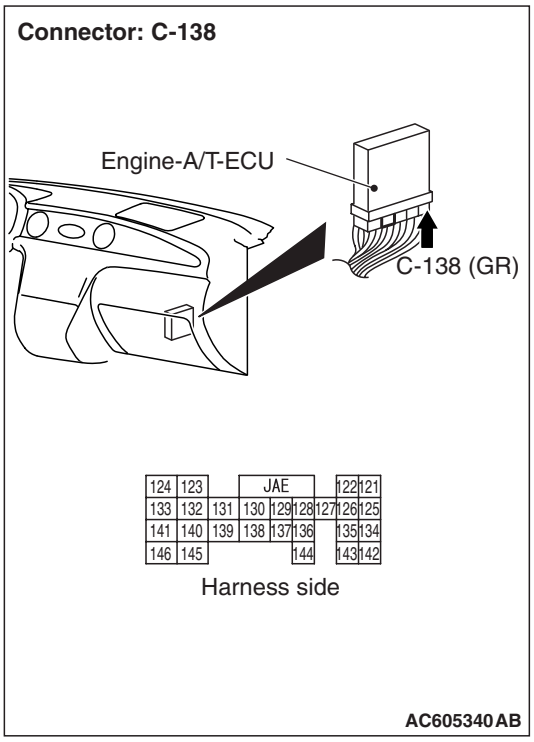


Check for the contact with terminals.

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-34 terminal No.4 and engine-A/T-ECU connector C-138 terminal No.136.





Check the output line for short or open circuit.

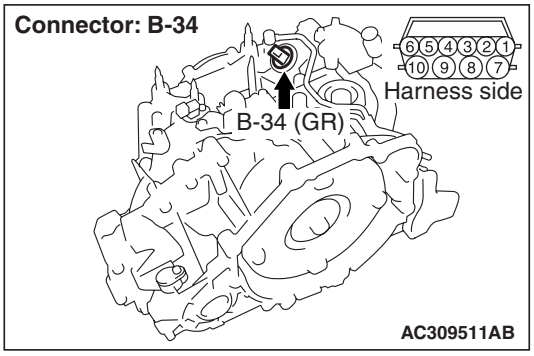
Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair the wiring harness.

STEP 8. M.U.T.-II/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.00-6.)
NO : Replace the engine-A/T-ECU.

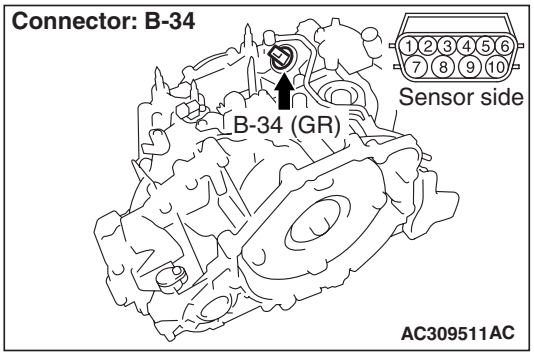
STEP 9. Connector check: B-34 A/T control solenoid valve assembly connector



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-34.

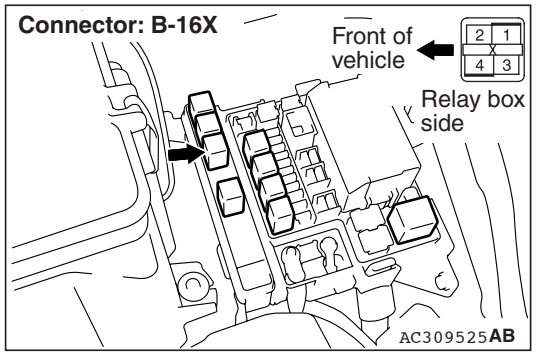


Disconnect the connector, and measure the resistance between terminal No.4 and No.9 at the solenoid valve side.

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.

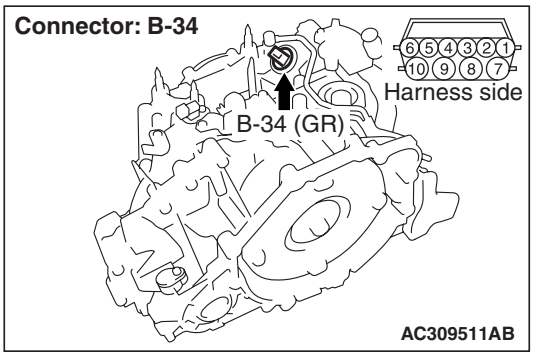
STEP 11. Connector check: B-16X A/T control relay connector

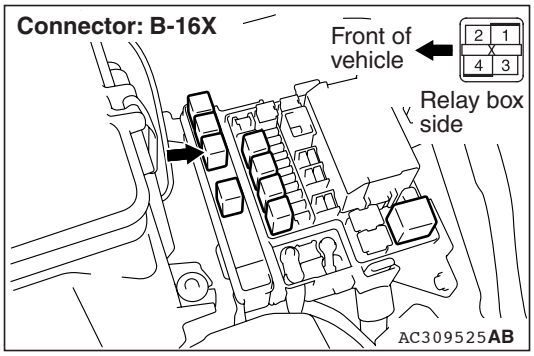


Check for the contact with terminals.

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-34 terminal No.9 and A/T control relay connector B-16X 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-58.

OPERATION

- Solenoid valve closes or opens according to the signals from the engine-A/T-ECU.
- The engine-A/T-ECU energizes or deenergizes 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 output.
If diagnosis code 34 is output 4 times, the transmission is fixed in 3rd as a fail-safe measure.

PROBABLE CAUSES

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

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-II/III diagnosis code

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

STEP 2. M.U.T.-II/III actuator test

Item 04: Overdrive solenoid valve

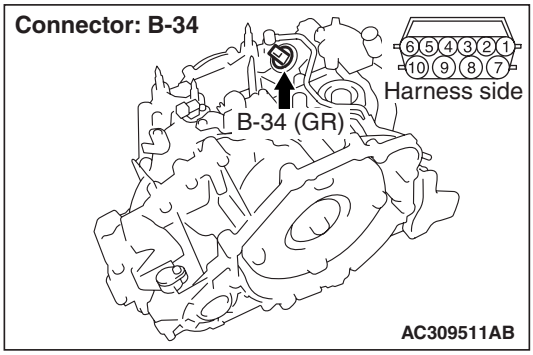
OK: Operating sound can be heard.

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6.)

NO : Go to Step 3.

STEP 3. Connector check: B-34 A/T control solenoid valve assembly connector



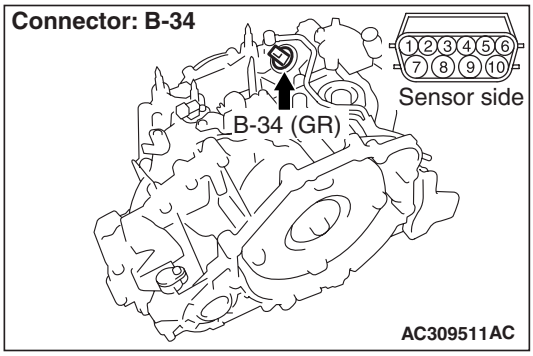
Check for the contact with terminals.

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-34.



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?

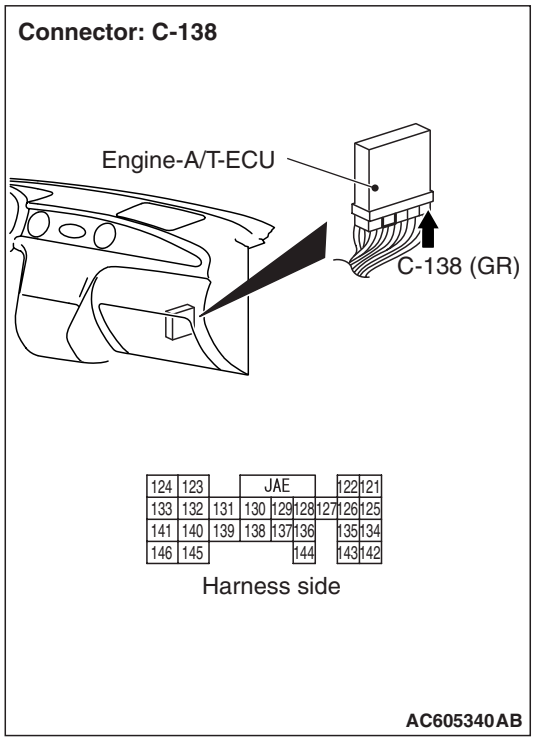
YES : Go to Step 5.

NO : Check the overdrive solenoid valve and solenoid valve harness.

STEP 5. Measure the voltage at engine-A/T-ECU connector C-138.

(1) Connect A/T control solenoid valve assembly connector B-34.

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



(3) Measure the voltage between engine-A/T-ECU connector C-138 terminal No.138 and earth.

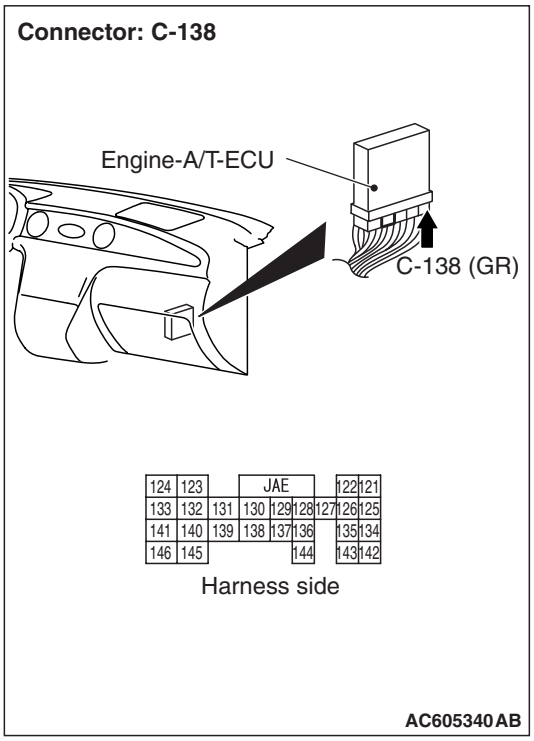
OK: 6–9 V

Q: Is the check result normal?

YES : Go to Step 8.

NO : Go to Step 6.

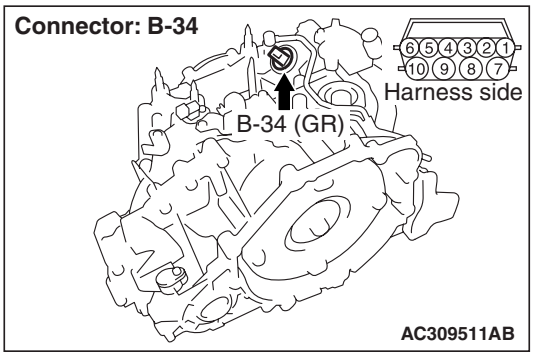
STEP 6. Connector check: C-138 engine-A/T-ECU connector

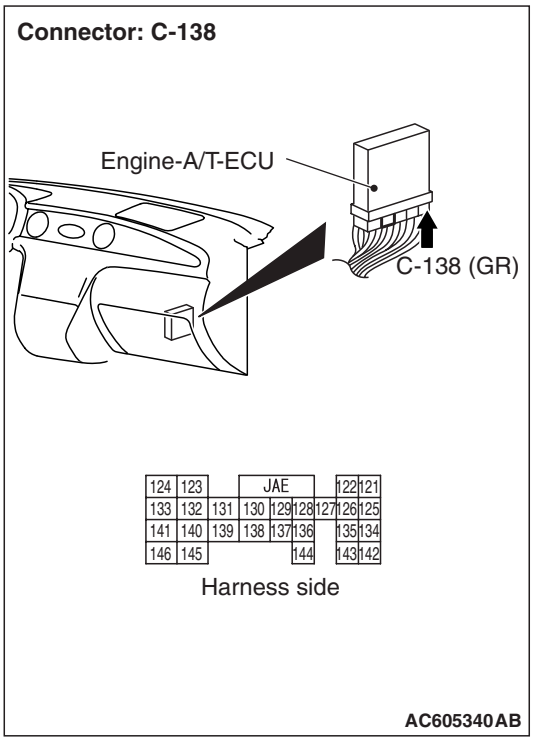


Check for the contact with terminals.

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-34 terminal No.5 and engine-A/T-ECU connector C-138 terminal No.138.





Check the output line for short or open circuit.

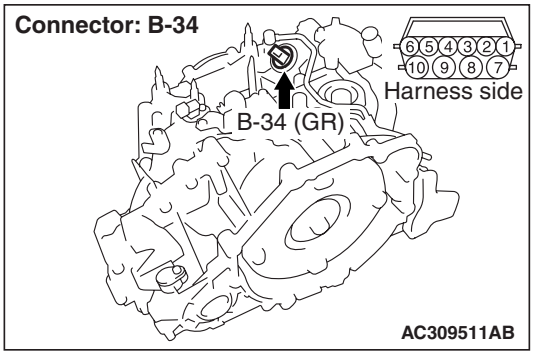
Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair the wiring harness.

STEP 8. M.U.T.-II/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.00-6.)
NO : Replace the engine-A/T-ECU.

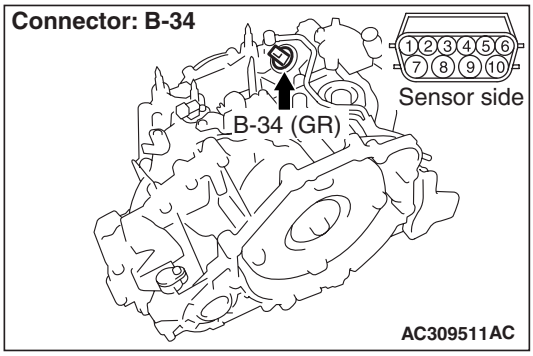
STEP 9. Connector check: B-34 A/T control solenoid valve assembly connector



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-34.

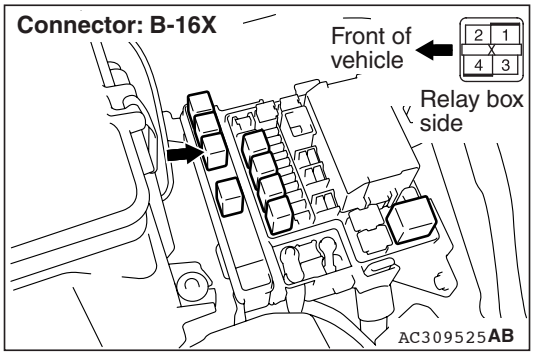


Disconnect the connector, and measure the resistance between terminal No.5 and No.9 at the solenoid valve side.

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.

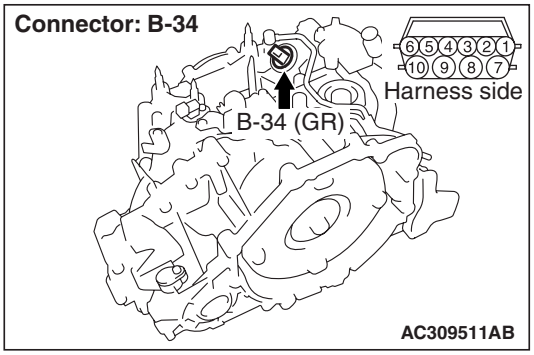
STEP 11. Connector check: B-16X A/T control relay connector

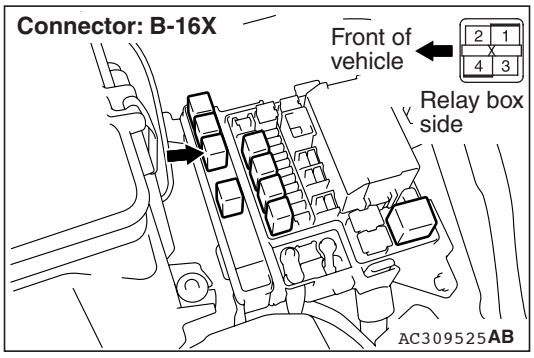


Check for the contact with terminals.

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-34 terminal No.9 and A/T control relay connector B-16X 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-58.

OPERATION

- Solenoid valve closes or opens according to the signals from the engine-A/T-ECU.
- The engine-A/T-ECU energizes or deenergizes 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 output.
If diagnosis code 36 is output 4 times, the transmission is fixed in 3rd as a fail-safe measure.

PROBABLE CAUSES

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

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-II/III diagnosis code

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

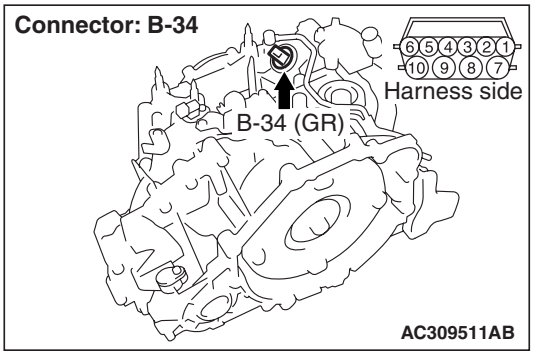
STEP 2. M.U.T.-II/III actuator test

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.00-6.)
NO : Go to Step 3.

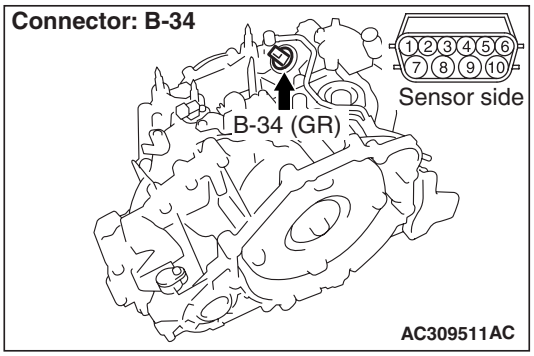
STEP 3. Connector check: B-34 A/T control solenoid valve assembly connector



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-34.



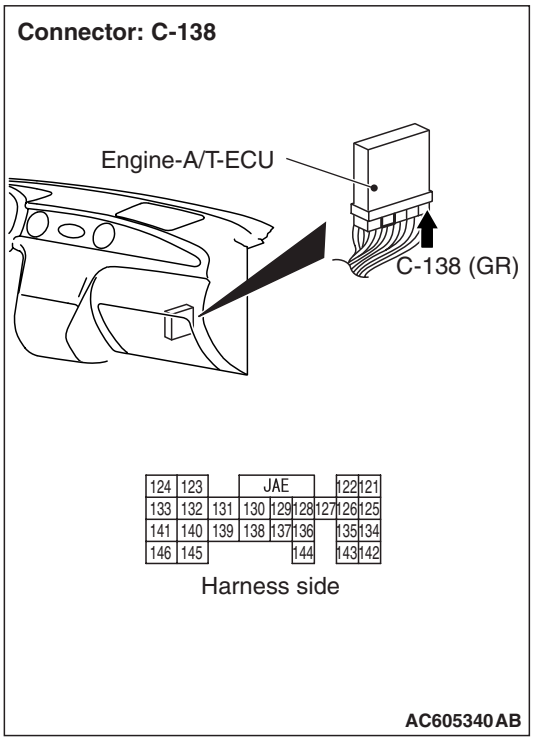
Disconnect the connector, and measure the resistance between terminal No.7 and No.10 at the solenoid valve side.

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-138.

(1) Connect A/T control solenoid valve assembly connector B-34.
(2) Turn the ignition switch to the ON position.

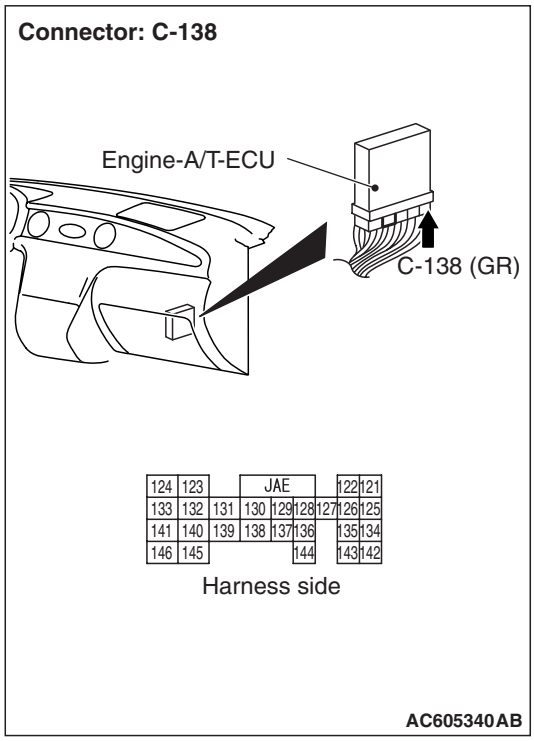


(3) Measure the voltage between engine-A/T-ECU connector C-138 terminal No.130 and earth.

OK: 6 – 9 V

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

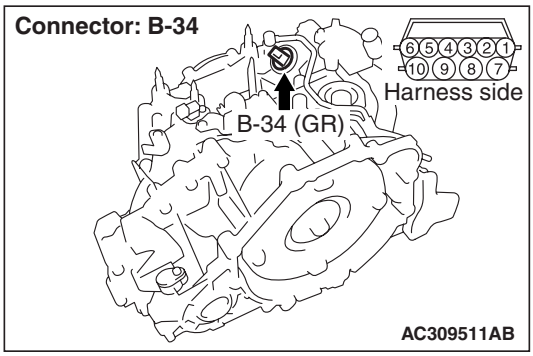
STEP 6. Connector check: C-138 engine-A/T-ECU connector

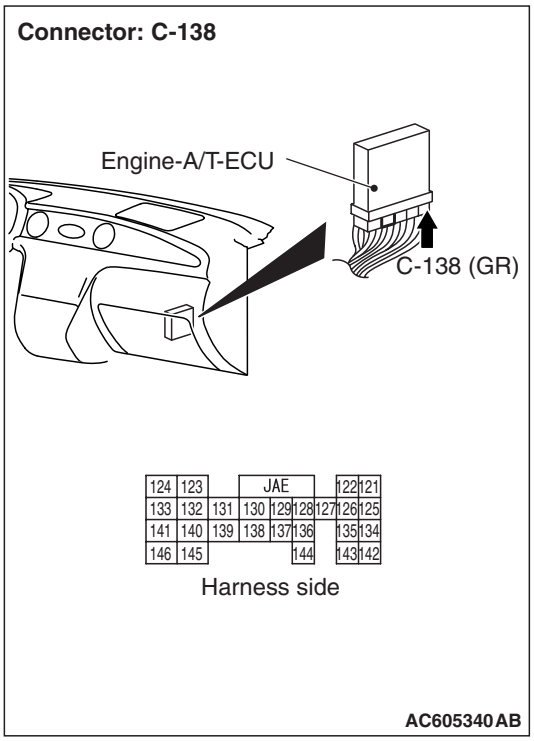


Check for the contact with terminals.

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-34 terminal No.7 and engine-A/T-ECU connector C-138 terminal No.130.





Check the output line for short or open circuit.

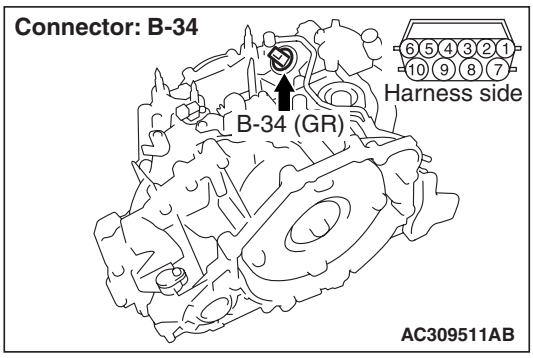
Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair the wiring harness.

STEP 8. M.U.T.-II/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.00-6.)
NO : Replace the engine-A/T-ECU.

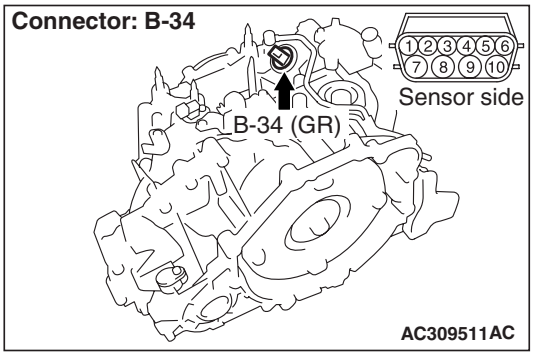
STEP 9. Connector check: B-34 A/T control solenoid valve assembly connector



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-34.

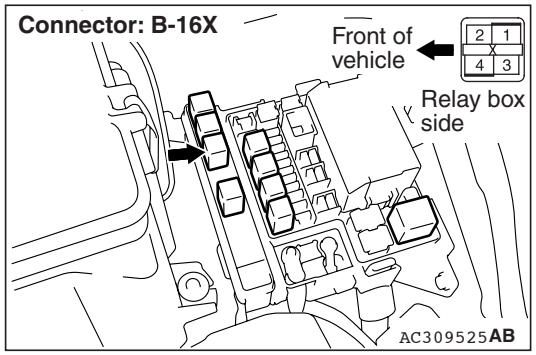


Disconnect the connector, and measure the resistance between terminal No.7 and No.10 at the solenoid valve side.

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.

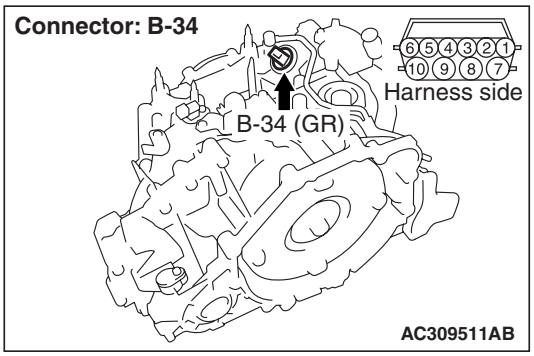
STEP 11. Connector check: B-16X A/T control relay connector

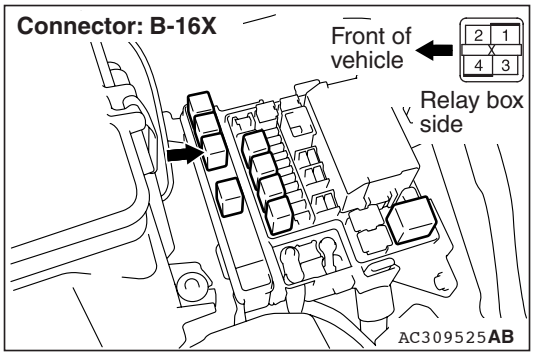


Check for the contact with terminals.

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-34 terminal No.10 and A/T control relay connector B-16X 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 output. If each diagnosis code is output 4 times, the transmission is fixed in 3rd as a fail-safe measure.

PROBABLE 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 PROCEDURE

STEP 1. M.U.T.-II/III diagnosis code
Either of diagnosis codes 41, 42, 43, 44 or 46 is output, 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 output> : Refer to diagnosis code 22 input shaft speed sensor system P.23A-28.
YES <diagnosis code 23 is output> : Refer to diagnosis code 23 output shaft speed sensor system P.23A-37.
NO : Go to Step 2.

STEP 2. M.U.T.-II/III diagnosis code
Either of diagnosis codes 41, 42, 43, 44 or 46 is output, the corresponding solenoid valve is defective.

Q: Is either of diagnosis code 31, 32, 33, 34 output?
YES <diagnosis code 31 is output> : Refer to diagnosis code 31: Low-reverse solenoid valve system P.23A-58.
YES <diagnosis code 32 is output> : Refer to diagnosis code 32: Underdrive solenoid valve system P.23A-62.
YES <diagnosis code 33 is output> : Refer to diagnosis code 33: Second solenoid valve system P.23A-66.
YES <diagnosis code 34 is output> : Refer to diagnosis code 34: Overdrive solenoid valve system P.23A-69.
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-132.

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

PROBABLE 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 PROCEDURE

STEP 1. M.U.T.-II/III diagnosis code

If diagnosis code 52 is output, 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-28.

NO : Go to Step 2.

STEP 2. M.U.T.-II/III diagnosis code

If diagnosis code 52 is output, 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-73.

NO : Go to Step 3.

STEP 3. M.U.T.-II/III data list

- Item 36: Damper clutch solenoid valve duty ratio (Refer to data list reference table P.23A-114).
- Item 52: Damper clutch slip amount (Refer to data list reference table P.23A-114).

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-132.)

OK: Refer to Hydraulic Pressure Test P.23A-132.

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.

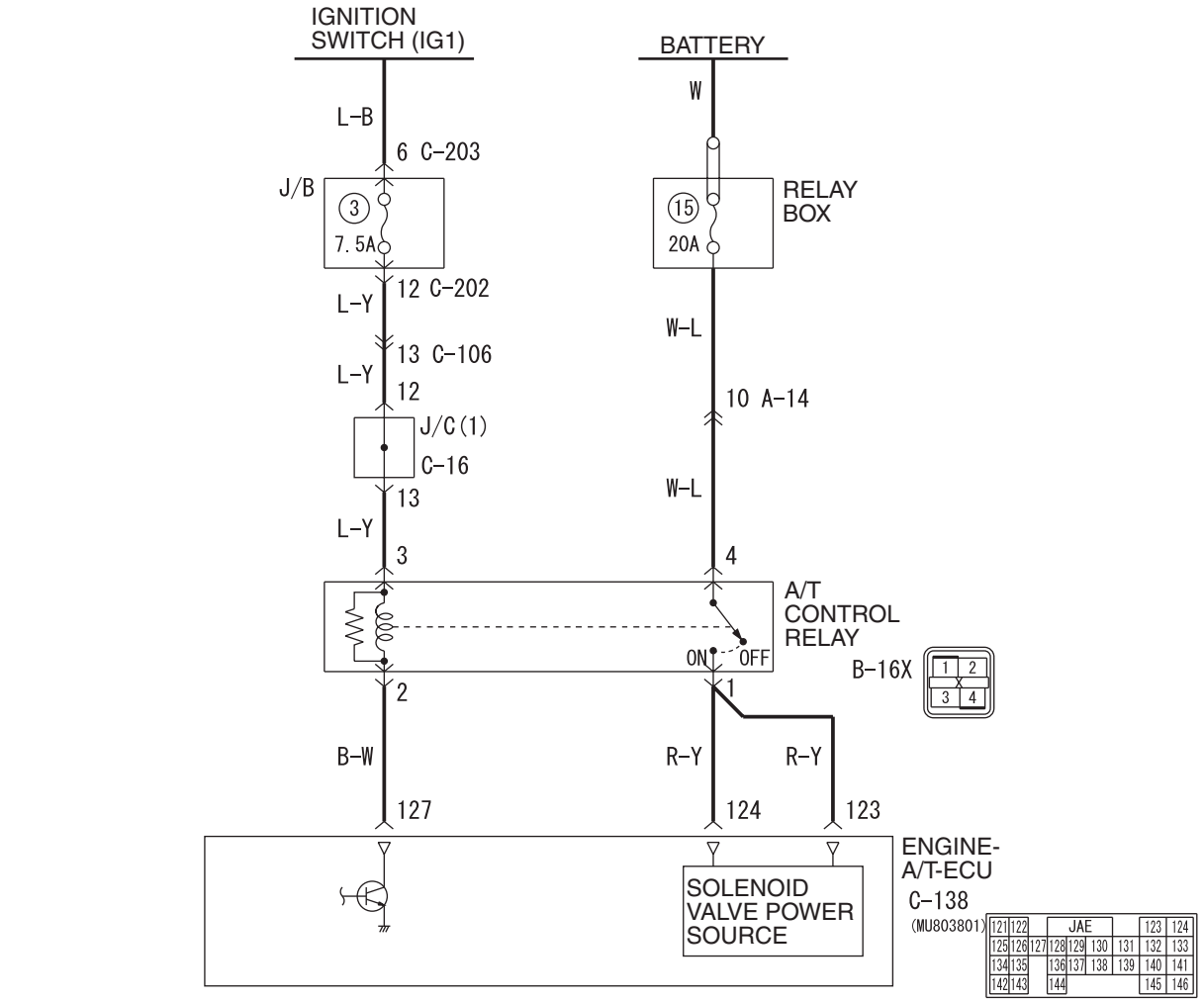
Q: Is the diagnosis code set?

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 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

W4Z23E06AA
AC309568AC

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 CONDITION

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.

PROBABLE CAUSES

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

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-II/III data list

Item 54: Relay voltage (Refer to data list reference table P.23A-114.)

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6.)

NO : Go to Step 2.

STEP 2. Check the A/T control relay connector

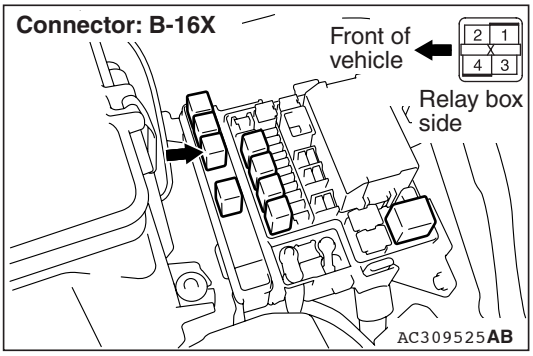
Refer to P.23A-129.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Replace the A/T control relay.

STEP 3. Connector check: B-16X A/T control relay connector



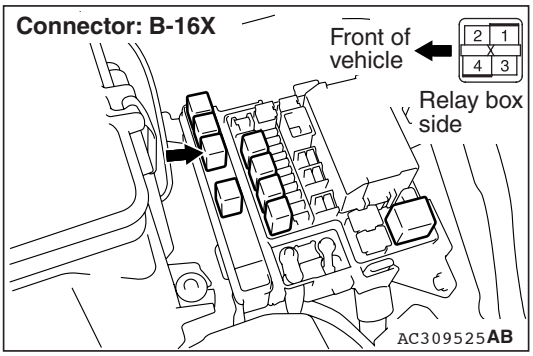
Check for the contact with terminals.

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-16X.



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

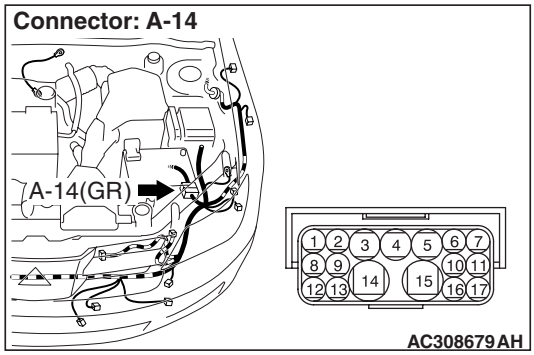
OK: System voltage

Q: Is the check result normal?

YES : Go to Step 8.

NO : Go to Step 5.

STEP 5. Connector check: A-14 intermediate connector



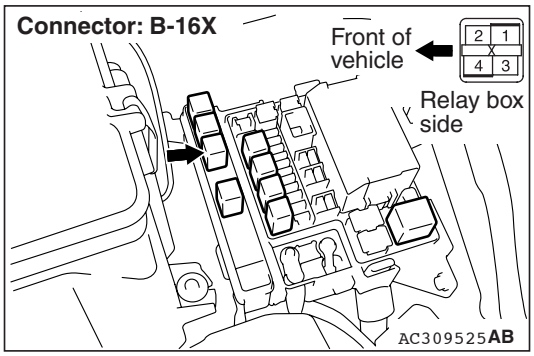
Check for the contact with terminals.

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-16X 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. M.U.T.-II/III data list

Item 54: Relay voltage (Refer to data list reference table P.23A-114.)

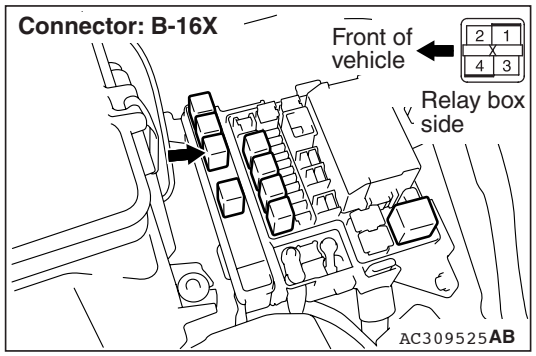
Q: Is the check result normal?

YES : The trouble can be an intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).

NO : Replace the engine-A/T-ECU.

STEP 8. Measure the voltage at the A/T control relay connector B-16X.

(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.

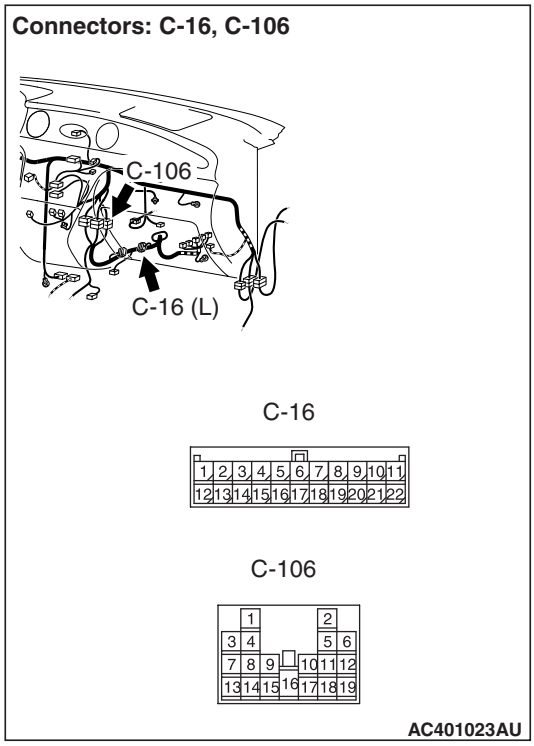
OK: System voltage

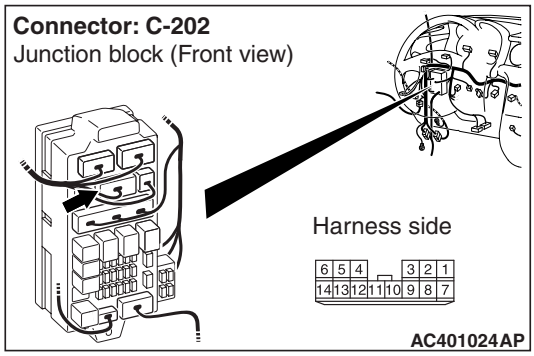
Q: Is the check result normal?

YES : Go to Step 11.

NO : Go to Step 9.

STEP 9. Connectors check: C-16 J/C (1), C-106 intermediate connector, C-202 J/B connector





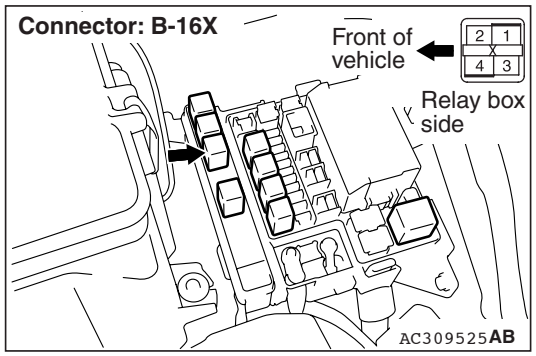
Check for the contact with terminals.

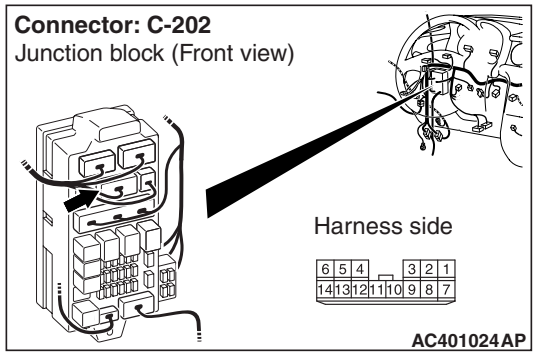
Q: Is the check result normal?

YES : Go to Step 10.

NO : Repair the defective connector.

STEP 10. Check the wiring harness between A/T control relay connector B-16X terminal No.3 and junction block connector C-202 terminal No.12.



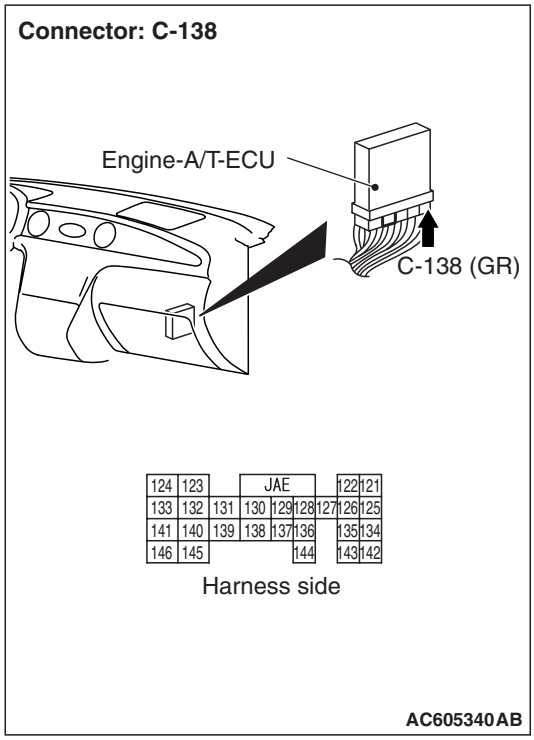


Check the power supply line for short or open circuit.

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-138.

(1) Install the A/T control relay.
(2) Turn the ignition switch to the ON position.

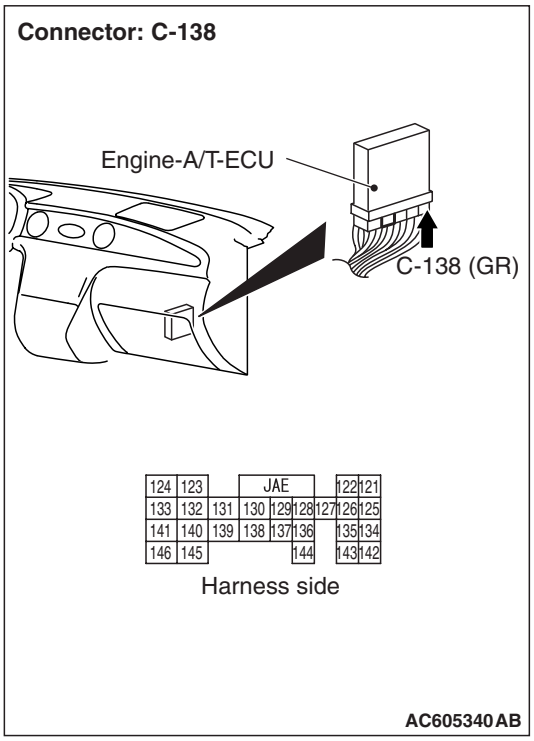


(3) Measure the voltage between engine-A/T-ECU connector C-138 terminal No.123, No.124 and earth.

OK: System voltage

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

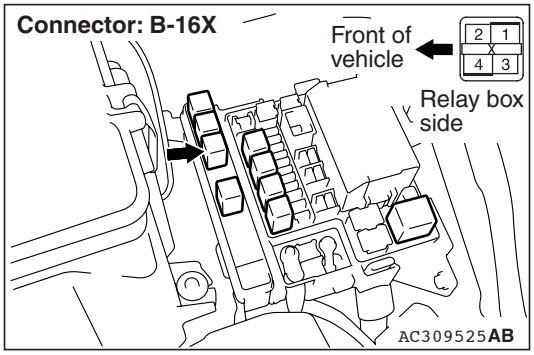
STEP 12. Connector check: C-138 engine-A/T-ECU connector

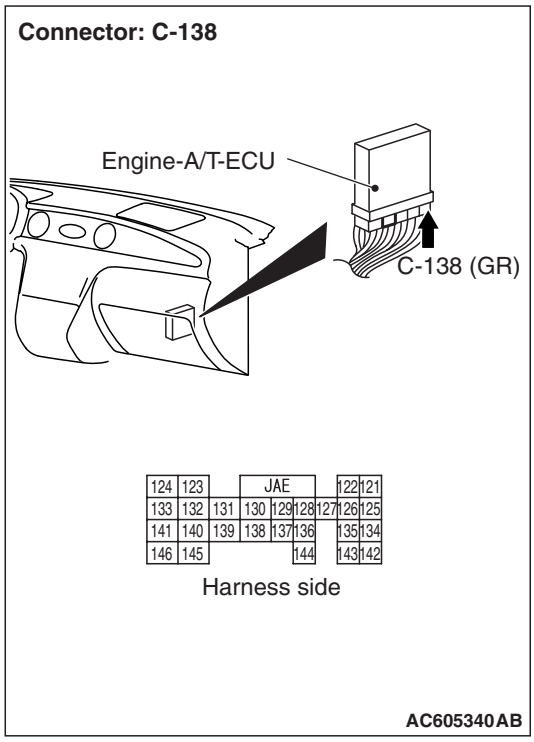


Check for the contact with terminals.

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-16X terminal No.1 and engine-A/T-ECU connector C-138 terminal No.123, 124.

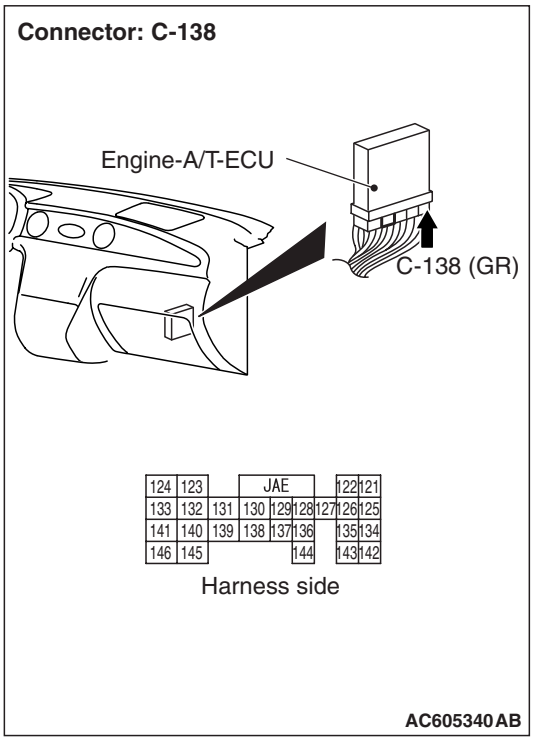




Check the power supply line for short or open circuit.

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

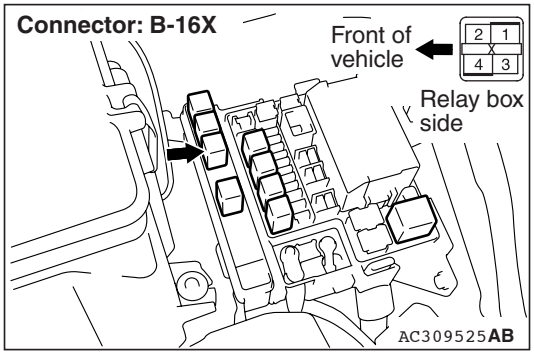
STEP 14. Connector check: C-138 engine-A/T-ECU connector

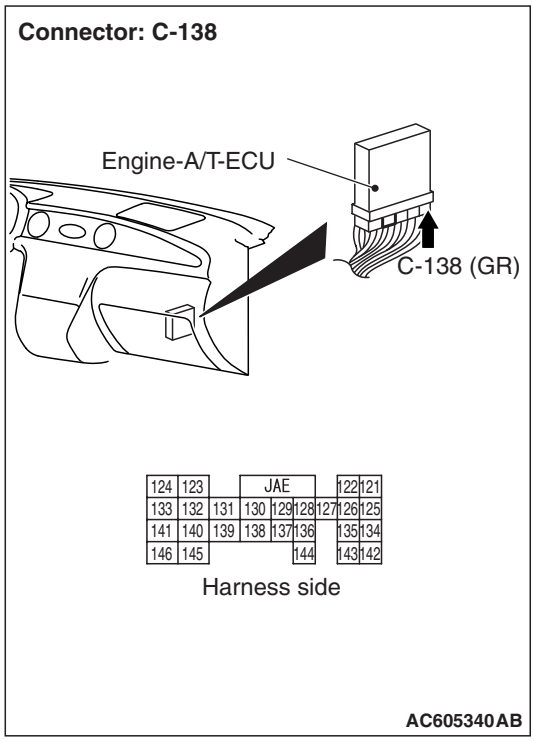


Check for the contact with terminals.

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-16X terminal No.2 and engine-A/T-ECU connector C-138 terminal No.127.



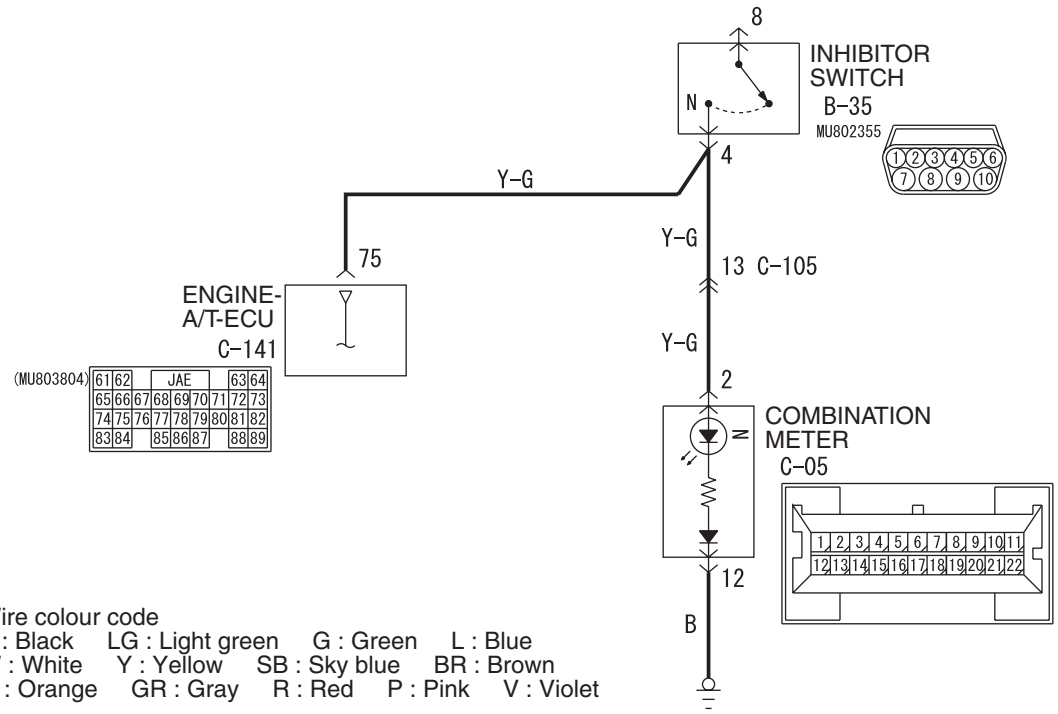


Check the output line for short or open circuit.

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

Code No.56: N Range Lamp System

N Range Lamp 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

W4Z23E07AA
AC309569AC

OPERATION

If a fail-safe operation is activated during driving, the engine-A/T-ECU flashes the N range lamp at a frequency of 1 Hz to inform the driver.

DIAGNOSIS CODE SET CONDITIONS

If the N range signal is OFF after the N range lamp illuminates (ON), it is judged that there is a short-circuit to earth or open circuit in the N range lamp, and code No. 56 is output.

PROBABLE CAUSES

- Malfunction of the combination meter
- Damaged harness wires and connectors
- Malfunction of the engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-II/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-50.

YES <diagnosis code 28 is set> : Refer to diagnosis code 28: Inhibitor switch system P.23A-55.

NO : Go to Step 2.

STEP 2. Check the N range lamp.

(1) Turn the ignition switch to the ON position.
(2) Shift the selector lever to the N position.

Q: Does the N range lamp illuminate?

YES : Go to Step 10.

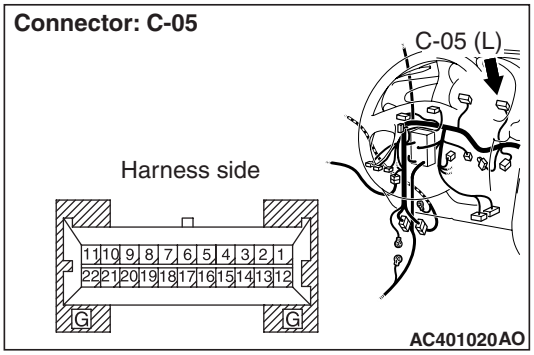
NO : Go to Step 3.

STEP 3. Check the N range lamp valve.

(1) Remove the combination meter. (Refer to GROUP 54A – Combination Meter Assembly Removal and Installation P.54A-60.)
(2) Check the N range lamp valve.

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

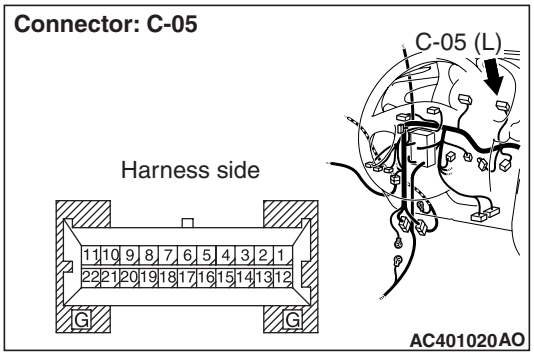
STEP 4. Connector check: C-05 combination meter connector



Check for the contact with terminals.

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

STEP 5. Measure the resistance at combination meter connector C-05.

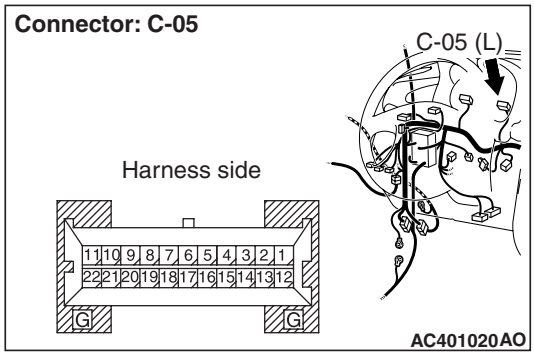


Disconnect the connector, and measure the resistance between terminal 12 and earth at the wiring harness side.

OK: 2 Ω or less

Q: Is the check result normal?
YES : Go to Step 7.
NO : Go to Step 6.

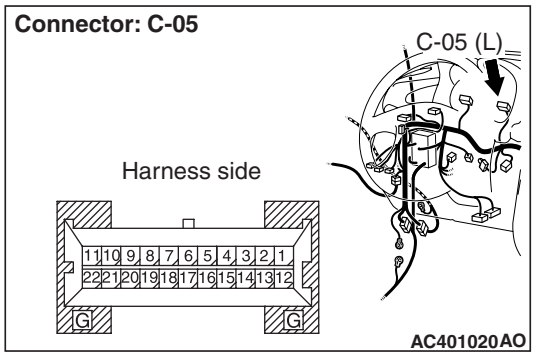
STEP 6. Check the harness between combination meter connector C-05 terminal No.12 and body earth.



Check the earth line for open circuit or short-circuit.

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

STEP 7. Measure the voltage at combination meter connector C-05.

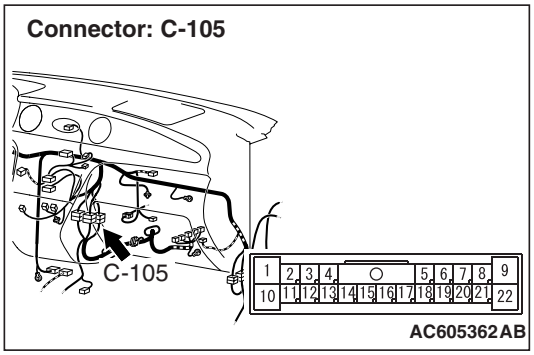


(1) Disconnect the connector, and measure the voltage between terminal 2 and earth at the wiring harness side.
(2) Turn the ignition switch to the ON position.
(3) Shift the selector lever to the N position.

OK: System voltage

Q: Is the check result normal?
YES : Check the combination meter, and replace if necessary.
NO : Go to Step 8.

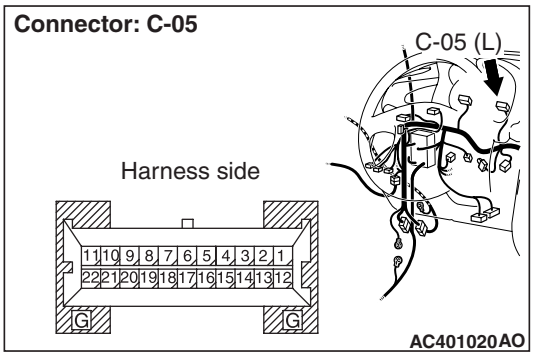
STEP 8. Connector check: C-105 intermediate connector

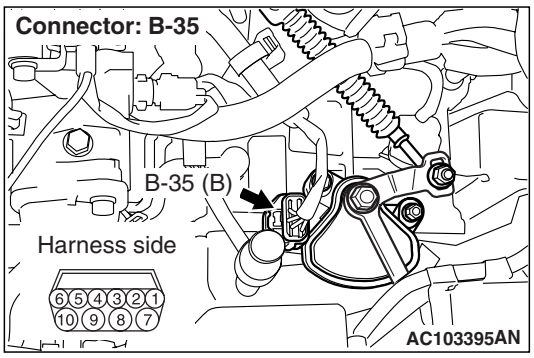


Check for the contact with terminals.

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

STEP 9. Check the harness between combination meter connector C-05 terminal No.2 and inhibitor switch connector B-35 terminal No.4.

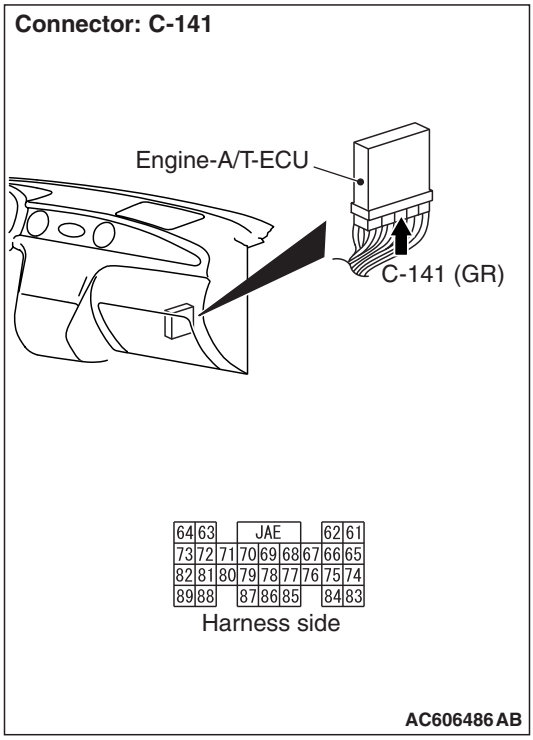




Check the output line for short-circuited or open circuit.

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

STEP 10. Connector check: C-141 engine A/T-ECU connector



Check for the contact with terminals.

Q: Is the check result normal?
YES : Replace the engine-A/T-ECU.
NO : Repair the defective connector.

INSPECTION CHART FOR TROUBLE SYMPTOMS

M1231008000415

Trouble symptom		Inspection procedure No.	Reference page
Communication with the M.U.T.-II/III is not possible		1	Refer to GROUP 13C, Troubleshooting P.13C-285.
Driving not possible	Engine does not start	2	P.23A-90
	Does not move forward	3	P.23A-91
	Does not move backward	4	P.23A-92
	Does not move (forward or backward)	5	P.23A-93
Malfunction when starting off	Engine stalls during shifting	6	P.23A-94
	Shift shock when shifting from N to D and long delay	7	P.23A-95
	Shift shock when shifting from N to R and long delay	8	P.23A-96
	Shift shock when shifting from N to D, N to R and long delay	9	P.23A-97
Problem during shifting	Shift shock and slipping	10	P.23A-98
Incorrect shift points	Does not shift properly (all point)	11	P.23A-99
	Does not shift properly (some point)	12	P.23A-100
No shifting	Does not shift (no diagnosis code)	13	P.23A-100
Problem during driving	Poor acceleration	14	P.23A-101
	Vibration	15	P.23A-101
Shift switch assembly system		16	P.23A-102
Abnormal shift indicator display		17	P.23A-110

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.

PROBABLE 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 PROCEDURE

STEP 1. M.U.T.-II/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-50.

YES <diagnosis code 28 is set> : Refer to diagnosis code 28: Inhibitor switch system P.23A-55.

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-127).

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.

PROBABLE CAUSES

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

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-II/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. M.U.T.-II/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-50.
YES <diagnosis code 28 is set> : Refer to diagnosis code 28: Inhibitor switch system P.23A-55.
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-132.

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 clean and assembly

(1) Check the 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) 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.

PROBABLE 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 PROCEDURE

STEP 1. M.U.T.-II/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.

OK: Refer to P.23A-132.

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 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) 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.

PROBABLE 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 PROCEDURE

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-132.

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 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) 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).

PROBABLE 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 PROCEDURE

STEP 1. M.U.T.-II/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 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) 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.

PROBABLE 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 PROCEDURE

STEP 1. M.U.T.-II/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. M.U.T.-II/III data list

Item 01: Input shaft speed sensor (Refer to data list reference table P.23A-114).

Q: Is the check result normal?
YES : Go to Step 3.
NO : Refer to diagnosis code 22: Input shaft speed sensor system P.23A-28.

STEP 3. M.U.T.-II/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.

OK: Refer to P.23A-132.

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. M.U.T.-II/III data list

Item 11: Throttle position sensor (Refer to data list reference table P.23A-114).

Q: Is the check result normal?
YES : Go to Step 8.
NO : Check the throttle position sensor system (Refer to GROUP 13C, Troubleshooting P.13C-21).

STEP 8. Valve body disassembly clean and assembly

(1) Check the 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) 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.

PROBABLE 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 PROCEDURE

STEP 1. M.U.T.-II/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. M.U.T.-II/III data list

Item 22: Input shaft speed sensor (Refer to data list reference table P.23A-114).

Q: Is the check result normal?
YES : Go to Step 3.
NO : Refer to diagnosis code 22: Input shaft speed sensor system P.23A-28.

STEP 3. M.U.T.-II/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-50.
YES <diagnosis code 28 is set> : Refer to diagnosis code 28: Inhibitor switch system P.23A-55.
NO : Go to Step 4.

STEP 4. M.U.T.-II/III data list

Item 31: Low-reverse solenoid valve duty ratio (Refer to data list reference table P.23A-114).

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-132.

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. M.U.T.-II/III data list

Item 11: Throttle position sensor (Refer to data list reference table P.23A-114).

Q: Is the check result normal?
YES : Go to Step 9.
NO : Check the throttle position sensor system (Refer to GROUP 13C, Troubleshooting P.13C-21).

STEP 9. Valve body disassembly clean and assembly

(1) Check the 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) 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.

PROBABLE 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 PROCEDURE

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-132.

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 : Check the oil pump for incorrect installation, damage and etc., and replace the oil pump assembly if necessary (The oil pump cannot be disassembled.)

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. M.U.T.-II/III data list

Item 11: Throttle position sensor (Refer to data list reference table P.23A-114).

Q: Is the check result normal?
YES : Go to Step 6.
NO : Check the throttle position sensor system (Refer to GROUP 13C, Troubleshooting P.13C-21).

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 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.

PROBABLE 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 PROCEDURE

STEP 1. M.U.T.-II/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. M.U.T.-II/III data list

- Item 63: Shift position (Refer to data list reference table P.23A-114).
- Item 31, 32, 33, 34: Each solenoid valve duty ratio (Refer to data list reference table P.23A-114).

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-132.

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 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) 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.

PROBABLE CAUSES

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

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-II/III data list

Item 02: Output shaft speed sensor (Refer to data list reference table P.23A-114).

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. M.U.T.-II/III data list

Item 11: Throttle position sensor (Refer to data list reference table P.23A-114).

Q: Is the check result normal?

YES : Go to Step 3.

NO : Check the throttle position sensor system (Refer to GROUP 13C, Troubleshooting P.13C-21).

STEP 3. M.U.T.-II/III actuator test

(1) Item 14: INVECS-II cancel command
(2) Test drive the vehicle (Refer to Road Test, Inspection procedure 8 P.23A-9).
(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.

PROBABLE CAUSES

- Malfunction of the engine-A/T-ECU

DIAGNOSIS PROCEDURE

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. M.U.T.-II/III actuator test

(1) Item 14: INVECS-II cancel command
(2) Test drive the vehicle (Refer to Road Test, Inspection procedure 8 P.23A-9).
(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 .

PROBABLE CAUSES

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

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-II/III data list

Item 54: A/T control relay (Refer to Data List Reference Table P.23A-114).

Q: Is the check result normal?
YES : Go to Step 2.
NO : Replace the engine-A/T-ECU.

STEP 2. M.U.T.-II/III data list

Item 67: Select switch (Refer to Data List Reference Table P.23A-114).

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-102).

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.

PROBABLE CAUSES

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

DIAGNOSIS PROCEDURE

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.

PROBABLE 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 PROCEDURE

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.

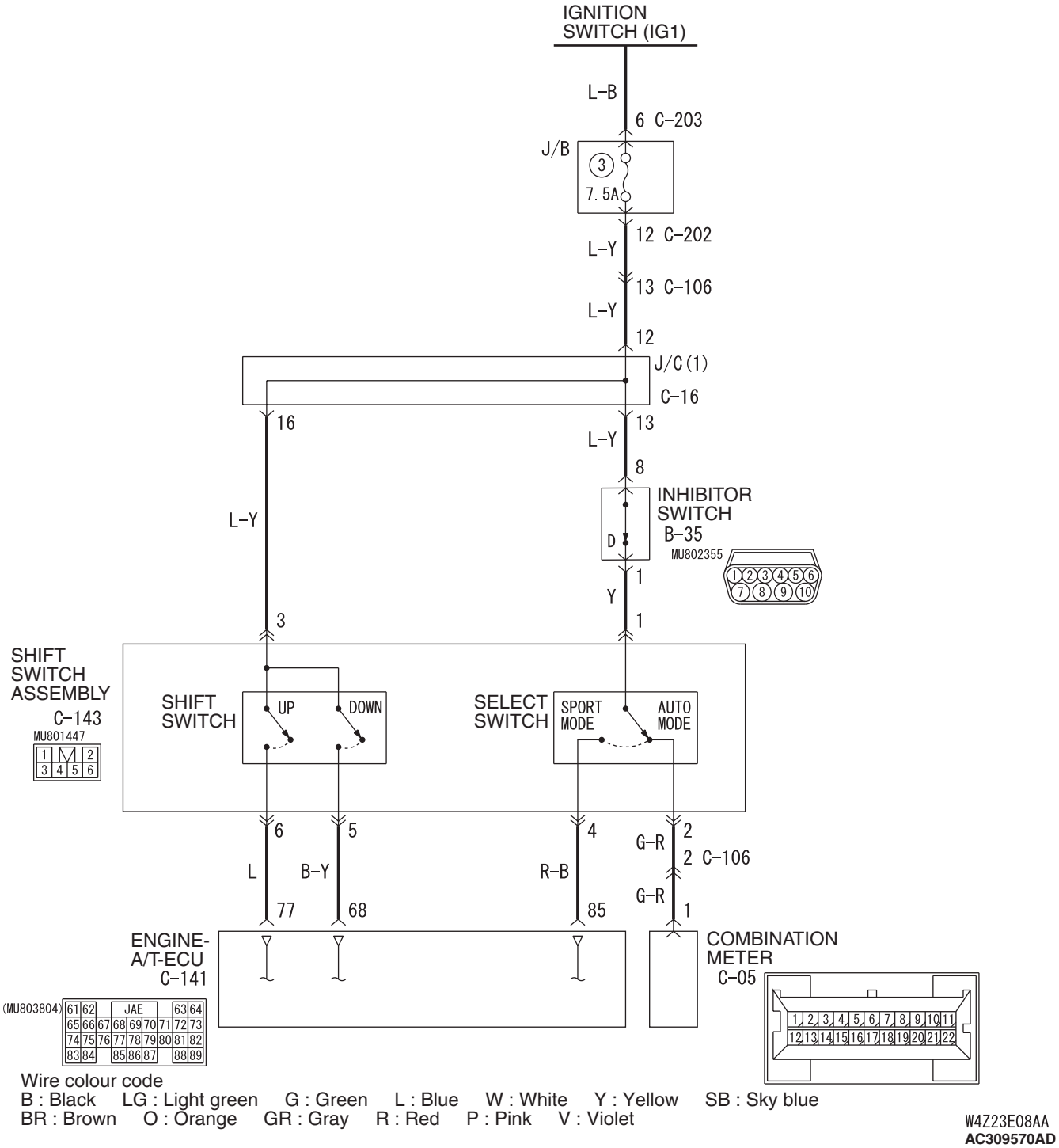
Q: Is the check result normal?
YES : Go to Step 5.
NO : If repair is possible, repair the damaged part. If repair is not possible because the splines on the drive plate or torque converter are damaged, replace it.

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



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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.

PROBABLE CAUSES

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

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-II/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-50.

YES <diagnosis code 28 is set> : Refer to diagnosis code 28: Inhibitor switch system P.23A-55.

NO : Go to Step 2.

STEP 2. M.U.T.-II/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-114).

Q: Is the check result normal?

YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).

NO <"NG" for all items> : Go to Step 3.

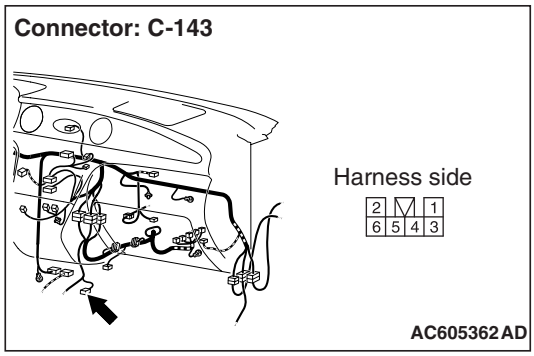
NO <"NG" for items 68 and 69> : Go to Step 5.

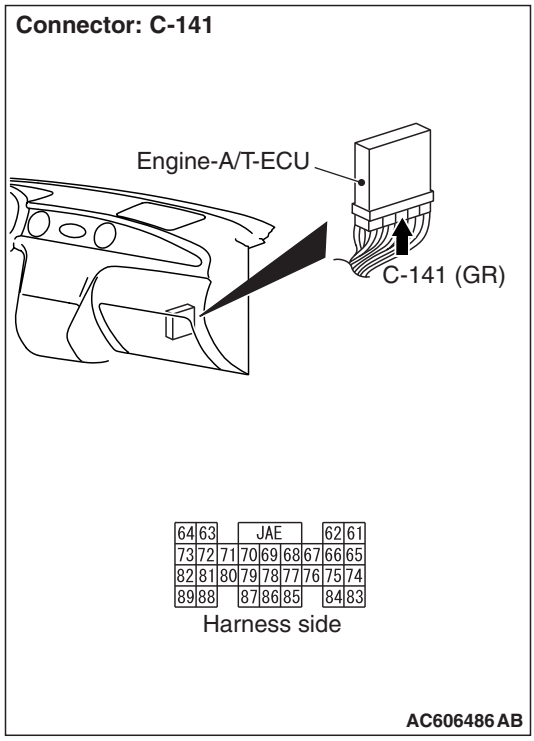
NO <"NG" for item 67> : Go to Step 10.

NO <"NG" for item 68> : Go to Step 19.

NO <"NG" for item 69> : Go to Step 22.

STEP 3. Connectors check: C-143 shift switch assembly connector, C-141 engine-A/T-ECU 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. M.U.T.-II/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-114).

Q: Is the check result normal?

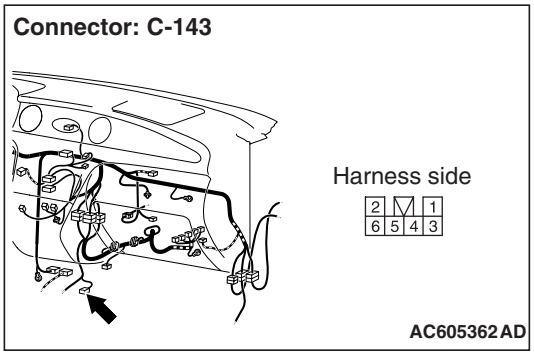
YES : Intermittent malfunction (Refer to GROUP 00 – How to Cope with Intermittent Malfunction P.00-6).

NO : Replace the engine-A/T-ECU.

STEP 5. Check the shift switch assembly.
Refer to P.23A-144.

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

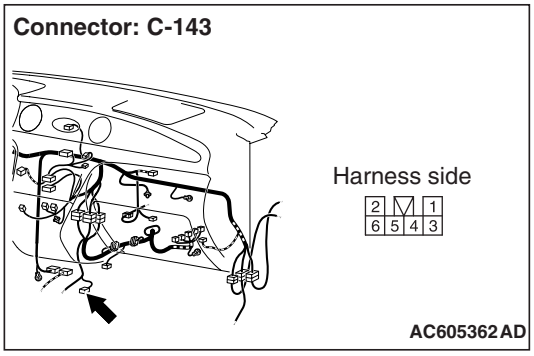
STEP 6. Connector check: C-143 shift switch assembly connector



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-143.
(1) Disconnect the connector, and measure the voltage between terminal 3 and earth at the wiring harness side.

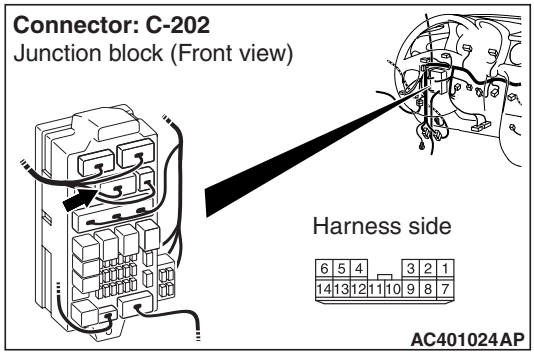


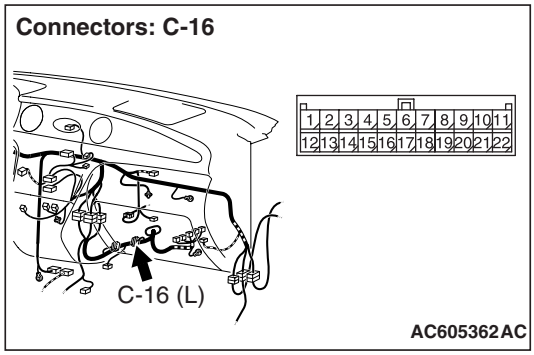
(2) Ignition switch: ON

OK: System voltage

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

STEP 8. Connectors check: C-202 J/B connector, C-16 J/C (1)

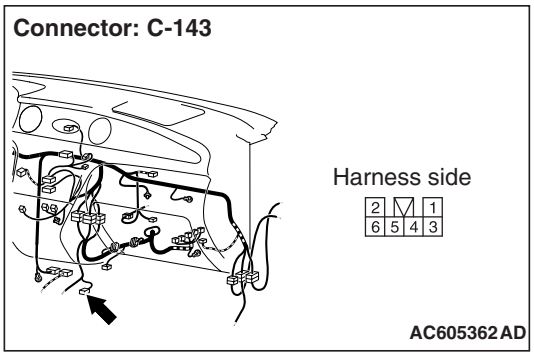


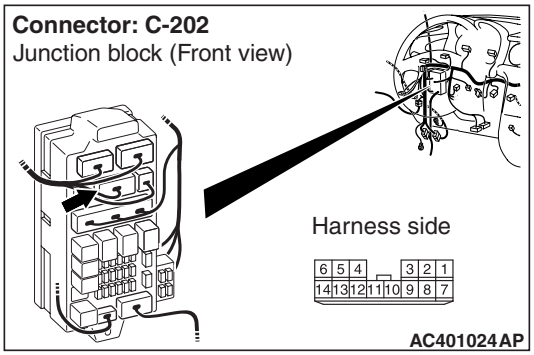


Check for the contact with terminals.

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-143 terminal No.3 and J/B connector C-202 terminal No.12.





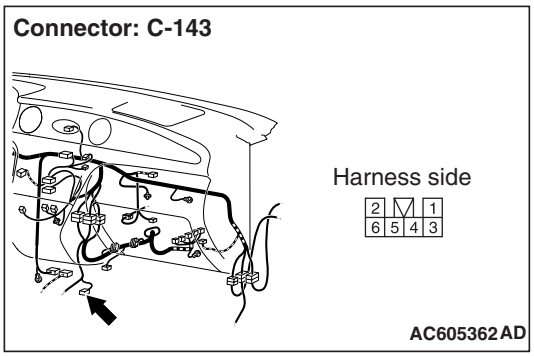
Check the power supply line for short or open circuit.

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-144.

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

STEP 11. Connector check: C-143 shift switch assembly connector

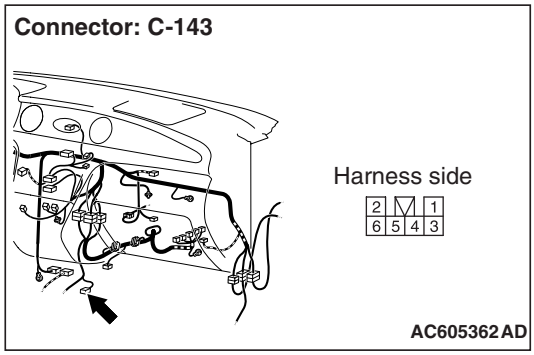


Check for the contact with terminals.

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-143

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

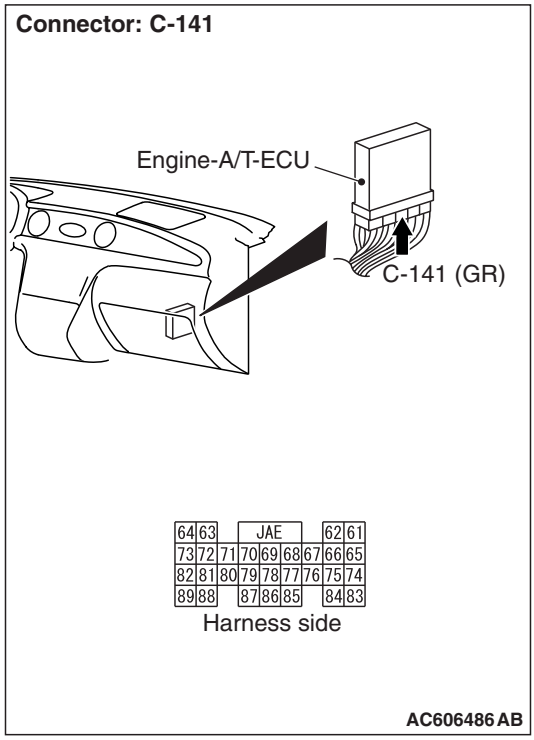


(2) Selector lever position: D
(3) Ignition switch: ON

OK: System voltage

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

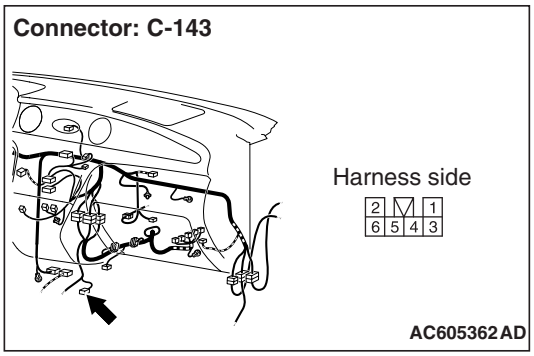
STEP 13. Connectors check: C-141 engine-A/T-ECU connector

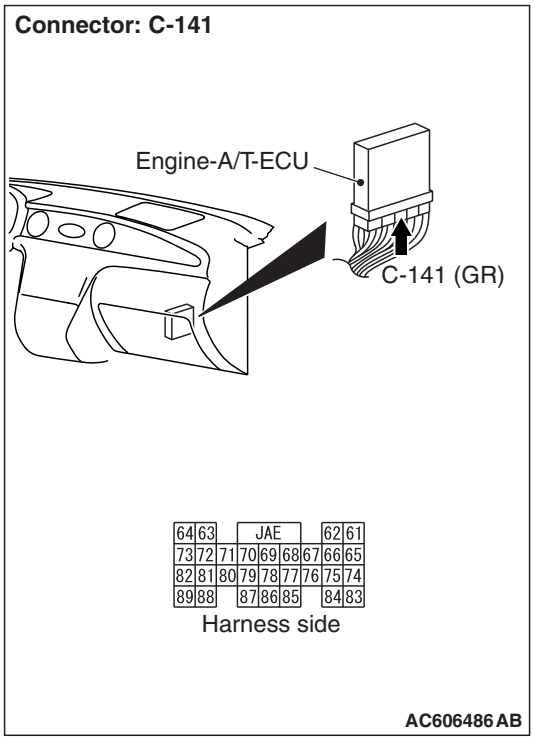


Check for the contact with terminals.

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-143 terminal No.4 and engine-A/T-ECU connector C-141 terminal No.85.

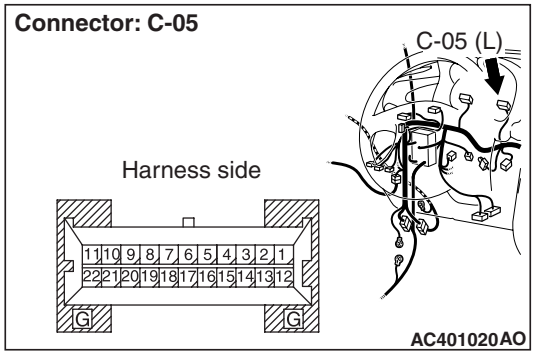


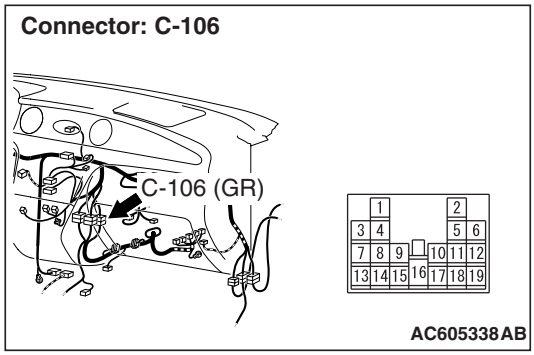


Check the output line for short-circuited or open circuit.

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

STEP 15. Connector check: C-05 combination meter connector, C-106 intermediate connector

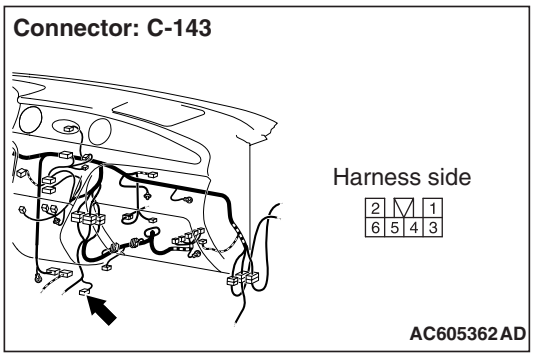


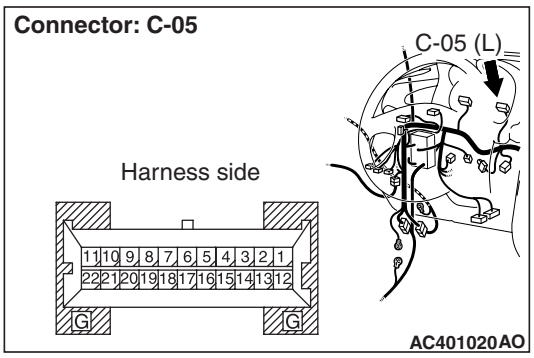


Check for the contact with terminals.

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

STEP 16. Checkt the harness between shift switch assembly connector C-143 terminal No.2 and combination meter connector C-05 terminal No.1.

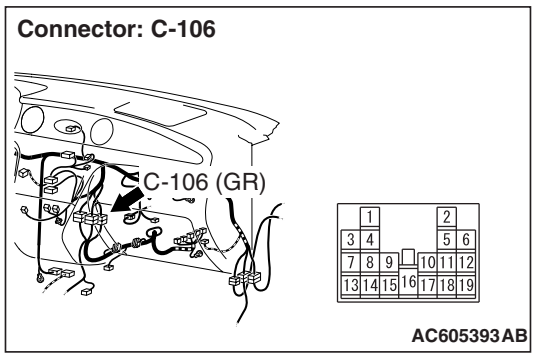




Check the output line for short-circuited or open circuit.

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

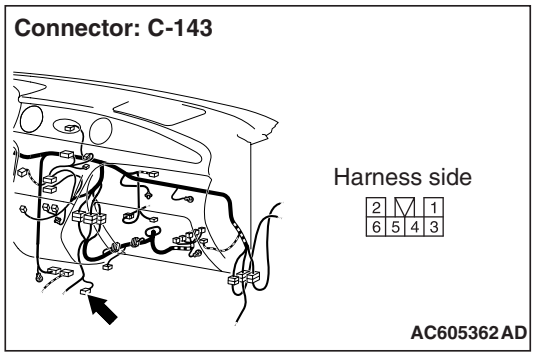
STEP 17. Connector check: C-105 intermediate connector

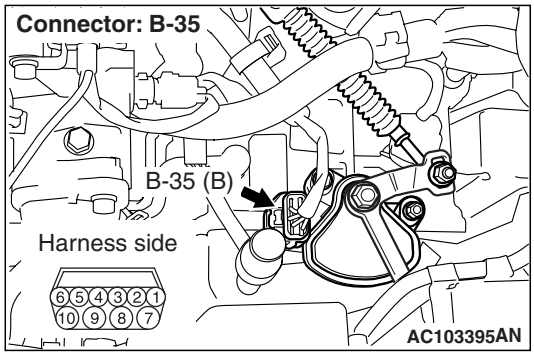


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 18.
NO : Repair the defective connector.

STEP 18. Check the harness between shift switch assembly connector C-143 terminal No.1 and inhibitor switch connector B-35 terminal No.1.





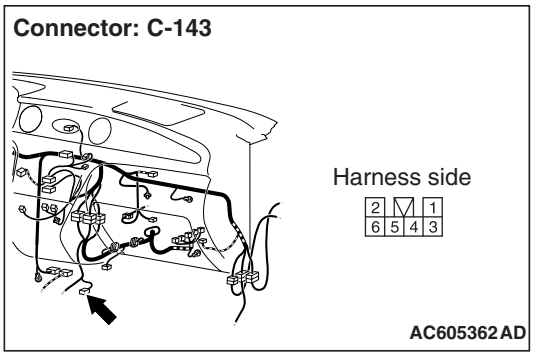
Check the power supply line for short or open circuit.

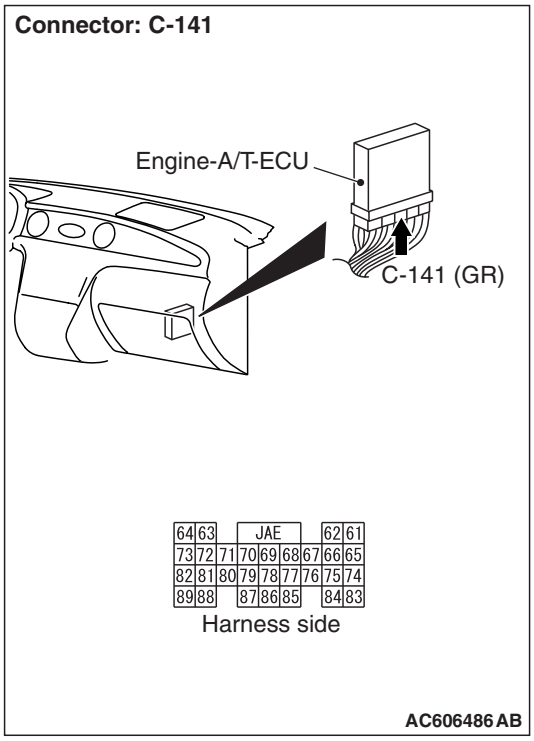
Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the wiring harness.

STEP 19. Check the shift switch assembly.
Refer to P.23A-144.

Q: Is the check result normal?
YES : Go to Step 20.
NO : Replace the shift switch assembly.

STEP 20. Connectors check: C-143 shift switch assembly connector, C-141 engine-A/T-ECU connector

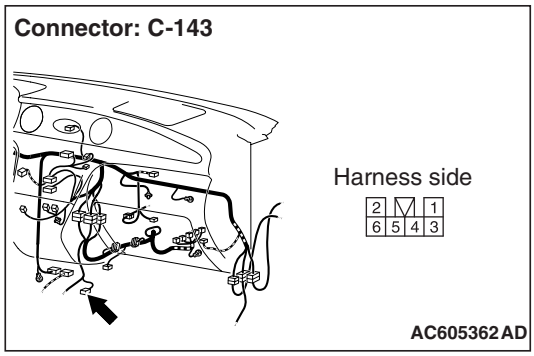


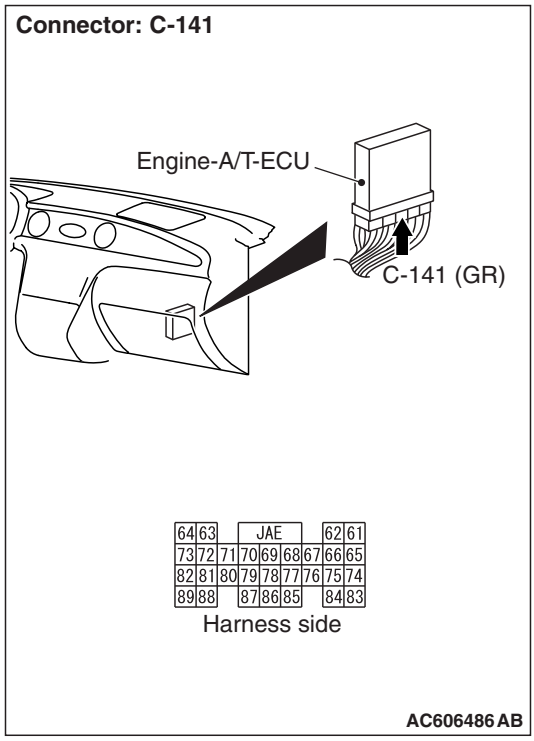


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 21.
NO : Repair the defective connector.

STEP 21. Check the harness between shift switch assembly connector C-143 terminal No.6 and engine-A/T-ECU connector C-141 terminal No.77.





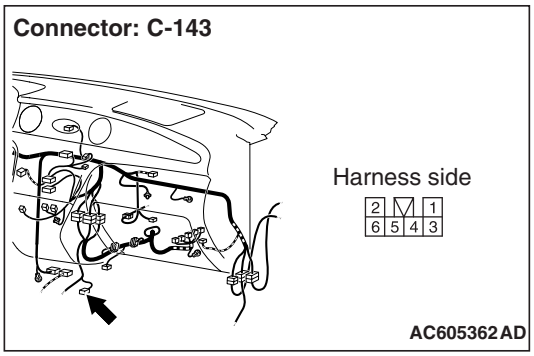
Check the output line for short-circuited or open circuit.

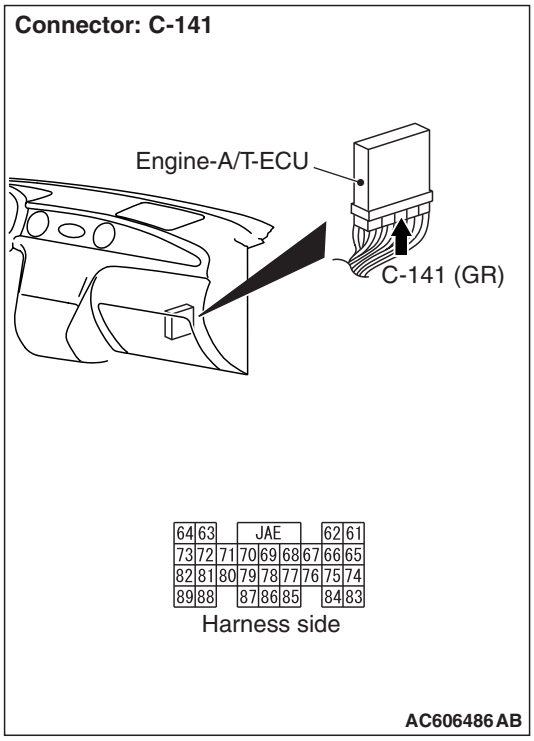
Q: Is the check result normal?
YES : Go to Step 4.
NO : Repair the wiring harness.

STEP 22. Check the shift switch assembly.
Refer to P.23A-144.

Q: Is the check result normal?
YES : Go to Step 23.
NO : Replace the shift switch assembly.

STEP 23. Connectors check: C-143 shift switch assembly connector, C-141 engine-A/T-ECU connector

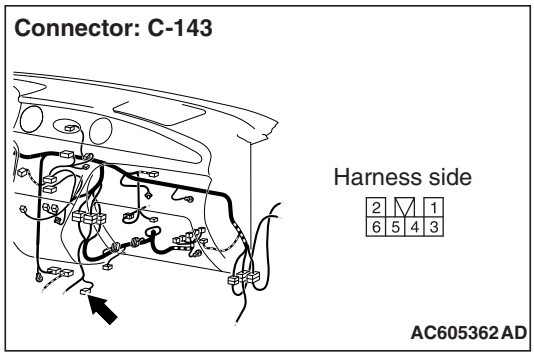


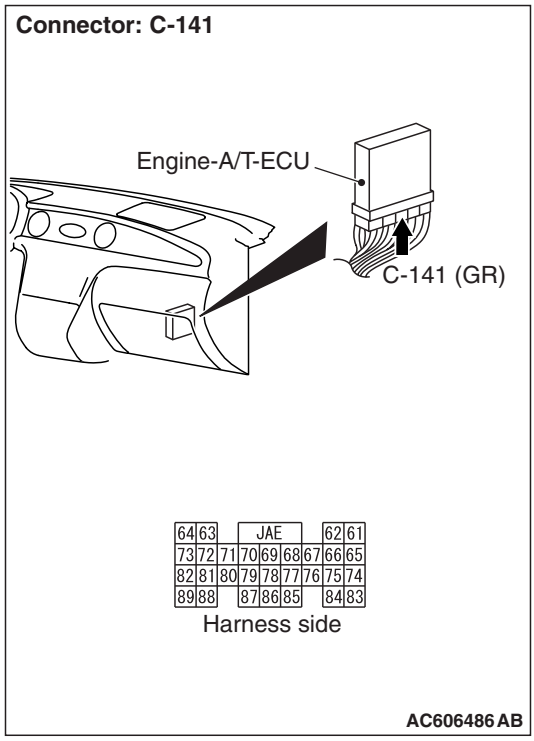


Check for the contact with terminals.

Q: Is the check result normal?
YES : Go to Step 24.
NO : Repair the defective connector.

STEP 24. Check the harness between shift switch assembly connector C-143 terminal No.5 and engine-A/T-ECU connector C-141 terminal No.68.



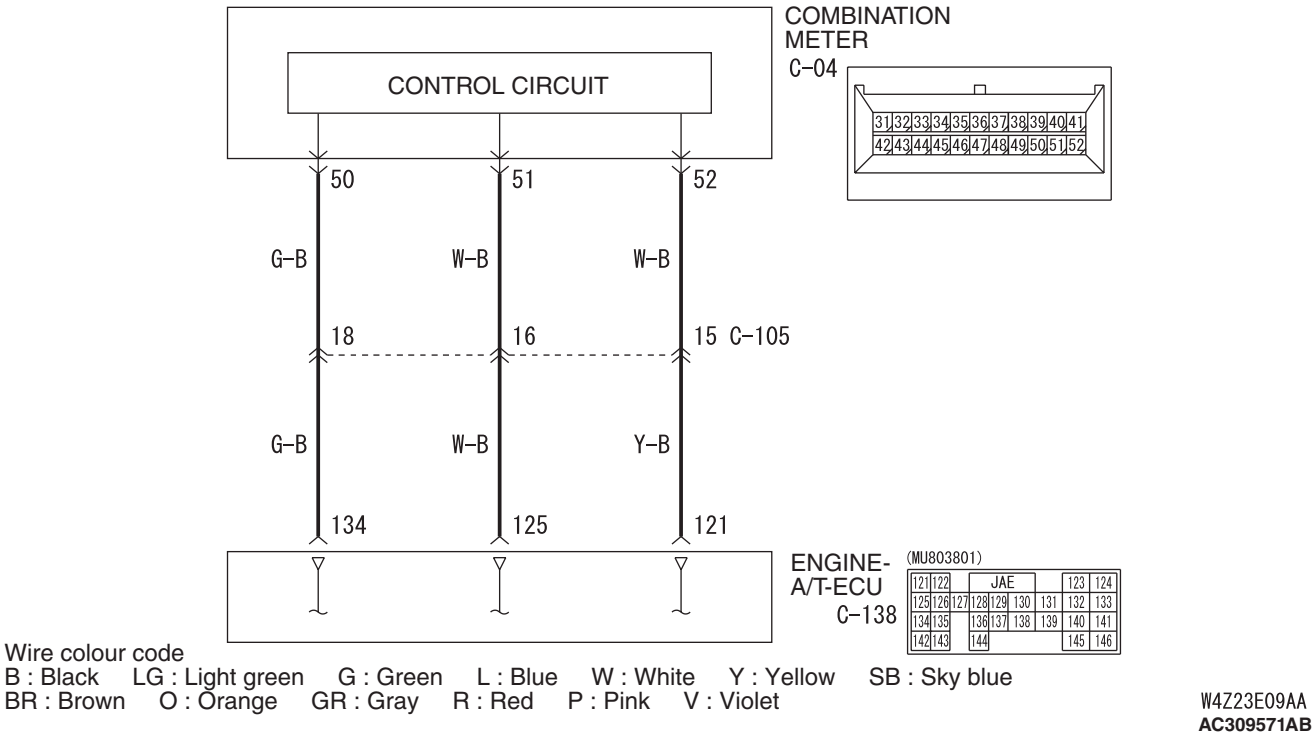


Check the output line for short-circuited or open circuit.

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

Inspection Procedure 17: Abnormal Shift Indicator Display

Shift Indicator Display 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

W4Z23E09AA
AC309571AB

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

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

PROBABLE CAUSES

- Malfunction of shift switch assembly
- Malfunction of the combination meter
- Damaged harness wires and connectors
- Malfunction of the engine-A/T-ECU

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-II/III data list

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

Check the above data list P.23A-114. (Refer to data list reference table.)

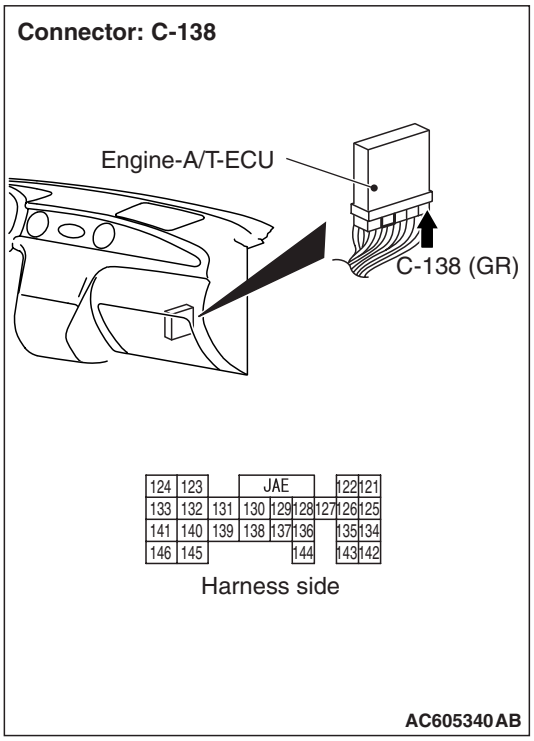
Q: Is the check result normal?

YES : Go to Step 2.

NO : Refer to inspection procedure 16: shift switch assembly system P.23A-102.

STEP 2. Measure the voltage at engine-A/T-ECU connector C-138.

(1) Confirm the shift range by using the Actuator test on the M.U.T.-II/III, and measure the voltage at the ECU terminals.

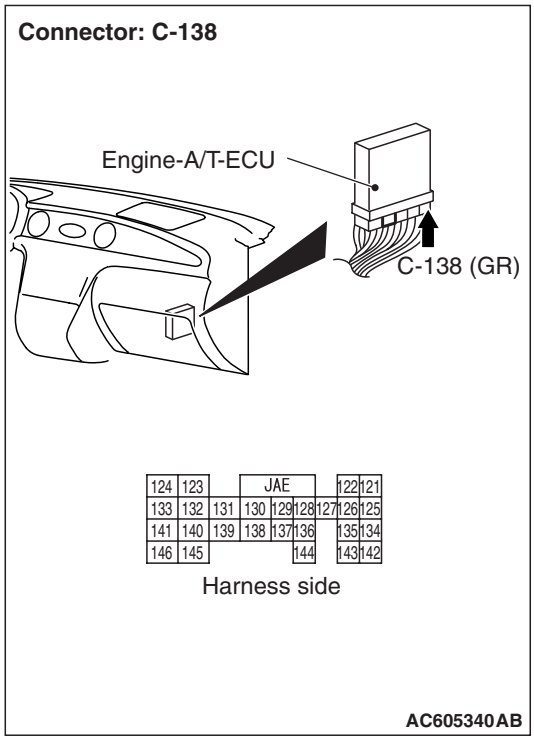


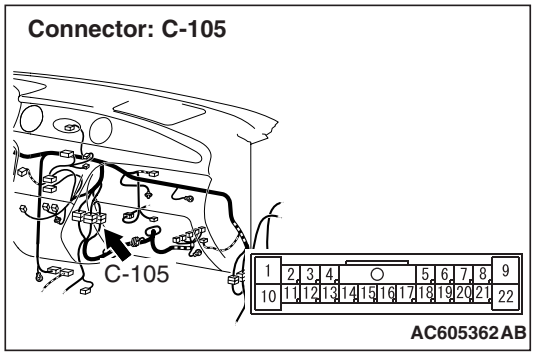
(2) Ignition switch: ON

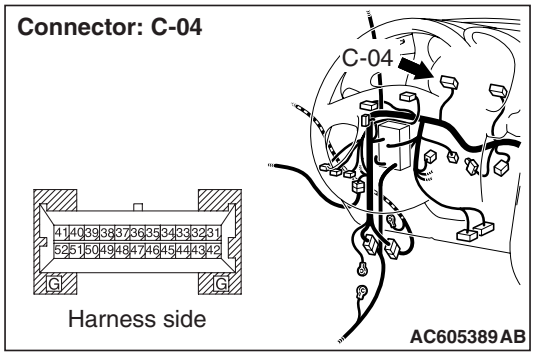
Item No.	Gear shift position	Measured terminals		
		Between terminal 134 and earth	Between terminal 125 and earth	Between terminal 121 and earth
09	3rd	8 – 10 V	8 – 10 V	1 V or less
10	4th	1 V or less	1 V or less	8 – 10 V

Q: Is the check result normal?
YES : Go to Step 4.
NO : Go to Step 3.

STEP 3. Connectors check: C-138 engine-A/T-ECU connector, C-105 intermediate connector, C-04 combination connector





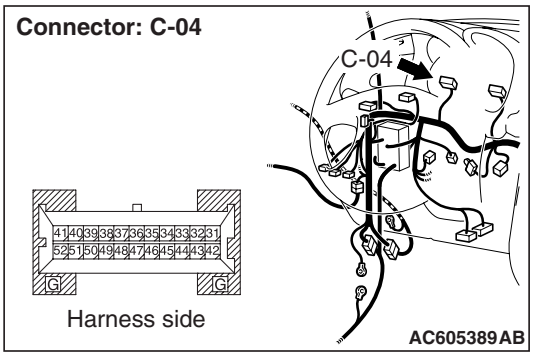


Check for the contact with terminals.

Q: Is the check result normal?
YES : Replace the engine-A/T-ECU.
NO : Repair the defective connector.

STEP 4. Measure the voltage at combination meter connector C-04.

(1) Remove the combination meter.



(2) Confirm the shift range by using the Actuator test on the M.U.T.-II/III, and measure the voltage at the combination meter harness-side connector terminals.

(3) Ignition switch: ON

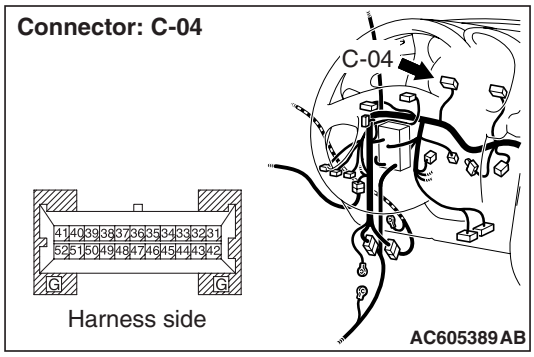
Item No.	Gear shift position	Measured terminals		
		Between terminal 50 and earth	Between terminal 51 and earth	Between terminal 52 and earth
09	3rd	8 – 10 V	8 – 10 V	1 V or less
10	4th	1 V or less	1 V or less	8 – 10 V

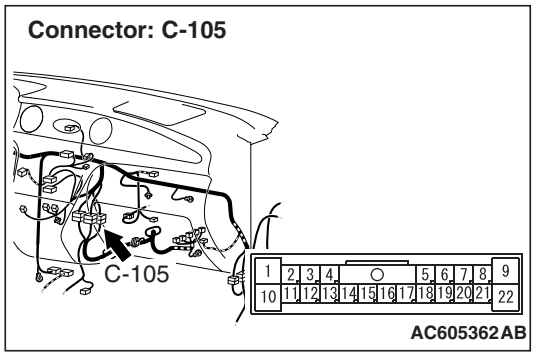
Q: Is the check result normal?

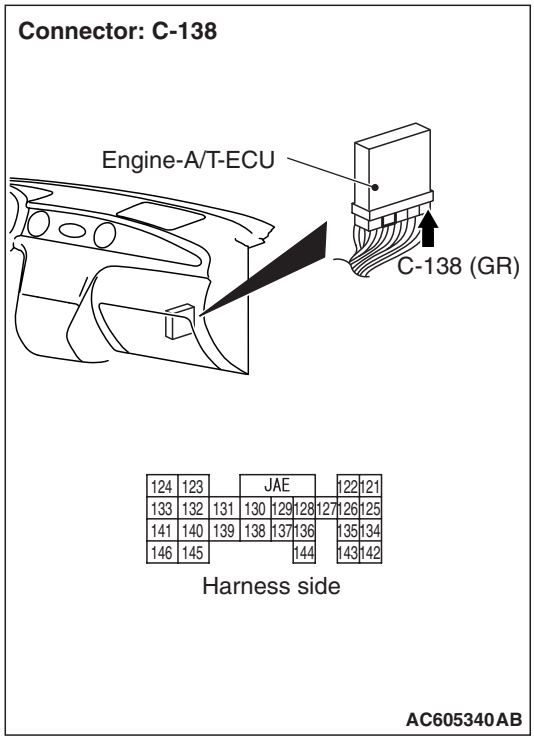
YES : Go to Step 7.

NO : Go to Step 5.

STEP 5. Connectors check: C-04 combination meter connector, C-105 intermediate connector, C-138 engine-A/T-ECU connector







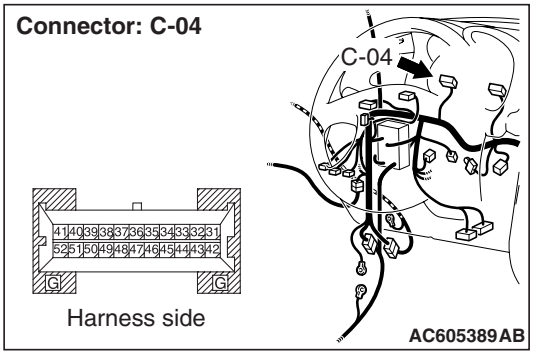
Check for the contact with terminals.

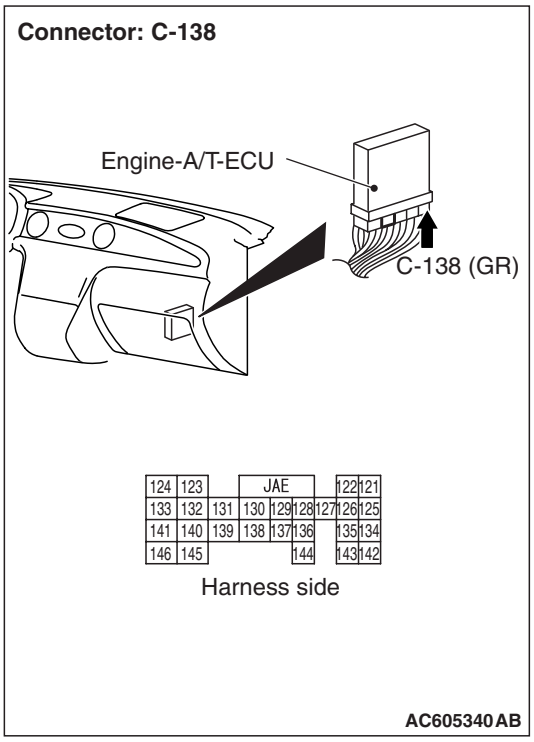
Q: Is the check result normal?

YES : Go to Step 6.

NO : Repair the defective connector.

STEP 6. Check the harness between combination meter connector C-04 terminal No.50, 51, 52 and engine-A/T-ECU connector C-138 terminal No.134, 125, 121.

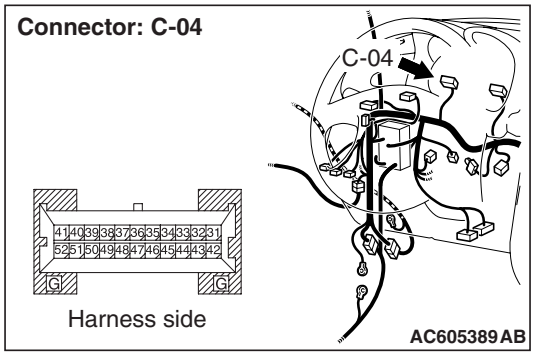




Check the output line for short-circuited or open circuit.

Q: Is the check result normal?
YES : Replace the engine-A/T-ECU.
NO : Repair the wiring harness.

STEP 7. Connector check: C-04 combination meter connector



Check for the contact with terminals.

Q: Is the check result normal?
YES : Replace the combination meter.
NO : Repair the defective connector.

DATA LIST REFERENCE TABLE

M1231008100371

Data list No.	Check item	Inspection conditions		Normal condition
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.
21	Crank angle sensor	Engine: Idling Selector lever position: P	Compare the engine speeds displayed on the tachometer and the M.U.T.-II/III.	Identical
22	Input shaft speed sensor	Driving at a constant speed of 50 km/h in 3rd		1,800 – 2,100 r/min
23	Output shaft speed sensor	Driving at a constant speed of 50 km/h in 3rd		1,800 – 2,100 r/min
26	Stop lamp switch	Ignition switch: ON Brake pedal: Depressed		ON
		Ignition switch: 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
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 %

Data list No.	Check item	Inspection conditions		Normal condition
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
57	Engine load (volumetric efficiency)	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
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		P, N
		Selector lever position: R	Driving at a constant speed of 5 km/h in reverse	REV
		Selector lever position: N		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

Data list No.	Check item	Inspection conditions		Normal condition
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

M1231008200345

Item No.	Inspection item	Test description	Inspection condition	Normal status
01	LR solenoid valve	Actuate solenoid valve indicated by M.U.T.-II/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 M.U.T.-II/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)

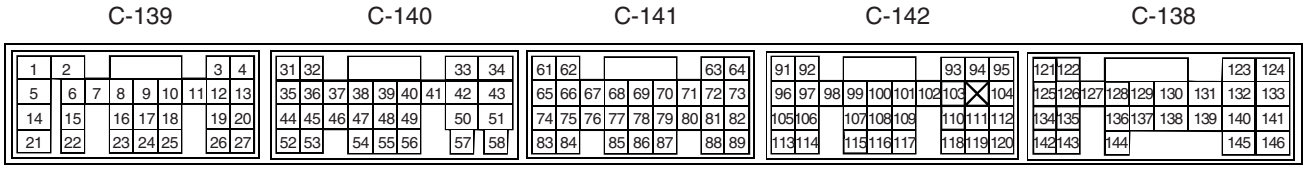
INVECS-II CANCEL COMMAND

M1231009500327

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

M1231008400350



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Terminal No.	Check item	Inspection condition	Standard value
39	Stoplight switch	• Ignition switch: ON • Brake pedal: Depressed	System voltage
		• Ignition switch: ON • 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-120, Inspection Procedure Using an Oscilloscope.
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-120, 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

Terminal No.	Check item	Inspection condition		Standard value
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-120, Inspection Procedure Using an Oscilloscope.
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	A/T fluid temperature: 20°C		3.8 – 4.0 V
		A/T fluid temperature: 40°C		3.2 – 3.4 V
		A/T fluid temperature: 80°C		1.7 – 1.9 V
121	Shift indicator C	Measure the voltage when each shift range is displayed by using actuator function (item No.07 to 10) on the M.U.T.-III (M.U.T.-II/III).	1st	1 V or less
			2nd	1 V or less
			3rd	1 V or less
			4th	8 – 10 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
125	Shift indicator B	Measure the voltage when each shift range is displayed by using actuator function (item No.07 to 10) on the M.U.T.-III (M.U.T.-II/III).	1st	1 V or less
			2nd	8 – 10 V
			3rd	8 – 10 V
			4th	1 V or less
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

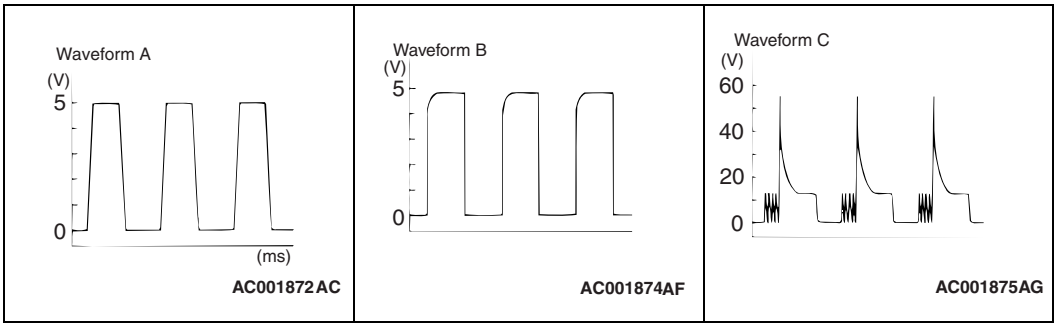
Terminal No.	Check item	Inspection condition		Standard value
131	Earth	Always		1 V or less
134	Shift indicator A	Measure the voltage when each shift range is displayed by using actuator function (item No.07 to 10) on the M.U.T.-III (M.U.T.-II/III).	1st	8 – 10 V
			2nd	1 V or less
			3rd	8 – 10 V
			4th	1 V or less
135	A/T fluid temperature warning light	Ignition switch: LOCK (OFF) to ON		1 V or less to System voltage (after several seconds have elapsed)
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

M1231008500357

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



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

TROUBLE SYMPTOM CHART

M1232001800468

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-122
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-122
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-122
The selector lever cannot be easily moved from the P to the R position.	4	P.23A-123
The selector lever cannot be moved from the R to the P position.	5	P.23A-123
The ignition key cannot be turned to the LOCK (OFF) position when the selector lever is at the P position.	6	P.23A-123
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-123
The buzzer does not sound when the selector lever is at the R position.*	–	–

*NOTE: The R (reverse) position warning function is controlled by the Smart Wiring System (SWS). The troubleshooting for * refers to GROUP 54B - SWS troubleshooting.*

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 ignition key cylinder lock bar.

Possible causes

- Malfunction of selector lever assembly
- Malfunction of transmission control cable
- Malfunction of shift lock cable
- Malfunction of key interlock cable
- Malfunction of lock bar

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 or ignition key cylinder lock bar.

Possible causes

- Malfunction of key interlock cable
- Malfunction of lock bar

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 ignition key cylinder lock bar.

Possible causes

- Malfunction of selector lever assembly
- Malfunction of transmission control cable
- Malfunction of shift lock cable
- Malfunction of key interlock cable
- Malfunction of lock bar

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 ignition key cylinder lock bar.

Possible causes

- Malfunction of selector lever assembly
- Malfunction of key interlock cable
- Malfunction of lock bar

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 ignition key cylinder lock bar.

Possible causes

- Malfunction of key interlock cable
- Malfunction of lock bar

DIAGNOSIS

Check by referring to the possible causes.

ON-VEHICLE SERVICE

ESSENTIAL SERVICE

AUTOMATIC TRANSMISSION FLUID (ATF) CHECK

M1231000900340

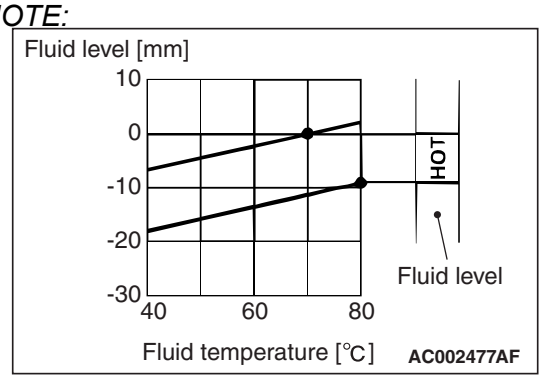
⚠ CAUTION

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 M.U.T.-II/III.

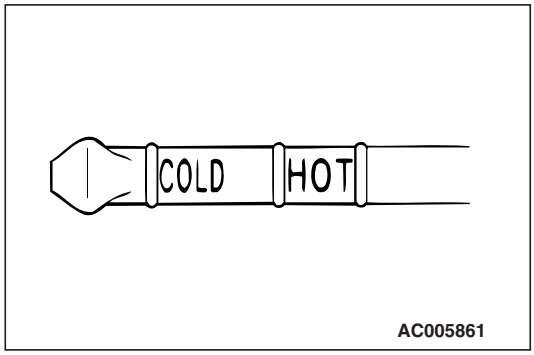
   NOTE:



   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.

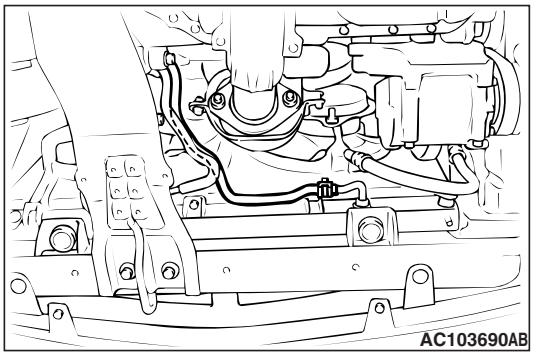
AUTOMATIC TRANSMISSION FLUID (ATF) REPLACEMENT

M1231001000339

⚠ 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.

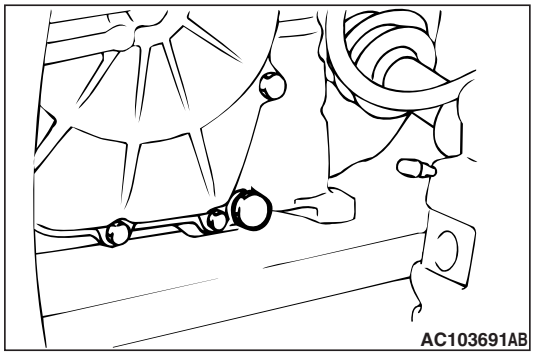
⚠ CAUTION

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.

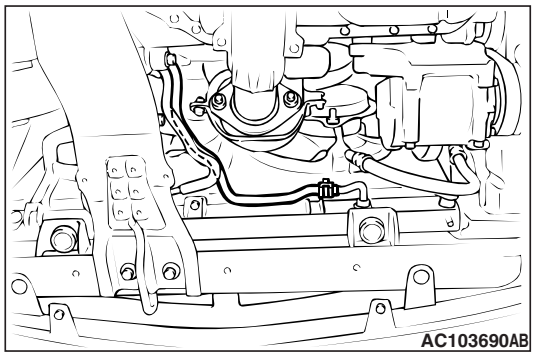
5. Pour in new A/T fluid through the oil filler tube.

   Amount to add: Approx. 2.0 L

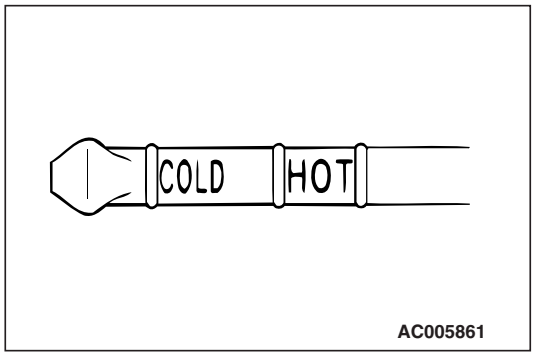
6. Repeat the operation in step 2.
7. Pour in new A/T fluid through the oil filler tube.

   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.

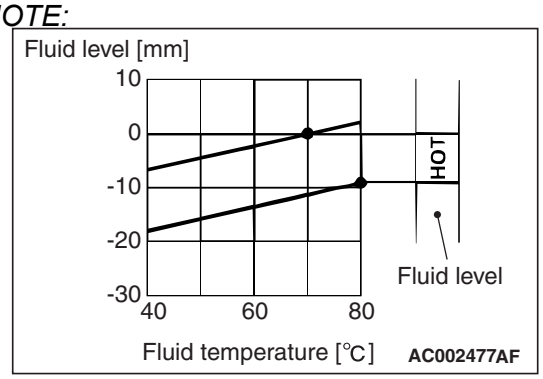


11. Check that the A/T fluid level on the oil level gauge is at the COLD mark. if it is not up to this mark, add more A/T fluid.
12. Drive the vehicle until the A/T fluid temperature reaches the normal temperature (70 – 80 °C), and then re check the A/T fluid level.

    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 M.U.T.-II/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 °C.)

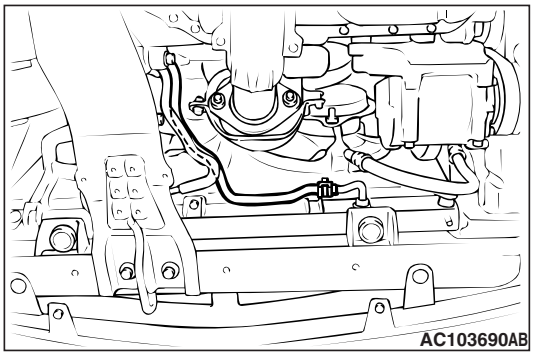
13. When A/T fluid is under the specified level, top up A/T fluid. When A/T fluid is over the specified level, drain the excessive A/T fluid from the drain plug to adjust A/T fluid level to the specified level.
14. Securely insert the oil level gauge into the oil filler tube.

AUTOMATIC TRANSMISSION FLUID COOLER LINE FLUSHING

M1231013000381

⚠ 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

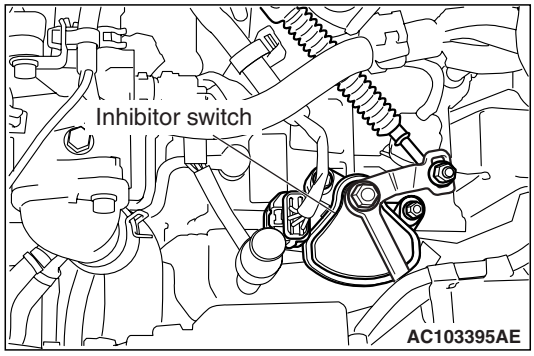
4. Repeat the operation in step 2 and 3.

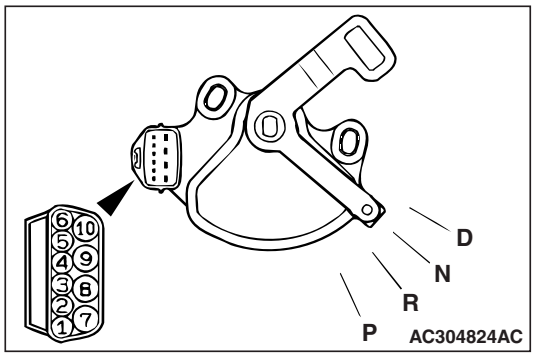
   NOTE: Carry out steps 2 and 3 so that at least 8.0 L has been discharged from the cooler hose. After this, discharge a small quantity of A/T fluid and check for contamination. If the A/T fluid is contaminated, repeat steps 2 and 3.

5. Carry out the procedure in "Automatic Transmission Fluid (ATF) Replacement" from step 2 onwards.

INHIBITOR SWITCH CONTINUITY CHECK

M1231001400586





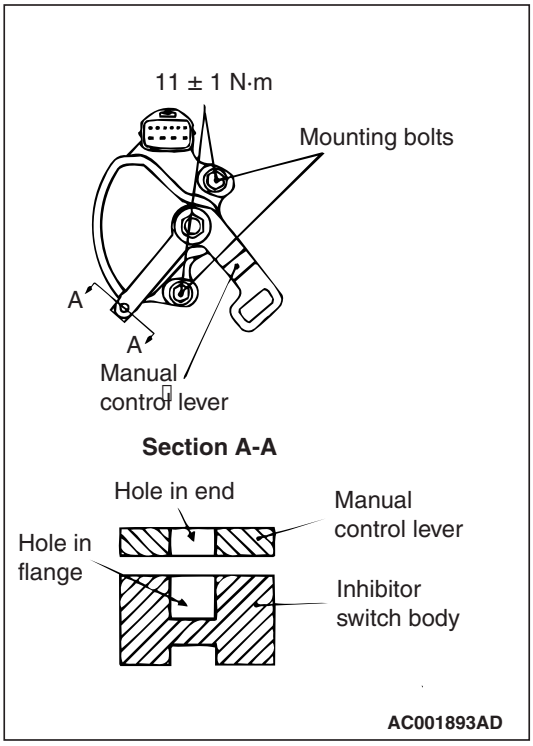
Item	Terminal No.	Resistance
P	3 – 8, 9 – 10	Less than 2 Ω
R	7 – 8	
N	4 – 8, 9 – 10	
D	1 – 8	

NOTE: The inhibitor switch has 7 positions, but only four positions [P, R, N and D]are used.

INHIBITOR SWITCH AND CONTROL CABLE ADJUSTMENT

M1231010300316

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 bolt, and then turn the inhibitor switch to adjust so that the hole at the end of the manual control lever and the hole in the inhibitor switch body flange (section A – A in the illustration at left) are aligned.

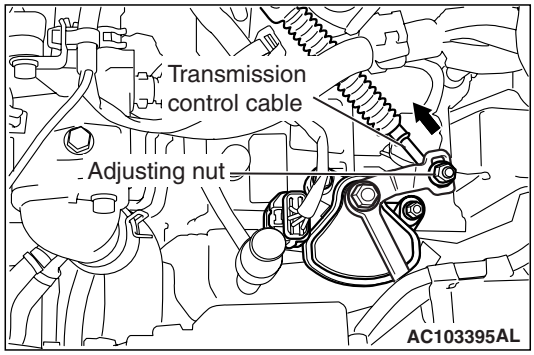
   NOTE: The inhibitor switch body can be aligned by hand, because the manual control lever end is as wide as the switch body flange. Alternatively, the inhibitor switch can also be aligned by inserting a 5-mm bar in the holes of the manual control lever end and the inhibitor switch body flange.

⚠ 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



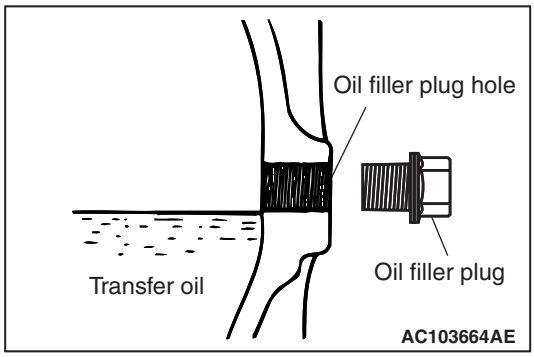
6. Gently push the transmission control cable in the direction as shown in the illustration at left, and tighten the adjusting nut the specified torque.

   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.

TRANSFER OIL LEVEL CHECK

M1231001100132

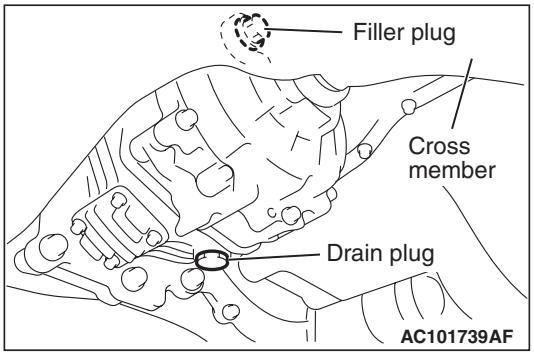


1. Remove the filler plug.
2. Check that the oil level is up to the lower edge of the filler plug hole.
3. Check that the oil is not noticeably dirty.
4. Tighten the filler plug to the specified torque.

   Tightening torque: 32 ± 2 N·m

TRANSFER OIL REPLACEMENT

M1231001200139



1. Remove the drain plug and discharge the oil.
2. Tighten the drain plug to the specified torque.

Tightening torque: 32 ± 2 N·m

⚠ CAUTION

Cover the heat protector of the front exhaust pipe with cardboard or something similar when refilling transfer oil so that transfer oil does not enter the area between the front exhaust pipe and heat protector.

3. Remove the oil filer plug and pour in oil until it reaches the bottom the oil filer plug hole.

   Specified oil: Hypoid gear oil API classification GL-5 SAE 90
   Quantity: 0.55 L

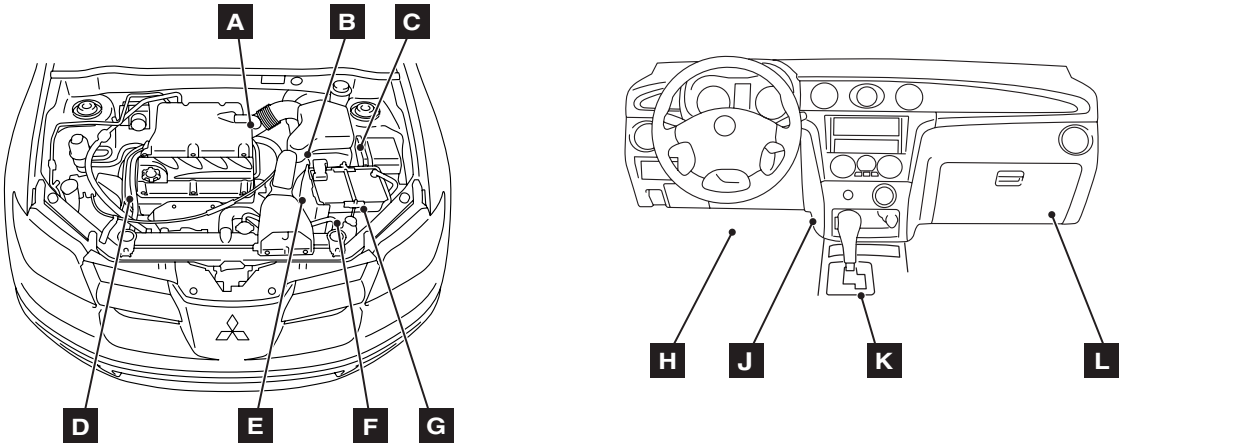
4. Tighten the filler plug to the specified torque.

   Tightening torque: 32 ± 2 N·m

A/T CONTROL COMPONENT LOCATION

M1231008600592

Name	Symbol	Name	symbol
A/C compressor relay	C	Inhibitor switch	F
A/T control relay	C	Input shaft speed sensor	E
A/T control solenoid valve assembly	G	Output shaft speed sensor	B
A/T fluid temperature sensor	G	Shift switch assembly	K
Crank angle sensor	D	Stop lamp switch	H
Diagnosis connector	J	Throttle position sensor (TPS)	A
Engine-A/T-ECU	L		



A/T CONTROL COMPONENT CHECK

INHIBITOR SWITCH CHECK

M1231001400597

Refer to P.23A-126.

CRANK ANGLE SENSOR CHECK

M1231009000463

Refer to GROUP 13C – Troubleshooting, Inspection Procedure using an Oscilloscope P.13C-419.

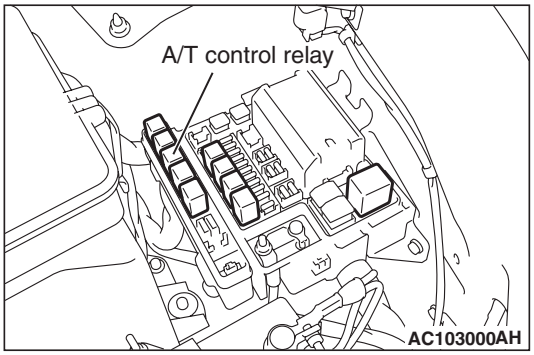
STOP LAMP SWITCH CHECK

M1231010100118

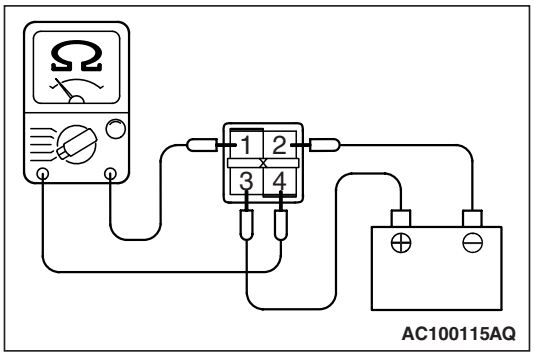
Refer to GROUP 35A – Brake pedal, Inspection P.35A-13.

A/T CONTROL RELAY CHECK

M1231009300282



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.

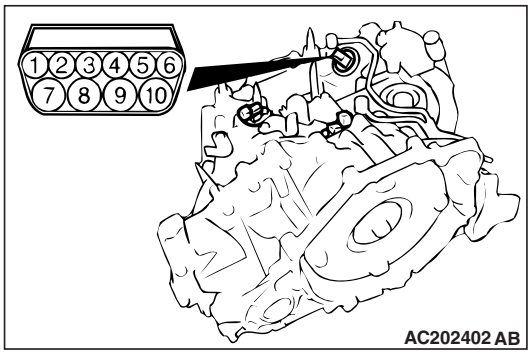
Jumper leads	Continuity between terminals 1 and 4
Connected	Less than 2 Ω
Disconnected	Open circuit

4. If there is a malfunction, replace the A/T control relay.

A/T CONTROL SOLENOID VALVE ASSEMBLY CHECK

M1231009400308

1. Use the M.U.T.-II/III to measure the A/T fluid temperature and check that the A/T fluid temperature is 20°C.

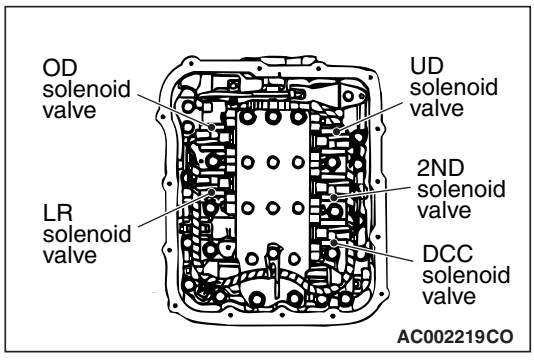


2. Disconnect the A/T control solenoid valve assembly connector.
3. Measure the resistance between the solenoid valve terminals.
4. Check that the measured values are within the standard values at items 1 and 3.

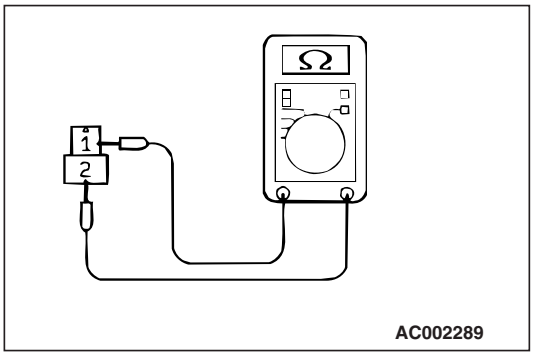
STANDARD VALUE:

Name	Terminal No.	Resistance value
Damper clutch control solenoid valve	7 – 10	2.7 – 3.4 Ω (A/T fluid temperature 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 A/T fluid 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.

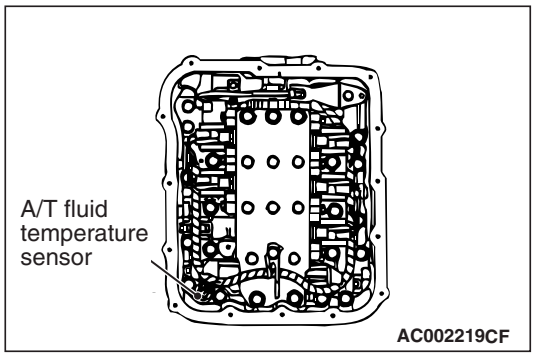
   Standard value: 2.7 – 3.4 Ω (A/T fluid temperature 20°C)

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.

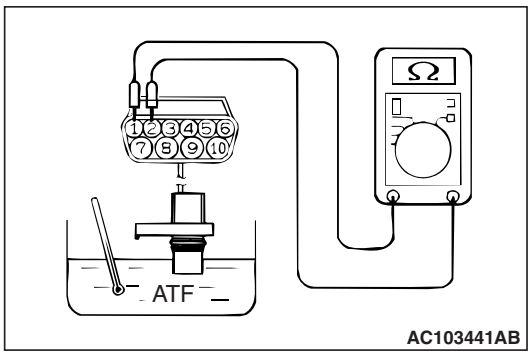
A/T FLUID TEMPERATURE SENSOR CHECK

M1231004500281

1. Drain the A/T fluid 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:

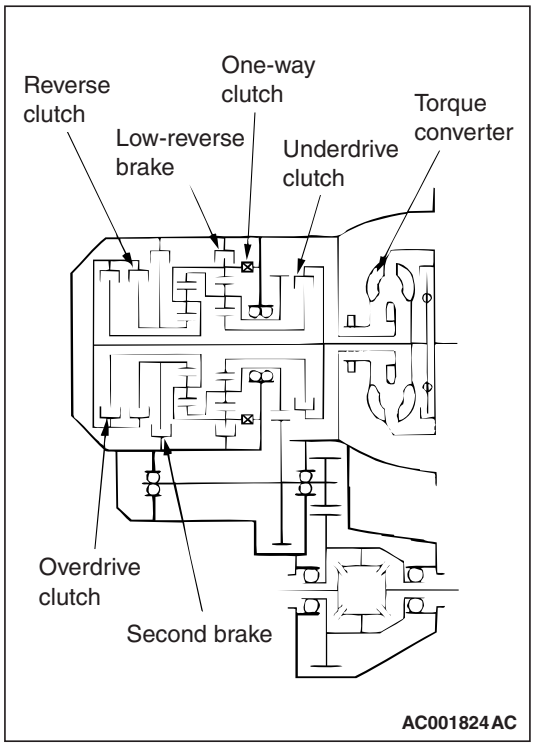
Fluid temperature (°C)	Resistance value (Ω)
0	16.7 – 20.5
20	7.3 – 8.9
40	3.4 – 4.2
60	1.9 – 2.2
80	1.0 – 1.2
100	0.57 – 0.69

   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

M1231005400403



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 M.U.T.-II/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

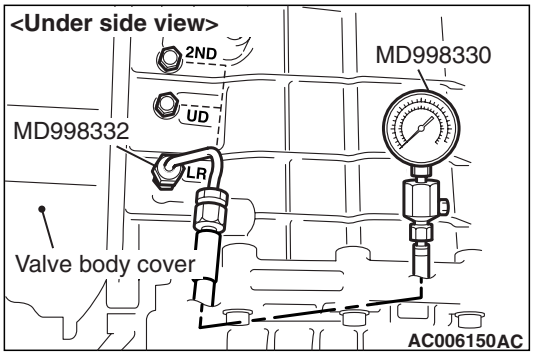
HYDRAULIC PRESSURE TESTS

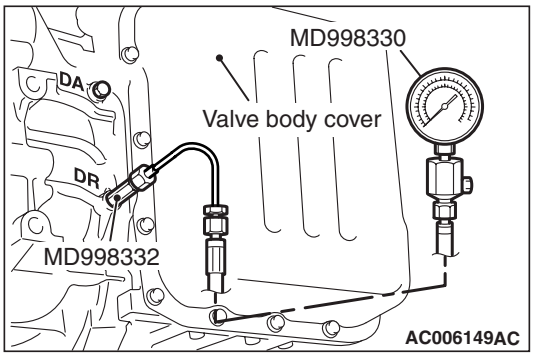
M1231005500433

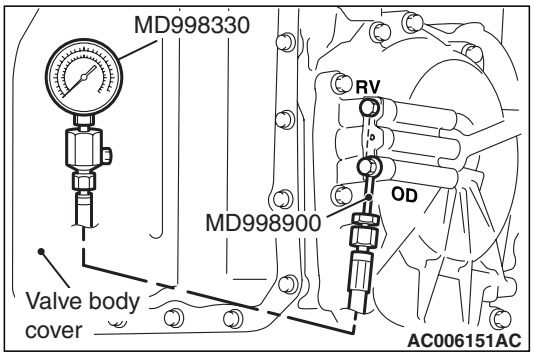
⚠ CAUTION

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 dip-stick
   - 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	–	–	–	1.01 – 1.05	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.

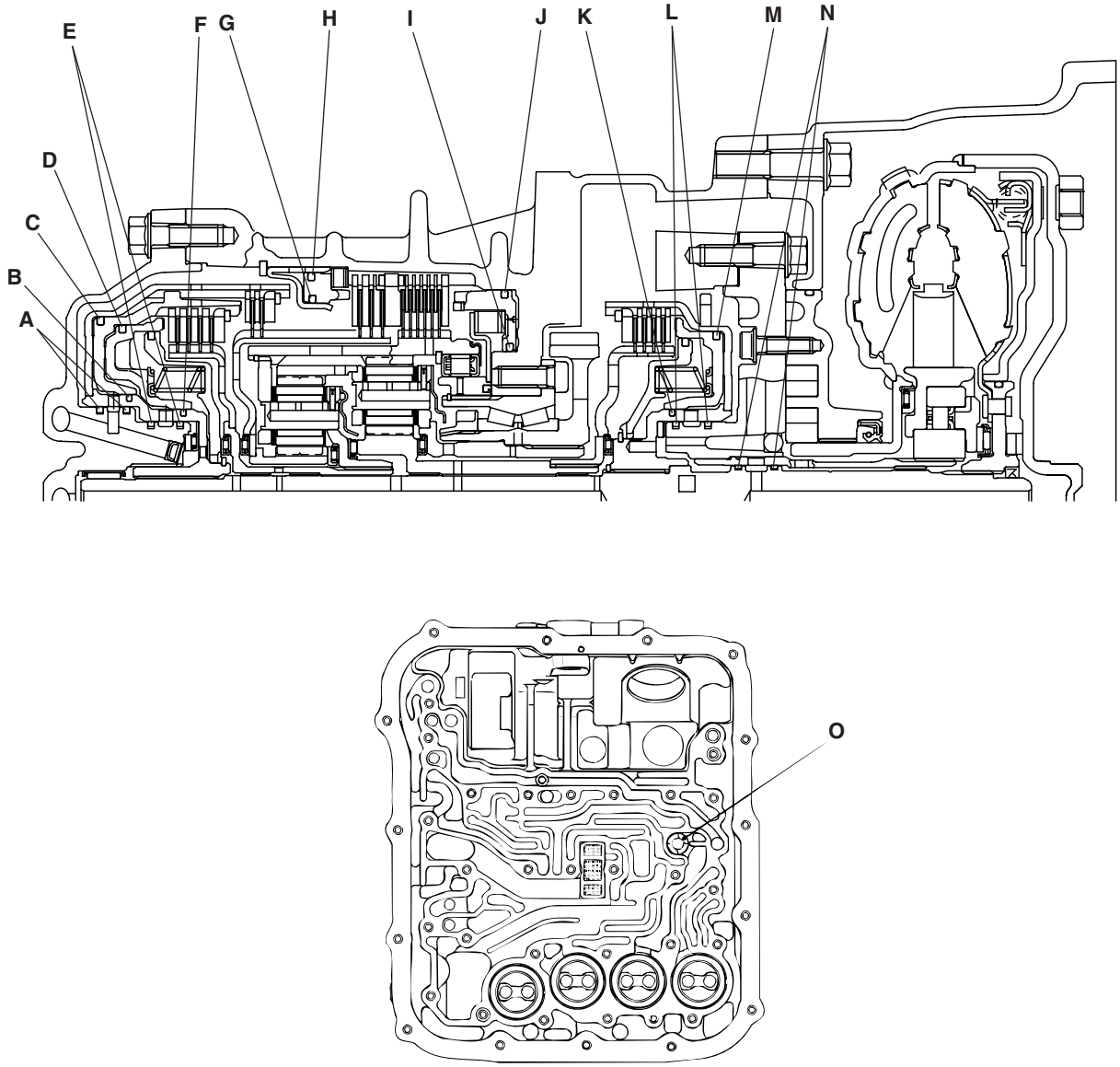
HYDRAULIC PRESSURE TEST DIAGNOSIS TABLE

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 reverse gear only.	Malfunction of the regulator valve
	Clogged orifice
	Incorrect valve body installation
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

Trouble symptom	Probable cause
Only underdrive clutch hydraulic pressure is abnormal.	Malfunction of the oil seal K
	Malfunction of the oil seal L
	Malfunction of the oil seal 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
Only reverse clutch hydraulic pressure is abnormal.	Malfunction of the oil seal A
	Malfunction of the oil seal B
	Malfunction of the oil seal C
	Clogged orifice
	Incorrect valve body installation
Only overdrive clutch hydraulic pressure is abnormal.	Malfunction of the oil seal D
	Malfunction of the oil seal E
	Malfunction of the oil seal 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
	Malfunction of the oil seal 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

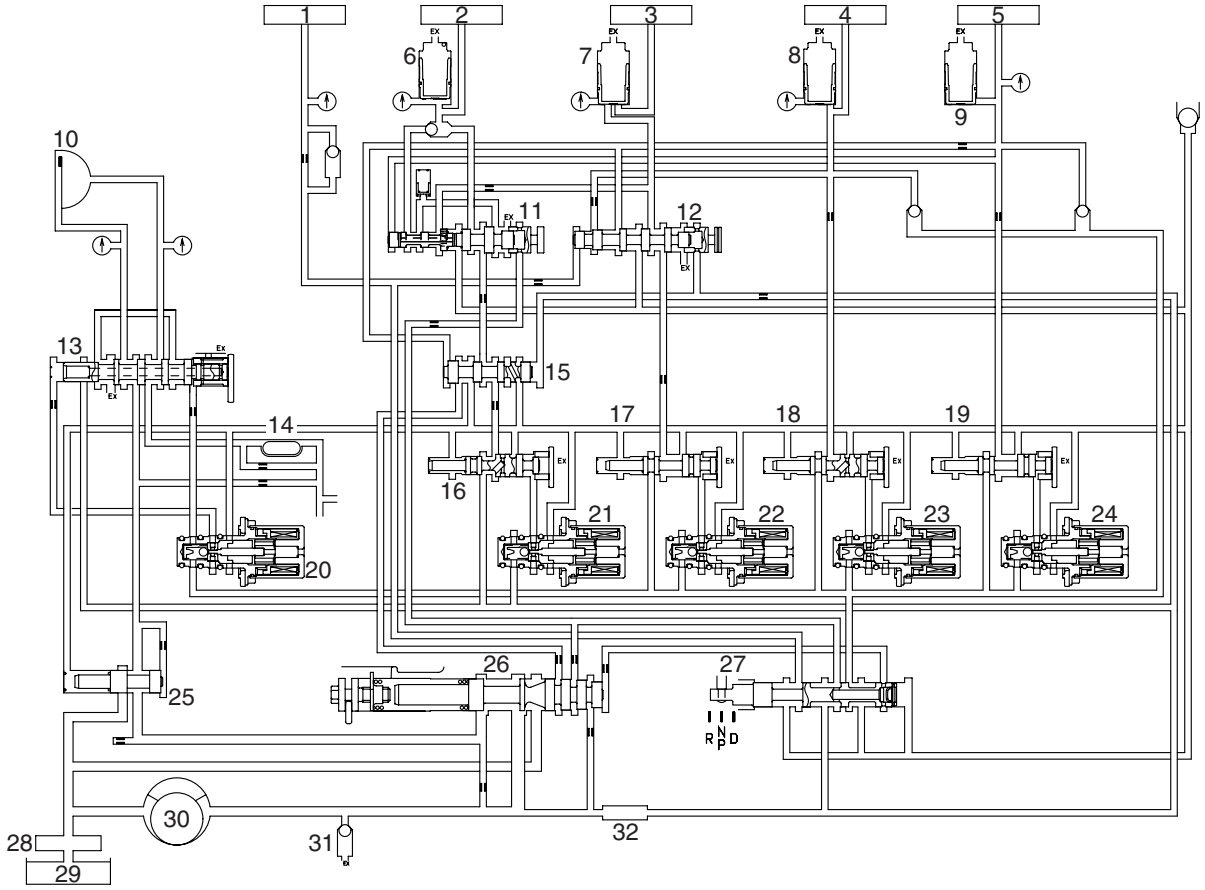
Trouble symptom	Probable cause
Only second brake hydraulic pressure is abnormal.	Malfunction of the oil seal G
	Malfunction of the oil seal H
	Malfunction of the oil seal O
	Malfunction of the second solenoid valve
	Malfunction of the second pressure control valve
	Malfunction of the fail safe valve 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



HYDRAULIC CIRCUIT

M1231008800370



AK202328AD

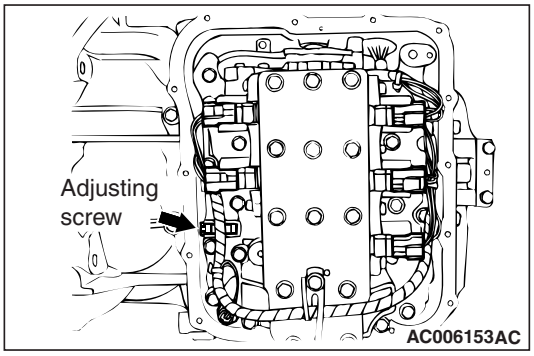
1. Reverse clutch
2. Low-reverse brake
3. Second brake
4. Underdrive clutch
5. Overdrive clutch
6. Low-reverse accumulator
7. Second accumulator
8. Underdrive accumulator
9. Overdrive accumulator
10. Damper clutch
11. Fail-safe valve A
12. Fail-safe valve B
13. Damper clutch control valve
14. Cooler
15. Switch valve
16. Low-reverse pressure control valve
17. Second pressure control valve
18. Underdrive pressure control valve
19. Overdrive pressure control valve
20. Damper clutch control solenoid valve
21. Low-reverse solenoid valve
22. Second solenoid valve
23. Underdrive solenoid valve
24. Overdrive solenoid valve
25. Damper clutch pressure control valve
26. Regulator valve
27. Manual valve
28. Oil filter
29. Oil pan
30. Oil pump
31. Relief valve
32. Oil strainer

LINE PRESSURE ADJUSTMENT

M1231001700402

1. Drain the A/T fluid.

   NOTE: The hydraulic pressure test must be performed before attempting any adjustments.
2. Remove the valve body cover.



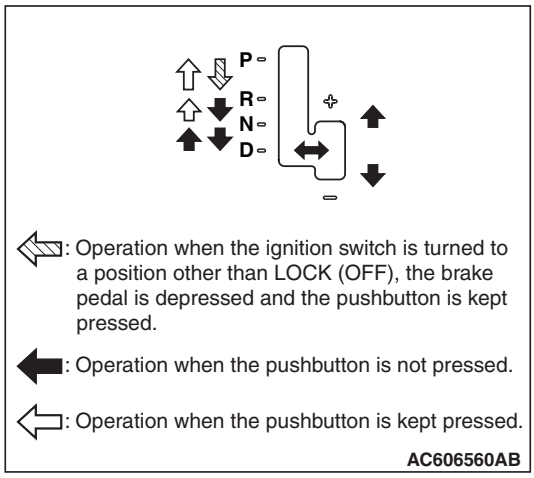
3. Turn the adjusting screw shown in the illustration to adjust the line pressure to the standard value. The pressure increases when the screw is turned counterclockwise.

   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 A/T fluid.
5. Repeat the hydraulic pressure test (Refer to P.23A-132.) Readjust the line pressure if necessary.

SELECTOR LEVER OPERATION CHECK

M1231001300686



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 or 2nd 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 AND SHIFT LOCK MECHANISM CHECK

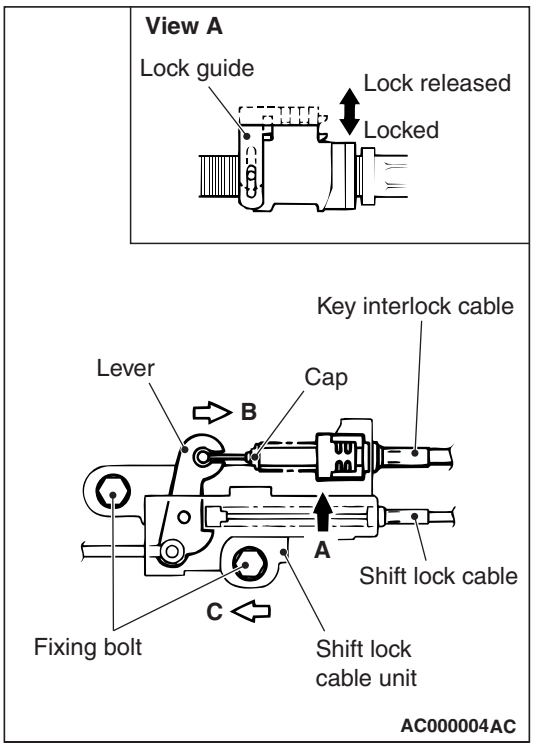
M1232003100692

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.

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.
3			The selector lever push button can be pushed, and the selector lever can be moved from R position to P position.

2. If the above operations do not occur correctly, adjust the shift lock cable unit by the following procedure.
   (1) Remove the front floor console (Refer to GROUP 52A – Floor Console Assembly P.52A-8).
   (2) Move the selector lever to P position.
   (3) Turn the ignition key to LOCK (OFF) position.



   (4) Loosen the shift lock cable unit fixing bolt, and then while pushing the lever in direction of B and the unit in direction of C, tighten the fixing bolt to the specified torque.

Tightening torque: 5.0 ± 1.0 N·m

   (5) Lift the lock guide to unlock the key interlocking cable.
   (6) While pushing the cap of the key interlock cable in the direction of B, lower the lock guide to lock the cable.

NOTE: The lock position at this time (the amount by which the cap is pushed) represents the amount of adjustment for the key interlock cable. If the key interlock cable does not operate correctly, adjust the lock position.

3. After adjusting, check the operation once more. If the operation is still incorrect, replace the shift lock unit. (Refer to P.23A-145)

TRANSMISSION CONTROL

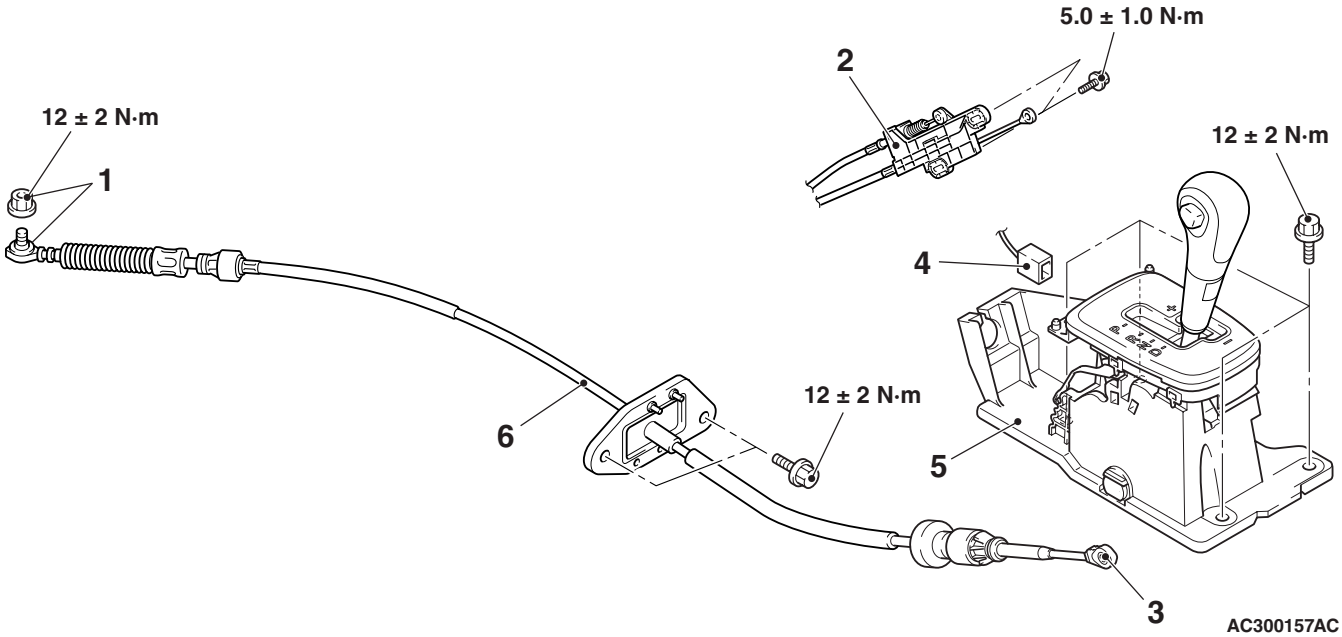
REMOVAL AND INSTALLATION

M1231006600875

⚠ CAUTION

When removing and installing the transmission control cable and shift lock cable unit, be careful not to hit the SRS-ECU.

Pre-removal and Post-installation Operation
- Front Floor Console Removal. (Refer to GROUP 52A – Floor Console Assembly P.52A-8.)



Transmission control cable assembly removal steps
- Air cleaner assembly (Refer to GROUP 15 P.15-8.)
- Battery and battery tray

>>B<< 1. Transmission control cable assembly connection (transmission side)

>>A<< 2. Shift lock cable unit connection

3. Transmission control cable assembly connection (selector lever assembly side)
4. Harness connector
5. Selector lever assembly

Transmission control cable assembly removal steps
- SRS-ECU (Refer to GROUP 52B, SRS control unit P.52B-134.)

6. Transmission control cable assembly

Selector lever assembly removal steps

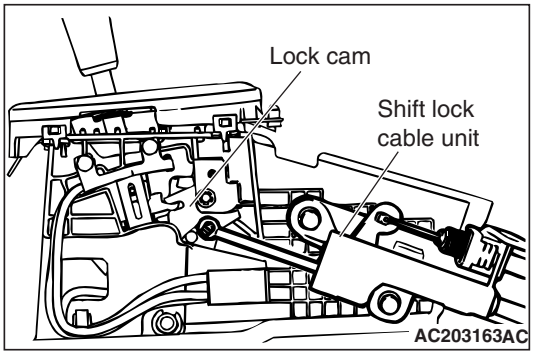
>>A<< 2. Shift lock cable unit connection

3. Transmission control cable assembly connection (selector lever assembly side)
4. Harness connector
5. Selector lever assembly

INSTALLATION SERVICE POINTS

>>A<< SHIFT LOCK CABLE UNIT INSTALLATION

1. Selector lever to P position.
2. Turn the ignition key to LOCK (OFF) position.



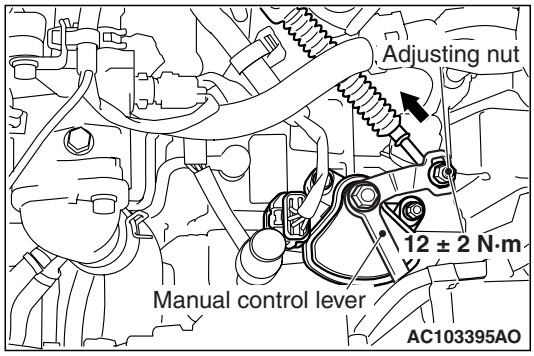
3. Install the shift lock cable unit rod to the selector lever assembly lock cam, and tighten the shift lock cable unit installation bolt to the specified torque.

   Tightening torque: 5.0 ± 1.0 N·m

4. Check the selector lever operation. (Refer to P.23A-138)

>>B<< TRANSMISSION CONTROL CABLE ASSEMBLY (TRANSMISSION SIDE) INSTALLATION

1. Place the selector lever and manual control lever in the N position.



2. Place the cable stud into the manual control lever slot and install the nut loosely. Gently push the transmission control cable into the manual control lever slot until the cable is taut. Tighten the nut to the specified torque.

   Tightening torque: 12 ± 2 N·m

DISASSEMBLY AND REASSEMBLY

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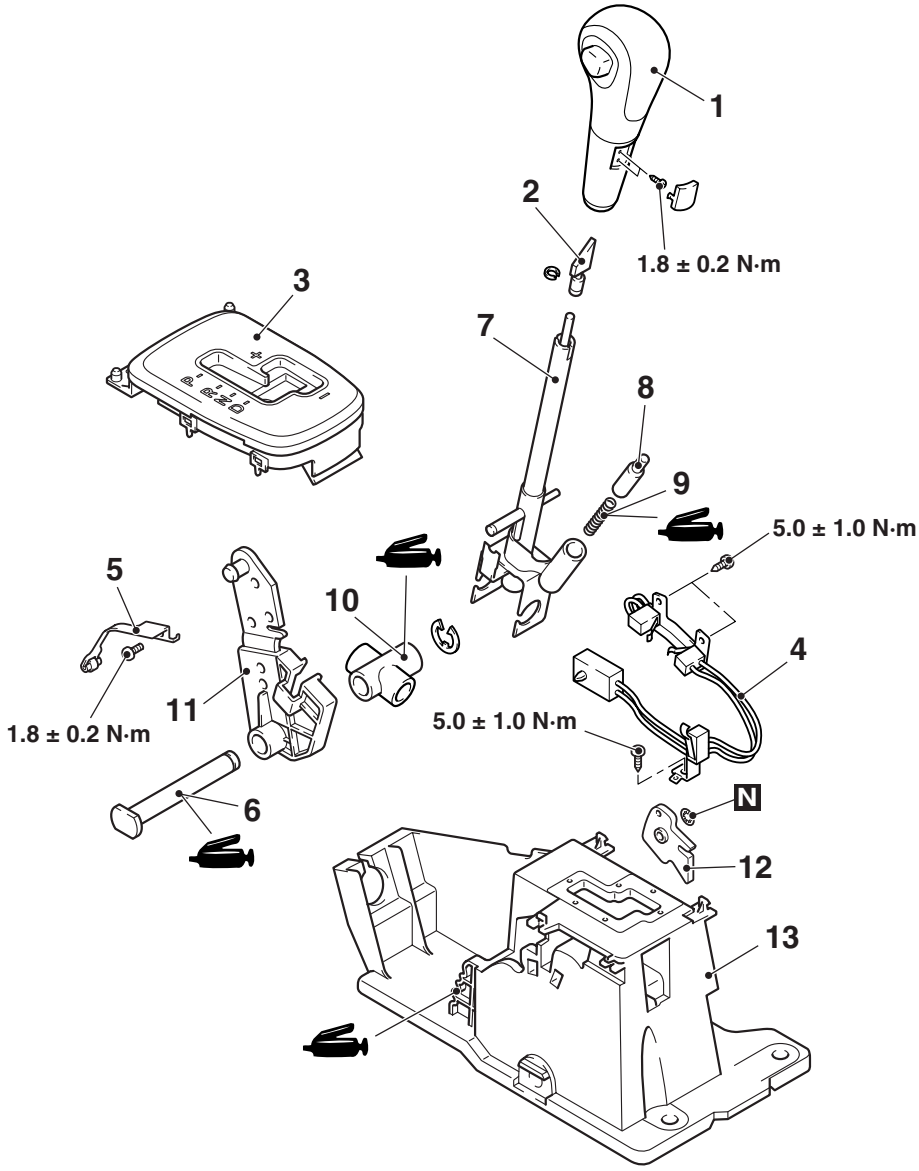

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Disassembly steps

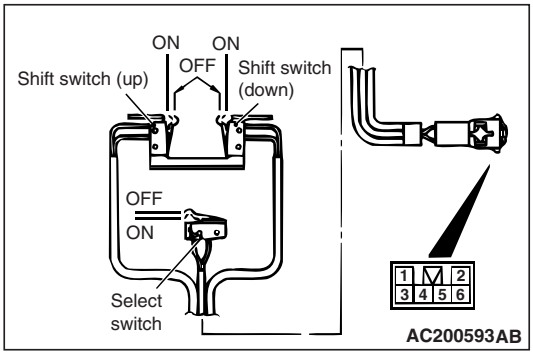
1. Shift knob
2. Sleeve
3. Indicator panel assembly
4. Shift switch assembly
5. Detente spring
6. Shaft
7. Lever assembly

Disassembly steps (Continued)

8. Plunger
9. Spring
10. Universal joint
11. Cable arm
12. Lock cam
13. Base bracket

INSPECTION

M1231006900207



SHIFT SWITCH ASSEMBLY CONTINUITY CHECK

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

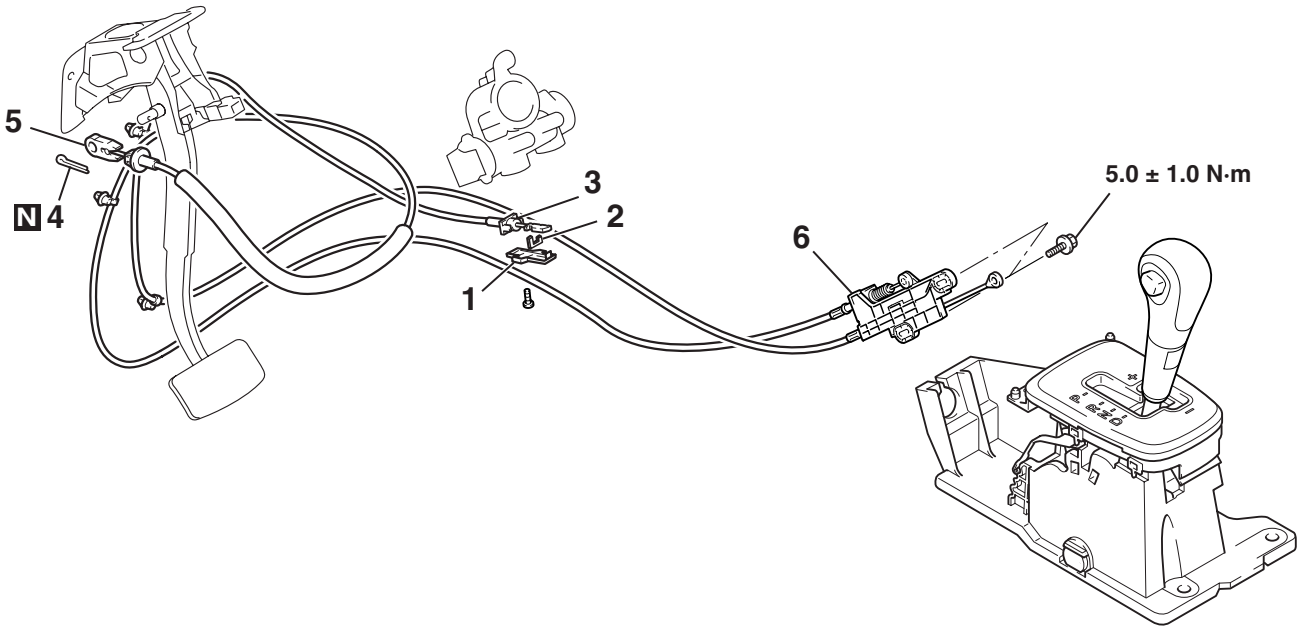
REMOVAL AND INSTALLATION

M1232001201027

⚠ CAUTION

When removing and installing the shift lock cable unit, be careful not to hit the SRS-ECU.

Pre-removal Operation	Post-installation Operation
• Instrument Lower Panel Removal (Refer to GROUP 52A, Instrument Panel Assembly P.52A-2.) • Lower Column Cover Removal (Refer to GROUP 37, Steering Shaft P.37-17.)	• Instrument Lower Panel Installation (Refer to GROUP 52A, Instrument Panel Assembly P.52A-2.) • Lower Column Cover Installation (Refer to GROUP 37, Steering Shaft P.37-17.) • Key Interlock and Shift Lock Mechanism Check (Refer to P.23A-139.)



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Shift lock cable unit removal steps

1. Cover
2. Slider
3. Key interlock cable connection (steering lock cylinder side)
4. Split pin

Shift lock cable unit removal steps (Continued)

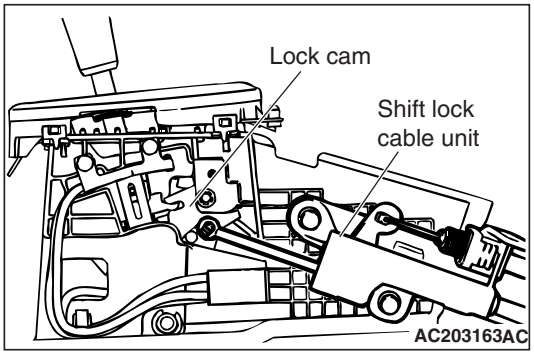
5. Shift lock cable connection (brake pedal side)

>>A<< 6. Shift lock cable unit

INSTALLATION SERVICE POINT

>>A<< SHIFT LOCK CABLE UNIT INSTALLATION

1. Selector lever to P position.
2. Turn the ignition switch to LOCK (OFF) position.



3. Install the shift lock cable unit rod to the selector lever assembly lock cam, and tighten the shift lock cable unit installation bolt to the specified torque.

   Tightening torque: 5.0 ± 1.0 N·m

4. Check the selector lever operation.(Refer to P.23A-138)

TRANSMISSION ASSEMBLY

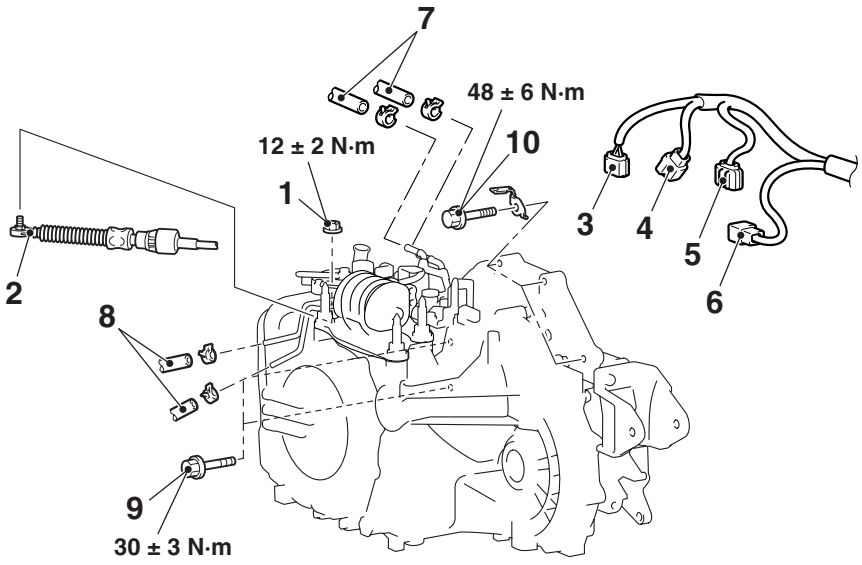
REMOVAL AND INSTALLATION

M1231005701203

⚠ 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
• Front Under Cover and Side Under Cover Removal (Refer to GROUP 51, Under Cover P.51-31.) • A/T Fluid Draining (Refer to P.23A-124.) • Transfer Oil Draining (Refer to P.23A-128.) • Front Exhaust Pipe Removal (Refer to GROUP 15, Exhaust Pipe and Main Muffler P.15-25.) • Propeller Shaft Removal (Refer to GROUP 25 P.25-3.) • Air Cleaner Assembly Removal (Refer to GROUP 15 P.15-8.) • Battery and Battery Tray Removal.	• Front Under Cover and Side Under Cover Installation (Refer to GROUP 51, Under Cover P.51-31.) • A/T Fluid Supplying (Refer to P.23A-124.) • Transfer Oil Supplying (Refer to P.23A-128.) • Front Exhaust Pipe Removal (Refer to GROUP 15, Exhaust Pipe and Main Muffler P.15-25.) • Propeller Shaft Installation (Refer to GROUP 25 P.25-3.) • Air Cleaner Assembly Installation (Refer to GROUP 15 P.15-8.) • Battery and Battery Tray Installation. • Selector Lever Operation Check (Refer to P.23A-138.) • Front Wheel Alignment Check and Adjustment (Refer to GROUP 33, On-vehicle Service P.33-5.)



AC309373AB

Removal steps

>>D<< 1. Adjusting nut
>>D<< 2. Transmission control cable
3. Inhibitor switch connector
4. A/T control solenoid valve assembly connector
5. Input shaft speed sensor connector
6. Output shaft speed sensor connector

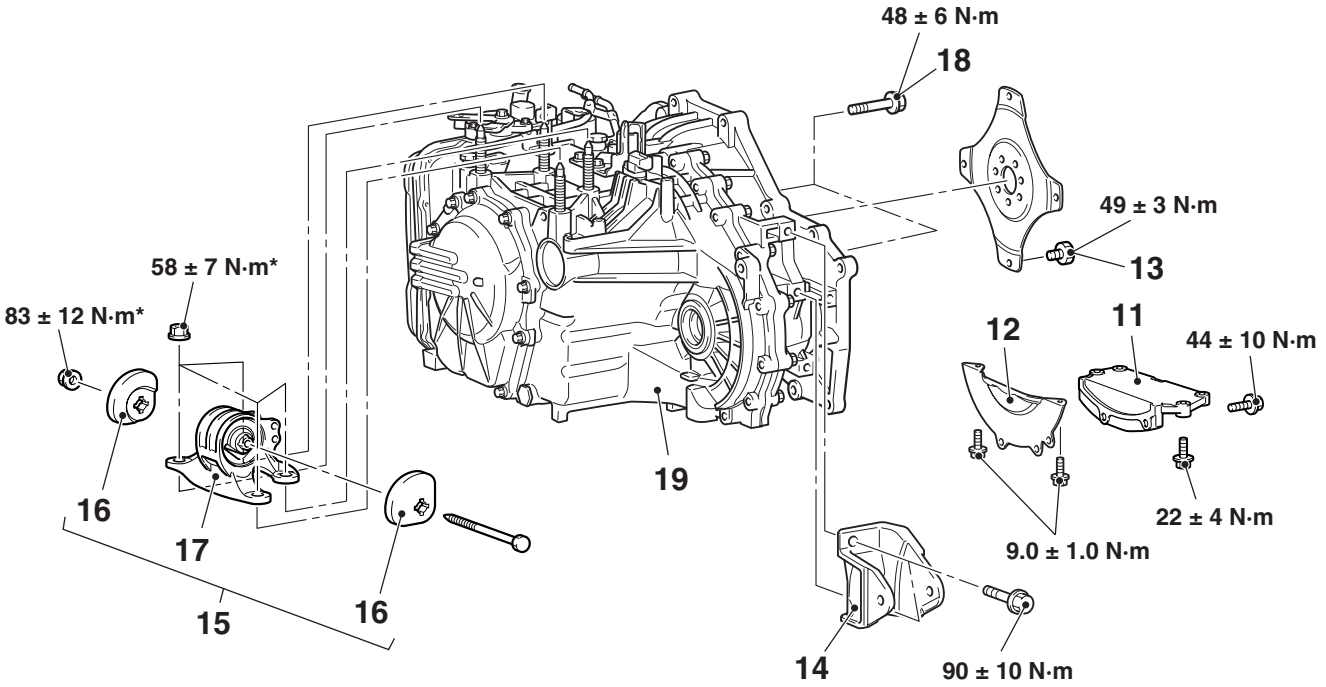
Removal steps (Continued)

7. A/T fluid cooler hose (radiator side)
8. A/T fluid cooler hose (A/T fluid cooler side)

<<A>>

- Drive shaft and output shaft (Refer to GROUP 26, Drive Shaft Assembly P.26-15.)

9. Starter motor installation bolt
10. Transmission upper connecting bolts



AC309374AB

Removal steps

>>**C**<< 11. Transmission stay
12. Bell housing cover
<<**B**>> 13. Torque converter and drive plate coupling bolts
- Transfer assembly (Refer to P.23A-152.)

14. Rear roll stopper bracket
<<**C**>> 15. Transmission mounting insulator assembly
>>**B**<< 16. Transmission mounting insulator stopper
17. Transmission insulator mounting

Removal steps (Continued)

<<**D**>>
- Engine assembly supporting
- Support the transmission
- Support the transmission with a transmission jack

18. Transmission lower part coupling bolts
>>**A**<< 19. Transmission assembly

REMOVAL SERVICE POINTS

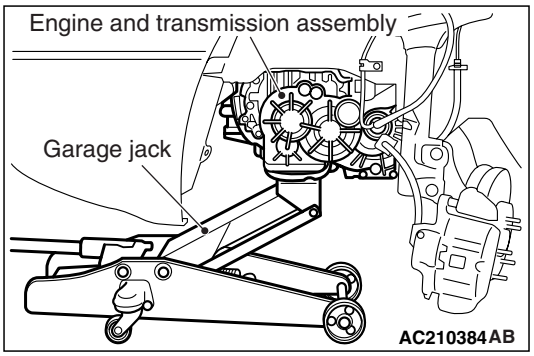
<<A>> TRANSMISSION UPPER CONNECTING BOLTS REMOVAL

Do not fully unscrew the bolts from the transmission assembly. Only loosen the bolts.

<<B>> TORQUE CONVETER AND DRIVE PLATE COUPLING BOLTS REMOVAL

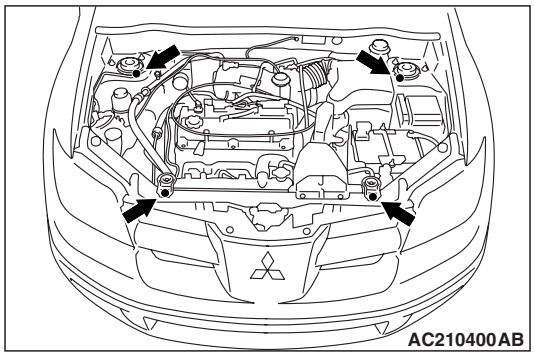
1. Turn the crank shaft so that it is positioned to allow the drive plate bolt to be unscrewed.
2. Push in the torque converter into the transmission side and make a point to ensure that the torque converter does not remain on the engine side.

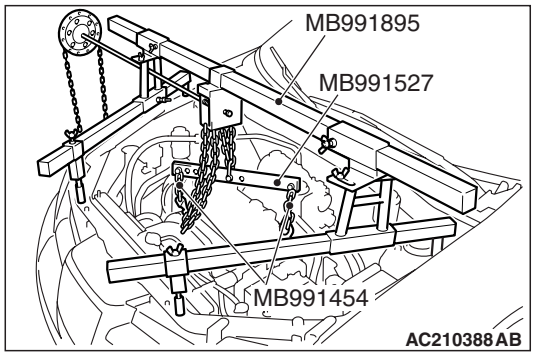
<<C>> TRANSMISSION MOUNTING INSULATOR ASSEMBLY REMOVAL



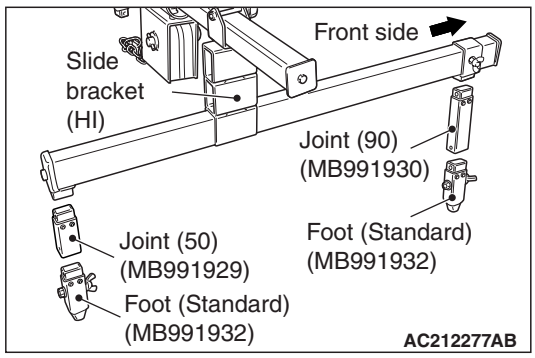
While supporting the engine and transmission assembly with a garage jack, remove the transmission mounting insulator assembly.

<<D>> ENGINE ASSEMBLY SUPPORTING

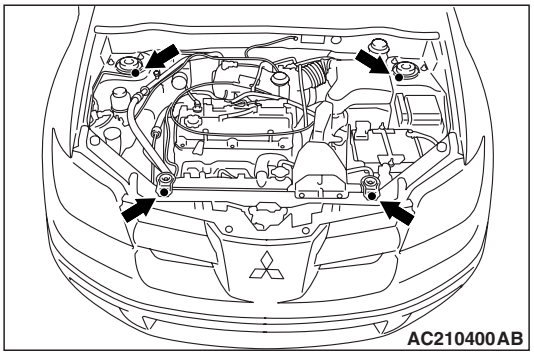


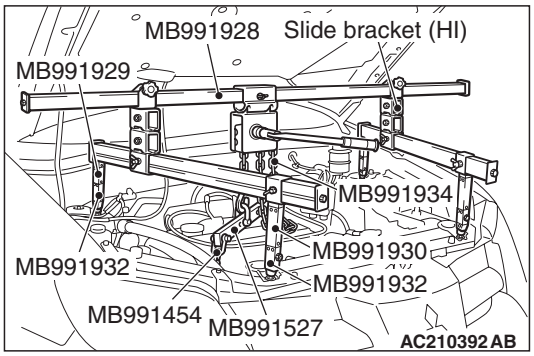


1. <Engine hanger (special tool MB991895) is used>
   (1) Set special tool MB991895 to the strut mounting nuts and the radiator support upper insulator mounting bolts, which are located in the engine compartment, as shown.
   (2) Set special tools MB991454 to hold the engine/transmission assembly.



2. <Engine hanger (special tool MB991928) is used>
   (1) Assemble the engine hanger (special tool MB991928). Set following parts to the base hanger.
   - Slide bracket (HI)
   - Foot (standard) (MB991932)
   - Joint (90) (MB991930)
   - Joint (50) (MB991929)





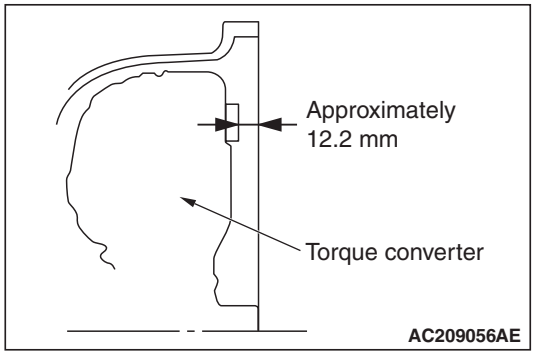
(2) Set the engine hanger (special tool MB991928) to the strut mounting nuts and the radiator support upper insulator mounting bolts, which are located in the engine compartment, as shown.

NOTE: Adjust the engine hanger balance by sliding the slide bracket (HI).

(3) Set special tools MB991454 to hold the engine/transmission assembly.

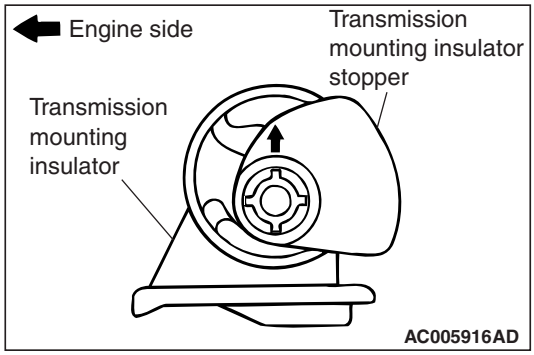
INSTALLATION SERVICE POINTS

>>A<< TRANSMISSION ASSEMBLY INSTALLATION



Engage the torque converter into the transmission side securely, and then assemble the transmission assembly on the engine.

>>B<< TRANSMISSION MOUNTING INSULATOR STOPPER INSTALLATION



Install the transmission mounting insulator stopper so that the arrow mark points as shown in the illustration.

>>C<< TRANSMISSION STAY INSTALLATION

Install the transmission stay as below.

1. Tighten the engine-side bolts to the specified torque.

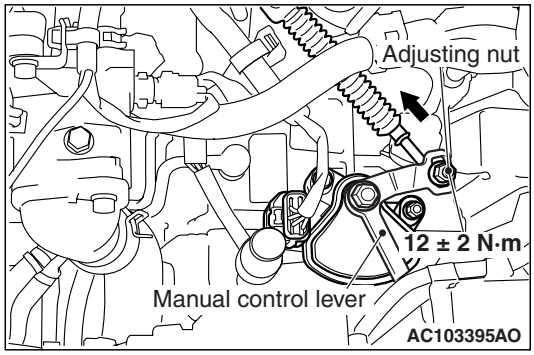
   Tightening torque: 22 ± 4 N·m

2. Tighten the transmission-side bolts to the specified torque.

   Tightening torque: 44 ± 10 N·m

>>D<< TRANSMISSION CONTROL CABLE/ADJUSTING NUT INSTALLATION

1. Place the selector lever and manual control lever in the N position.



2. Place the cable stud into the manual control lever slot and install the nut loosely. Gently push the transmission control cable into the manual control lever slot until the cable is taut. Tighten the nut to the specified torque.

   Tightening torque: 12 ± 2 N·m

TRANSFER ASSEMBLY

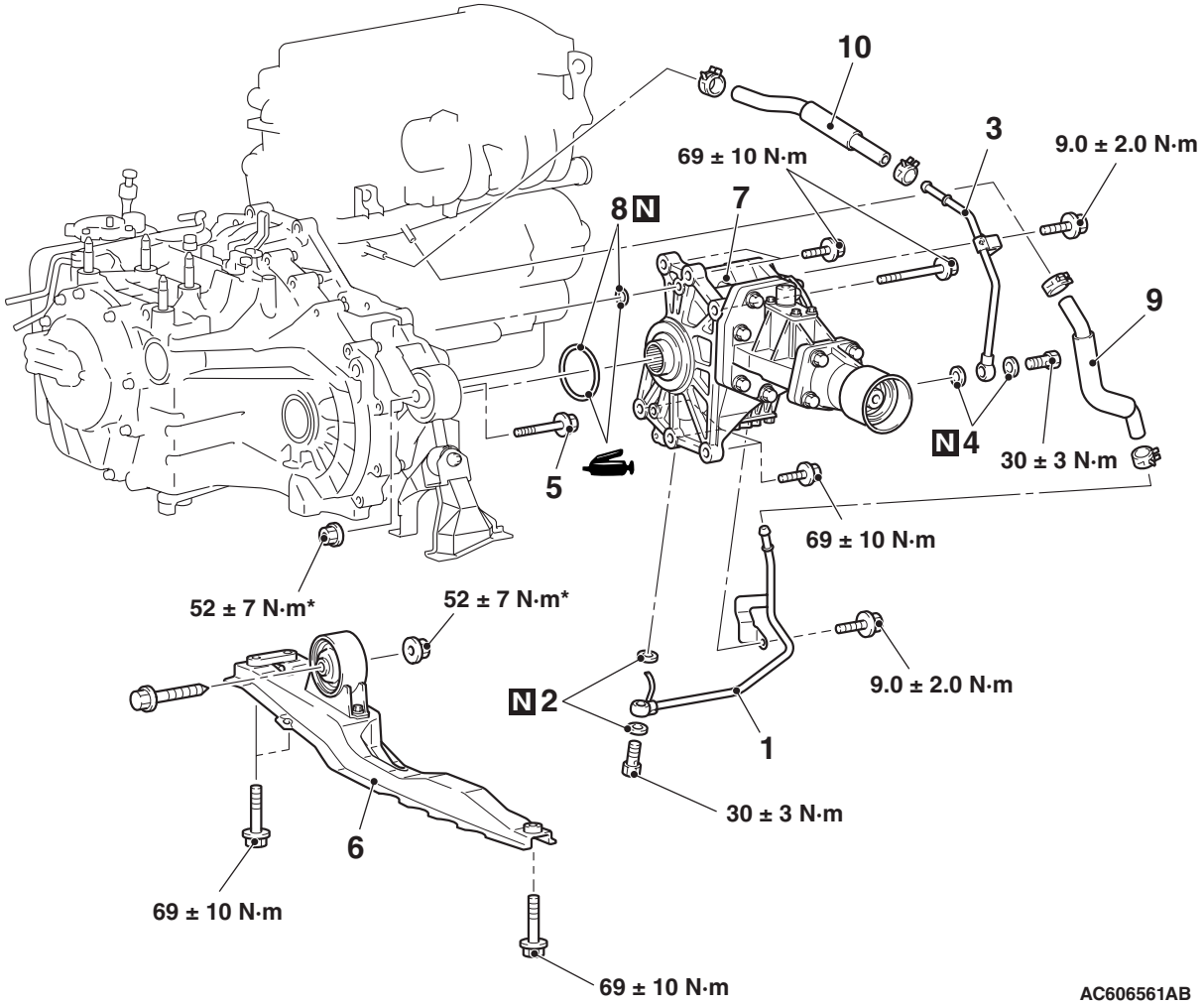
REMOVAL AND INSTALLATION

M1231006000378

⚠ CAUTION

***: Indicates parts which should be initially tightened, and then fully tightened after placing the vehicle horizontally and loading the full weight of the engine on the vehicle body.**

Pre-removal and Post-installation Operation
- Under Cover Removal and Installation
- A/T fluid Draining and Supplying (Refer to GROUP 23A, On-vehicle Service P.23A-124).
- Transfer Oil Draining and Supplying (Refer to GROUP 23A, On-vehicle Service P.23A-128).
- Drive Shaft, Output Shaft Removal and Installation (Refer to GROUP 26 P.26-15).
- Front Exhaust Pipe Removal and Installation (Refer to GROUP 15, Exhaust Pipe and Main Muffler P.15-25).
- Propeller Shaft Removal and Installation (Refer to GROUP 25P.25-3).



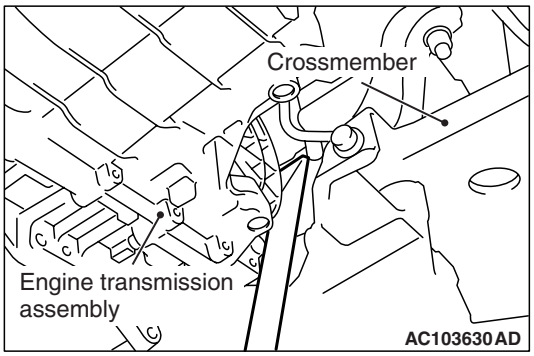
Removal steps
1. Water return tube assembly
2. Gasket
3. Water feed tube assembly
4. Gasket
5. Rear roll stopper connection bolt

<<A>>

Removal steps (Continued)
6. Centre member assembly
7. Transfer assembly
8. O-ring
9. Water return hose
10. Water feed hose

REMOVAL SERVICE POINT

<<A>> TRANSFER ASSEMBLY REMOVAL



⚠ CAUTION

After pulling out the transfer assembly, upon returning the transmission assembly to the original position be careful not to damage the bush parts of the roll stopper.

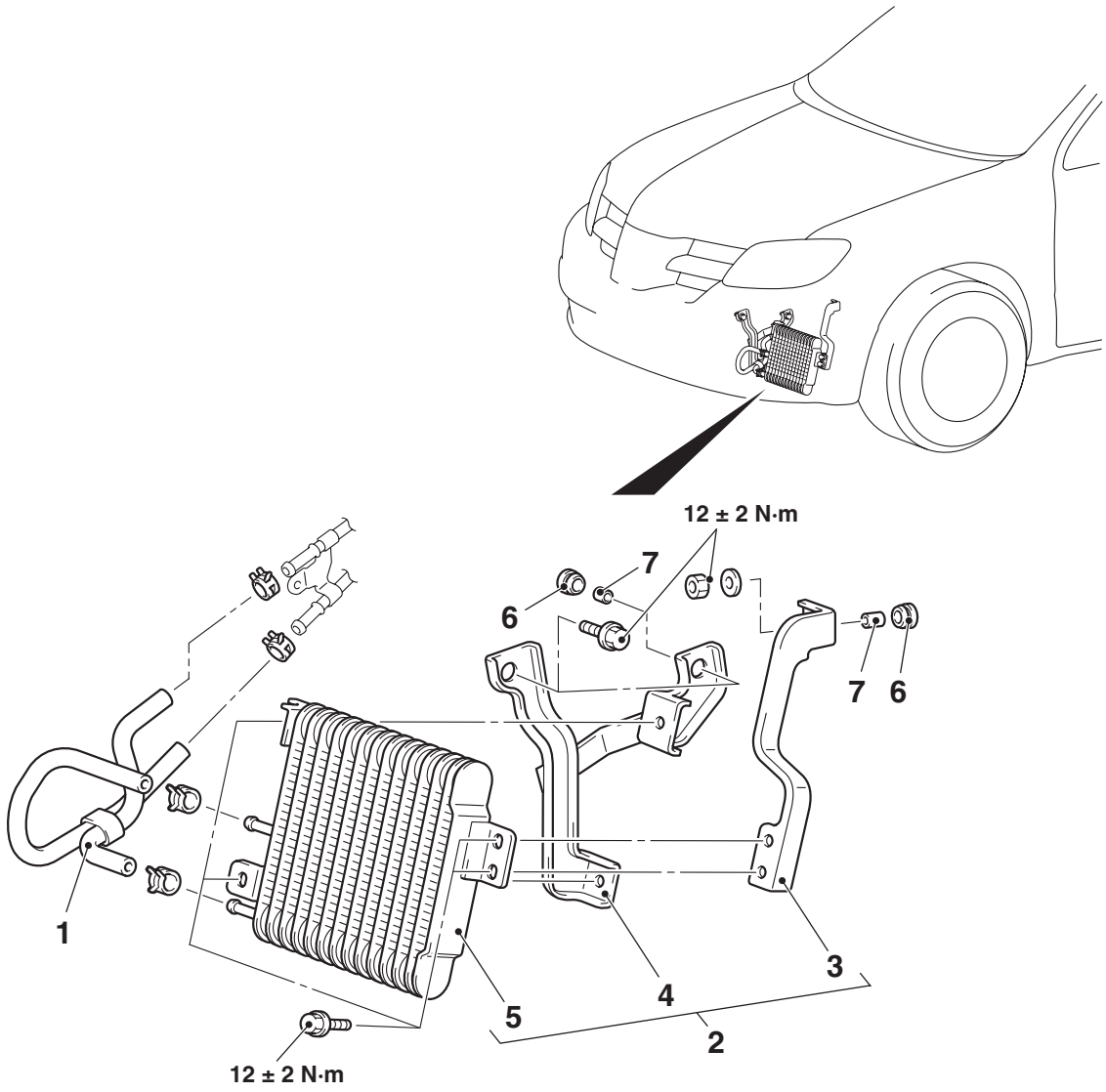
Use a tyre lever, etc. to slide the transmission assembly to the front of the vehicle, create a clearance between the transmission assembly and crossmember, and then pull out the transfer assembly from that clearance.

A/T FLUID COOLER

REMOVAL AND INSTALLATION

M1231028600099

Pre-removal and Post-installation Operation
- Front Under Cover (LH) Removal and Installation (Refer to GROUP 51, Under Cover P.51-31.)
- Splash Shield Mounting Clips (LH) Removal and Installation (Refer to GROUP 51, Front Bumper P.51-3.)
- A/T Fluid Supplying (Refer to P.23A-124.)



Removal steps
1. Cooler hose assembly
2. A/T fluid cooler and bracket
3. Bracket A
4. Bracket B

Removal steps (Continued)
5. A/T fluid cooler
6. Bush
7. Collar