

TRANSFER DIAGNOSIS <ACTIVE TRAC AWD II>**TRANSFER (ACTIVE TRAC 4WD II) DIAGNOSTIC TROUBLESHOOTING STRATEGY**

M1231110800062

Use these steps to plan your diagnostic strategy. If you follow them carefully, you will find most transfer malfunctions.

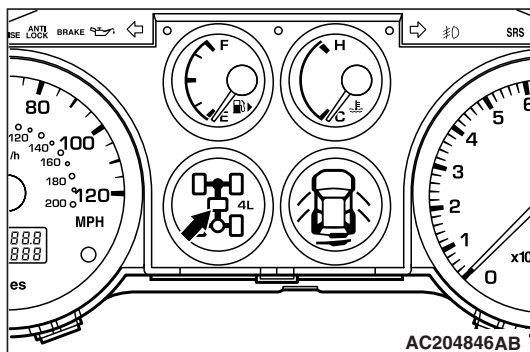
1. Gather as much information as possible about the complaint from the customer.
2. Verify that the condition described by the customer exists.
3. Check the vehicle for any transfer Diagnostic Trouble Codes (DTCs).
4. If you can not verify the condition and there are no DTCs, the malfunction is intermittent. For information on how to cope with intermittent malfunctions, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-13](#).
5. If there is a DTC, record the number of the code, then erase the code from memory using scan tool MB991958 (MUT-III sub assembly).
6. If a DTC is set again, go to Inspection Chart for Diagnostic Trouble Codes.
7. If a DTC is not set again, the malfunction is intermittent. For information on how to cope with intermittent malfunctions, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-13](#).
8. After repairs are completed, confirm the malfunction has been eliminated.

DIAGNOSTIC FUNCTION

M1231103300021

CHECK CENTER DIFFERENTIAL LOCK INDICATOR LIGHT

The center differential lock indicator light flashes once per second if there is an abnormality in any of the items below which are related to the transfer system. Check for diagnostic trouble codes if the center differential lock indicator light is flashing once per second.

**ON-BOARD DIAGNOSTICS**

The transfer-ECU monitors its input/output signals (some signals all the time and others under specified conditions). When an irregular signal is initially monitored, the transfer-ECU decides that a malfunction has occurred and records the occurrence as a diagnostic trouble code. There are 21 diagnostic items. The diagnostic results can be read with a scan tool. Diagnostic trouble codes are kept in memory by direct battery feed. The codes are retained in memory even if the ignition switch is in the "LOCK" (OFF)

position. Diagnostic trouble codes will, however, be erased when a battery terminal or the transfer-ECU connector is disconnected. In addition, the diagnostic trouble code can also be erased by scan tool MB991958 (MUT-III sub assembly).

NOTE: If a sensor is disconnected when the ignition switch is in the "ON" position a diagnostic trouble code is stored in memory. In this case, erase the DTC using scan tool MB991958 (MUT-III sub assembly).

The 21 diagnostic items are displayed in numeric order.

HOW TO CONNECT THE SCAN TOOL (MUT-III)**Required Special Tools:**

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: MUT-III USB Cable
 - MB991911: MUT-III Main Harness B

⚠ CAUTION

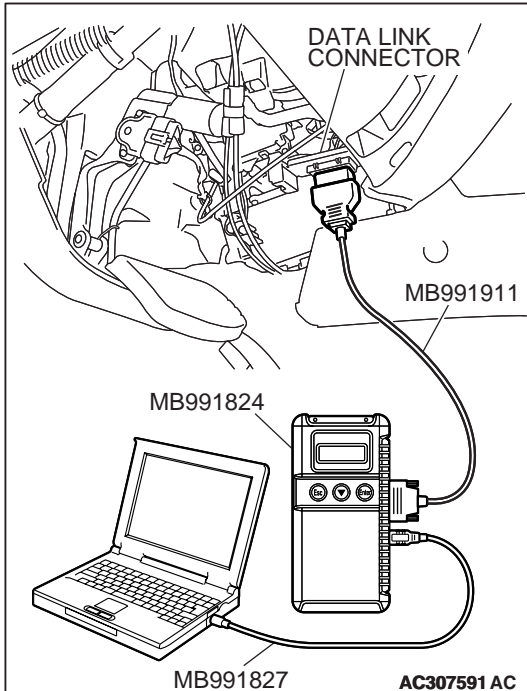
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

1. Ensure that the ignition switch is at the "LOCK" (OFF) position.
2. Start up the personal computer.
3. Connect special tool MB991827 to special tool MB991824 and the personal computer.
4. Connect special tool MB991911 to special tool MB991824.
5. Connect special tool MB991911 to the data link connector.
6. Turn the power switch of special tool MB991824 to the "ON" position.

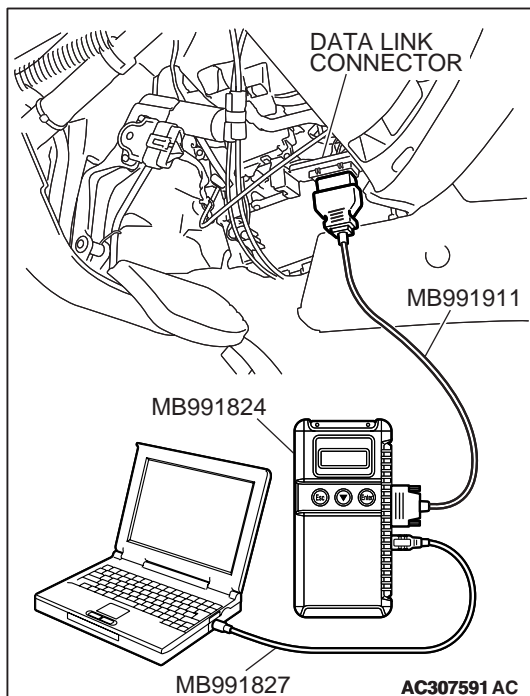
NOTE: When special tool MB991824 is energized, special tool MB991824 indicator light will be illuminated in a green color.

7. Start the MUT-III system on the personal computer.

NOTE: Disconnecting scan tool MB991958 is the reverse of the connecting sequence, making sure that the ignition switch is at the "LOCK" (OFF) position.

**HOW TO READ AND ERASE DIAGNOSTIC TROUBLE CODES****Required Special Tools:**

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991911: MUT-III Main Harness B



⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

NOTE: If the battery voltage is low, diagnostic trouble codes will not be set. Check the battery if scan tool MB991958 does not display.

1. Connect scan tool MB991958 to the data link connector.
2. Turn the ignition switch to the "ON" position.
3. Select "Interactive Diagnosis" from the start-up screen.
4. Select "System select."
5. Choose "SS4II" from the "POWER TRAIN" tab.
6. Select "MITSUBISHI."
7. Select "Diagnostic Trouble Code."
8. If a DTC is set, it is shown.
9. Choose "Erase DTCs" to erase the DTC.

HOW TO READ DATA LIST

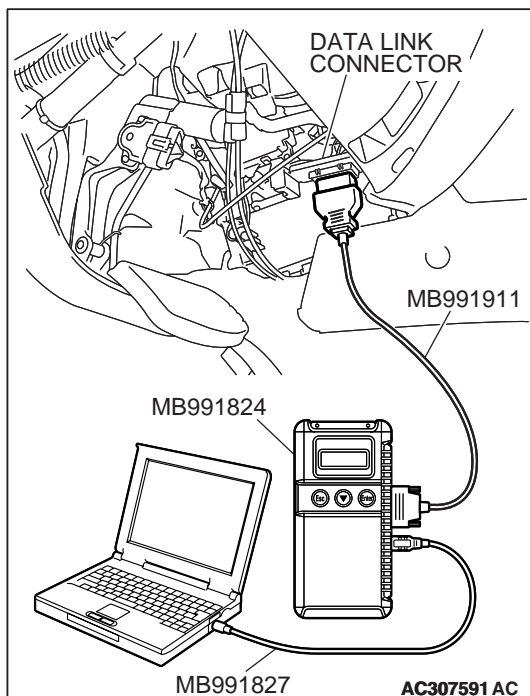
Required Special Tools:

- MB991958 : Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991911: MUT-III Main Harness B

⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

1. Connect scan tool MB991958 to the data link connector.
2. Turn the ignition switch to the "ON" position.
3. Select "Interactive Diagnosis" from the start-up screen.
4. Select "System select."
5. Choose "SS4II" from the "POWER TRAIN" tab.
6. Select "MITSUBISHI."
7. Select "Data List."
8. Choose an appropriate item and select the "OK" button.



HOW TO PERFORM ACTUATOR TEST

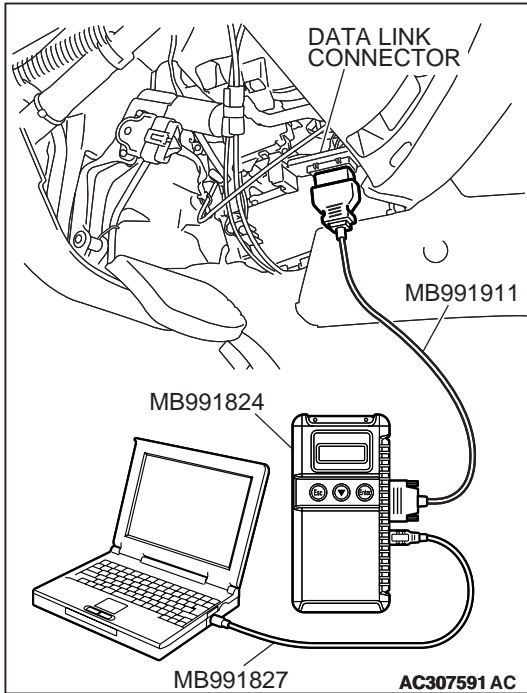
Required Special Tools:

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991911: MUT-III Main Harness B

⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

1. Connect scan tool MB991958 to the data link connector.
2. Turn the ignition switch to the "ON" position.
3. Select "Interactive Diagnosis" from the start-up screen.
4. Select "System select."
5. Choose "SS4II" from the "POWER TRAIN" tab.
6. Select "MITSUBISHI."
7. Select "Actuator Test."
8. Choose an appropriate item and select the "OK" button.



FAIL-SAFE/BACKUP FUNCTIONS

When malfunctions of the main sensors or actuators are detected by the transfer-ECU, the transfer is controlled by pre-set control logic to maintain safe conditions for driving.

M1231111000058

The following table shows how the fail-safe/backup function affects vehicle driveability and operation.

MALFUNCTIONING ITEM	JUDGMENT CONDITION	CONTROL CONTENTS DURING MALFUNCTION
Power supply voltage	Power supply voltage is 9.5 V and less.	Control start prohibited
	Power supply voltage is 18 V and over.	Control stop
Main relay (inside of ECU)	Voltage at relay OFF is 6 V and over, or voltage at relay ON is 6 V and less.	Control stop
Accelerator pedal position (APP) sensor	APP sensor voltage at idle condition is less than 0.2 V.	Vehicle speed limitation
Front propeller shaft speed sensor 1	Input signal from front propeller shaft speed sensor is unstable during low and medium speed driving. (When malfunction is detected during 2WD → 4WD shifting)	Control start prohibited

MALFUNCTIONING ITEM	JUDGMENT CONDITION	CONTROL CONTENTS DURING MALFUNCTION
Front propeller shaft speed sensor 2	Input signal from front propeller shaft speed sensor is unstable at freewheel engage switch ON condition. (When malfunction is detected at 4WD condition)	Control start prohibited
Rear propeller shaft speed sensor 1	Input signal from rear propeller shaft speed sensor is unstable when APP sensor voltage is 1.5 V and over. (When malfunction is detected at 2WD and 4WD conditions)	Control start prohibited
Rear propeller shaft speed sensor 2	Input signal from rear propeller shaft speed sensor is unstable when freewheel engage switch is ON condition. (When malfunction is detected at 4WD condition)	Control start prohibited
Stoplight switch	Stoplight switch ON was detected for 15 minutes at vehicle speed of 15 km/h and over.	Control continued
Transfer shift lever switch	Input signal from transfer shift lever switch is unstable.	Control start prohibited
Transfer position switch 1	Shifting of transfer has not been completed during driving.	Control prohibited
Transfer position switch 2	Input signals from detection switches are unstable.	Control prohibited
Freewheel engage solenoid valve	Energizing condition to solenoid valve and ECU terminal voltage do not accord.	Control start prohibited
Freewheel engage switch	Energizing condition to solenoid valve and freewheel engage switch condition do not accord.	Control prohibited
Shift actuator abnormality	ECU terminal voltage is more than main relay voltage (90% of specified voltage) or lower than main relay voltage (10% of specified voltage).	Control stop
Shift actuator short-circuited	Actual value of actuator current is more than target value +1A.	Control stop
Shift actuator open-circuited	Main relay voltage is 6V and over or actual value of actuator current is less than 0.1 A.	Control stop
Shift actuator overload	Accumulation time to drive actuator exceeds 5 minutes.	Control stop
Dissimilar tire diameter	Speed difference between front wheel and rear wheel at 4WD condition is larger than set value.	Vehicle speed limitation
M-ASTC-ECU malfunction	Open circuit in all signal lines with the M-ASTC-ECU	Control continued
Transfer-ECU malfunction	Malfunction of ECU was detected.	Control stop

DIAGNOSTIC TROUBLE CODE CHART

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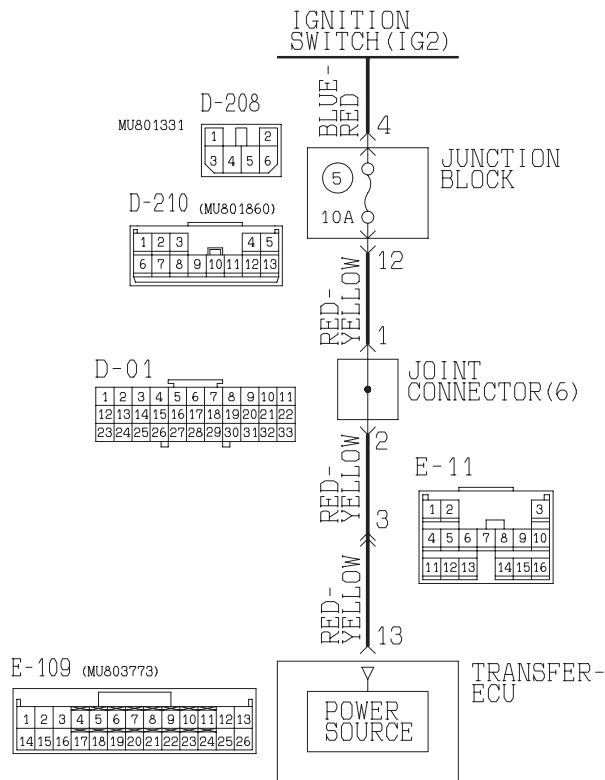
CODE	DIAGNOSIS ITEM		REFERENCE PAGE
11	Power supply voltage system	Low voltage	P.23A-407
12		Over voltage	P.23A-407
13	Main relay system (inside of ECU)	Relay malfunction	P.23A-414
21	Accelerator pedal position (APP) sensor system	Open-circuit/sensor malfunction	P.23A-415
22	Front propeller shaft speed sensor system	Open-circuit/short-circuit/sensor malfunction	P.23A-421
23			P.23A-421
24	Rear propeller shaft speed sensor system	Open-circuit/short-circuit/sensor malfunction	P.23A-433
25			P.23A-433
26	Stoplight switch system	Open-circuit/short-circuit/lamp failure/switch failure	P.23A-445
31	Transfer shift lever switch system	Open-circuit/short-circuit/switch failure	P.23A-453
32	Transfer position switch system	Transfer shift mechanism malfunction/actuator malfunction	P.23A-462
33	Transfer position switch system	Open-circuit/short-circuit/switch failure	P.23A-462
34	Free-wheel engage solenoid valve system	Open-circuit/short-circuit/solenoid valve malfunction	P.23A-473
35	Free-wheel engage switch system	Open-circuit/short-circuit/switch failure	P.23A-486
41	Shift actuator system (short-circuit, open-circuit)	Open-circuit/short-circuit/actuator malfunction/ECU malfunction	P.23A-498
42	Shift actuator system (short-circuit)	Short-circuit/actuator malfunction/ECU malfunction	P.23A-504
43	Shift actuator system (open-circuit)	Open-circuit/actuator malfunction/ECU malfunction	P.23A-504
44	Shift actuator system (Overload)	Transfer shift mechanism malfunction/actuator malfunction	P.23A-510
45	Dissimilar tire diameter	Incorrect tire pressure/dissimilar tire size	P.23A-516

CODE	DIAGNOSIS ITEM	REFERENCE PAGE
51	Transfer-ECU malfunction	Replace the transfer-ECU
61	M-ASTC-ECU malfunction	Open-circuit/short-circuit/ECU malfunction
		P.23A-517

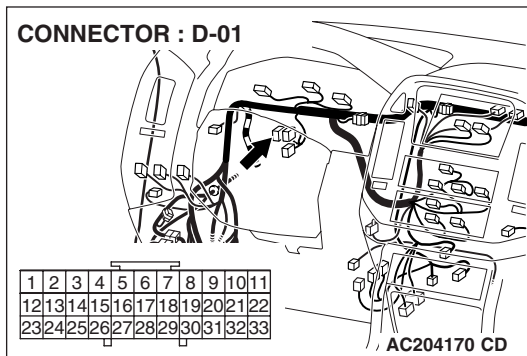
DIAGNOSTIC TROUBLE CODE PROCEDURES <TRANSFER>

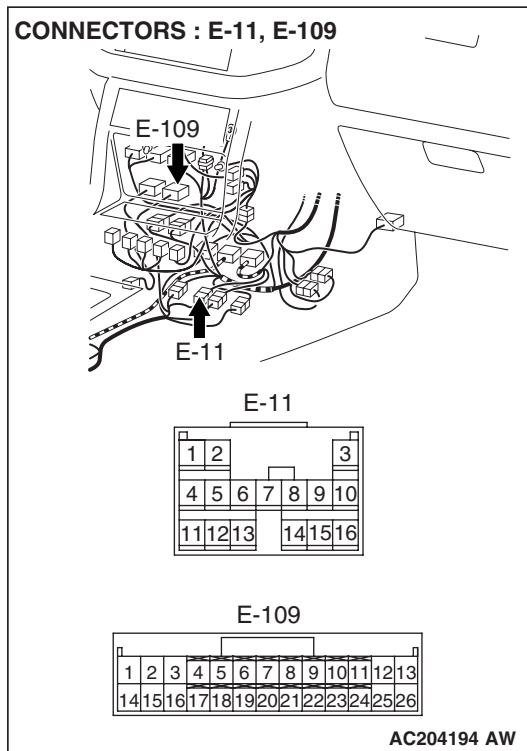
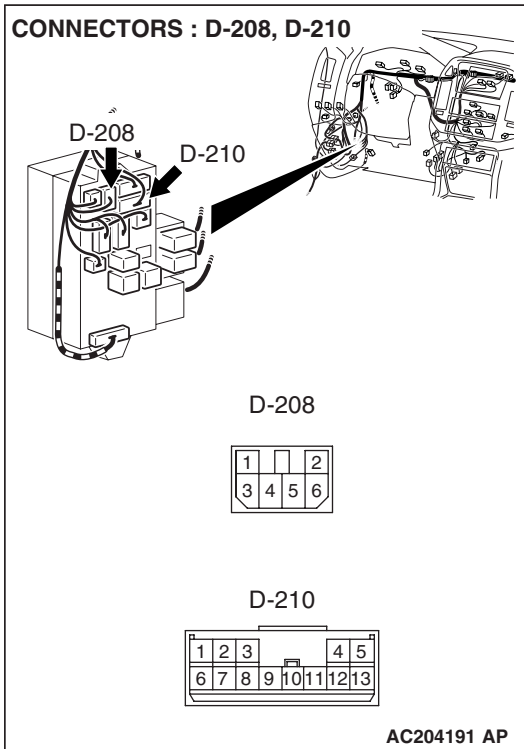
DTC.11, 12: Power Supply Voltage System

Power Supply System Circuit



ACX02030AB





CIRCUIT OPERATION

When turning the ignition switch to "ON," the transfer-ECU (terminal number 13) receives battery voltage from the ignition switch.

DTC SET CONDITIONS

When power supply voltage drops to 9.5 volts and less, the DTC 11 is set as low voltage. When power supply voltage rises to 18 volts and over, the DTC 12 is set as high voltage.

**TROUBLESHOOTING HINTS (THE MOST LIKELY
CAUSES FOR THIS CODE TO BE SET ARE:)**

- Malfunction of the ignition switch
- Damaged harness, connector
- Malfunction of the transfer-ECU

DIAGNOSIS

Required Special Tool:

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991911: MUT-III Main Harness B

**STEP 1. Using scan tool MB991958, check data list item 09:
Ignition switch power supply.**

⚠ CAUTION

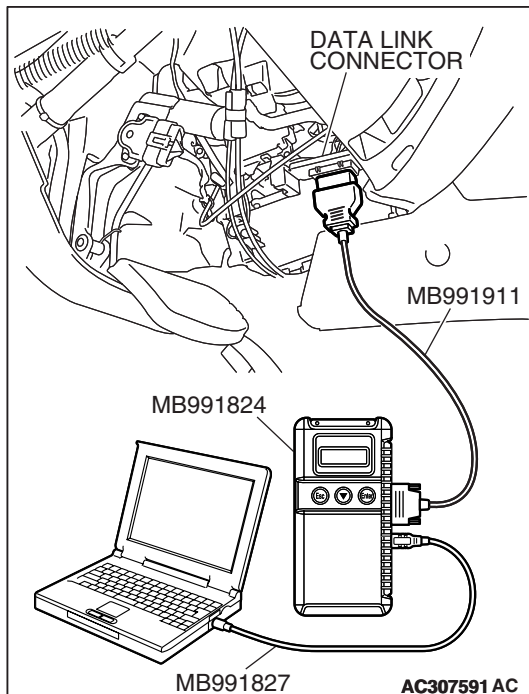
**To prevent damage to scan tool MB991958, always turn the
ignition switch to the "LOCK" (OFF) position before con-
necting or disconnecting scan tool MB991958.**

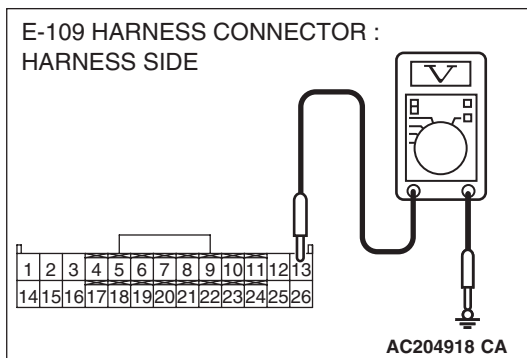
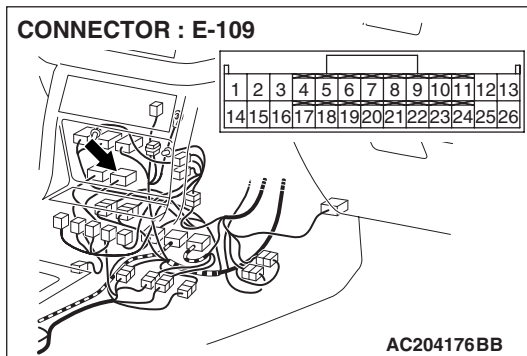
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode.
 - Item 09: Ignition Switch Power Supply.
 - The voltage should equal battery positive voltage.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage equal battery positive voltage?

YES : It can be assumed that this malfunction is intermittent.
Refer to GROUP 00, How to Use Troubleshooting/
Inspection Service Points – How to Cope with
Intermittent Malfunction [P.00-13](#).

NO : Go to Step 2.





STEP 2. Measure the power supply voltage at transfer-ECU connector E-109 by backprobing.

- (1) Do not disconnect connector E-109.
- (2) Turn the ignition switch to the "ON" position.

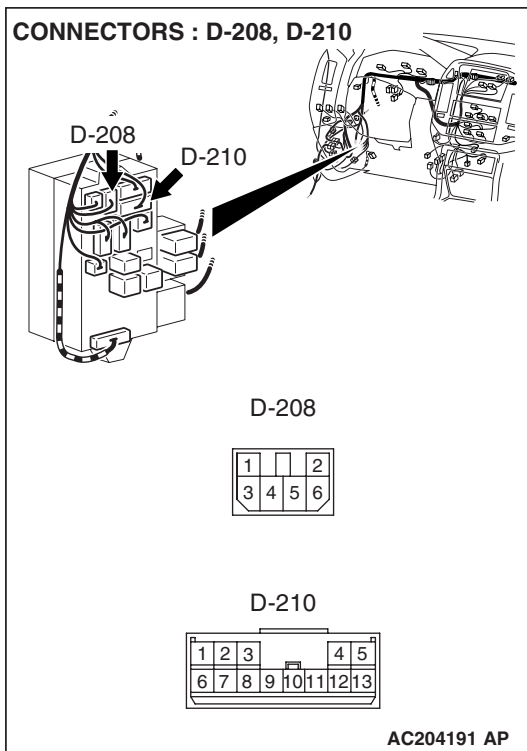
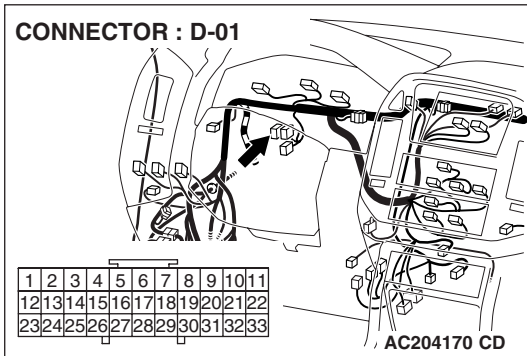
- (3) Measure the voltage between terminal 13 and ground by backprobing.
 - The voltage should measure battery positive voltage.
- (4) Turn the ignition switch to "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

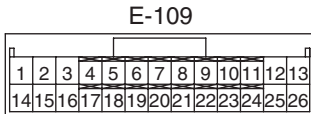
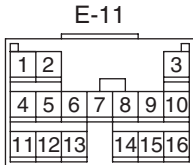
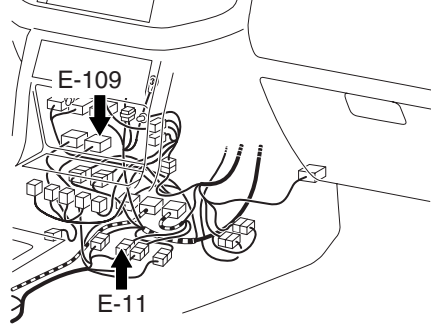
YES : Go to Step 5.

NO : Go to Step 3.

STEP 3. Check joint connector D-01, junction block connector D-208, D-210, intermediate connector E-11 and transfer-ECU connector E-109 for loose, corroded or damaged terminals, or terminals pushed back in the connector.



CONNECTORS : E-11, E-109



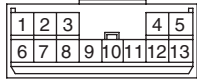
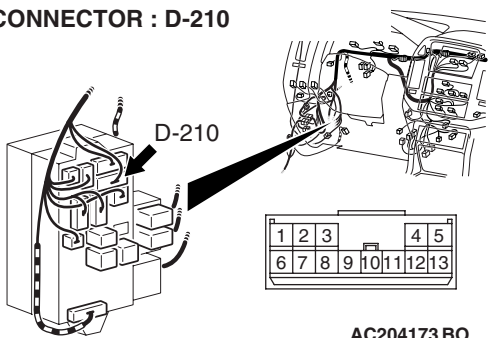
AC204194 AW

Q: Are the connectors and terminals in good condition?

YES : Go to Step 4.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

CONNECTOR : D-210



AC204173 BO

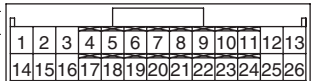
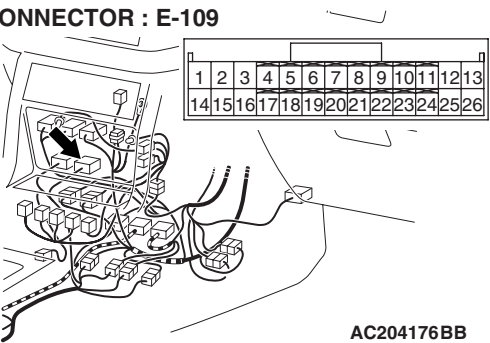
STEP 4. Check the harness for open circuit or short circuit to ground between junction block connector D-210 terminal 12 and transfer-ECU connector E-109 terminal 13.

Q: Is the harness wire in good condition?

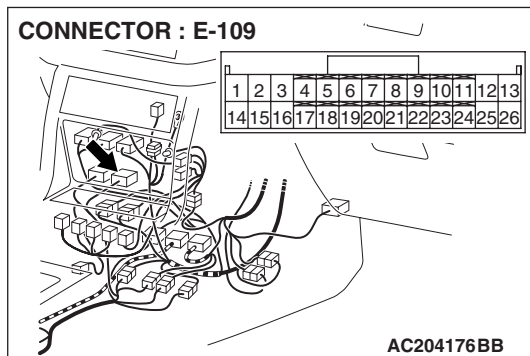
YES : Go to Step 6.

NO : Repair or replace the harness wire.

CONNECTOR : E-109



AC204176 BB



STEP 5. Check transfer-ECU connector E-109 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

YES : Go to Step 6.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

STEP 6. Using scan tool MB991958, check data list item 09: Ignition switch power supply.

⚠ CAUTION

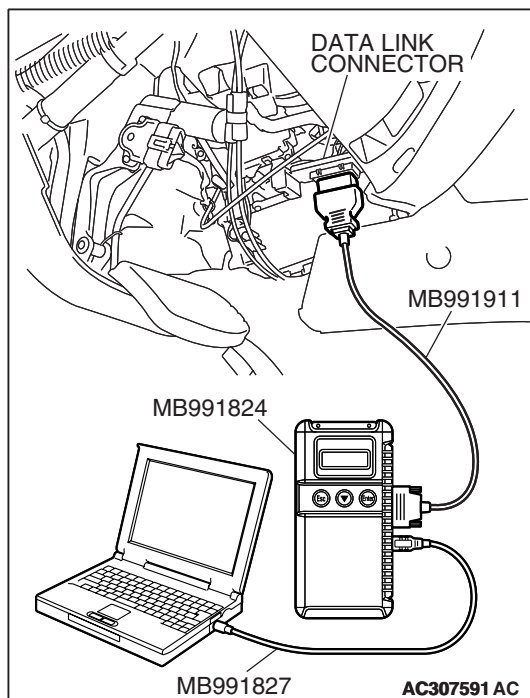
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode.
 - Item 09: Ignition Switch Power Supply.
 - The voltage should equal battery positive voltage.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage equal battery positive voltage?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-13](#).

NO : Replace the transfer-ECU.



DTC 13: Main Relay System (Inside of ECU)

CIRCUIT OPERATION

The power supplied from the ignition switch is distributed to each part of ECU through the main relay located inside of ECU.

DTC SET CONDITIONS

When the voltage at main relay OFF is 6 volts and over, or the voltage at main relay ON is 6 volts and less, the DTC 13 is set as the main relay malfunction.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CODE TO BE SET:)

- Malfunction of the transfer-ECU

DIAGNOSIS

Replace the transfer-ECU.

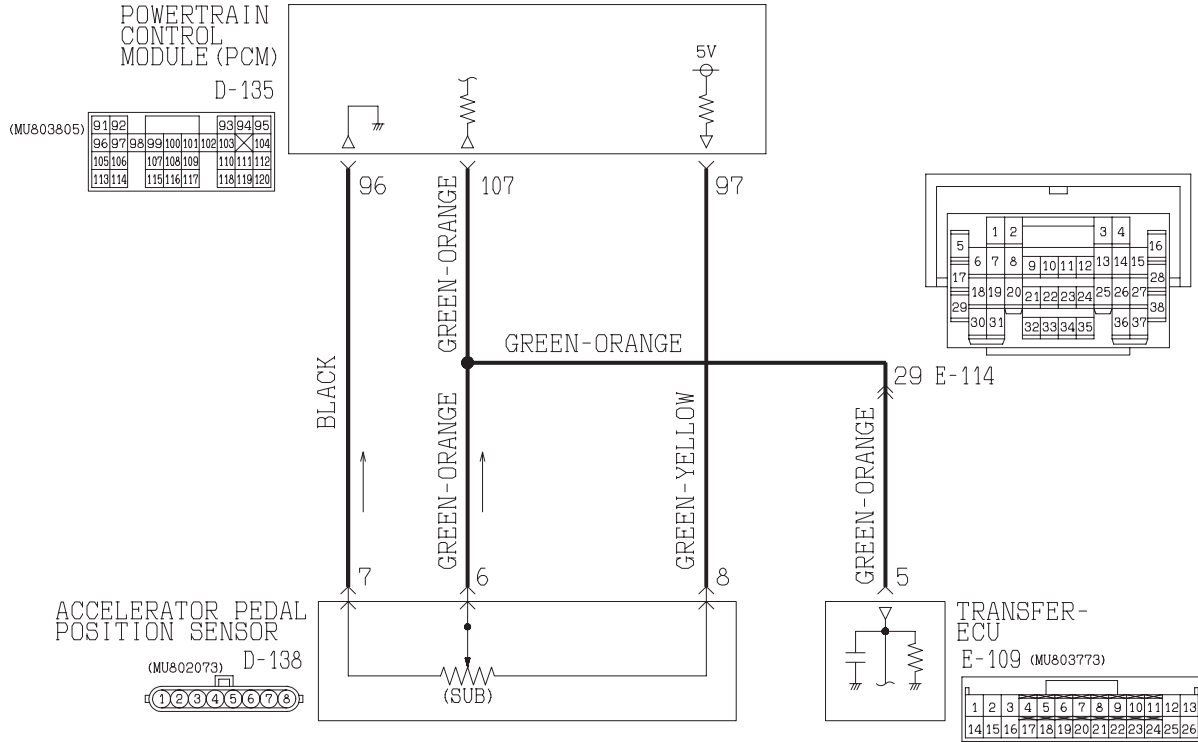
Q: Is the malfunction eliminated?

YES : The procedure is complete (If no malfunction is not found an intermittent malfunction is suspected. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-13](#)).

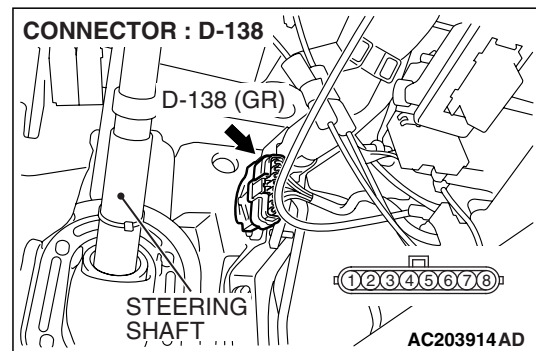
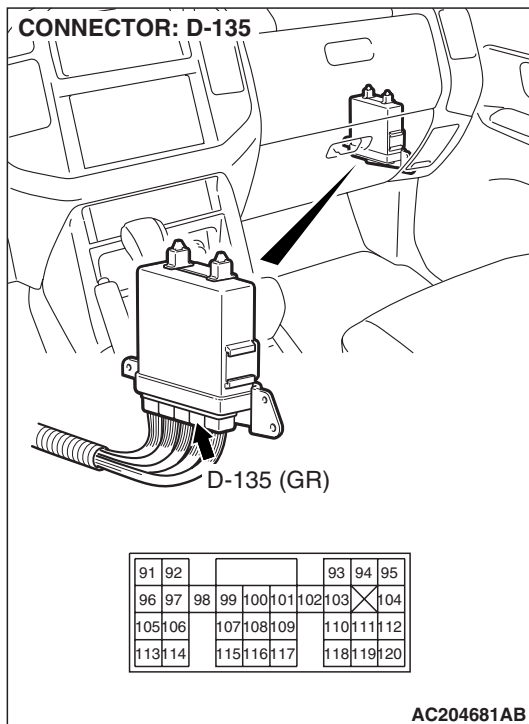
NO : Replace the PCM.

DTC 21: Accelerator Pedal Position Sensor System

Accelerator Pedal Position Sensor System Circuit



W3Q20M05AA
AC205258AB



STEP 1. Using scan tool MB991958, check data list item 01: Accelerator Pedal Position Sensor.

⚠ CAUTION

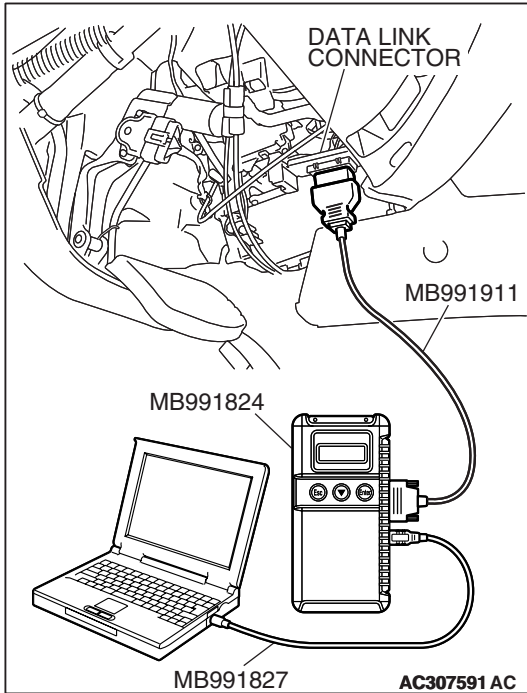
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode.
 - Item 01: Accelerator Pedal Position Sensor – Active trac 4WD II.
 - With the throttle valve in idle position, voltage should measure between 905 and 1,165 mV.
 - With the throttle valve in full-open position, voltage should measure 4,035 mV or more.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage between 905 and 1,165 mV at idle, and 4,035 mV or more in the full-open position?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-13](#).

NO : Go to Step 2.



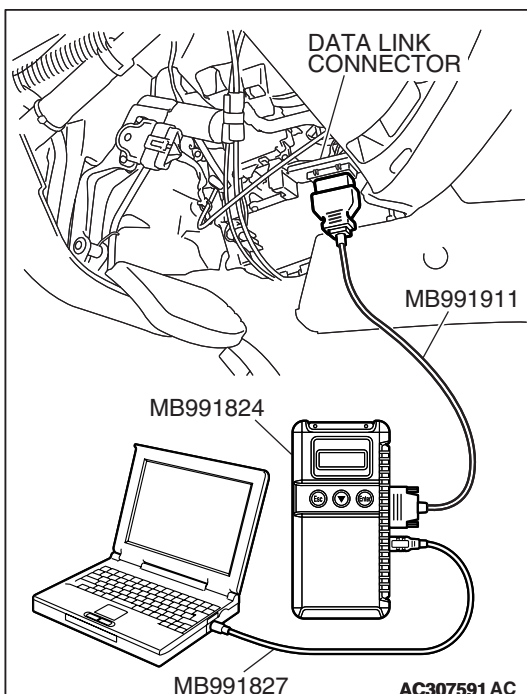
STEP 2. Using scan tool MB991958, read the MFI diagnostic trouble code.

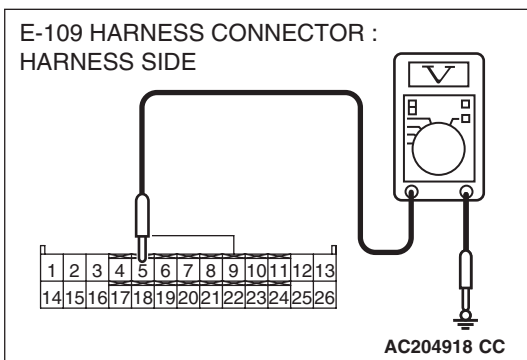
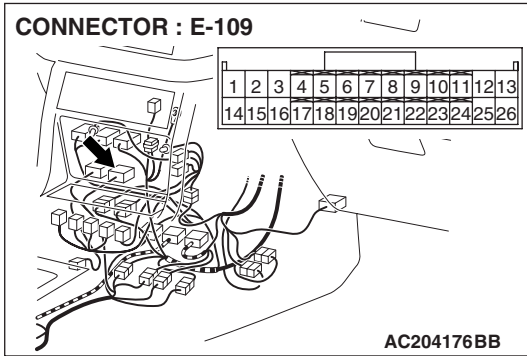
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check for MFI diagnostic trouble code.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are MFI DTCs P2126, P2127 or P2128 set?

YES : Refer to GROUP 13A, Diagnosis – Diagnostic Trouble Code Chart [P.13A-33](#).

NO : Go to Step 3.





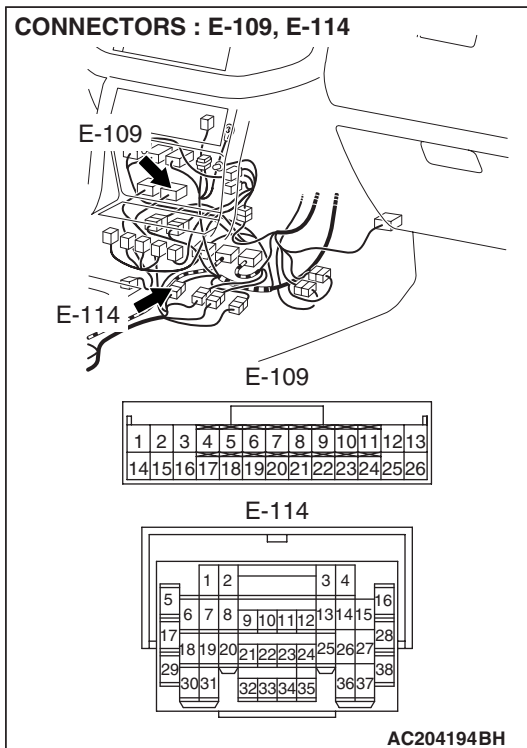
STEP 3. Measure the accelerator pedal position sensor output voltage at transfer-ECU connector E-109 by backprobing.

- (1) Do not disconnect connector E-109.
- (2) Turn the ignition switch to the "ON" position.

- (3) Measure the voltage between terminal 5 and ground by backprobing.
 - With the throttle valve in idle position, voltage should measure between 0.905 and 1.165 volts.
 - With the throttle valve in full-open position, voltage should measure between 4.035 volts or more.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage between 0.535 and 0.735volt at idle, and between 4.5 and 5.5 volts in the full-open position?

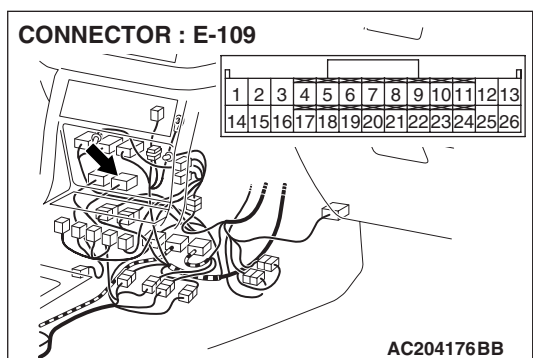
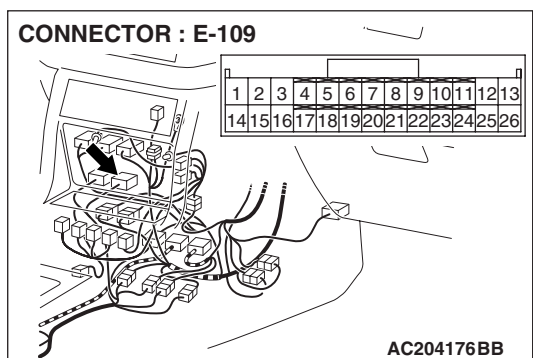
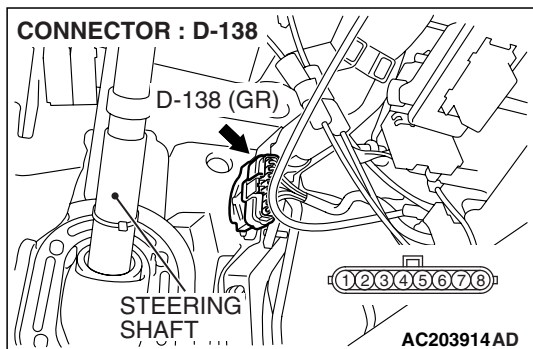
- YES :** Go to Step 6.
NO : Go to Step 4.



STEP 4. Check transfer-ECU connector E-109 and intermediate connector E-114 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

- YES :** Go to Step 5.
NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).



STEP 5. Check harness for open circuit or damage between accelerator pedal position sensor connector D-138 terminal 6 and transfer-ECU connector E-109 terminal 5.

Q: Is the harness wire in good condition?

YES : Go to Step 7.

NO : Repair or replace the harness wire.

STEP 6. Check transfer-ECU connector E-109 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

YES : Go to Step 7.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

STEP 7. Using scan tool MB991958, check data list item 01: Accelerator Pedal Position Sensor.

⚠ CAUTION

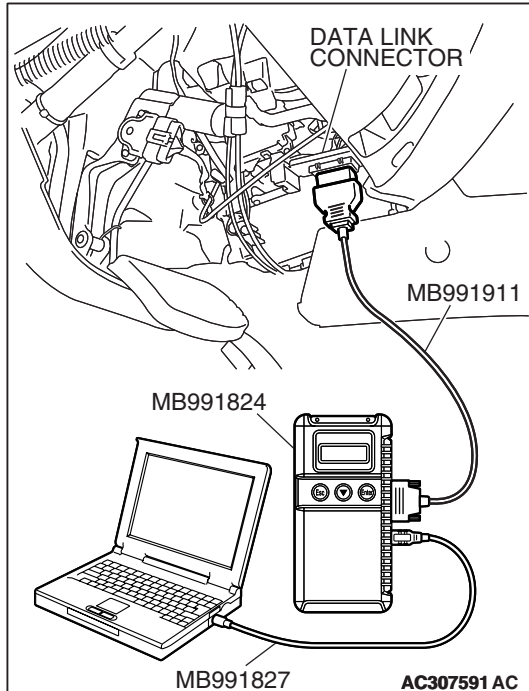
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to the data reading mode.
 - Item 01: Accelerator Pedal Position Sensor – Active trac 4WD II.
 - With the throttle valve in idle position, voltage should measure between 905 and 1,165 mV.
 - With the throttle valve in full-open position, voltage should measure 4,035 mV or more.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage between 905 and 1,165 mV at idle, and 4,035 mV or more in the full-open position?

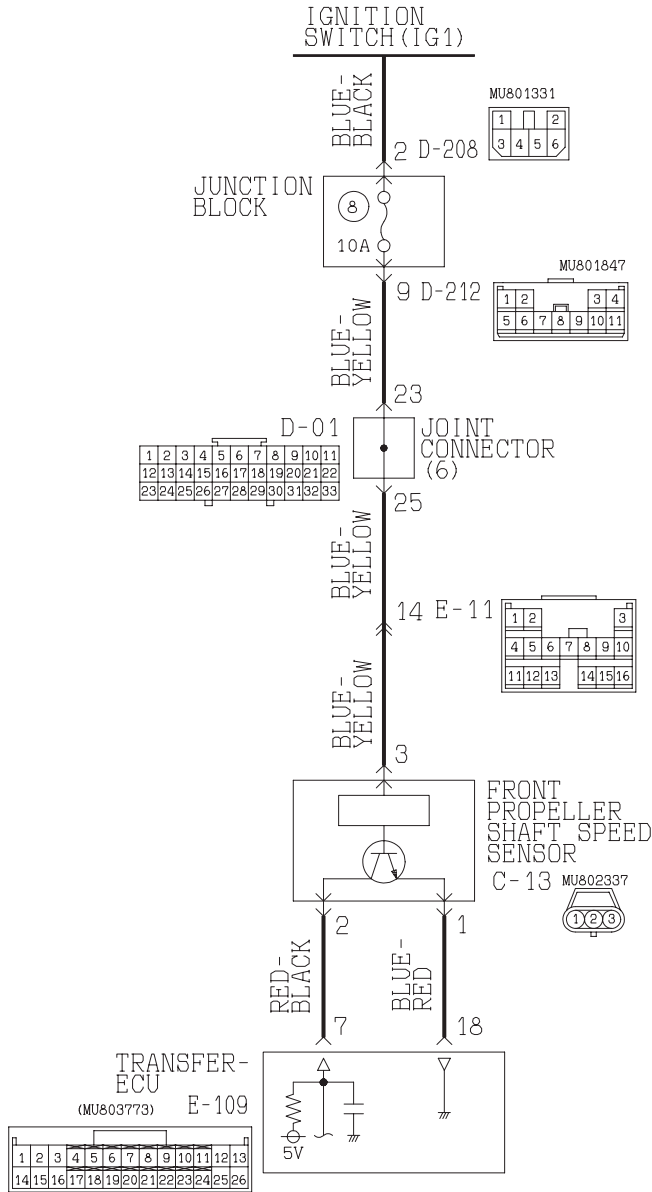
YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-13](#).

NO : Replace the transfer-ECU.

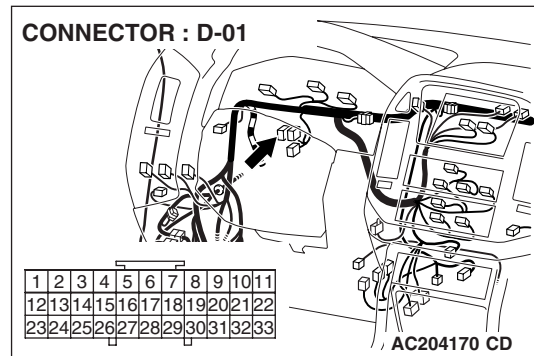
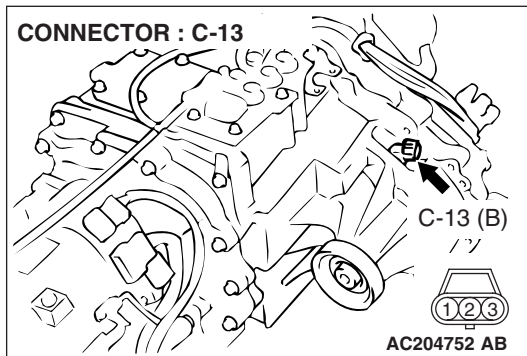


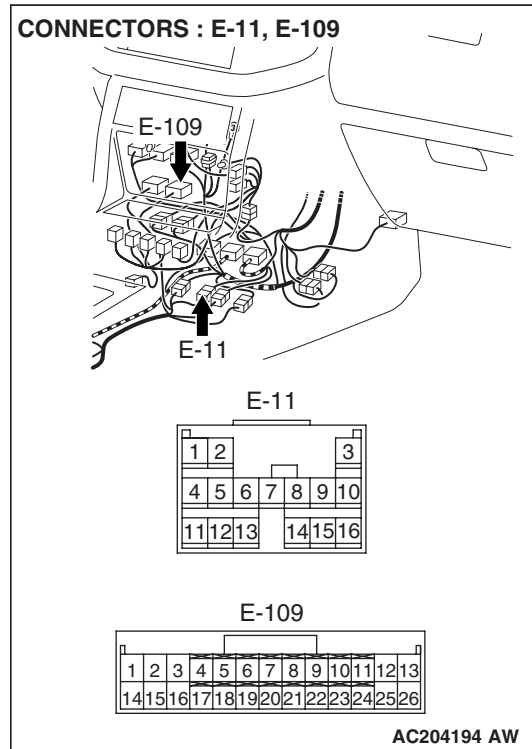
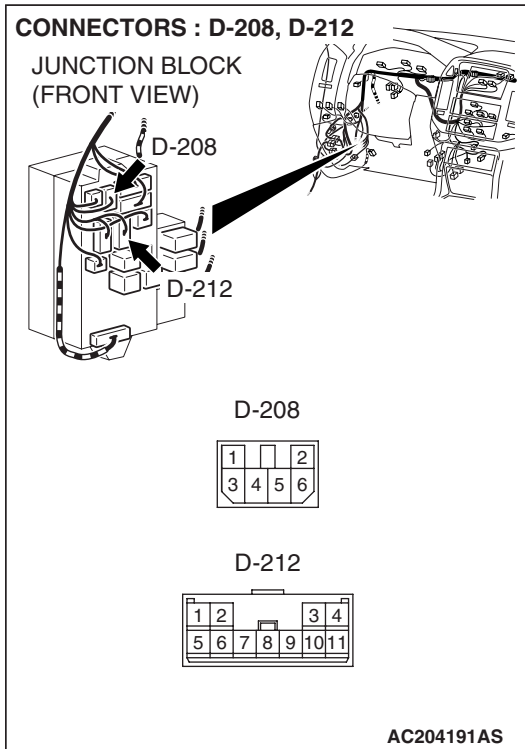
DTC 22, 23: Front Propeller Shaft Speed Sensor System

Front Propeller Shaft Speed Sensor System Circuit



W2Q01M06AA
AC100558AB





CIRCUIT OPERATION

- The front propeller shaft speed sensor generates 0 ⇔ 5 volts pulse signal when the front propeller shaft rotates. The pulse signal frequency increases with a rise in front propeller shaft speed.
- The front propeller shaft speed sensor is connected to the transfer-ECU (terminals 7 and 18) via the front propeller shaft speed sensor connector (terminals 1 and 2).
- The transfer-ECU detects the front propeller shaft speed by the signal input to terminal 7.
- The front propeller shaft speed sensor generates the pulse signal as the hole in the front output shaft pass the magnetic tip of the sensor.

DTC SET CONDITIONS

In the case that the input signal from the front propeller shaft speed sensor is not input during the shift from 2WD to 4WD, the DTC 22 is set as the open circuit or the short circuit of the front propeller shaft speed sensor. In the case that the input signal from the front propeller shaft speed sensor is unstable when the engage switch is ON condition, the code DTC 23 is set as the open circuit or the short circuit of the front propeller shaft speed sensor.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CODE TO BE SET ARE:)

- Malfunction of the front propeller shaft speed sensor circuit
- Malfunction of the front output shaft
- Damaged harness, connector
- Malfunction of the transfer-ECU

DIAGNOSIS

Required Special Tool:

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991911: MUT-III Main Harness B

STEP 1. Using scan tool MB991958, check data list item 02: Front Propeller Shaft Speed Sensor.

⚠ CAUTION

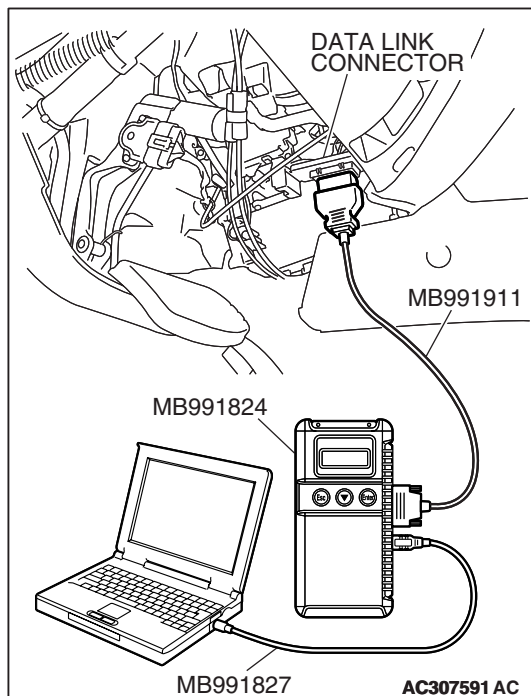
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Start the engine.
- (3) Set scan tool MB991958 to data reading mode.
 - Item 02: Front Propeller Shaft Speed Sensor.
 - When driving at constant speed of 30 km/h (19 mph), the display should be "30 km/h (19 mph)."
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

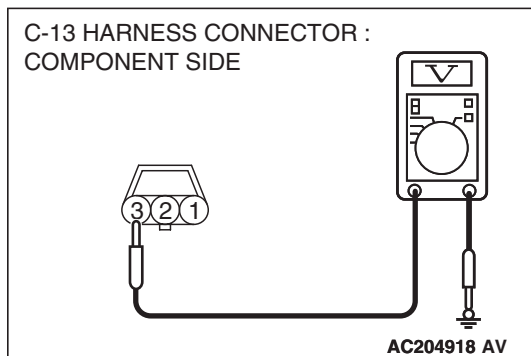
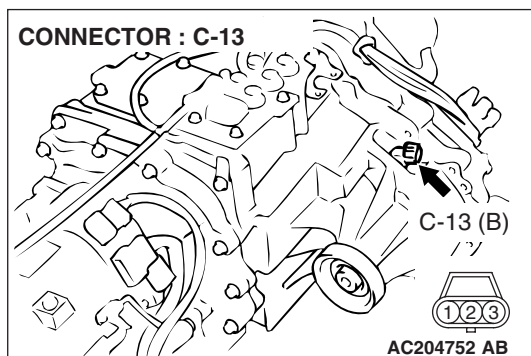
YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction P.00-13.

NO : Go to Step 2.



STEP 2. Measure the power supply voltage at front propeller shaft speed sensor connector C-13.

- (1) Disconnect connector C-13 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.



- (3) Measure the voltage between terminal 3 and ground.
 - The voltage should measure battery positive voltage.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

YES : Go to Step 5.

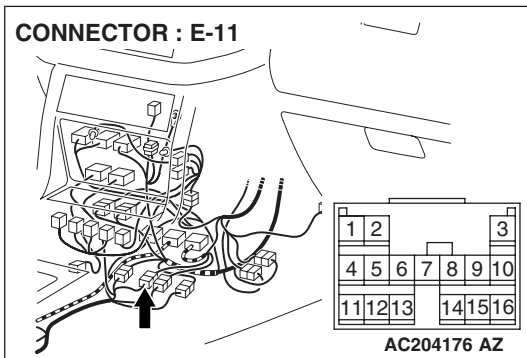
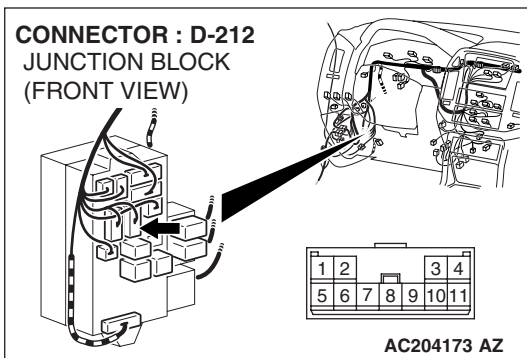
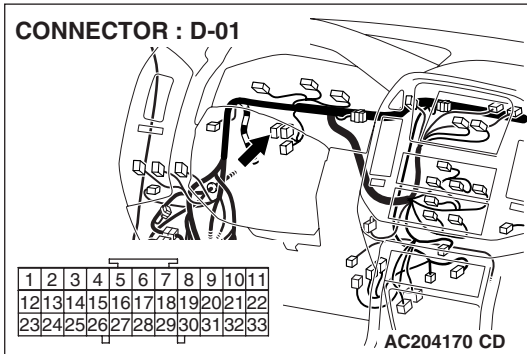
NO : Go to Step 3.

STEP 3. Check joint connector D-01, junction block connector D-212 and intermediate connector E-11 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 4.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

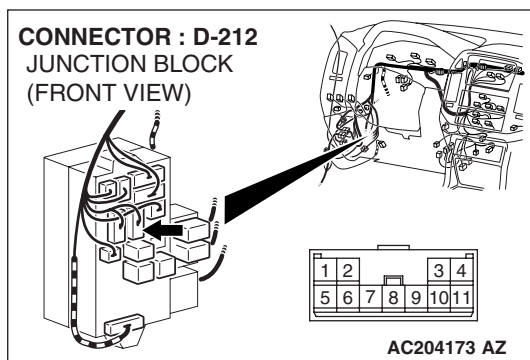
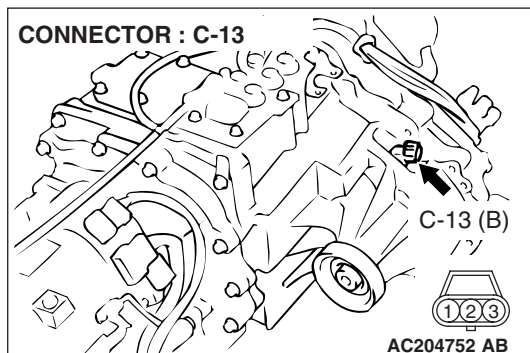


STEP 4. Check the harness for open circuit or short circuit to ground between front propeller shaft speed sensor connector C-13 terminal 3 and junction block connector D-212 terminal 9.

Q: Is the harness wire in good condition?

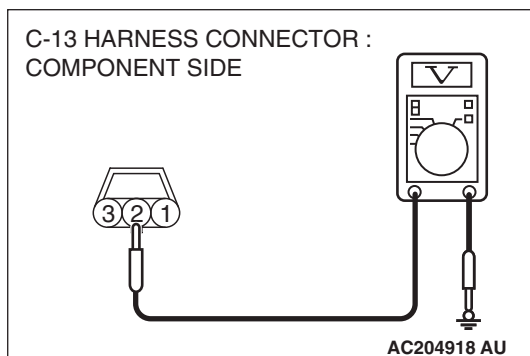
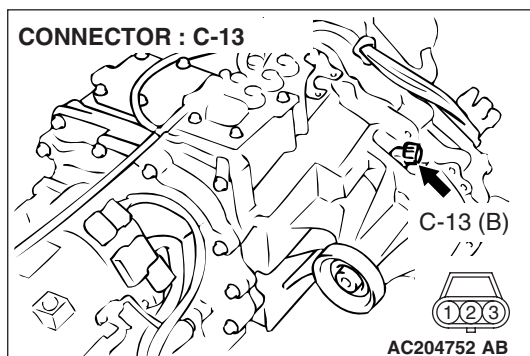
YES : Go to Step 5.

NO : Repair or replace the harness wire.



STEP 5. Measure the sensor output voltage at front propeller shaft speed sensor connector C-13.

- (1) Disconnect connector C-13 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.

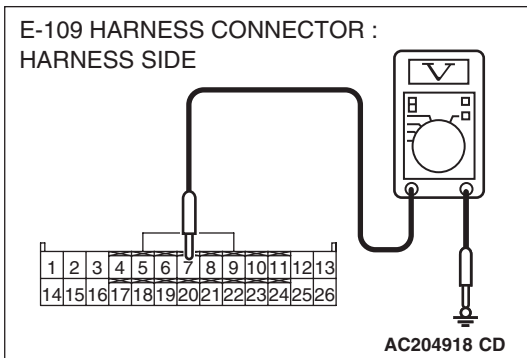
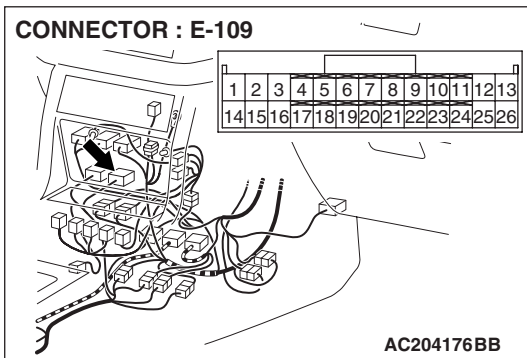


- (3) Measure the voltage between terminal 2 and ground.
 - The voltage should measure between 4.5 and 4.9 volts.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage between 4.5 and 4.9 volts?

YES : Go to Step 11.

NO : Go to Step 6.



STEP 6. Measure the sensor output voltage at transfer-ECU connector E-109 by backprobing.

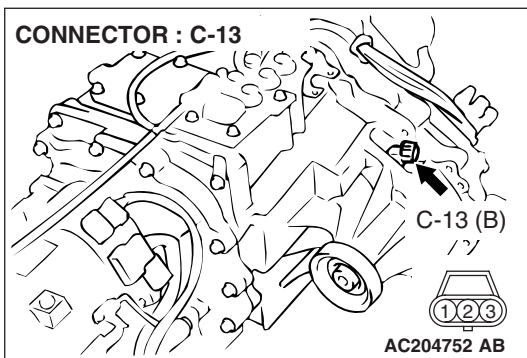
- (1) Do not disconnect connector E-109.
- (2) Disconnect connector C-13 at the front propeller shaft speed sensor.
- (3) Turn the ignition switch to the "ON" position.

- (4) Measure the voltage between terminal 7 and ground by backprobing.
 - The voltage should measure between 4.5 and 4.9 volts.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage between 4.5 and 4.9 volts?

YES : Go to Step 7.

NO : Go to Step 9.

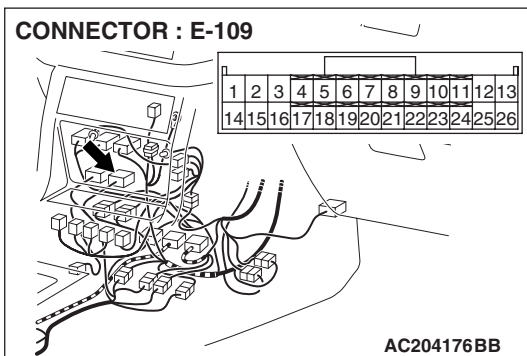


STEP 7. Check front propeller shaft speed sensor connector C-13 and transfer-ECU connector E-109 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 8.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

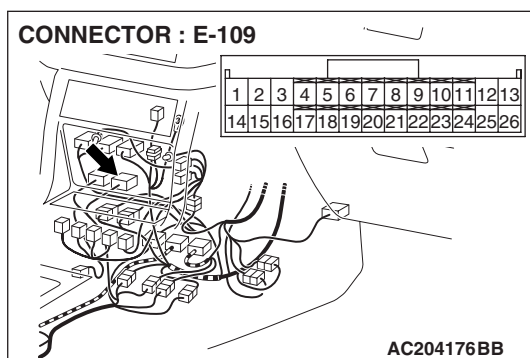
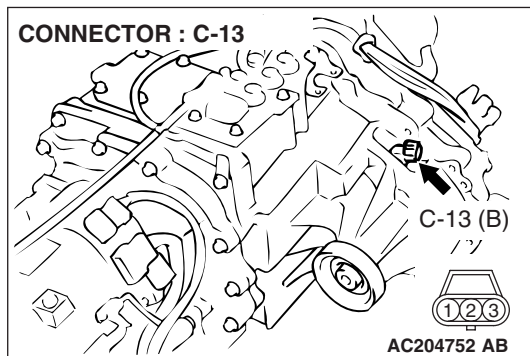


STEP 8. Check harness for open circuit or damage between front propeller shaft speed sensor connector C-13 terminal 2 and transfer-ECU connector E-109 terminal 7.

Q: Is the harness wire in good condition?

YES : Go to Step 19.

NO : Repair or replace the harness wire.

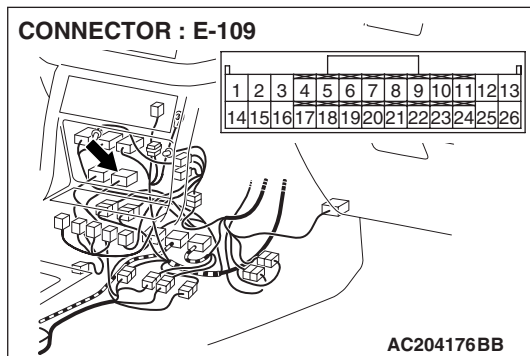
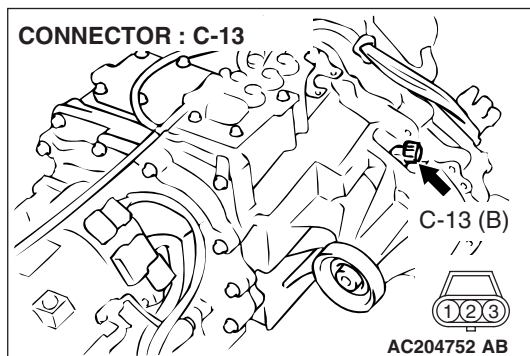


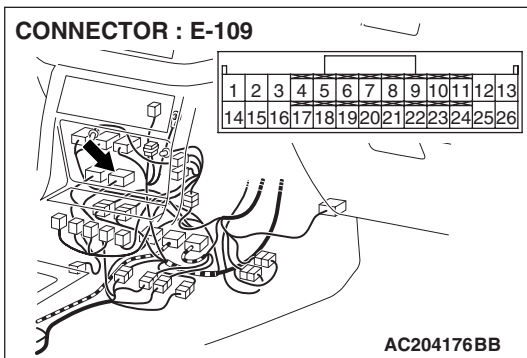
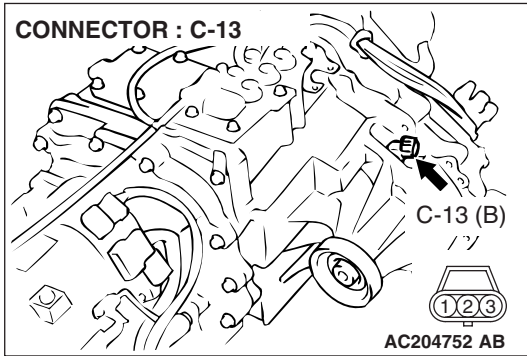
STEP 9. Check front propeller shaft speed sensor connector C-13 and transfer-ECU connector E-109 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 10.

NO : Repair or replace the damages components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).



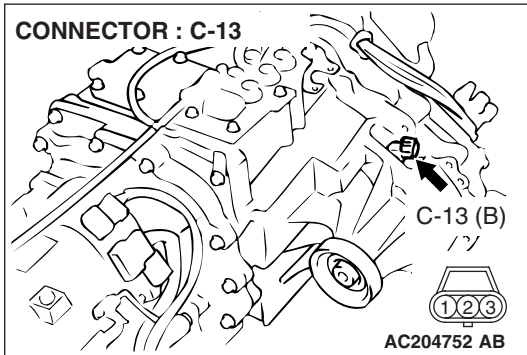


STEP 10. Check harness for short circuit to ground between front propeller shaft speed sensor connector C-13 terminal 2 and transfer-ECU connector E-109 terminal 7.

Q: Is the harness wire in good condition?

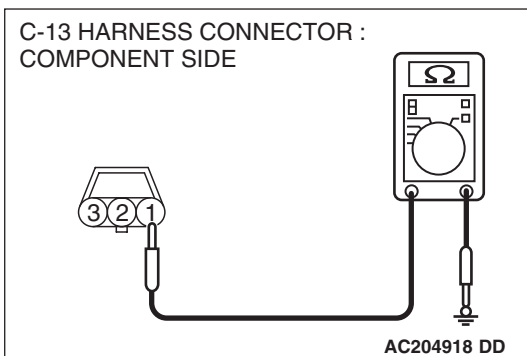
YES : Go to Step 11.

NO : Repair or replace the harness wire.



STEP 11. Measure the ground circuit for resistance at the front propeller shaft speed sensor connector C-13.

(1) Disconnect connector C-13 and measure at the harness side.



(2) Measure the resistance between terminal 1 and ground.

- The resistance should measure less than 2 ohms.

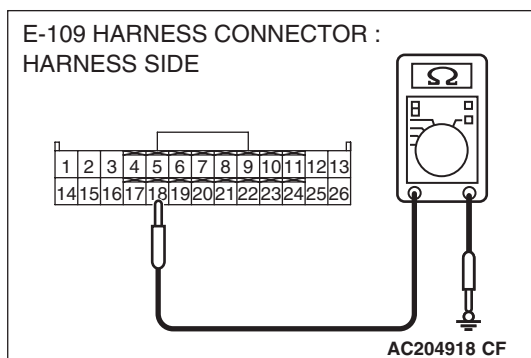
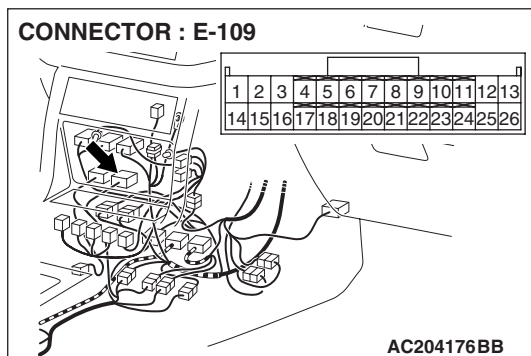
Q: Is the measured resistance less than 2 ohms?

YES : Go to Step 16.

NO : Go to Step 12.

STEP 12. Measure the resistance at the transfer-ECU connector E-109 by backprobing.

(1) Do not disconnect connector E-109.



(2) Measure the resistance between terminal 18 and ground by backprobing.

- The resistance should measure less than 2 ohms.

Q: Is the measured resistance less than 2 ohms?

YES : Go to Step 13.

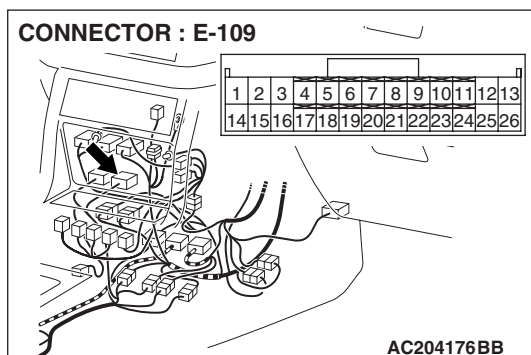
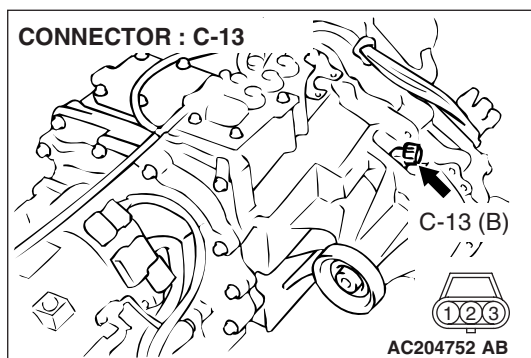
NO : Go to Step 15.

STEP 13. Check front propeller shaft speed sensor connector C-13 and transfer-ECU connector E-109 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 14.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

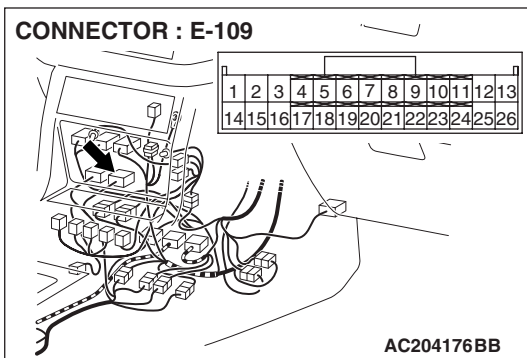
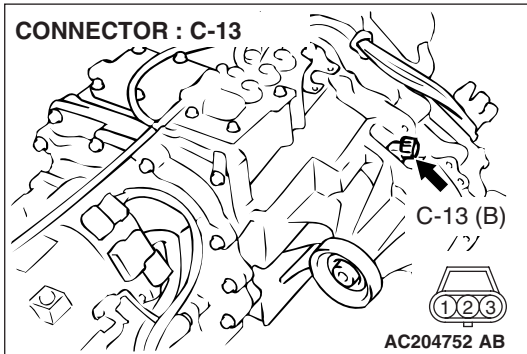


STEP 14. Check harness for open circuit or damage between front propeller shaft speed sensor harness side connector C-13 terminal 1 and transfer-ECU connector E-109 terminal 18.

Q: Is the harness wire in good condition?

YES : Go to Step 16.

NO : Repair or replace the harness wire.

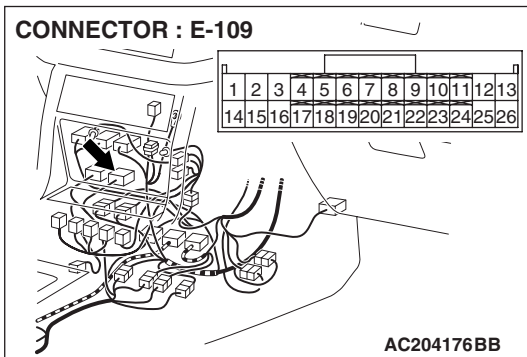


STEP 15. Check transfer-ECU connector E-109 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

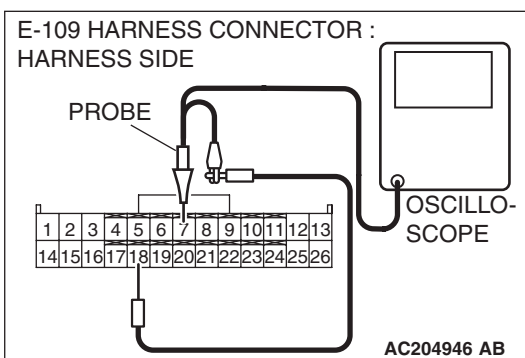
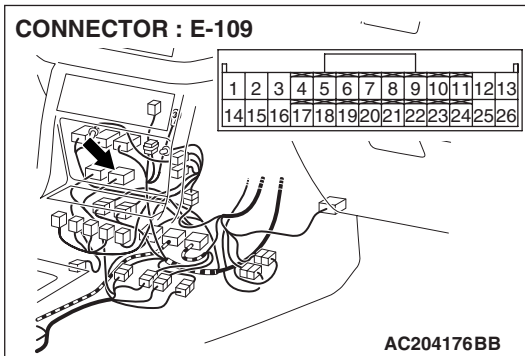
YES : Replace the PCM.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).



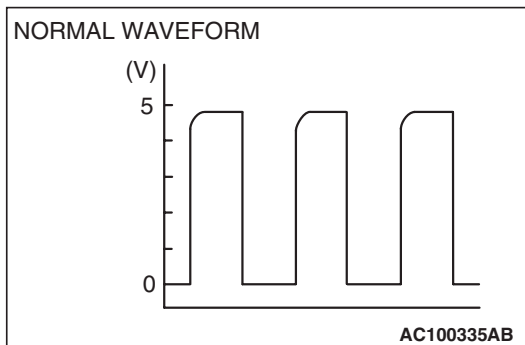
STEP 16. Using an oscilloscope, check the front propeller shaft speed sensor waveform at transfer-ECU connector E-109 by backprobing.

(1) Do not disconnect connector E-109.



(2) Connect an oscilloscope probe to transfer-ECU connector E-109 terminal 7 and 18 by backprobing.

(3) Start the engine and drive the vehicle at constant speed of 30 km/h (19 mph).



(4) Check the front propeller shaft speed sensor waveform.

- The front propeller shaft speed sensor waveform should show a pattern similar to the illustration. The maximum value should be 4.8 volts and more and the minimum value 0.8 volt and less. The output waveform should not contain electrical noise.

(5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the waveform normal?

YES : Go to Step 19.

NO : Go to Step 17.

STEP 17. Replace the front propeller shaft speed sensor.

(1) Replace the front propeller shaft speed sensor. Refer to GROUP 23B, Transfer [P.23B-75](#).

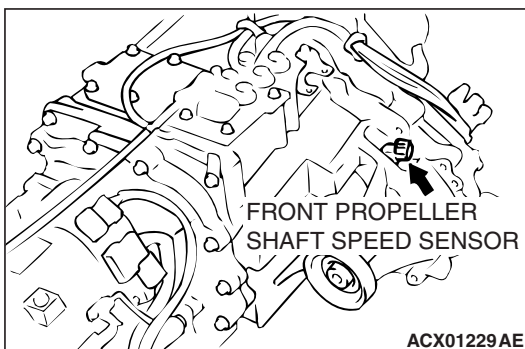
(2) Test drive the vehicle.

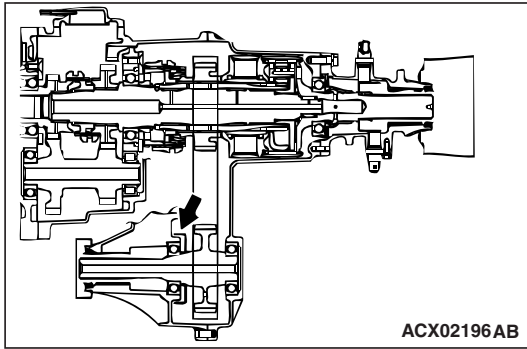
(3) Check for transfer diagnostic trouble code.

Q: Is transfer DTC 22 or 23 set?

YES : Go to Step 18.

NO : The procedure is complete.



**STEP 18. Replace the sensor rotor.**

- (1) Replace the sensor rotor. Refer to GROUP 23B, Front Output Shaft P.23B-94.
- (2) Test drive the vehicle.
- (3) Check for transfer diagnostic trouble code.

Q: Is transfer DTC 22 or 23 set?

YES : The transfer DTC may have set due to external radio frequency interference (RFI), possibly caused by cellular phone activity, or aftermarket components installed on the vehicle.

NO : The procedure is complete.

STEP 19. Using scan tool MB991958, check data list item 02: Front Propeller Shaft Speed Sensor.**⚠ CAUTION**

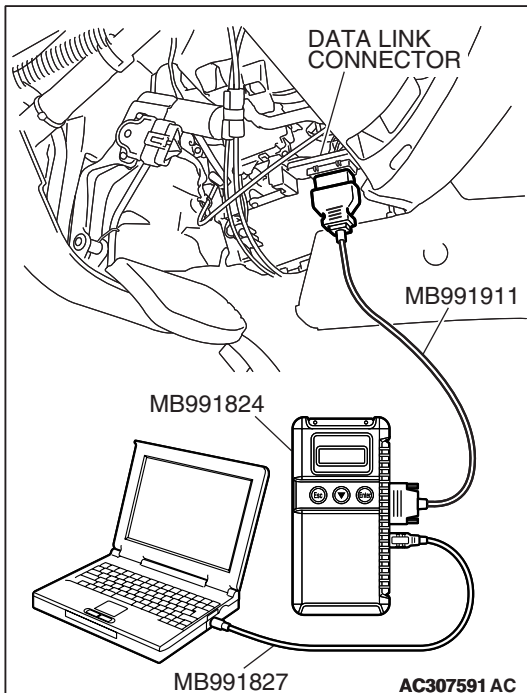
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Start the engine.
- (3) Set scan tool MB991958 to data reading mode.
 - Item 02: Front Propeller Shaft Speed Sensor.
 - When driving at constant speed of 30 km/h (19 mph), the display should be "30 km/h (19 mph)."
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

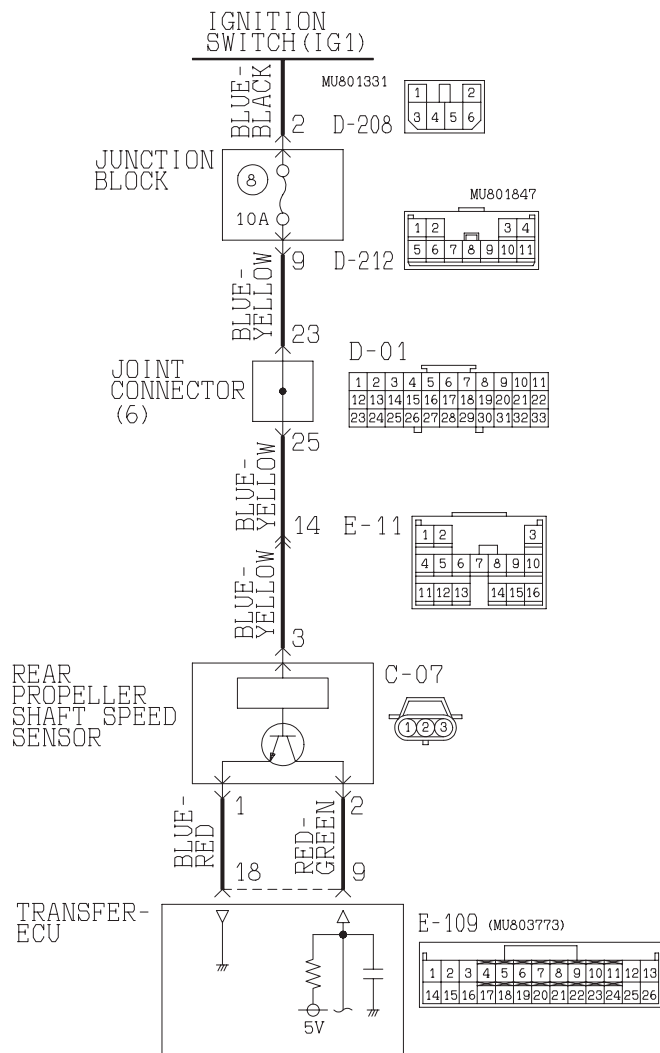
YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction P.00-13.

NO : Replace the transfer-ECU.

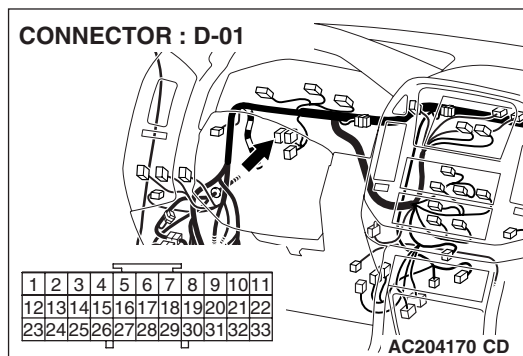
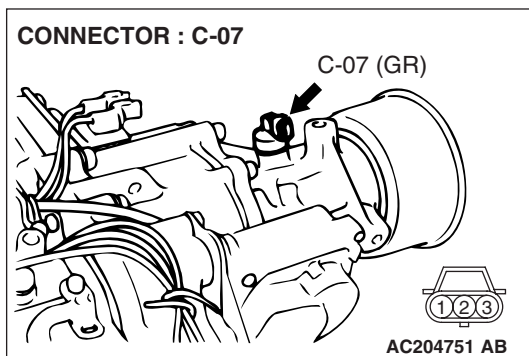


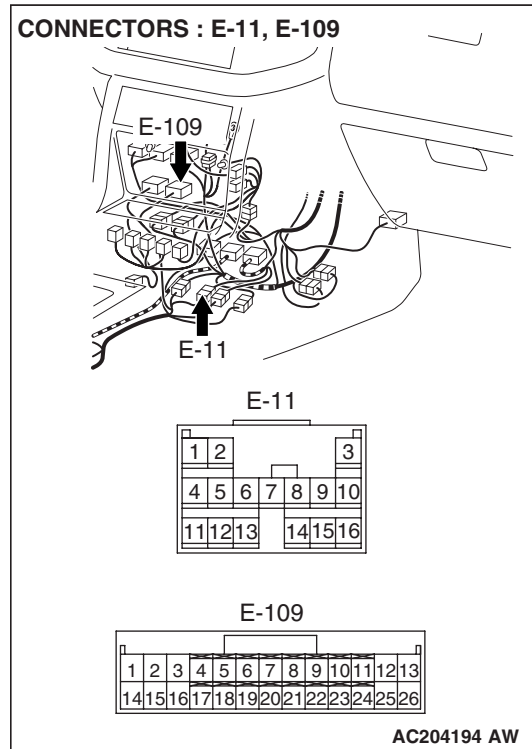
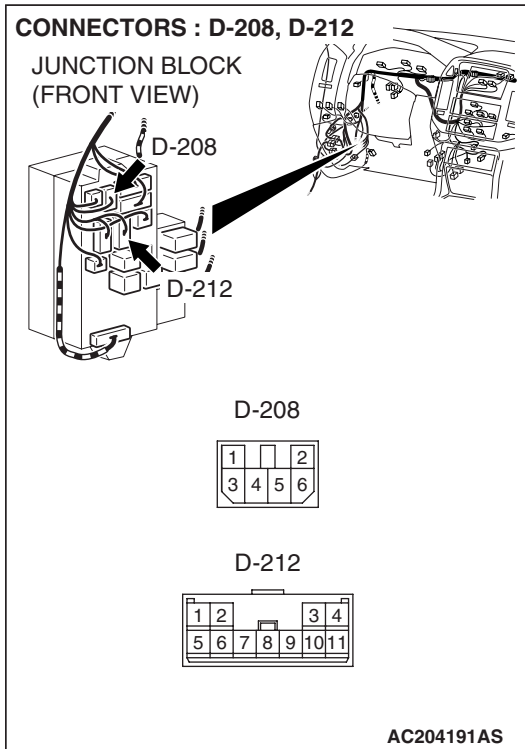
DTC 24, 25: Rear Propeller Shaft Speed Sensor System

Rear Propeller Shaft Speed Sensor System Circuit



ACX02197AB





CIRCUIT OPERATION

- The rear propeller shaft speed sensor generates 0 ⇔ 5 volts pulse signal when the rear propeller shaft rotates. The pulse signal frequency increases with a rise in rear propeller shaft speed.
- The rear propeller shaft speed sensor is connected to the transfer-ECU (terminals 9 and 18) via the rear propeller shaft speed sensor connector (terminals 1 and 2).
- The transfer-ECU detects the rear propeller shaft speed by the signal input to terminal 9.
- The rear propeller shaft speed sensor generates the pulse signal as the hole in the rear output shaft pass the magnetic tip of the sensor.

DTC SET CONDITIONS

In the case that the input signal from the rear propeller shaft speed sensor is unstable when the APP sensor voltage is 1.5 volts and over, the DTC 24 is set as the open circuit or the short circuit of the rear propeller shaft speed sensor. In the case that the input signal from the rear propeller shaft speed sensor is unstable when the freewheel engage switch is ON condition, the DTC 25 is set as the open circuit or the short circuit of the rear propeller shaft speed sensor.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CODE TO BE SET ARE:)

- Malfunction of the rear propeller shaft speed sensor circuit
- Malfunction of the rear output shaft
- Damaged harness, connector
- Malfunction of the transfer-ECU

DIAGNOSIS

Required Special Tool:

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991911: MUT-III Main Harness B

STEP 1. Using scan tool MB991958, check data list item 03: Rear Propeller Shaft Speed Sensor.

⚠ CAUTION

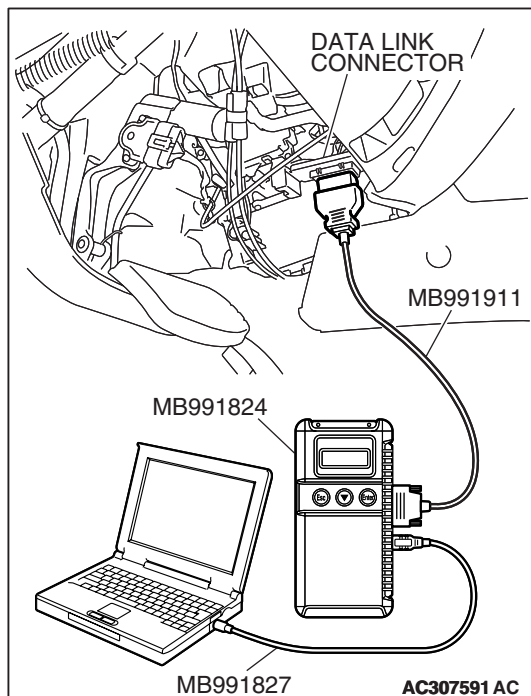
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Start the engine.
- (3) Set scan tool MB991958 to data reading mode.
 - Item 03: Rear Propeller Shaft Speed Sensor.
 - When driving at constant speed of 30 km/h (19 mph), the display should be "30 km/h (19 mph)."
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

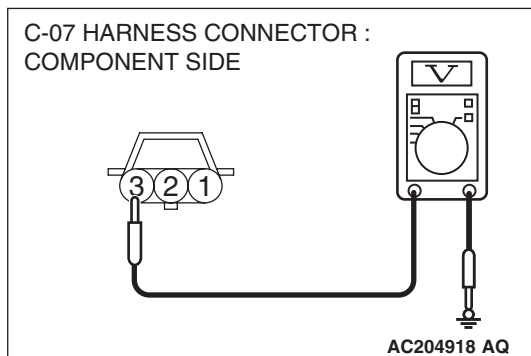
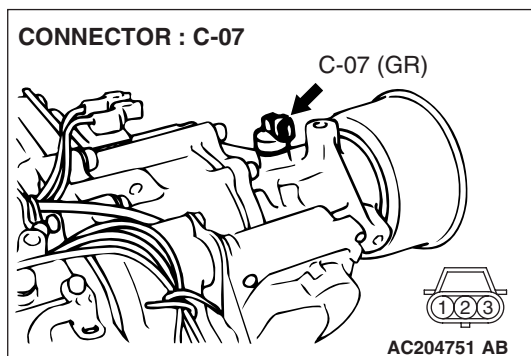
YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction P.00-13.

NO : Go to Step 2.



STEP 2. Measure the power supply voltage at rear propeller shaft speed sensor connector C-07.

- (1) Disconnect connector C-07 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.



- (3) Measure the voltage between terminal 3 and ground.
 - The voltage should measure battery positive voltage.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

YES : Go to Step 5.

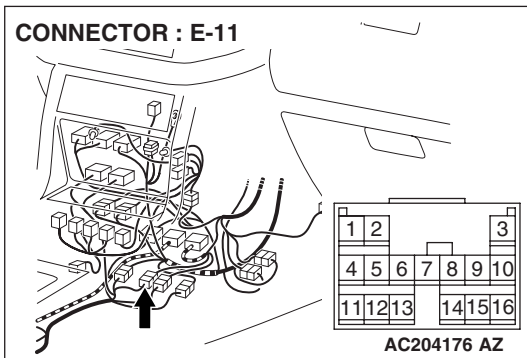
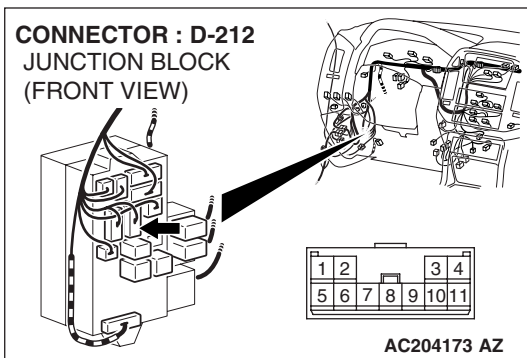
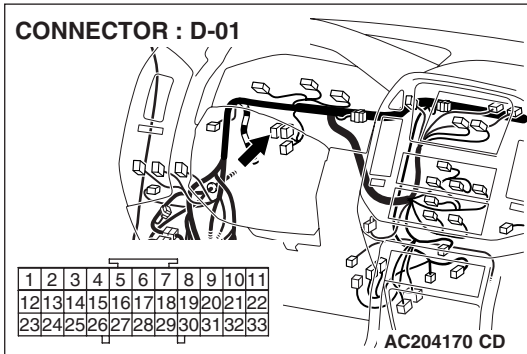
NO : Go to Step 3.

STEP 3. Check joint connector D-01, junction block connector D-212 and intermediate connector E-11 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 4.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

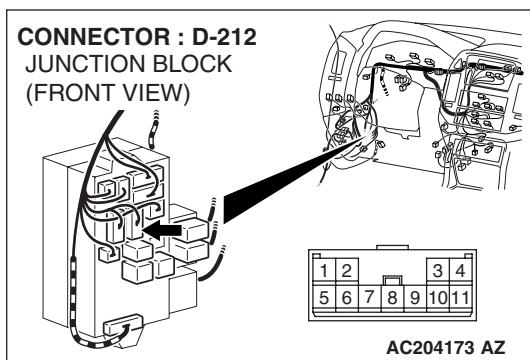
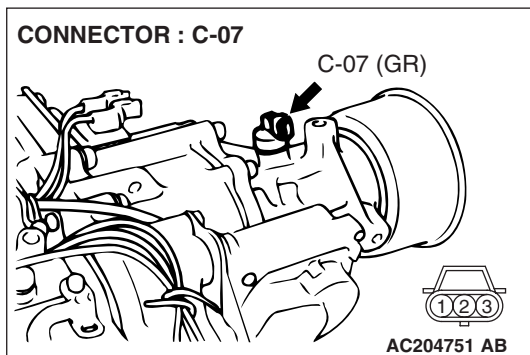


STEP 4. Check the harness for open circuit or short circuit to ground between rear propeller shaft speed sensor connector C-07 terminal 3 and junction block connector D-212 terminal 9.

Q: Is the harness wire in good condition?

YES : Go to Step 5.

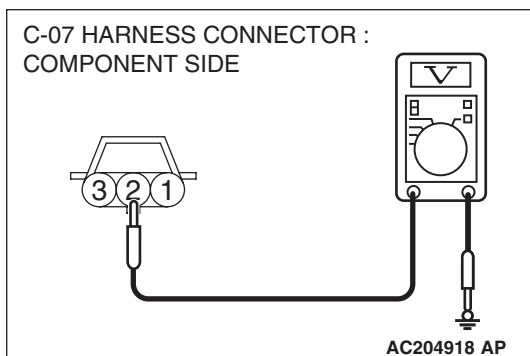
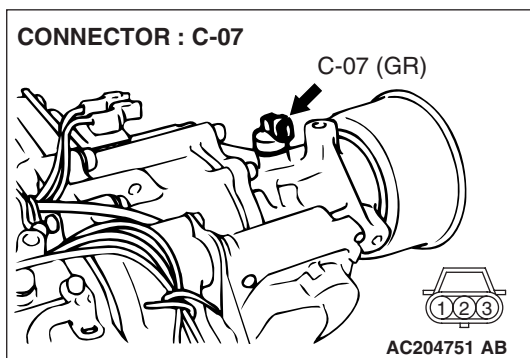
NO : Repair or replace the harness wire.



STEP 5. Measure the sensor output voltage at rear propeller shaft speed sensor connector C-07.

(1) Disconnect connector C-07 and measure at the harness side.

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



(3) Measure the voltage between terminal 2 and ground.

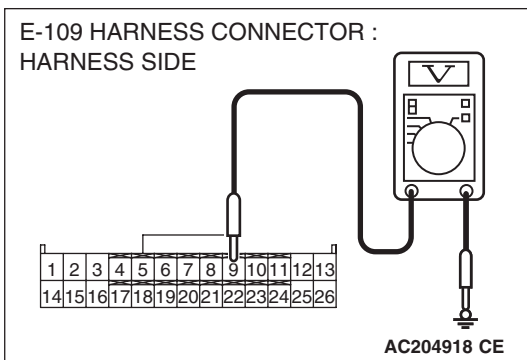
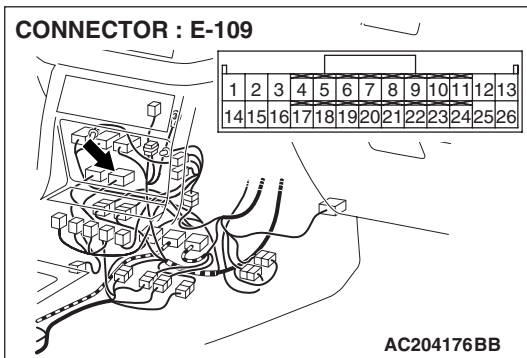
- The voltage should measure between 4.5 and 4.9 volts.

(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage between 4.5 and 4.9 volts?

YES : Go to Step 11.

NO : Go to Step 6.



STEP 6. Measure the sensor output voltage at transfer-ECU connector E-109 by backprobing.

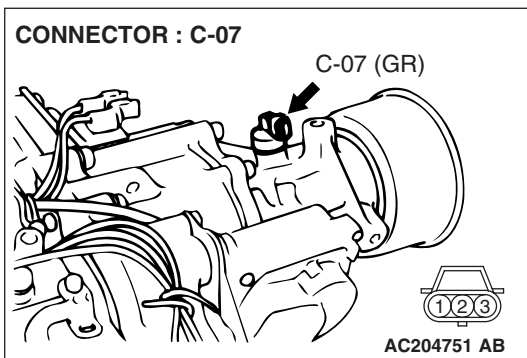
- (1) Do not disconnect connector E-109.
- (2) Disconnect connector C-07 at the rear propeller shaft speed sensor.
- (3) Turn the ignition switch to the "ON" position.

- (4) Measure the voltage between terminal 9 and ground by backprobing.
 - The voltage should measure between 4.5 and 4.9 volts.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage between 4.5 and 4.9 volts?

YES : Go to Step 7.

NO : Go to Step 9.

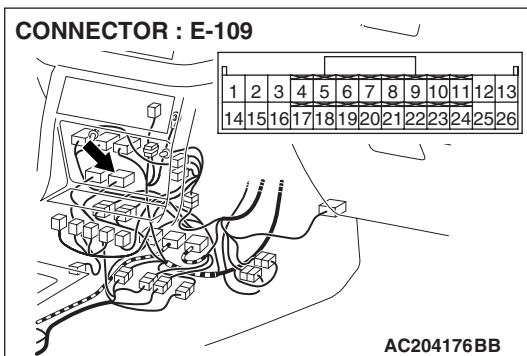


STEP 7. Check rear propeller shaft speed sensor connector C-07 and transfer-ECU connector E-109 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 8.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

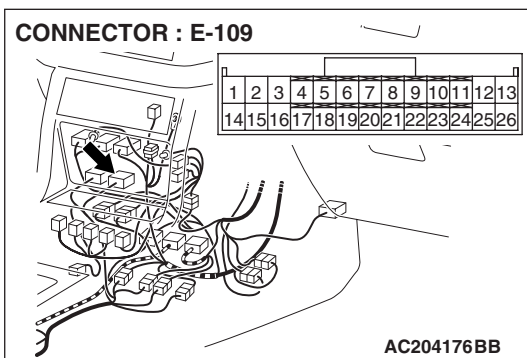
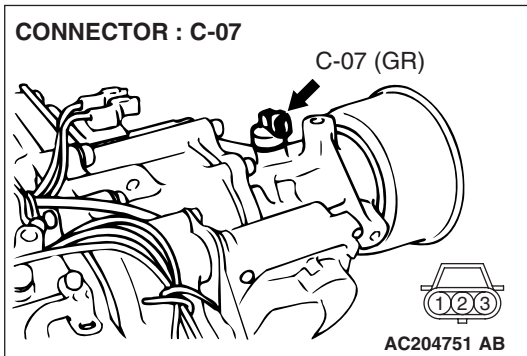


STEP 8. Check harness for open circuit or damage between rear propeller shaft speed sensor connector C-07 terminal 2 and transfer-ECU connector E-109 terminal 9.

Q: Is the harness wire in good condition?

YES : Go to Step 19.

NO : Repair or replace the harness wire.

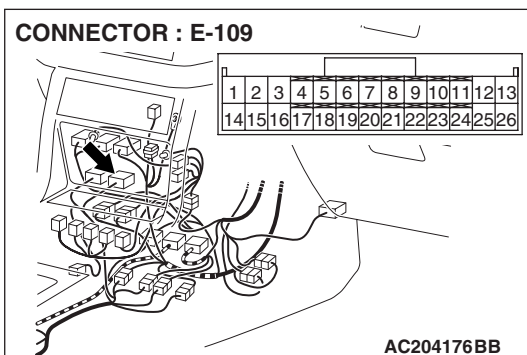
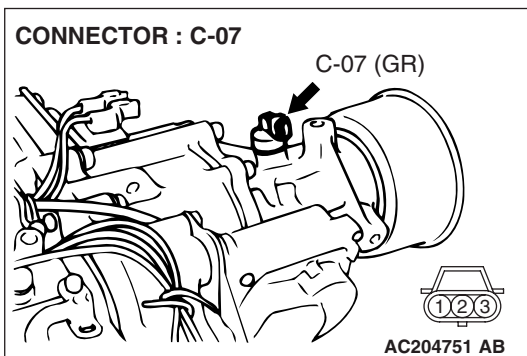


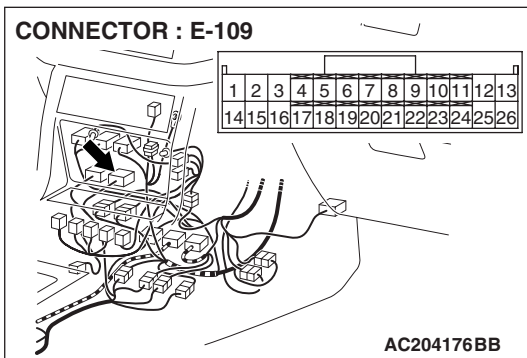
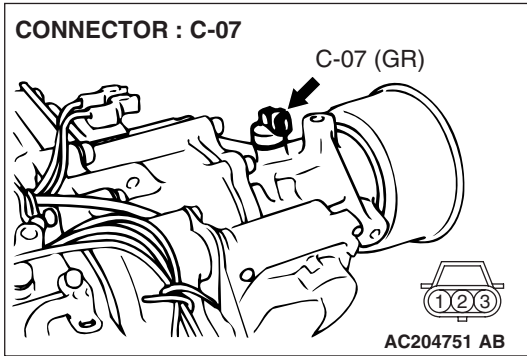
STEP 9. Check rear propeller shaft speed sensor connector C-07 and transfer-ECU connector E-109 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 10.

NO : Repair or replace the damages components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).



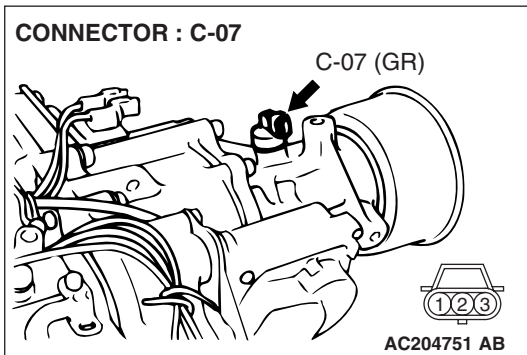


STEP 10. Check harness for short circuit to ground between rear propeller shaft speed sensor connector C-07 terminal 2 and transfer-ECU connector E-109 terminal 9.

Q: Is the harness wire in good condition?

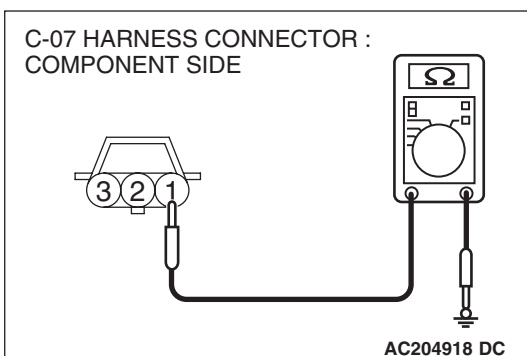
YES : Go to Step 11.

NO : Repair or replace the harness wire.



STEP 11. Measure the ground circuit for resistance at the rear propeller shaft speed sensor connector C-07.

(1) Disconnect connector C-07 and measure at the harness side.



(2) Measure the resistance between terminal 1 and ground.

- The resistance should measure less than 2 ohms.

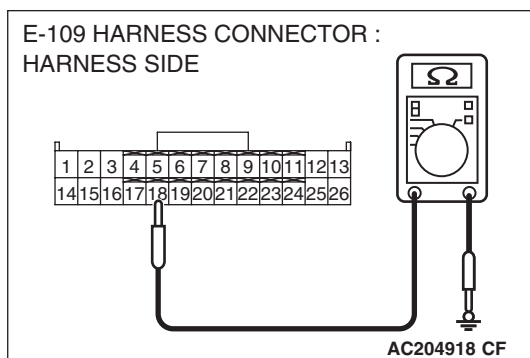
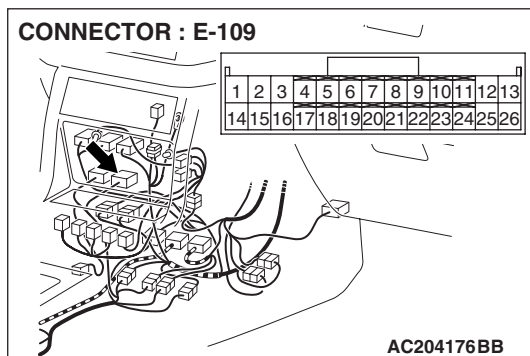
Q: Is the measured resistance less than 2 ohms?

YES : Go to Step 16.

NO : Go to Step 12.

STEP 12. Measure the resistance at the transfer-ECU connector E-109 by backprobing.

(1) Do not disconnect connector E-109.



(2) Measure the resistance between terminal 18 and ground by backprobing.

- The resistance should measure less than 2 ohms.

Q: Is the measured resistance less than 2 ohms?

YES : Go to Step 13.

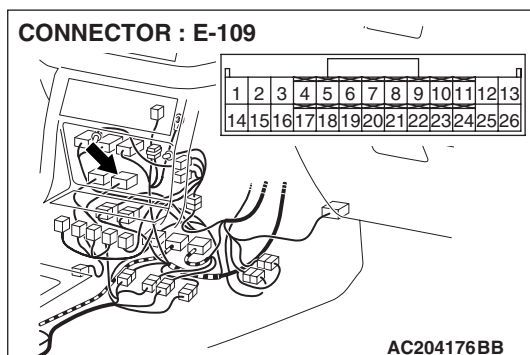
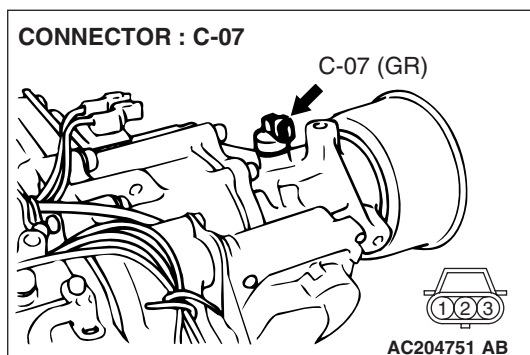
NO : Go to Step 15.

STEP 13. Check rear propeller shaft speed sensor connector C-07 and transfer-ECU connector E-109 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 14.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

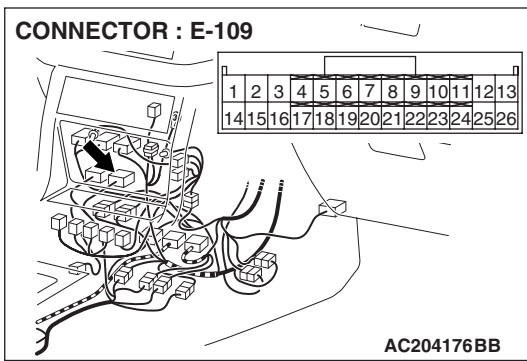
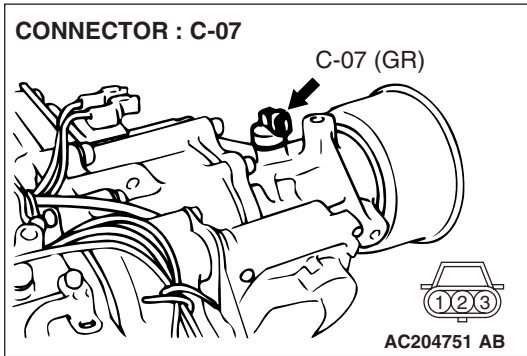


STEP 14. Check harness for open circuit or damage between rear propeller shaft speed sensor harness side connector C-07 terminal 1 and transfer-ECU connector E-109 terminal 18.

Q: Is the harness wire in good condition?

YES : Go to Step 16.

NO : Repair or replace the harness wire.

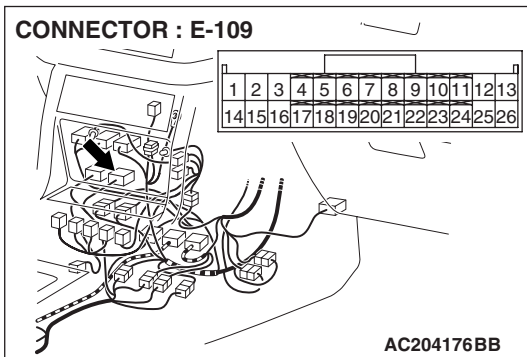


STEP 15. Check transfer-ECU connector E-109 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

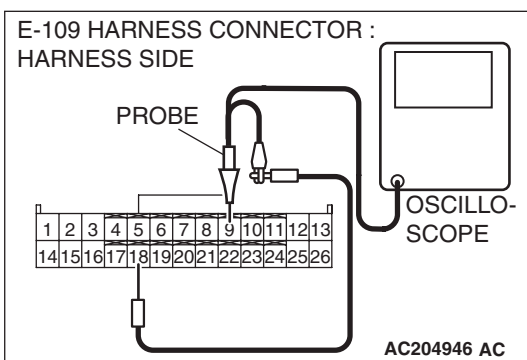
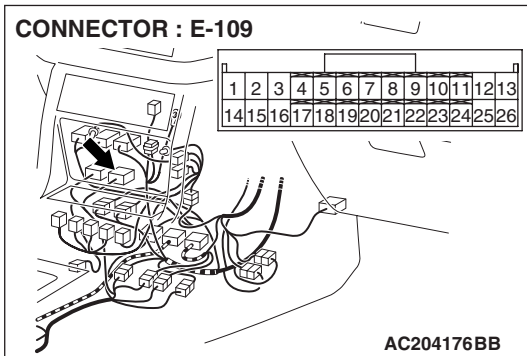
YES : Replace the PCM.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

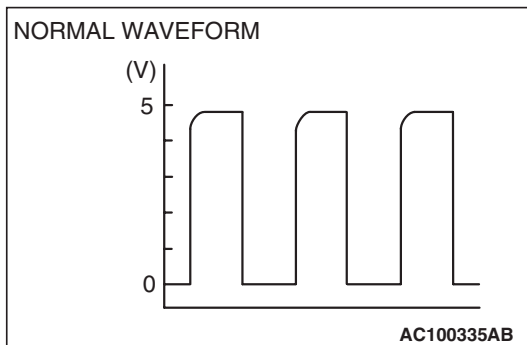


STEP 16. Using an oscilloscope, check the rear propeller shaft speed sensor waveform at transfer-ECU connector E-109 by backprobing.

(1) Do not disconnect connector E-109.



- (2) Connect an oscilloscope probe to transfer-ECU connector E-109 terminal 9 and 18 by backprobing.
 (3) Start the engine and drive the vehicle at constant speed of 30 km/h (19 mph).



- (4) Check the rear propeller shaft speed sensor waveform.
- The rear propeller shaft speed sensor waveform should show a pattern similar to the illustration. The maximum value should be 4.8 volts and more and the minimum value 0.8 volt and less. The output waveform should not contain electrical noise.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the waveform normal?

YES : Go to Step 19.

NO : Go to Step 17.

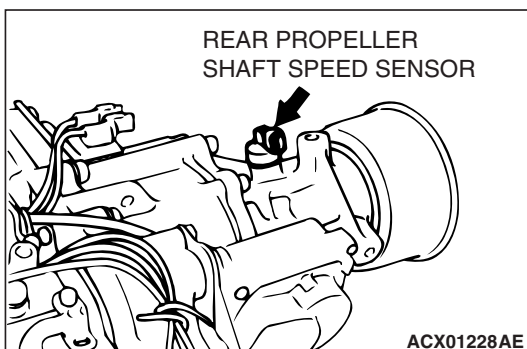
STEP 17. Replace the rear propeller shaft speed sensor.

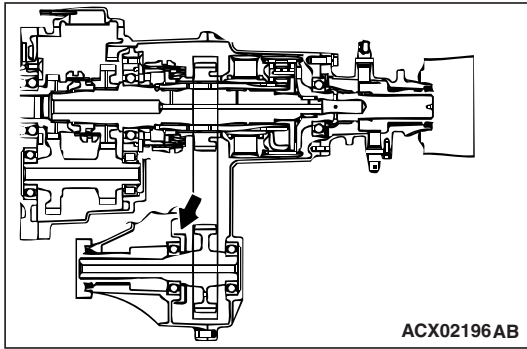
- (1) Replace the rear propeller shaft speed sensor. Refer to GROUP 23B, Transfer [P.23B-75](#).
 (2) Test drive the vehicle.
 (3) Check for transfer diagnostic trouble code.

Q: Is transfer DTC 24 or 25 set?

YES : Go to Step 18.

NO : The procedure is complete.



**STEP 18. Replace the sensor rotor.**

- (1) Replace the sensor rotor. Refer to GROUP 23B, Transfer [P.23B-75](#).
- (2) Test drive the vehicle.
- (3) Check for transfer diagnostic trouble code.

Q: Is transfer DTC 24 or 25 set?

YES : The transfer DTC may have set due to external radio frequency interference (RFI), possibly caused by cellular phone activity, or aftermarket components installed on the vehicle.

NO : The procedure is complete.

STEP 19. Using scan tool MB991958, check data list item 03: Rear Propeller Shaft Speed Sensor.**⚠ CAUTION**

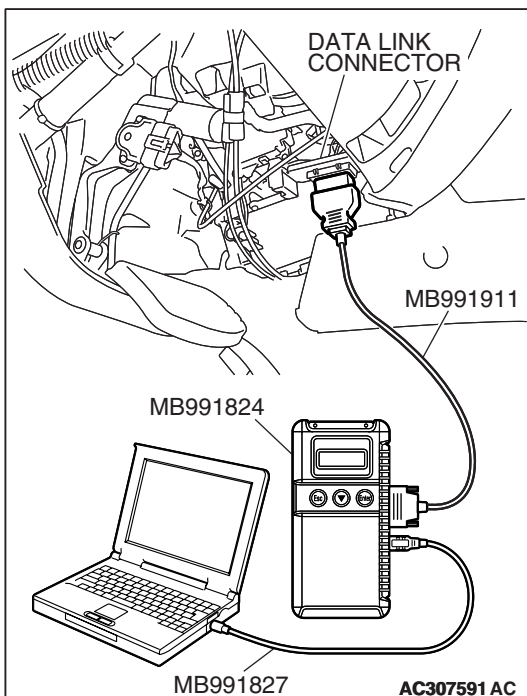
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

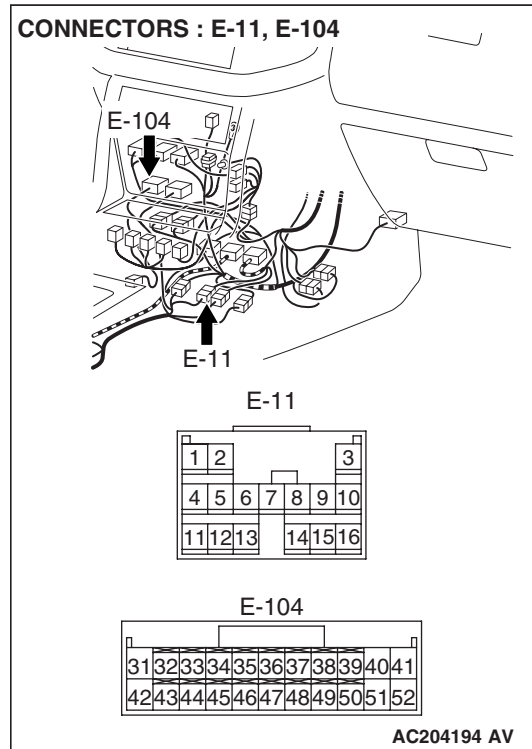
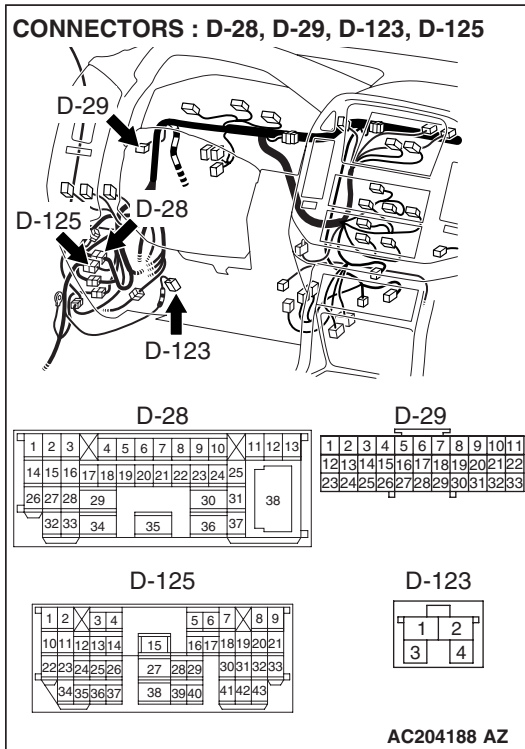
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Start the engine.
- (3) Set scan tool MB991958 to data reading mode.
 - Item 03: Rear Propeller Shaft Speed Sensor.
 - When driving at constant speed of 30 km/h (19 mph), the display should be "30 km/h (19 mph)."
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the sensor operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-13](#).

NO : Replace the transfer-ECU.





CIRCUIT OPERATION

- Battery positive voltage is supplied to the stoplight switch (terminal 2).
- When the brake pedal is depressed, battery positive voltage is applied to the transfer-ECU (terminal 34).

DTC SET CONDITIONS

In the case that the stoplight switch is continuously turned ON for 15 minutes at the vehicle speed of 15 km/h (9.3 mph) and over, the DTC 26 is set as the short circuit of the stoplight switch.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CODE TO BE SET ARE:)

- Malfunction of the stoplight switch circuit
- Damaged harness, connector
- Malfunction of the transfer-ECU

DIAGNOSIS

Required Special Tool:

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991911: MUT-III Main Harness B

STEP 1. Check the brake pedal height.

Refer to GROUP 35A, On-vehicle Service – Brake Pedal Check and Adjustment P.35A-116.

Q: Is the height adjusted properly?

YES : Go to Step 2.

NO : Adjust the brake pedal to the proper height.

STEP 2. Using scan tool MB991958, check data list item 23: Stoplight Switch.

⚠ CAUTION

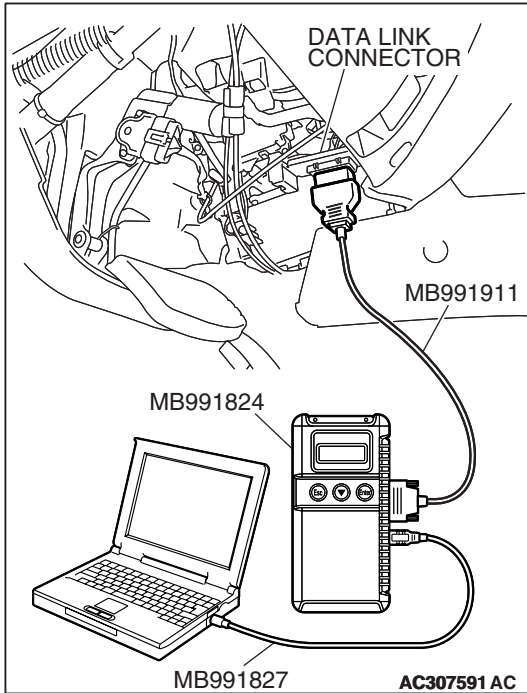
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode.
 - Item 23: Stoplight Switch – Active Trac 4WD II.
 - When the brake pedal is depressed, the display on scan tool MB991958 should be "ON."
 - When the brake pedal is not depressed, the display on scan tool MB991958 should be "OFF."
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the switch operating properly?

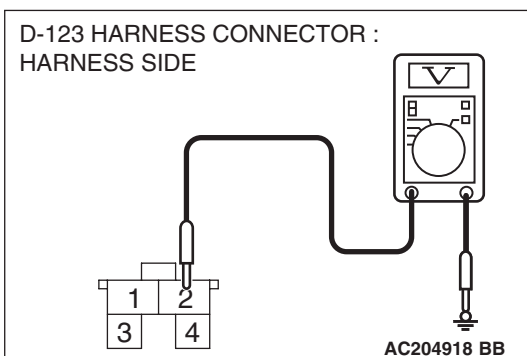
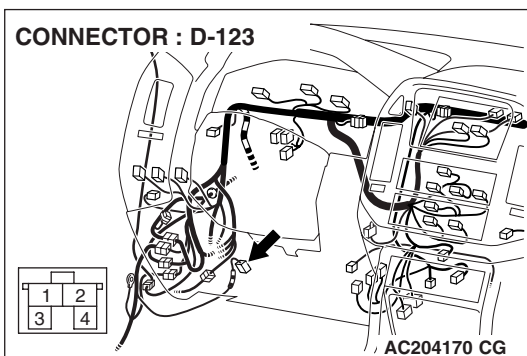
YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction P.00-13.

NO : Go to Step 3.



STEP 3. Measure the stoplight switch power supply voltage at connector D-123 by backprobing.

- (1) Remove the stoplight switch from the mounting bracket.
- (2) Do not disconnect connector D-123.

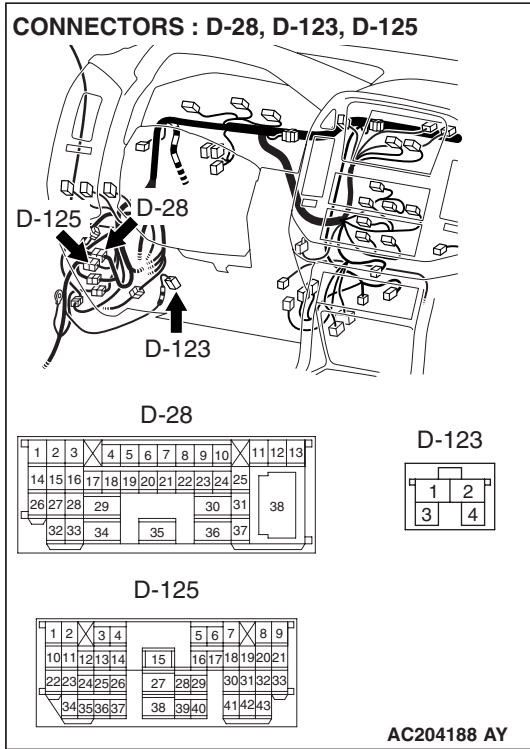


- (3) Measure the voltage between terminal 2 and ground by backprobing.
 - The voltage should measure battery positive voltage.

Q: Is the measured voltage battery positive voltage?

YES : Go to Step 6.

NO : Go to step 4.

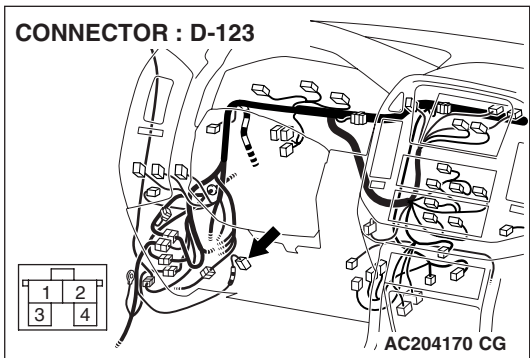


STEP 4. Check stoplight switch connector D-123, intermediate connector D-28 and D-125 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 5.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

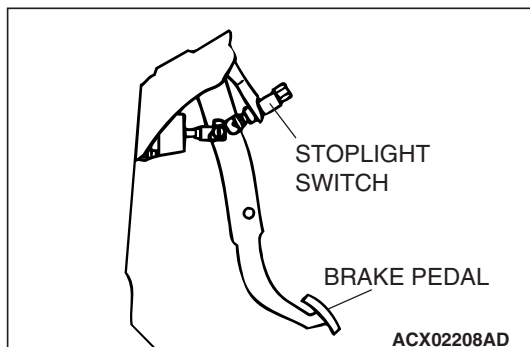
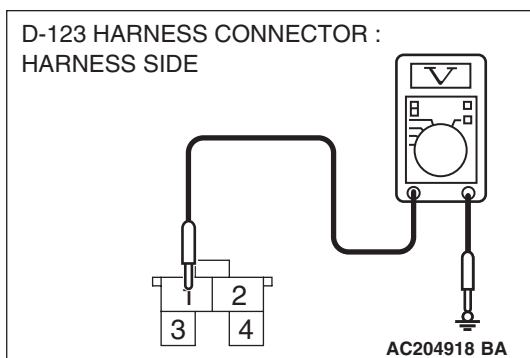
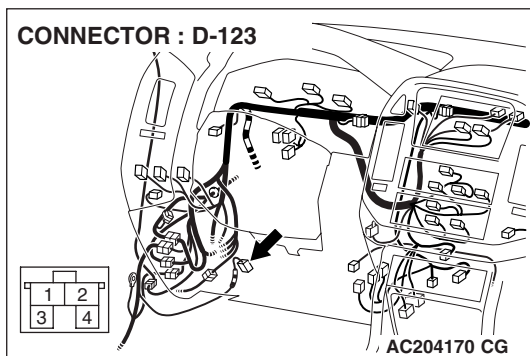


STEP 5. Check the harness for open circuit or short circuit to ground between stoplight switch connector D-123 terminal 2 and the power supply fuse.

Q: Is the harness wire in good condition?

YES : Go to Step 6.

NO : Repair or replace the harness wire.



STEP 6. Measure the stoplight switch output voltage to the PCM at connector D-123 by backprobing.

- (1) Remove the stoplight switch from the mounting bracket.
- (2) Do not disconnect connector D-123.

- (3) Measure the voltage between stoplight switch connector D-123 terminal 1 and ground by backprobing.
 - When the switch button is out (closed circuit), voltage should equal battery positive voltage.
 - When the switch button is depressed (open circuit), voltage should measure less than 1.0 volt.

Q: Is the measured voltage battery positive voltage with the switch button released (closed circuit), and less than 1.0 volt with the switch button depressed (open circuit)?

YES : Go to Step 8.

NO : Go to Step 7.

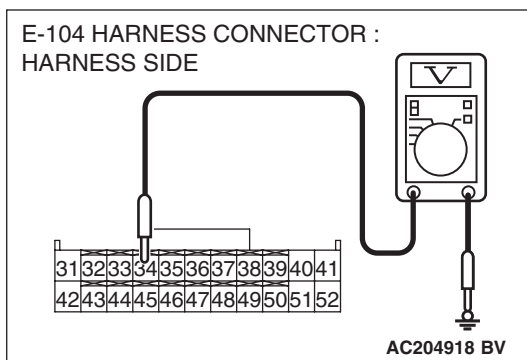
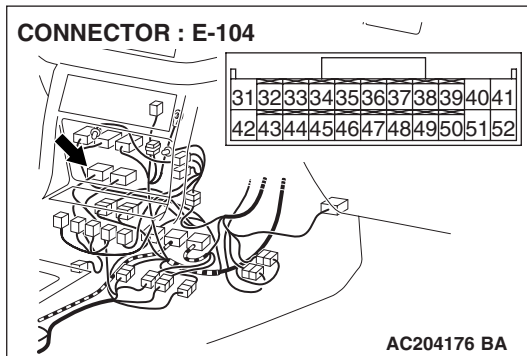
STEP 7. Check the stoplight switch.

Refer to GROUP 35A, On-vehicle Service – Stoplight Switch Check [P.35A-118](#).

Q: Does the stoplight switch pass the checks?

YES : Go to Step 8.

NO : Replace the stoplight switch. Refer to GROUP 35A, Brake Pedal [P.35A-135](#).



STEP 8. Measure the stoplight switch output voltage at transfer-ECU connector E-104 by backprobing.

- (1) Install the stoplight switch into the mounting bracket if it was removed.
- (2) Do not disconnect connector E-104.

- (3) Measure the voltage between terminal 34 and ground by backprobing.

- When the brake pedal is depressed, voltage should measure battery positive voltage.
- When the brake pedal is not depressed, voltage should measure less than 1.0 volt.

Q: Is the measured voltage battery positive voltage with the brake pedal depressed (closed circuit), and less than 1.0 volt with the brake pedal released (open circuit)?

YES : Go to Step 11.

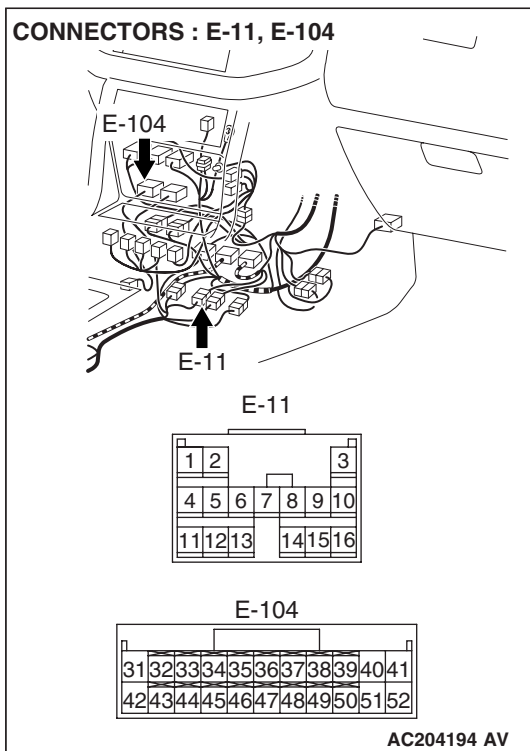
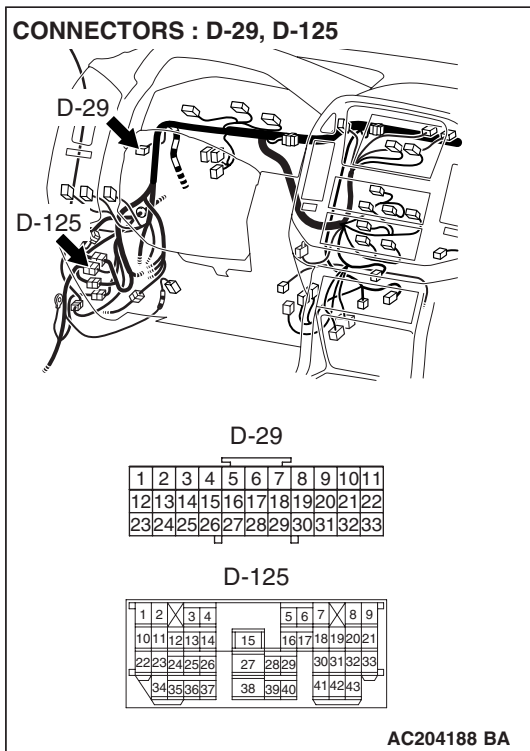
NO : Go to Step 9.

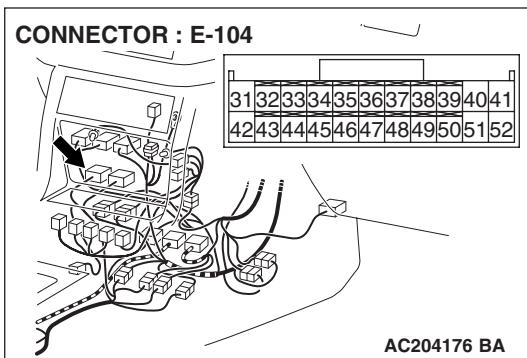
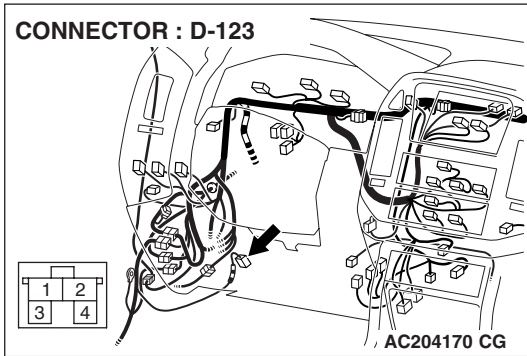
STEP 9. Check joint connector D-29, intermediate connector D-125, E-11 and transfer-ECU connector E-104 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 10.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).



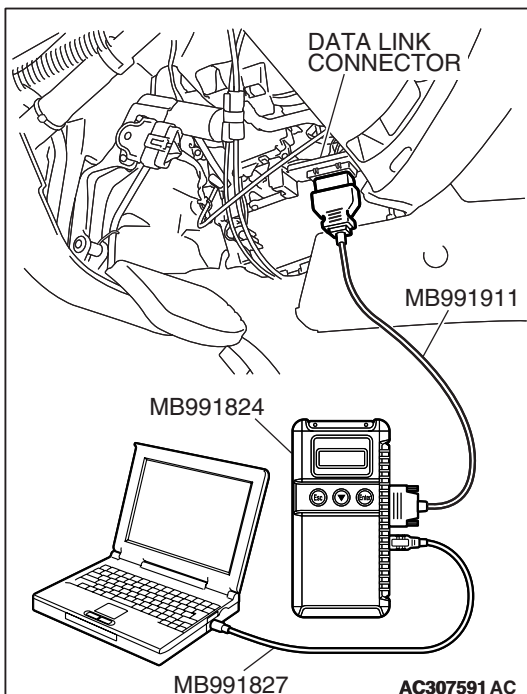


STEP 10. Check the harness for open circuit or short circuit to ground between stoplight switch connector D-123 terminal 1 and transfer-ECU connector E-104 terminal 34.

Q: Is the harness wire in good condition?

YES : Go to Step 11.

NO : Repair or replace the harness wire.



STEP 11. Using scan tool MB991958, check data list item 23: Stoplight Switch.

CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode.
 - Item 23: Stoplight Switch – Active Trac 4WD II.
 - When the brake pedal is depressed, the display on scan tool MB991958 should be "ON."
 - When the brake pedal is not depressed, the display on scan tool MB991958 should be "OFF."
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

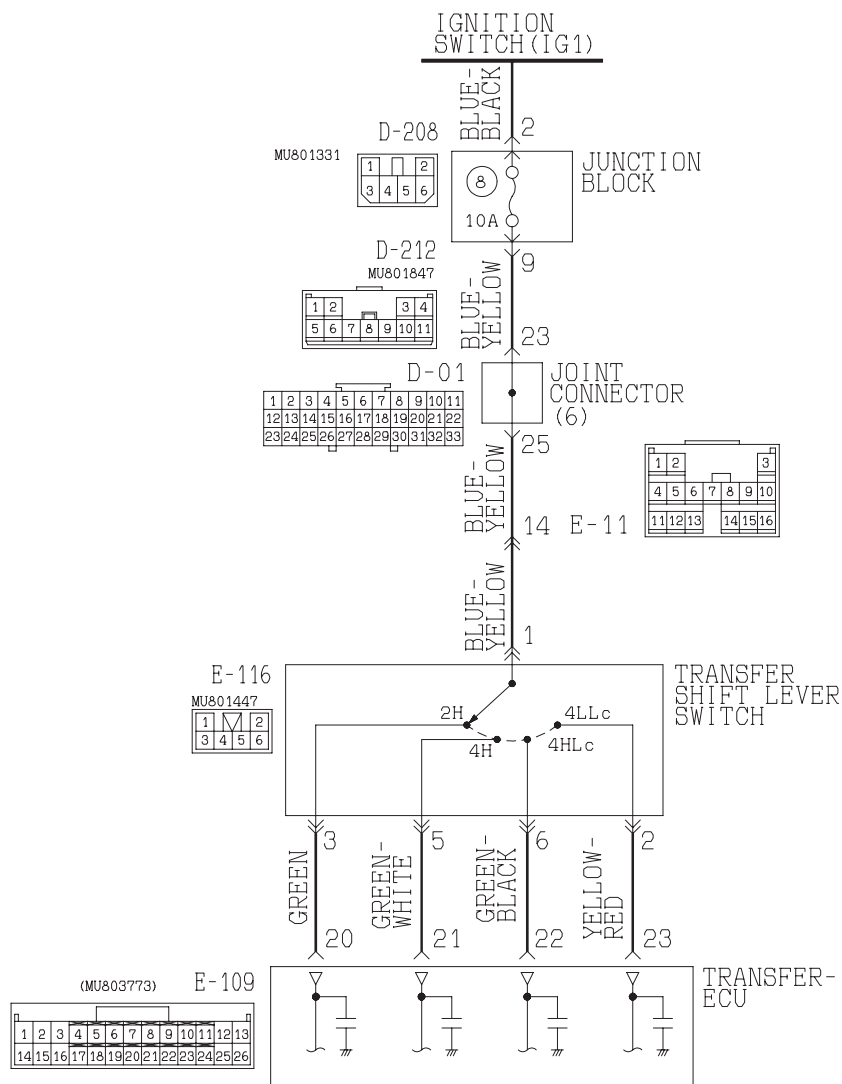
Q: Is the switch operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction P.00-13.

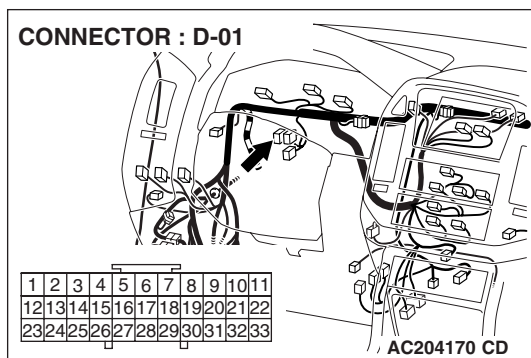
NO : Replace the PCM.

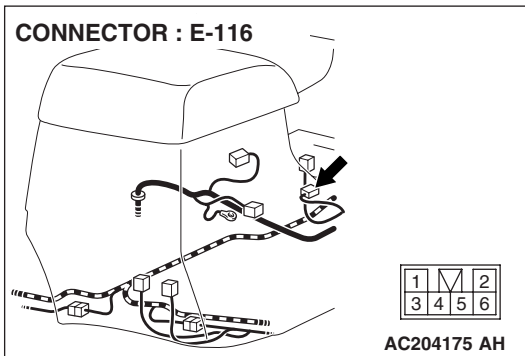
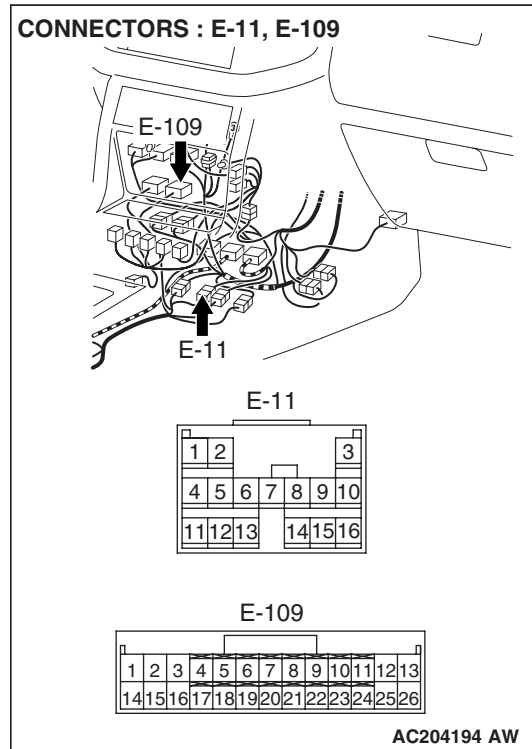
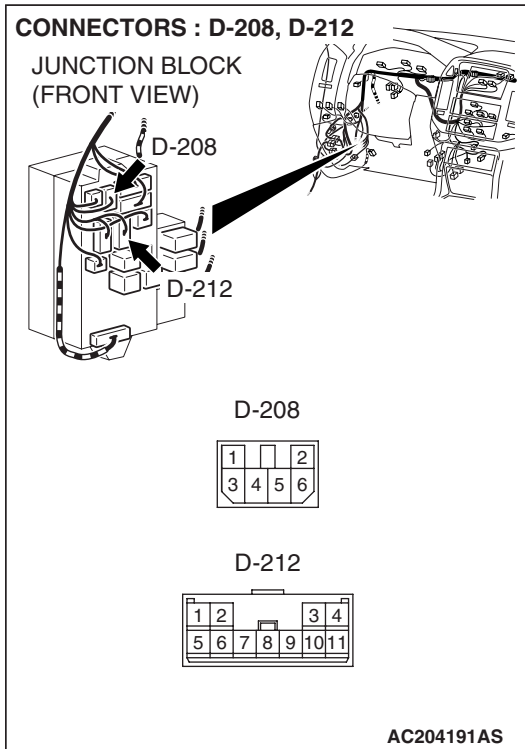
DTC 31: Transfer Shift Lever Switch System

Transfer Shift Lever Switch System Circuit



ACX02035AB





CIRCUIT OPERATION

- Battery positive voltage is applied to the transfer shift lever switch (terminal 1) when the ignition switch is turned "ON."
- Battery positive voltage is applied to the transfer-ECU terminal 20, 21, 22, or 23 when the transfer shift lever is in the "2H," "4H," "4HLc" or "4LLc." The transfer-ECU judges that the transfer shift lever is in the "2H," "4H," "4HLc" or "4LLc" when the battery positive voltage is applied.

DTC SET CONDITIONS

In the case that the input signal from the transfer shift lever switch is open or shorted, the DTC 31 is set as the open circuit or the short circuit of the transfer shift lever switch system.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CODE TO BE SET ARE:)

- Malfunction of the transfer shift lever switch
- Malfunction of the ignition switch
- Damaged harness, connector
- Malfunction of the transfer-ECU

DIAGNOSIS

Required Special Tool:

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991911: MUT-III Main Harness B

STEP 1. Using scan tool MB991958, check data list item 06: Transfer Shift Lever Position.

⚠ CAUTION

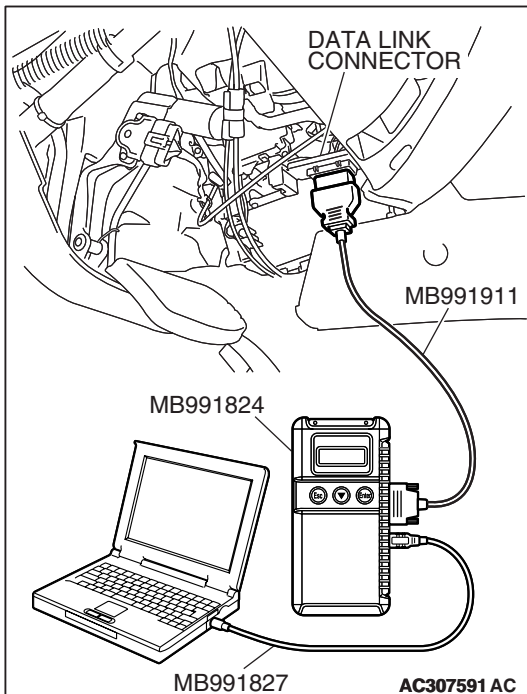
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode.
 - Item 06: Transfer Shift Lever Position.
 - Display should be the same as the actual transfer shift lever position.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is switch operating properly?

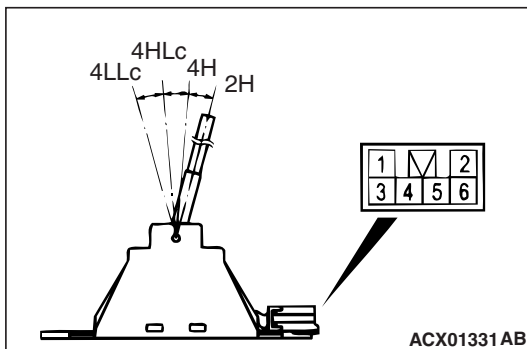
YES : If can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction P.00-13.

NO : Go to Step 2.



STEP 2. Check the transfer shift lever switch.

Check for resistance between terminals for each transfer shift lever position.

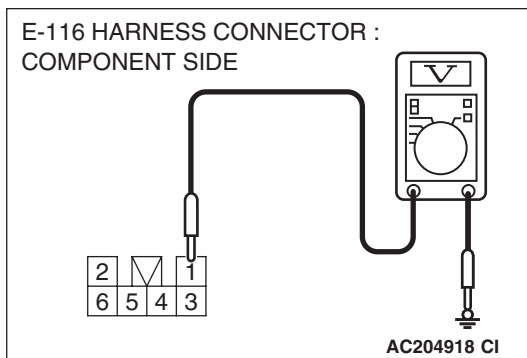
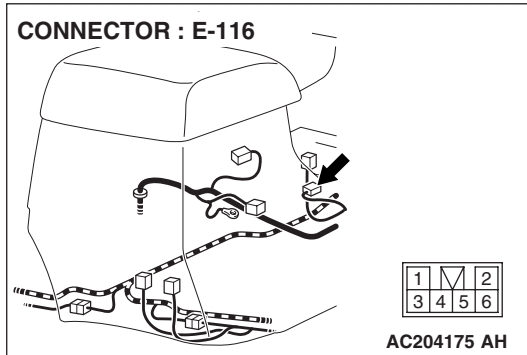


TRANSFER SHIFT LEVER POSITION	TERMINAL NUMBER	SPECIFIED CONDITION
2H	1 – 3	Less than 2 ohms.
4H	1 – 5	
4HLc	1 – 6	
4LLc	1 – 2	

Q: Is switch operating properly?

YES : Go to Step 3.

NO : Replace the transfer shift lever switch. Refer to P.23A-566, Transmission Control.



STEP 3. Measure the power supply voltage at transfer shift lever switch connector E-116.

- (1) Disconnect connector E-116 and measure at harness side.
- (2) Turn the ignition switch to the "ON" position.

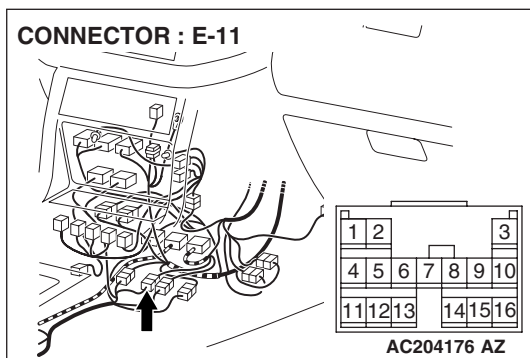
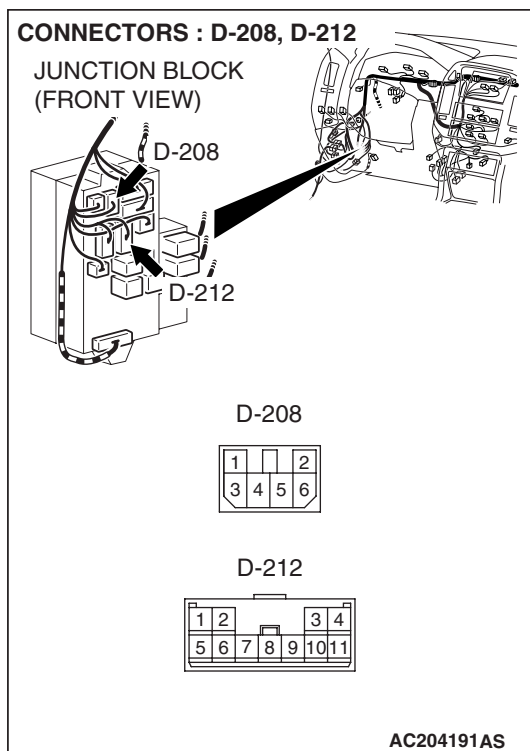
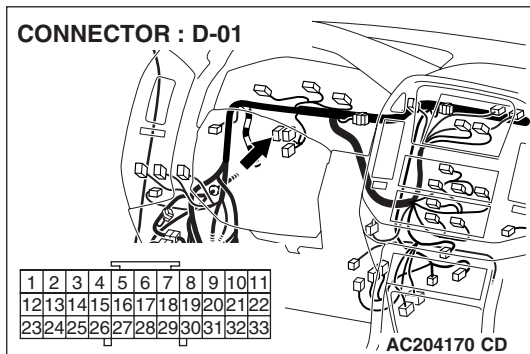
- (3) Measure the voltage between terminal 1 and ground.
 - The voltage should measure battery positive voltage.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

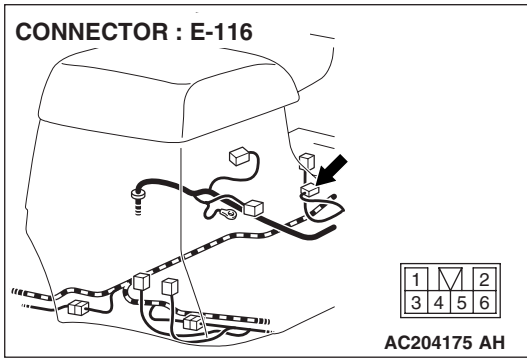
Q: Is the measured voltage battery positive voltage?

YES : Go to Step 6.

NO : Go to Step 4.

STEP 4. Check joint connector D-01, junction block connector D-208, D-212, intermediate connector E-11 and transfer shift lever switch connector E-116 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

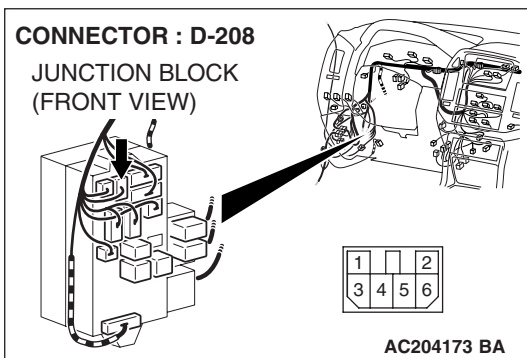




Q: Are the connectors and terminals in good condition?

YES : Go to Step 5.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

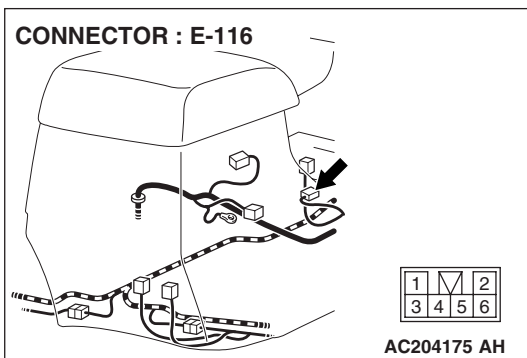


STEP 5. Check harness for open circuit or short circuit to ground between junction block connector D-208 terminal 2 and transfer shift lever switch connector E-116 terminal 1.

Q: Is the harness wire in good condition?

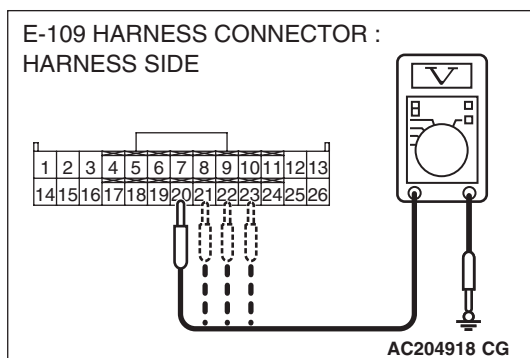
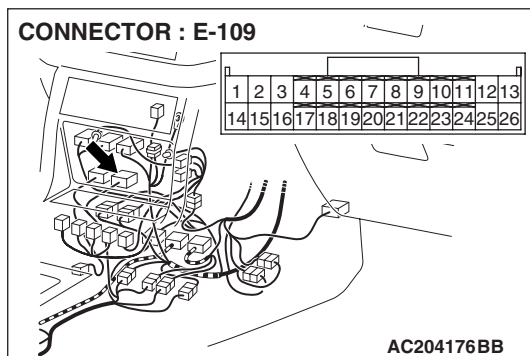
YES : Go to Step 10.

NO : Repair or replace the harness wire.



STEP 6. Measure the switch output voltage at transfer-ECU connector E-109 by backprobing.

- (1) Disconnect connector E-109 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.



- (3) Measure the voltage between terminal 20 (Transfer shift lever position: 2H) and ground by backprobing. [terminal 21 (Transfer shift lever position: 4H), terminal 22 (Transfer shift lever position: 4HLc), terminal 23 (Transfer shift lever position: 4LLc) and ground by backprobing.]
 - The voltage should measure battery positive voltage.

- (4) Turn the ignition switch to the "LOCK" (OFF) position.

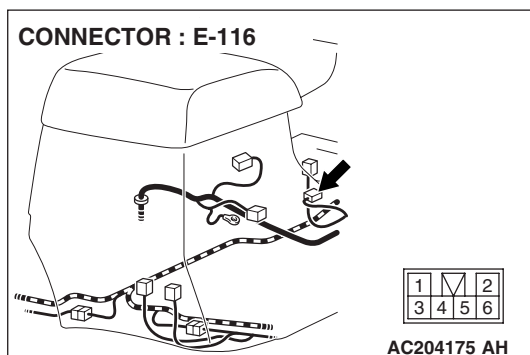
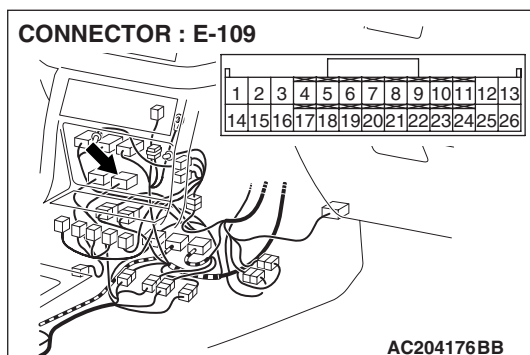
Q: Is the measured voltage battery positive voltage?

- YES :** Go to Step 9.
NO : Go to Step 7.

STEP 7. Check transfer-ECU connector E-109 and transfer shift lever switch connector E-116 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

- YES :** Go to Step 8.
NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

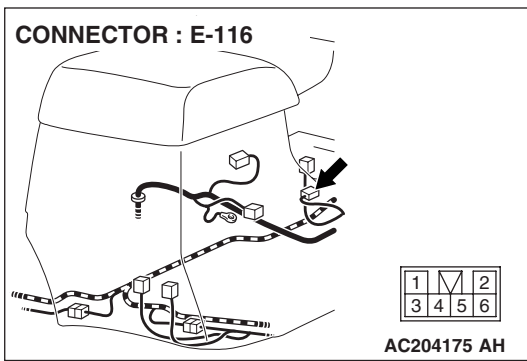
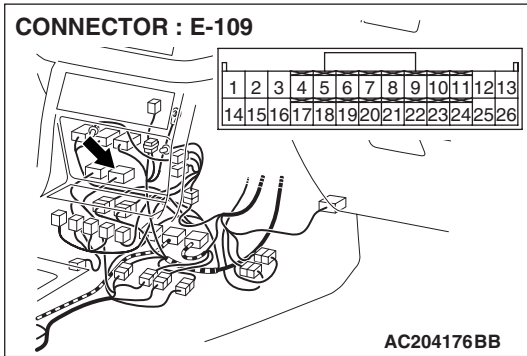


STEP 8. Check harness for open circuit or short circuit to ground between transfer-ECU connector E-109 terminal 20 (21, 22 and 23) and transfer shift lever switch connector E-116 terminal 3 (5, 6 and 2).

Q: Is the harness wire in good condition?

YES : Go to Step 10.

NO : Repair or replace the harness wire.

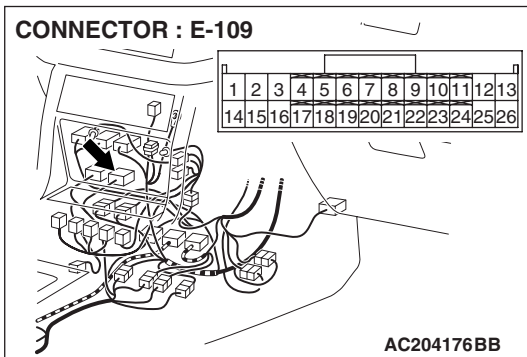


STEP 9. Check transfer-ECU connector E-109 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

YES : Go to Step 10.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).



STEP 10. Using scan tool MB991958, check data list item 06: Transfer Shift Lever Position.

⚠ CAUTION

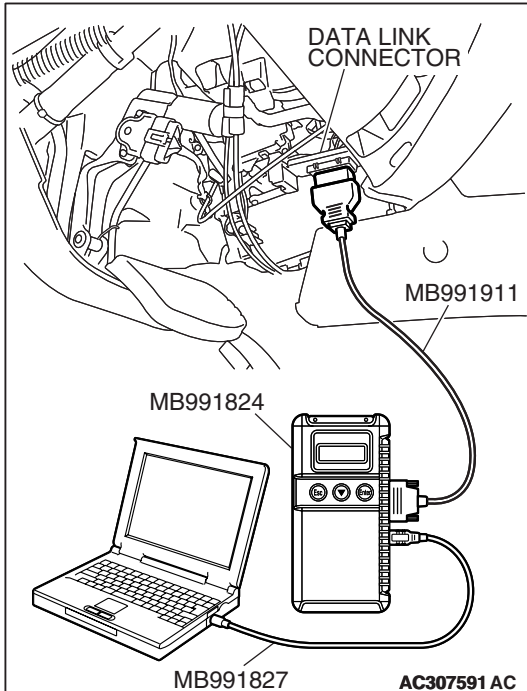
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode.
 - Item 06: Transfer Shift Lever Position.
 - Display should be the same as the actual transfer shift lever position.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is switch operating properly?

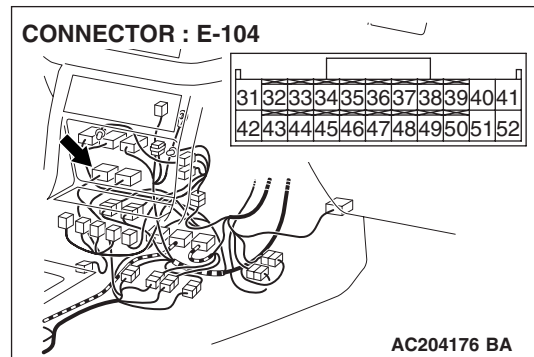
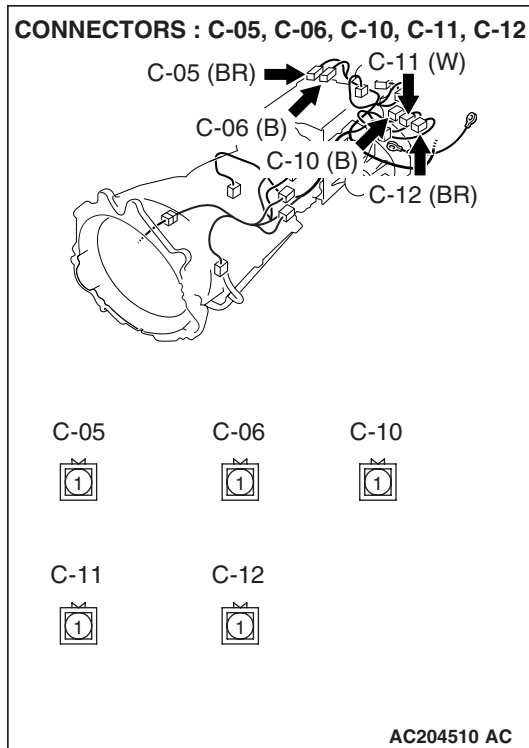
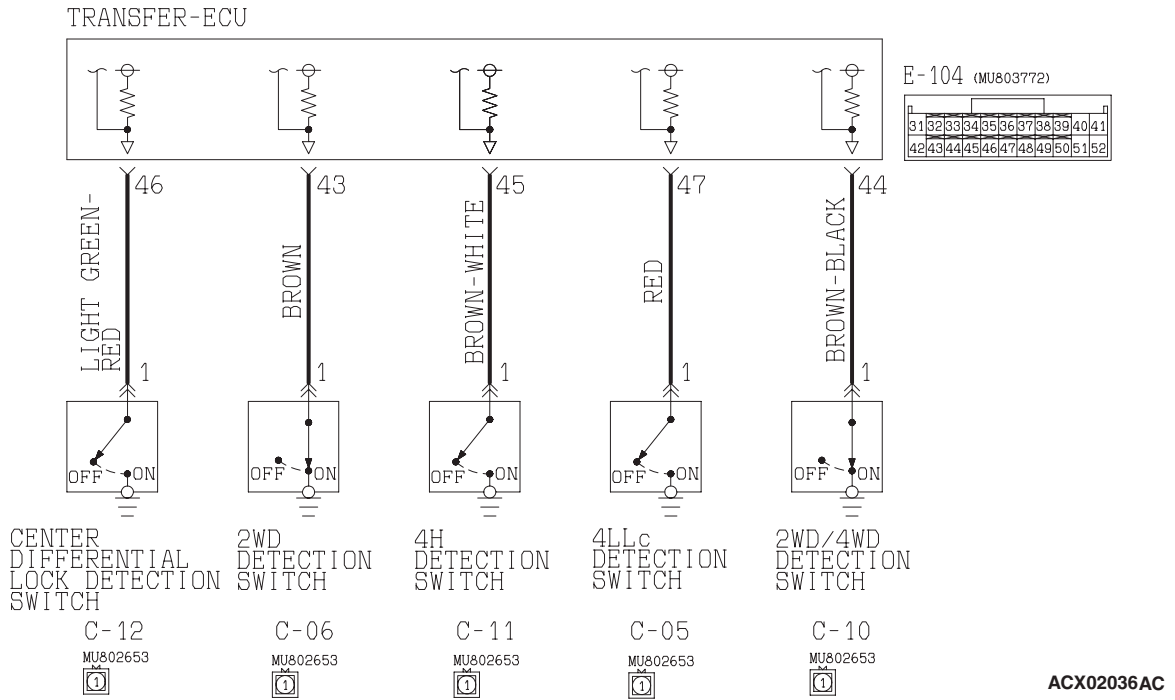
YES : If can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-13](#).

NO : Replace the transfer-ECU.



DTC 32, 33: Transfer Detection Switch System

Transfer Detection switch System Circuit



CIRCUIT OPERATION

- A battery positive voltage is applied to the each detection switch (terminal 1) from the transfer-ECU (terminal 43, 44, 45, 46 or 47).

- The each detection switch is grounded through the transfer case to the vehicle body.

DTC SET CONDITIONS

In the case that the transfer shifting has not been completed during driving, the DTC 32 is set as the open circuit or the short circuit of each transfer detection switch system, malfunction of the shift actuator or the malfunction of the transfer shift mechanism. In the case that the input signal from each transfer detection switch is unstable, the DTC 33 is set as the open circuit or the short circuit of each transfer detection switch system.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CODE TO BE SET ARE:)

- Malfunction of the each transfer detection switch
- Damaged harness, connector
- Malfunction of the transfer-ECU
- Malfunction of the shift actuator
- Malfunction of the transfer shift mechanism

DIAGNOSIS

Required Special Tool:

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991911: MUT-III Main Harness B

STEP 1. Using scan tool MB991958, check actuator test item 02 or 03: Shift Actuator <Only when DTC 32 is set>.

⚠ CAUTION

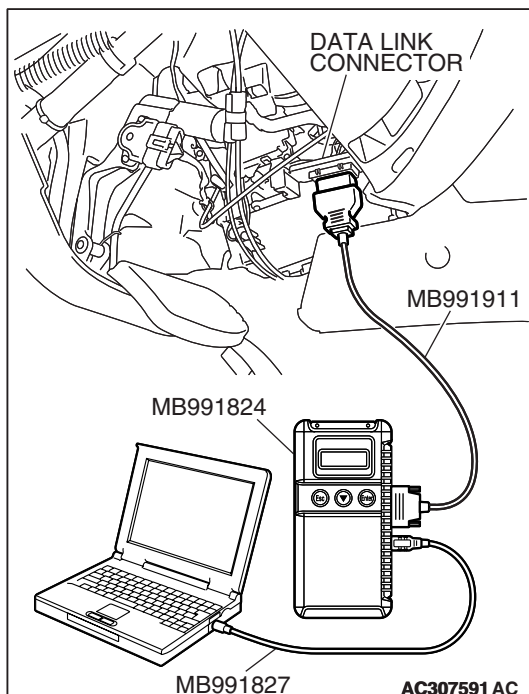
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

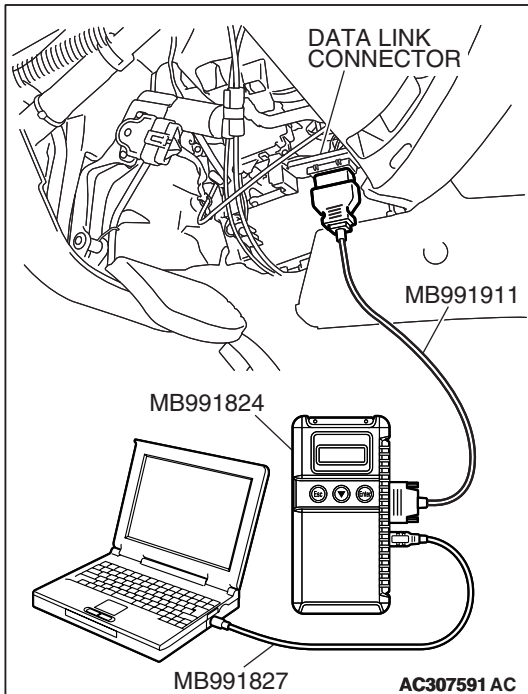
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.
- (4) Set scan tool MB991958 to actuator testing mode.
 - Item 02, 03: Shift Actuator.
 - The shift actuator operate.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the shift actuator operate?

YES : Go to Step 2.

NO : Replace the shift actuator. Refer to GROUP 23B, Transfer [P.23B-75](#).



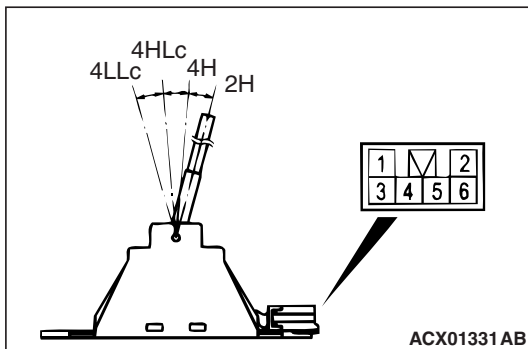


STEP 2. Using scan tool MB991958, check data list item 07: Transfer Mode Detected.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.
- (4) Set scan tool MB991958 to data reading mode.
 - Item 07: Transfer Mode Detected.
 - Display should be the same as the actual transfer shift lever position.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are all position operating properly?

- YES :** It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-13](#).
- NO :** Go to Step 3.



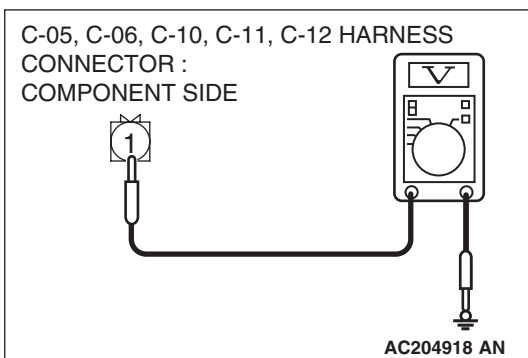
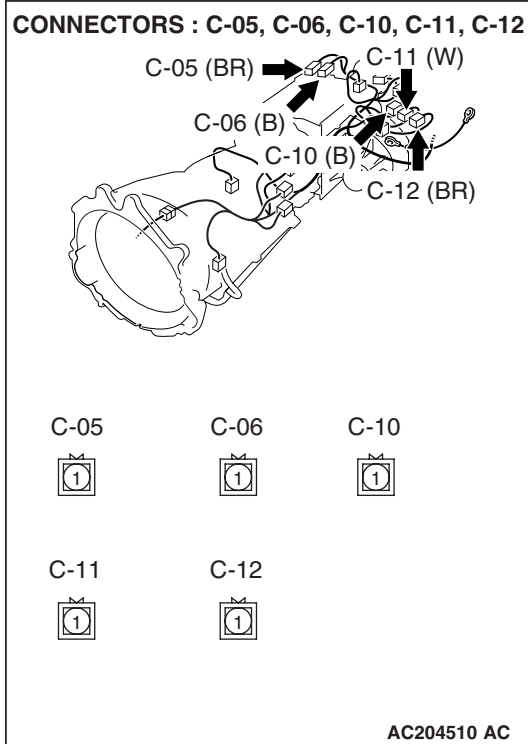
STEP 3. Check the transfer shift lever switch.

Check for resistance between terminals for each transfer shift lever position.

TRANSFER SHIFT LEVER POSITION	TERMINAL NUMBER	SPECIFIED CONDITION
2H	1 – 3	Less than 2 ohms.
4H	1 – 5	
4HLc	1 – 6	
4LLc	1 – 2	

Q: Is the switch operating properly?

- YES :** Go to Step 4.
- NO :** Replace the transfer shift lever switch. Refer to [P.23A-559](#), Transmission Control.



STEP 4. Measure the switch output voltage at each detection switch connectors C-05, C-06, C-10, C-11, C-12.

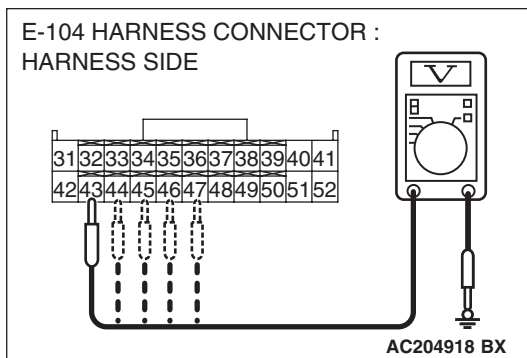
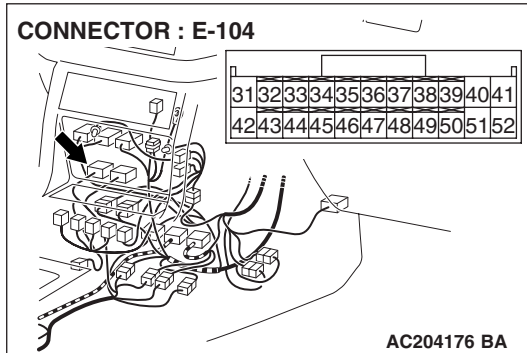
- (1) Disconnect connectors C-05, C-06, C-10, C-11, C-12 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.

- (3) Measure the voltage between terminal 1 and ground.
 - The voltage should measure between battery positive voltage.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

YES : Go to Step 10.

NO : Go to Step 5.



STEP 5. Measure the switch output voltage at transfer-ECU connector E-104 by backprobing.

- (1) Do not disconnect connector E-104.
- (2) Turn the ignition switch to the "ON" position.

- (3) Measure the voltage between terminals 43, 44, 45, 46, 47 and ground by backprobing.
 - The voltage should measure battery positive voltage.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

YES : Go to Step 8.

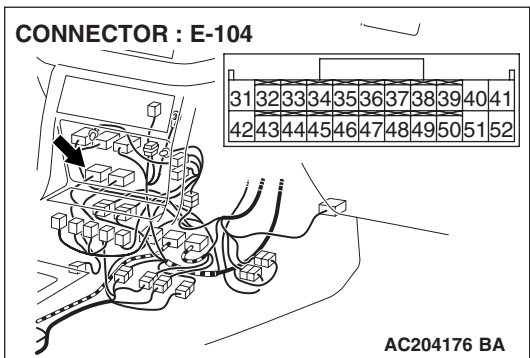
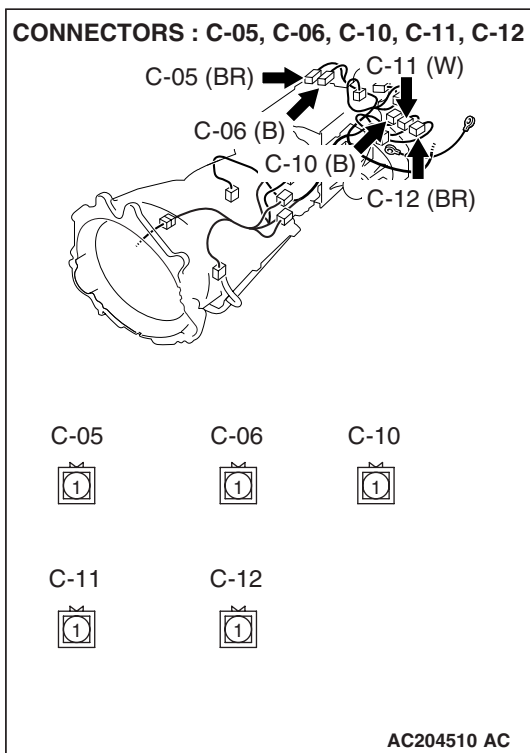
NO : Go to Step 6.

STEP 6. Check each detection switch connectors C-05, C-06, C-10, C-11, C-12 and transfer-ECU connector E-104 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 7.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

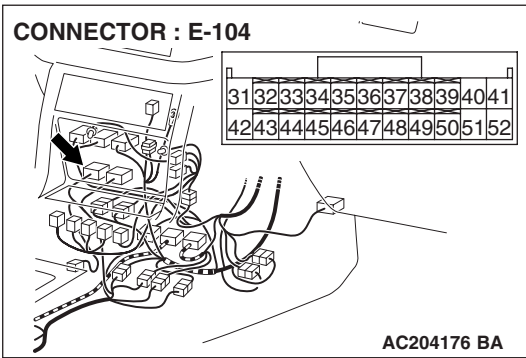
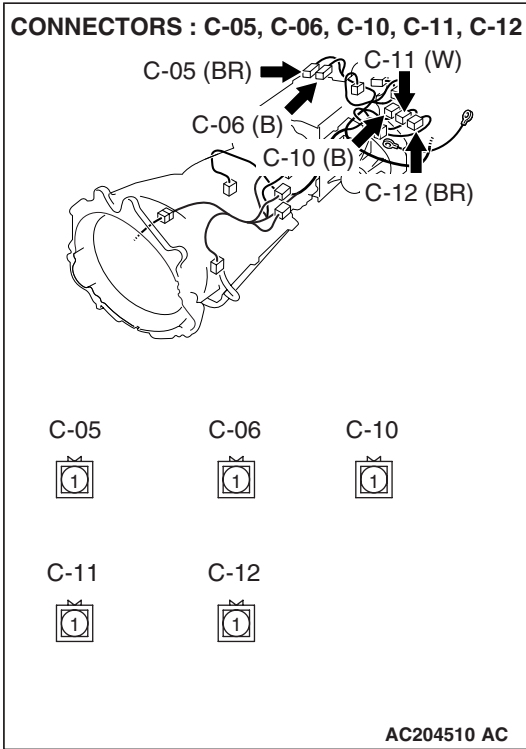


STEP 7. Check harnesses for short circuit to ground between each detection switch connectors C-05, C-06, C-10, C-11, C-12 terminal 1 and transfer-ECU connector E-104 terminals 43, 44, 45, 46, 47.

Q: Are the harnesses wire in good condition?

YES : Go to Step 11.

NO : Repair or replace the harness wire.

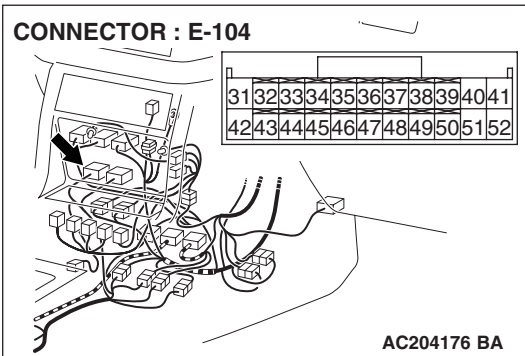
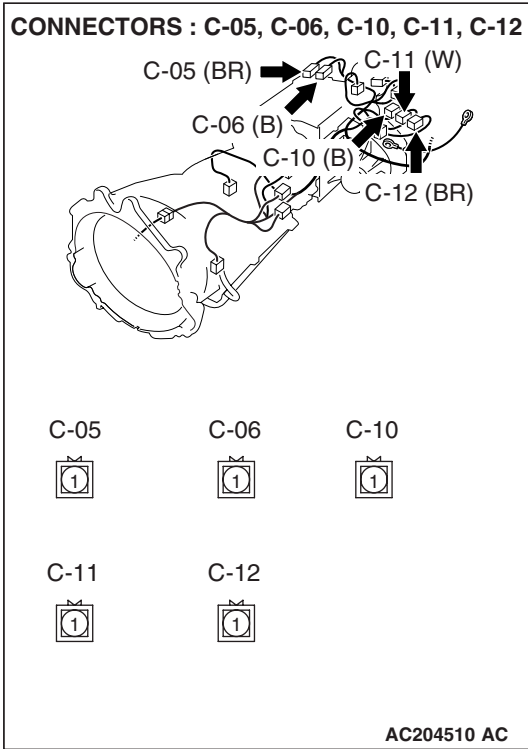


STEP 8. Check each detection switch connectors C-05, C-06, C-10, C-11, C-12 and transfer-ECU connector E-104 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 9.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).



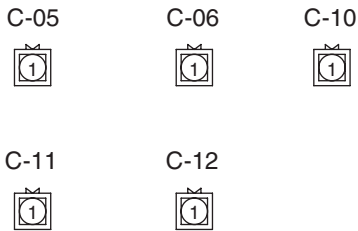
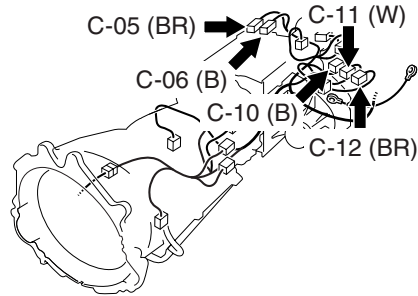
STEP 9. Check harnesses for open circuit between each detection switch connectors C-05, C-06, C-10, C-11, C-12 terminal 1 and transfer-ECU connector E-104 terminals 43, 44, 45, 46, 47.

Q: Are the harnesses wire in good condition?

YES : Go to Step 11.

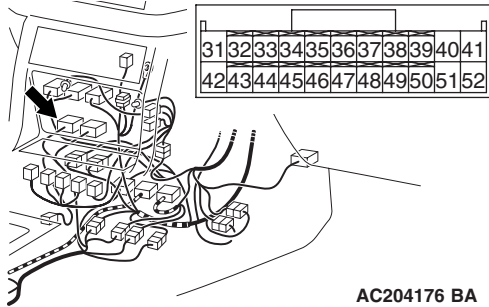
NO : Repair or replace the harness wire.

CONNECTORS : C-05, C-06, C-10, C-11, C-12

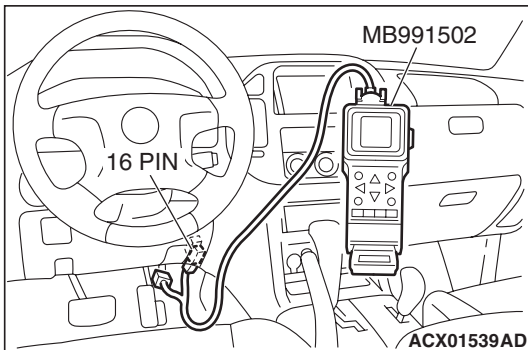


AC204510 AC

CONNECTOR : E-104



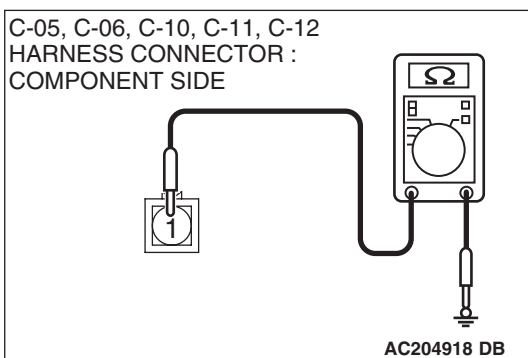
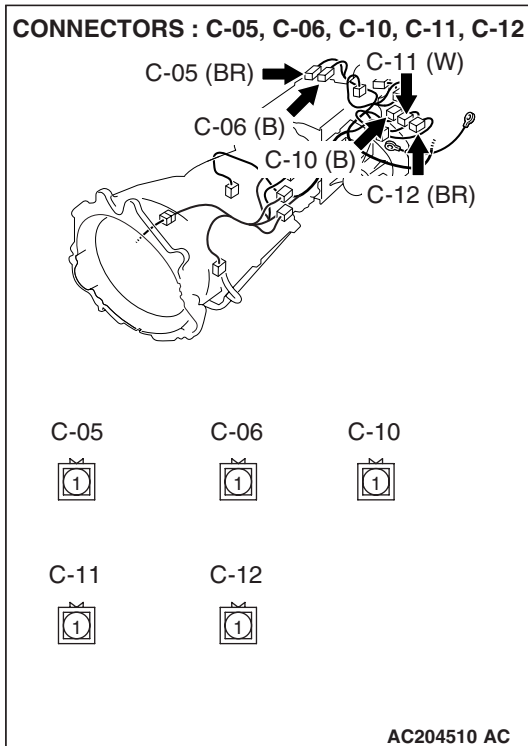
AC204176 BA



STEP 10. Measure the resistance at each detection switch connectors C-05, C-06, C-10, C-11, C-12.

- (1) Connect scan tool MB991502 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.
- (4) Set scan tool MB991502 to actuator testing mode.
 - Item 02, 03: Shift Actuator.

- (5) Disconnect connectors C-05, C-06, C-10, C-11, C-12 and measure at the switch side.



- (6) Measure the resistance between terminal 1 and ground.
 - When the transfer position is 2H, connector C-06 terminal 1 resistance should measure less than 2 ohms. When the transfer position is other than 2H, connector C-06 terminal 1 resistance should measure open circuit.
 - When the transfer position is 2H or 4H, connector C-10 terminal 1 resistance should measure less than 2 ohms. When the transfer position is other than 2H or 4H, connector C-10 terminal 1 resistance should measure open circuit.
 - When the transfer position is 4H or 4HLc, connector C-11 terminal 1 resistance should measure less than 2 ohms. When the transfer position is other than 4H or 4HLc, connector C-11 terminal 1 resistance should measure open circuit.

- When the transfer position is 4HLc or 4LLc, connector C-12 terminal 1 resistance should measure less than 2 ohms.
When the transfer position is other than 4HLc or 4LLc, connector C-12 terminal 1 resistance should measure open circuit.
- When the transfer position is 4LLc, connector C-05 terminal 1 resistance should measure less than 2 ohms.
When the transfer position is other than 4LLc, connector C-05 terminal 1 resistance should measure open circuit.

(7) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are the resistance normal?

YES : Go to Step 11.

NO : Replace the each detection switch. Refer to GROUP 23B, Transfer [P.23B-75](#).

STEP 11. Using scan tool MB991958, check data list item 07: Transfer Mode Detected.

⚠ CAUTION

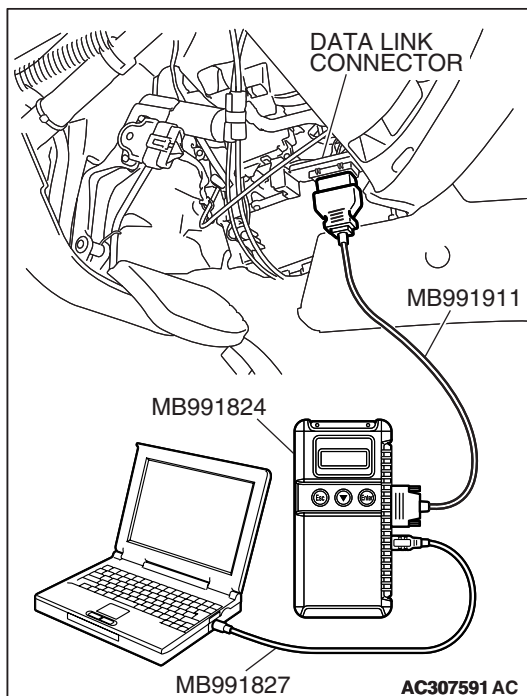
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.
- (4) Set scan tool MB991958 to data reading mode.
 - Item 07: Transfer Mode Detected.
 - Display should be the same as the actual transfer shift lever position.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are all position operating properly?

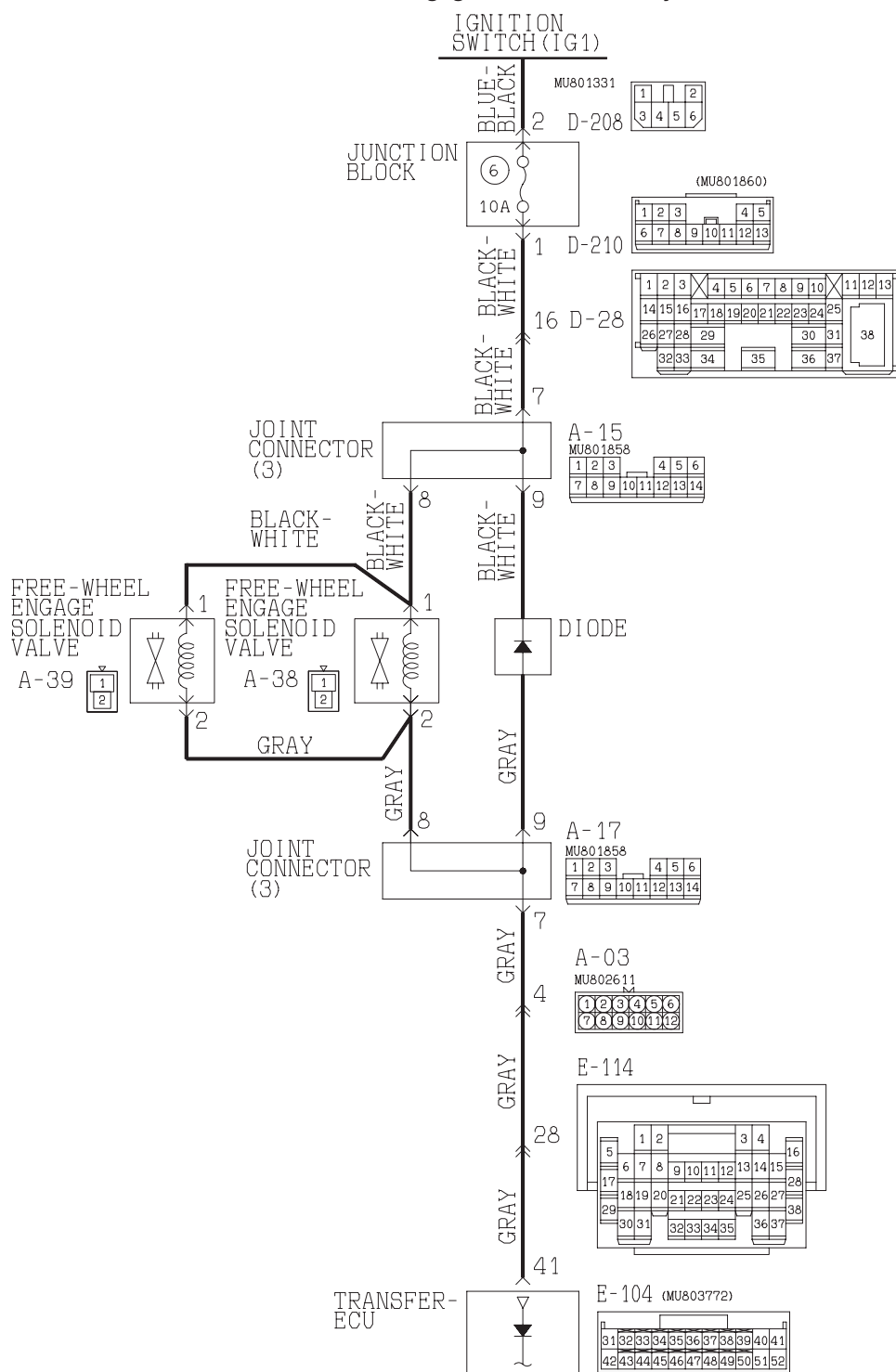
YES : If can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-13](#).

NO : Replace the transfer-ECU.



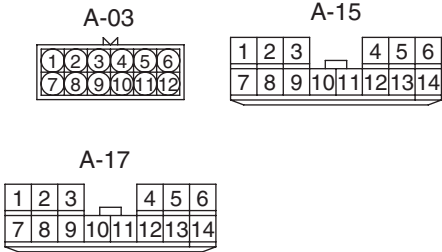
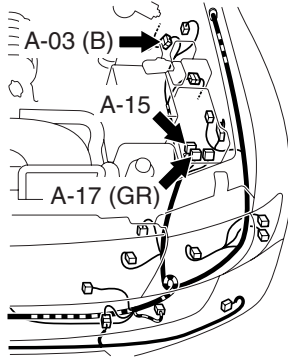
DTC 34: Free-wheel Engage Solenoid Valve System

Free-wheel Engage Solenoid Valve System Circuit



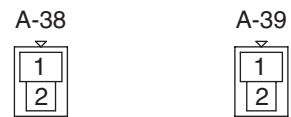
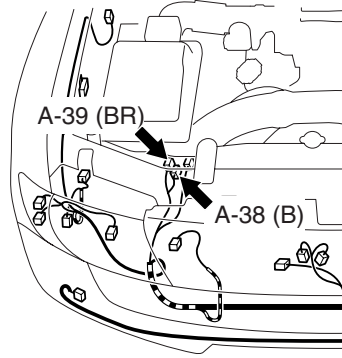
ACX02037AB

CONNECTORS : A-03, A-15, A-17



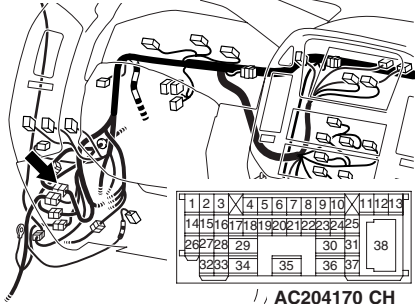
AC204185 AH

CONNECTORS : A-38, A-39



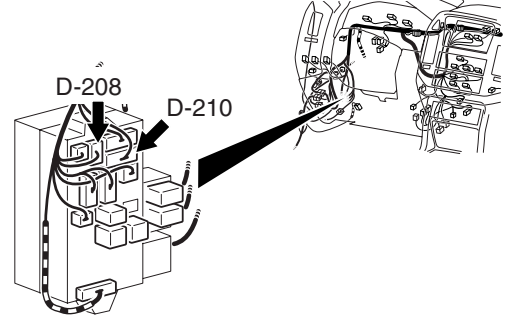
AC204184 AD

CONNECTOR : D-28

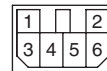


AC204170 CH

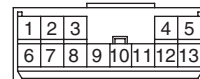
CONNECTORS : D-208, D-210



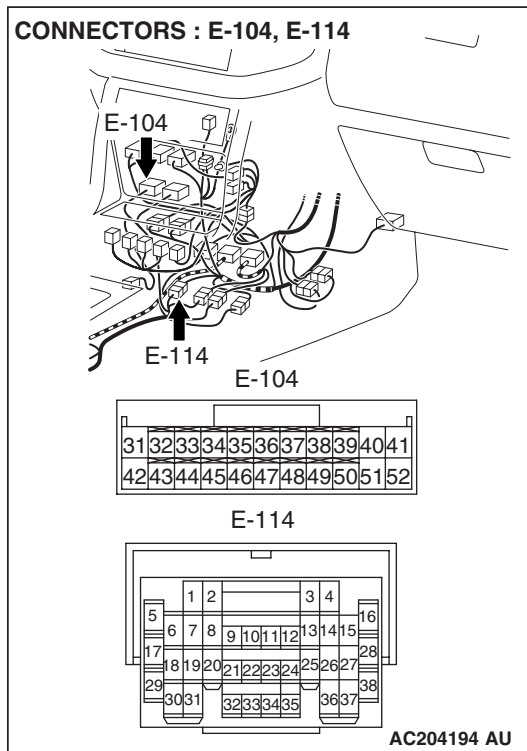
D-208



D-210



AC204191 AP



CIRCUIT OPERATION

The power voltage from the ignition switch is imposed to the free-wheel engage solenoid valves (terminal 1), when the driving condition is shifted to 2WD the terminal 41 of the transfer-ECU is grounded, which operates the free-wheel engage solenoid valves.

DTC SET CONDITIONS

In the case that the free-wheel engage solenoid valves operation and free-wheel engage solenoid valves operation command (transfer shift lever, front propeller shaft speed sensor and rear propeller shaft speed sensor) do not match, the DTC 34 is set as the open circuit or the short circuit of the free-wheel engage solenoid valve system.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CODE TO BE SET ARE:)

- Malfunction of free-wheel engage solenoid valve
- Damaged harness, connector
- Malfunction of the transfer-ECU

DIAGNOSIS**Required Special Tool:**

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991911: MUT-III Main Harness B

STEP 1. Using scan tool MB991958, check data list item 30: Free-wheel Engage Solenoid Valve.**⚠ CAUTION**

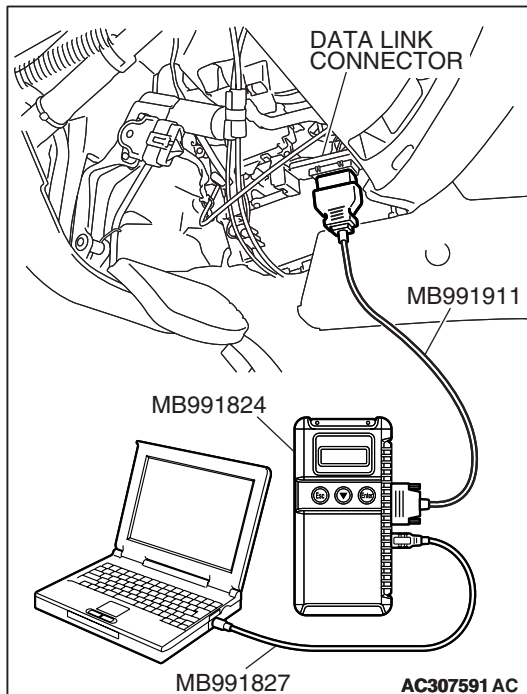
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.
- (4) Set scan tool MB991958 to the data reading mode.
 - Item 30: Free-wheel Engage Solenoid Valve.
 - When the transfer shift lever position is other than 2H, the display should be "ON."
 - When the transfer shift lever position is 2H, the display should be "OFF."
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the solenoid valve operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-13](#).

NO : Go to Step 2.

**STEP 2. Check the free-wheel engage solenoid valve.**

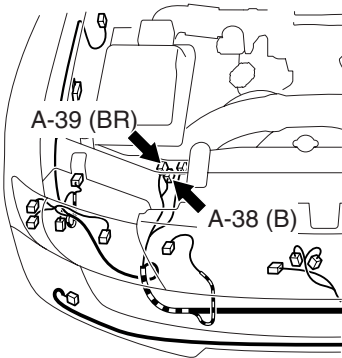
Refer to GROUP 26, On-vehicle Service – Solenoid Valve Operation Check [P.26-17](#).

Q: Is the solenoid valve operating properly?

YES : Go to Step 3.

NO : Replace the free-wheel engage solenoid valve. Refer to GROUP 26, Solenoid Valve and Vacuum Hose [P.26-60](#).

CONNECTORS : A-38, A-39



A-38

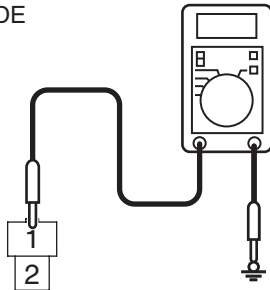


A-39



AC204184 AD

A-38, A-39 HARNESS CONNECTOR :
COMPONENT SIDE



AC204918

STEP 3. Measure the power supply voltage at free-wheel engage solenoid valve connectors A-38 and A-39.

- (1) Disconnect connectors A-38 and A-39.
- (2) Turn the ignition switch to the "ON" position.

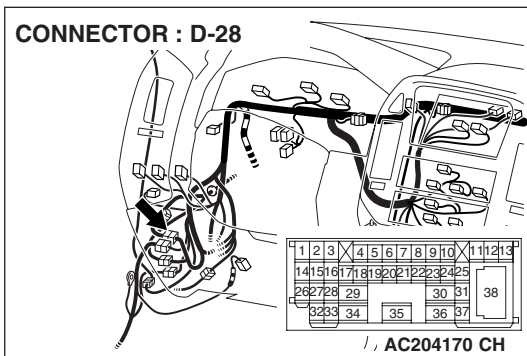
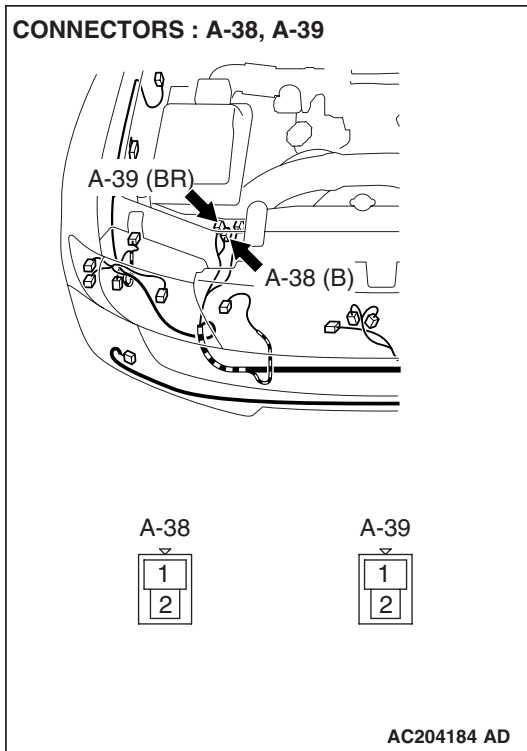
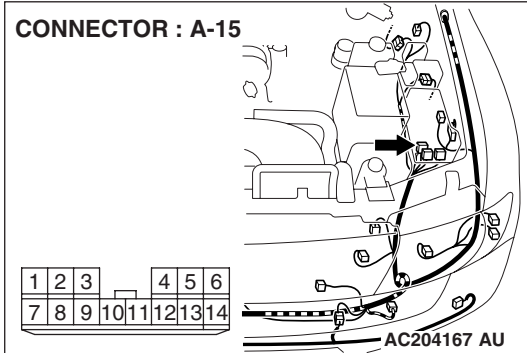
- (3) Measure the voltage between terminal 1 and ground.
 - The voltage should measure battery positive voltage.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

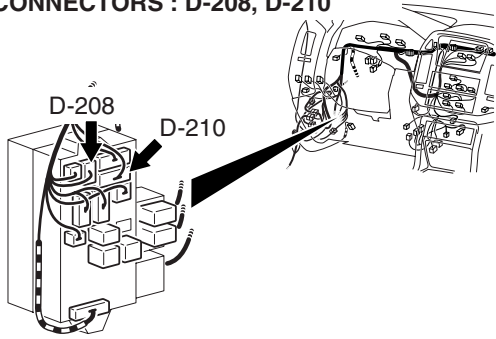
YES : Go to Step 6.

NO : Go to Step 4.

STEP 4. Check joint connector A-15, free-wheel engage solenoid valve connectors A-38, A-39, intermediate connector D-28, junction block connector D-210 and D-208 for loose, corroded or damaged terminals, or terminals pushed back in the connector.



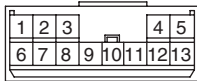
CONNECTORS : D-208, D-210



D-208



D-210



AC204191 AP

Q: Are the connectors and terminals in good condition?

YES : Go to Step 5.

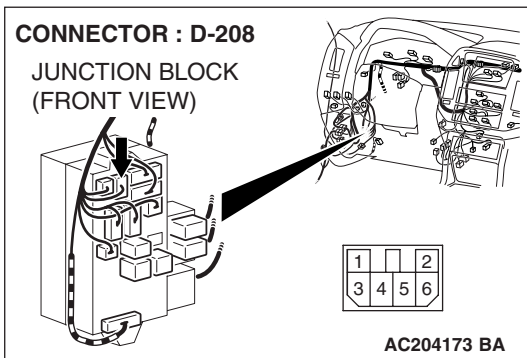
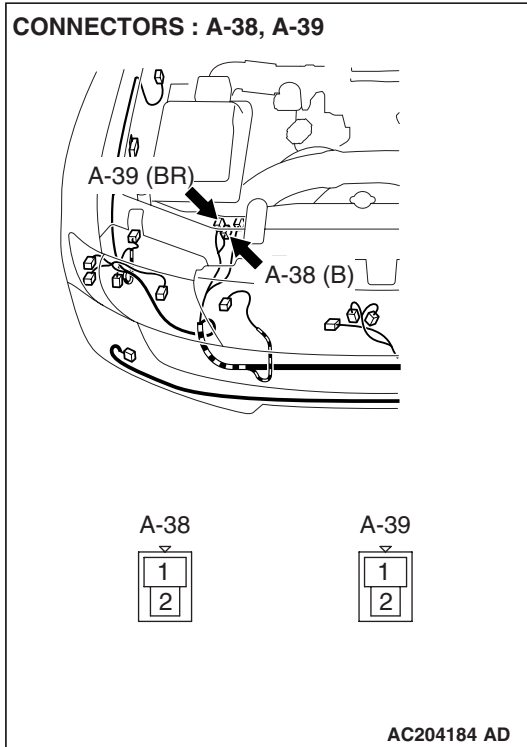
NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

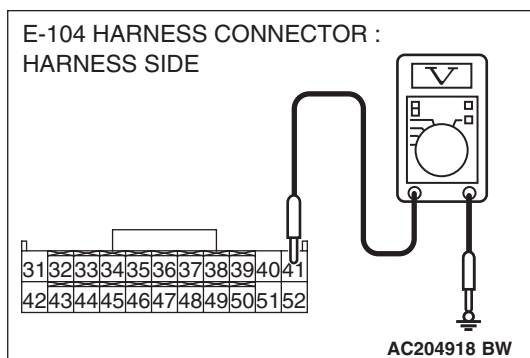
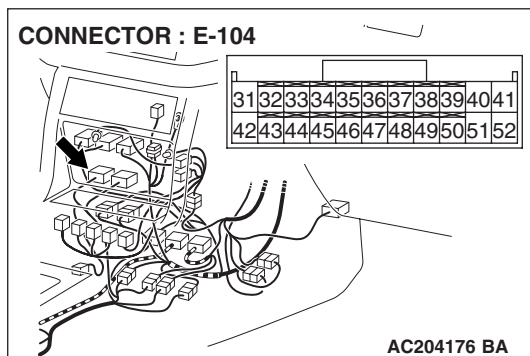
STEP 5. Check harness for open circuit or short circuit to ground between free-wheel engage solenoid valve connectors A-38, A-39 terminal 1 and junction block connector D-208 terminal 2.

Q: Is the harness wire in good condition?

YES : Go to Step 10.

NO : Repair or replace the harness wire.





STEP 6. Measure the solenoid valve output voltage at the transfer-ECU connector E-104 by backprobing.

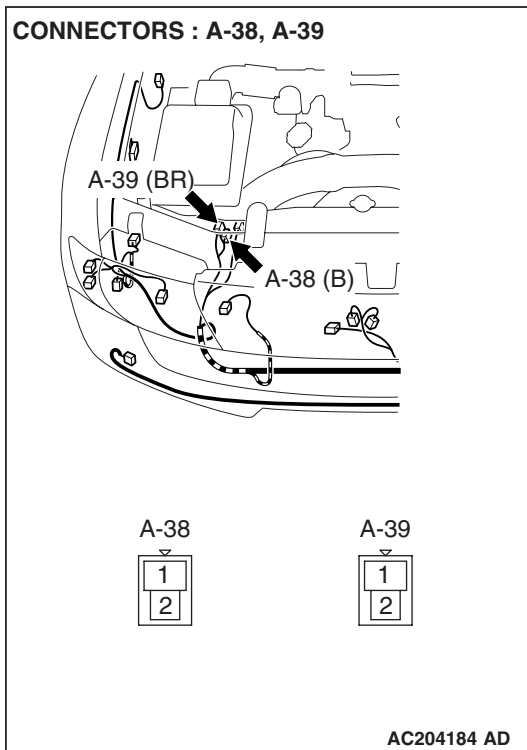
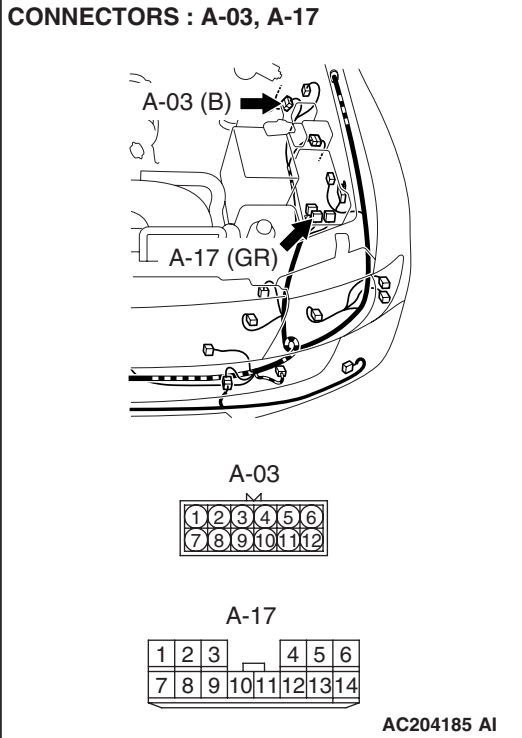
- (1) Do not disconnect connector E-104.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.

- (4) Measure the voltage between terminal 41 and ground by backprobing.
 - When the transfer shift lever position is other than 2H, voltage should measure battery positive voltage.
 - When the transfer shift lever position is 2H, voltage should measure less than 1.0 volt.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

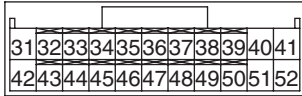
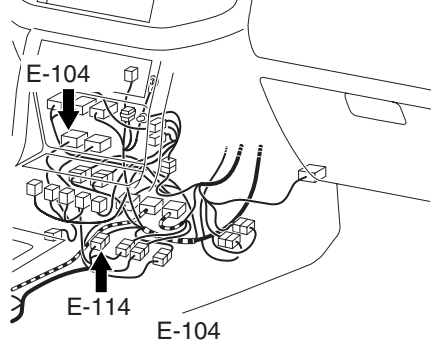
Q: Is the measured voltage normal?

- YES :** Go to Step 9.
NO : Go to Step 7.

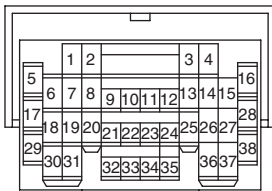
STEP 7. Check joint connector A-17, free-wheel engage solenoid valve connectors A-38, A-39, intermediate connectors A-03, E-114 and transfer-ECU connector E-104 for loose, corroded or damaged terminals, or terminals pushed back in the connector.



CONNECTORS : E-104, E-114



E-114



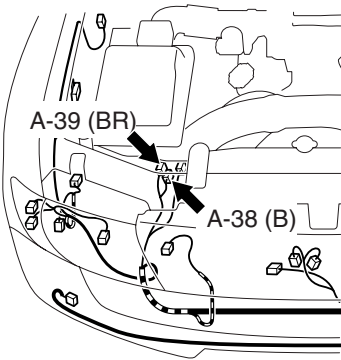
AC204194 AU

Q: Are the connectors and terminals in good condition?

YES : Go to Step 8.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

CONNECTORS : A-38, A-39



A-38



A-39



AC204184 AD

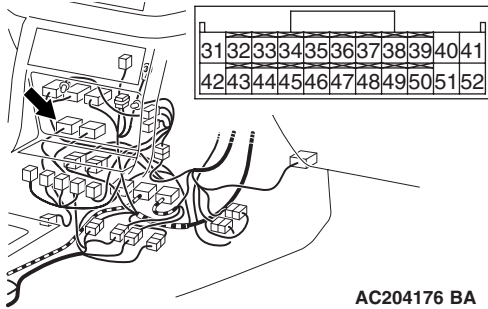
STEP 8. Check harness for damage between free-wheel engage solenoid valve connectors A-38, A-39 terminal 2 and transfer-ECU connector E-104 terminal 41.

Q: Is the harness wire in good condition?

YES : Go to Step 10.

NO : Repair or replace the harness wire.

CONNECTOR : E-104



AC204176 BA

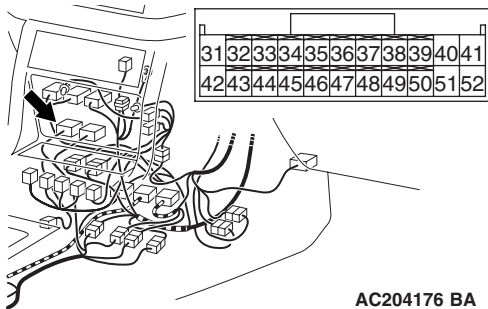
STEP 9. Check transfer-ECU connector E-104 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

YES : Go to Step 10.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

CONNECTOR : E-104



AC204176 BA

STEP 10. Using scan tool MB991958, check data list item 30: Free-wheel Engage Solenoid Valve.

⚠ CAUTION

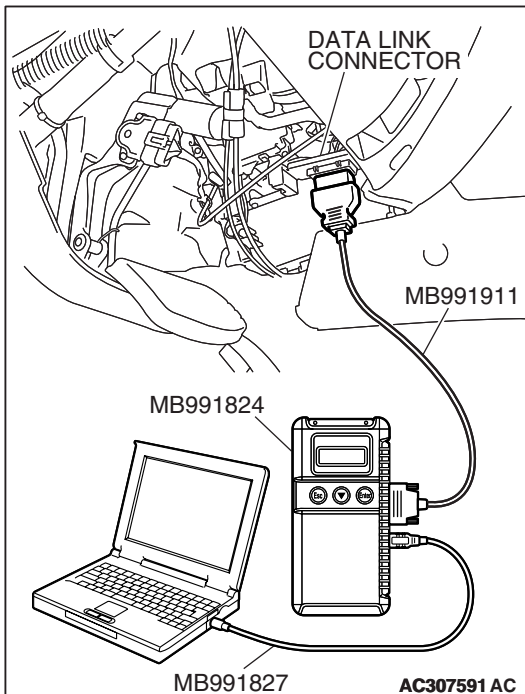
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.
- (4) Set scan tool MB991958 to the data reading mode.
 - Item 30: Free-wheel Engage Solenoid Valve.
 - When the transfer shift lever position is other than 2H, the display should be "ON."
 - When the transfer shift lever position is 2H, the display should be "OFF."
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the solenoid valve operating properly?

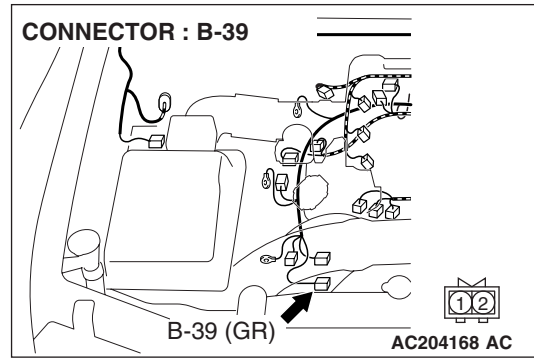
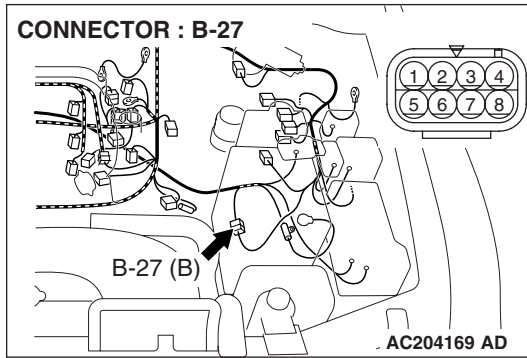
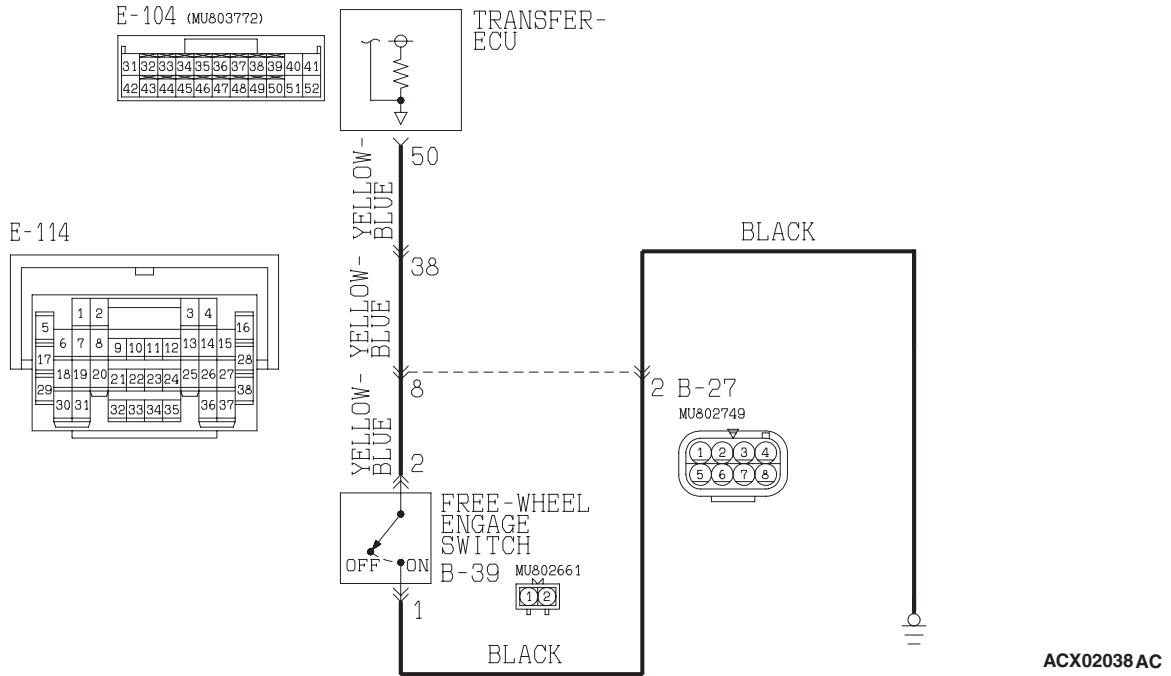
YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-13](#).

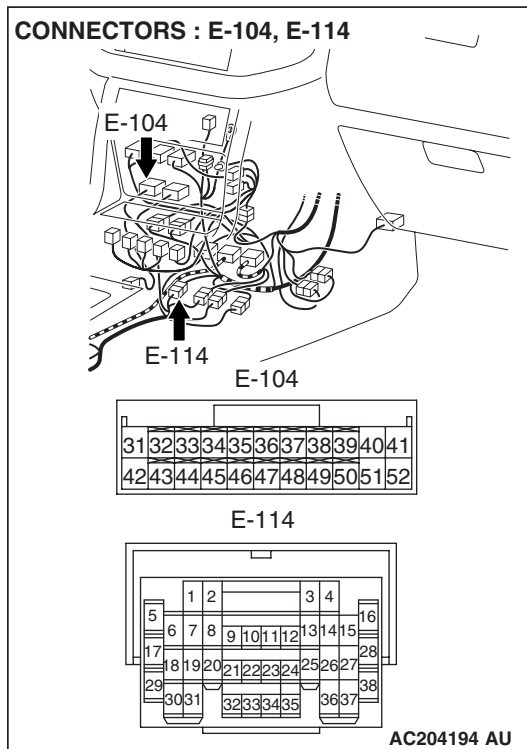
NO : Replace the transfer-ECU.



DTC 35: Free-wheel Engage Switch System

Free-wheel Engage Switch System Circuit





CIRCUIT OPERATION

The free-wheel engage switch is turned ON when the freewheel engage solenoid valve is activated and the condition is shifted to the 4WD condition. The power supply voltage is imposed to the free-wheel engage switch from the transfer-ECU, and when the free-wheel engage switch is turned ON, the power supply voltage from the transfer-ECU is grounded.

DTC SET CONDITIONS

When the energizing condition to the free-wheel engage solenoid valve and the condition of free-wheel engage switch do not agree, DTC 35 is set as the open circuit or the short circuit on the free-wheel engage switch system.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CODE TO BE SET ARE:)

- Malfunction of the free-wheel engage switch
- Damaged harness, connector
- Malfunction of the transfer-ECU

DIAGNOSIS

Required Special Tool:

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991911: MUT-III Main Harness B

STEP 1. Using scan tool MB991958, read the transfer diagnostic trouble code.

⚠ CAUTION

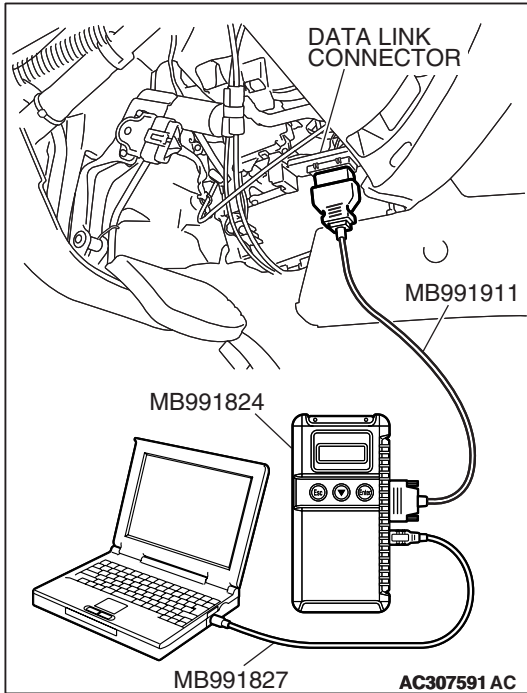
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Check for transfer diagnostic trouble code.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is DTC 34 set?

YES : Refer to [P.23A-473](#), DTC 34: Free-wheel Engage Solenoid Valve System.

NO : Go to Step 2.



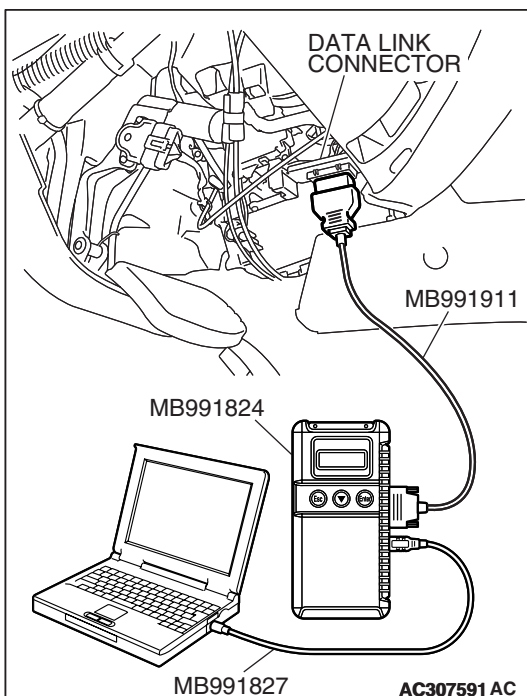
STEP 2. Using scan tool MB991958, check data list item 38: Free-wheel Engage Switch.

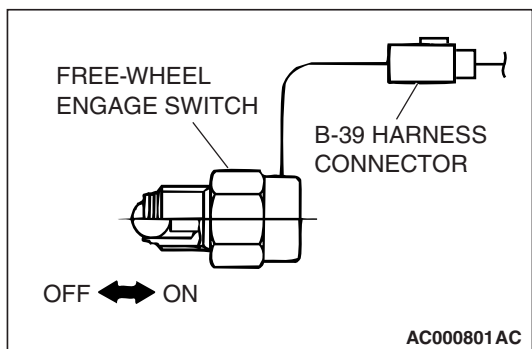
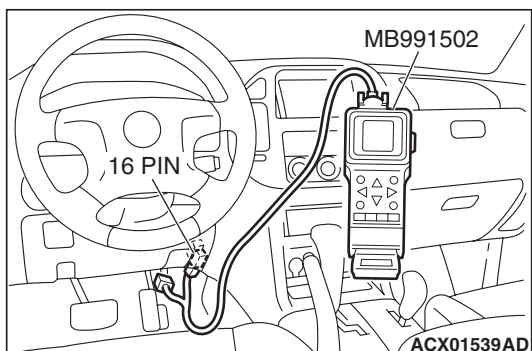
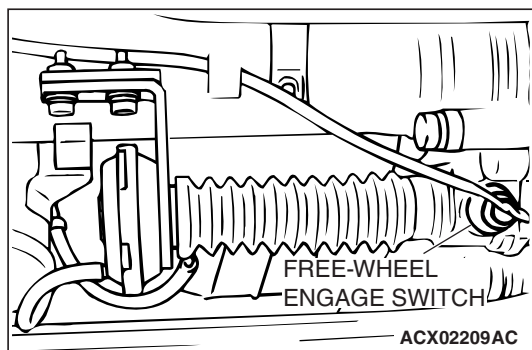
- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.
- (4) Set scan tool MB991958 to data reading mode.
 - Item 38: Free-wheel Engage Switch.
 - When the transfer shift lever position is other than 2H, the display should be "ON."
 - When the transfer shift lever position is 2H, the display should be "OFF."
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the switch operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-13](#).

NO : Go to Step 3.





STEP 3. Using scan tool MB991958, check the free-wheel engage switch circuit.

- (1) Remove the free-wheel engage switch.
- (2) Do not disconnect connector B-39.

- (3) Connect scan tool MB991958 to the data link connector.
- (4) Turn the ignition switch to the "ON" position.

- (5) Set scan tool MB991958 to data reading mode.

- Item 38: Free-wheel Engage Switch.
 - When the free-wheel engage switch is released (OFF), the display should be "OFF."
 - When the free-wheel engage switch is pressed (ON), the display should be "ON."

- (6) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the switch operating properly?

YES : Go to Step 4.

NO : Go to Step 5.

STEP 4. Check the free-wheel engage solenoid valve.

Refer to GROUP 26, On-vehicle Service – Solenoid Valve Operation Check [P.26-17](#).

Q: Is the solenoid valve normal?

YES : Repair or replace the actuator assembly and free-wheel engage clutch. Refer to GROUP 26, Differential Carrier and Free-wheel Clutch [P.26-39](#).

NO : Repair or replace the free-wheel engage solenoid valve and vacuum hoses. Refer to GROUP 26, Solenoid Valve and Vacuum Hose [P.26-60](#).

STEP 5. Check the free-wheel engage switch.

Refer to GROUP 26, Differential Carrier and Free-wheel Clutch P.26-38.

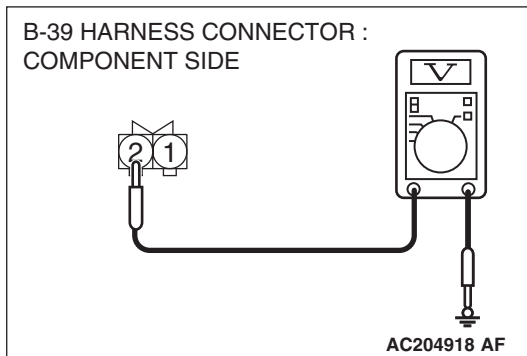
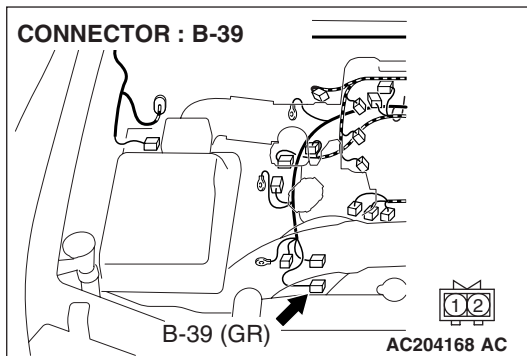
Q: Is the switch operating properly?

YES : Go to Step 6.

NO : Replace the free-wheel engage switch. Refer to GROUP 26, Differential Carrier and Free-wheel Clutch P.26-36.

STEP 6. Measure the power supply voltage at freewheel engage switch B-39.

- (1) Disconnect connector B-39 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.

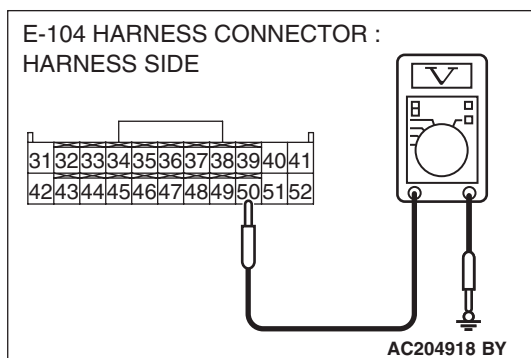
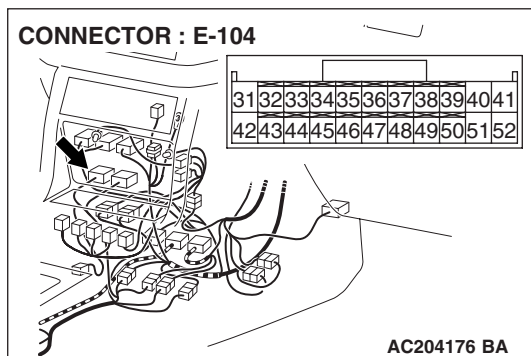


- (3) Measure the voltage between terminal 2 and ground.
 - The voltage should measure 10.5 volts.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage 10.5 volts?

YES : Go to Step 12.

NO : Go to Step 7.



STEP 7. Measure the switch output voltage at transfer-ECU connector E-104 by backprobing.

- (1) Do not disconnect connector E-104.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.

- (4) Measure the voltage between terminal 50 and ground by backprobing.
 - When the transfer shift lever position is 2H, voltage should measure 10.5 volts.
 - When the transfer shift lever position is other than 2H, voltage should measure 0 volt.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage within the specified range?

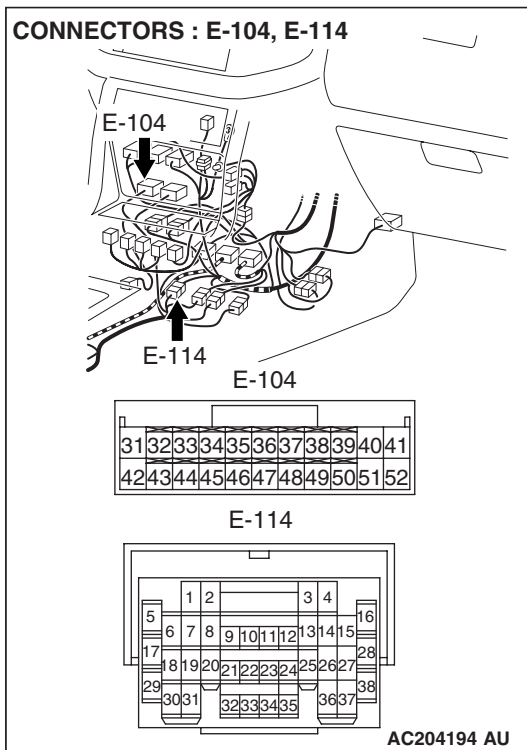
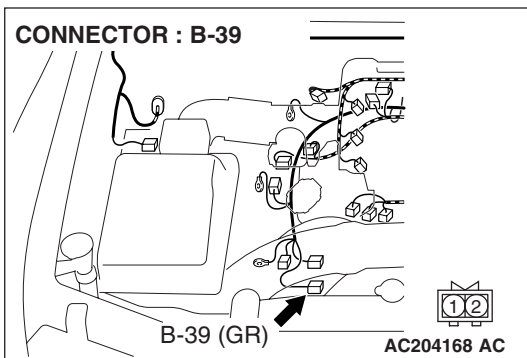
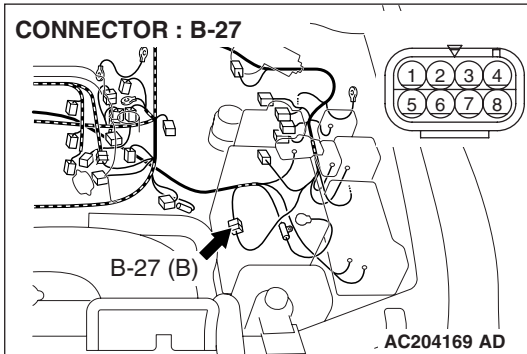
- YES :** Go to Step 10.
NO : Go to Step 8.

STEP 8. Check intermediate connectors B-27, E-114, free-wheel engage switch connector B-39 and transfer-ECU connector E-104 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 9.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

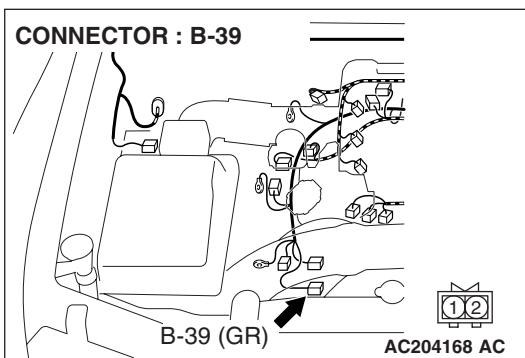
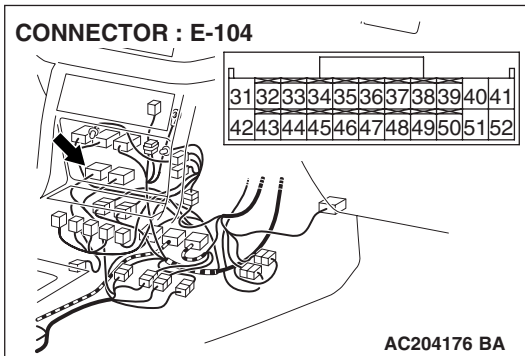


STEP 9. Check harness for short circuit to ground between transfer-ECU connector E-104 terminal 50 and free-wheel engage switch connector B-39 terminal 2.

Q: Is the harness wire in good condition?

YES : Go to Step 15.

NO : Repair or replace the harness wire.

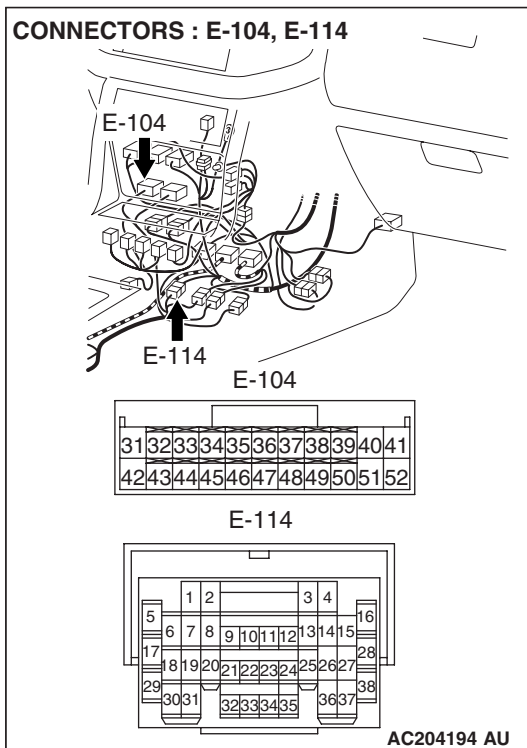
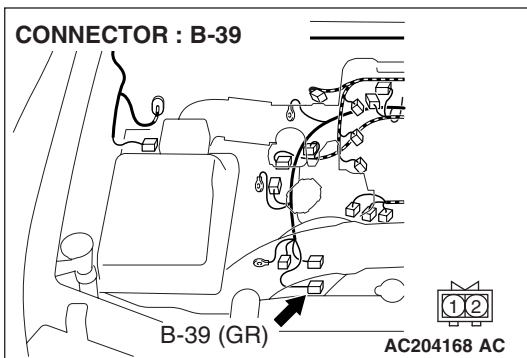
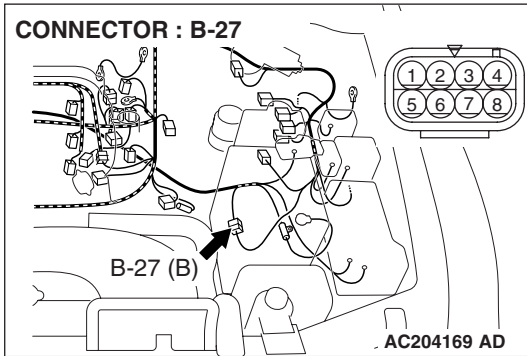


STEP 10. Check intermediate connectors B-27, E-114, free-wheel engage switch connector B-39 and transfer-ECU connector E-104 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 11.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

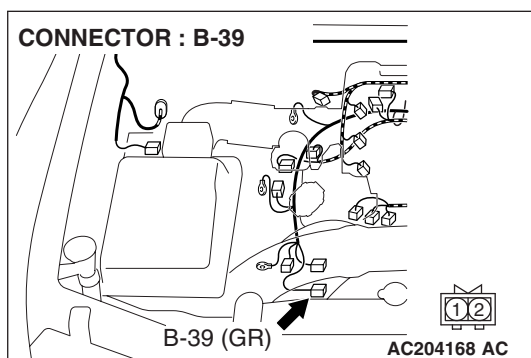
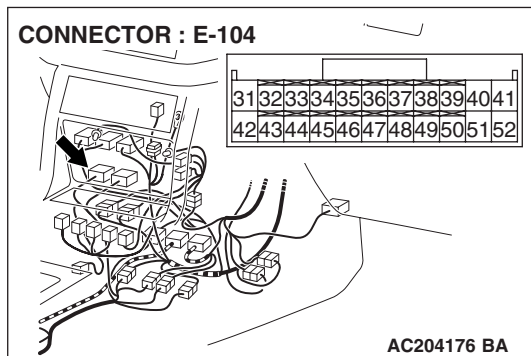


STEP 11. Check harness for open circuit between transfer-ECU connector E-104 terminal 50 and free-wheel engage switch connector B-39 terminal 2.

Q: Is the harness wire in good condition?

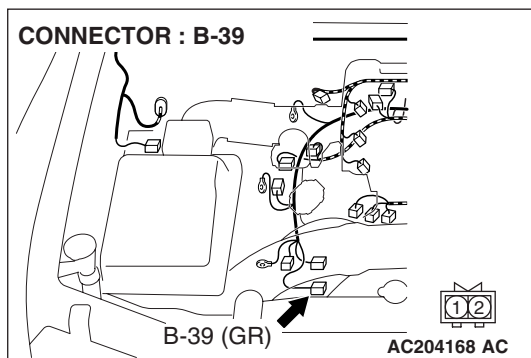
YES : Go to Step 15.

NO : Repair or replace the harness wire.



STEP 12. Measure the resistance at free-wheel engage switch.

(1) Disconnect connector B-39 and measure at the harness side.

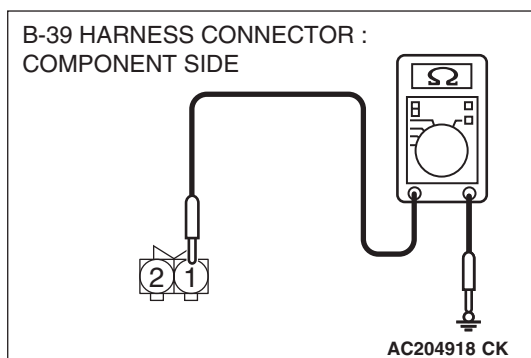


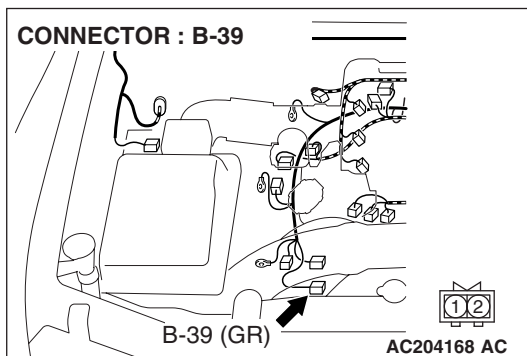
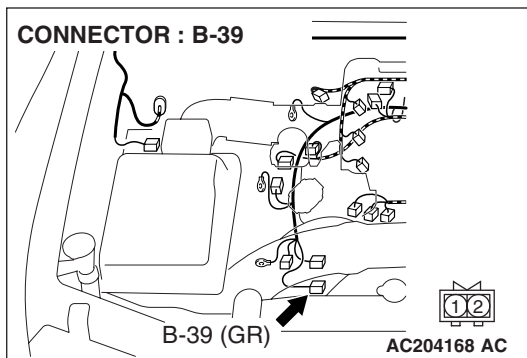
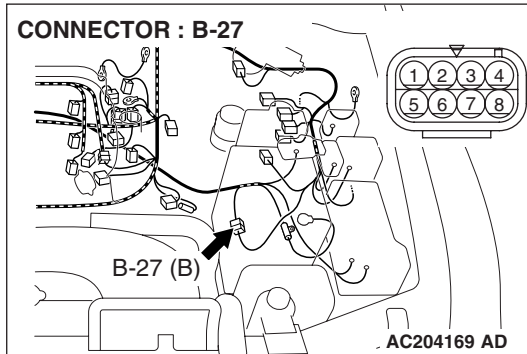
(2) Measure the resistance between terminal 1 and ground.
 • The resistance should measure less than 2 ohms.

Q: Is the measured resistance less than 2 ohms?

YES : Go to Step 15.

NO : Go to Step 13.





STEP 13. Check intermediate connector B-27 and free-wheel engage switch connector B-39 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 14.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

STEP 14. Check harness for open circuit between free-wheel engage switch connector B-39 terminal 1 and ground.

Q: Is the harness wire in good condition?

YES : Go to Step 15.

NO : Repair or replace the harness wire.

STEP 15. Using scan tool MB991958, check data list item 38: Free-wheel Engage Switch.

⚠ CAUTION

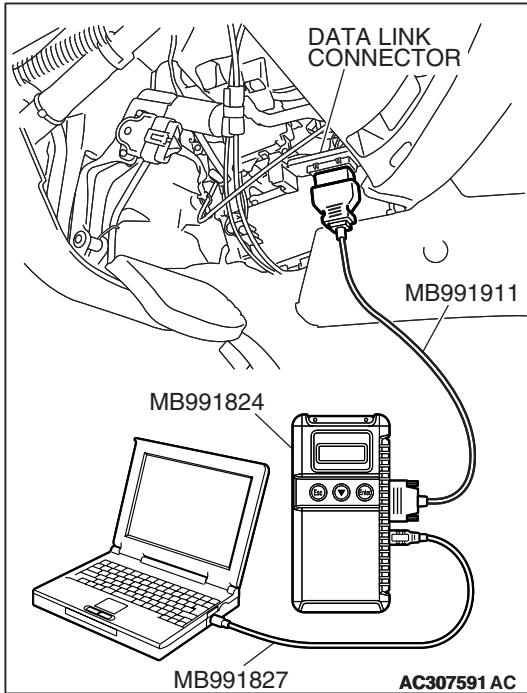
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.
- (4) Set scan tool MB991958 to data reading mode.
 - Item 38: Free-wheel Engage Switch.
 - When the transfer shift lever position is other than 2H, the display should be "ON."
 - When the transfer shift lever position is 2H, the display should be "OFF."
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the switch operating properly?

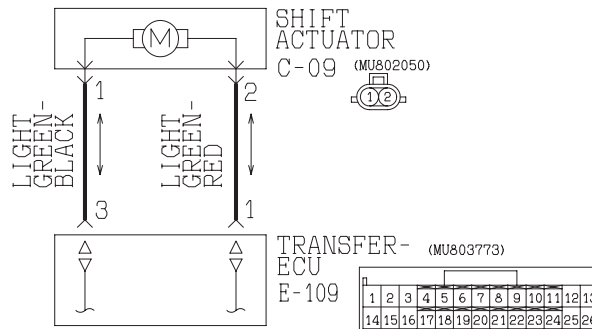
YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-13](#).

NO : Replace the transfer-ECU.

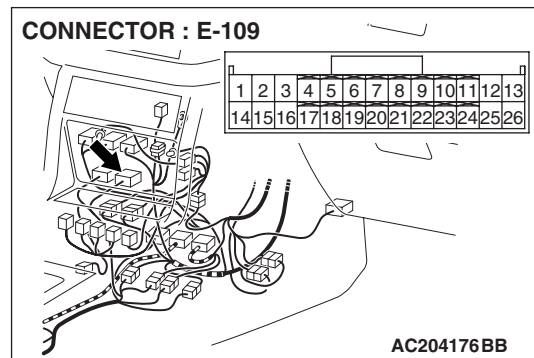
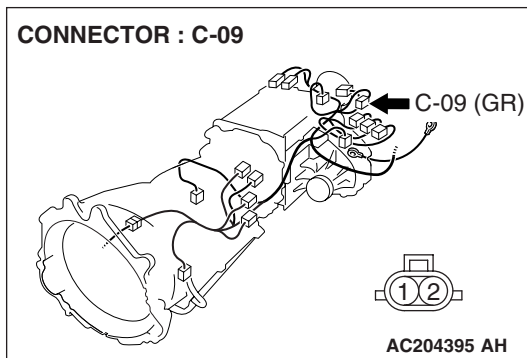


DTC 41: Shift Actuator System (Short/Open Circuit)

Shift Actuator System Circuit



W2Q01M07AA
AC100559AB



CIRCUIT OPERATION

When voltage is applied to the shift actuator terminal 2 from the transfer-ECU, the motor turns to the normal direction and the drive mode is shifted in the order of 2H → 4H → 4HLc → 4LLc. When voltage is applied to the shift actuator terminal 1, the motor turns to the reverse direction and the drive mode is shifted in the order of 4LLc → 4HLc → 4H → 2H.

DTC SET CONDITIONS

In the case that the transfer-ECU terminal voltage is more than the main relay voltage (90% of specified voltage) or lower than the main relay voltage (10% of specified voltage) when the shift is not operated, DTC 41 is set as the open circuit or the short circuit of the shift actuator system.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CODE TO BE SET ARE:)

- Malfunction of the shift actuator
- Damaged harness, connector
- Malfunction of the transfer-ECU

DIAGNOSIS

Required Special Tool:

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991911: MUT-III Main Harness B

STEP 1. Using scan tool MB991958, check data list item 12: Shift Actuator Voltage.

⚠ CAUTION

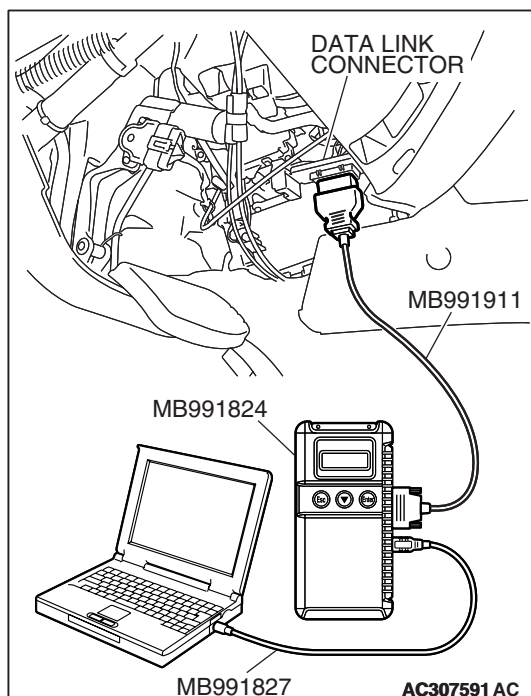
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.
- (4) Set scan tool MB991958 to data reading mode.
 - Item 12: Shift Actuator Voltage.
 - When the operating transfer shift lever 2H → 4H, 4H → 4HLc or 4HLc → 4LLc, the display should be 1/2 battery voltage → battery positive voltage → 1.0 volt or less → 1/2 battery voltage.
 - When the operating transfer shift lever 4LLc → 4HLc, 4HLc → 4H or 4H → 2H, the display should be 1/2 battery voltage → 1.0 volt or less → 1/2 battery voltage.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

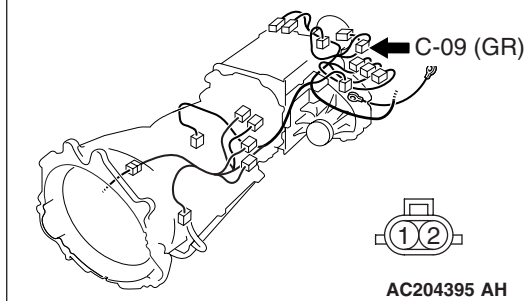
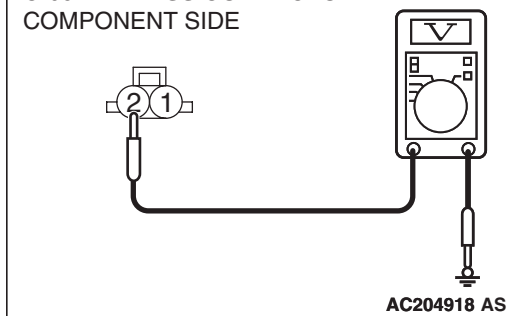
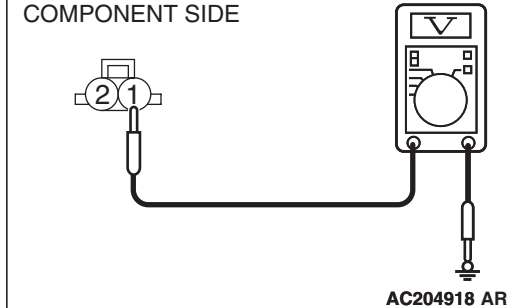
Q: Is the actuator operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-13](#).

NO : Go to Step 2.



CONNECTOR : C-09

C-09 HARNESS CONNECTOR :
COMPONENT SIDEC-09 HARNESS CONNECTOR :
COMPONENT SIDE**STEP 2. Measure the power supply voltage at shift actuator connector C-09.**

- (1) Disconnect connector C-09 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.

- (4) Measure the voltage between terminal 2 and ground.
 - When the operating transfer shift lever 2H → 4H, 4H → 4HLc or 4HLc → 4LLc, the voltage should measure battery positive voltage.

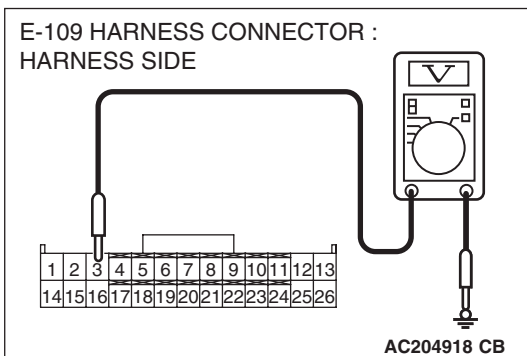
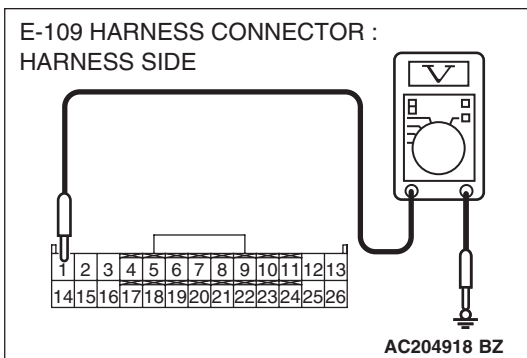
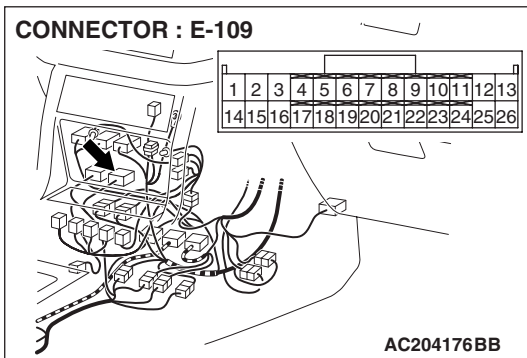
- (5) Measure the voltage between terminal 1 and ground.
 - When the operating transfer shift lever 4LLc → 4HLc, 4HLc → 4H or 4H → 2H, the voltage should measure battery positive voltage.

- (6) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage battery positive voltage?

YES : Replace the shift actuator. Refer to GROUP 23B, Transfer [P.23B-75](#).

NO : Go to Step 3.



STEP 3. Measure the actuator output voltage at transfer-ECU connector E-109 by backprobing.

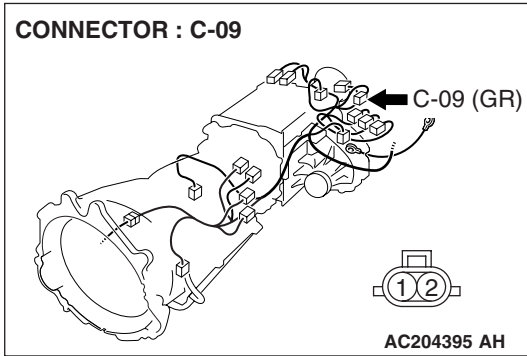
- (1) Do not disconnect connector E-109.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.

- (4) Measure the voltage between terminal 1 and ground by backprobing.
 - When the operating transfer shift lever 2H → 4H, 4H → 4HLc or 4HLc → 4LLc, the voltage should measure 1/2 battery voltage → battery positive voltage → 1.0 volt or less → 1/2 battery voltage.
 - When the operating transfer shift lever 4LLc → 4HLc, 4HLc → 4H or 4H → 2H, the voltage should measure 1/2 battery voltage → 1.0 volt or less → 1/2 battery voltage.
- (5) Measure the voltage between terminal 3 and ground by backprobing.
 - When the operating transfer shift lever 2H → 4H, 4H → 4HLc or 4HLc → 4LLc, the voltage should measure 1/2 battery voltage → 1.0 volt or less → 1/2 battery voltage.
 - When the operating transfer shift lever 4LLc → 4HLc, 4HLc → 4H or 4H → 2H, the voltage should measure 1/2 battery voltage → battery positive voltage → 1.0 volt or less → 1/2 battery voltage.
- (6) Turn the ignition switch to the "LOCK" (OFF) position.

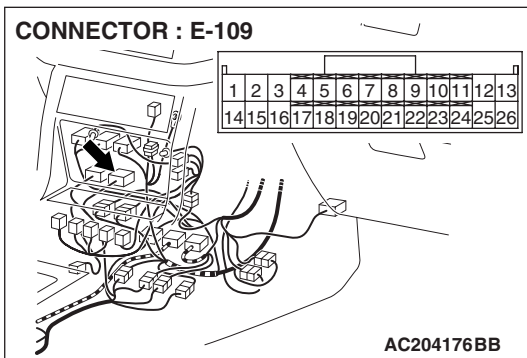
Q: Is the measured voltage within the specified range?

- YES** : Go to Step 6.
NO : Go to Step 4.

CONNECTOR : C-09



CONNECTOR : E-109



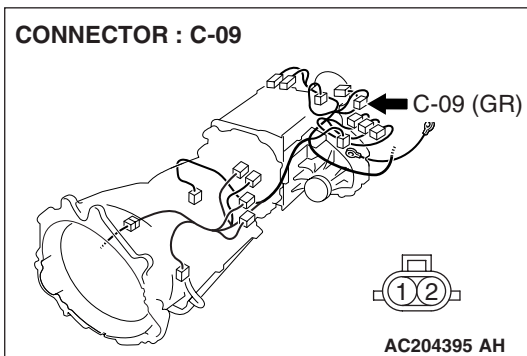
STEP 4. Check shift actuator connector C-09 and transfer-ECU connector E-109 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

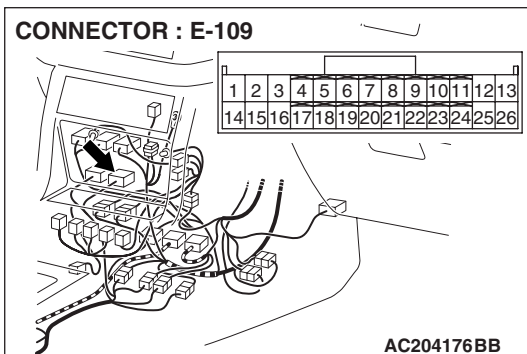
YES : Go to Step 5.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

CONNECTOR : C-09



CONNECTOR : E-109



STEP 5. Check harnesses for short circuit to ground between shift actuator connector C-09 terminals 2, 1 and transfer-ECU connector E-109 terminals 1, 3.

Q: Are the harnesses wire in good condition?

YES : Go to Step 8.

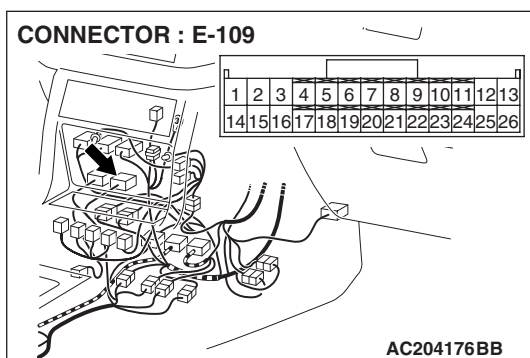
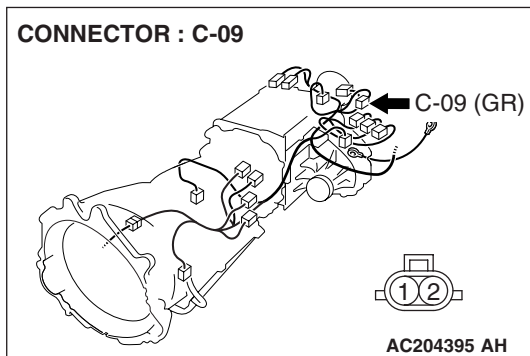
NO : Repair or replace the harness wire.

STEP 6. Check shift actuator connector C-09 and transfer-ECU connector E-109 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 7.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

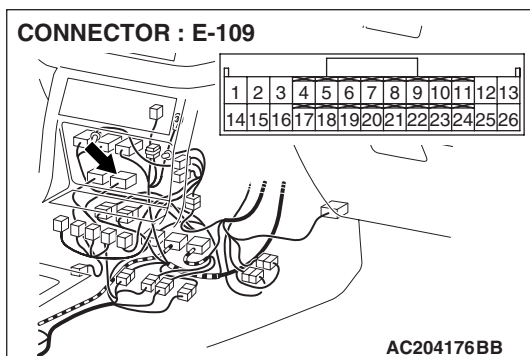
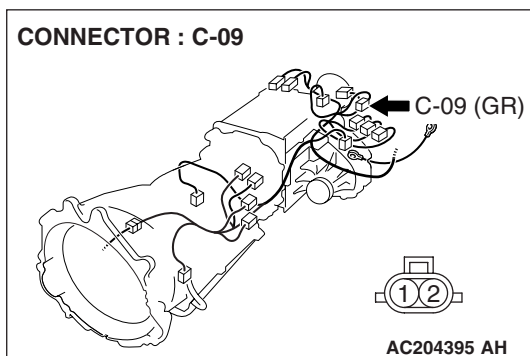


STEP 7. Check harnesses for open circuit between shift actuator connector C-09 terminals 2, 1 and transfer-ECU connector E-109 terminals 1, 3.

Q: Are the harnesses wire in good condition?

YES : Go to Step 8.

NO : Repair or replace the harness wire.



STEP 8. Using scan tool MB991958, check data list item 12: Shift Actuator Voltage.

⚠ CAUTION

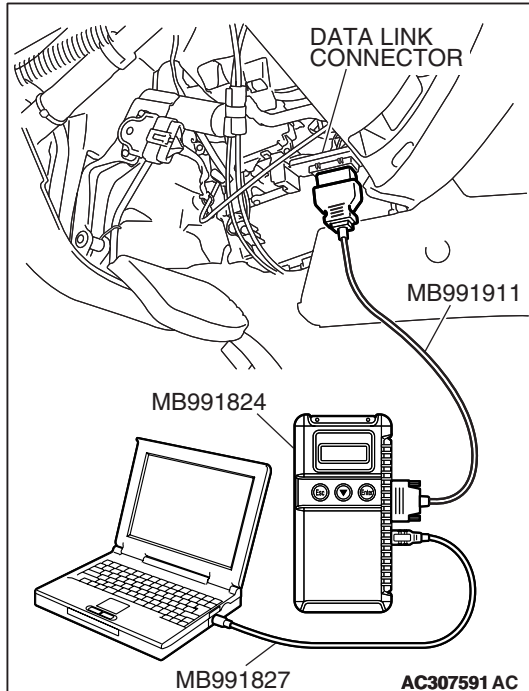
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.
- (4) Set scan tool MB991958 to data reading mode.
 - Item 12: Shift Actuator Voltage.
 - When the operating transfer shift lever 2H → 4H, 4H → 4HLc or 4HLc → 4LLc, the display should be 1/2 battery voltage → battery positive voltage → 1.0 volt or less → 1/2 battery voltage.
 - When the operating transfer shift lever 4LLc → 4HLc, 4HLc → 4H or 4H → 2H, the display should be 1/2 battery voltage → 1.0 volt or less → 1/2 battery voltage.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction P.00-13.

NO : Replace the transfer-ECU.



DTC 42: Shift Actuator System (Short Circuit)

DTC 43: Shift Actuator System (Open Circuit)

SHIFT ACTUATOR SYSTEM CIRCUIT

Refer to P.23A-498.

CIRCUIT OPERATION

Refer to P.23A-498.

DTC SET CONDITIONS

When the shift actuator current is more than the target value +1 ampere during drive, the DTC 42 is set as the short circuit of the shift actuator system. When the main relay voltage is 6 volts or less or the actual value of the shift actuator current is less than 0.1 ampere, the DTC 43 is set as the open circuit of the shift actuator system.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CODE TO BE SET ARE:)

- Malfunction of the shift actuator
- Damaged harness, connector
- Malfunction of the transfer-ECU

DIAGNOSIS

Required Special Tool:

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991911: MUT-III Main Harness B

STEP 1. Using scan tool MB991958, check data list item 10: Shift Actuator Amperage.

⚠ CAUTION

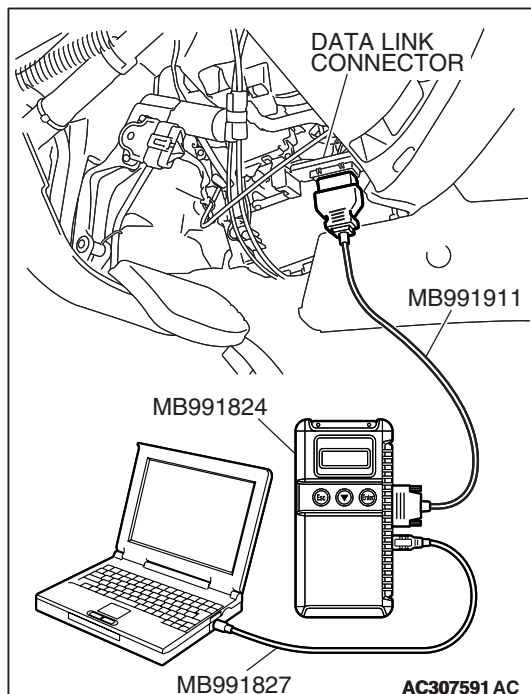
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.
- (4) Set scan tool MB991958 to data reading mode.
 - Item 10: Shift Actuator Amperage.
 - When the operating transfer shift lever 2H → 4H, 4H → 4HLc or 4HLc → 4LLc, the display should be 0 ampere → 0.2 – 1.5 ampere → 0 ampere.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

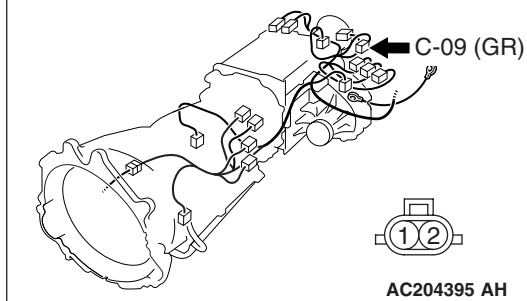
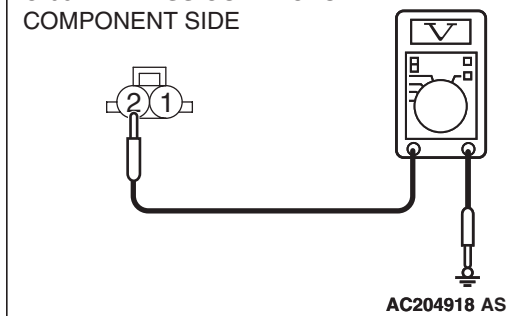
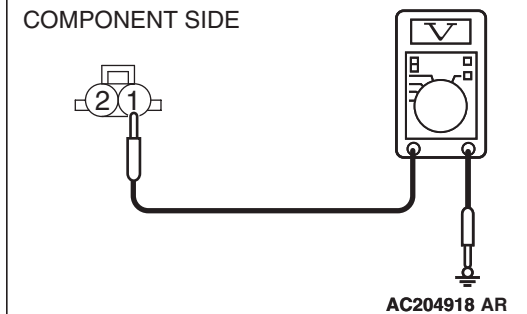
Q: Is the actuator operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction P.00-13.

NO : Go to Step 2.



CONNECTOR : C-09

C-09 HARNESS CONNECTOR :
COMPONENT SIDEC-09 HARNESS CONNECTOR :
COMPONENT SIDE**STEP 2. Measure the power supply voltage at shift actuator connector C-09.**

- (1) Disconnect connector C-09 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.

- (4) Measure the voltage between terminal 2 and ground.
 - When the operating transfer shift lever 2H → 4H, 4H → 4HLc or 4HLc → 4LLc, the voltage should measure battery positive voltage.

- (5) Measure the voltage between terminal 1 and ground.
 - When the operating transfer shift lever 4LLc → 4HLc, 4HLc → 4H or 4H → 2H, the voltage should measure battery positive voltage.

- (6) Turn the ignition switch to the "LOCK" (OFF) position.

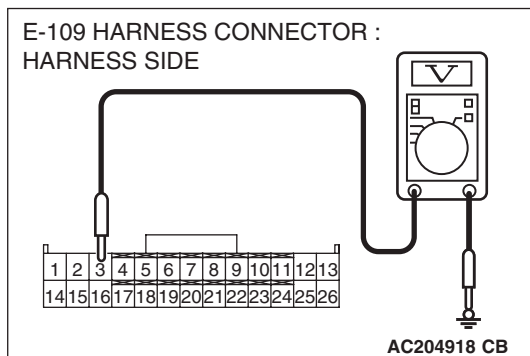
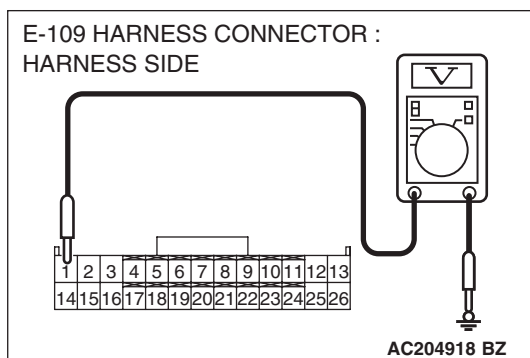
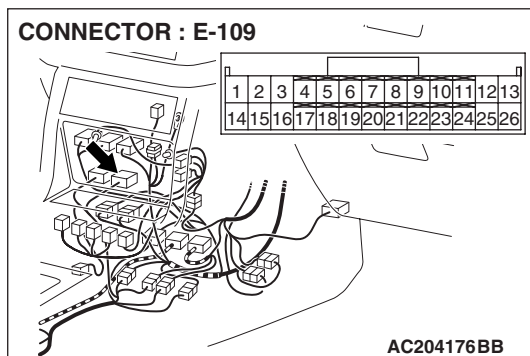
Q: Is the measured voltage battery positive voltage?

YES : Replace the shift actuator. Refer to GROUP 23B, Transfer [P.23B-75](#).

NO : Go to Step 3.

STEP 3. Measure the actuator output voltage at transfer-ECU connector E-109 by backprobing.

- (1) Do not disconnect connector E-109.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.

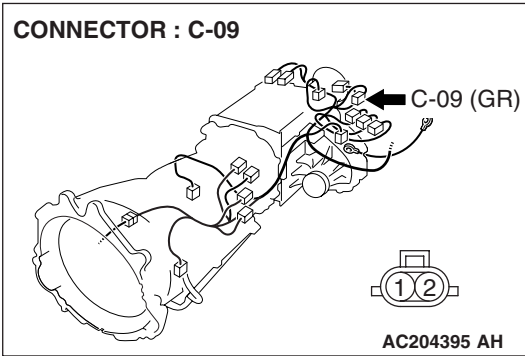


- (4) Measure the voltage between terminal 1 and ground by backprobing.
 - When the operating transfer shift lever 2H → 4H, 4H → 4HLc or 4HLc → 4LLc, the voltage should measure 1/2 battery voltage → battery positive voltage → 1.0 volt or less → 1/2 battery voltage.
 - When the operating transfer shift lever 4LLc → 4HLc, 4HLc → 4H or 4H → 2H, the voltage should measure 1/2 battery voltage → 1.0 volt or less → 1/2 battery voltage.
- (5) Measure the voltage between terminal 3 and ground by backprobing.
 - When the operating transfer shift lever 2H → 4H, 4H → 4HLc or 4HLc → 4LLc, the voltage should measure 1/2 battery voltage → 1.0 volt or less → 1/2 battery voltage.
 - When the operating transfer shift lever 4LLc → 4HLc, 4HLc → 4H or 4H → 2H, the voltage should measure 1/2 battery voltage → battery positive voltage → 1.0 volt or less → 1/2 battery voltage.
- (6) Turn the ignition switch to the "LOCK" (OFF) position.

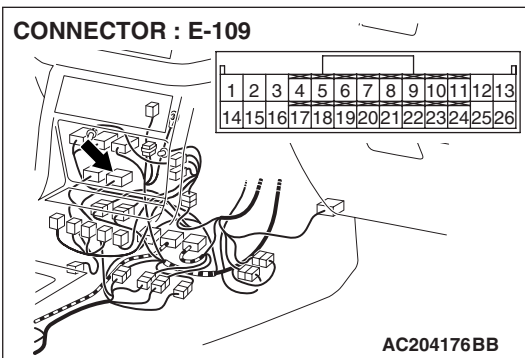
Q: Is the measured voltage within the specified range?

- YES :** Go to Step 6.
NO : Go to Step 4.

CONNECTOR : C-09



CONNECTOR : E-109



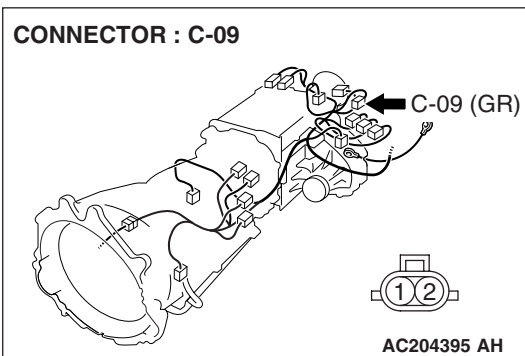
STEP 4. Check shift actuator connector C-09 and transfer-ECU connector E-109 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

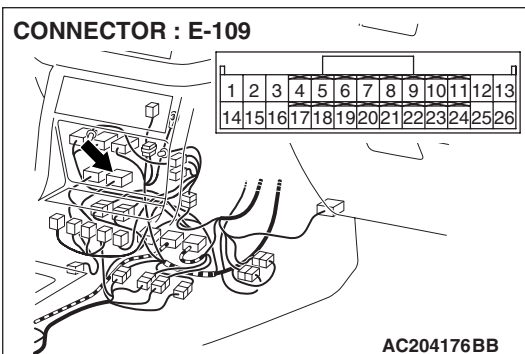
YES : Go to Step 5.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

CONNECTOR : C-09



CONNECTOR : E-109



STEP 5. Check harnesses for short circuit to ground between shift actuator connector C-09 terminals 2, 1 and transfer-ECU connector E-109 terminals 1, 3.

Q: Are the harnesses wire in good condition?

YES : Go to Step 8.

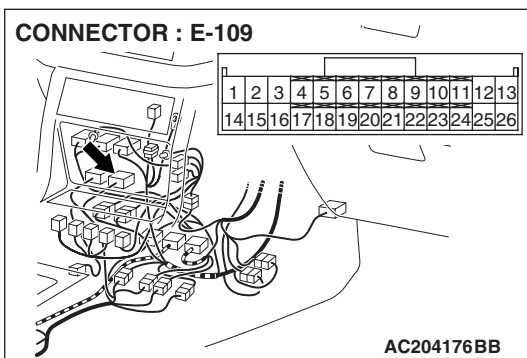
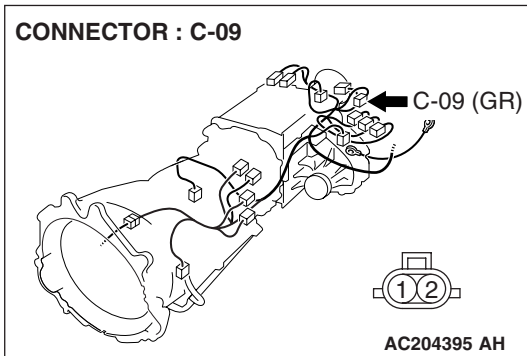
NO : Repair or replace the harness wire.

STEP 6. Check shift actuator connector C-09 and transfer-ECU connector E-109 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 7.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

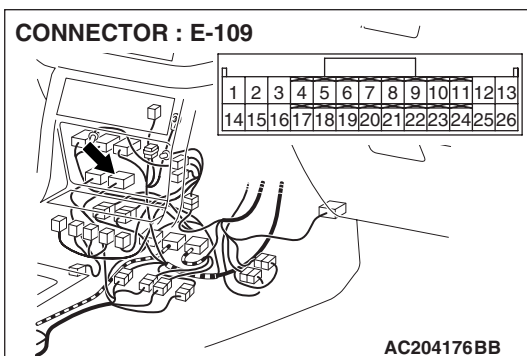
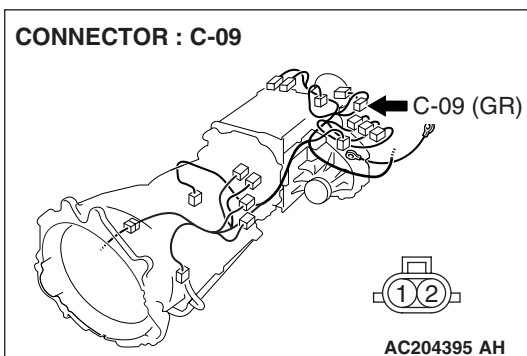


STEP 7. Check harnesses for open circuit between shift actuator connector C-09 terminals 2, 1 and transfer-ECU connector E-109 terminals 1, 3.

Q: Are the harnesses wire in good condition?

YES : Go to Step 8.

NO : Repair or replace the harness wire.



STEP 8. Using scan tool MB991958, check data list item 10: Shift Actuator Amperage.

⚠ CAUTION

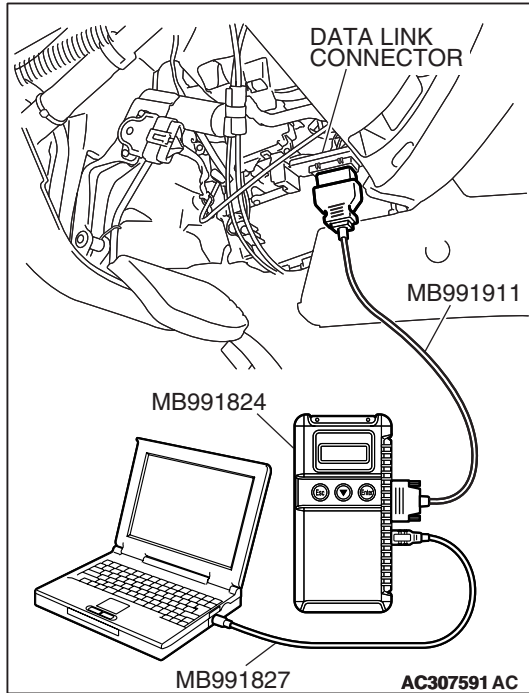
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.
- (4) Set scan tool MB991958 to data reading mode.
 - Item 10: Shift Actuator Amperage.
 - When the operating transfer shift lever 2H → 4H, 4H → 4HLc or 4HLc → 4LLc, the display should be 0 ampere → 0.2 – 1.5 ampere → 0 ampere.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction P.00-13.

NO : Replace the transfer-ECU.



DTC 44: Shift Actuator System (Overload)

SHIFT ACTUATOR SYSTEM CIRCUIT

Refer to P.23A-498.

CIRCUIT OPERATION

Refer to P.23A-498.

DTC SET CONDITIONS

When the accumulated time to operate the shift actuator exceeds five minutes, DTC 44 is set as the overload of the shift actuator.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CODE TO BE SET ARE:)

- Malfunction of the shift actuator
- Damaged harness, connector
- Malfunction of the transfer-ECU

DIAGNOSIS

Required Special Tool:

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991911: MUT-III Main Harness B

STEP 1. Using scan tool MB991958, check actuator test item 02 or 03: Shift Actuator.

⚠ CAUTION

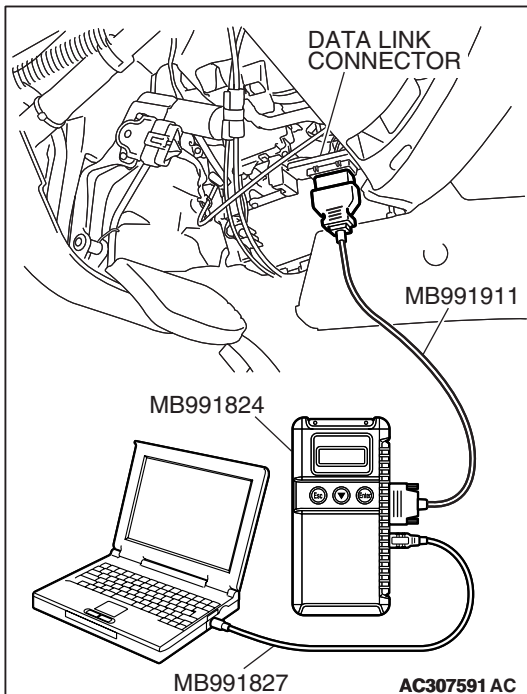
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.
- (4) Set scan tool MB991958 to actuator testing mode.
 - Item 02, 03: Shift Actuator.
 - The shift actuator operate.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-13](#).

NO : Go to Step 2.



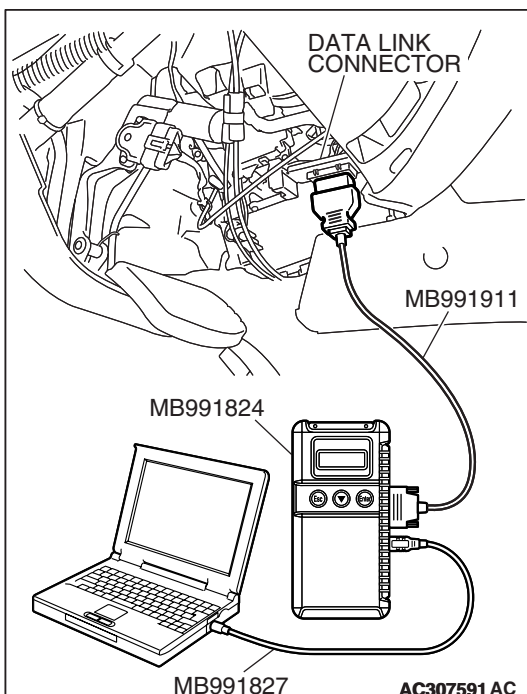
STEP 2. Using scan tool MB991958, check data list item 12: Shift Actuator Voltage.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.
- (4) Set scan tool MB991958 to data reading mode.
 - Item 12: Shift Actuator Voltage.
 - When the operating transfer shift lever 2H → 4H, 4H → 4HLc or 4HLc → 4LLc, the display should be 1/2 battery voltage → battery positive voltage → 1.0 volt or less → 1/2 battery voltage.
 - When the operating transfer shift lever 4LLc → 4HLc, 4HLc → 4H or 4H → 2H, the display should be 1/2 battery voltage → 1.0 volt or less → 1/2 battery voltage.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

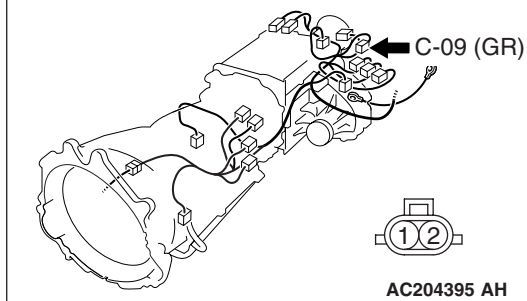
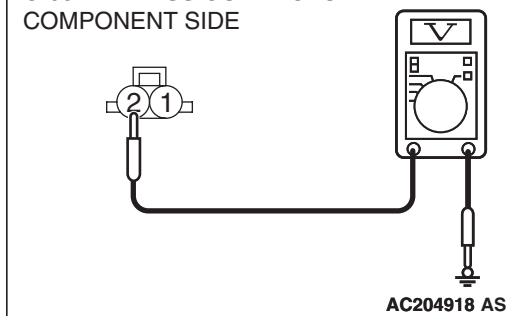
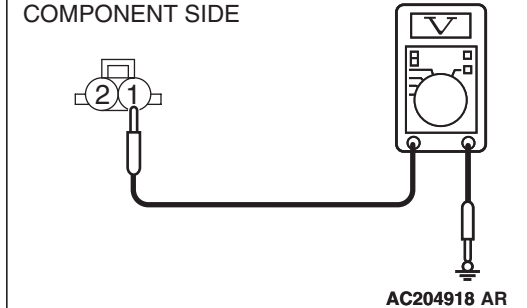
Q: Is the actuator operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-13](#).

NO : Go to Step 3.



CONNECTOR : C-09

C-09 HARNESS CONNECTOR :
COMPONENT SIDEC-09 HARNESS CONNECTOR :
COMPONENT SIDE**STEP 3. Measure the power supply voltage at shift actuator connector C-09.**

- (1) Disconnect connector C-09 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.

- (4) Measure the voltage between terminal 2 and ground.
 - When the operating transfer shift lever 2H → 4H, 4H → 4HLc or 4HLc → 4LLc, the voltage should measure battery positive voltage.

- (5) Measure the voltage between terminal 1 and ground.
 - When the operating transfer shift lever 4LLc → 4HLc, 4HLc → 4H or 4H → 2H, the voltage should measure battery positive voltage.

- (6) Turn the ignition switch to the "LOCK" (OFF) position.

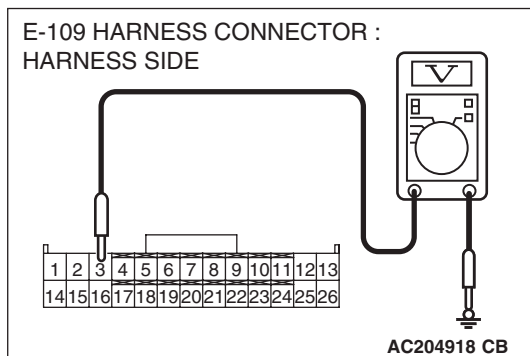
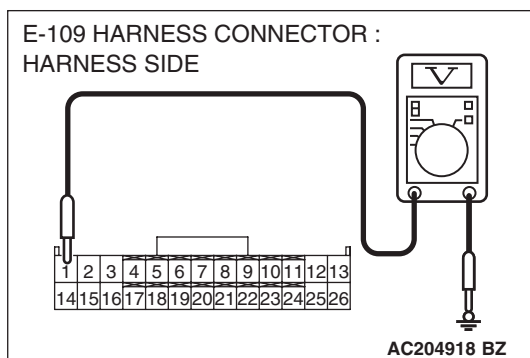
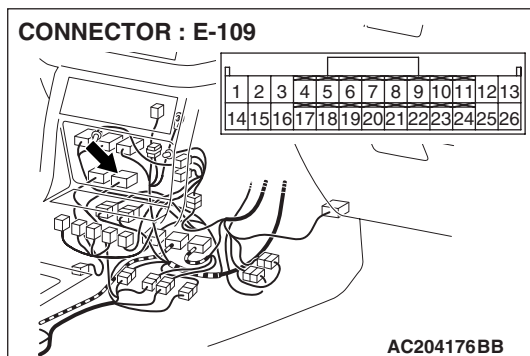
Q: Is the measured voltage battery positive voltage?

YES : Replace the shift actuator. Refer to GROUP 23B, Transfer [P.23B-75](#).

NO : Go to Step 4.

STEP 4. Measure the actuator output voltage at transfer-ECU connector E-109 by backprobing.

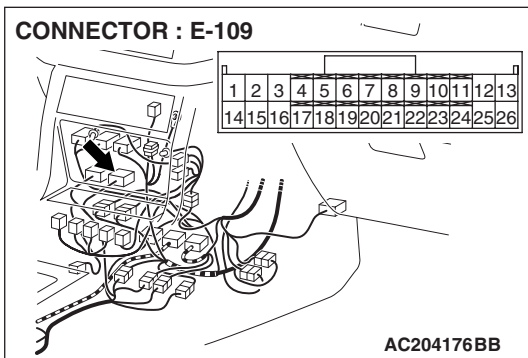
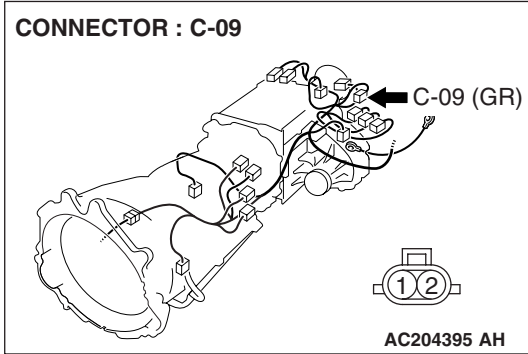
- (1) Do not disconnect connector E-109.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.



- (4) Measure the voltage between terminal 1 and ground by backprobing.
 - When the operating transfer shift lever 2H → 4H, 4H → 4HLc or 4HLc → 4LLc, the voltage should measure 1/2 battery voltage → battery positive voltage → 1.0 volt or less → 1/2 battery voltage.
 - When the operating transfer shift lever 4LLc → 4HLc, 4HLc → 4H or 4H → 2H, the voltage should measure 1/2 battery voltage → 1.0 volt or less → 1/2 battery voltage.
- (5) Measure the voltage between terminal 3 and ground by backprobing.
 - When the operating transfer shift lever 2H → 4H, 4H → 4HLc or 4HLc → 4LLc, the voltage should measure 1/2 battery voltage → 1.0 volt or less → 1/2 battery voltage.
 - When the operating transfer shift lever 4LLc → 4HLc, 4HLc → 4H or 4H → 2H, the voltage should measure 1/2 battery voltage → battery positive voltage → 1.0 volt or less → 1/2 battery voltage.
- (6) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage within the specified range?

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

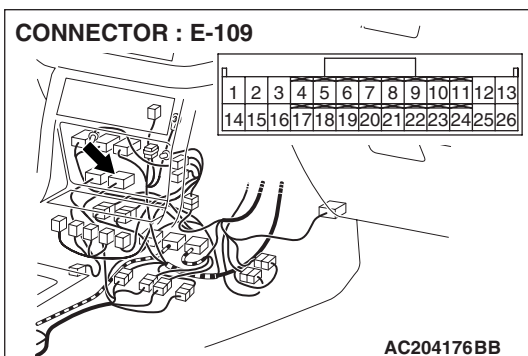
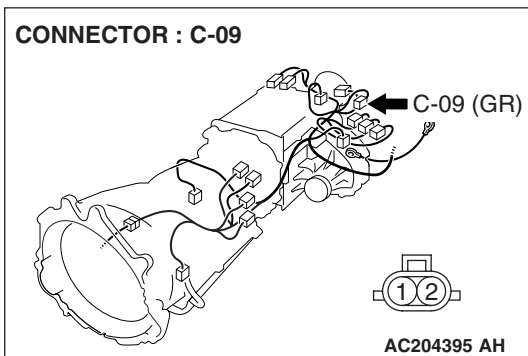


STEP 5. Check shift actuator connector C-09 and transfer-ECU connector E-109 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 6.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).



STEP 6. Check harnesses for short circuit to ground between shift actuator connector C-09 terminals 2, 1 and transfer-ECU connector E-109 terminals 1, 3.

Q: Are the harnesses wire in good condition?

YES : Go to Step 9.

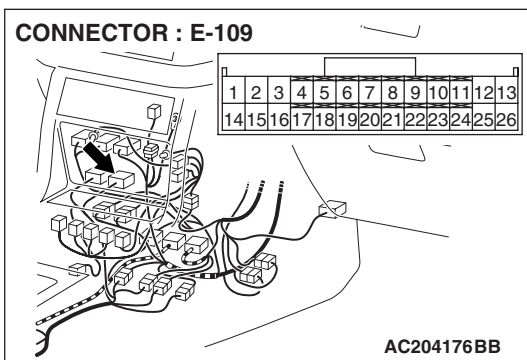
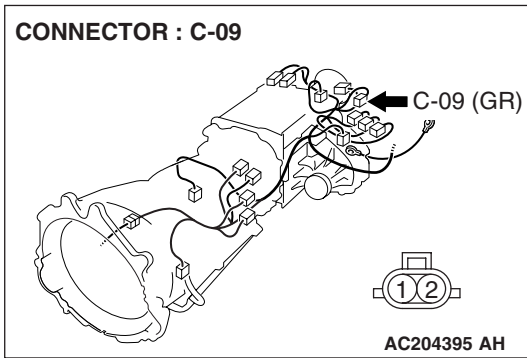
NO : Repair or replace the harness wire.

STEP 7. Check shift actuator connector C-09 and transfer-ECU connector E-109 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 8.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

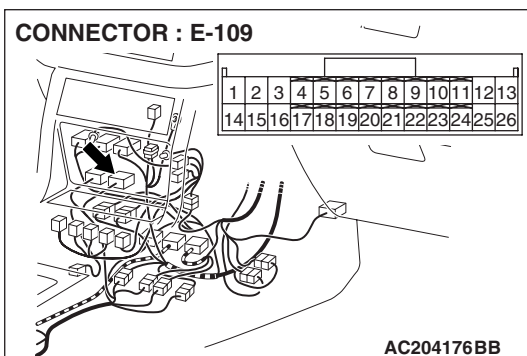
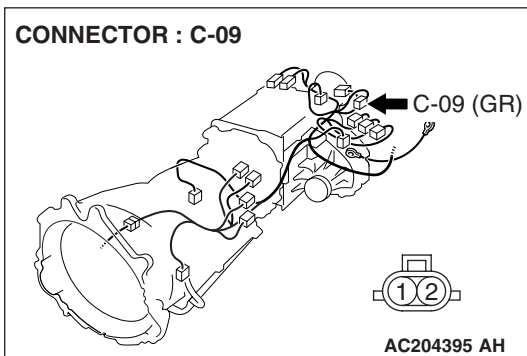


STEP 8. Check harnesses for open circuit between shift actuator connector C-09 terminals 2, 1 and transfer-ECU connector E-109 terminals 1, 3.

Q: Are the harnesses wire in good condition?

YES : Go to Step 9.

NO : Repair or replace the harness wire.



STEP 9. Using scan tool MB991958, check data list item 12: Shift Actuator Voltage.

⚠ CAUTION

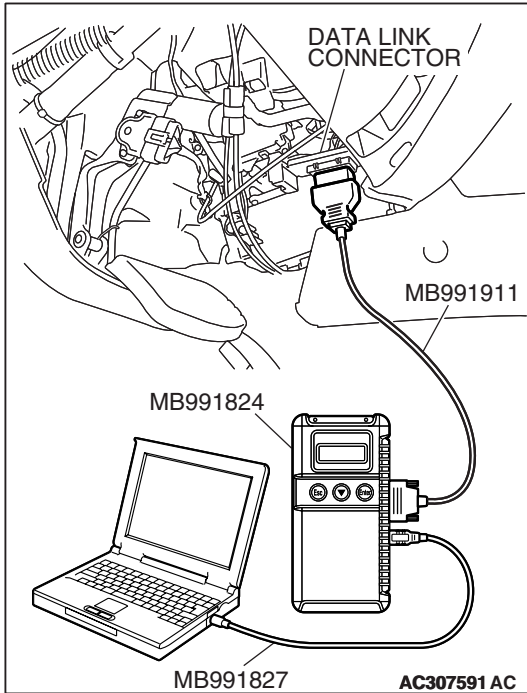
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Transmission range should be "N" range.
- (4) Set scan tool MB991958 to data reading mode.
 - Item 12: Shift Actuator Voltage.
 - When the operating transfer shift lever 2H → 4H, 4H → 4HLc or 4HLc → 4LLc, the display should be 1/2 battery voltage → battery positive voltage → 1.0 volt or less → 1/2 battery voltage.
 - When the operating transfer shift lever 4LLc → 4HLc, 4HLc → 4H or 4H → 2H, the display should be 1/2 battery voltage → 1.0 volt or less → 1/2 battery voltage.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the actuator operating properly?

YES : It can be assumed that this malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/ Inspection Service Points – How to Cope with Intermittent Malfunction P.00-13.

NO : Replace the transfer-ECU.



DTC 45: Dissimilar Tire Diameter

CIRCUIT OPERATION

The condition of tire is detected by monitoring the speed difference between the front propeller shaft speed sensor and the rear propeller shaft speed sensor with the transfer-ECU at 4WD condition.

DTC SET CONDITIONS

If the speed difference between the front wheel and the rear wheel is larger than the set value at the free-wheel engage switch ON condition, the DTC 45 is set as the inadequate tire pressure, non-conformity of the tire size or the tire brand.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CODE TO BE SET ARE:)

- Malfunction of the tire
- Malfunction of the transfer-ECU

DIAGNOSIS

STEP 1. Tire pressure check.

Check the tire pressure, size and brand.

Q: Is the tire condition normal?

YES : Go to Step 2.

NO : Adjust or replace the tire.

STEP 2. Check for transfer diagnostic trouble code.

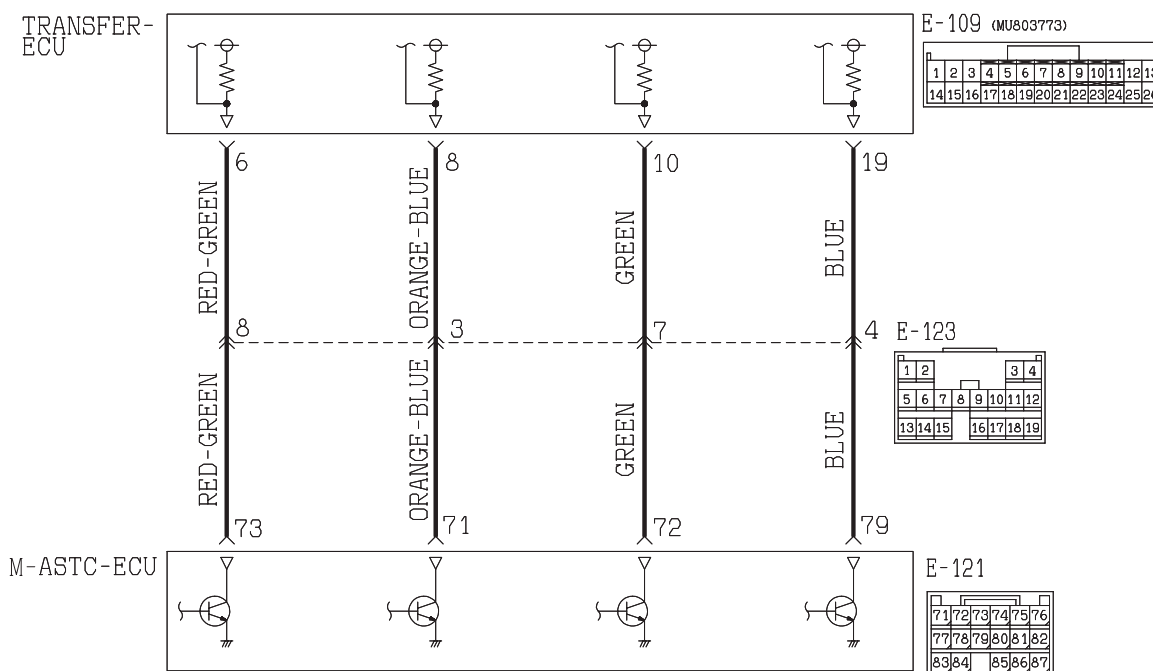
Q: Is the transfer diagnostic trouble code reset?

YES : The procedure is complete (If no malfunctions are not found in all steps, an intermittent malfunction is suspected. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-13).

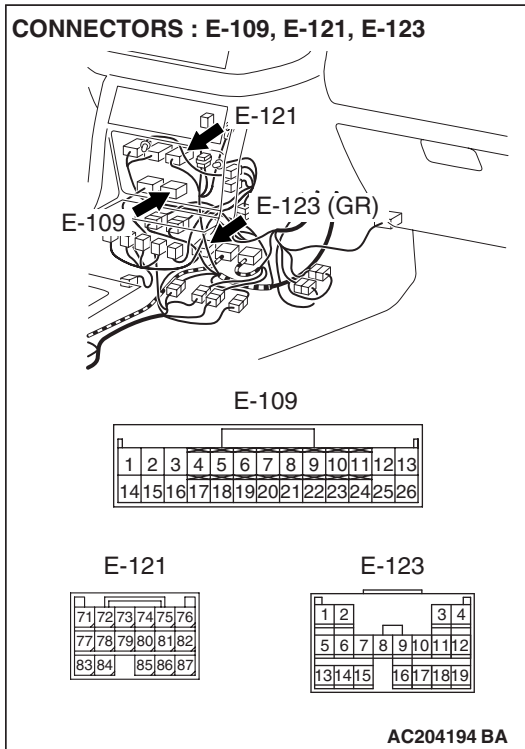
NO : Replace the transfer-ECU.

DTC 61: M-ASTC-ECU System

M-ASTC-ECU System Circuit



W3Q20M16AA
AC205197AB



CIRCUIT OPERATION

If the Mitsubishi active skid and traction control system is activated, the M-ASTC-ECU sends a signal to the transfer-ECU. The transfer-ECU illuminates the relevant wheel of the 4WD indicator light according to the signal.

DTC SET CONDITIONS

If there is a communication error with the M-ASTC-ECU (i.e. simultaneous open circuit in all signal lines), DTC 61 will be set.

TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CODE TO BE SET ARE:)

- Damaged harness, connector
- Malfunction of the M-ASTC
- Malfunction of the transfer-ECU

DIAGNOSIS

STEP 1. Check the Mitsubishi active skid and traction control system.

Refer to GROUP 35C, Troubleshooting Strategy [P.35C-3](#).

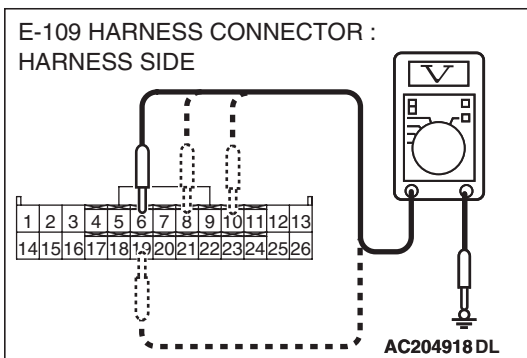
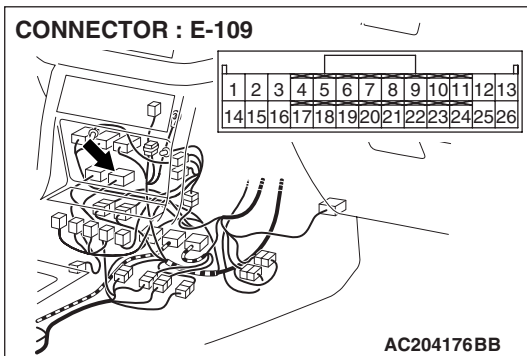
Q: Is the inspection result good?

YES : Go to Step 2.

NO : Repair or replace the Mitsubishi active skid and traction control system component(s).

STEP 2. Measure the voltage at transfer-ECU connector E-109 by backprobing.

- (1) Do not disconnect connector E-109.
- (2) Turn the ignition switch to the "ON" position.



- (3) Measure the voltage between terminals 6, 8, 10, 19 and ground by backprobing.
 - The voltage should measure 1 volt or less.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

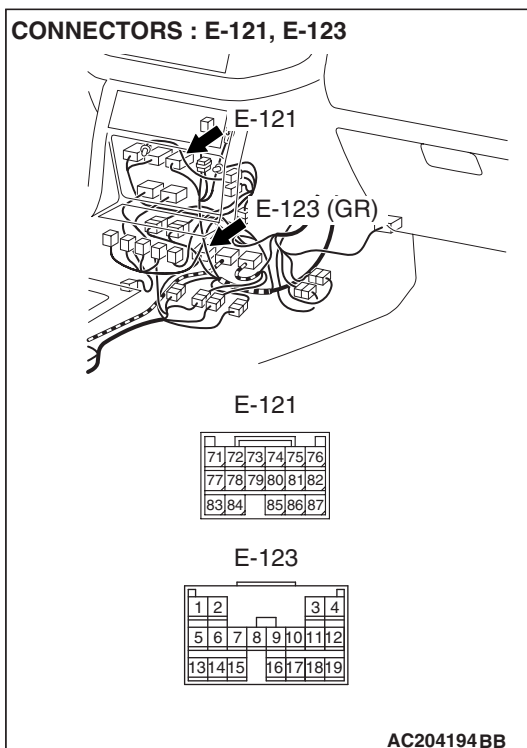
Q: Is the measured voltage 1 volt or less?

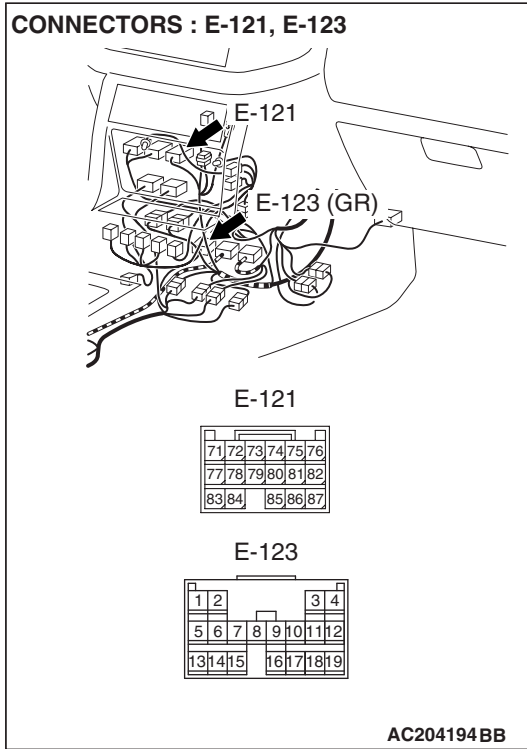
- YES :** Go to Step 5.
- NO :** Go to Step 3.

STEP 3. Check M-ASTC-ECU connector E-121 and intermediate connector E-123 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

- YES :** Go to Step 4.
- NO :** Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).



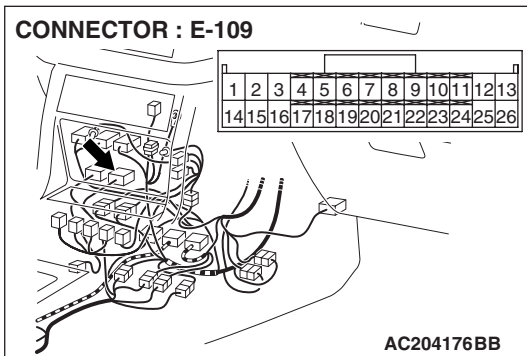


STEP 4. Check the harness for open circuit or damage between transfer-ECU connector E-109 (terminals 6, 8, 10 and 19) and M-ASTC-ECU connector E-121 (terminals 71, 72, 73 and 79).

Q: Are the harness wires in good condition?

YES : Go to Step 5.

NO : Repair or replace the harness wire(s).



STEP 5. Check transfer-ECU connector E-109 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

YES : Go to Step 6.

NO : Repair or replace the damaged components. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

STEP 6. Replace the transfer-ECU.

(1) Replace the transfer-ECU.

(2) Test drive the vehicle.

(3) Check for transfer diagnostic trouble code.

Q: Is DTC 61 set?

YES : Start over at Step 1.

NO : The procedure is complete.

DATA LIST REFERENCE TABLE

M1231111300059

MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION
2/4WD DET SW	34	2WD/4WD detection switch	Ignition switch: ON Transmission range: N	Transfer shift lever position: 2H or 4H	ON
				Transfer shift lever position: 4HLc or 4LLc	OFF
2WD DET SW	33	2WD detection switch	Ignition switch: ON Transmission range: N	Transfer shift lever position: 2H	ON
				Transfer shift lever position: Other than 2H	OFF
4H DET SW	35	4H detection switch	Ignition switch: ON Transmission range: N	Transfer shift lever position: 4H or 4HLc	ON
				Transfer shift lever position: 2H or 4LLc	OFF
4LLc DET SW	37	4LLc detection switch	Ignition switch: ON Transmission range: N	Transfer shift lever position: 4LLc	ON
				Transfer shift lever position: Other than 4LLc	OFF
APP SENSOR	01	Accelerator pedal position sensor	Ignition switch: ON Engine: Stopped Transmission range: P	Accelerator pedal: Fully closed	905 – 1,165 mV
				Accelerator pedal: Depressed	Gradually rises from the above value
				Accelerator pedal: Fully open	4,035 mV or more
C/D LOCK SW	36	Center differential lock detection switch	Ignition switch: ON Transmission range: N	Transfer shift lever position: 4HLc or 4LLc	ON
				Transfer shift lever position: 2H or 4H	OFF
ENGINE TYPE	28	Engine type	Ignition switch: ON Gasoline-fueled vehicle		GASOLINE
F/W ENG SOL	30	Free-wheel engage solenoid valve	Ignition switch: ON Transmission range: N	Transfer shift lever position: 2H	ON
				Transfer shift lever position: Other than 2H	OFF
F/W ENGAGE SW	38	Free-wheel engage switch	Engine: Idling Transmission range: N 4WD indicator light: Should not be flashing	Transfer shift lever position: 2H	OFF
				Transfer shift lever position: Other than 2H	ON

MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT	NORMAL CONDITION	
FL M-ASTC SIG	40	M-ASTC-ECU	Active traction control system is acting on front left wheel.	ON	
			Active traction control system is not acting on front left wheel.	OFF	
FR2RR SPD DIF	04	Front to rear propeller shaft speed difference	Transfer position: 4WD	Driving at constant speed of 30 km/h (19 mph)	Within 5 km/h (3.1 mph)
FR M-ASTC SIG	39	M-ASTC-ECU	Active traction control system is acting on front right wheel.	ON	
			Active traction control system is not acting on front right wheel.	OFF	
FRT PROP SNSR	02	Front propeller shaft speed sensor	Transfer position: 4WD	Driving at constant speed of 30 km/h (19 mph)	30 km/h (19 mph)
IGNITION SW	21	Ignition switch	Ignition switch: ON		ON
IGNITION VOLT	09	Ignition switch power supply (Battery voltage)	Ignition switch: ON		Battery positive voltage
MAIN RELAY V	08	Main relay output voltage (Inside ECU)	Ignition switch: ON		Battery positive voltage
RL M-ASTC SIG	42	M-ASTC-ECU	Active traction control system is acting on rear left wheel.	ON	
			Active traction control system is not acting on rear left wheel.	OFF	
RR M-ASTC SIG	41	M-ASTC-ECU	Active traction control system is acting on rear right wheel.	ON	
			Active traction control system is not acting on rear right wheel.	OFF	

MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION
RR PROP SNSR	03	Rear propeller shaft speed sensor	Transfer position: 4WD	Driving at constant speed of 30 km/h (19 mph)	30 km/h (19 mph)
SHIFT SOL AMP	10	Shift actuator amperage	Ignition switch: ON Transmission range: N	Transfer shift lever position: In operation (Actuator should be operating)	0 A → 0.2 A – 1.5 A → 0 A
SHIFT SOL TGT	11	Shift actuator target amperage	Ignition switch: ON Transmission range: N	Transfer shift lever position: In operation (Actuator should be operating)	0 A → 1.4 A – 1.6A → 0 A
SHIFT SOL V	12	Shift actuator voltage	Ignition switch: ON Transmission range: N	Transfer shift lever position: 2H → 4H or 4H → 4HLc or 4HLc → 4LLc	1/2 Battery voltage → Battery voltage → 1 V or less → 1/2 Battery voltage
				Transfer shift lever position: 4LLc → 4HLc or 4HLc → 4H or 4H → 2H	1/2 Battery voltage → 1 V or less → 1/2 Battery voltage
STOPLIGHT SW	23	Stoplight switch	Ignition switch: ON	Brake pedal: Depressed	ON
				Brake pedal: Released	OFF
T/F LEVER 2H	24	Transfer shift lever switch: 2H	Ignition switch: ON Transmission range: N	Transfer shift lever position: 2H	ON
				Transfer shift lever position: Other than 2H	OFF
T/F LEVER 4H	25	Transfer shift lever switch: 4H	Ignition switch: ON Transmission range: N	Transfer shift lever position: 4H	ON
				Transfer shift lever position: Other than 4H	OFF
T/F LEVER POS	06	Transfer shift lever position	Ignition switch: ON Transmission range: N	Transfer shift lever position: 2H	2H
				Transfer shift lever position: 4H	4H
				Transfer shift lever position: 4HLc	4HLc

MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION
T/F LEVER POS	06	Transfer shift lever position	Ignition switch: ON Transmission range: N	Transfer shift lever position: 4LLc	4LLc
T/F LVR 4HLC	26	Transfer shift lever switch: 4HLC	Ignition switch: ON Transmission range: N	Transfer shift lever position: 4HLC	ON
				Transfer shift lever position: Other than 4HLC	OFF
T/F LVR 4LLC	27	Transfer shift lever switch: 4LLc	Ignition switch: ON Transmission range: N	Transfer shift lever position: 4LLc	ON
				Transfer shift lever position: Other than 4LLc	OFF
T/F MODE DET	07	Transfer mode (condition) detected	Engine: Idling Transmission range: N 4WD indicator light: Should not be flashing	Transfer shift lever position: 2H	2H
				Transfer shift lever position: 4H	4H
				Transfer shift lever position: 4HLC	4HL
				Transfer shift lever position: 4LLc	4LL
T/M TYPE	22	Transmission type	Ignition switch: ON A/T vehicle		AT
TR SW: NEUTRAL	31	Transmission range switch: N	Ignition switch: ON	Transmission range: N	ON
				Transmission range: Other than N and P	OFF
				Transmission range: P	ON ⇔ OFF (The "N" range light flashes when scan tool MB991958 (MUT-III) is connection)
TR SW: PARK	32	Transmission range switch: P	Ignition switch: ON	Transmission range: N	ON
				Transmission range: Other than N and P	OFF

MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT		NORMAL CONDITION
TR SW: PARK	32	Transmission range switch: P	Ignition switch: ON	Transmission range: P	ON ⇔ OFF (The "N" range light flashes when scan tool MB991958 (MUT-III) is connection)
VEHICLE SPEED	05	Vehicle speed	Transmission range: Sport mode	Idling with 1st gear (Vehicle stopped)	0 km/h (0 mph)
				Driving at constant speed of 50 km/h (31 mph) in 3rd gear	50 km/h (31 mph)

ACTUATOR TEST REFERENCE TABLE

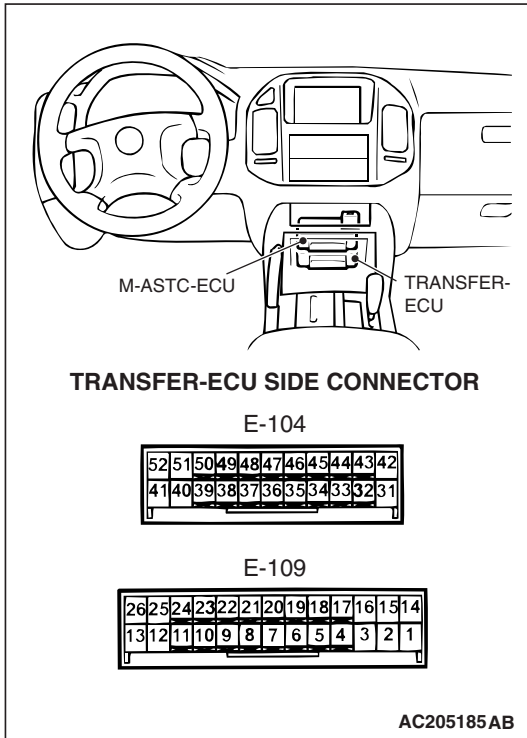
M123111400045

MUT-III SCAN TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	TEST CONTENT	INSPECTION REQUIREMENT	NORMAL CONDITION
F/W SOLENOID	01	Freewheel solenoid valve	Drives freewheel solenoid valve	<ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: P • Engine: 0 r/min • Vehicle speed: 0 km/h (Vehicle stop) 	Freewheel engage solenoid valve is switched from ON to OFF, or from OFF to ON.
SHIFT NORMAL	02	Shift actuator	Turns shift actuator motor to normal direction		When the position is 2H, 4H and 4HLc, the shift returns from that position to original position after shifting in the order of 2H→4H→4HLc→4LLc. When the position is 4LLc, no shifting is performed.
SHIFT REVERSE	03		Turns shift actuator motor to reverse direction		When the position is 2H, 4HLc and 4LLc, the shift returns from that position to original position after shifting in the order of 4LLc→4HLc→4H→2H. When the position is 2H, no shifting is performed.

**TRANSFER-ECU TERMINAL VOLTAGE
REFERENCE CHART**

M1231111500064

NOTE: Two ECUs of the same shape are situated up and down in a row at the inner part of the floor console. The upper side ECU is the M-ASTC-ECU. The lower side ECU is the transfer-ECU.



TERMINAL NO.	INSPECTION ITEMS	INSPECTION REQUIREMENT		NORMAL CONDITION
1	Shift actuator voltage	<ul style="list-style-type: none"> Ignition switch: ON Transmission range: N 	Transfer shift lever position: 2H → 4H or 4H → 4HLc or 4HLc → 4LLc	1/2 Battery voltage → Battery voltage → 1 V or less → 1/2 Battery voltage
			Transfer shift lever position: 4LLc → 4HLc or 4HLc → 4H or 4H → 2H	1/2 Battery voltage → 1 V or less → 1/2 Battery voltage
3	Shift actuator voltage	<ul style="list-style-type: none"> Ignition switch: ON Transmission range: N 	Transfer shift lever position: 2H → 4H or 4H → 4HLc or 4HLc → 4LLc	1/2 Battery voltage → 1 V or less → 1/2 Battery voltage
			Transfer shift lever position: 4LLc → 4HLc or 4HLc → 4H or 4H → 2H	1/2 Battery voltage → Battery voltage → 1 V or less → 1/2 Battery voltage
5	Accelerator pedal position sensor	<ul style="list-style-type: none"> Ignition switch: ON Engine: Stopped Transmission range: P 	Accelerator pedal: Fully closed	0.905 – 1.165 V
			Accelerator pedal: Fully open	4.035 V or more
6	M-ASTC-ECU signal (FR)	Ignition switch: ON		1 V or less

TERMINAL NO.	INSPECTION ITEMS	INSPECTION REQUIREMENT		NORMAL CONDITION
7	Front propeller shaft speed sensor	<ul style="list-style-type: none"> • Measure between terminals 7 and 18 with an oscilloscope. • Engine: 2,000 r/min • Gear range: 3rd gear • Transfer position: 4HLc 		Refer to P.23A-400 , Inspection Procedure Using an Oscilloscope.
8	M-ASTC-ECU signal (RL)	Ignition switch: ON		1 V or less
9	Rear propeller shaft speed sensor	<ul style="list-style-type: none"> • Measure between terminals 9 and 18 with an oscilloscope. • Engine: 2,000 r/min • Gear range: 3rd gear • Transfer position: 4HLc 		Refer to P.23A-400 , Inspection Procedure Using an Oscilloscope.
10	M-ASTC-ECU signal (RR)	Ignition switch: ON		1 V or less
13	ECU power supply	Ignition switch: OFF		0 V
		Ignition switch: ON		Battery positive voltage
18	Sensor ground	Always		1 V or less
19	M-ASTC-ECU signal (FL)	Ignition switch: ON		1 V or less
20	Transfer shift lever switch: 2H	<ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: N 	Transfer shift lever position: 2H	Battery positive voltage
			Transfer shift lever position: Other than 2H	0 V
21	Transfer shift lever switch: 4H	<ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: N 	Transfer shift lever position: 4H	Battery positive voltage
			Transfer shift lever position: Other than 4H	0 V
22	Transfer shift lever switch: 4HLc	<ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: N 	Transfer shift lever position: 4HLc	Battery positive voltage
			Transfer shift lever position: Other than 4HLc	0 V
23	Transfer shift lever switch: 4LLc	<ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: N 	Transfer shift lever position: 4LLc	Battery positive voltage
			Transfer shift lever position: Other than 4LLc	0 V
25	Ground	Always		1 V or less
26	Ground	Always		1 V or less
31	Back-up power supply	Always		Battery positive voltage

TERMINAL NO.	INSPECTION ITEMS	INSPECTION REQUIREMENT		NORMAL CONDITION
32	Transmission range switch: N	Ignition switch: ON	Transmission range: N	Battery positive voltage
			Transmission range: Other than N	0 V
34	Stoplight switch	Ignition switch: ON	Brake pedal: Depressed	Battery positive voltage
			Brake pedal: Released	0 V
35	Ground	Always		1 V or less
37	2WD indicator light (RL)	<ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: N 	Transfer shift lever position: 4HLc ⇔ 4LLc	Battery positive voltage ⇔ 1 V or less → battery positive voltage
			Transfer shift lever position: 2H ⇔ 4H ⇔ 4HLc	Battery positive voltage
38	4WD indicator light (FL)	<ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: N 	Transfer shift lever position: 2H	1V or less
			Transfer shift lever position: Other than 2H	1 V or less ⇔ battery positive voltage
39	Ground	Always		1 V or less
40	Center differential lock indicator light	<ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: N 	Transfer shift lever position: 2H, 4H	Battery positive voltage
			Transfer shift lever position: 4HLc, 4LLc	1 V or less
41	Free-wheel engage solenoid valve	<ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: N 	Transfer shift lever position: 2H	1 V or less
			Transfer shift lever position: Other than 2H	Battery positive voltage
42	Ground	Always		1 V or less
43	2WD detection switch	<ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: N 	Transfer shift lever position: 2H	1 V or less
		<ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: N 	Transfer shift lever position: Other than 2H	Battery positive voltage

TERMINAL NO.	INSPECTION ITEMS	INSPECTION REQUIREMENT	NORMAL CONDITION	
44	2WD/4WD detection switch	<ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: N 	Transfer shift lever position: 2H, 4H	1 V or less
			Transfer shift lever position: 4HLc, 4LLc	Battery positive voltage
45	4H detection switch	<ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: N 	Transfer shift lever position: 4H, 4HLc	1 V or less
			Transfer shift lever position: 2H, 4LLc	Battery positive voltage
46	Center differential lock detection switch	<ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: N 	Transfer shift lever position: 4HLc, 4LLc	1 V or less
			Transfer shift lever position: 2H, 4H	Battery positive voltage
47	4LLc detection switch	<ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: N 	Transfer shift lever position: 4LLc	1 V or less
			Transfer shift lever position: Other than 4LLc	Battery positive voltage
48	2WD indicator light (RR)	<ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: N 	Transfer shift lever position: 4HLc ⇔ 4LLc	Battery positive voltage ⇔ 1 V or less → battery positive voltage
			Transfer shift lever position: 2H ⇔ 4H ⇔ 4HLc	Battery positive voltage
49	4WD indicator light (FR)	<ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: N 	Transfer shift lever position: 2H	1 V or less
			Transfer shift lever position: Other than 2H	1 V or less ⇔ battery positive voltage
50	Free-wheel engage switch	<ul style="list-style-type: none"> • Engine: Idling • Transmission range: N • 4WD indicator light: Should not be flashing 	Transfer shift lever position: 2H	Battery positive voltage
			Transfer shift lever position: Other than 2H	1 V or less
51	Buzzer	Ignition switch: ON	When buzzer not sounds	Battery positive voltage
			When buzzer sounds	0 V ⇔ battery positive voltage

TERMINAL NO.	INSPECTION ITEMS	INSPECTION REQUIREMENT		NORMAL CONDITION
52	4LLc indicator light	<ul style="list-style-type: none"> • Ignition switch: ON • Transmission range: N 	Transfer shift lever position: 4LLc	1 V or less
			Transfer shift lever position: Other than 4LLc	Battery positive voltage

A/T FAULTY OPERATION PREVENTION MECHANISM DIAGNOSIS

INTRODUCTION TO A/T KEY INTERLOCK AND SHIFT LOCK MECHANISMS

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If the key interlock and shift lock mechanisms indicate a malfunction, the key interlock cable, the shift lock cable, or the selector lever assembly may be defective. In this case, follow troubleshooting below.

A/T KEY INTERLOCK AND SHIFT LOCK MECHANISM DIAGNOSTIC TROUBLESHOOTING STRATEGY

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Use these steps to plan your diagnostic strategy. If you follow them carefully, you will be sure that you have exhausted most of the possible ways to find automatic transmission key interlock and shift lock mechanism fault.

1. Gather information from the customer.

2. Verify that the condition described by the customer exists.
3. Find the malfunction by following the Symptom Chart.
4. Verify malfunction is eliminated.

SYMPTOM CHART <A/T FAULTY OPERATION PREVENTION MECHANISM>

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SYMPTOM	INSPECTION PROCEDURE	REFERENCE PAGE
Selector lever can be moved from "P" to "R" position without depressing brake pedal when ignition key is at any position other than "LOCK" (OFF) position.	1	P.23A-531
Selector lever cannot be moved from "P" to "R" position with brake pedal depressed when ignition key is at any position other than "LOCK" (OFF) position.	2	P.23A-531
Selector lever can be moved from "P" to "R" position with brake pedal depressed when ignition key is at "LOCK" (OFF) position.	3	P.23A-533
Selector lever cannot be moved from "P" to "R" position smoothly.	4	P.23A-533
Selector lever cannot be moved from "P" to "R" position.	5	P.23A-534
Ignition key cannot be turned to "LOCK" (OFF) position when selector lever is at "P" position.	6	P.23A-535
Ignition key can be turned to "LOCK" (OFF) position when selector lever is at any position other than "P" position.	7	P.23A-536

SYMPTOM PROCEDURES <KEY INTERLOCK AND SHIFT LOCK MECHANISMS>

INSPECTION PROCEDURE 1: Selector Lever can be Moved from "P" to "R" Position without Depressing Brake Pedal when Ignition Key is at Positions other than "LOCK" (OFF) Position.

TECHNICAL DESCRIPTION (COMMENT)

Lock cam or shift lock cable may be defective.

TROUBLESHOOTING HINTS

- Malfunction of lock cam
- Malfunction of shift lock cable

DIAGNOSIS

STEP 1. Check the fit of the lock cam.

Q: Is the lock cam installed correctly?

YES : Go to Step 2.

NO : Install the lock cam correctly. Refer to [P.23A-562](#). When the brake pedal is released with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

STEP 2. Check the lock cam.

Q: Is the lock cam in good condition?

YES : Go to Step 3.

NO : Replace the lock cam. Refer to [P.23A-562](#). When the brake pedal is released with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

INSPECTION PROCEDURE 2: Selector Lever cannot be Moved from "P" to "R" Position with Brake Pedal Depressed when Ignition Key is at Positions other than "LOCK" (OFF) Position.

TECHNICAL DESCRIPTION (COMMENT)

Selector lever assembly, shift lock cable, key interlock cable, transmission control cable, or lock cam may be defective.

STEP 3. Check the fit of the shift lock cable.

Q: Is the shift lock cable installed correctly?

YES : Go to Step 4.

NO : Install the shift lock cable correctly. Refer to [P.23A-564](#). When the brake pedal is released with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

STEP 4. Check the shift lock cable.

Q: Is the shift lock cable in good condition?

YES : No action to be taken.

NO : Replace the shift lock cable. Refer to [P.23A-564](#). When the brake pedal is released with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

TROUBLESHOOTING HINTS

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

DIAGNOSIS

STEP 1. Check the connection of lock cam and key interlock cable.

Q: Is the connection of lock cam and key interlock cable in good condition?

YES : Go to Step 2.

NO : Repair the connection of lock cam and shift lock cable. When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

STEP 2. Check the connection of selector lever assembly and shift transmission control cable.

Q: Is the connection of selector lever assembly and shift transmission control cable in good condition?

YES : Go to Step 3.

NO : Repair the connection of selector lever assembly and shift transmission control cable. When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

STEP 3. Check the fit of the shift lock cable.

Q: Is the shift lock cable installed correctly?

YES : Go to Step 4.

NO : Install the shift lock cable correctly. Refer to [P.23A-564](#). When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

STEP 4. Check the shift lock cable.

Q: Is the shift lock cable in good condition?

YES : Go to Step 5.

NO : Replace the shift lock cable. Refer to [P.23A-564](#). When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

STEP 5. Check the fit of the key interlock cable.

Q: Is the key interlock cable installed correctly?

YES : Go to Step 6.

NO : Install the key interlock cable correctly. Refer to [P.23A-564](#). When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

STEP 6. Check the key interlock cable.

Q: Is the key interlock cable in good condition?

YES : Go to Step 7.

NO : Replace the key interlock cable. Refer to [P.23A-564](#). When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

STEP 7. Check the fit of the transmission control cable.

Q: Is the transmission control cable installed correctly?

YES : Go to Step 8.

NO : Install the transmission control cable correctly. Refer to [P.23A-559](#). When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

STEP 8. Check the transmission control cable.

Q: Is the transmission control cable in good condition?

YES : Repair or replace the selector lever assembly. Refer to [P.23A-559](#) and [P.23A-562](#). When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

NO : Replace the transmission control cable. Refer to [P.23A-559](#). When the brake pedal is depressed with the ignition key at other positions than "LOCK" (OFF) position, check that the selector lever can be moved from "P" position to "R" position.

INSPECTION PROCEDURE 3: Selector Lever can be Moved from "P" to "R" Position with Brake Pedal Depressed when Ignition Key is at "LOCK" (OFF) Position.

TECHNICAL DESCRIPTION (COMMENT)

Key interlock cable or lock cam may be defective.

TROUBLESHOOTING HINTS

- Malfunction of lock cam
- Malfunction of key interlock cable

DIAGNOSIS

STEP 1. Check the connection of lock cam and key interlock cable.

Q: Is the connection of lock cam and key interlock cable in good condition?

YES : Go to Step 2.

NO : Repair the connection of lock cam and shift lock cable. When the brake pedal is depressed with the ignition key at the "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

STEP 2. Check the fit of the lock cam.

Q: Is the lock cam installed correctly?

YES : Go to Step 3.

NO : Install the lock cam correctly. Refer to [P.23A-562](#). When the brake pedal is depressed with the ignition key at the "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

STEP 3. Check the lock cam.

Q: Is the lock cam in good condition?

YES : Go to Step 4.

NO : Replace the lock cam. Refer to [P.23A-562](#). When the brake pedal is depressed with the ignition key at the "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

STEP 4. Check the fit of the key interlock cable.

Q: Is the key interlock cable installed correctly?

YES : Go to Step 5.

NO : Install the key interlock cable correctly. Refer to [P.23A-564](#). When the brake pedal is depressed with the ignition key at the "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

STEP 5. Check the key interlock cable.

Q: Is the key interlock cable in good condition?

YES : No action to be taken.

NO : Replace the key interlock cable. Refer to [P.23A-564](#). When the brake pedal is depressed with the ignition key at the "LOCK" (OFF) position, check that the selector lever can not be moved from "P" position to "R" position.

INSPECTION PROCEDURE 4: Selector Lever cannot be Moved from "P" to "R" Position Smoothly.

TECHNICAL DESCRIPTION (COMMENT)

Key interlock cable, shift lock cable, transmission control cable, lock cam, or selector lever assembly may be defective.

TROUBLESHOOTING HINTS

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

DIAGNOSIS

STEP 1. Check the connection of lock cam and key interlock cable.

Q: Is the connection of lock cam and key interlock cable in good condition?

YES : Go to Step 2.

NO : Repair the connection of lock cam and shift lock cable. Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 2. Check the connection of selector lever assembly and transmission control cable.

Q: Is the connection of selector lever assembly and transmission control cable in good condition?

YES : Go to Step 3.

NO : Repair the connection of selector lever assembly and transmission control cable. Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 3. Check the fit of the lock cam.

Q: Is the lock cam installed correctly?

YES : Go to Step 4.

NO : Install the lock cam correctly. Refer to [P.23A-562](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 4. Check the lock cam.

Q: Is the lock cam in good condition?

YES : Go to Step 5.

NO : Replace the lock cam. Refer to [P.23A-562](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 5. Check the fit of the shift lock cable.

Q: Is the shift lock cable installed correctly?

YES : Go to Step 6.

NO : Install the shift lock cable correctly. Refer to [P.23A-564](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 6. Check the shift lock cable.

Q: Is the shift lock cable in good condition?

YES : Go to Step 7.

NO : Replace the shift lock cable. Refer to [P.23A-564](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 7. Check the fit of the key interlock cable.

Q: Is the key interlock cable installed correctly?

YES : Go to Step 8.

NO : Install the key interlock cable correctly. Refer to [P.23A-564](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 8. Check the key interlock cable.

Q: Is the key interlock cable in good condition?

YES : Go to Step 9.

NO : Replace the key interlock cable. Refer to [P.23A-564](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 9. Check the fit of the transmission control cable.

Q: Is the transmission control cable installed correctly?

YES : Go to Step 10.

NO : Install the transmission control cable correctly. Refer to [P.23A-559](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

STEP 10. Check the transmission control cable.

Q: Is the transmission control cable in good condition?

YES : Repair or replace the selector lever assembly. Refer to [P.23A-559](#) and [P.23A-562](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

NO : Replace the transmission control cable. Refer to [P.23A-559](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

INSPECTION PROCEDURE 5: Selector Lever cannot be Moved from "R" Position to "P" Position.**TECHNICAL DESCRIPTION (COMMENT)**

Selector lever assembly, transmission control cable, or lock cam may be defective.

TROUBLESHOOTING HINTS

- Malfunction of selector lever assembly
- Malfunction of transmission control cable
- Malfunction of lock cam

DIAGNOSIS

STEP 1. Check the connection of selector lever assembly and transmission control cable.

Q: Is the connection of selector lever assembly and transmission control cable in good condition?

YES : Go to Step 2.

NO : Repair the connection of selector lever assembly and transmission control cable. Check that the selector lever can be moved from "R" position to "P" position.

STEP 2. Check the fit of the lock cam.

Q: Is the lock cam installed correctly?

YES : Go to Step 3.

NO : Install the lock cam correctly. Refer to [P.23A-562](#). Check that the selector lever can be moved from "R" position to "P" position.

STEP 3. Check the lock cam.

Q: Is the lock cam in good condition?

YES : Go to Step 4.

NO : Replace the lock cam. Refer to [P.23A-562](#). Check that the selector lever can be moved from "R" position to "P" position.

STEP 4. Check the fit of the transmission control cable.

Q: Is the transmission control cable installed correctly?

YES : Go to Step 5.

NO : Install the transmission control cable correctly. Refer to [P.23A-559](#). Check that the selector lever can be moved from "R" position to "P" position.

STEP 5. Check the transmission control cable.

Q: Is the transmission control cable in good condition?

YES : Repair or replace the selector lever assembly. Refer to [P.23A-559](#) and [P.23A-562](#). Check that the selector lever can be moved from "P" position to "R" position smoothly.

NO : Replace the transmission control cable. Refer to [P.23A-559](#). Check that the selector lever can be moved from "R" position to "P" position.

INSPECTION PROCEDURE 6: Ignition Key cannot be Turned to "LOCK" (OFF) Position when Selector Lever is at "P" Position.

TECHNICAL DESCRIPTION (COMMENT)

Lock cam, steering lock cylinder assembly, transmission control cable, or key interlock cable may be defective.

TROUBLESHOOTING HINTS

- Malfunction of lock cam
- Malfunction of key interlock cable
- Malfunction of transmission control cable
- Malfunction of steering lock cylinder assembly

DIAGNOSIS

STEP 1. Check the connection of lock cam and key interlock cable.

Q: Is the connection of lock cam and key interlock cable in good condition?

YES : Go to Step 2.

NO : Repair the connection of lock cam and shift lock cable. Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at "P" position.

STEP 2. Check the fit of the lock cam.

Q: Is the lock cam installed correctly?

YES : Go to Step 3.

NO : Install the lock cam correctly. Refer to [P.23A-562](#). Check that the selector lever can be moved from "R" position to "P" position.

STEP 3. Check the lock cam.**Q: Is the lock cam in good condition?****YES :** Go to Step 4.**NO :** Replace the lock cam. Refer to [P.23A-562](#).
Check that the selector lever can be moved from "R" position to "P" position.**STEP 4. Check the fit of the key interlock cable.****Q: Is the key interlock cable installed correctly?****YES :** Go to Step 5.**NO :** Install the key interlock cable correctly.
Refer to [P.23A-564](#). Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at "P" position.**STEP 5. Check the key interlock cable.****Q: Is the key interlock cable in good condition?****YES :** Go to Step 6.**NO :** Replace the key interlock cable. Refer to [P.23A-564](#). Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at "P" position.**STEP 6. Check the fit of the transmission control cable.****Q: Is the transmission control cable installed correctly?****YES :** Replace the steering lock cylinder assembly. Refer to [P.37-22](#) and [P.37-25](#).
Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at "P" position.**NO :** Install the transmission control cable correctly. Refer to [P.23A-562](#). Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at "P" position.**INSPECTION PROCEDURE 7: Ignition Key can be Turned to "LOCK" (OFF) Position when Selector at Positions other than "P" Position.****TECHNICAL DESCRIPTION (COMMENT)**

Lock cam, steering lock cylinder assembly, transmission control cable, or key interlock cable may be defective.

TROUBLESHOOTING HINTS

- Malfunction of lock cam
- Malfunction of steering lock cylinder assembly
- Malfunction of transmission control cable
- Malfunction of key interlock cable

DIAGNOSIS**STEP 1. Check the connection of lock cam and key interlock cable.****Q: Is the connection of lock cam and key interlock cable in good condition?****YES :** Go to Step 2.**NO :** Repair the connection of lock cam and shift lock cable. Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at any position other than "P" position.**STEP 2. Check the fit of the lock cam.****Q: Is the lock cam installed correctly?****YES :** Go to Step 3.**NO :** Install the lock cam correctly. Refer to [P.23A-562](#). Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at any position other than "P" position.**STEP 3. Check the lock cam.****Q: Is the lock cam in good condition?****YES :** Go to Step 4.**NO :** Replace the lock cam. Refer to [P.23A-562](#).
Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at any position other than "P" position.

STEP 4. Check the fit of the key interlock cable.

Q: Is the key interlock cable installed correctly?

YES : Go to Step 5.

NO : Install the key interlock cable correctly. Refer to [P.23A-564](#). Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at any position other than "P" position.

STEP 5. Check the key interlock cable.

Q: Is the key interlock cable in good condition?

YES : Go to Step 6.

NO : Replace the key interlock cable. Refer to [P.23A-564](#). Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at any position other than "P" position.

STEP 6. Check the fit of the transmission control cable.

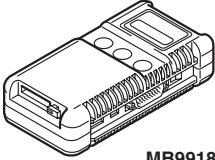
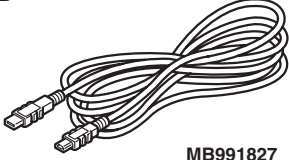

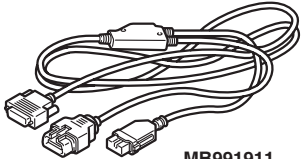
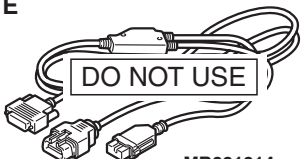
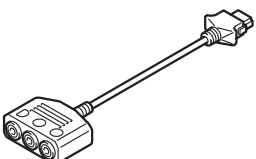

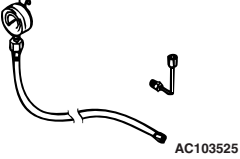
Q: Is the transmission control cable installed correctly?

YES : Replace the steering lock cylinder assembly. Refer to [P.37-22](#) and [P.37-25](#). Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at any position other than "P" position.

NO : Install the transmission control cable correctly. Refer to [P.23A-562](#). Check that the ignition key can not be turned to the "LOCK" (OFF) position with the selector lever at any position other than "P" position.

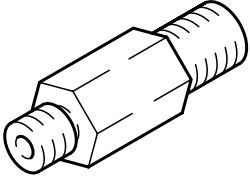
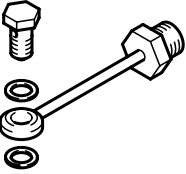
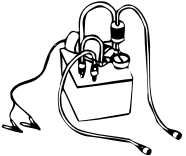
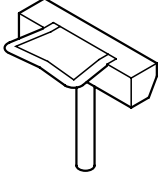
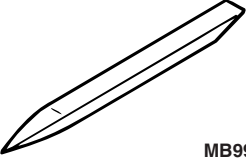
SPECIAL TOOLS

M1231100600153

TOOL	TOOL NUMBER AND NAME	SUPERSESION	APPLICATION
<p>A</p>  <p>MB991824</p> <p>B</p>  <p>MB991827</p> <p>C</p>  <p>MB991910</p> <p>D</p>  <p>MB991911</p> <p>E</p>  <p>MB991914</p> <p>F</p>  <p>MB991825</p> <p>G</p>  <p>MB991826 MB991958</p>	<p>MB991958 A: MB991824 B: MB991827 C: MB991910 D: MB991911 E: MB991914 F: MB991825 G: MB991826</p> <p>MUT-III sub assembly A: Vehicle communication interface (V.C.I.) B: MUT-III USB cable C: MUT-III main harness A (Vehicles with CAN communication system) D: MUT-III main harness B (Vehicles without CAN communication system) E: MUT-III main harness C (for Daimler Chrysler models only) F: MUT-III measurement adapter G: MUT-III trigger harness</p>	<p>MB991824-KIT <i>NOTE: G: MB991826 MUT-III trigger harness is not necessary when pushing V.C.I ENTER key</i></p>	<p>Checking diagnostic trouble codes</p> <p>CAUTION MUT-III main harness B (MB991911) should be used. MUT-III main harness A and C should not be used for this vehicle.</p>
 <p>AC103525</p>	<p>MD998330 (Includes MD998331) Oil pressure gauge (3.0 MPa, 427 psi)</p>	<p>MD998330-01</p>	<p>Measurement of hydraulic pressure</p>

**AUTOMATIC TRANSMISSION
SPECIAL TOOLS**

23A-539

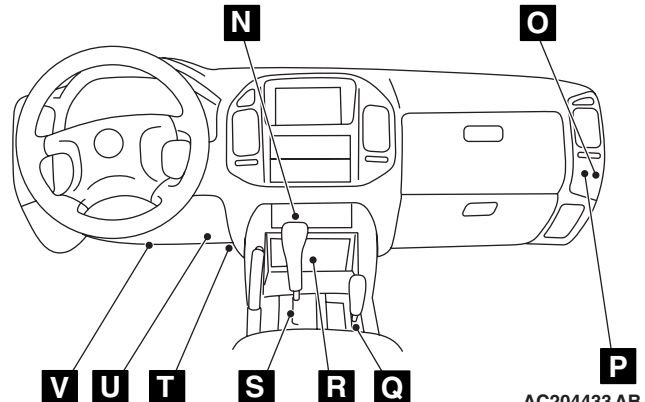
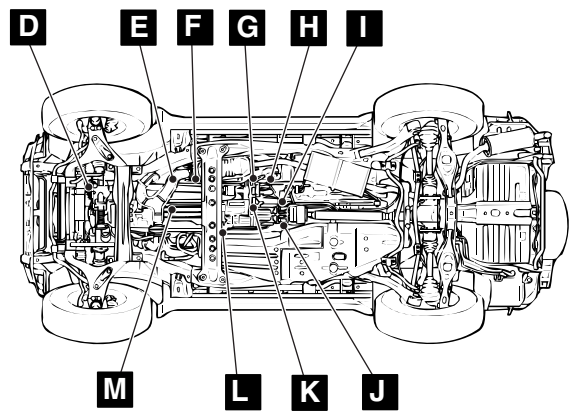
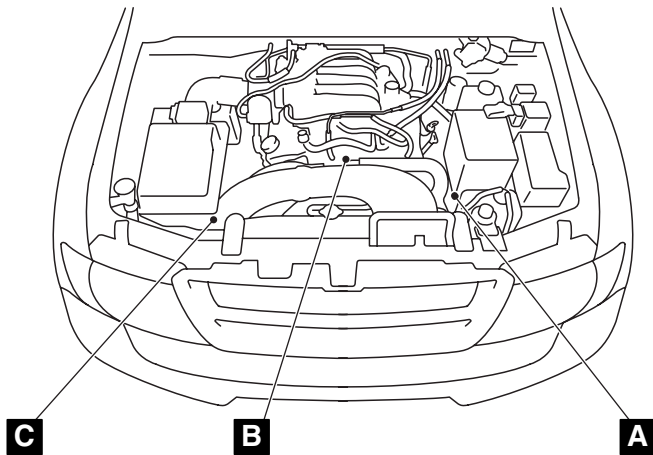
TOOL	TOOL NUMBER AND NAME	SUPERSESION	APPLICATION
	MD998332 Adapter	MD998332-01	Connection for oil pressure gauge
	MD998900 Adapter	MD998900-01	Connection for oil pressure gauge
	MB995062 Flushing tool	MLR-6906C or equivalent	Flushing cooler and tube
 <p align="right">D998727</p>	MD998727 Oil pan remover	MD998727-01	Removal of oil pan
 <p align="right">MB990784</p>	MB990784 Ornament remover	General service tool	Removal of shift knob

ON-VEHICLE SERVICE

AUTOMATIC TRANSMISSION CONTROL COMPONENT LAYOUT

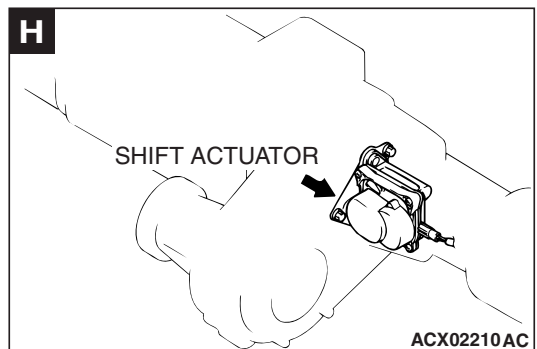
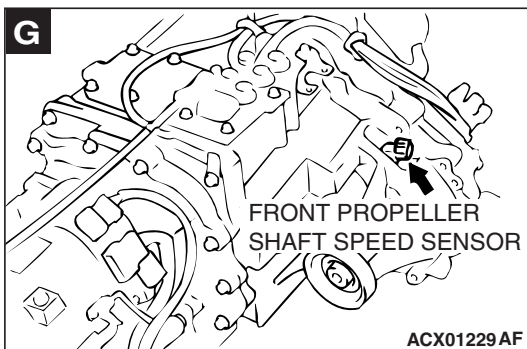
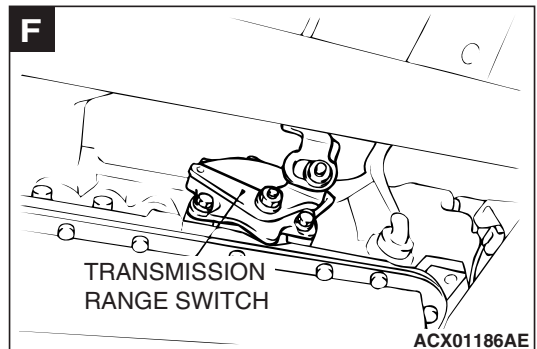
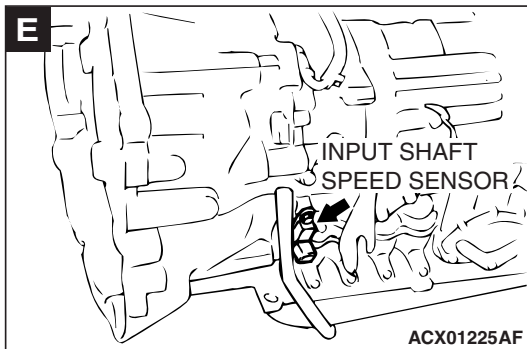
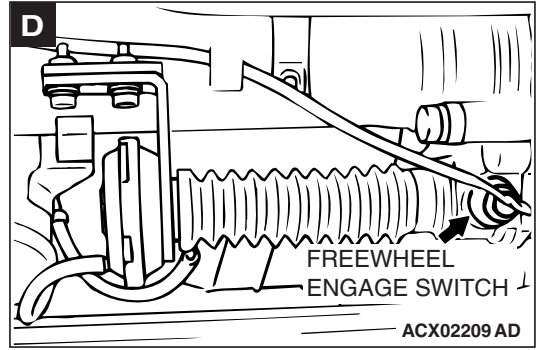
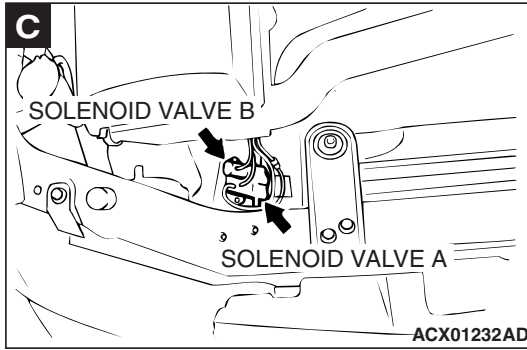
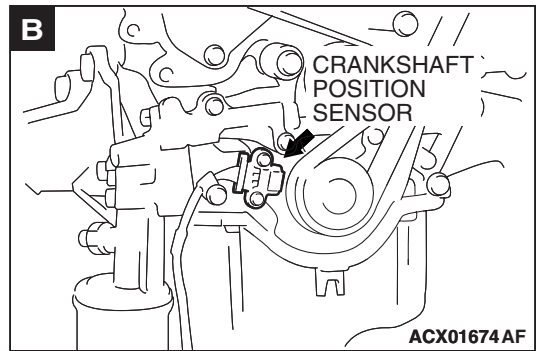
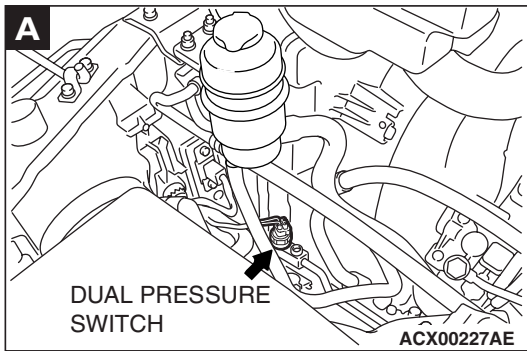
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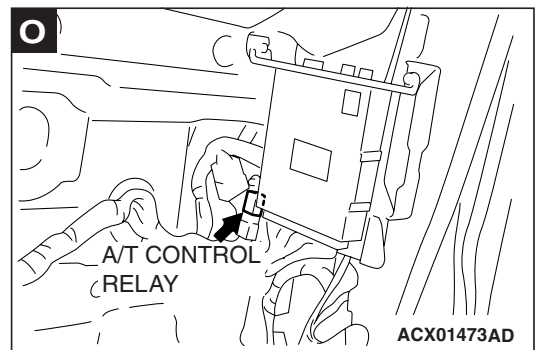
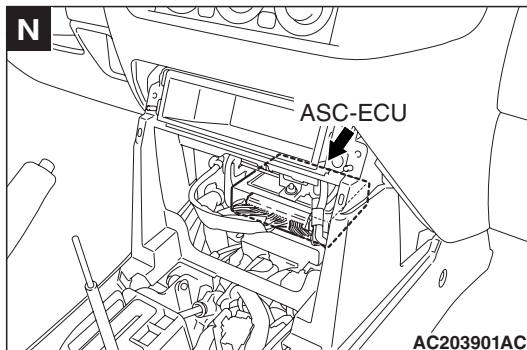
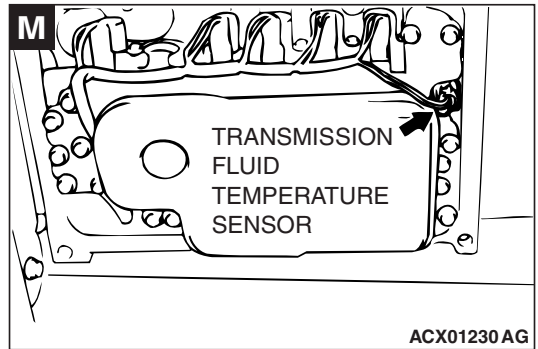
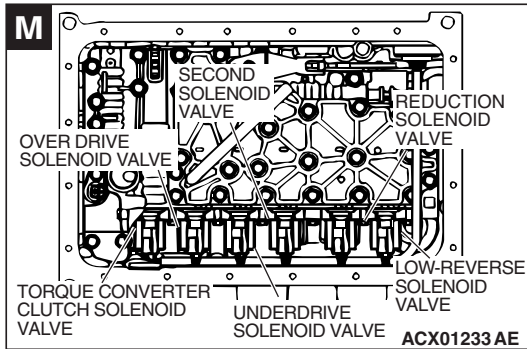
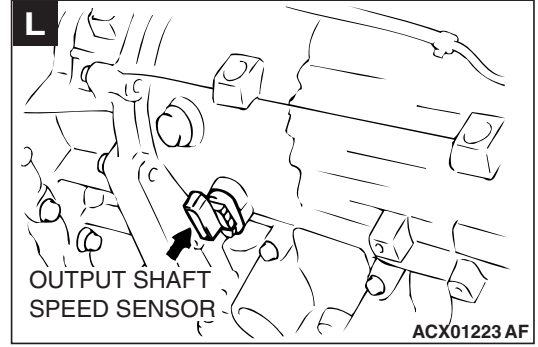
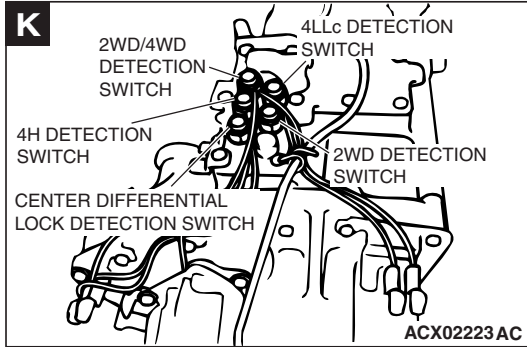
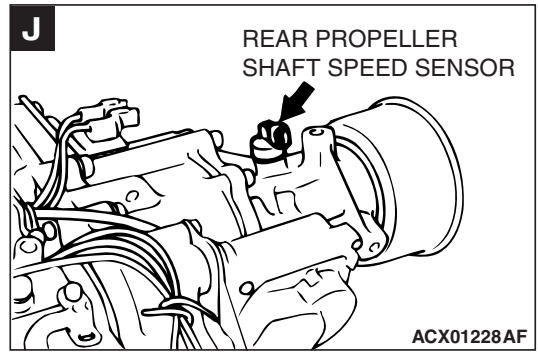
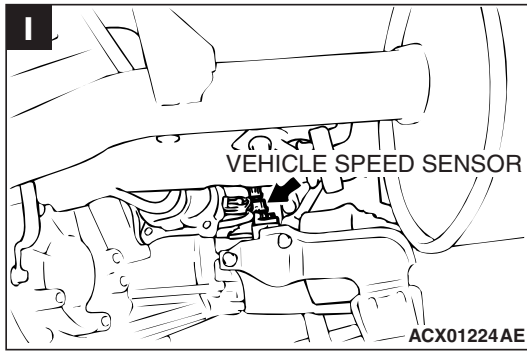
NAME	SYMBOL	NAME	SYMBOL
2WD detection switch	K	Input shaft speed sensor	E
2WD/4WD detection switch	K	Output shaft speed sensor	L
4H detection switch	K	Powertrain control module (PCM)	P
4LLc detection switch	K	Rear propeller shaft speed sensor	J
Accelerator pedal position sensor	U	Select switch	S
ASC-ECU	N	Shift actuator	H
A/T control relay	O	Shift switch (Up and down)	S
A/T control solenoid valves	M	Solenoid valves A and B	C
Center differential lock detection switch	K	Stoplight switch	V
Crankshaft position sensor	B	Transfer-ECU	R
Data link connector	T	Transfer shift lever switch	Q
Dual pressure switch	A	Transmission fluid temperature sensor	M
Freewheel engage switch	D	Transmission range switch	F
Front propeller shaft speed sensor	G	Vehicle speed sensor	I

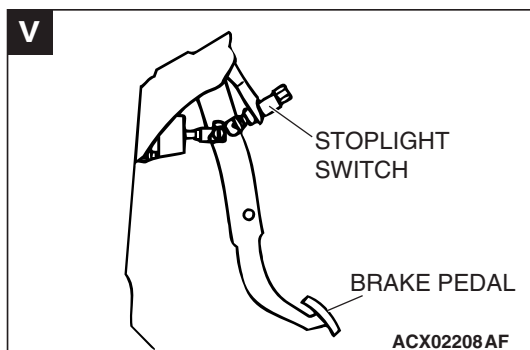
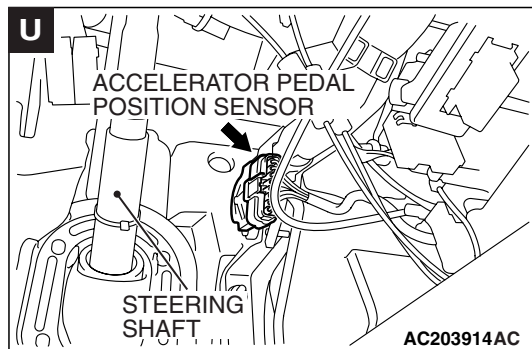
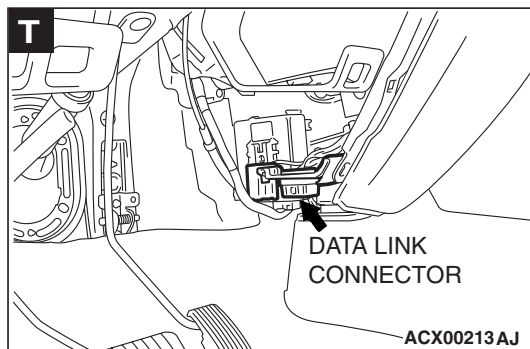
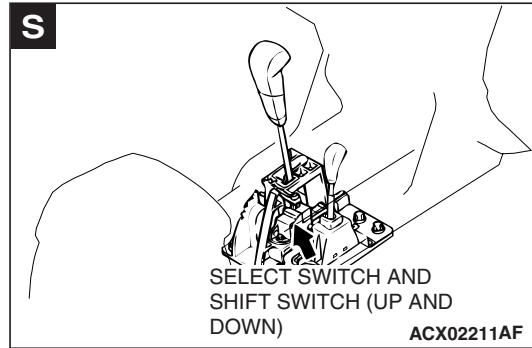
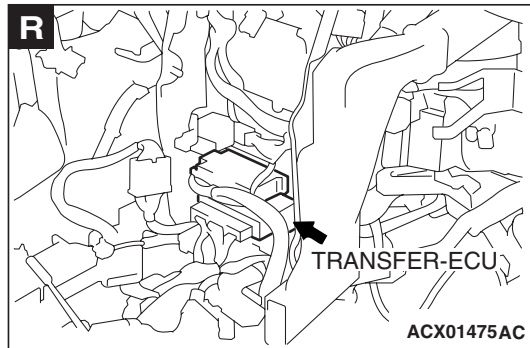
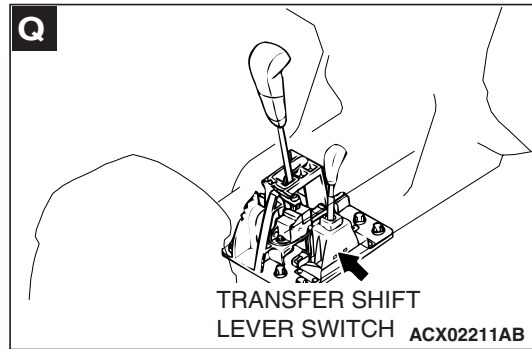
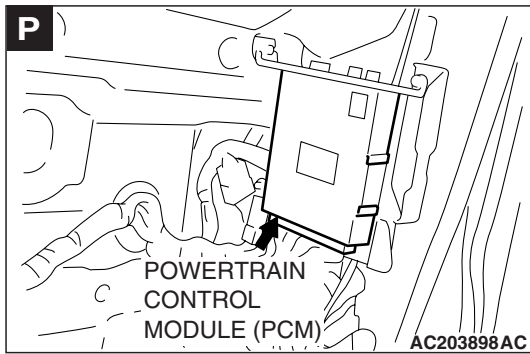


AC204433 AB

TSB Revision







ESSENTIAL SERVICE

TRANSMISSION FLUID CHECK

M1231103700018

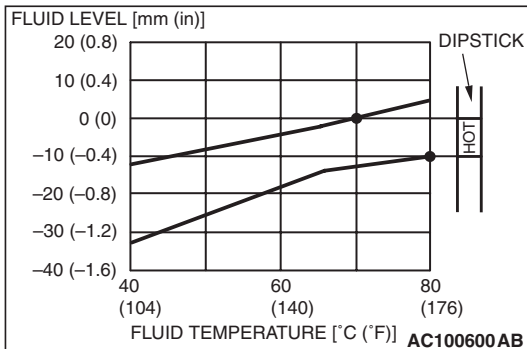
Required Special Tool:

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991911: MUT-III Main Harness B

1. Drive the vehicle until the transmission fluid temperature rises to the normal temperature [70 – 80°C (158 – 176°F)].

NOTE: The transmission fluid temperature is measured with scan tool MB991958.

NOTE: If it takes some amount of time until the transmission fluid reaches its normal operating temperature [70 – 80 °C (158 – 176 °F)], check the transmission fluid level by referring to the left diagram.



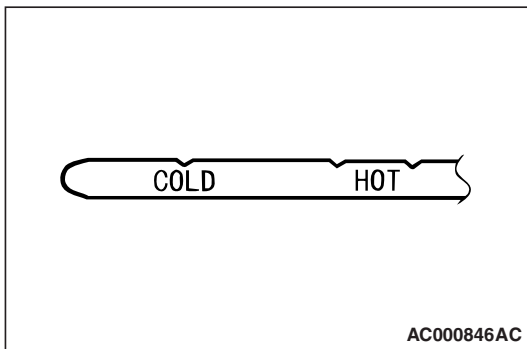
2. Park the vehicle on a level surface.
3. Move the selector lever through all positions to fill the torque converter and the hydraulic circuits with fluid, and then move the selector lever to the "N" position.
4. After wiping off any dirt around the dipstick, remove the dipstick and check the condition of the transmission fluid.

NOTE: If the transmission fluid smells as if it is burnt, it means that the transmission fluid has been contaminated by fine particles from the bushings and friction materials. A transmission overhaul and cooler line flushing may be necessary.

5. Check that the transmission fluid level is at the "HOT" mark on the dipstick. If the transmission fluid level is less than this, add DIAMOND ATF SP III transmission fluid until the level reaches the "HOT" mark.

NOTE: If the transmission fluid level is too low, the oil pump will draw in air along with the transmission fluid, which will cause bubbles to form. If the transmission fluid level is too high, rotating components inside the transmission will churn the fluid and air into a foamy liquid. Both conditions (level too low or too high) will cause the hydraulic pressure to drop, which will result in late shifting and slipping of the clutches and brakes.

In either case, air bubbles can interfere with normal valve, clutch, and brake operation. Also, foaming can cause transmission fluid to escape from the transmission vents where it may be mistaken for a leak.



- Securely insert the dipstick.

NOTE: The transmission fluid should always be replaced under the following conditions:

- *When troubleshooting the transmission*
- *When overhauling the transmission*
- *When the transmission fluid is noticeably dirty or burnt (driving under severe conditions)*

TRANSMISSION FLUID CHANGE

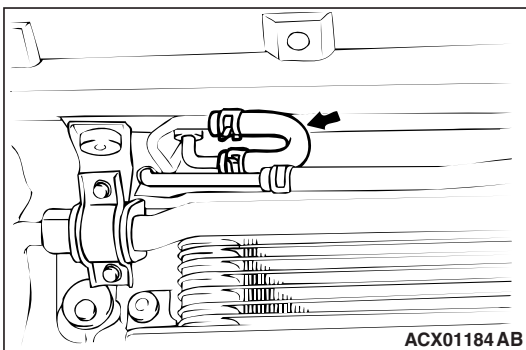
M1231104100019

Required Special Tool:

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991911: MUT-III Main Harness B

If you have an transmission fluid changer, use it to replace the transmission fluid. If you do not have an transmission fluid changer, replace the transmission fluid by the following procedure.

- Disconnect the hose shown in the illustration which connects the transmission and the oil cooler (inside the radiator). Place a container under the hose to collect the discharge.



⚠ CAUTION

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

- Start the engine and let the transmission fluid drain out. (Running conditions: "N" range with engine idling)

Discharge volume: Approximately 4.0 dm³ (4.2 quarts)

- Remove the drain plug from the bottom of the transmission case to drain the transmission fluid.

Discharge volume: Approximately 2.0 dm³ (2.1 quarts)

- Install the drain plug with a new gasket, and tighten it to the specified torque.

Tightening torque: 39 ± 5 N·m (29 ± 3 ft·lb)

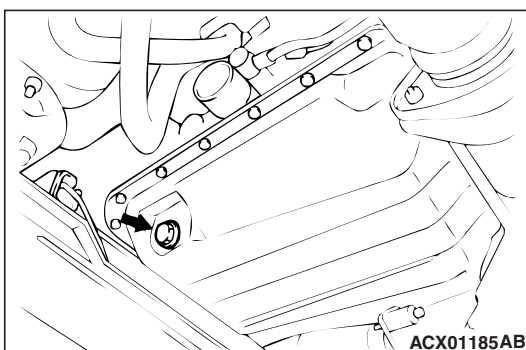
⚠ CAUTION

Stop pouring if the full volume of transmission fluid can not be added.

- Add new transmission fluid (DIAMOND ATF SP III) through the oil filter tube.

Adding volume: Approximately 6.0 dm³ (6.3 quarts)

- Repeat the procedure in Step 2. (to pump out the rest of the contaminated transmission fluid)

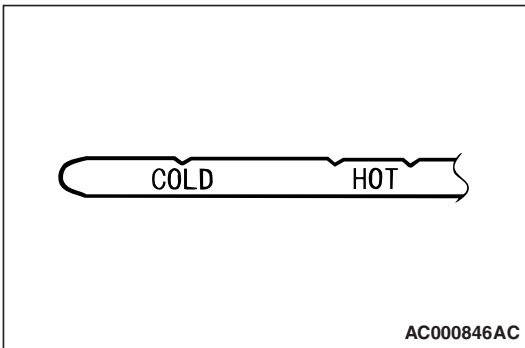
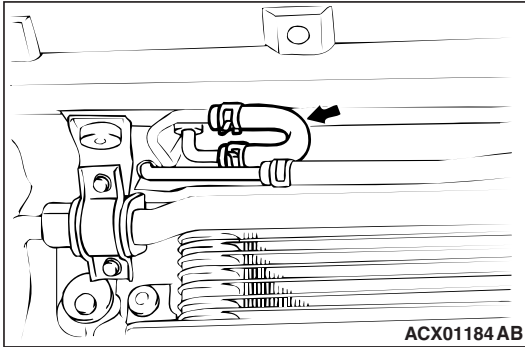


7. Add new transmission fluid (DIAMOND ATF SP III) through the oil filler tube.

Adding volume: Approximately 4.0 dm³ (4.2 quarts)

NOTE: Check for contamination or a burnt odor. If the transmission fluid is still contaminated or burnt, repeat Steps 6 and 7 before proceeding to Step 8.

8. Reconnect the hose which was disconnected in step 1 above, and firmly replace the dipstick.
9. Start the engine and run it at idle for one to two minutes.
10. Move the selector lever through all positions, and then move it to the "N" position.

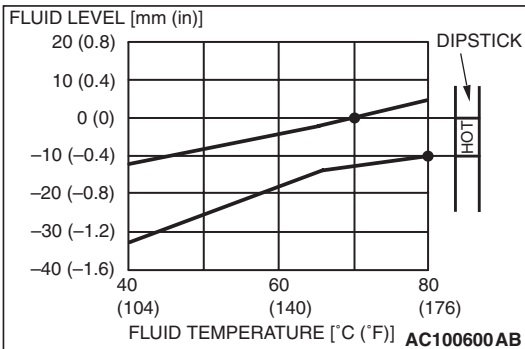


11. Check that the transmission fluid level is at the "COLD" mark on the dipstick. If the level is less than this, add transmission fluid.
12. Drive the vehicle until the transmission fluid temperature rises to the normal operating temperature [70 – 80°C (158 – 176°F)], and then check the transmission fluid level again. The transmission fluid level must be at the "HOT" mark.

NOTE: The transmission fluid temperature is measured with scan tool MB991958.

NOTE: The "COLD" level is for reference only; the "HOT" level should be regarded as the standard level.

NOTE: If it takes some amount of time until the transmission fluid reaches its normal operating temperature [70 – 80 °C (158 – 176 °F)], check the transmission fluid level by referring to the left diagram.



13. When the transmission fluid is less than the specified level, add transmission fluid.

When the transmission fluid is greater than the specified level, drain the excess fluid through the drain plug to adjust the transmission fluid to the specified level.

14. Firmly insert the dipstick into the oil filler tube.

FLUSHING COOLERS AND TUBES

M1231104800160

Required Special Tool:

- MB995062: Flushing Tool

⚠ WARNING

- ***Wear protective eyewear that meets the requirements of and ANSI Z87.1 – 1968 and OSHA. Wear standard industrial rubber gloves.***
- ***Keep lighted cigarettes, sparks, flames, and other ignition sources away from the area to prevent the ignition of combustible liquids and gases. Keep a class B fire extinguisher in the area where the flushing tool will be used. Keep the area well ventilated. Do not let flushing solvent come in contact with eyes or skin. If it does, flush with water for 15 to 20 seconds. Remove contaminated clothing and wash affected skin with soap and water. Seek medical attention.***

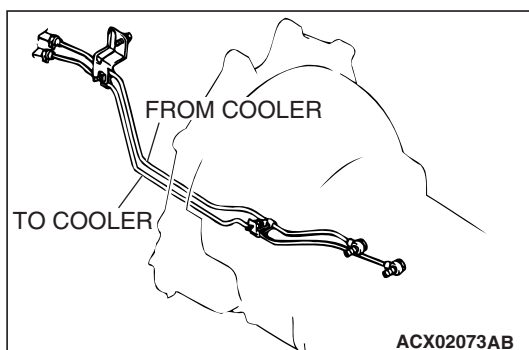
When a transmission failure has contaminated the transmission fluid, the oil cooler(s) must be flushed. The cooler by-pass valve in the transmission must also be replaced. The torque converter must also be replaced with an exchange unit. This will ensure that metal particles or sludged transmission fluid are not later transferred back into the reconditioned (or replaced) transmission. There are two different procedures for flushing coolers and lines. The recommended procedure is to use special tool MB995062 Flushing Tool. The other procedure is to use a hand suction gun and mineral spirits.

1. Remove the cover plate filler plug on special tool MB995062. Fill the reservoir 1/2 to 3/4 full with fresh flushing solution. Flushing solvents are petroleum based solutions generally used to clean transmission components. Do not use solvents containing acids, water, gasoline, or any other corrosive liquids.
2. Reinstall the filler plug on special tool MB995062.
3. Verify that the pump power switch is turned "OFF." Connect the red alligator clip to the positive battery terminal. Connect the black alligator clip to a good ground.

4. Disconnect the cooler lines at the transmission.

NOTE: When flushing the transmission cooler and lines, always reverse flush.

5. Connect the BLUE pressure line to the OUTLET (from cooler) cooler line.
6. Connect the CLEAR return line to the INLET (to cooler) cooler line.
7. Turn the pump "ON" for two to three minutes to flush the cooler(s) and lines. Monitor the pressure readings. Clear the return lines. Pressure readings should stabilize below 138 kPa (20 psi) for vehicles equipped with a single cooler and 208 kPa (30 psi) for vehicles equipped with dual coolers. If flow is intermittent or exceeds these pressures, replace the cooler(s).



8. Turn the pump "OFF."
9. Disconnect the CLEAR suction line from the reservoir at the cover plate. Disconnect the CLEAR return line at the cover plate, and place it in a drain pan.
10. Turn the pump "ON" for 30 seconds to purge flushing solution from the cooler(s) and lines. Turn the pump "OFF."
11. Place the CLEAR suction line into a one quart container of DIAMOND ATF SP III transmission fluid.
12. Turn the pump "ON" until all transmission fluid is removed from the one quart container and lines. This purges any residual cleaning solvent from the transmission cooler(s) and lines. Turn the pump "OFF."
13. Disconnect the alligator clips from the battery. Reconnect the flusher lines to the cover plate, and remove the flushing adapters from the cooler lines. Reconnect the cooler lines.

OIL COOLER FLOW CHECK

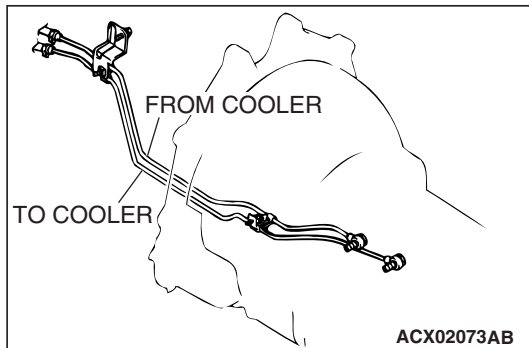
M1231104900156

After the new or repaired transmission has been installed, fill to the proper level with DIAMOND ATF SP III transmission fluid. The flow should be checked using the following procedure:

⚠ CAUTION

With the fluid set at the proper level, transmission fluid collection should not exceed one quart or internal damage to the transmission may occur.

1. Disconnect the OUTLET line (from cooler) at the transmission and place a collecting container under the disconnected line.
2. Run the engine at curb idle speed with the shift selector in neutral.
3. If transmission fluid flow is intermittent or it takes more than 20 seconds to collect one quart of transmission fluid, replace the cooler.
4. If flow is within acceptable limits, reconnect the cooler line. Then fill the transmission to the proper level, using DIAMOND ATF SP III transmission fluid.



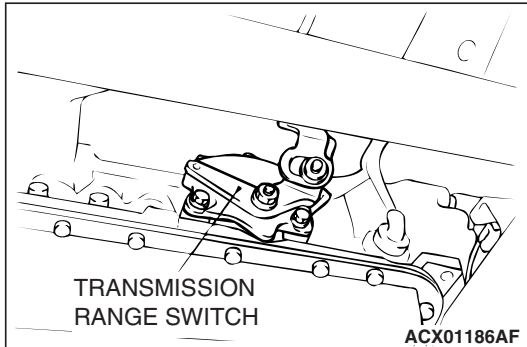
**ACCELERATOR PEDAL POSITION SENSOR
ADJUSTMENT**

M1231102600029

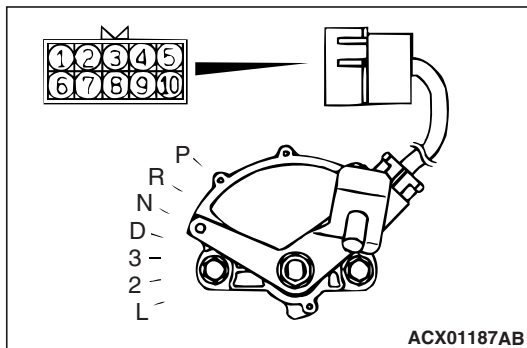
Refer to GROUP 13A – On-vehicle Service – Accelerator Pedal Position Sensor Check [P.13A-1047](#).

**TRANSMISSION RANGE SWITCH CONTINUITY
CHECK**

M1231101900168



ITEM	TERMINAL CONNECTION OF TESTER	SPECIFIED CONDITION
P	1 – 7, 9 – 10	Less than 2 ohms
R	7 – 8	
N	2 – 7, 9 – 10	
D	3 – 7	

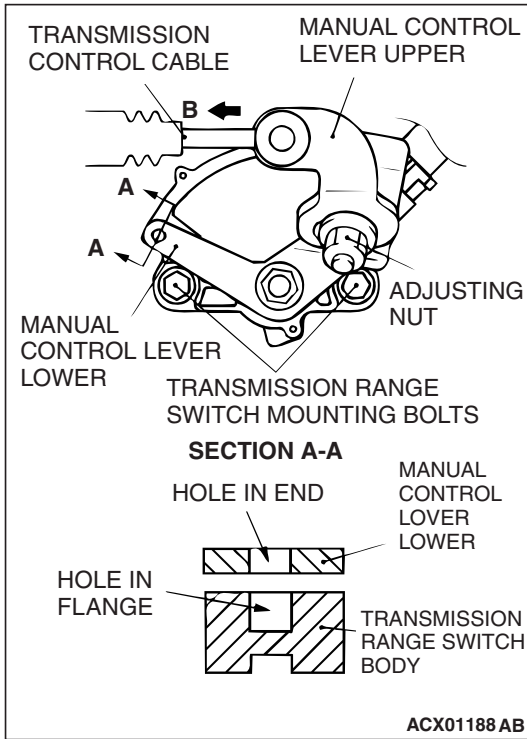


**TRANSMISSION RANGE SWITCH AND CONTROL
CABLE ADJUSTMENT**

M1231109700135

Required Special Tool:

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991911: MUT-III Main Harness B



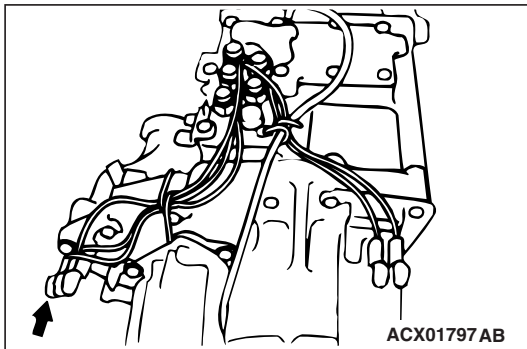
1. Set the selector lever to the "N" position.
2. Loosen the control cable to manual control lever coupling nut to free the cable and lever.
3. Set the manual control lever to the neutral position.
4. Loosen the transmission range switch body mounting bolts and turn the transmission range switch body so the hole in the end of the manual control lever and the hole (cross section A – A in the figure on the left) in the flange of the transmission range switch body are aligned.
NOTE: The transmission range switch body can be aligned by inserting a 5-mm diameter steel bar into the end hole of the manual control lever and the flange hole of the transmission range switch body.
5. Tighten the transmission range switch mounting bolts to the specified torque. Be careful at this time that the switch body does not move.
Tightening torque: 11 ± 1 N·m (98 ± 8 in-lb)
6. Gently pull the transmission control cable in the direction of the arrow (B), until the cable is taut. Tighten the adjusting nut.
Tightening torque: 23 ± 4 N·m (17 ± 3 ft-lb)

7. Check that the selector lever is in the "N" position.
8. Check that each position of the manual control lever matches each position of the selector lever using scan tool MB991958.

2WD/4WD DETECTION SWITCH CHECK

M123111900040

Check for continuity between the terminal of the black connector located on the transfer case.

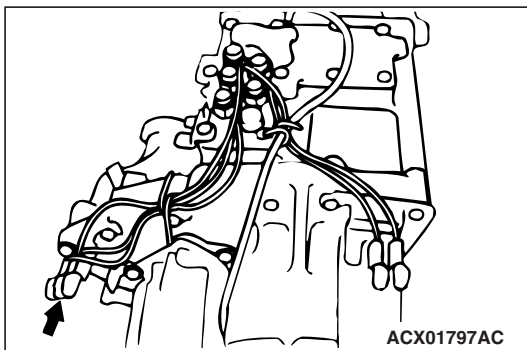


TRANSFER CONTROL LEVER POSITION	CONTINUITY
2H, 4H	Less than 2 ohms
4HLc, 4LLc	Open circuit

4H DETECTION SWITCH CHECK

M123111200040

Check for continuity between the terminal of the white connector located on the transfer case.

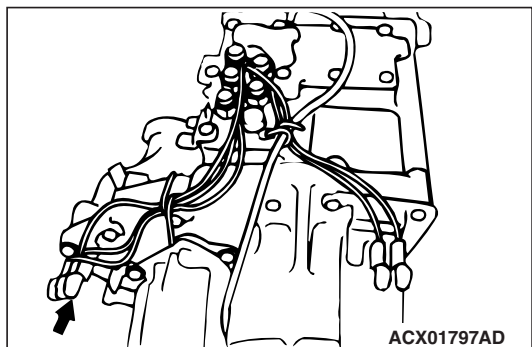


TRANSFER CONTROL LEVER POSITION	CONTINUITY
4H, 4HLc	Less than 2 ohms
2H, 4LLc	Open circuit

CENTER DIFFERENTIAL LOCK DETECTION SWITCH CHECK

M1231112100047

Check for continuity between the terminal of the brown connector located on the transfer case.

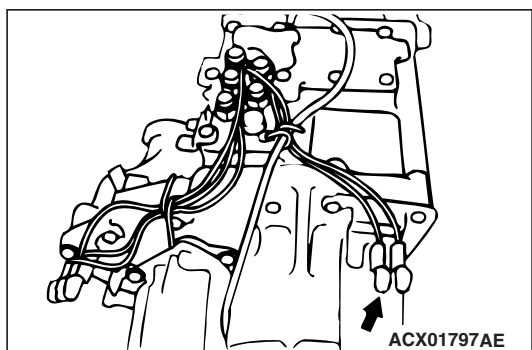


TRANSFER CONTROL LEVER POSITION	CONTINUITY
4HLc, 4LLc	Less than 2 ohms
2H, 4H	Open circuit

2WD DETECTION SWITCH CHECK

M1231112200044

Check for continuity between the terminal of the black connector located on the transfer case.

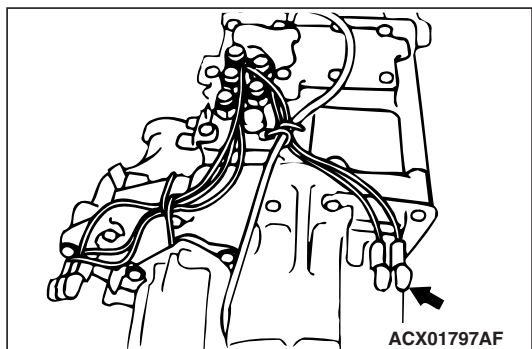


TRANSFER CONTROL LEVER POSITION	CONTINUITY
2H	Less than 2 ohms
Other than 2H	Open circuit

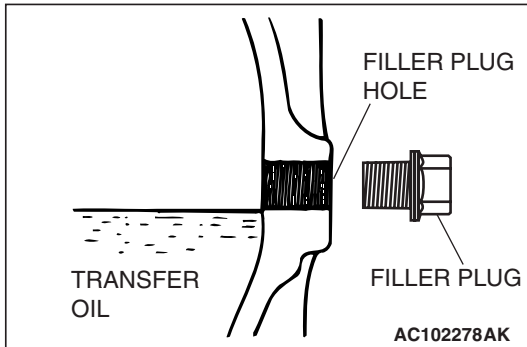
4LLC DETECTION SWITCH CHECK

M1231112300041

Check for continuity between the terminal of the brown connector located on the transfer case.



TRANSFER CONTROL LEVER POSITION	CONTINUITY
4LLc	Less than 2 ohms
Other than 4LLc	Open circuit

**TRANSFER OIL CHECK**

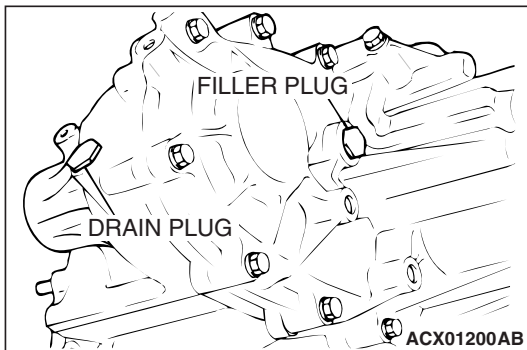
M1231112400112

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 (24 ± 1 ft·lb)

TRANSFER OIL REPLACEMENT

M1231112500119



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

Tightening torque: 32 ± 2 N·m (24 ± 1 ft·lb)

4. Fill in oil to the bottom of the filler plug hole.

Specified oil: Gear oil API classification GL-4 SAE 75W – 85W or 75W – 90

Quantity: 2.8 dm³ (3.0 quarts)

5. Tighten the filler plug to the specified torque.

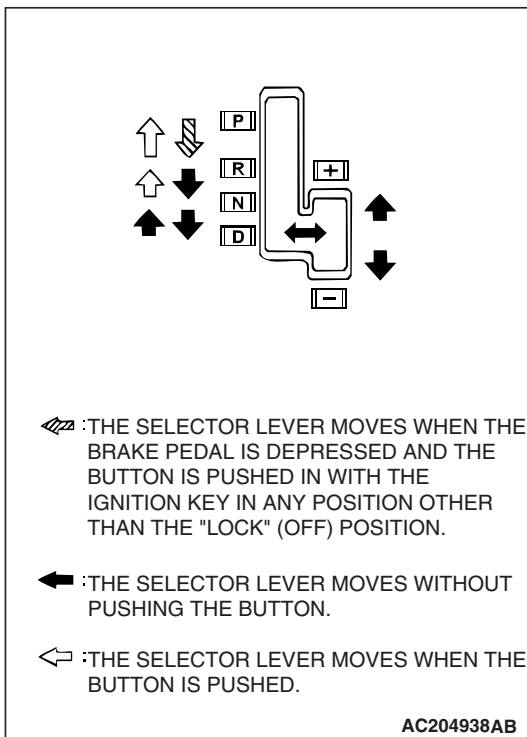
Tightening torque: 32 ± 2 N·m (24 ± 1 ft·lb)

SELECTOR LEVER OPERATION CHECK

M1231001300471

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 the "N" position 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" to the "R" position.

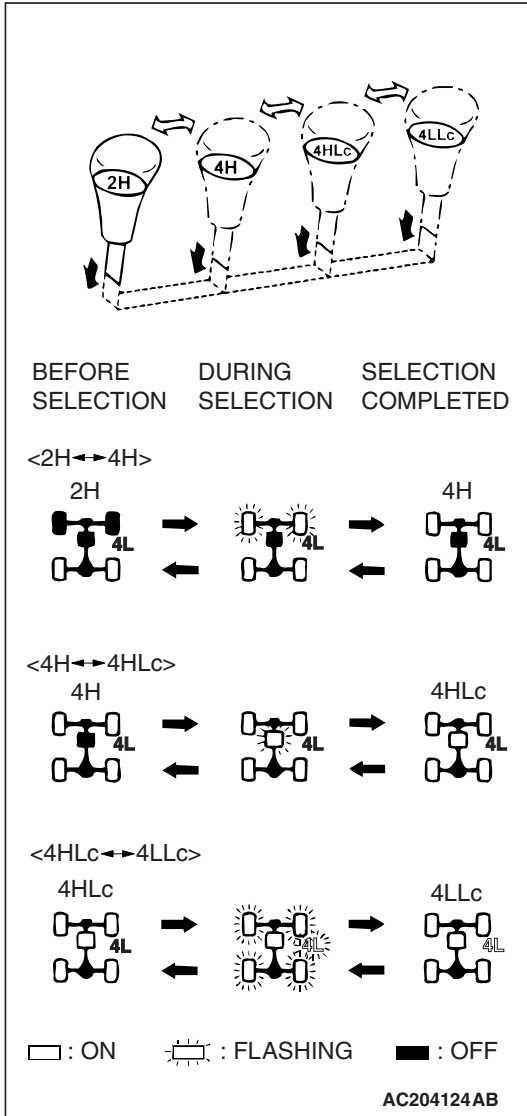
NOTE: The A/T key interlock and shift lock mechanisms prevent movement of the selector lever from the "P" position if the ignition switch is in a position other than "LOCK" (OFF) and the brake pedal is not depressed.



TRANSFER SHIFT LEVER OPERATION CHECK

M1231120800030

1. Check that the transfer shift lever moves smoothly and correctly to each transfer gear position when the lever is pushed downwards and moved.
2. Apply the parking brake, turn the ignition switch to the "ON" position and move the selector lever to "N" position.
3. Check that the 4WD indicator light illuminates, flashes or switches off according to the pattern shown in the illustration when the transfer shift lever is move to each transfer position.
4. If the selection is not completed even after 5 seconds or more have passed, carry out the following procedure.
 - (1) Return the transfer shift lever to the position it was at before selection.
 - (2) Start the engine, drive the vehicle straight forward, and then stop the engine.
 - (3) Apply the parking brake, and then move the selector lever to the "N" position.
 - (4) Operate the transfer shift lever once more.



NOTE: If the vehicle is not fully stopped or if the selector lever is at a position other than "N" position when selecting 4HLc or 4LLc, the 4WD indicator light will flash more quickly than normal, and the 4WD position will not be selected. This is a normal phenomenon which serves to control the smooth selection of 4HLc and 4LLc.

**KEY INTERLOCK AND SHIFT LOCK MECHANISM
CHECK**

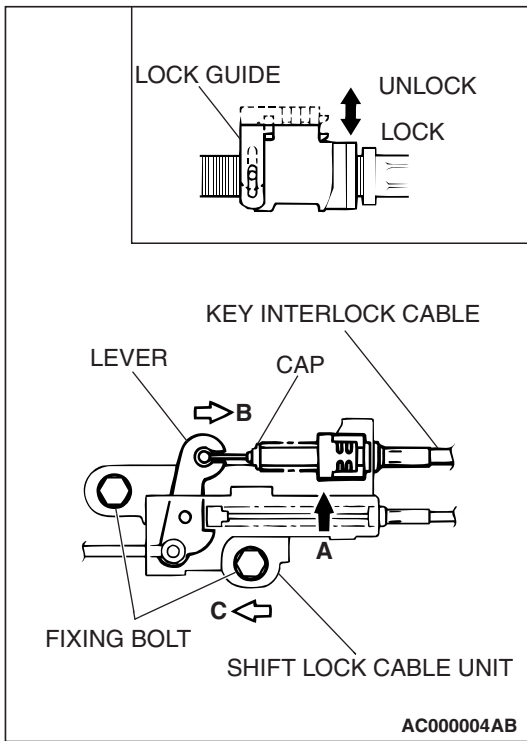
M1232003100249

1. Carry out the following inspection.

KEY INTERLOCK SIDE			
INSPECTION PROCEDURE	INSPECTION REQUIREMENTS	INSPECTION ITEM (NORMAL CONDITION)	
1	Brake pedal: Depressed	Ignition key position: "LOCK" (OFF) or removed	Unable to push in the selector lever push button and move the lever out of the "P" position.
2		Ignition key position: "ACC"	Able to push in the selector lever push button, move the lever out of the "P" position, and shift to any position.
3	Brake pedal: Not depressed	Selector lever: Other than "P" position	Unable to turn the ignition key to the "LOCK" (OFF) position.
4		Selector lever: "P" position	Able to turn the ignition key to the "LOCK" (OFF) position.

SHIFT LOCK SIDE			
INSPECTION PROCEDURE	INSPECTION CONTENTS		CHECK DETAILS (NORMAL CONDITION)
1	Brake pedal: Not depressed	Ignition key position: "ACC"	When the selector lever push button is depressed, the selector lever can not be shifted out of the "P" position.
2	Brake pedal: Depressed		When the selector lever push button is depressed, the selector lever can be shifted smoothly to other position.
3	Brake pedal: Not depressed		When the selector lever push button is depressed, the selector lever can be shifted smoothly from the "R" position to the "P" position.

2. When any of the above checks are not normal, adjust the shift lock cable unit in following procedure.
- (1) Remove the front floor console (Refer to GROUP 52A – Floor Console Assembly P.52A-7).
 - (2) Shift selector lever to "P" position.
 - (3) Turn the ignition key to "LOCK" (OFF) position.



- (4) Loosen the bolt fixing the shift lock cable unit, push the lever in direction B and the unit in direction C and tighten the bolt at the standard torque.

Tightening torque: 5.0 ± 1.0 N·m (44 ± 9 in-lb)

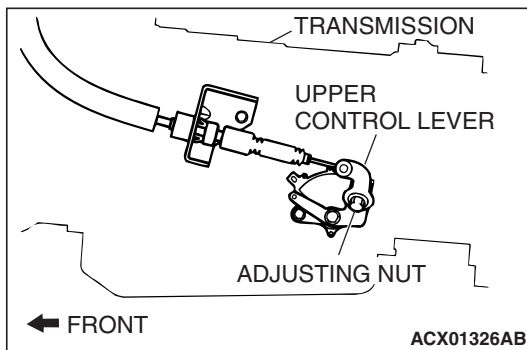
- (5) Lift the lock guide of the key interlocking cable and then unlock it.
- (6) Lower the lock guide of the key interlocking cable and then lock it.

NOTE: The key interlocking cable is adjusted according to the lock position (cap push state) at this time. Readjust the lock position if key interlocking operations malfunction after locking.

3. After adjustment, re-check the operations. Replace the shift lock cable unit if operations are defective (Refer to P.23A-564).

TRANSMISSION CONTROL CABLE ADJUSTMENT

M1231119500035



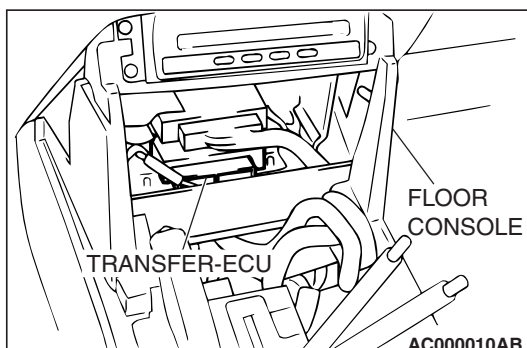
1. Move the selector lever to the "N" position.
2. Loosen the upper control lever adjusting nut.
3. Check that the transmission range switch is at "N" position.
4. Adjust the upper control lever so that there is no slackness or excessive tightness in the transmission control cable, and then tighten the adjusting nut to the specified torque.

Tightening torque: 23 ± 4 N·m (17 ± 3 ft-lb)

5. Check that the transmission operation and functioning in each position corresponds accurately to the position of the selector lever.

TRANSFER-ECU CHECK

M1231120900048



1. Remove the indicator panel and the floor console front panel (Refer to GROUP 52A – Floor Console P.52A-7).
2. Measure the transfer-ECU terminal voltage (Refer to P.23A-526).

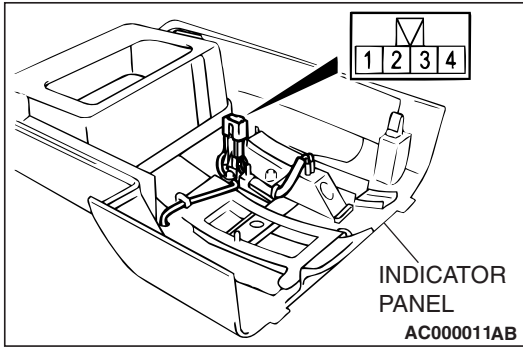
POSITION INDICATOR LIGHT CHECK

M1231121000037

1. Remove the indicator panel (Refer to GROUP 52A – Floor Console P.52A-7).
2. Check that there is continuity between the following terminals:

TERMINAL NO.	NORMAL CONDITION
1 – 2	Less than 2 ohms
3 – 4	

3. If the continuity is incorrect, replace the position indicator light unit assembly.



AUTOMATIC TRANSMISSION CONTROL COMPONENT CHECK

CRANKSHAFT POSITION SENSOR CHECK

M1231102700134

Refer to GROUP 13A, Diagnosis – Check Procedure With Oscilloscope. P.13A-1028.

ACCELERATOR PEDAL POSITION SENSOR CHECK

M1231102800023

Refer to GROUP 13A, On-vehicle Service – Accelerator Pedal Position Sensor Check. P.13A-1028.

TRANSMISSION FLUID TEMPERATURE SENSOR CHECK

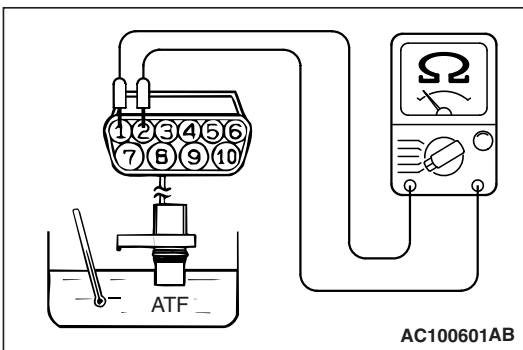
M1231104200016

1. Remove the transmission fluid temperature sensor.
2. Measure the resistance between terminals No.1 and No.2 of the transmission fluid temperature sensor connector.

Standard value:

TRANSMISSION FLUID TEMPERATURE	RESISTANCE
0°C (32°F)	16.7 – 20.5 kΩ
20°C (68°F)	7.3 – 8.9 kΩ
40°C (104°F)	3.4 – 4.2 kΩ
60°C (140°F)	1.9 – 2.2 kΩ
80°C (176°F)	1.0 – 1.2 kΩ
100°C (212°F)	0.57 – 0.69 kΩ

3. If the transmission fluid temperature sensor resistance is outside the specified range and the "A/T TEMP" indicator light is illuminating, replace the transmission fluid temperature sensor.



NOTE: The "A/T TEMP" indicator light on the combination meter illuminating when the temperature reaches approximately 125 °C (257 °F) or greater, and then stops illuminating when the temperature drops below approximately 115 °C (238 °F).

TRANSMISSION RANGE SWITCH CHECK

M1231112600116

Refer to [P.23A-549](#).

STOPLIGHT SWITCH CHECK

M1231103000138

Refer to GROUP 35A, On-vehicle Service – Stoplight Switch Check [P.35A-118](#).

VEHICLE SPEED SENSOR CHECK

M1231109800121

Refer to GROUP 54A, Combination Meters Assembly and Vehicle Speed Sensor [P.54A-75](#).

DUAL PRESSURE SWITCH CHECK

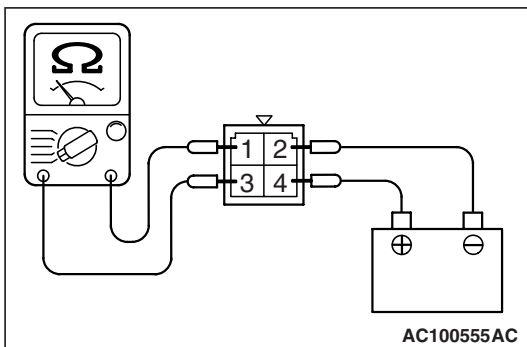
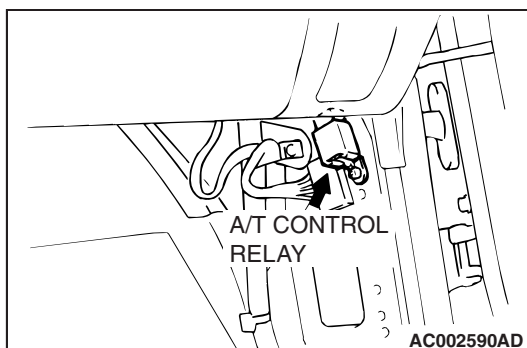
M1231109900128

Refer to GROUP 55A, On-vehicle Service – Dual Pressure Switch Check [P.55A-115](#).

A/T CONTROL RELAY CHECK

M1231110300120

1. Remove the A/T control relay.



2. Use jumper wires to connect A/T control relay terminal 2 to the negative battery terminal and terminal 4 to the positive battery terminal.
3. Check for continuity between A/T control relay terminals 1 and 3 when the jumper wires are connected to and disconnected from the battery.

JUMPER WIRE	CONTINUITY BETWEEN TERMINALS NO.1 AND NO.3
Connected	Less than 2 ohms
Disconnected	Open circuit

4. If there is any problem with the A/T control relay, replace it.

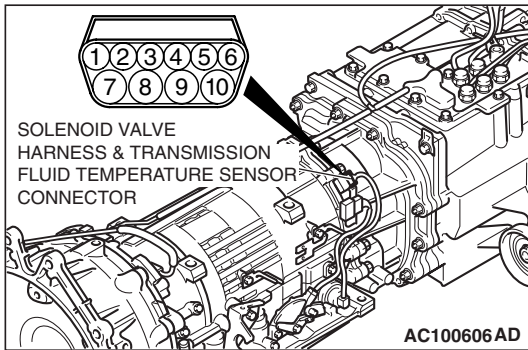
SOLENOID VALVE CHECK

M1231110400127

Required Special Tool:

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: MUT-III USB Cable
 - MB991911: MUT-III Main Harness B

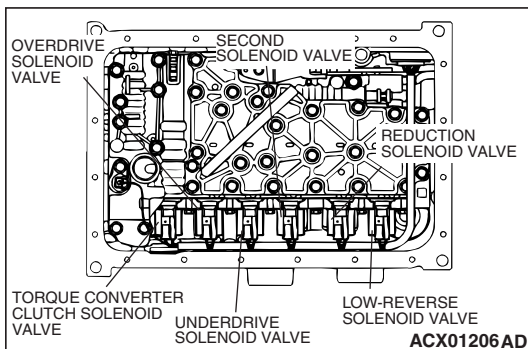
1. Use scan tool MB991958 to measure the transmission fluid temperature. The desired temperature setting for performing the solenoid valve check is 20°C (68°F).
2. Remove the solenoid valve harness and transmission fluid temperature sensor connector.
3. Measure the resistance between the solenoid valve terminals.
4. The measured resistance of the solenoid valve when the transmission fluid temperature is 20°C (68°F) should match the specified resistance on the chart below.

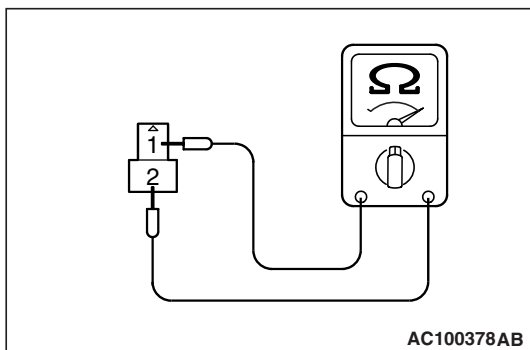


STANDARD VALUE:

TERMINAL NO.	ITEMS	RESISTANCE
7 - 10	Torque converter clutch solenoid valve	2.7 – 3.4 Ω [at 20°C (68°F)]
6 - 10	Low-reverse/Direct solenoid valve	
4 - 9	Second solenoid valve	
3 - 9	Underdrive solenoid valve	
5 - 9	Overdrive solenoid valve	
8 - 10	Reduction solenoid valve	

5. If the solenoid valve resistance is within the specified range, check the power supply and the ground circuits.
6. If the solenoid valve resistance is not within the specified range, drain the transmission fluid and remove the valve body cover.
7. Disconnect the connector of any solenoid valves that are not within the specified range.





8. Measure the resistance between terminals 1 and 2 of any solenoid valve that was not within the specified range.

Specified resistance:

2.7 – 3.4 Ω [at 20°C (68°F)]

9. If the resistance is not within the specified range, replace the solenoid valve.
10. If the resistance is within the specified range, check the wiring harness between the affected A/T control solenoid valve assembly and the solenoid valve. If a problem is not found in the above steps, check the solenoid valve O-rings and replace them if necessary.

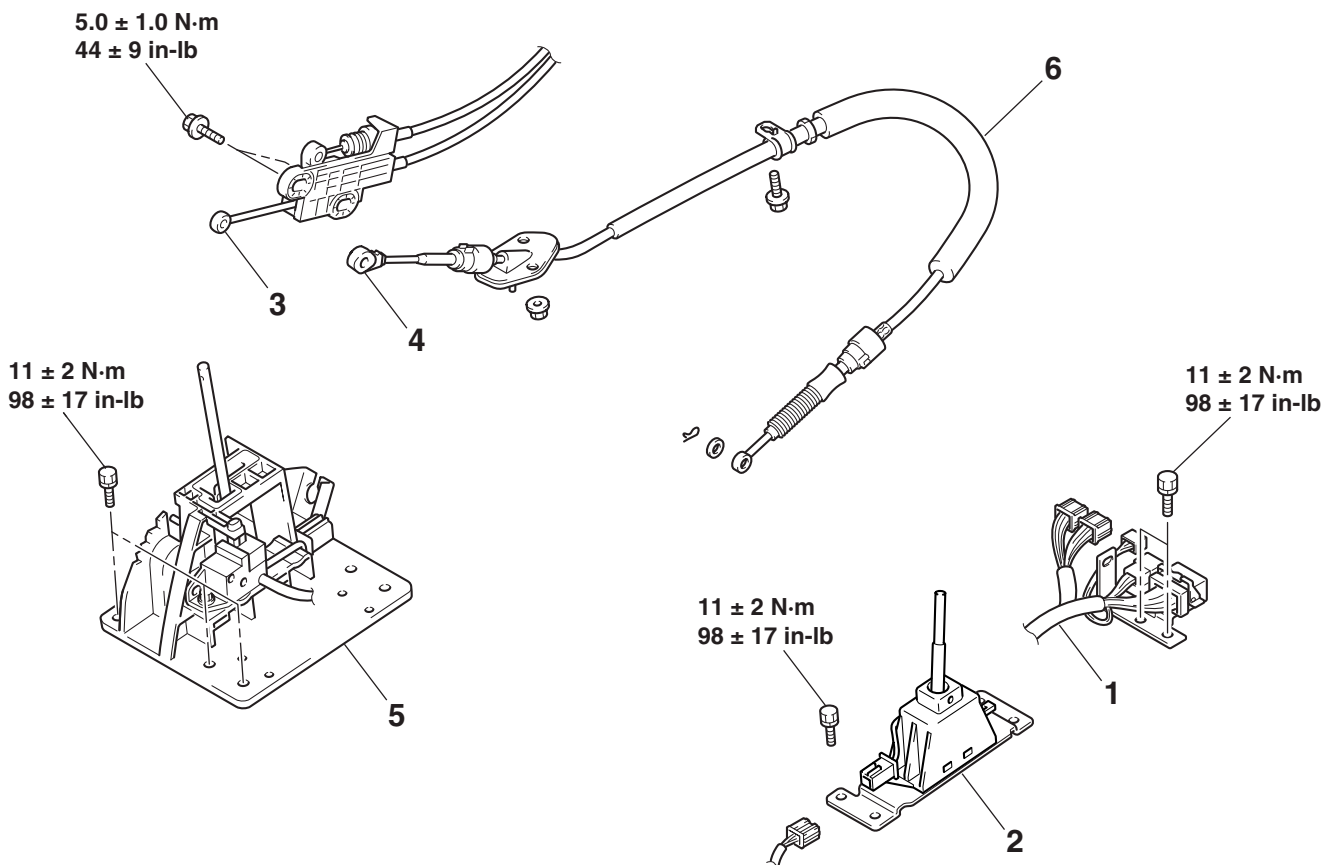
TRANSMISSION CONTROL

REMOVAL AND INSTALLATION

M1231117900112

⚠ WARNING

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



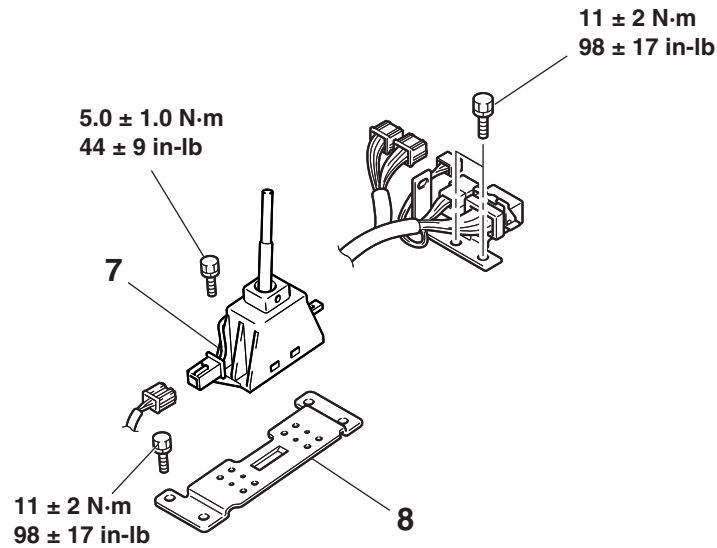
AC000012AD

**SELECTOR LEVER ASSEMBLY
AND TRANSMISSION
CONTROL CABLE ASSEMBLY
REMOVAL STEPS**

- FRONT FLOOR CONSOLE (REFER TO GROUP 52A P.52A-7).
- 1. TRANSMISSION CONTROL HARNESS CONNECTION
- 2. TRANSFER SHIFT LEVER SWITCH, BRACKET ASSEMBLY
- >>B<< 3. SHIFT LOCK CABLE UNIT CONNECTION

**SELECTOR LEVER ASSEMBLY
AND TRANSMISSION
CONTROL CABLE ASSEMBLY
REMOVAL STEPS (Continued)**

- 4. TRANSMISSION CONTROL CABLE CONNECTION
- 5. SELECTOR LEVER ASSEMBLY FRONT EXHAUST PIPE (REFER TO GROUP 15 P.15-13).
- <<A>> >>A<< 6. TRANSMISSION CONTROL CABLE ASSEMBLY



AC204313AB

**TRANSFER SHIFT LEVER
SWITCH REMOVAL STEPS**

- INDICATOR PANEL (REFER TO GROUP 52A – FLOOR CONSOLE P.52A-7).

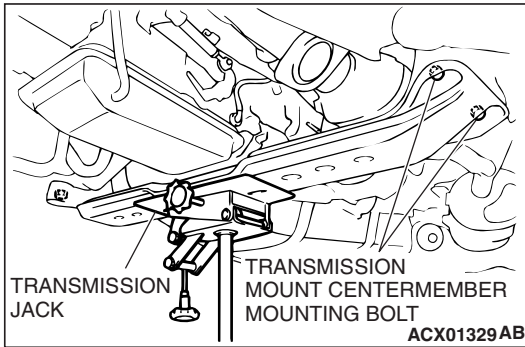
**TRANSFER SHIFT LEVER
SWITCH REMOVAL STEPS**

- 7. TRANSFER SHIFT LEVER SWITCH
- 8. BRACKET

REMOVAL SERVICE POINT

<<A>> TRANSMISSION CONTROL CABLE ASSEMBLY REMOVAL

1. Support the transmission mount center member with a transmission jack, and then remove the transmission mount center member mounting bolts.
2. Lower the transmission so that there is enough room available to remove the transmission control cable assembly mounting nuts, and then remove the transmission control cable assembly mounting nuts.



INSTALLATION SERVICE POINTS

>>A<< TRANSMISSION CONTROL CABLE ASSEMBLY INSTALLATION

After installing the transmission control cable assembly, install the transmission mount center member mounting bolts and tighten them to the specified torque.

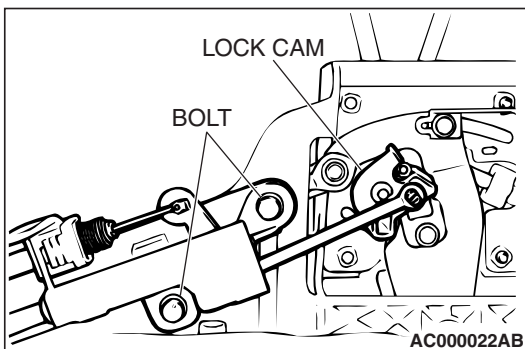
Tightening torque: 44 ± 10 N·m (33 ± 7 ft-lb)

>>B<< SHIFT LOCK CABLE UNIT INSTALLATION

1. Temporarily install the selector lever knob, and then move the selector lever to the "P" position and turn the ignition switch to the "LOCK" (OFF) position.
2. After installing the rod of the shift lock cable unit to the lock cam of the selector lever assembly, install the bolts of the shift lock cable unit.

Tightening torque: 5.0 ± 1.0 N·m (44 ± 9 in-lb)

3. Check the operation of the selector lever assembly (Refer to [P.23A-552](#)).

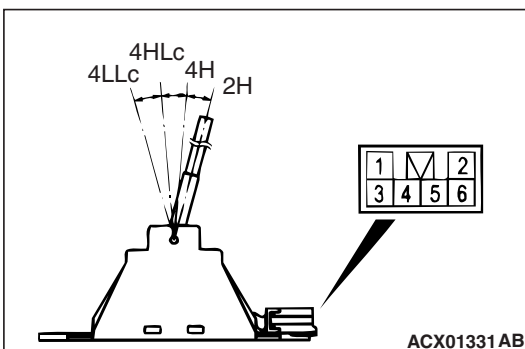


INSPECTION

M1231118000112

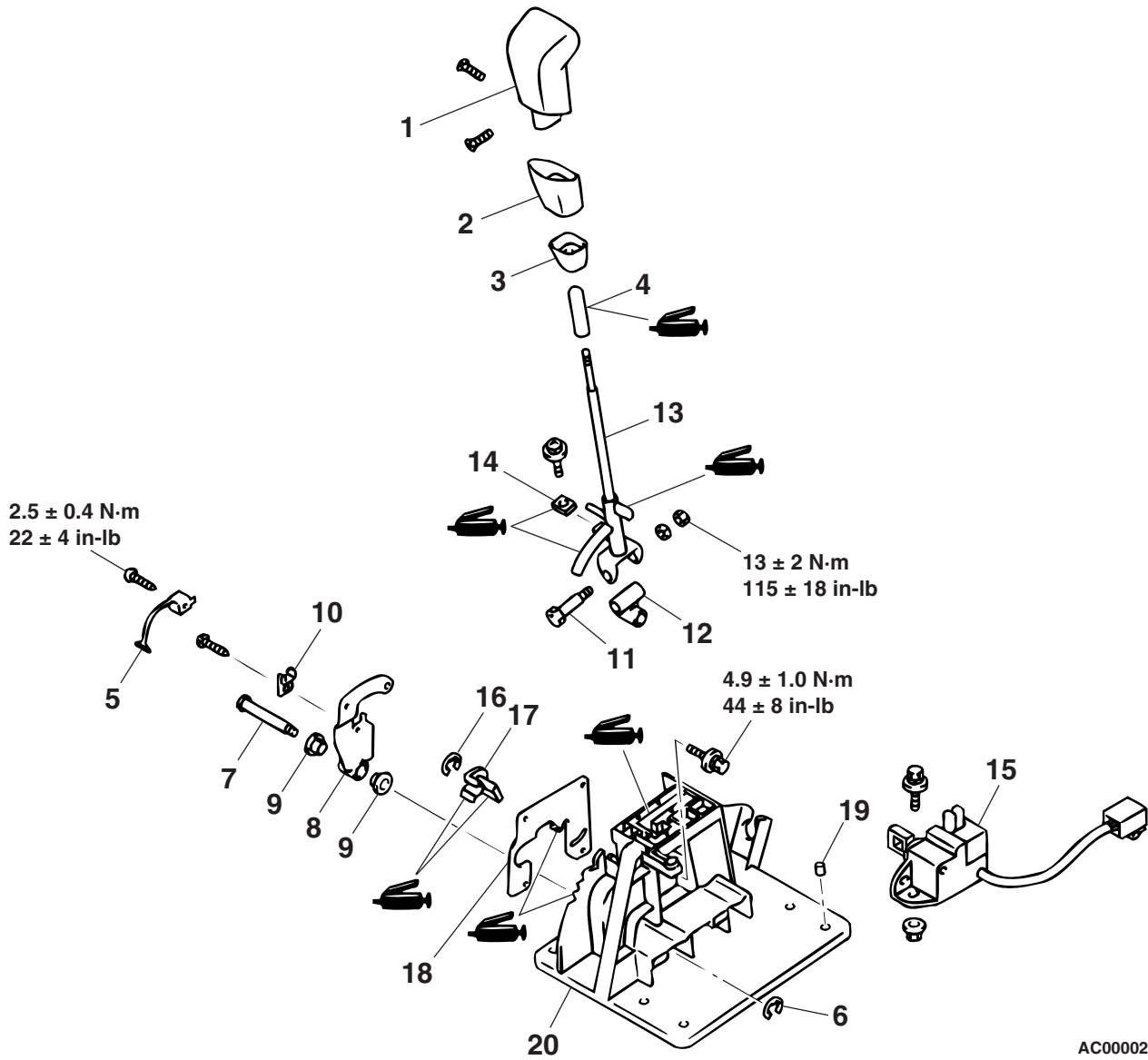
TRANSFER SHIFT LEVER SWITCH CONTINUITY CHECK

SWITCH POSITION	MEASUREMENT TERMINAL
2H	1 - 3
4H	1 - 4
4HLc	1 - 5
4LLc	1 - 2



DISASSEMBLY AND ASSEMBLY

M1231006800426



AC000024 AC

<<A>>

DISASSEMBLY STEPS

1. SHIFT KNOB
2. KNOB COVER A
3. KNOB COVER B
4. SLEEVE
- FRONT FLOOR CONSOLE
(REFER TO GROUP 52A P.52A-7).
5. DETENT SPRING
6. SNAP RING
7. SHAFT
8. ARM ASSEMBLY
9. BUSHING

DISASSEMBLY STEPS

10. ARM COVER
11. BOLT
12. UNIVERSAL JOINT
13. LEVER ASSEMBLY
14. STAY COVER
15. SHIFT SWITCH ASSEMBLY
16. SNAP RING
17. LOCK CAM
18. DETENT PLATE ASSEMBLY
19. COLLAR
20. BASE BRACKET

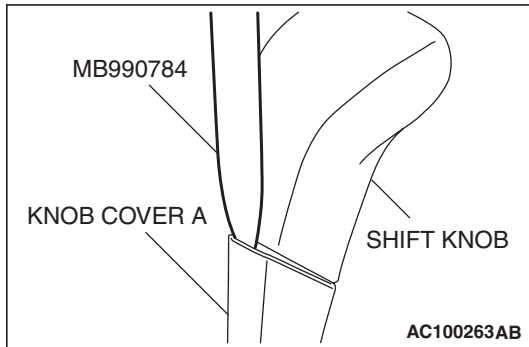
Required Special Tool:

- MB990784: Ornament Remover

REMOVAL SERVICE POINT

<<A>> SHIFT KNOB REMOVAL

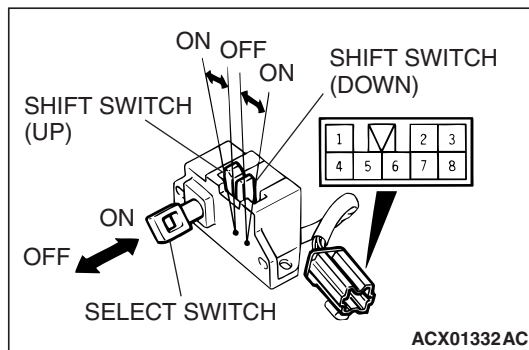
Insert special tool MB990784 in the crack of knob cover A and shift knob, and then push down on knob cover A and remove screw.



INSPECTION

M1231118200031

SHIFT SWITCH ASSEMBLY CONTINUITY CHECK



SWITCH POSITION		TERMINAL NO.
Select switch	ON	1 – 4
	OFF	1 – 5
Shift switch (up shift)	ON	3 – 7
	OFF	–
Shift switch (down shift)	ON	3 – 8
	OFF	–

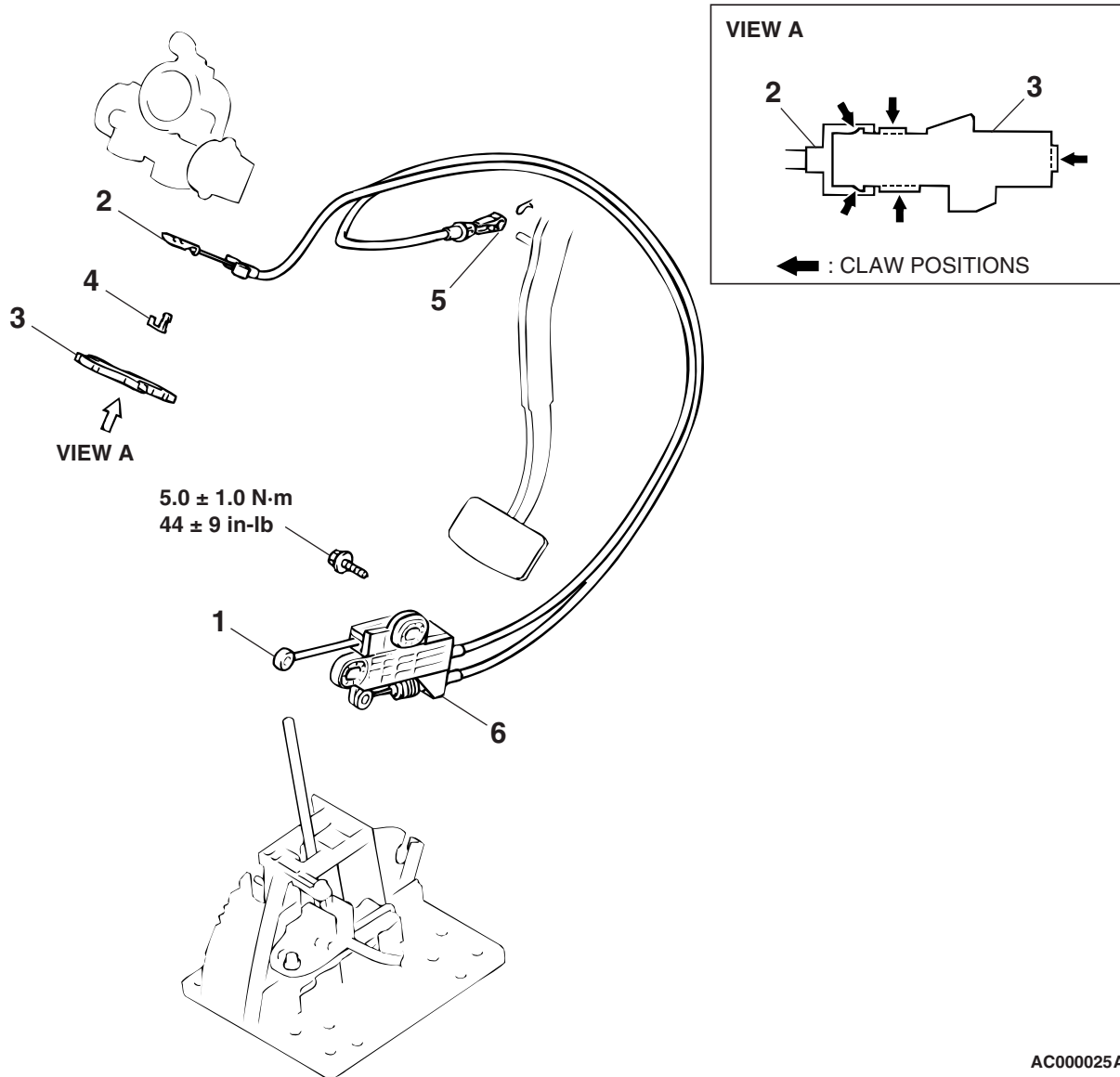
A/T KEY INTERLOCK AND SHIFT LOCK MECHANISMS

REMOVAL AND INSTALLATION

M1232001200529

⚠ WARNING

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



AC000025AD

**SHIFT LOCK CABLE UNIT
REMOVAL STEPS**

- COLUMN COVER (REFER TO GROUP 52A, INSTRUMENT PANEL ASSEMBLY P.52A-7).
- FRONT FLOOR CONSOLE (REFER TO GROUP 52A, FLOOR CONSOLE ASSEMBLY P.52A-7).

**SHIFT LOCK CABLE UNIT
REMOVAL STEPS (Continued)**

- >>A<< 1. SHIFT LOCK CABLE UNIT CONNECTION
- <<A>> 2. KEY INTERLOCK CABLE CONNECTION
- 3. COVER
- 4. LOCK BAR
- 5. SHIFT LOCK CABLE CONNECTION
- 6. SHIFT LOCK CABLE UNIT

REMOVAL SERVICE POINT

<<A>> KEY INTERLOCK CABLE REMOVAL

Turn the ignition switch to the "ACC" position, and then pull the key interlock cable out from the ignition key cylinder.

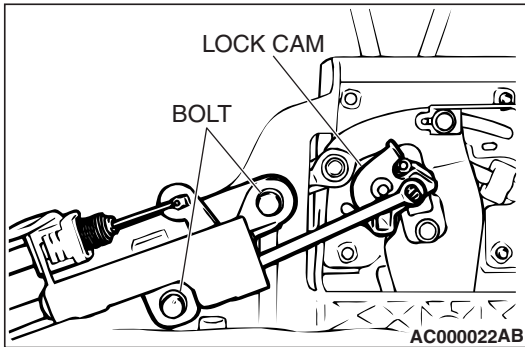
INSTALLATION SERVICE POINT

>>A<< SHIFT LOCK CABLE UNIT INSTALLATION

1. Temporarily install the selector lever knob, and then move the selector lever to the "P" position and turn the ignition switch to the "LOCK" (OFF) position.
2. After installing the rod of the shift lock cable unit to the lock cam of the selector lever assembly, install the bolts of the shift lock cable unit.

Tightening torque: 5.0 ± 1.0 N·m (44 ± 9 in-lb)

3. Check the operation of the selector lever assembly (Refer to [P.23A-552](#)).



TRANSMISSION AND TRANSFER ASSEMBLY

REMOVAL AND INSTALLATION

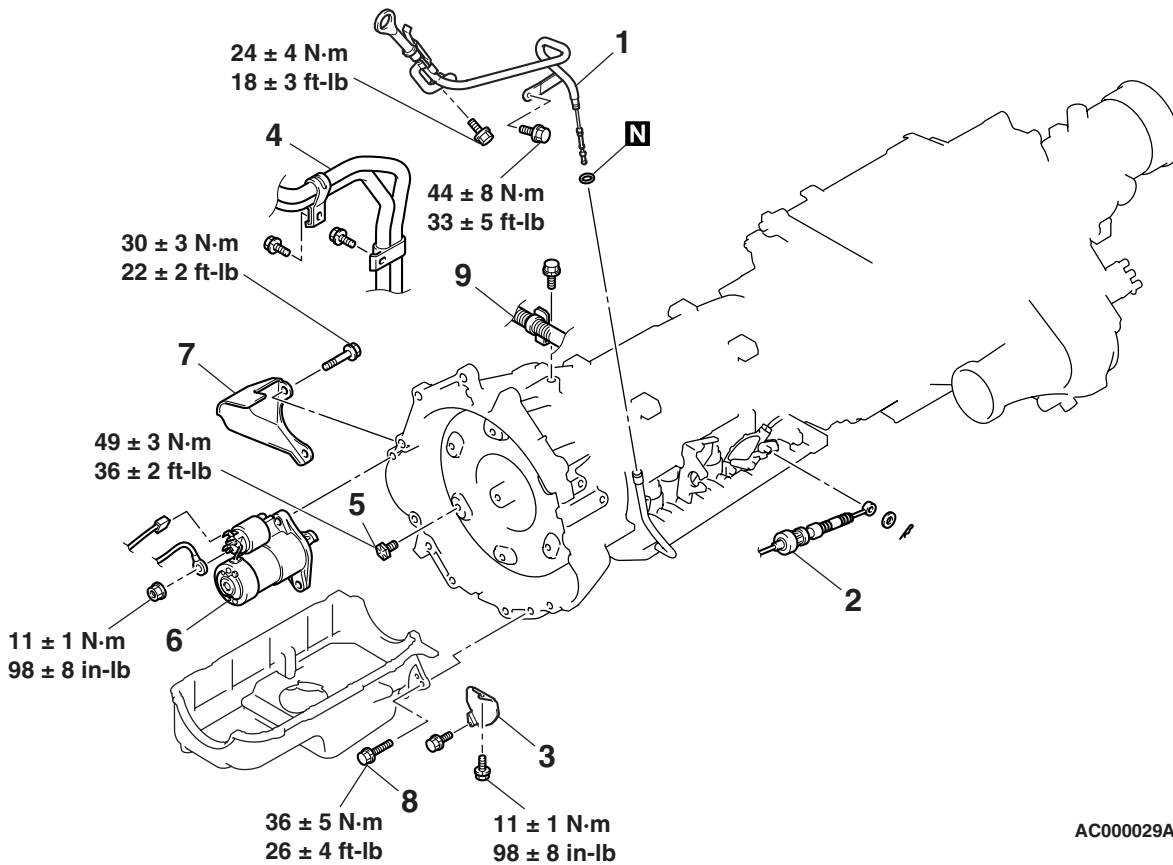
M1231117600111

CAUTION

The rear propeller shaft incorporates a carbon fiber-reinforced plastic tube, so be sure to refer to GROUP 25 during removal.

Pre-removal and Post-installation Operations

- Skid Plate and Under Cover Removal and Installation
- Transmission Fluid and Transfer Oil Draining and Refilling (Refer to P.23A-545 and P.23A-552).
- Front and Rear Propeller Shaft Removal and Installation (Refer to GROUP 25 P.25-5).
- Front Exhaust Pipe Removal and Installation (Refer to GROUP 15 P.15-12).
- Radiator Shroud Lower Cover Removal and Installation (Refer to GROUP 14 P.14-8).



AC000029AC

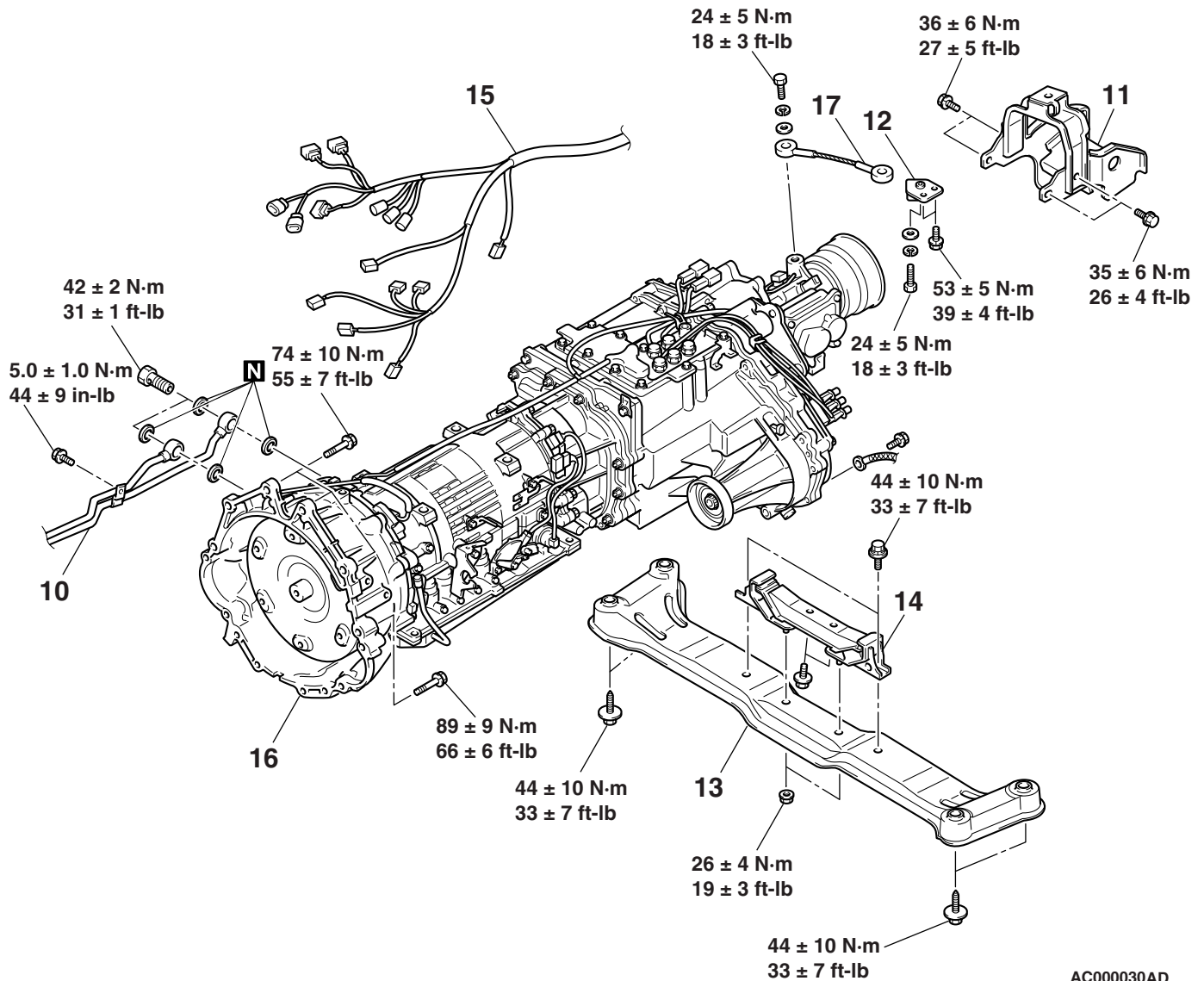
REMOVAL STEPS

1. TRANSMISSION FLUID
2. TRANSMISSION CONTROL CABLE CONNECTION
3. COVER
4. HEATER HOSE CONNECTION

<<A>>

REMOVAL STEPS (Continued)

5. TORQUE CONVERTER AND DRIVE PLATE CONNECTION BOLTS
6. STARTER MOTOR
7. STARTER COVER
8. OIL PAN CONNECTION BOLTS
9. BATTERY CABLE CONNECTION



AC000030AD

- REMOVAL STEPS**
10. OIL COOLER TUBE CONNECTION
 11. DYNAMIC DAMPER
 12. TENSION WIRE BRACKET
 - SUPPORT THE TRANSMISSION WITH A TRANSMISSION JACK
 13. TRANSMISSION MOUNT CENTER MEMBER ASSEMBLY

<>

>>A<<

- REMOVAL STEPS (Continued)**
14. TRANSMISSION MOUNT INSULATOR ASSEMBLY
 15. TRANSMISSION HARNESS CONNECTOR CONNECTION
 16. TRANSMISSION ASSEMBLY
 17. TENSION WIRE

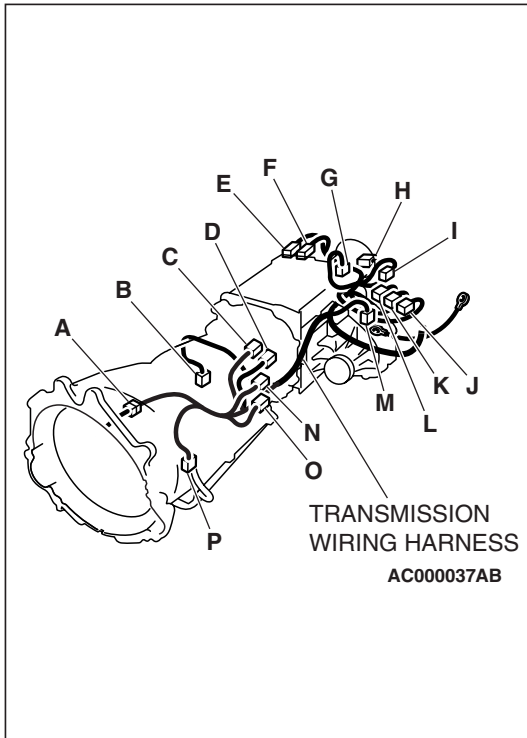
REMOVAL SERVICE POINTS

<<A>> TORQUE CONVERTER AND DRIVE PLATE CONNECTION BOLTS REMOVAL

1. While turning the crankshaft, remove the six connecting bolts.
2. Push the torque converter towards the transmission, away from the engine.

**<> TRANSMISSION HARNESS CONNECTOR
DISCONNECTION**

1. Lower the transmission to a position where the transmission harness connector can be disconnected, and then disconnect the connector.



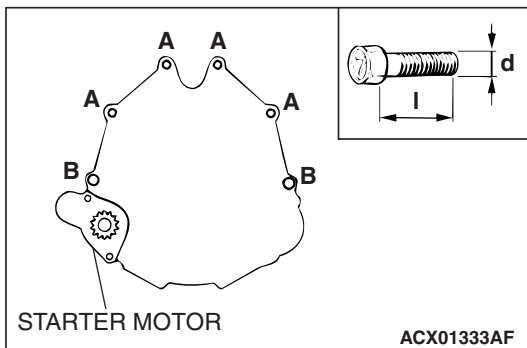
SYMBOL	CONNECTOR NAME
A	TRANSMISSION WIRING HARNESS AND BATTERY WIRING HARNESS COMBINATION
B	OUTPUT SHAFT SPEED SENSOR
C	AUTOMATIC TRANSMISSION CONTROL SOLENOID VALVE ASSEMBLY
D	TRANSMISSION RANGE SWITCH
E	4LLc DETECTION SWITCH
F	2WD DETECTION SWITCH
G	REAR PROPELLER SHAFT SPEED SENSOR
H	VEHICLE SPEED SENSOR
I	SHIFT ACTUATOR
J	2WD/4WD DETECTION SWITCH
K	4H DETECTION SWITCH
L	CENTER DIFFERENTIAL LOCK DETECTION SWITCH
M	FRONT PROPELLER SHAFT SPEED SENSOR
N	RIGHT BANK OXYGEN SENSOR (REAR)
O	LEFT BANK OXYGEN SENSOR (REAR)
P	INPUT SHAFT SPEED SENSOR

2. Position the disconnected transmission harness so that it rests on the vehicle body.

INSTALLATION SERVICE POINT

>>A<< TRANSMISSION ASSEMBLY INSTALLATION

The bolt lengths differ according to where they are to be installed, so do not install them in the wrong place.



BOLTS	d × l mm
A	12 × 40
B	12 × 55

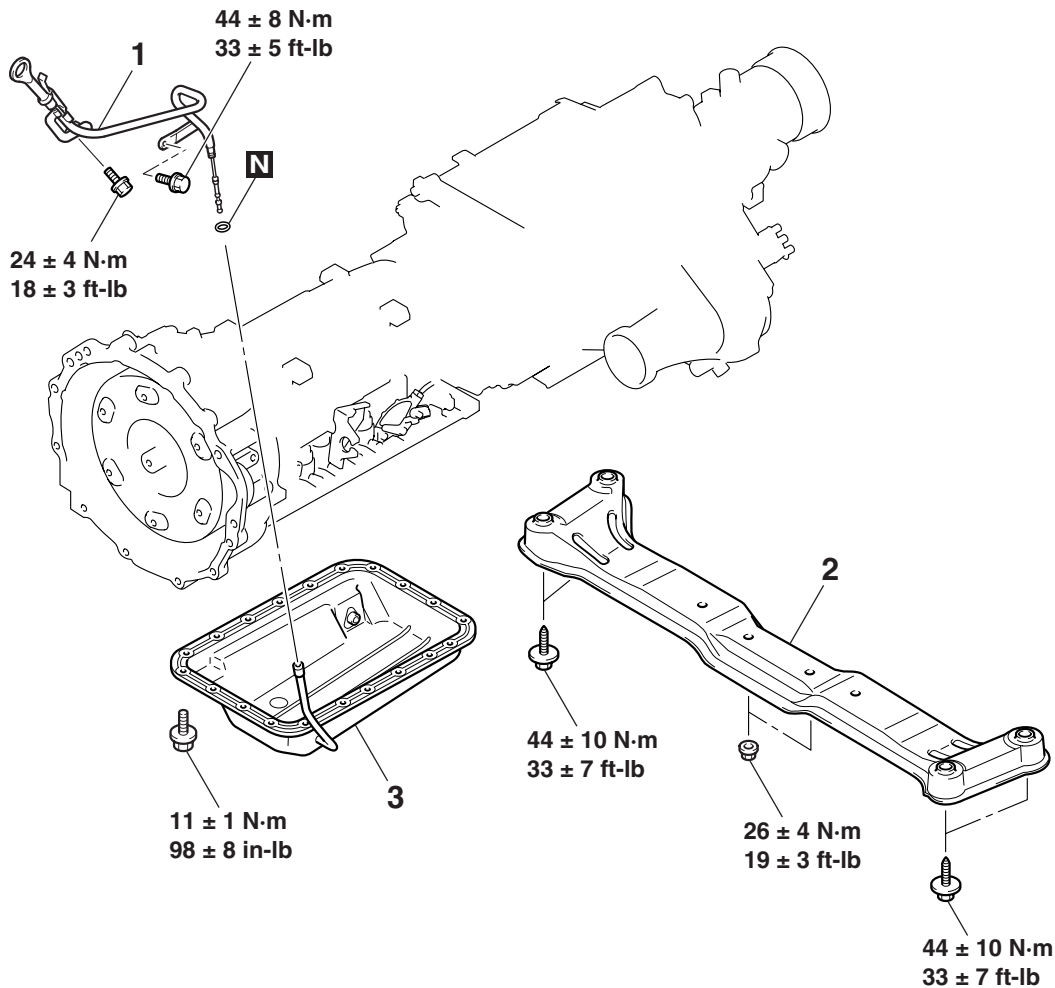
OIL PAN

REMOVAL AND INSTALLATION

M1231120700130

Pre-removal and Post-installation Operation

- Transmission Fluid Draining (Refer to GROUP 00, Maintenance Service – Automatic Transmission Fluid P.00-46).
- Under Cover Removal and Installation.



AC100073AB

REMOVAL STEPS

1. TRANSMISSION FLUID DIPSTICK GUIDE
- SUPPORT THE TRANSMISSION WITH A TRANSMISSION JACK

REMOVAL STEPS (Continued)

2. TRANSMISSION MOUNT CENTER MEMBER ASSEMBLY
3. OIL PAN

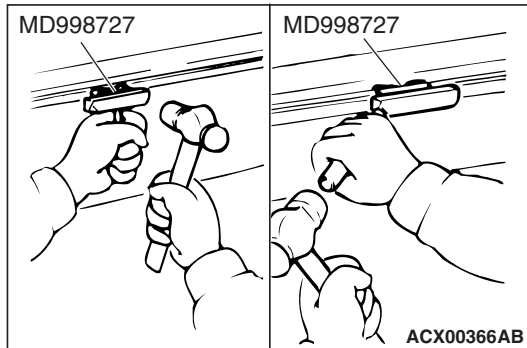
Required Special Tool:

- MD998727: Oil Pan Remover

REMOVAL SERVICE POINT

<<A>> OIL PAN REMOVAL

After removing the oil pan mounting bolts, remove the oil pan with special tool MD998727 and a brass bar.



INSTALLATION SERVICE POINT

>>A<< OIL PAN INSTALLATION

1. Remove sealant from the oil pan and transmission case mating surfaces.
2. Degrease the sealant-coated surface and the transmission mating surface.
3. Clean the magnet and install it in the hollow of the oil pan base.

NOTE: If the oil pan is replaced, reuse the cleaned magnet.

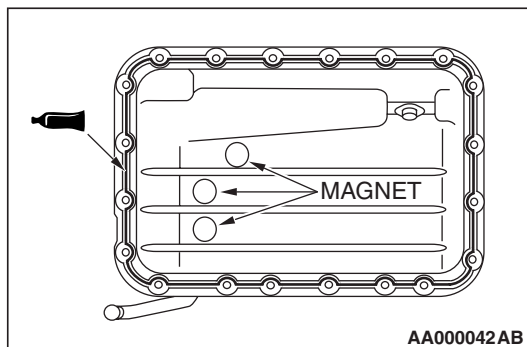
4. Apply sealant around the gasket surface of the oil pan as specified in the illustration.

Specified sealant: MITSUBISHI GENUINE PART number MD166584 or equivalent

NOTE: The sealant should be applied in a continuous bead approximately 3 mm (0.1 inch) in diameter.

5. Tighten the mounting bolts to the specified torque.

Tightening torque: 11 ± 1 N·m (98 ± 8 in-lb)

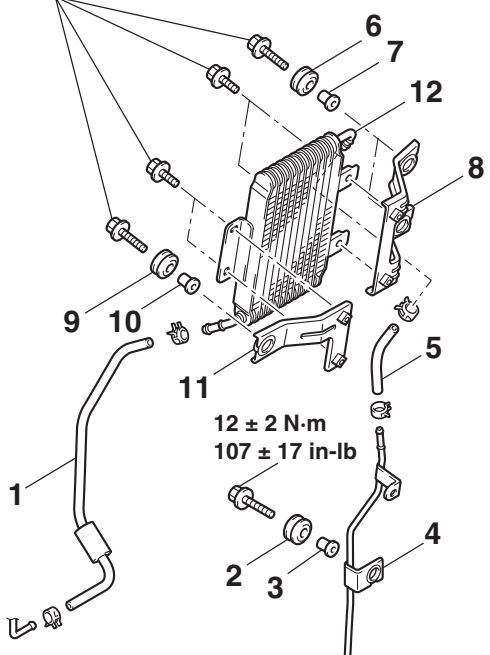


TRANSMISSION FLUID COOLER, HOSE AND PIPE REMOVAL AND INSTALLATION

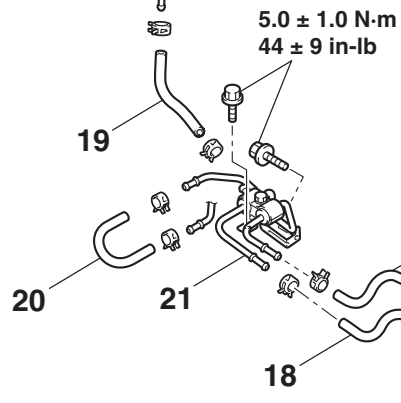
M1231118400109

- Pre-removal and Post-installation Operations**
- Transmission Fluid Draining and Refilling (Refer to [P.23A-545](#)).
 - Skid Plate and Under Cover Removal and Installation
 - Radiator Grille Removal and Installation (Refer to Group 51 – Front Bumper [P.51-3](#)).

**12 ± 2 N·m
107 ± 17 in-lb**

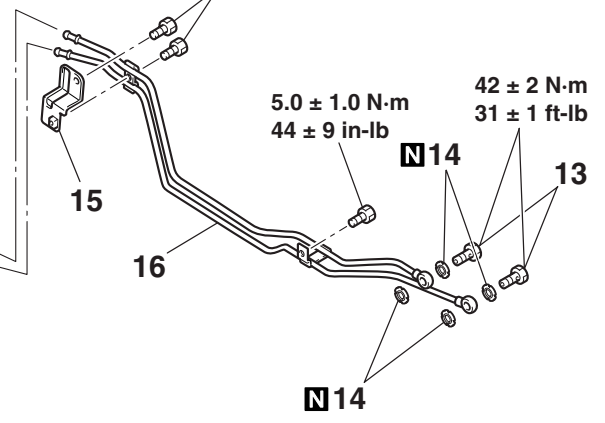


**12 ± 2 N·m
107 ± 17 in-lb**



**5.0 ± 1.0 N·m
44 ± 9 in-lb**

**5.0 ± 1.0 N·m
44 ± 9 in-lb**



**5.0 ± 1.0 N·m
44 ± 9 in-lb**

**42 ± 2 N·m
31 ± 1 ft-lb**

AC000031AB

TRANSMISSION FLUID COOLER REMOVAL STEPS

1. HOSE
2. BUSHING
3. DISTANCE PIECE
4. TRANSMISSION FLUID RETURN TUBE
5. HOSE

TRANSMISSION FLUID COOLER REMOVAL STEPS

- HEADLIGHT ASSEMBLY (REFER TO GROUP 54A [P.54A-80](#)).
- 6. BUSHING
- 7. DISTANCE PIECE

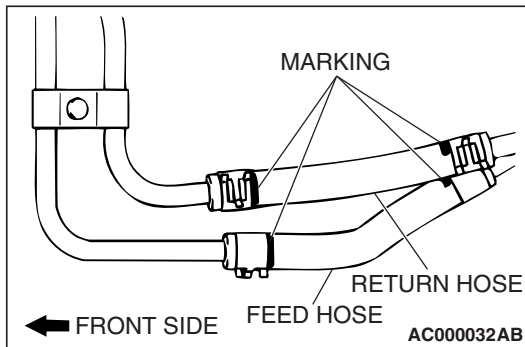
TSB Revision

- | TRANSMISSION FLUID
COOLER REMOVAL STEPS | | TRANSMISSION FLUID
COOLER TUBE ASSEMBLY
REMOVAL STEPS | |
|--|-----------------------------------|--|---|
| 8. | TRANSMISSION FLUID COOLER BRACKET | >>B<< 13. | EYE BOLT |
| 9. | BUSHING | >>B<< 14. | GASKET |
| 10. | DISTANCE PIECE | >>B<< 15. | TRANSMISSION FLUID COOLER TUBE BRACKET |
| 11. | TRANSMISSION FLUID COOLER BRACKET | >>B<< 16. | TRANSMISSION FLUID COOLER TUBE ASSEMBLY |
| 12. | TRANSMISSION FLUID COOLER | >>A<< 17. | RETURN HOSE |
| | | >>A<< 18. | FEED HOSE |
| | | 19. | HOSE |
| | | 20. | HOSE |
| | | 21. | TRANSMISSION FLUID COOLER TUBE ASSEMBLY |

INSTALLATION SERVICE POINTS

>>A<< FEED HOSE/RETURN HOSE INSTALLATION

Install the feed hose and return hose so that the markings are positioned as shown in the illustration.



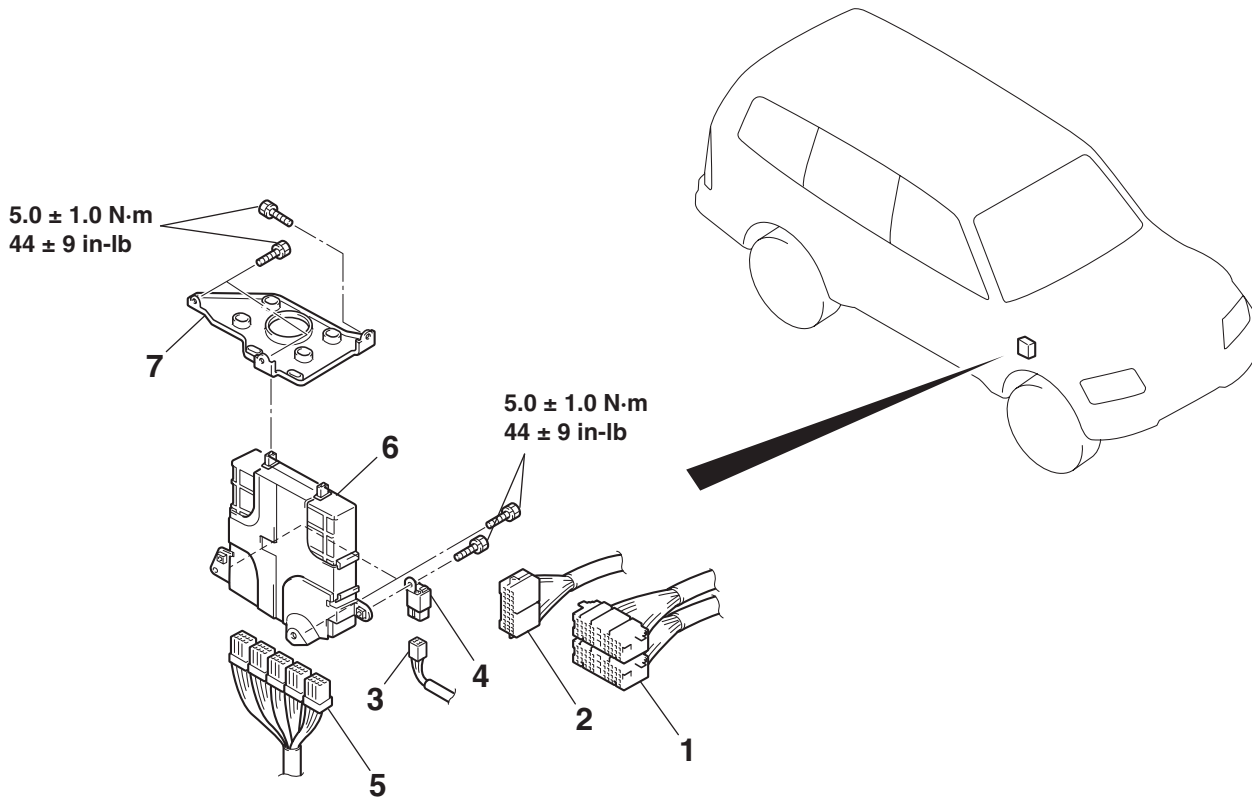
>>B<< TRANSMISSION FLUID COOLER TUBE ASSEMBLY/ TRANSMISSION FLUID COOLER TUBE BRACKET/ GASKET/EYE BOLT INSTALLATION

Temporarily tighten the eye bolts onto the transmission and temporarily secure the pipes with the clamps, and then fully tighten the eye bolts. Then tighten the clamps in order starting from the one closest to the transmission.

POWERTRAIN CONTROL MODULE (PCM)

REMOVAL AND INSTALLATION

M1231121600073



AC204613AC

REMOVAL STEPS

- COWL SIDE TRIM <RH> (REFER TO GROUP 52A, TRIM [P.52A-8](#)).
- 1. INSTRUMENT PANEL HARNESS AND FRONT DOOR HARNESS <RH> CONNECTION
- 2. INSTRUMENT PANEL HARNESS AND FLOOR HARNESS <RH> CONNECTION
- 3. A/T CONTROL RELAY CONNECTOR
- 4. A/T CONTROL RELAY

REMOVAL STEPS (Continued)

- 5. POWERTRAIN CONTROL MODULE CONNECTOR
- 6. POWERTRAIN CONTROL MODULE (PCM)
- INSTRUMENT PANEL ASSEMBLY (REFER TO GROUP 52A, INSTRUMENT PANEL ASSEMBLY [P.52A-3](#)).
- 7. POWERTRAIN CONTROL MODULE (PCM) BRACKET

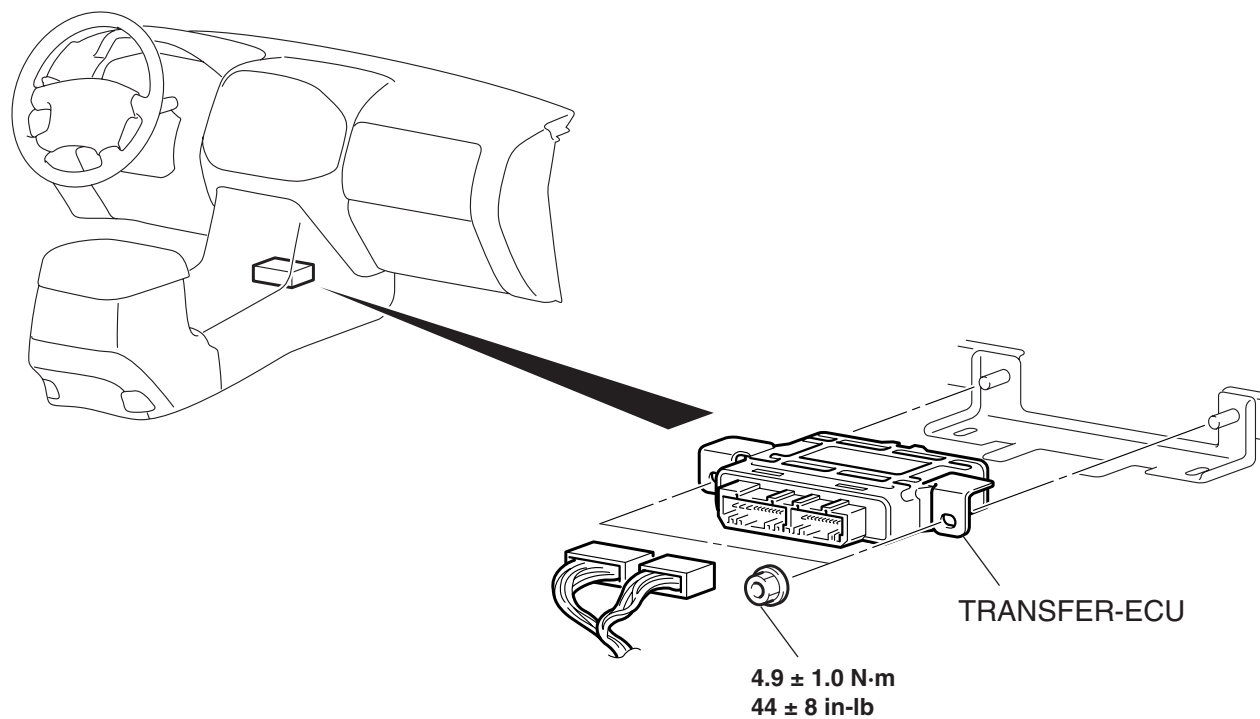
TRANSFER-ECU

REMOVAL AND INSTALLATION

M1231102400047

Pre-removal and Post-installation Operations

Indicator panel, floor console panel removal and installation
(GROUP 52A – Floor Console [P.52A-7](#)).



AC204337AC

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATION

M1231104700130

ITEM	SPECIFICATION
Oil pan	
Oil pan mounting bolt	11 ± 1 N·m (98 ± 8 in-lb)
Transmission fluid dipstick guide mounting bolt (engine side)	24 ± 4 N·m (18 ± 3 ft-lb)
Transmission fluid dipstick guide mounting bolt (transmission side)	44 ± 8 N·m (33 ± 5 ft-lb)
Transmission mount center member assembly mounting bolt	44 ± 10 N·m (33 ± 7 ft-lb)
Transmission mount insulator assembly mounting nut	26 ± 4 N·m (19 ± 3 ft-lb)
Powertrain control module (PCM)	
Powertrain control module (PCM) mounting bolt	5.0 ± 1.0 N·m (44 ± 9 in-lb)
Powertrain control module (PCM) bracket mounting bolt	5.0 ± 1.0 N·m (44 ± 9 in-lb)
Shift lock cable unit	
Shift lock cable unit mounting bolt	5.0 ± 1.0 N·m (44 ± 9 in-lb)
Transfer	
Transfer oil filler plug	32 ± 2 N·m (24 ± 1 ft-lb)
Transfer oil drain plug	32 ± 2 N·m (24 ± 1 ft-lb)
Transfer-ECU	
Transfer-ECU mounting nut	4.9 ± 1.0 N·m (44 ± 8 in-lb)
Transmission assembly	
Cover mounting bolt	11 ± 1 N·m (98 ± 8 in-lb)
Dynamic damper mounting bolt (left side)	35 ± 6 N·m (26 ± 4 ft-lb)
Dynamic damper mounting bolt (right side)	36 ± 6 N·m (27 ± 5 ft-lb)
Transmission fluid dipstick guide mounting bolt (engine side)	24 ± 4 N·m (18 ± 3 ft-lb)
Transmission fluid dipstick guide mounting bolt (transmission side)	44 ± 8 N·m (33 ± 5 ft-lb)
Oil cooler tube connecting eye bolt	42 ± 2 N·m (31 ± 1 ft-lb)
Oil cooler tube mounting bolt (M6 bolt)	5.0 ± 1.0 N·m (44 ± 9 in-lb)
Oil pan connection bolt	36 ± 5 N·m (26 ± 4 ft-lb)
Starter motor and starter cover mounting bolt	30 ± 3 N·m (22 ± 2 ft-lb)
Starter harness connection nut	11 ± 1 N·m (98 ± 8 in-lb)
Tension wire mounting bolt	24 ± 5 N·m (18 ± 3 ft-lb)
Tension wire bracket mounting bolt	53 ± 5 N·m (39 ± 4 ft-lb)
Torque converter and drive plate connecting bolt	49 ± 3 N·m (36 ± 2 ft-lb)
Transmission assembly upper part coupling bolt	74 ± 10 N·m (55 ± 7 ft-lb)
Transmission assembly lower part coupling bolt	89 ± 9 N·m (66 ± 6 ft-lb)
Transmission fluid drain plug	39 ± 5 N·m (29 ± 3 ft-lb)
Transmission mount center member assembly mounting bolt	44 ± 10 N·m (33 ± 7 ft-lb)
Transmission mount insulator assembly mounting bolt	44 ± 10 N·m (33 ± 7 ft-lb)
Transmission mount insulator assembly mounting nut	26 ± 4 N·m (19 ± 3 ft-lb)

ITEM	SPECIFICATION
Transmission control	
Bracket to selector lever assembly mounting bolt	11 ± 2 N·m (98 ± 17 in-lb)
Detent plate assembly mounting bolt	4.9 ± 1.0 N·m (44 ± 8 in-lb)
Detent spring mounting screw	2.5 ± 0.4 N·m (22 ± 4 in-lb)
Lever assembly and universal joint connecting nut	13 ± 2 N·m (115 ± 18 in-lb)
Selector lever assembly mounting bolt	11 ± 2 N·m (98 ± 17 in-lb)
Shift lock cable unit mounting bolt	5.0 ± 1.0 N·m (44 ± 9 in-lb)
Transfer shift lever bracket assembly mounting bolt	11 ± 2 N·m (98 ± 17 in-lb)
Transfer shift lever switch mounting bolt	5.0 ± 1.0 N·m (44 ± 9 in-lb)
Transmission control cable adjusting nut	23 ± 4 N·m (17 ± 3 ft-lb)
Transmission control harness connecting bolt	11 ± 2 N·m (98 ± 17 in-lb)
Transmission range switch adjusting nut	23 ± 4 N·m (17 ± 3 ft-lb)
Transmission range switch mounting bolt	11 ± 1 N·m (98 ± 8 in-lb)
Transmission oil cooler	
Eye bolt	42 ± 2 N·m (31 ± 1 ft-lb)
Transmission fluid return tube mounting bolt	12 ± 2 N·m (107 ± 17 in-lb)
Transmission oil cooler bracket mounting bolt	12 ± 2 N·m (107 ± 17 in-lb)
Transmission oil cooler tube assembly mounting bolt	5.0 ± 1.0 N·m (44 ± 9 in-lb)
Transmission oil cooler tube bracket mounting bolt	5.0 ± 1.0 N·m (44 ± 9 in-lb)

SERVICE SPECIFICATION

M1231100300118

ITEMS	STANDARD VALUE	
Line pressure MPa (psi)	0.98 – 1.05 (142 – 152)	
Transmission fluid temperature sensor kΩ	at 0°C (32°F)	16.7 – 20.5
	at 20°C (68°F)	7.3 – 8.9
	at 40°C (104°F)	3.4 – 4.2
	at 60°C (140°F)	1.9 – 2.2
	at 80°C (176°F)	1.0 – 1.2
	at 100°C (212°F)	0.57 – 0.69
Resistance of torque converter clutch control solenoid valve coil [at 20°C (68°F)] Ω	2.7 – 3.4	
Resistance of low-reverse/direction solenoid valve coil [at 20°C (68°F)] Ω	2.7 – 3.4	
Resistance of second solenoid valve coil [at 20°C (68°F)] Ω	2.7 – 3.4	
Resistance of underdrive solenoid valve coil [at 20°C (68°F)] Ω	2.7 – 3.4	
Resistance of overdrive solenoid valve coil [at 20°C (68°F)] Ω	2.7 – 3.4	
Resistance of reduction solenoid valve coil [at 20°C (68°F)] Ω	2.7 – 3.4	
Stall speed r/min	2,200 – 2,700	

LUBRICANTS

M1231100400137

ITEM	SPECIFIED LUBRICANT	SPECIFICATION
Automatic transmission fluid dm ³ (qt)	DIAMOND ATF SP III	9.7 (10.2)
Transfer oil dm ³ (qt)	Gear oil API classification GL-4 SAE 75W-85W or 75W-90	2.8 (3.0)

SEALANT AND ADHESIVE

M1231100500123

ITEM	SPECIFIED SEALANT AND ADHESIVE
Oil pan	
Oil pan	MITSUBISHI GENUINE Part No.MR166584 or equivalent

NOTES