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# **MITSUBISHI ACTIVE STABILITY AND TRACTION CONTROL SYSTEM (M-ASTC)**

**Click on the applicable bookmark to selected the required model year.**

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# **MITSUBISHI ACTIVE STABILITY AND TRACTION CONTROL SYSTEM (M-ASTC)**

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

#### **WARNING!**

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

#### **NOTE**

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

## GENERAL

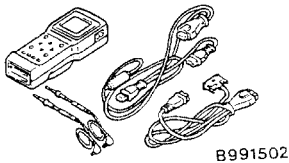
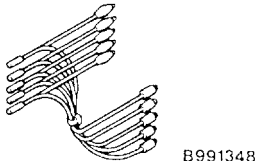
### OUTLINE OF CHANGES

Due to the addition of MITSUBISHI Active Stability and Traction Control System (M-ASTC), the following service procedures have been established.

## SERVICE SPECIFICATIONS

Item	Standard Value
Switch solenoid valve (SA1, SA2, SA3, STR) resistance $\Omega$	3.5 - 3.9

## SPECIAL TOOLS

Tool	Number	Name	Application
 B991502	MB991502	MUT-II Sub-Assembly	For checking of M-ASTC (Diagnosis code display when using the MUT-II)
 B991348	MB991348	Test harness set	For checking of G and yaw rate sensor

## TROUBLESHOOTING

### STANDARD FLOW OF DIAGNOSTIC TROUBLESHOOTING

Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points\*.

#### NOTE

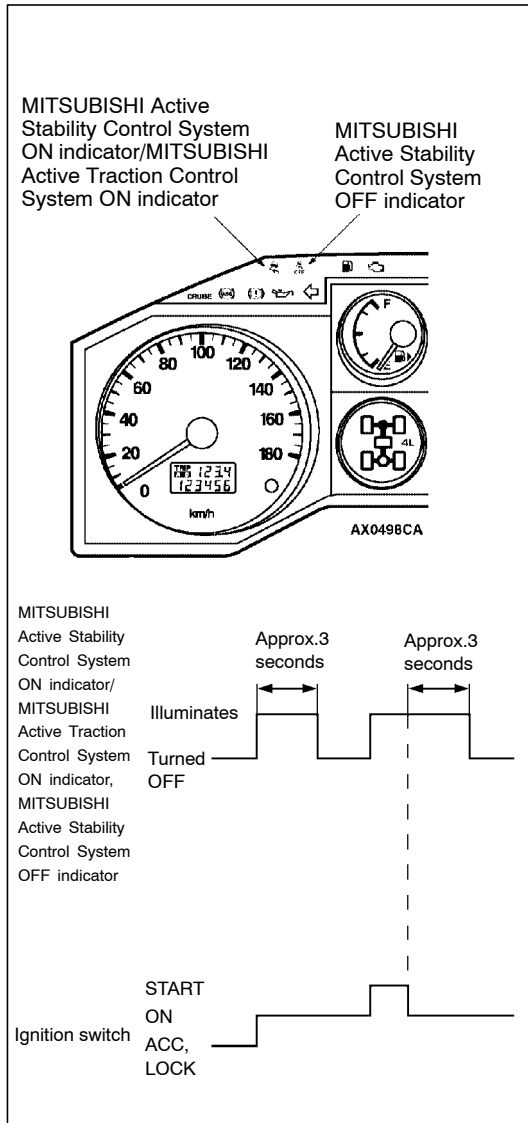
\*: Refer to 2001 PAJERO Workshop Manual [Pub. No. PWJE 0001 (1/2)]

### NOTES ON DIAGNOSIS

1. MITSUBISHI Active Stability Control System and MITSUBISHI Active Traction Control System control brake pressure with the help of the ECU's. Therefore, although the phenomena described in the following table may occur, they should not be regarded as faults because they are generated in a normal operation of MITSUBISHI Active Stability Control System and MITSUBISHI Active Traction Control System.

Symptom	Explanation of symptom
When the engine is started, light noise such as "clicking" sound may be generated from the engine room.	This system is performing operation check, and this is not abnormal.
<ul style="list-style-type: none"> <li>• According to the change of brake pedal feeling, a noise is generated. (gargling sound)</li> <li>• Noise occurs from the chassis parts because Active Stability Control System and Active Traction Control System repeat ON/OFF operations of these parts. (roaring sound from suspension, squeaky sound from tyres)</li> </ul>	This is not a fault because of the noise in a normal operation.
When the brake pedal is lightly depressed in a low-speed driving, shock may occur.	This is not a fault because of system operation check (starting-off check at the speed of 2 - 3 km/h or over).

2. Diagnosis detecting conditions depend on diagnostic codes. To reconfirm the fault symptom, the requirements described in the explanatory column of Inspection Procedure Classified by Diagnostic Code must be fulfilled.



## MITSUBISHI ACTIVE STABILITY CONTROL SYSTEM ON INDICATOR/MITSUBISHI ACTIVE TRACTION CONTROL SYSTEM ON INDICATOR, MITSUBISHI ACTIVE STABILITY CONTROL SYSTEM OFF INDICATOR CHECK

Check whether MITSUBISHI Active Stability Control System ON indicator/MITSUBISHI Active Traction Control System ON indicator and MITSUBISHI Active Stability Control System OFF indicator illuminate as follows:

1. When the ignition switch is turned to the "ON" position, MITSUBISHI Active Stability Control System ON indicator/MITSUBISHI Active Traction Control System ON indicator and MITSUBISHI Active Stability Control System OFF indicator illuminate for approx. 3 seconds, and then they are turned off.
2. When the ignition switch is further turned to the "START" position, MITSUBISHI Active Stability Control System ON indicator/MITSUBISHI Active Traction Control System ON indicator and MITSUBISHI Active Stability Control System OFF indicator remain illuminating.
3. When the ignition switch is turned back from the "START" to the "ON" position, MITSUBISHI Active Stability Control System ON indicator/MITSUBISHI Active Traction Control System ON indicator and MITSUBISHI Active Stability Control System OFF indicator illuminate for approx. 3 seconds, and then they are turned off.
4. In other cases, diagnostic codes must be inspected.

## DIAGNOSTIC FUNCTION

### HOW TO READ DIAGNOSIS CODE

Use MUT-II to read the diagnosis code.

(Refer to GROUP 00 - How to Use /Inspection Service Points.\*)

NOTE:

- Connect MUT-II to the 16-pin diagnosis connector.
- \*:Refer to 2001 PAJERO Workshop Manual [Pub.No. PWJE0001 (2/2)]

### HOW TO ERASE DIAGNOSIS CODE

Connect MUT-II to the diagnosis connector and erase the diagnosis code.

**CAUTION:**

**Connection and disconnection of MUT-II must be carried out after the ignition switch is turned to the LOCK (OFF) position.**

NOTE:

Connect MUT-II to the 16-pin diagnosis connector.

## INSPECTION CHART FOR DIAGNOSIS CODES

DTC No.	Item	Reference page
11	ABS sensor (FR) open circuit or short circuit	Refer to GROUP 35B.
12	ABS sensor (FL) open circuit or short circuit	Refer to GROUP 35B.
13	ABS sensor (RR) open circuit or short circuit	Refer to GROUP 35B.
14	ABS sensor (RL) open circuit or short circuit	Refer to GROUP 35B.
16*	Excessive decrease or increase in the power supply voltage of the M-ASTC-ECU	Refer to GROUP 35A.
17	Active stability control switch system	35C-6
21	ABS sensor (FR) system	Refer to GROUP 35B.
22	ABS sensor (FL) system	Refer to GROUP 35B.
23	ABS sensor (RR) system	Refer to GROUP 35B.
24	ABS sensor (RL) system	Refer to GROUP 35B.
25	Defective tyre with different diameter	Refer to GROUP 35B.
31	Ignition switch (IG2) system	Refer to GROUP 35A.
33	Stop light switch system	Refer to GROUP 35B.
34	CAN communication error	35C-7
35	Engine system fault	35C-7
36	Engine-ECU communication error	35C-7
37	A/T system fault	35C-7
38	A/T-ECU communication error	35C-7
41	Control solenoid valve (FR) system	In the case of no response for solenoid valve drive signals corresponding to individual items:  Refer to GROUP 35B.
42	Control solenoid valve (FL) system	
43	Control solenoid valve (RR) system	
44	Control solenoid valve (RL) system	
45	Switch solenoid valve (SA1) system	
46	Switch solenoid valve (SA2) system	
47	Switch solenoid valve (SA3) system	35C-8
48	Switch solenoid valve (STR) system	35C-8
51	Valve relay ON defective	Refer to GROUP 35B.
52	Valve relay OFF defective	Refer to GROUP 35B.
53	Motor system	Refer to GROUP 35A.
54	Motor relay system	Refer to GROUP 35A.
55	Motor system	Refer to GROUP 35A.
56	Pressure switch system	Refer to GROUP 35A.
57	Accumulator pressure sensor system	Refer to GROUP 35A.

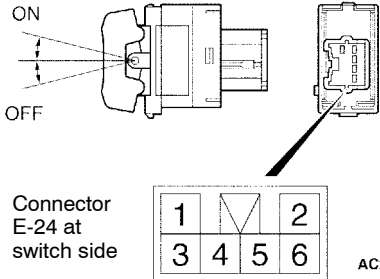
DTC No.	Item	Reference page
58	Power supply drive circuit system	Replace the ASTC-ECU (Refer to 35C-42).
61	Master cylinder pressure sensor system	Refer to GROUP 35B.
63	G sensor output error	35C-9
64	G sensor clogging	35C-9
65	G sensor self-diagnosis error	35C-9
66	Steering wheel sensor self-diagnosis error	35C-10
67	Steering wheel sensor communication line error	35C-11
68	Steering wheel sensor output error	35C-10
71	Yaw rate sensor self-diagnosis error	35C-9
72	Yaw rate sensor 0-point error	35C-9
73	Yaw rate sensor output error	35C-9
74	G and yaw rate sensor communication line fault	35C-12
75	Transfer switch defect	35C-13
76	G sensor error	35C-9
77	Yaw rate sensor error	35C-9
78	Engine ECU inappropriately installed	35C-7
81	G sensor initialization incomplete	35C-13
82	Yaw rate sensor initialization incomplete	35C-13
83	Steering wheel sensor initialization incomplete	35C-14
84	Transfer switch initialization incomplete	35C-14
85	Master cylinder pressure sensor initialization incomplete	35C-14

## NOTE

\*: For Code No. 16, memory is erased if the system is returned to the normal state.

## INSPECTION PROCEDURE CLASSIFIED BY DIAGNOSTIC CODE

Code No. 17 Active Stability Control Switch System	Probable Cause
This code is output when Active Stability Control Switch is turned on and off at the same time.	<ul style="list-style-type: none"> <li>• Malfunction of Active Stability Control Switch</li> <li>• Malfunction of harness or connector</li> <li>• Malfunction of M-ASTC-ECU</li> </ul>



Remove Active Stability Control Switch

Measure at E-24 Active Stability Control Switch connector

Active Stability Control Switch: ON

Continuity between terminals 3 - 6

**OK:** Continuity

Active Stability Control Switch: ON

Continuity between terminals 2 and 3

Continuity between terminals 2 and 6

**OK:** No continuity

Active Stability Control Switch: Neutral

Continuity between terminals 2 and 3

Continuity between terminals 2 and 6

Continuity between terminals 3 and 6

**OK:** No continuity

Active Stability Control Switch: OFF

Continuity between terminals 2 and 3

**OK:** Continuity

Active Stability Control Switch: OFF

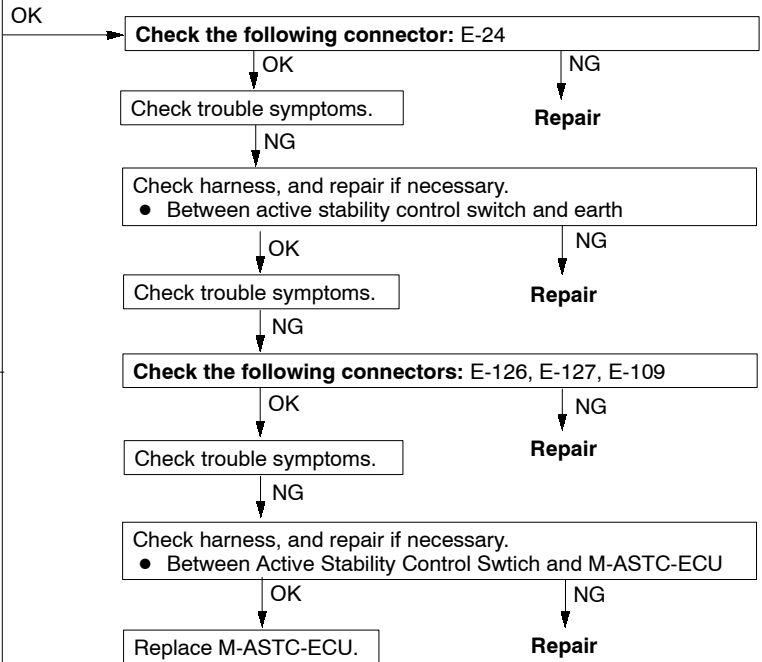
Continuity between terminals 2 and 6

Continuity between terminals 3 and 6

**OK:** No continuity

NG

**Replace**



Code No. 34 CAN communication error	Probable Cause
This code is output when communication error occurs at the same time on several ECU's or sensors linked with CAN-bus lines.	<ul style="list-style-type: none"> <li>● CAN-bus line fault</li> <li>● Connector fault</li> <li>● Malfunction of M-ASTC-ECU</li> </ul>

**CAUTION**

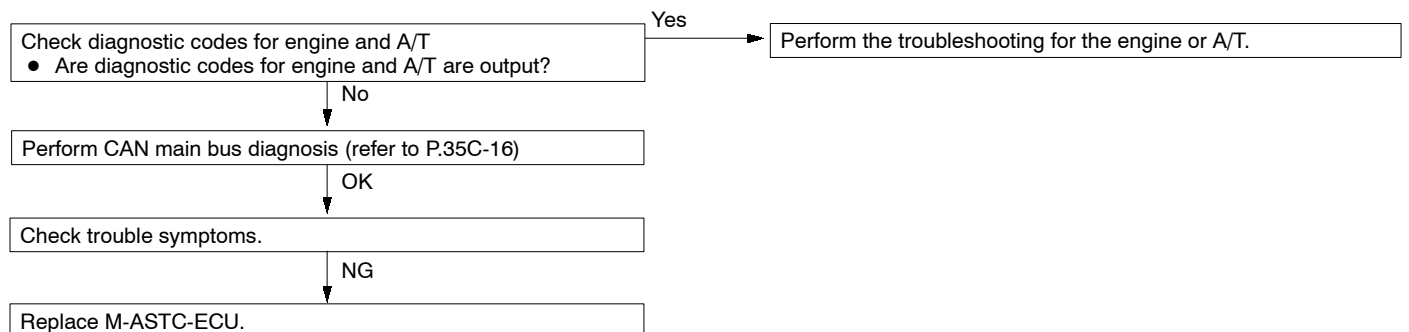
When the diagnostic code for CAN-bus line fault is displayed, always perform CAN main bus line diagnosis.

Perform CAN main bus diagnosis (refer to P.35C-16).

Code No. 35 Engine system fault	Probable Cause
Code No. 36 Engine-ECU communication error	
Code No. 37 A/T system fault	
Code No. 38 A/T-ECU communication error	
Code No. 78 Engine-ECU inappropriately installed	
<p>Code No. 35 is output when an error is detected on the data related to the engine acquired by M-ASTC-ECU. (Data error in this case shows that data is transmitted from the engine and A/T-ECU, but there is an error on the data)</p> <p>Code No. 36 is output when all data related to the engine is not sent from the engine and A/T-ECU to the M-ASTC-ECU.</p> <p>Code No. 37 is output when an error is detected on the data related to the automatic transmission acquired by M-ASTC-ECU. (Data error in this case shows that data is transmitted from the engine and A/T-ECU, but there is an error on the data)</p> <p>Code No. 38 is output when all data related to the automatic transmission is not sent from the engine and A/T-ECU to the M-ASTC-ECU.</p> <p>Code No. 78 is output when the engine-ECU is improperly installed.</p>	<ul style="list-style-type: none"> <li>● CAN-bus line fault</li> <li>● Connector fault</li> <li>● Malfunction of engine-A/T-ECU &lt;Petrol vehicles&gt;</li> <li>● Malfunction of engine-ECU &lt;Diesel vehicles&gt;</li> <li>● Malfunction of A/T-ECU &lt;Diesel vehicles&gt;</li> <li>● Malfunction of M-ASTC-ECU</li> </ul>

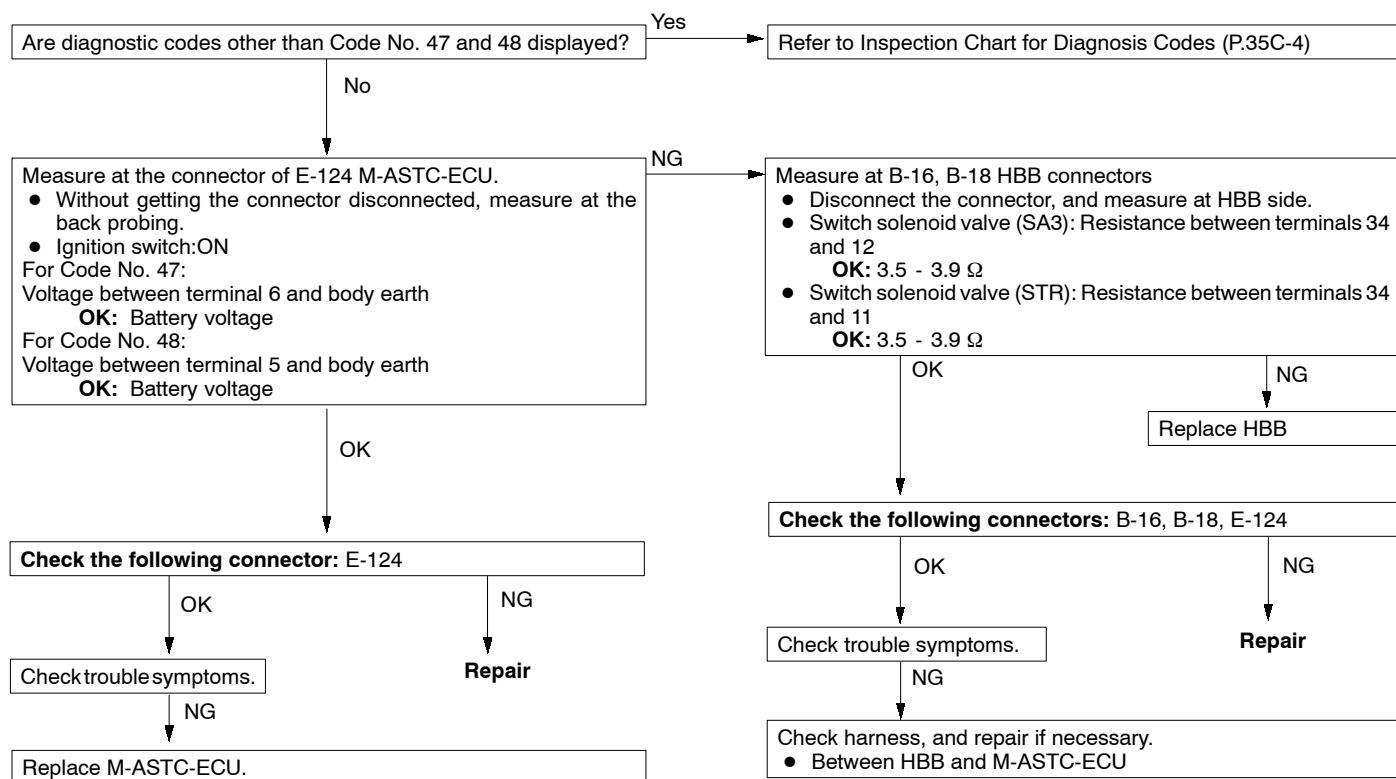
**CAUTION:**

When these diagnostic code are displayed, always perform CAN main bus line diagnosis.

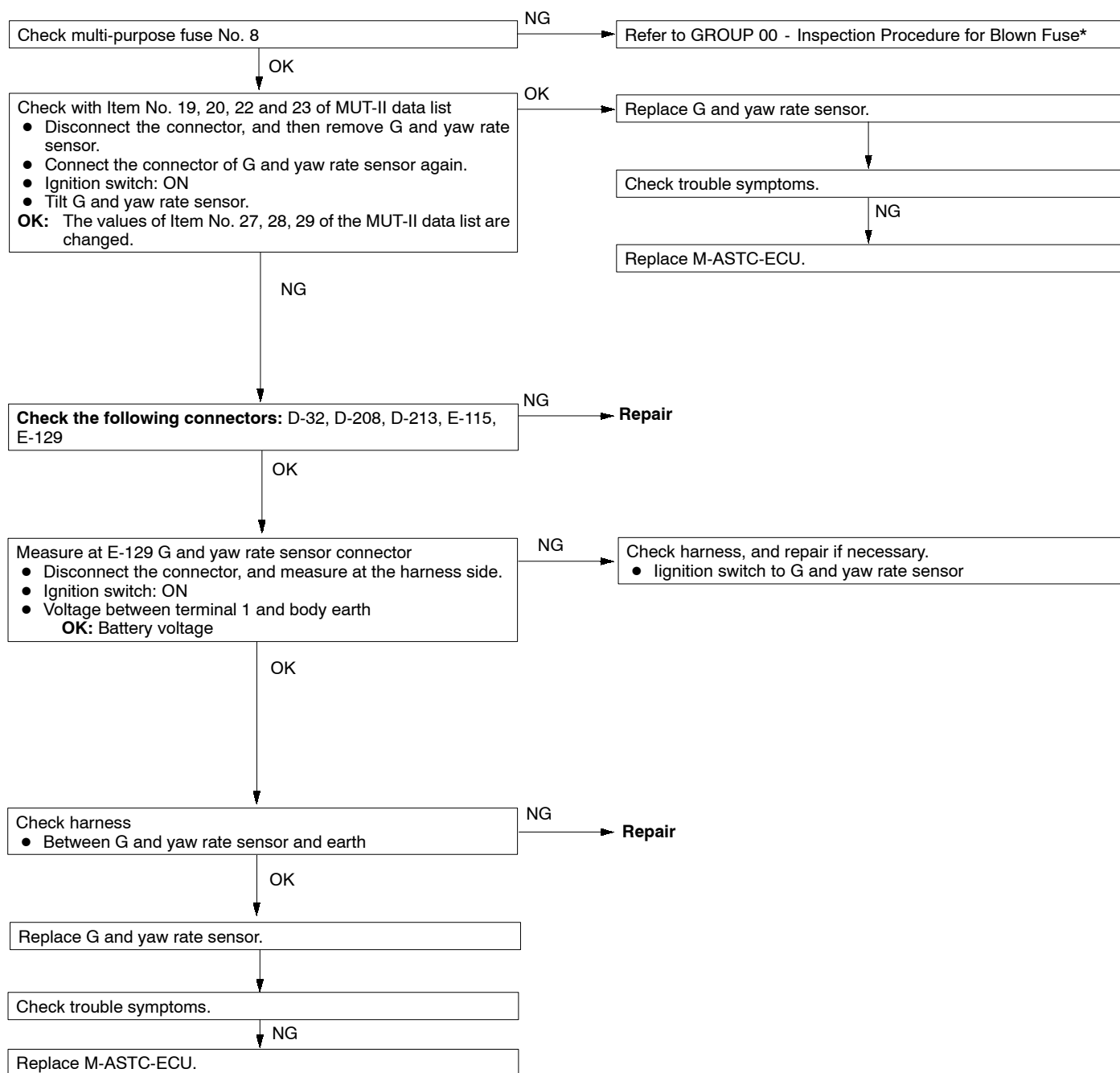




Code No. 47 Switch solenoid valve (SA3) system	Probable Cause
Code No. 48 Switch solenoid valve (STR) system	
M-ASTC-ECU is always monitoring the solenoid valve drive circuit. This code is output by determination of open/short circuit on the solenoid coil or harness when the solenoid is not energized even if M-ASTC-ECU activates it, or the solenoid keep energized even if either of the ECU's switches it off.	<ul style="list-style-type: none"> <li>● Malfunction of HBB</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of M-ASTC-ECU</li> </ul>

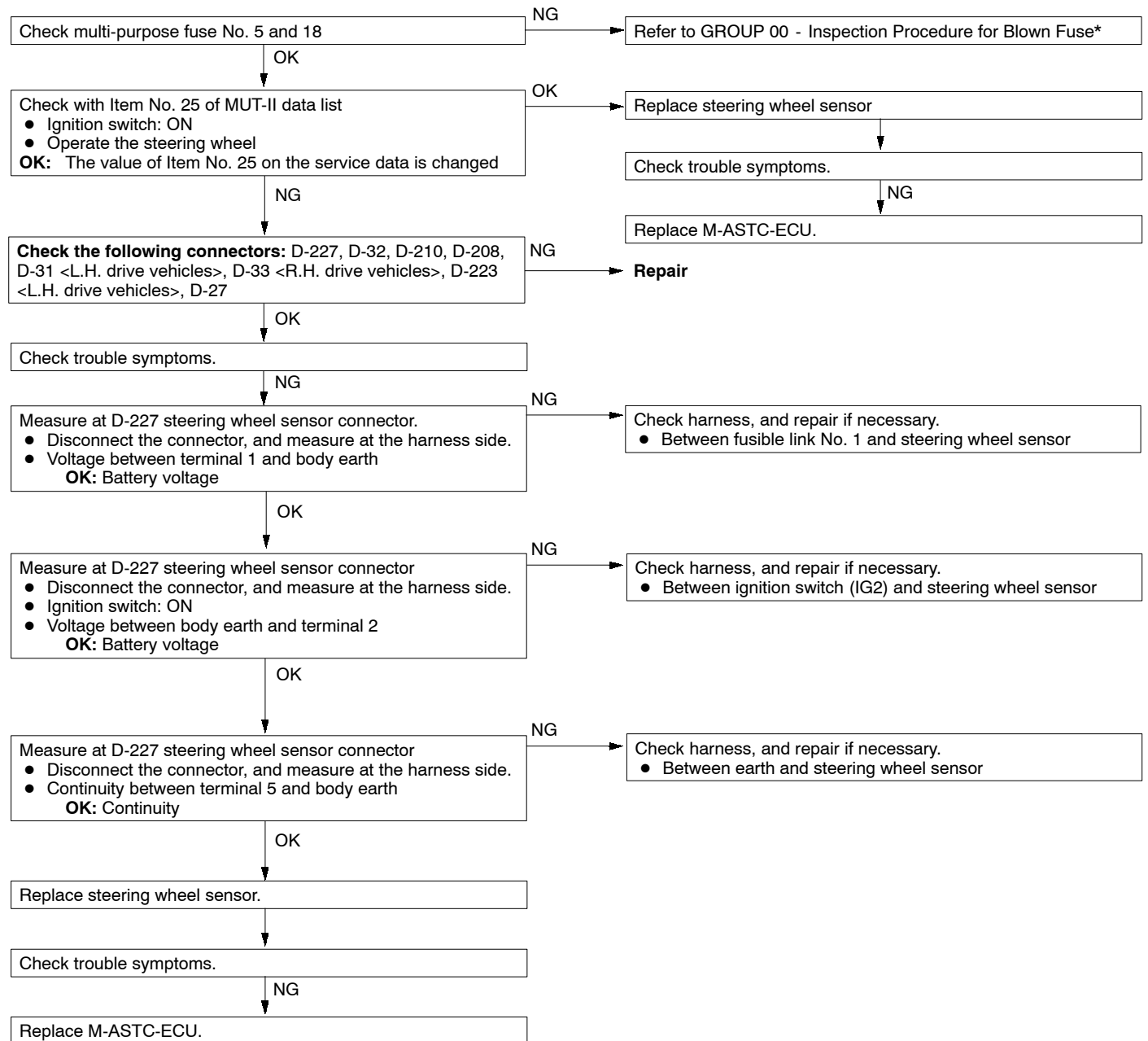


Code No. 63 G sensor output error	Probable Cause
Code No. 64 G sensor clogging	
Code No. 65 G sensor self-diagnosis error	
Code No. 71 Yaw rate sensor self-diagnosis error	
Code No. 72 Yaw rate sensor 0-point error	
Code No. 73 Yaw rate sensor output error	
Code No. 76 G sensor error	
Code No. 77 Yaw rate sensor error	
These codes are output when an error is detected on the data transmitted from the G and yaw rate sensor to M-ASTC-ECU. (Data error in this case shows that data is transmitted from the G and yaw rate sensor, but there is an error on the data)	<ul style="list-style-type: none"><li>● Malfunction of G and yaw rate sensor</li><li>● Malfunction of harness or connector</li><li>● Malfunction of M-ASTC-ECU</li></ul>

**NOTE:**

\*: Refer to the 2001 PAJERO Workshop Manual [Pub. No. PWJE0001(1/2)].

Code No. 66 Steering wheel sensor self-diagnosis error	Probable Cause
Code No. 68 Steering wheel sensor output error	
These codes are output when an error is detected on the data transmitted from the steering wheel sensor to M-ASTC-ECU. (Data error in this case shows that data is transmitted from the steering wheel sensor, but there is an error on the data)	<ul style="list-style-type: none"> <li>● Malfunction of steering wheel sensor</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of M-ASTC-ECU</li> </ul>



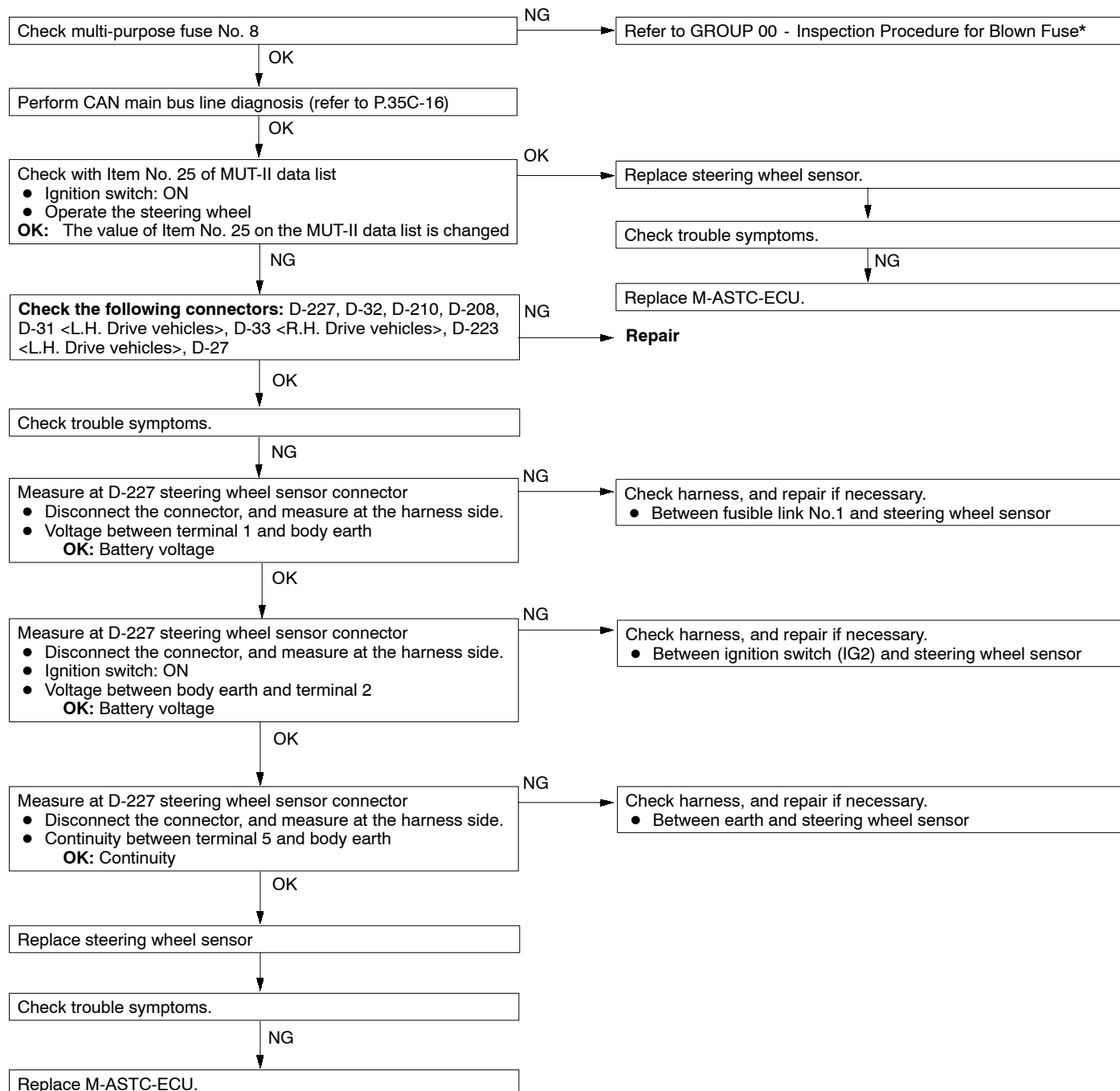
## NOTE:

\*: Refer to the 2001 PAJERO Workshop Manual [Pub. No. PWJE0001(1/2)].

Code No.67 Steering wheel sensor communication line error	Probable Cause
These codes are output when all data are not sent from the steering wheel sensor to M-ASTC-ECU.	<ul style="list-style-type: none"> <li>• CAN-bus line fault</li> <li>• Connector fault</li> <li>• Malfunction of steering wheel sensor</li> <li>• Malfunction of M-ASTC-ECU</li> </ul>

**CAUTION:**

When DTC No. 67 is displayed, always perform CAN main bus line diagnosis.

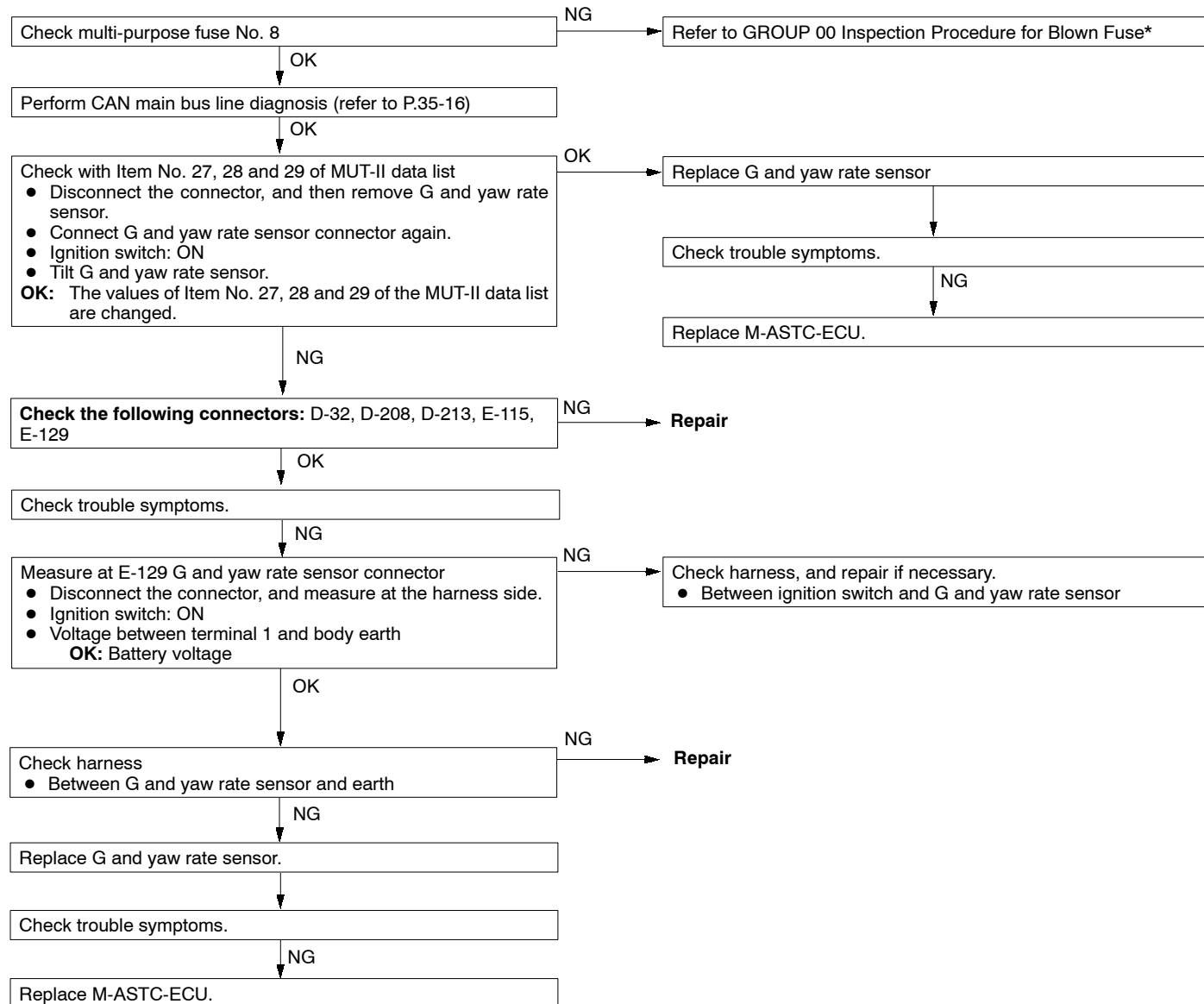
**NOTE:**

\*: Refer to the 2001 PAJERO Workshop Manual [Pub. No. PWJE0001(1/2)].

Code No. 74 G and yaw rate sensor communication line fault	Probable Cause
These codes are output when error is detected on the data transmitted from the G and yaw rate sensor to M-ASTC-ECU. (Data error in this case shows that data is transmitted from the G and yaw rate sensor, but there is an error on the data)	<ul style="list-style-type: none"> <li>● Malfunction of G and yaw rate sensor</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of M-ASTC-ECU</li> </ul>

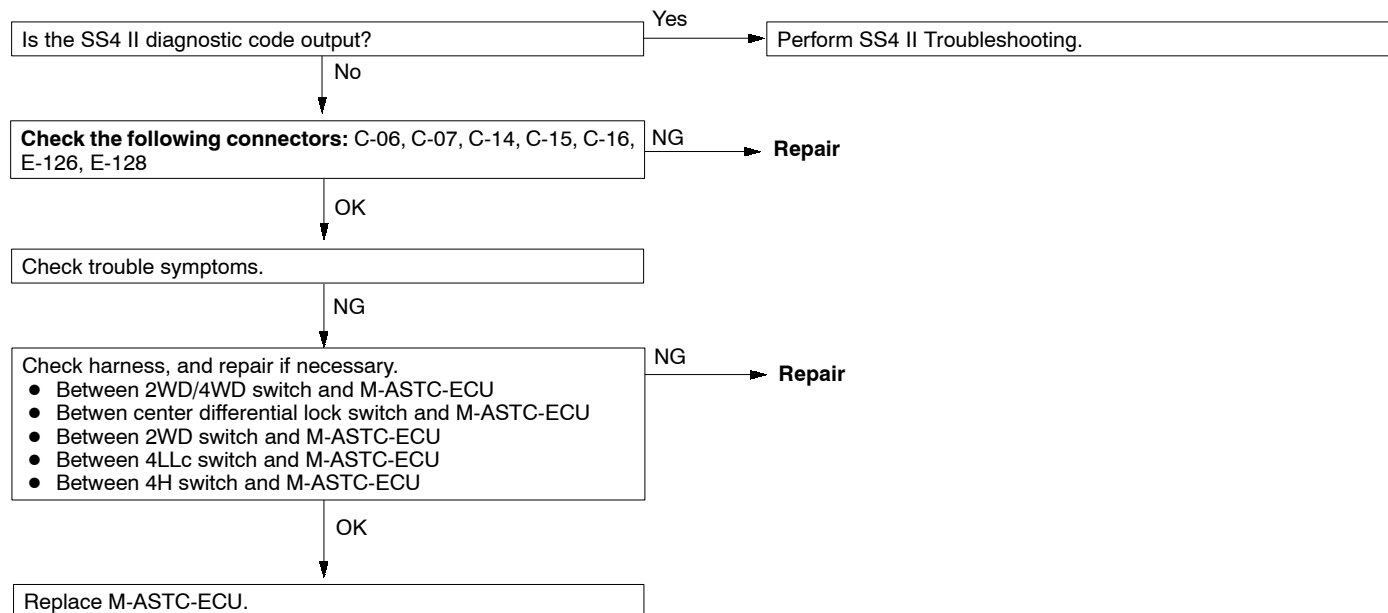
**CAUTION:**

When the diagnostic code for G and yaw rate sensor communication system is displayed, always perform CAN main bus line diagnosis.

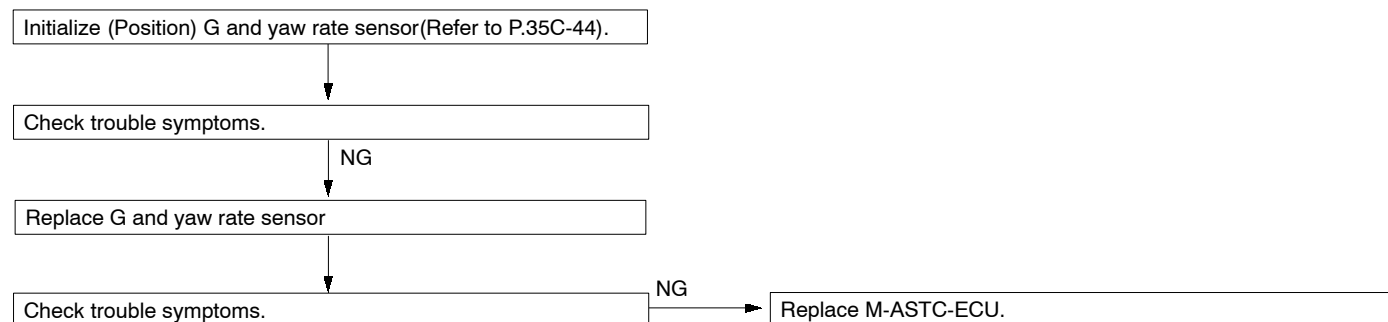
**NOTE:**

\*: Refer to the 2001 PAJERO Workshop Manual [Pub. No. PWJE0001(1/2)].

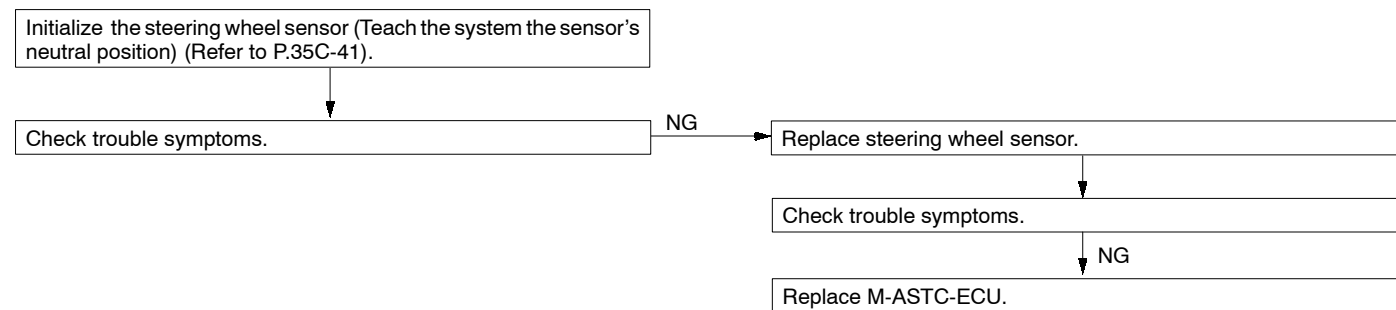
Code No. 75 Transfer switch defect	Probable Cause
This code is output when defective switching status is detected on 2WD/4WD switch, center differential lock switch, 2WD switch, 4LLc switch and 4H switch.	<ul style="list-style-type: none"> <li>● Malfunction of 2WD/4WD switch</li> <li>● Malfunction of center differential lock switch</li> <li>● Malfunction of 2WD switch</li> <li>● Malfunction of 4LLc switch</li> <li>● Malfunction of 4H switch</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of M-ASTC-ECU</li> </ul>



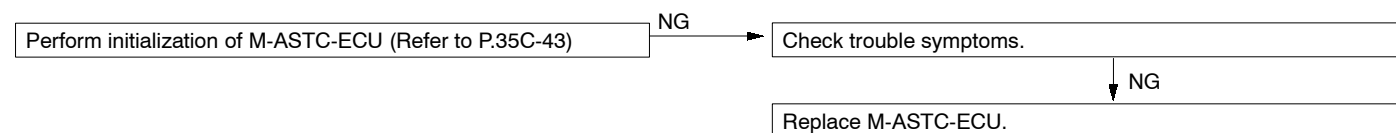
Code No. 81 G sensor initialization incomplete	Probable Cause
Code No. 82 Yaw rate sensor initialization incomplete	
When G and yaw rate sensor is replaced with a new one, initialization (positioning) of the sensor is required. These codes are displayed when the sensor is not initialized.	<ul style="list-style-type: none"> <li>● Malfunction of G and yaw rate sensor</li> <li>● Malfunction of M-ASTC-ECU</li> </ul>



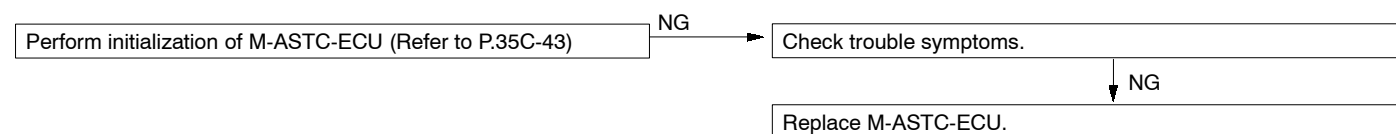
Code No. 83 Steering wheel sensor initialization incomplete	Probable Cause
This code is output immediately when the battery is removed and the learned neutral point of the steering wheel sensor is erased.	<ul style="list-style-type: none"> <li>● Malfunction of steering wheel sensor</li> <li>● Malfunction of M-ASTC-ECU</li> </ul>

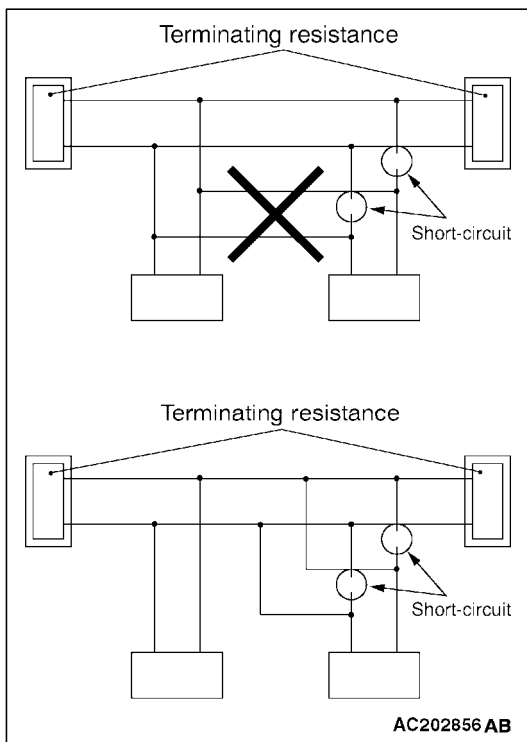
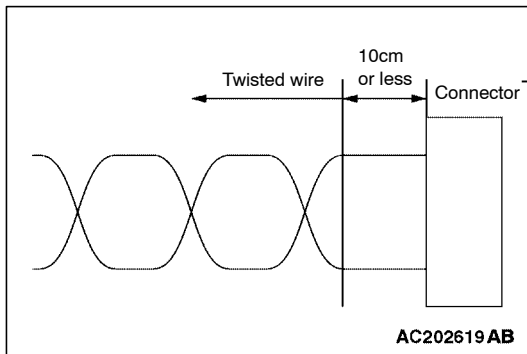
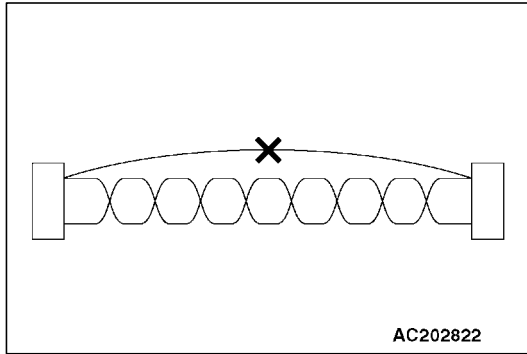


Code No. 84 Transfer switch initialization incomplete	Probable Cause
This code is output when the transfer switch is not initialized yet after M-ASTC-ECU is replaced with new one.	<ul style="list-style-type: none"> <li>● Transfer switch of M-ASTC-ECU initialization incomplete</li> <li>● Malfunction of M-ASTC-ECU</li> </ul>



Code No. 85 Master cylinder pressure sensor initialization incomplete	Probable Cause
This code is output when the master cylinder pressure sensor is not initialized (positioned) after M-ASTC-ECU is replaced with a new one.	<ul style="list-style-type: none"> <li>● Master cylinder pressure sensor of M-ASTC-ECU initialization incomplete</li> <li>● Malfunction of M-ASTC-ECU</li> </ul>





## CAN-BUS DIAGNOSIS

### NOTES ON CAN-BUS LINE REPAIR

#### Notes for CAN-bus line repair

- To repair the main bus line, CAN\_L line or CAN\_H line of the branch, route the entire twisted wire between the connectors at both ends again. If the harness is repaired partially, or CAN\_L or CAN\_H line is only corrected, deterioration of the noise-proof property results in communication error.
- To replace the main bus line, or connectors on the branch (including replacement of only terminals), or harnesses, loose twisted wire must be within 10 cm apart from the connector. When the loose twisted wire is over 10 cm apart from the connector, the harness must be twisted so that it can be matched with the original twisted wire. When the loose twisted wire is over 10 cm apart from the connector, deterioration of noise-proof property results in communication error.
- The branch must be repaired so that it can be separated directly from the main bus. If the branch is separated from the branch connected to the other devices, CAN communication is not established.

#### Notes for repair of terminating resistance

- Even if the terminating resistance at one end is damaged, communication continues, but deterioration of noise-proof property occurs. In this case, also ensure that the diagnostic code has been displayed, because no code may be displayed. When the damage is detected, replace the terminating resistance.

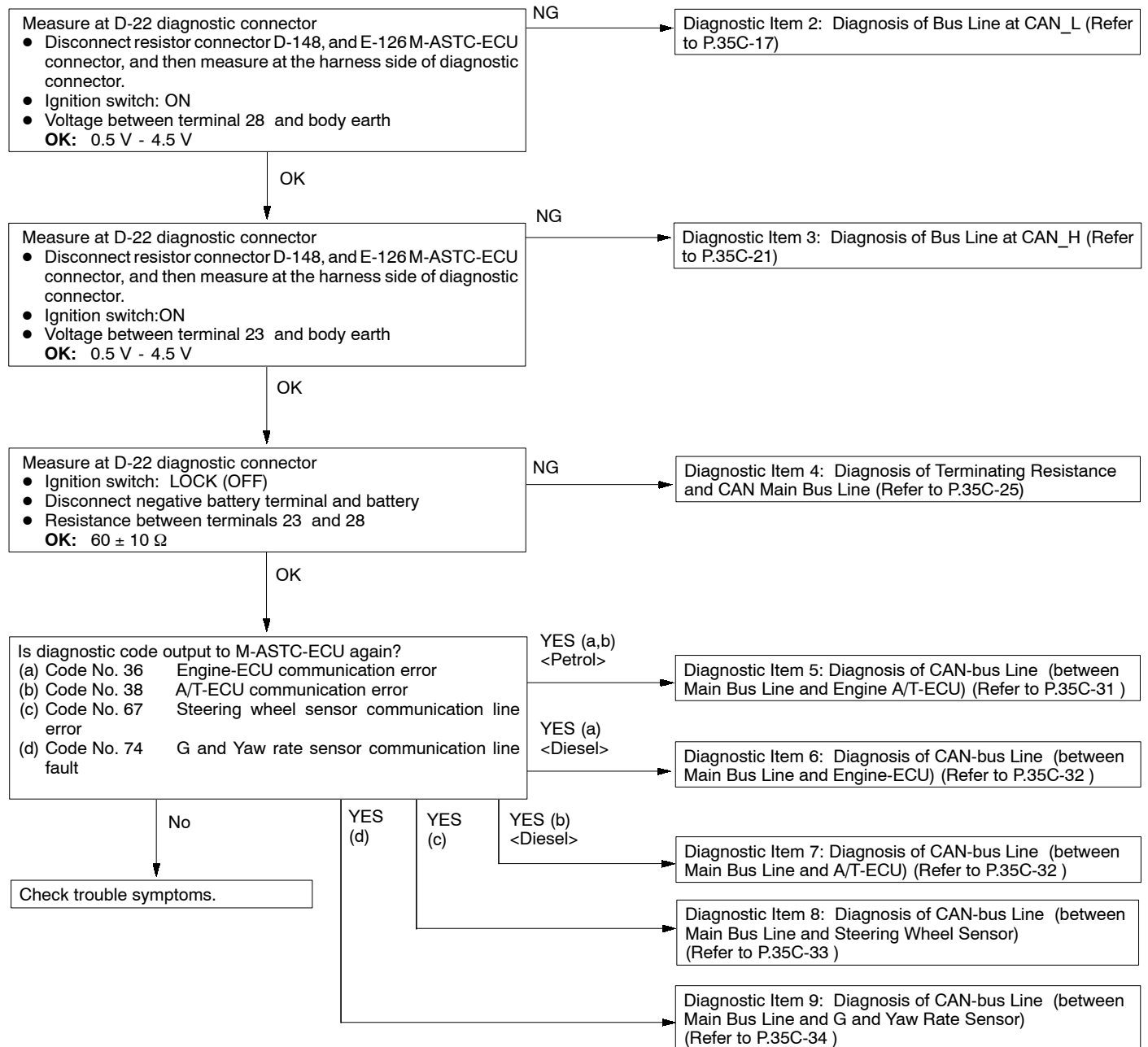


## Diagnostic Item 1

Diagnosis of CAN Main Bus Line	Probable Cause
When a fault is detected on M-ASTC, CAN main bus line or terminating resistance may be defective. (Each ECU and sensor may be damaged, and therefore use this troubleshooting to check the status of CAN main bus line)	<ul style="list-style-type: none"> <li>• CAN main bus line fault</li> <li>• Terminating resistance defect (integrated in M-ASTC-ECU or resistor)</li> <li>• Malfunction of harness or connector</li> </ul>

## Caution

- Use digital tester to measure resistance or voltage of CAN-bus line. If other device than the digital tester is used, it may cause the damage of the equipment connected to CAN-bus line.
- To measure resistance of CAN-bus line, disconnect the negative battery terminal. If the resistance is measured with the negative battery terminal connected, it may cause the damage of the equipment connected to CAN-bus line.
- To measure resistance or voltage at a female connector, always use test harness. If resistance or voltage is measured with other device than the test harness, it may cause the damage of connector.

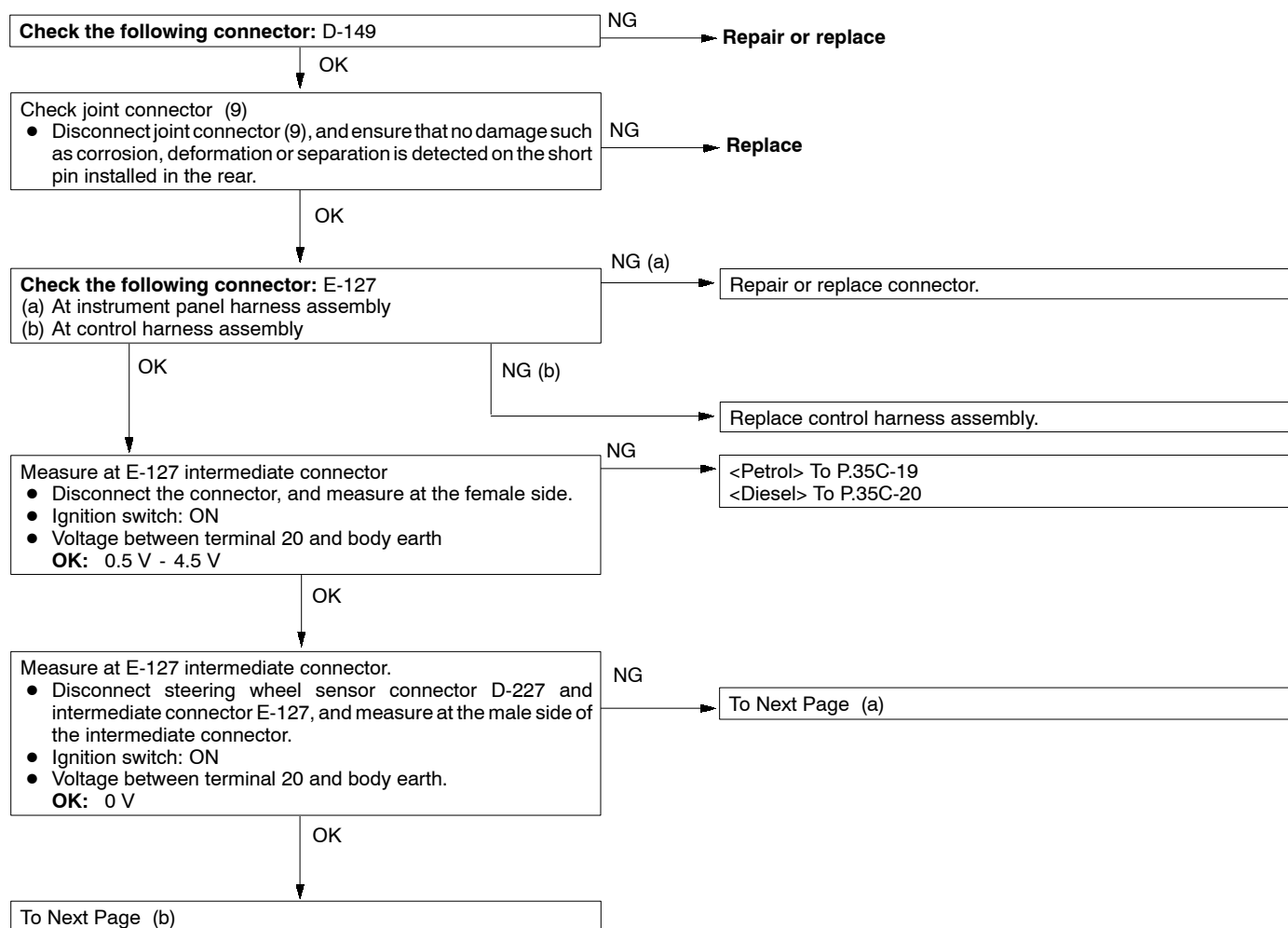


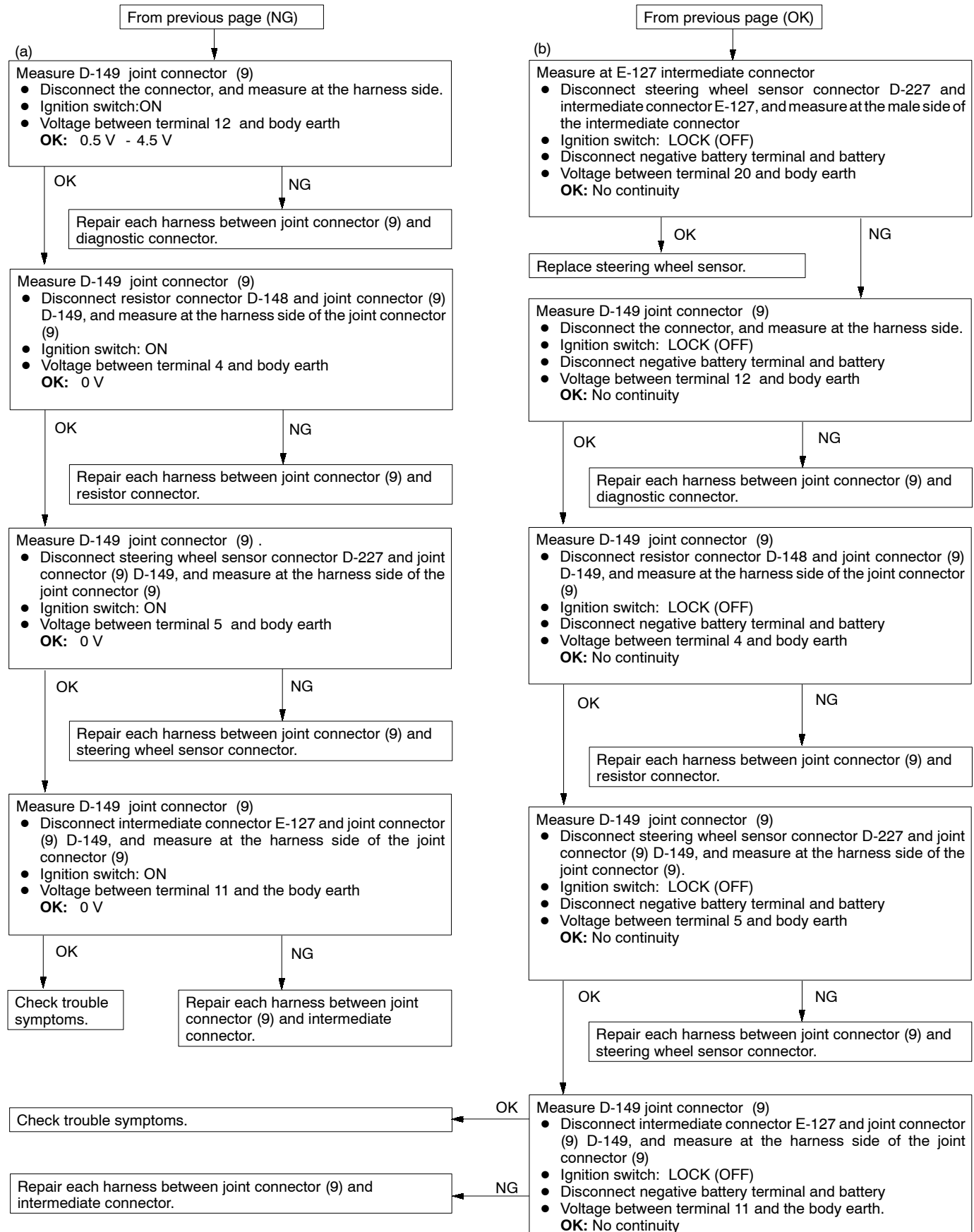
## Diagnostic Item 2

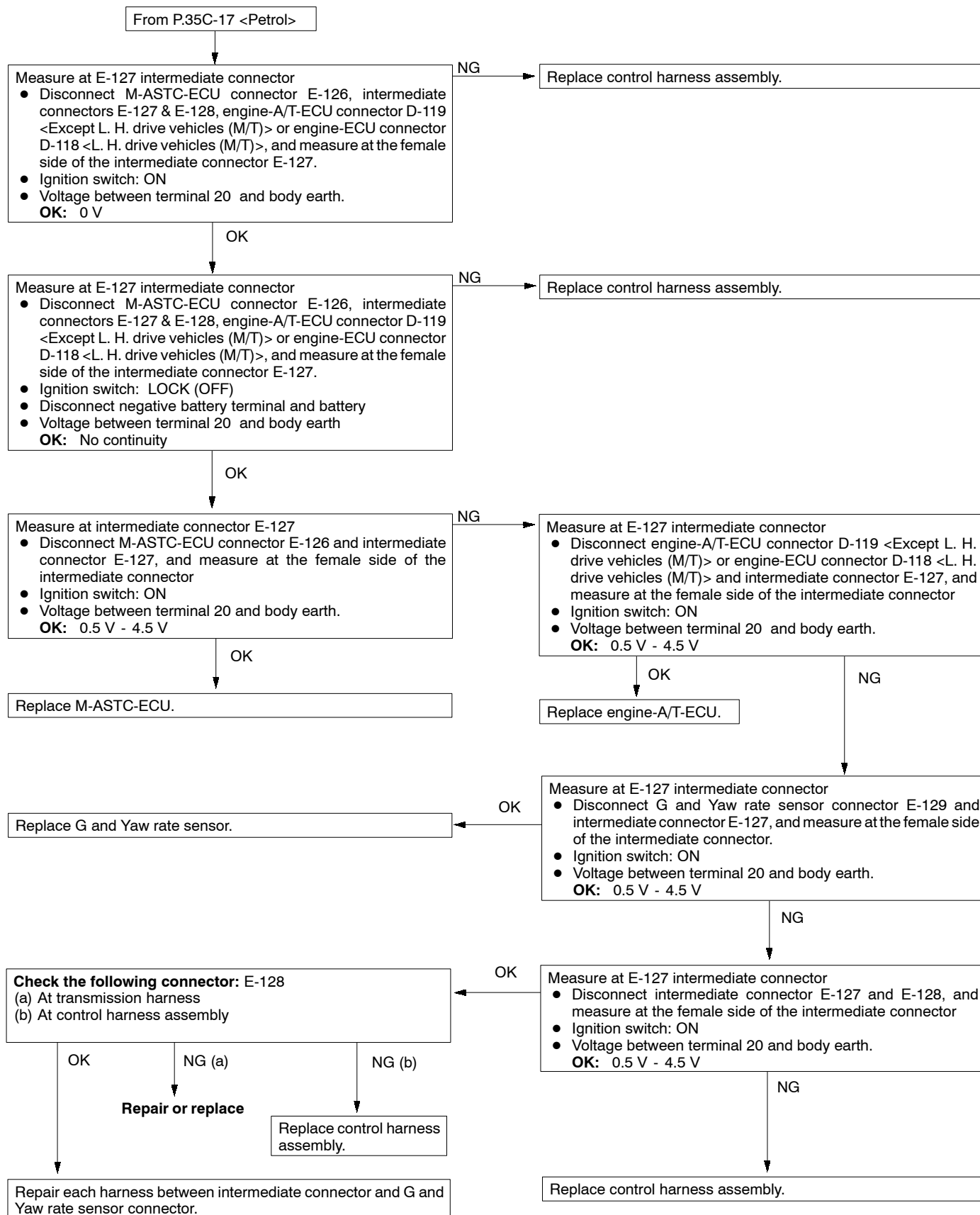
## Diagnosis of Bus Line at CAN\_L

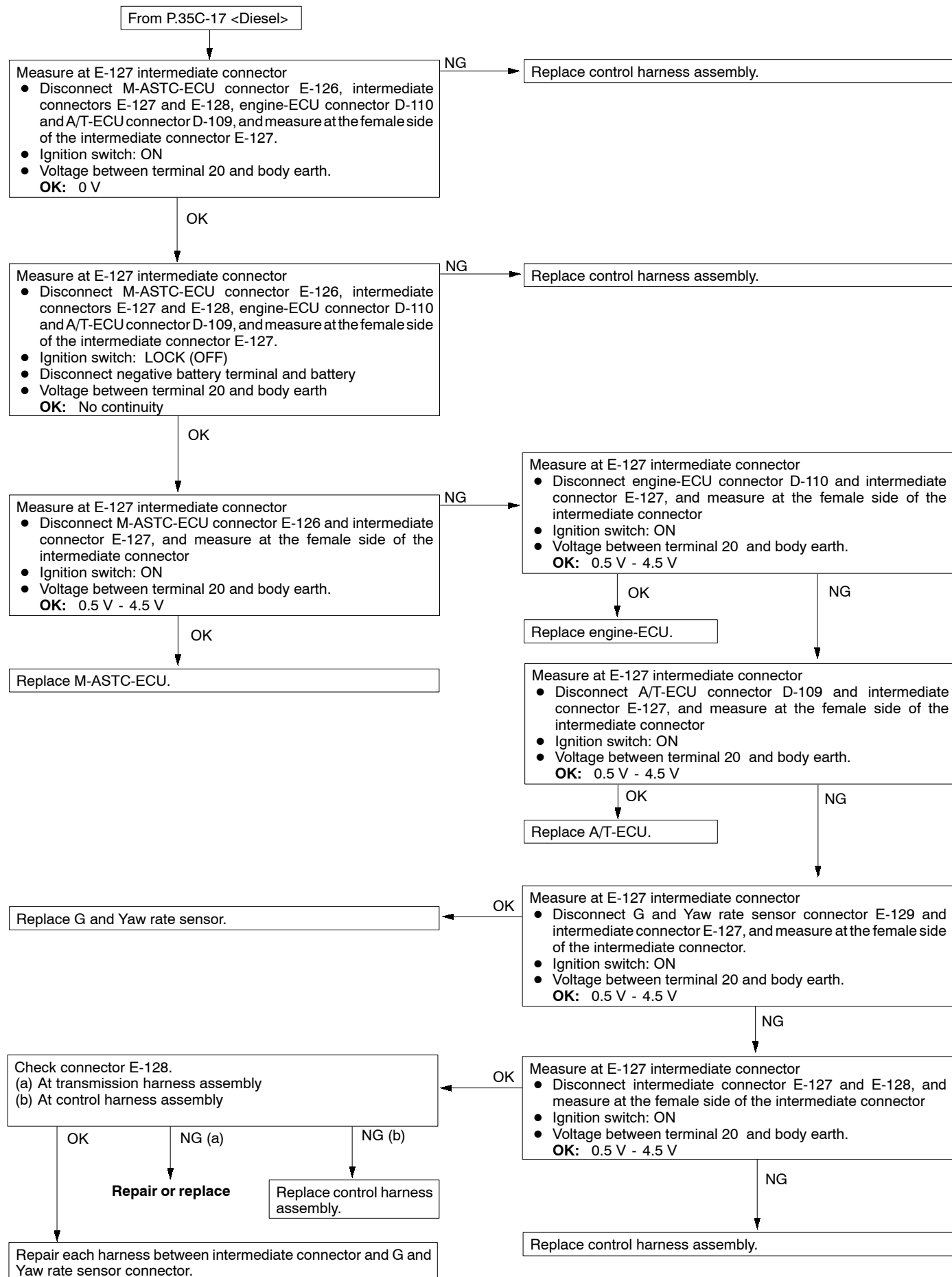
## Caution

- Use digital tester to measure resistance or voltage of CAN-bus line. If other device than the digital tester is used, it may cause the damage of the equipment connected to CAN-bus line.
- To measure resistance of CAN-bus line, disconnect the negative battery terminal. If the resistance is measured with the negative battery terminal connected, it may cause the damage of the equipment connected to CAN-bus line.
- To measure resistance or voltage at a female connector, always use test harness. If resistance or voltage is measured with other device than the test harness, it may cause the damage of connector.
- When defective connectors (including terminals) of instrument panel harness assembly (connected to steering wheel sensor, diagnostic connector and resistor) and transmission harness (connected to G and Yaw rate sensor connector and intermediate connector E-128) require harness cutting, loose twisted wire must be within 10 cm apart from the connector. When the loose twisted wire is over 10 cm apart from the connector, the harness must be twisted so that it can be matched with the original twisted wire. When the loose twisted wire is over 10 cm apart from the connector, it results in communication error.
- When CAN-bus line for the instrument panel harness assembly (connected to the steering wheel sensor, diagnostic connector and the resistor) and the transmission harness (connected to G and Yaw rate sensor connector and intermediate connector E-128) is repaired, notes on harness repair must be strictly followed. Redrawing CAN\_L or CAN\_H line only, or changing separation points causes CAN communication error.
- When a defect occurs on CAN-bus line or connector for the control harness assembly (connected to M-ASTC-ECU, engine A/T-ECU <Petrol>, engine-ECU <Diesel>, A/T-ECU <Diesel> and intermediate connector E-128), do not repair harness or connector only. Replace the harness assembly. Redrawing a new line or repairing connector causes CAN communication error.







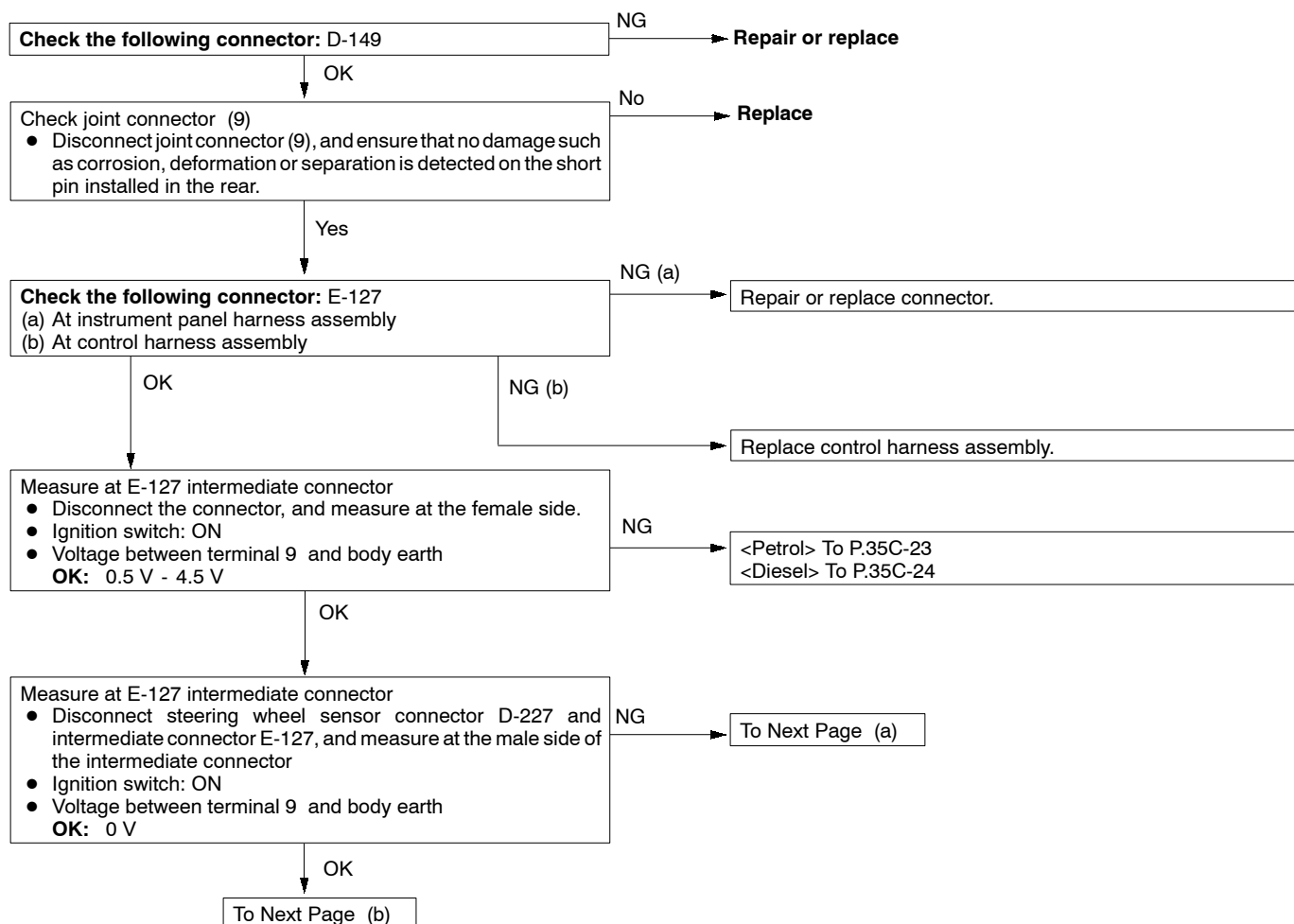


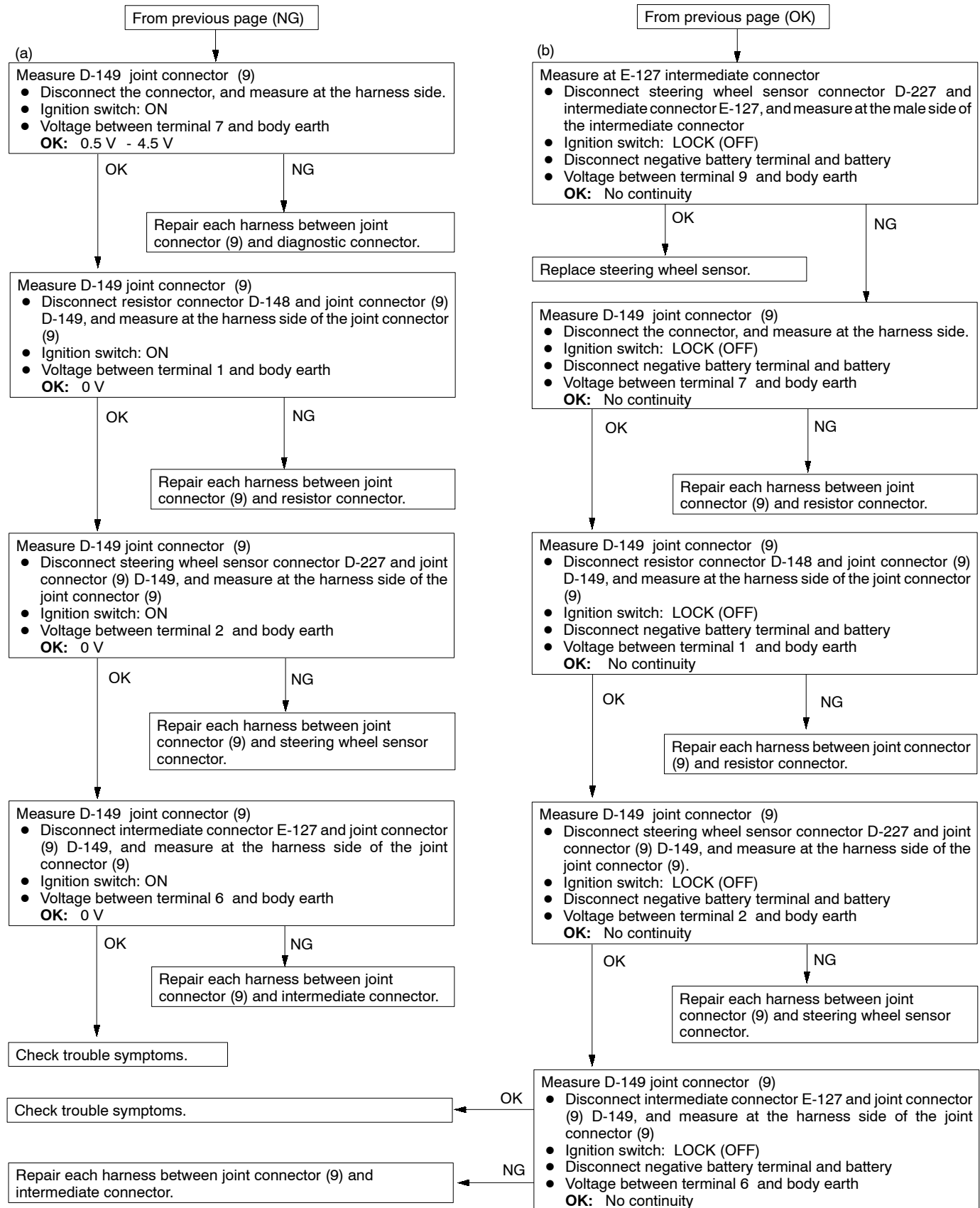
## Diagnostic Item 3

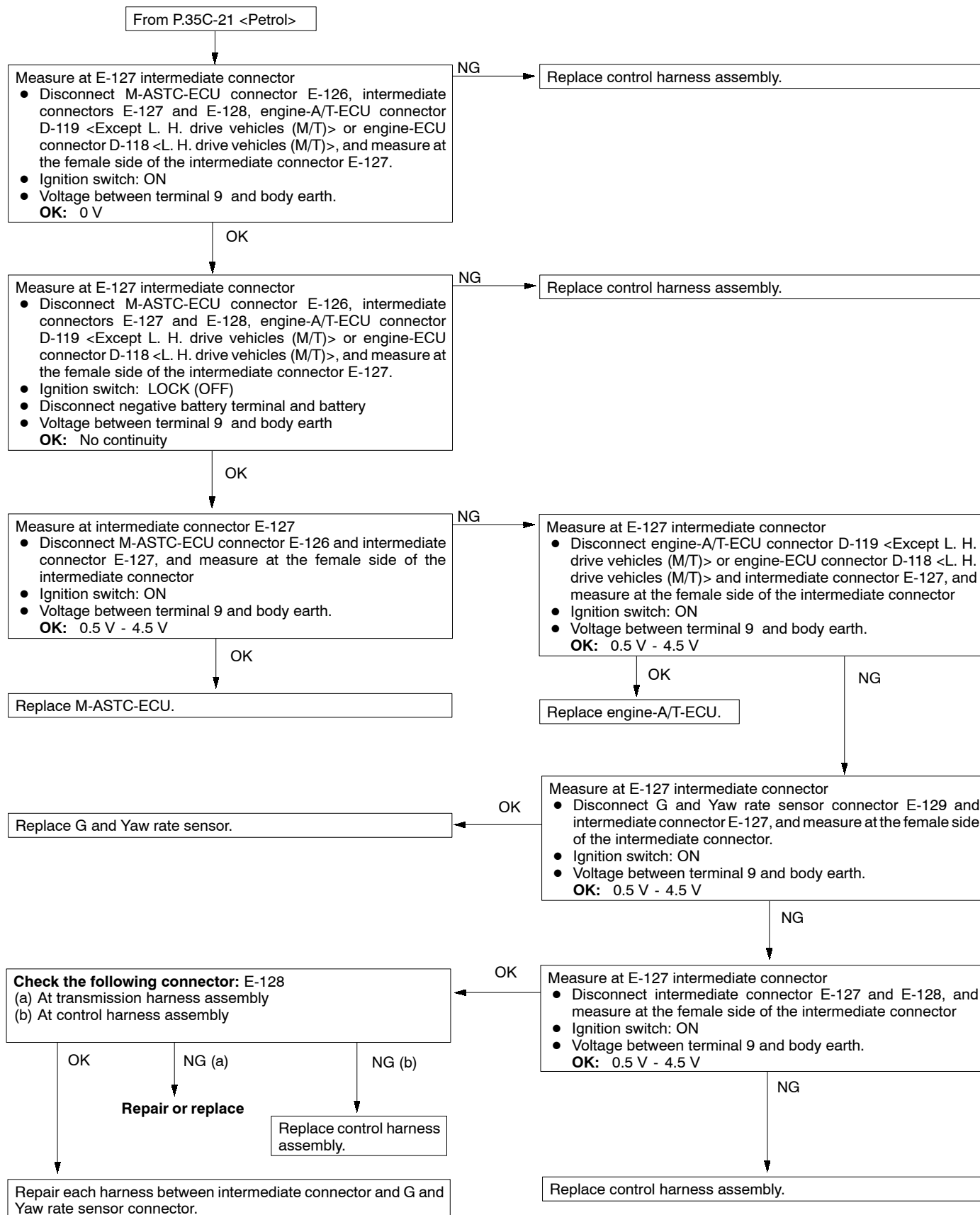
## Diagnosis of Bus Line at CAN\_H

## Caution

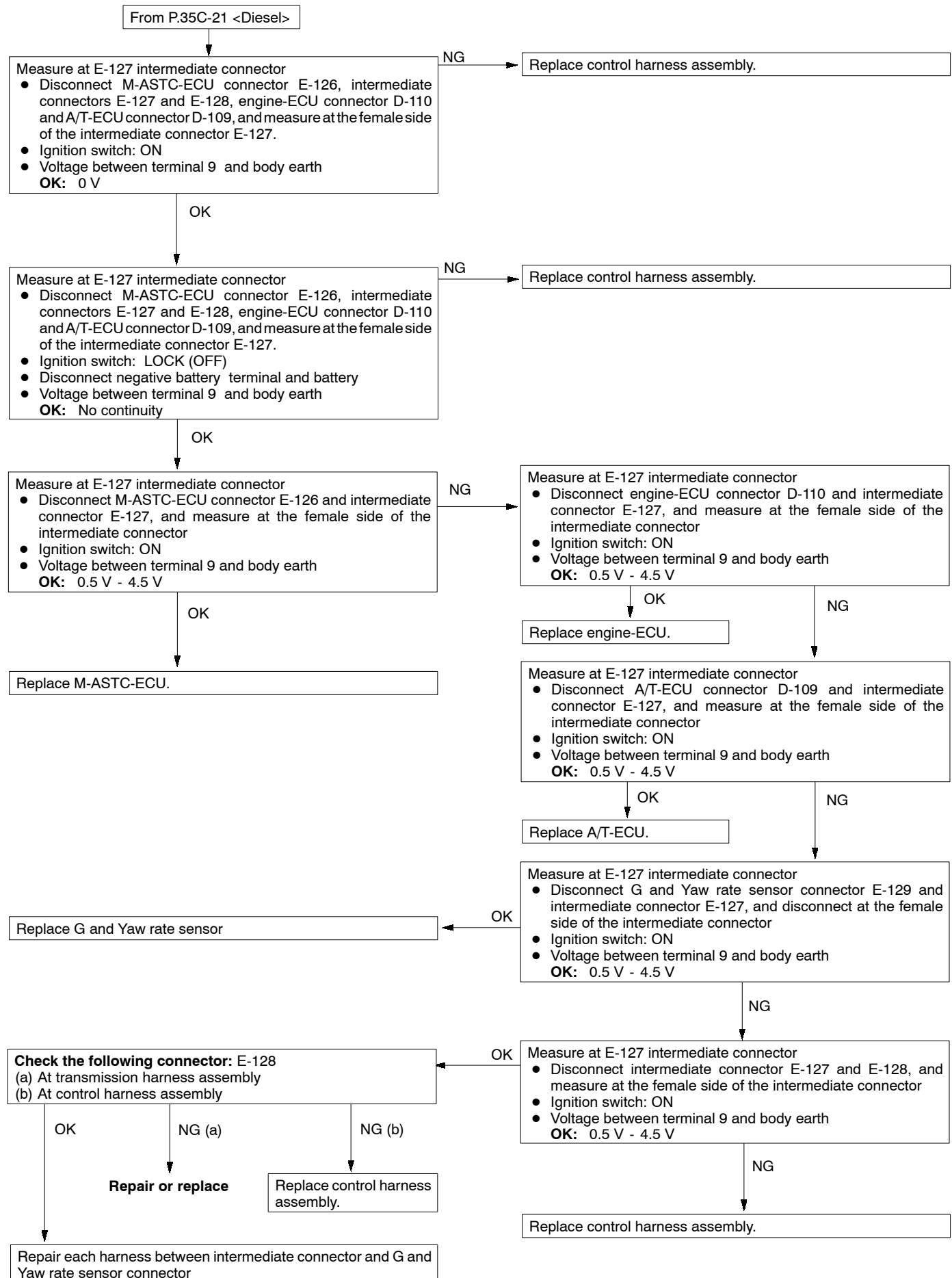
- Use digital tester to measure resistance or voltage of CAN-bus line. If other device than the digital tester is used, it may cause the damage of the equipment connected to CAN-bus line.
- To measure resistance of CAN-bus line, disconnect the negative battery terminal. If the resistance is measured with the negative battery terminal connected, it may cause the damage of the equipment connected to CAN-bus line.
- To measure resistance or voltage at a female connector, always use test harness. If resistance or voltage is measured with other device than the test harness, it may cause the damage of connector.
- When defective connectors (including terminals) of instrument panel harness assembly (connected to steering wheel sensor, diagnostic connector and resistor) and transmission harness (connected to G and Yaw rate sensor connector and intermediate connector E-128) require harness cutting, loose twisted wire must be within 10 cm apart from the connector. When the loose twisted wire is over 10 cm apart from the connector, the harness must be twisted so that it can be matched with the original twisted wire. When the loose twisted wire is over 10 cm apart from the connector, it results in communication error.
- When CAN-bus line for the instrument panel harness assembly (connected to the steering wheel sensor, diagnostic connector and the resistor) and the transmission harness (connected to G and Yaw rate sensor connector and intermediate connector E-128) is repaired, notes on harness repair must be strictly followed. Redrawing CAN\_L or CAN\_H line only, or changing separation points causes CAN communication error.
- When a defect occurs on CAN-bus line or connector for the control harness assembly (connected to M-ASTC-ECU, engine A/T-ECU <Petrol>, engine-ECU <Diesel>, A/T-ECU <Diesel> and intermediate connector E-128), do not repair harness or connector only. Replace the harness assembly. Redrawing a new line or repairing connector causes CAN communication error.









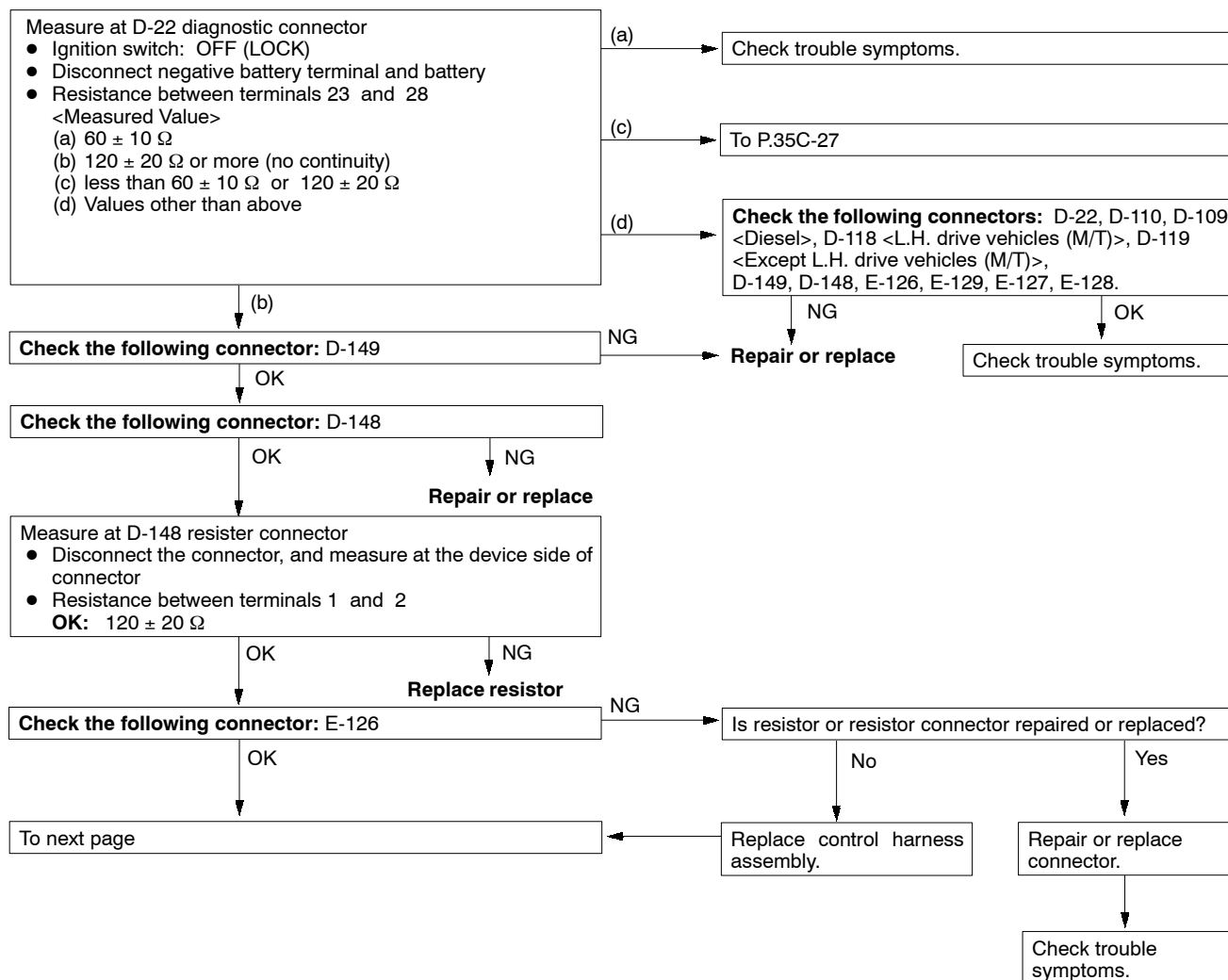


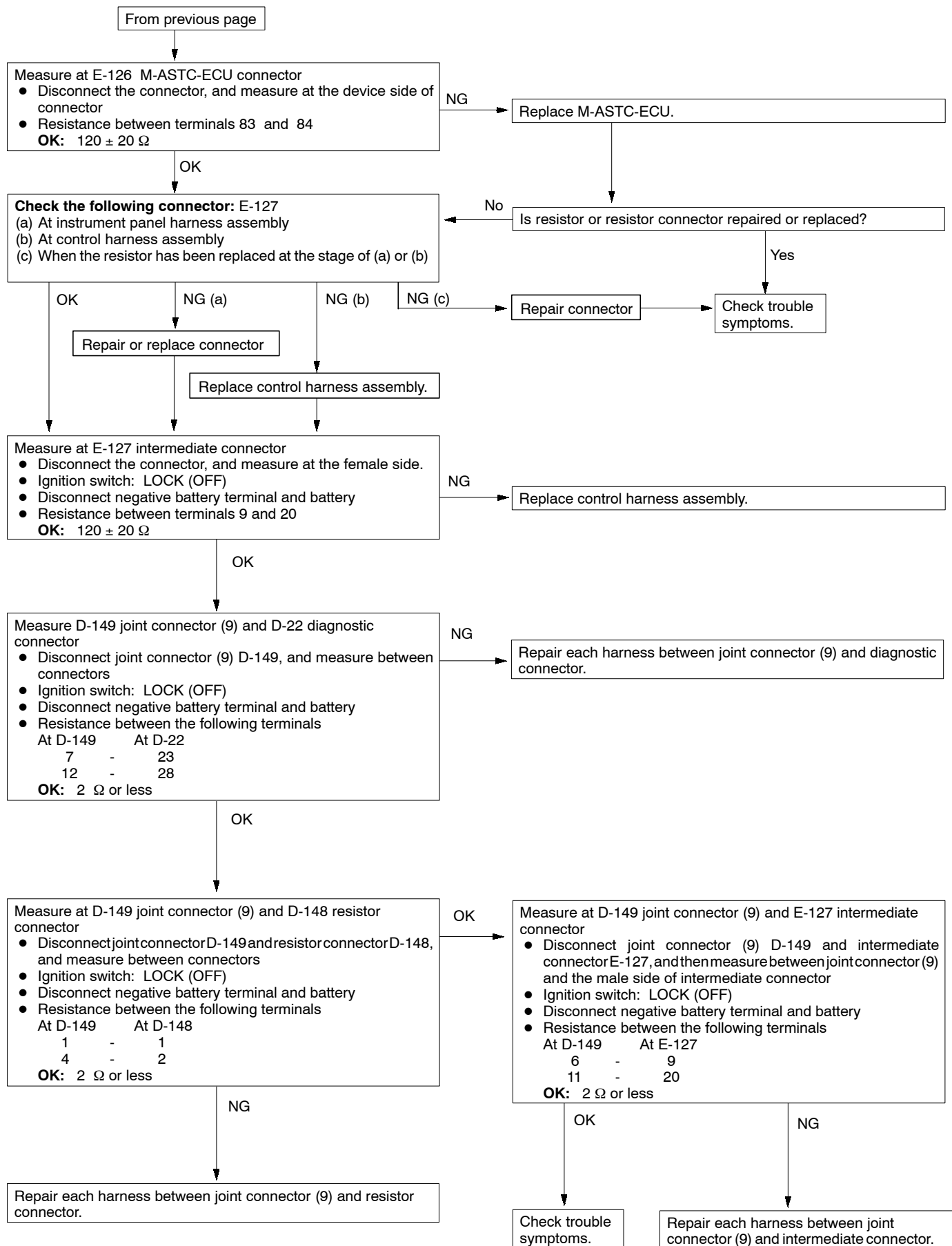
## Diagnostic Item 4

## Diagnosis of Terminating Resistance and CAN Main Bus Line

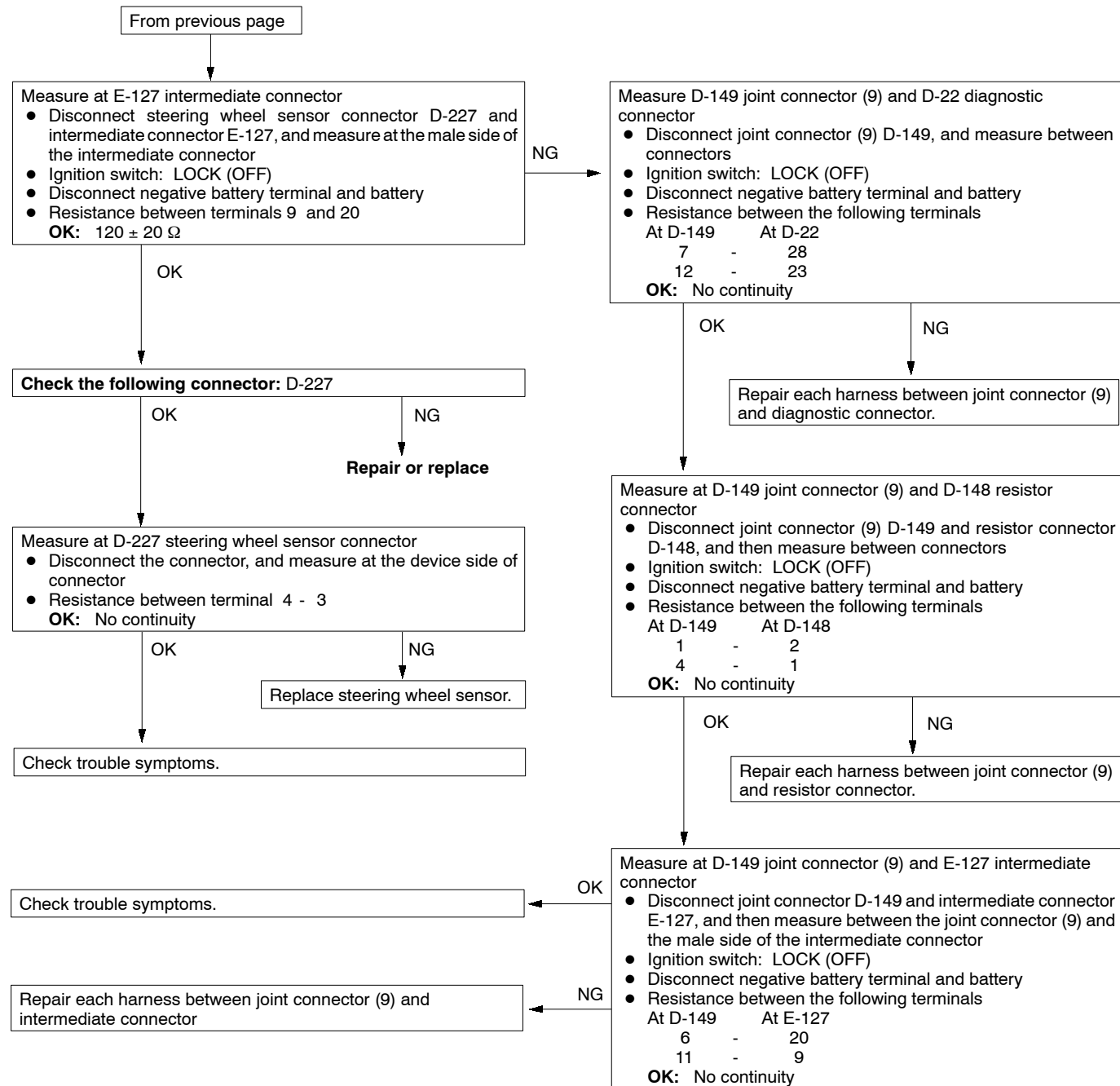
## Caution

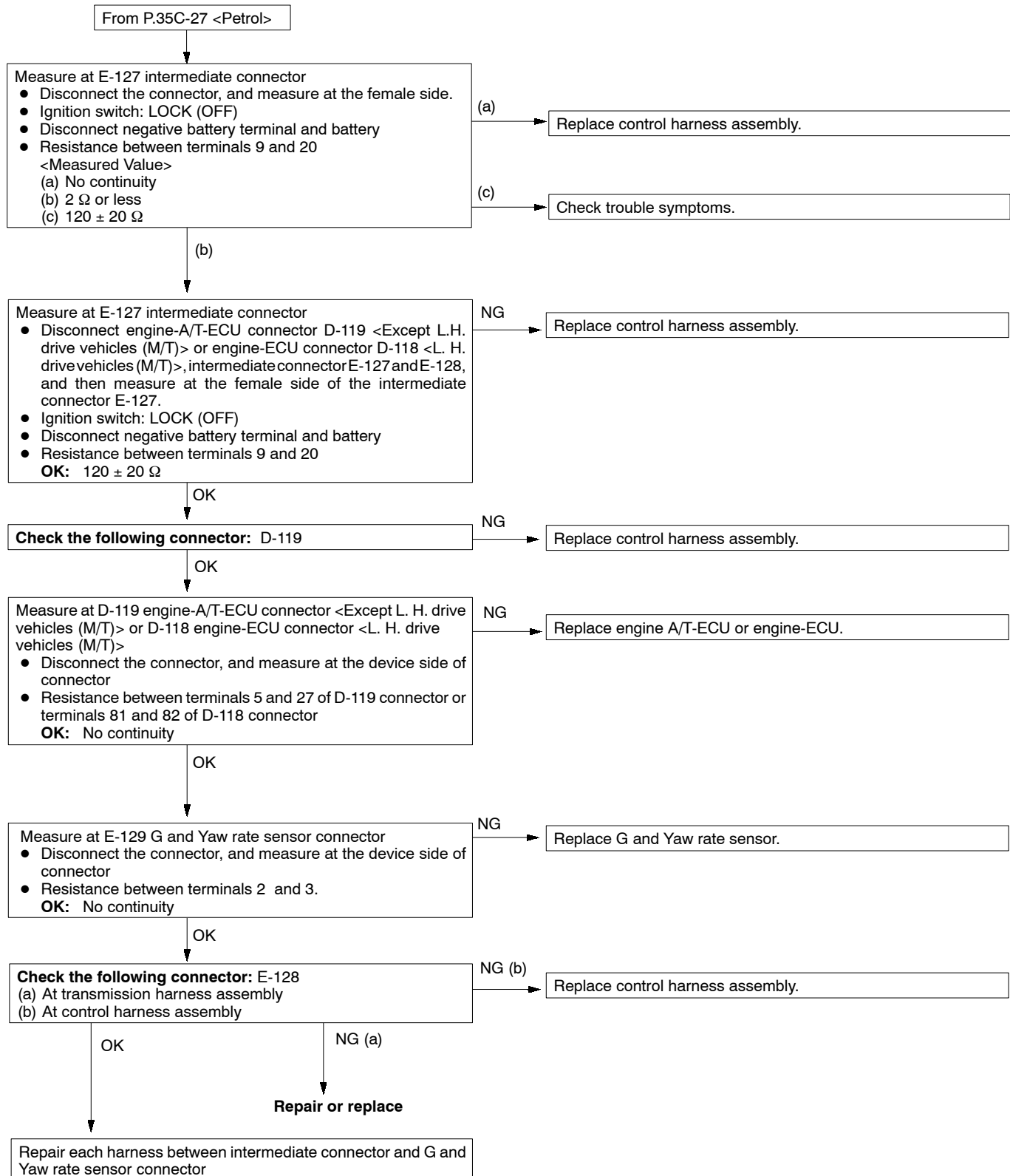
- Use digital tester to measure resistance or voltage of CAN-bus line. If other device than the digital tester is used, it may cause the damage of the equipment connected to CAN-bus line.
- To measure resistance of CAN-bus line, disconnect the negative battery terminal. If the resistance is measured with the negative battery terminal connected, it may cause the damage of the equipment connected to CAN-bus line.
- To measure resistance or voltage at a female connector, always use test harness. If resistance or voltage is measured with other device than the test harness, it may cause the damage of connector.
- When defective connectors (including terminals) of instrument panel harness assembly (connected to steering wheel sensor, diagnostic connector and resistor) and transmission harness (connected to G and Yaw rate sensor connector and intermediate connector E-128) require harness cutting, loose twisted wire must be within 10 cm apart from the connector. When the loose twisted wire is over 10 cm apart from the connector, the harness must be twisted so that it can be matched with the original twisted wire. When the loose twisted wire is over 10 cm apart from the connector, it results in communication error.
- When CAN-bus line for the instrument panel harness assembly (connected to the steering wheel sensor, diagnostic connector and the resistor) and the transmission harness (connected to G and Yaw rate sensor connector and intermediate connector E-128) is repaired, notes on harness repair must be strictly followed. Redrawing CAN\_L or CAN\_H line only, or changing separation points causes CAN communication error.
- When a defect occurs on CAN-bus line or connector for the control harness assembly (connected to M-ASTC-ECU, engine A/T-ECU <Petrol>, engine-ECU <Diesel>, A/T-ECU <Diesel> and intermediate connector E-128), do not repair harness or connector only. Replace the harness assembly. Redrawing a new line or repairing connector causes CAN communication error.

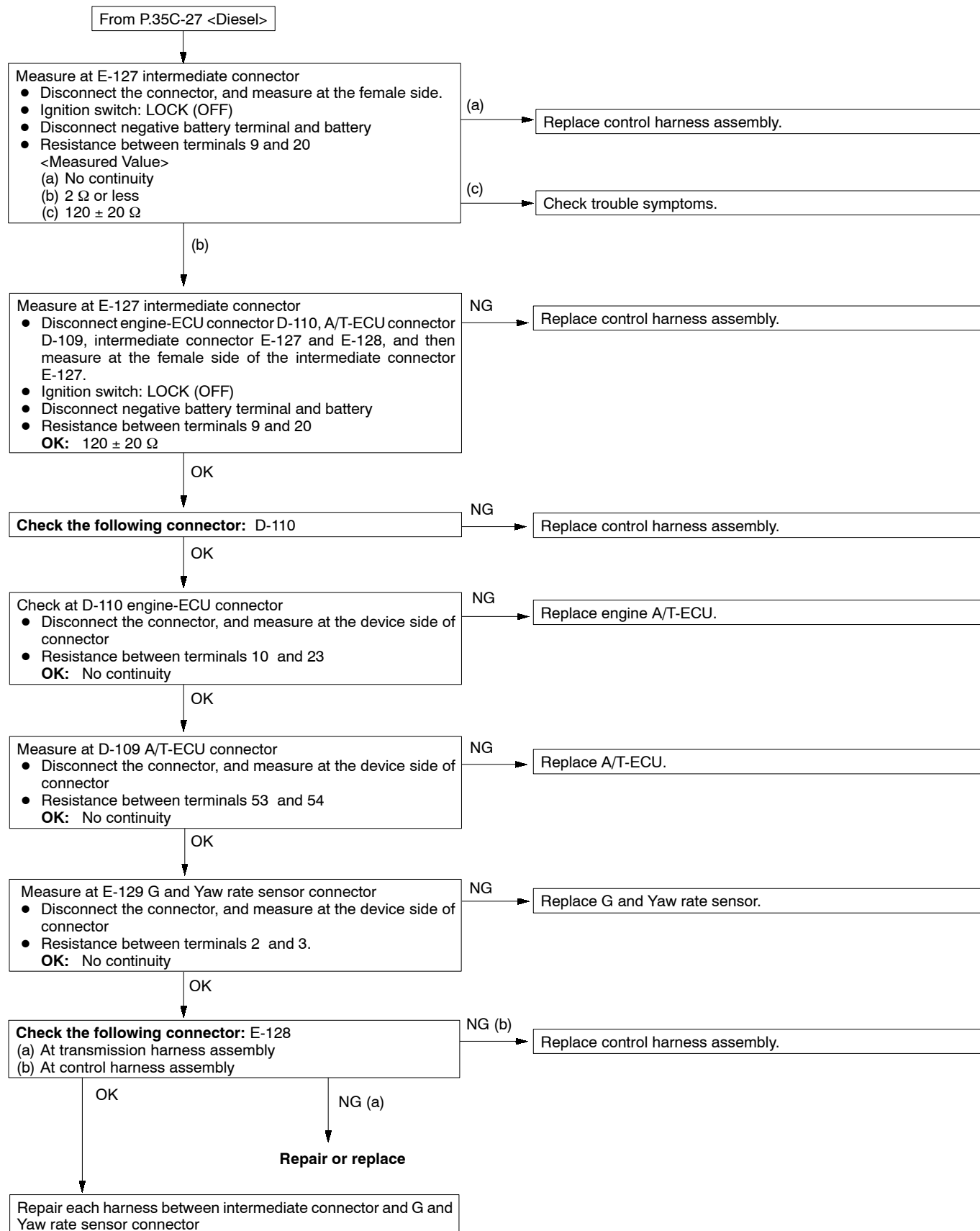










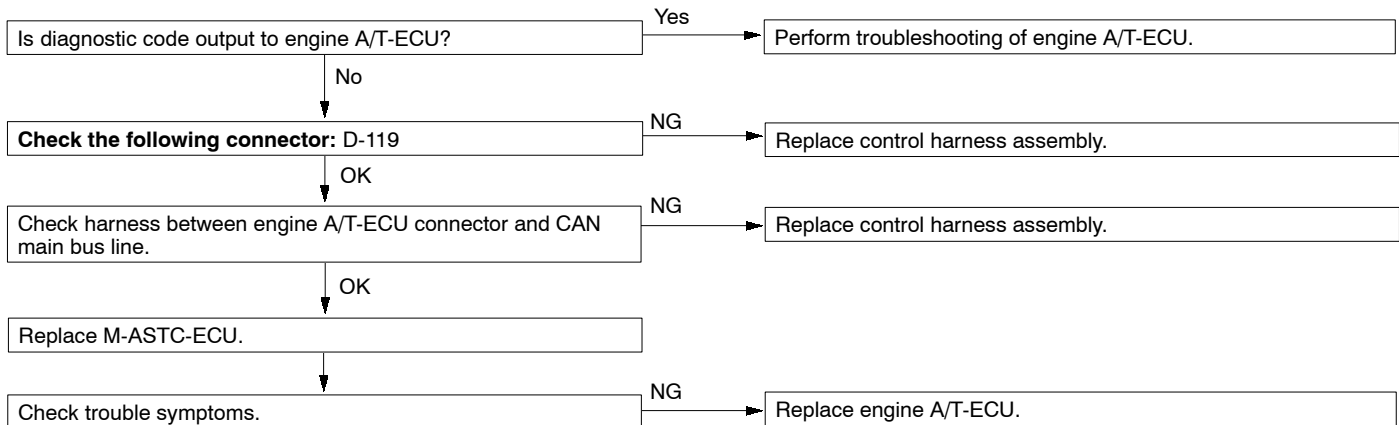


**Diagnostic Item 5**

Diagnosis of CAN-bus Line (between Main Bus Line and Engine A/T-ECU)	Probable Cause
When DTC No. 35 or 36 is output to M-ASTC-ECU, the harness from CAN main bus line to engine A/T-ECU, or engine A/T-ECU itself or M-ASTC-ECU may be damaged or defective.	<ul style="list-style-type: none"> <li>• CAN-bus line damaged between CAN main bus line and Engine A/T-ECU</li> <li>• Connector fault</li> <li>• Engine-A/T-ECU inoperative</li> <li>• Malfunction of M-ASTC-ECU</li> </ul>

**Caution**

- This troubleshooting must be carried out after the diagnosis of CAN main bus line has been completed.
- When CAN-bus line or connector of the control harness assembly (connected to M-ASTC-ECU, engine A/T-ECU <Petrol>, engine-ECU <Diesel>, A/T-ECU <Diesel> and intermediate connector E-128) is defective, do not repair the harness or connector only. Always replace the harness assembly. Redrawing a new line or repairing connector causes CAN communication error.



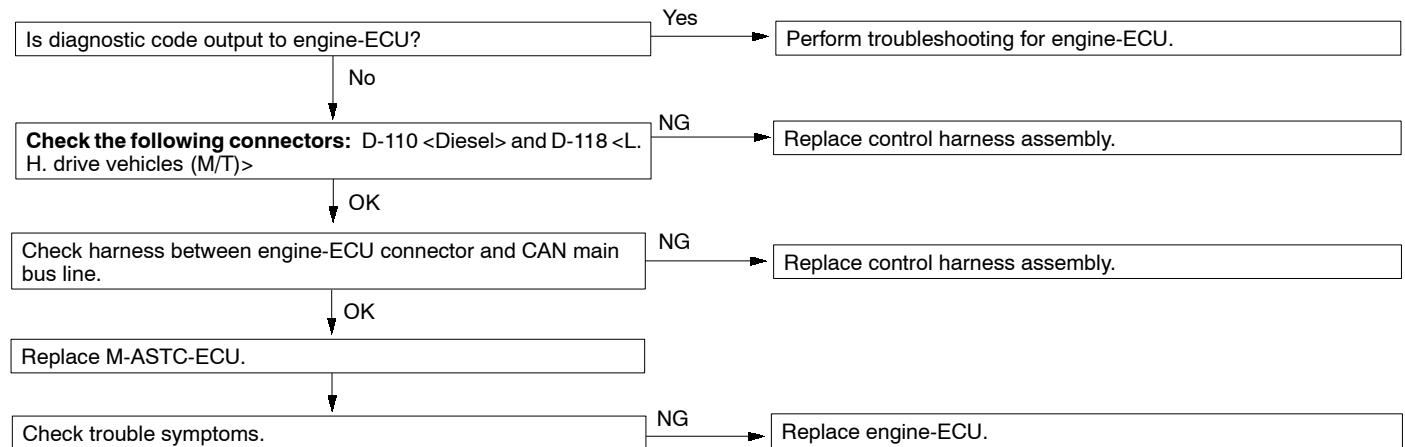


## Diagnostic Item 6

Diagnosis of CAN Bus Line (between Main Bus Line and Engine-ECU)	Probable Cause
When DTC No. 35 is output to M-ASTC-ECU, harness from CAN main bus line to engine-ECU, or engine-ECU itself, or M-ASTC-ECU may be damaged or defective.	<ul style="list-style-type: none"> <li>• CAN-bus line defect between CAN main bus line and engine-ECU</li> <li>• Connector fault</li> <li>• Malfunction of engine-ECU</li> <li>• Malfunction of M-ASTC-ECU</li> </ul>

## Caution

- This troubleshooting must be carried out after the diagnosis of CAN main bus line has been completed.
- When CAN-bus line or connector of the control harness assembly (connected to M-ASTC-ECU, engine A/T-ECU <Petrol>, engine-ECU <Diesel>, A/T-ECU <Diesel> and intermediate connector E-128) is defective, do not repair the harness or connector only. Always replace the harness assembly. Redrawing a new line or repairing connector causes CAN communication error.

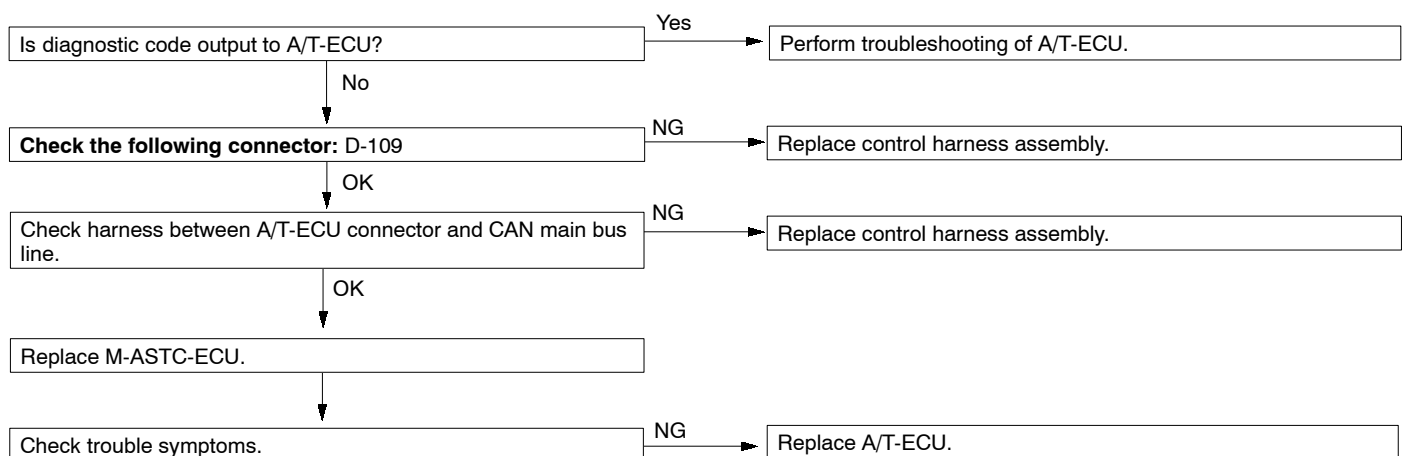


## Diagnostic Item 7

Diagnosis of CAN-bus Line (between Main Bus Line and A/T-ECU)	Probable Cause
When DTC No. 35 or 36 is output to M-ASTC-ECU, the harness from CAN main bus line to A/T-ECU, or A/T-ECU itself or M-ASTC-ECU may be damaged or defective.	<ul style="list-style-type: none"> <li>• CAN-bus line damaged between CAN main bus line and A/T-ECU</li> <li>• Connector fault</li> <li>• A/T-ECU inoperative</li> <li>• Malfunction of M-ASTC-ECU</li> </ul>

## Caution

- This troubleshooting must be carried out after the diagnosis of CAN main bus line has been completed.
- When CAN-bus line or connector of the control harness assembly (connected to M-ASTC-ECU, engine A/T-ECU <Petrol>, engine-ECU <Diesel>, A/T-ECU <Diesel> and intermediate connector E-128) is defective, do not repair the harness or connector only. Always replace the harness assembly. Redrawing a new line or repairing connector causes CAN communication error.

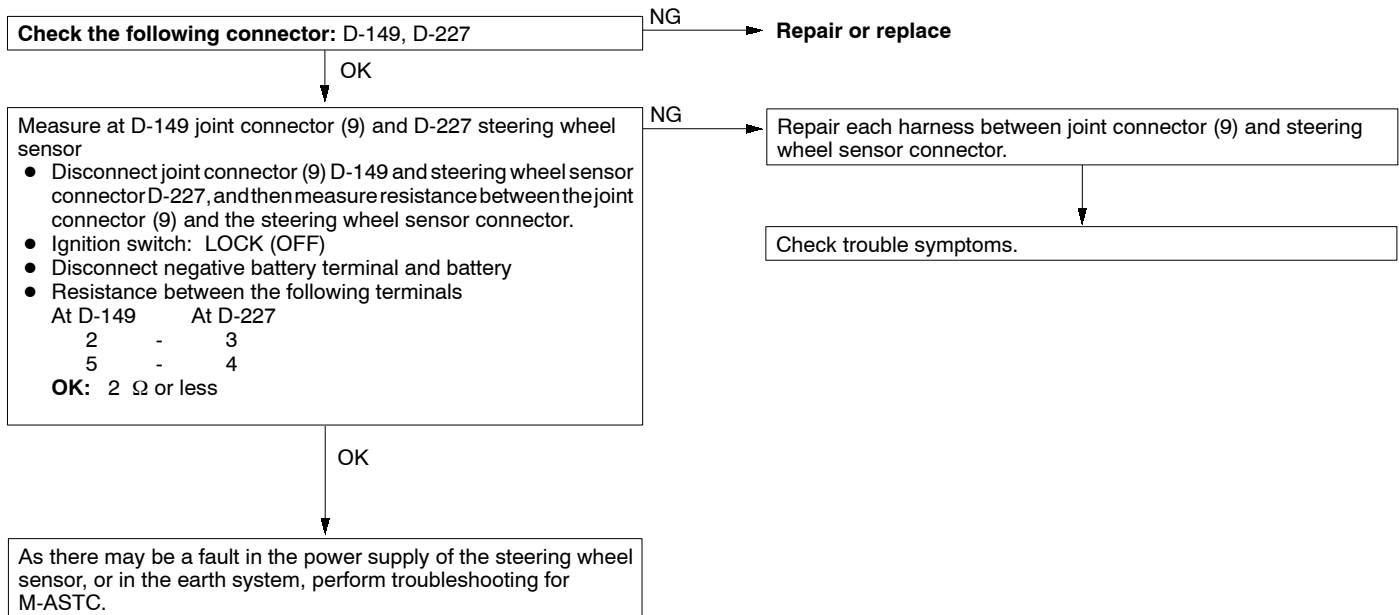


## Diagnostic Item 8

Diagnosis of CAN Bus Line (between Main Bus Line and Steering Wheel Sensor)	Probable Cause
When DTC No. 67 is output to M-ASTC-ECU, harness from CAN main bus line to steering wheel sensor, steering wheel sensor itself, or M-ASTC-ECU may be defective.	<ul style="list-style-type: none"> <li>• CAN-bus line defect between CAN main bus line and steering wheel sensor</li> <li>• Connector fault</li> <li>• Malfunction of steering wheel sensor</li> <li>• Malfunction of M-ASTC-ECU</li> </ul>

## Caution

- This troubleshooting must be carried out after the diagnosis of CAN main bus line has been completed.
- Use digital tester to measure resistance or voltage of CAN-bus line. If other device than the digital tester is used, it may cause the damage of the equipment connected to CAN-bus line.
- To measure resistance of CAN-bus line, disconnect the negative battery terminal. If the resistance is measured with the negative battery terminal connected, it may cause the damage of the equipment connected to CAN-bus line.
- To measure resistance or voltage at a female connector, always use test harness. If resistance or voltage is measured with other device than the test harness, it may cause the damage of connector.
- When defective connectors (including terminals) of instrument panel harness assembly (connected to steering wheel sensor, diagnostic connector and resistor) and transmission harness (connected to G and Yaw rate sensor connector and intermediate connector E-128) require harness cutting, loose twisted wire must be within 10 cm apart from the connector. When the loose twisted wire is over 10 cm apart from the connector, the harness must be twisted so that it can be matched with the original twisted wire. When the loose twisted wire is over 10 cm apart from the connector, it results in communication error.
- When CAN-bus line for the instrument panel harness assembly (connected to the steering wheel sensor, diagnostic connector and the resistor) and the transmission harness (connected to G and Yaw rate sensor connector and intermediate connector E-128) is repaired, notes on harness repair must be strictly followed. Redrawing CAN\_L or CAN\_H line only, or changing separation points causes CAN communication error.

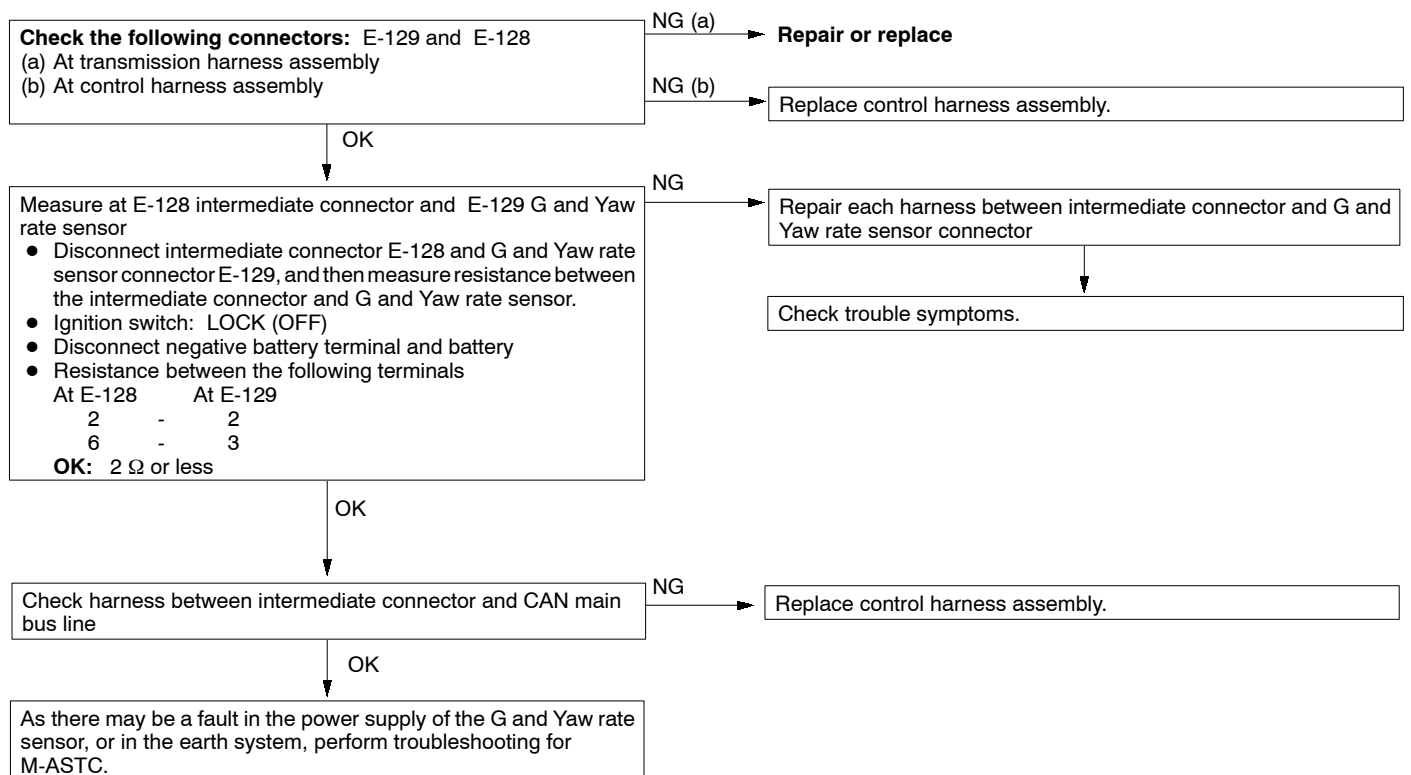


## Diagnostic Item 9

Diagnosis of CAN-bus Line (between Main Bus Line and G and Yaw Rate Sensor)	Probable Cause
When DTC No. 74 is output to M-ASTC-ECU, harness between CAN main bus line and G and Yaw rate sensor, G and Yaw rate sensor itself, or M-ASTC-ECU may be defective.	<ul style="list-style-type: none"> <li>• CAN-bus line defect between CAN main bus line and G and Yaw rate sensor</li> <li>• Connector fault</li> <li>• Malfunction of G and Yaw rate sensor</li> <li>• Malfunction of M-ASTC-ECU</li> </ul>

## Caution

- This troubleshooting must be carried out after the diagnosis of CAN main bus line has been completed.
- Use digital tester to measure resistance or voltage of CAN-bus line. If other device than the digital tester is used, it may cause the damage of the equipment connected to CAN-bus line.
- To measure resistance of CAN-bus line, disconnect the negative battery terminal. If the resistance is measured with the negative battery terminal connected, it may cause the damage of the equipment connected to CAN-bus line.
- To measure resistance or voltage at a female connector, always use test harness. If resistance or voltage is measured with other device than the test harness, it may cause the damage of connector.
- When defective connectors (including terminals) of instrument panel harness assembly (connected to steering wheel sensor, diagnostic connector and resistor) and transmission harness (connected to G and Yaw rate sensor connector and intermediate connector E-128) require harness cutting, loose twisted wire must be within 10 cm apart from the connector. When the loose twisted wire is over 10 cm apart from the connector, the harness must be twisted so that it can be matched with the original twisted wire. When the loose twisted wire is over 10 cm apart from the connector, it results in communication error.
- When CAN-bus line for the instrument panel harness assembly (connected to the steering wheel sensor, diagnostic connector and the resistor) and the transmission harness (connected to G and Yaw rate sensor connector and intermediate connector E-128) is repaired, notes on harness repair must be strictly followed. Redrawing CAN\_L or CAN\_H line only, or changing separation points causes CAN communication error.
- When CAN-bus line or connector of the control harness assembly (connected to M-ASTC-ECU, engine A/T-ECU <Petrol>, engine-ECU <Diesel>, A/T-ECU <Diesel> and intermediate connector E-128) is defective, do not repair the harness or connector only. Always replace the harness assembly. Redrawing a new line or repairing connector causes CAN communication error.



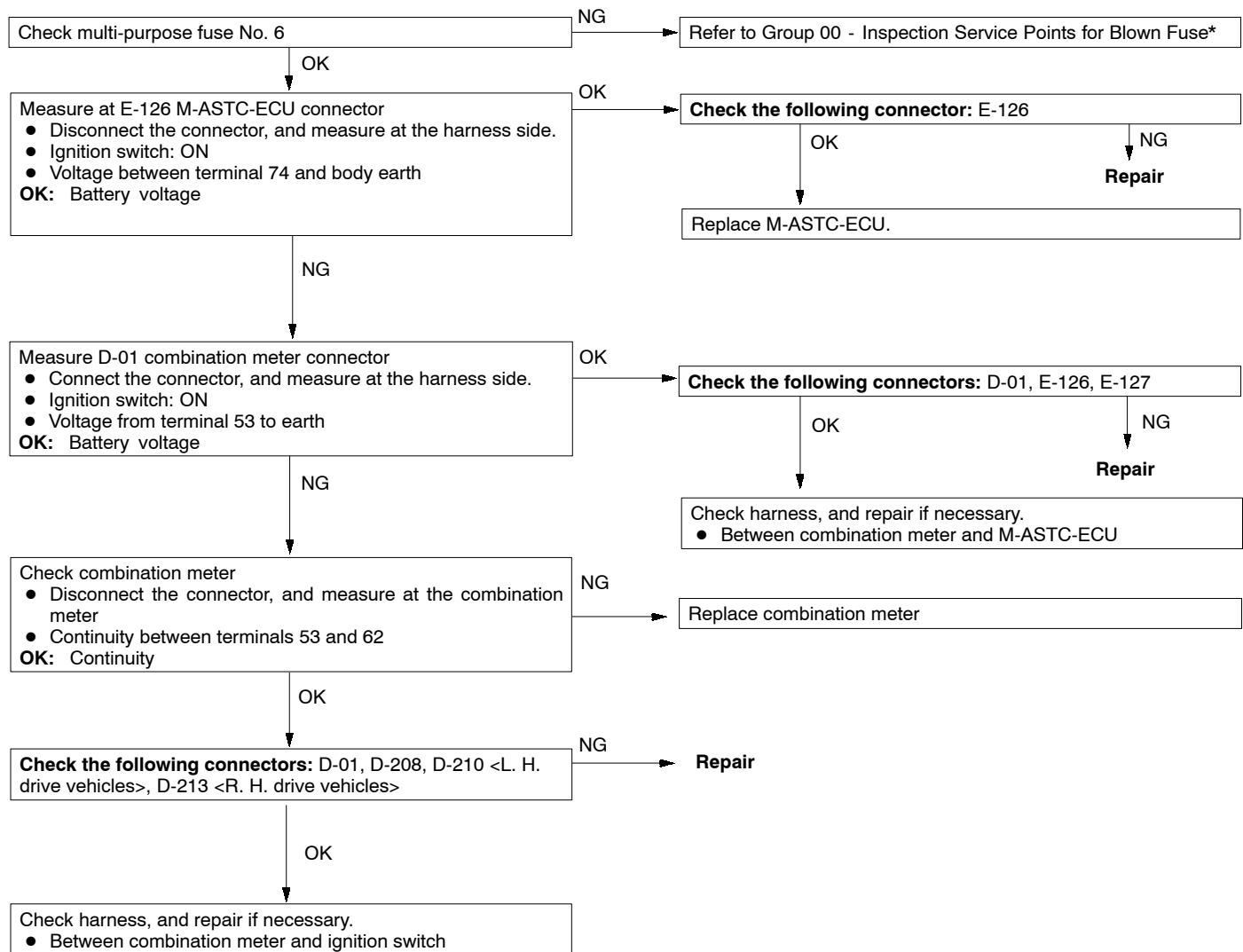
**INSPECTION CHART FOR TROUBLE SYMPTOMS**

Trouble symptom	Inspection Procedure No.	Reference page
MUT-II cannot communicate with other systems.	Refer to GROUP 13A	
Communication between MUT-II and M-ASTC-ECU cannot be achieved.	Refer to GROUP 35B	
When the ignition switch is turned to the "ON" position (engine not running), Active Stability Control System ON indicator/Active Traction Control System ON indicator do not illuminate.	1	35C-36
When the ignition switch is turned to the "ON" position (engine not running), Active Stability Control System OFF indicator does not illuminate.	2	35C-37
After the engine is started, Active Stability Control System ON indicator/Active Traction Control System ON indicator remain illuminating.	3	35C-38
After the engine is started, Active Stability Control System OFF indicator remains illuminating.	4	35C-38
Even if Active Stability Control switch is operated after the engine is started, Active Stability Control System OFF indicator does not illuminate, or it illuminates but is not turned off.	5	35C-39

## INSPECTION PROCEDURES FOR TROUBLE SYMPTOMS

## Inspection Procedure 1

When the ignition switch is turned to the "ON" position (engine not running), Active Stability Control System ON indicator/Active Traction Control System ON indicator do not illuminate.	Probable cause
M-ASTC-ECU illuminates Active Stability Control System ON indicator/Active Traction Control System ON indicator during initial check operation when the ignition switch is turned to the "ON" position. Therefore, open circuit of the lamp power supply circuit, burnt bulb, or open circuit between Active Stability Control System ON indicator/Active Traction Control System ON indicator and M-ASTC-ECU may be the cause of not illuminating lamp.	<ul style="list-style-type: none"> <li>• Blown fuse</li> <li>• Burnt bulb (for Active Stability Control System ON indicator/Active Traction Control System ON indicator)</li> <li>• Malfunction of harness or connector</li> <li>• Malfunction of combination meter</li> <li>• Malfunction of M-ASTC-ECU</li> </ul>

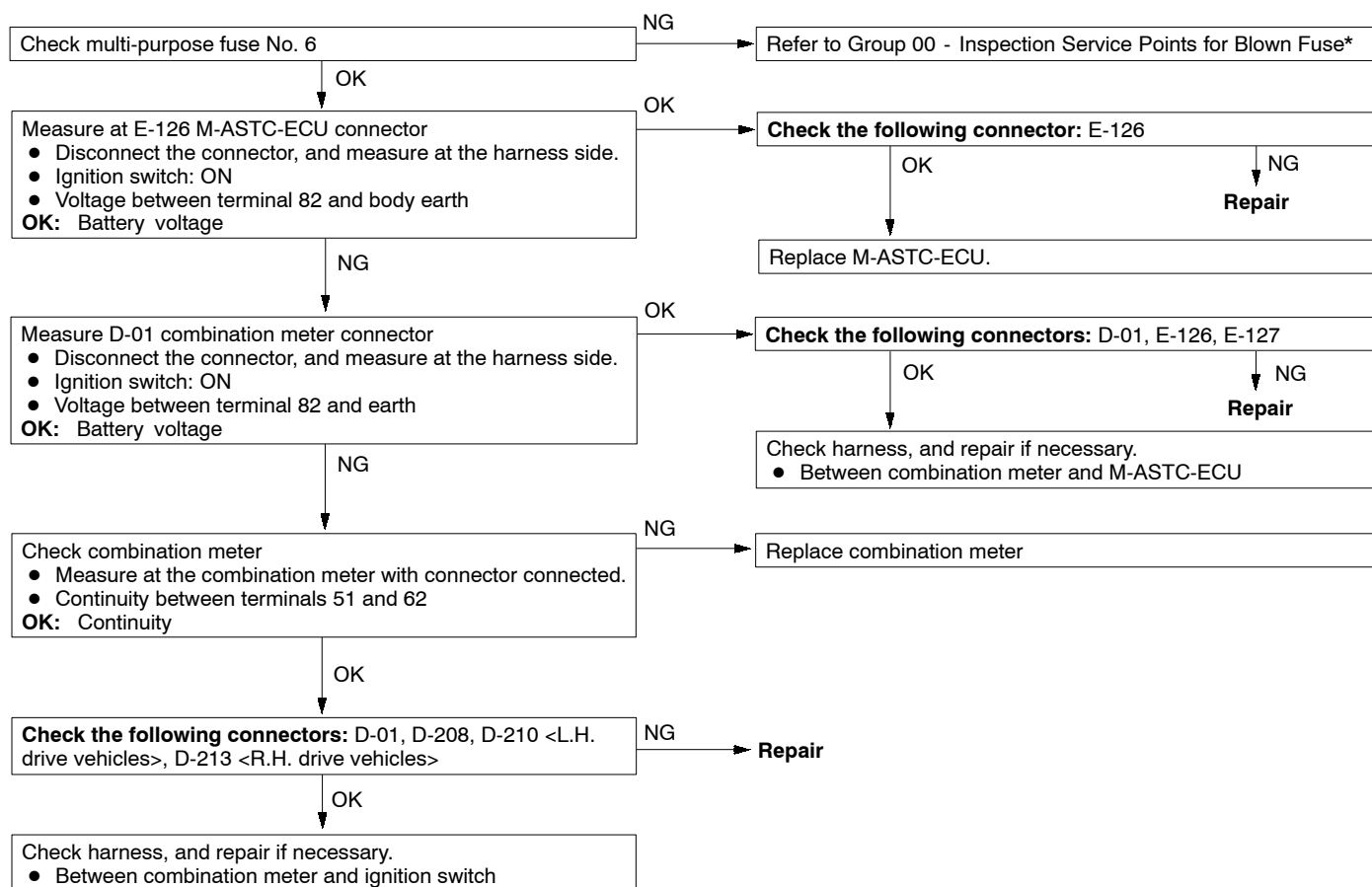


## NOTE

\*: Refer to 2001 PAJERO Workshop Manual [Pub. No. PWJE0001 (1/2)]

## Inspection Procedure 2

When the ignition switch is turned to the "ON" position (engine not running), Active Stability Control System OFF indicator does not illuminate.	Probable cause
M-ASTC-ECU illuminates Active Stability Control System OFF indicator during initial check operation when the ignition switch is turned to the "ON" position. Therefore, open circuit of the lamp power supply circuit, burnt bulb, or open circuit between the Active Stability Control System OFF indicator and M-ASTC-ECU may be the cause of not illuminating lamp.	<ul style="list-style-type: none"> <li>● Blown fuse</li> <li>● Burnt bulb for Active Stability Control System OFF indicator</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of combination meter</li> <li>● Malfunction of M-ASTC-ECU</li> </ul>

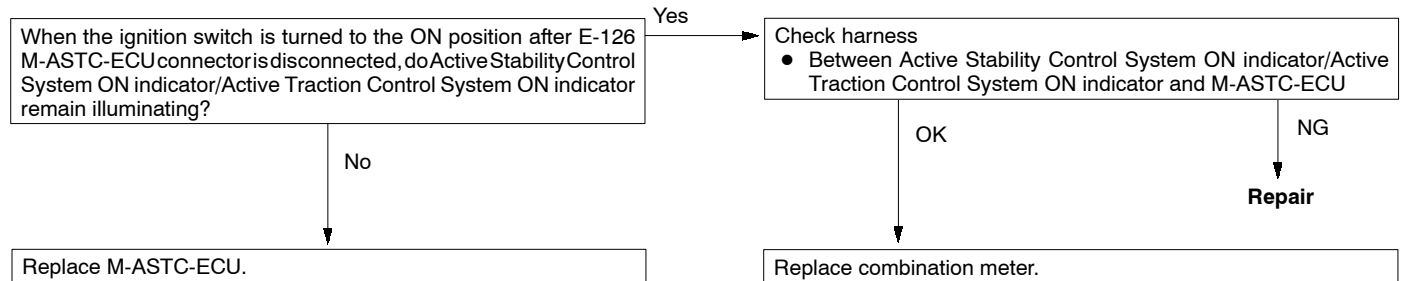


## NOTE

\*: Refer to 2001 PAJERO Workshop Manual [Pub. No. PWJE0001 (1/2)]

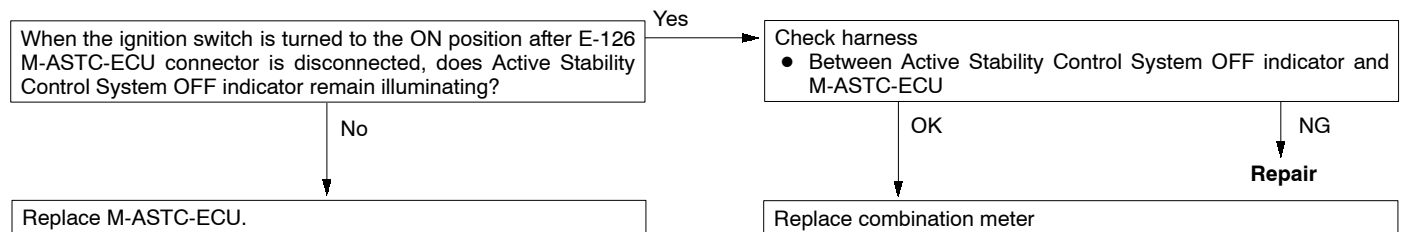
## Inspection Procedure 3

<b>After the engine is started, Active Stability Control System indicator/Active Traction Control System indicator remain illuminating.</b>	<b>Probable cause</b>
Active Stability Control System ON indicator/Active Traction Control System ON indicator circuit may be open.	<ul style="list-style-type: none"> <li>● Malfunction of harness (short-circuit)</li> <li>● Malfunction of combination meter</li> <li>● Malfunction of M-ASTC-ECU</li> </ul>



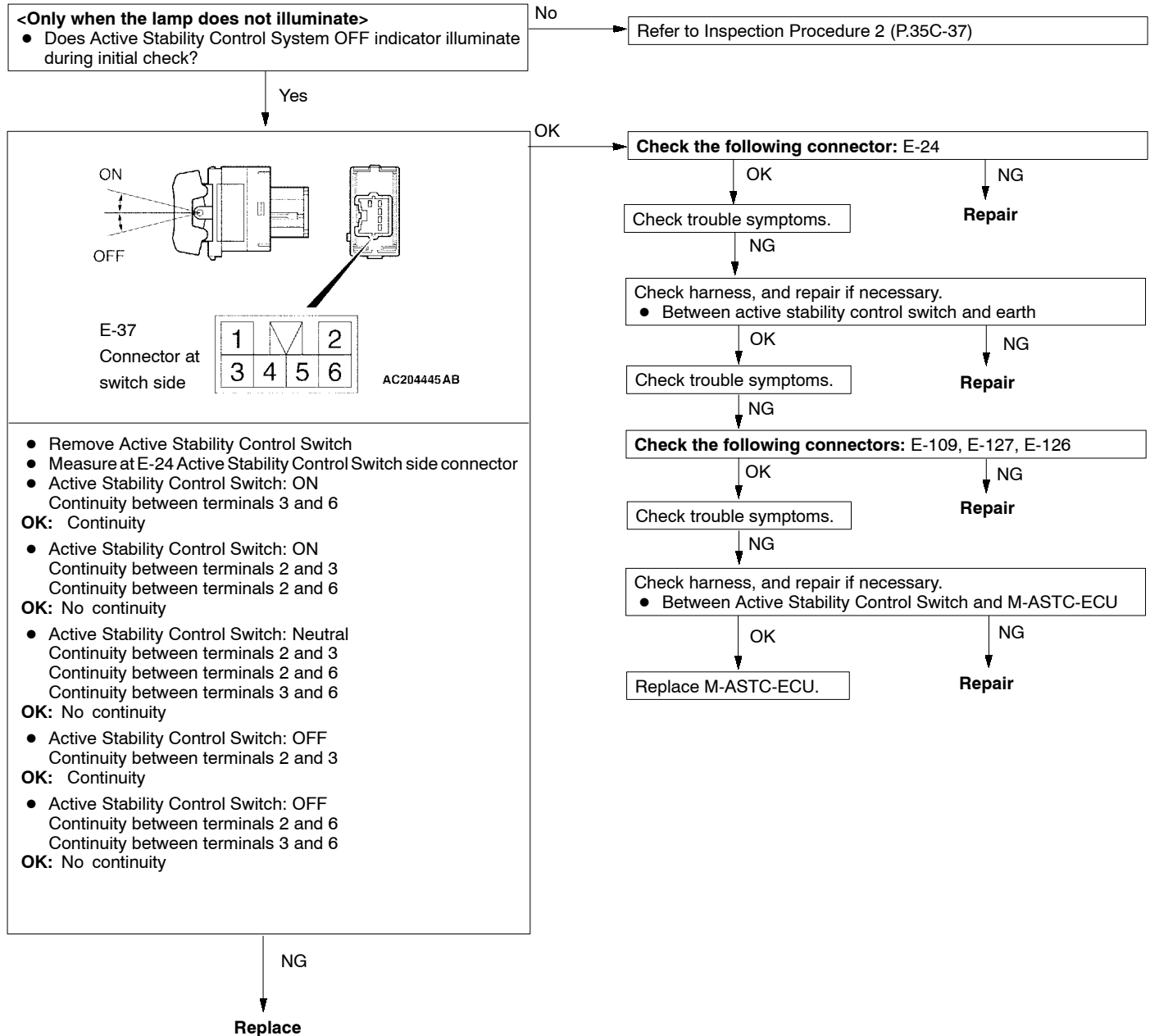
## Inspection Procedure 4

<b>After the engine is started, Active Stability Control System OFF indicator remains illuminating.</b>	<b>Probable cause</b>
Active Stability Control System OFF indicator circuit may be short-circuited.	<ul style="list-style-type: none"> <li>● Malfunction of harness (short-circuit)</li> <li>● Malfunction of combination meter</li> <li>● Malfunction of M-ASTC-ECU</li> </ul>



## Inspection Procedure 5

Even if Active Stability Control switch is operated after the engine is started, Active Stability Control System OFF indicator does not illuminate, or it illuminates but is not turned off.	Probable cause
When Active Stability Control System OFF indicator does not illuminate, the indicator drive circuit may be defective, but if the indicator normally illuminates during the initial check operation, the input circuit of Active Stability Control switch may be defective.	<ul style="list-style-type: none"> <li>• Malfunction of Active Stability Control Switch</li> <li>• Malfunction of harness or connector</li> <li>• Malfunction of M-ASTC-ECU</li> </ul> <p>&lt;Only when the lamp does not illuminate&gt;</p> <ul style="list-style-type: none"> <li>• Blown fuse</li> <li>• Burnt bulb for Active Stability Control System OFF indicator</li> <li>• Malfunction of combination meter</li> </ul>





## DATA LIST REFERENCE TABLE

Refer to Group 35B.

### LIST OF ACTUATOR TESTS

By using MUT-II, the next actuator can be driven forcibly.

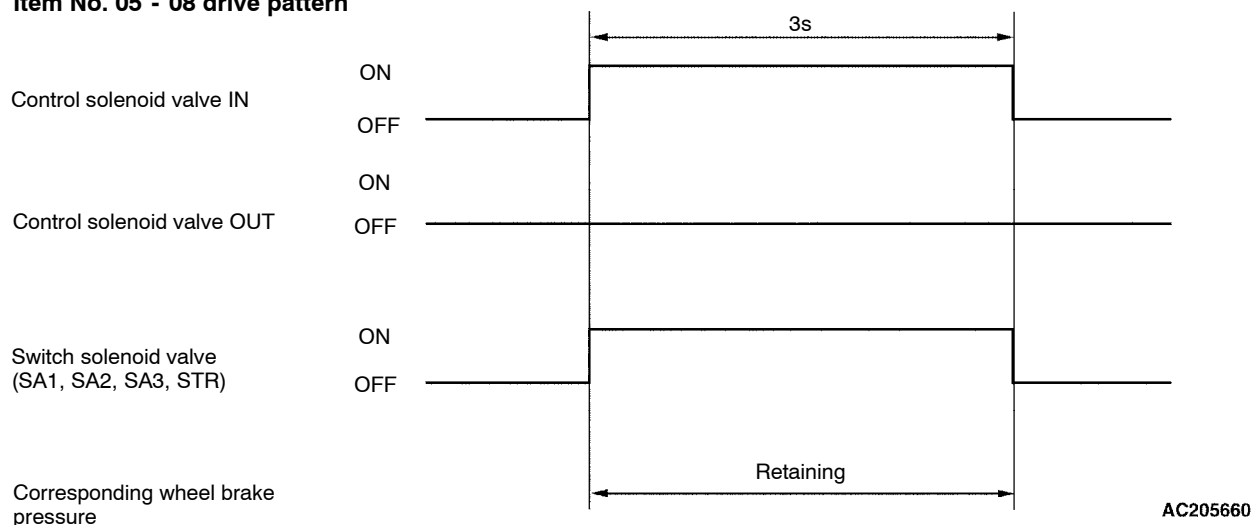
#### NOTE

- (1) When ABS-ECU is deactivated due to fail safe, actuator test cannot be performed.
- (2) Actuator test can be performed only when the vehicle is stationary.

### Actuator Test Specifications

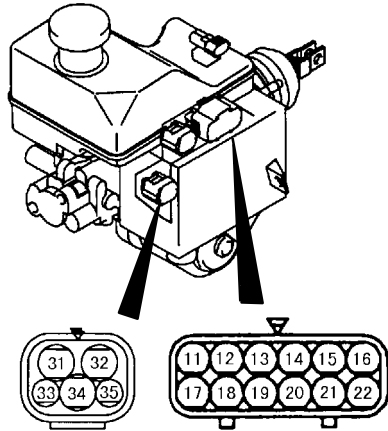
Item No.	Inspection Item	Drive Contents
05	Solenoid valve for front right wheel	Switch solenoid valve of Active Stability Control System and control solenoid valve corresponding to each channel
06	Solenoid valve for front left wheel	
07	Solenoid valve for rear right wheel	
08	Solenoid valve for rear left wheel	
11	Pump motor	Drive pump motor for 1 second.
12	HBB buzzer	Drive HBB buzzer for 3 seconds.
13	Engine	Reduce engine torque.
14	Steering wheel sensor	Initialize steering wheel sensor.
15	Yaw rate sensor	Initialize yaw rate sensor.
16	G sensor	Initialize G sensor.
23	Brake warning lamp	Make the brake warning lamp flash twice.
24	ABS warning lamp	Make the ABS warning lamp flash twice.
25	Active Stability Control System ON indicator/ Active Traction Control System ON indicator	Make Active Stability Control System ON indicator/Active Traction Control System ON indicator flash twice.
26	Active Stability Control System OFF indicator	Make Active Stability Control System OFF indicator flash twice.

#### Item No. 05 - 08 drive pattern



## CHECK AT M-ASTC-ECU TERMINAL

Refer to GROUP 35B.



AX0862CA

## ON-VEHICLE SERVICE

### SOLENOID VALVE CHECK

Measure resistance between the following solenoid valves and terminals respectively:

- Switch solenoid valve (SA1)  
:Between Terminals No. 18 - No. 34
- Switch solenoid valve (SA2)  
:Between Terminals No. 17 - No. 34
- Switch solenoid valve (SA3)  
:Between Terminals No. 12 - No. 34
- Switch solenoid valve (STR)  
:Between Terminals No. 11 - No. 34

**Standard value: 3.5 - 3.9  $\Omega$**

### INITIALIZATION OF STEERING WHEEL SENSOR

When the battery is removed, the learned neutral position of steering wheel sensor is erased, and Active Stability Control System OFF indicator illuminates, and DTC No. 83 is output. In this case, use either one of the following procedures to initialize the steering wheel sensor:

#### When using MUT-II:

1. After turning the ignition switch to the LOCK (OFF) position, place MUT-II.
2. Turn the ignition switch to the ON position.
3. Rotate the steering wheel over 8°, and then maintain it in a neutral position (in the straight-ahead position of the vehicle).
4. Perform actuator test item No. 14.
5. Ensure that the active stability control system OFF indicator has been turned OFF.
6. Turn the ignition switch to the LOCK (OFF) position.
7. Remove MUT-II.

#### When not using MUT-II:

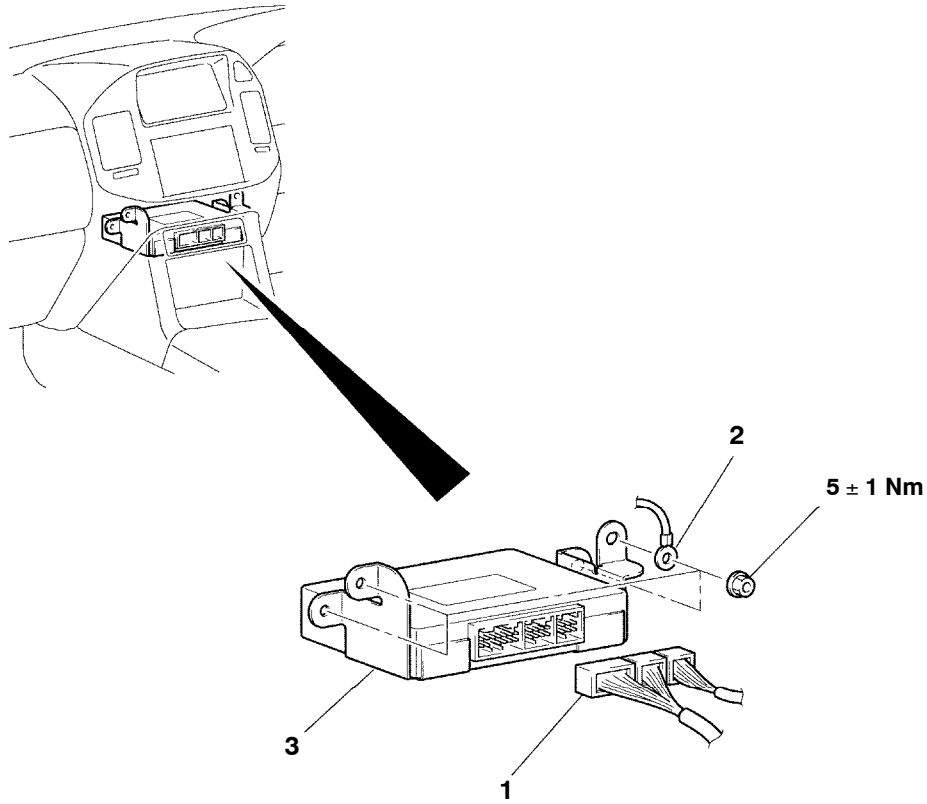
1. Rotate the steering wheel over 8°.
2. Drive the vehicle in a straight-ahead direction at 35 km/h or over for 1 second or more.
3. Ensure that the active stability control system OFF indicator has been turned OFF.

## M-ASTC-ECU

### REMOVAL AND INSTALLATION

#### Pre-removal and Post-installation Operations

Removal and installation of indicator panel and front panel  
(Refer to GROUP 52A - Floor Console).



AC204232AB

#### Removal steps



- Deactivate HBB buzzer communication check mode (when M-ASTC-ECU is replaced)
- 1. M-ASTC-ECU connector



- 2. Earth
- 3. M-ASTC-ECU

## INSTALLATION SERVICE POINTS

### ►A◄ INITIALIZATION OF M-ASTC-ECU

When the M-ASTC-ECU is replaced with a new one, Active Stability Control System OFF indicator illuminates to warn that the M-ASTC-ECU is not initialized yet, and DTC No. 81, No. 84 and No. 85 are output. In this case, use the following procedure to perform initialization:

1. Place the vehicle on a level surface.
2. After turning the ignition switch to the LOCK (OFF) position, place MUT-II.
3. Turn the ignition switch to the ON position.
4. Perform Item No. 16 of the actuator test.
5. Rapidly depress the brake pedal once with the pedal force of about 40 kgf.
6. Ensure that the transfer lever can be shifted to all positions (2H, 4H, 4HLc, 4LLc).
7. Ensure that the active stability control system OFF indicator has been turned OFF.
8. Turn the ignition switch to the LOCK (OFF) position.
9. Remove MUT-II.

### ►B◄ DEACTIVATION OF HBB BUZZER COMMUNICATION CHECK MODE (WHEN ASTC-ECU IS REPLACED)

When the ignition switch is turned to the ON position after M-ASTC-ECU is replaced, HBB buzzer remains sounding for about 5 seconds. This is HBB buzzer communication check mode for M-ASTC-ECU (for inspection at the factory)

To stop the HBB buzzer, perform the following procedure:

- Use MUT-II to erase the HBB diagnostic code.
- Drive the vehicle at the speed of 40 km/h or more.

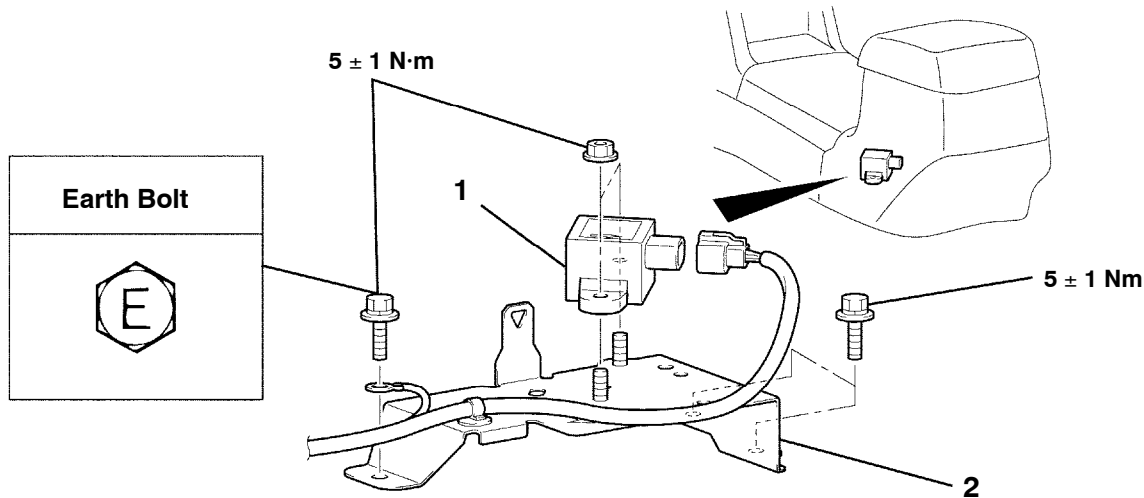
## G AND YAW RATE SENSOR

### REMOVAL AND INSTALLATION

#### CAUTION:

Do not drop G and Yaw rate sensor or do not apply shock on the sensor.

**Pre-removal and Post-installation Operations**  
Removal and installation of floor console



AC204233AB

#### Removal steps

- A◄
1. G and yaw rate sensor
  2. G and yaw rate sensor bracket

### INSTALLATION SERVICE POINT

#### ►A◄ INSTALLATION OF G AND YAW RATE SENSOR

When G and Yaw rate sensor is replaced, the learned neutral point of the G and Yaw rate sensor is erased, and Active Stability Control System OFF indicator illuminates to warn that the sensor is not initialized yet, and DTC No. 81 and 82 are output. In this case, use the following procedure to initialize the G and Yaw rate sensor.

1. Place the vehicle on a level surface.
2. After turning the ignition switch to the LOCK (OFF) position, place MUT-II.
3. Turn the ignition switch to the ON position.
4. Rotate the steering wheel over 8°, and then maintain it in a neutral position (in the straight-ahead position of the vehicle).
5. Perform Item No. 16 of the actuator test.
6. Ensure that the active stability control system OFF indicator has been turned OFF.
7. Turn the ignition switch to the LOCK (OFF) position.
8. Remove MUT-II.

## STEERING WHEEL SENSOR

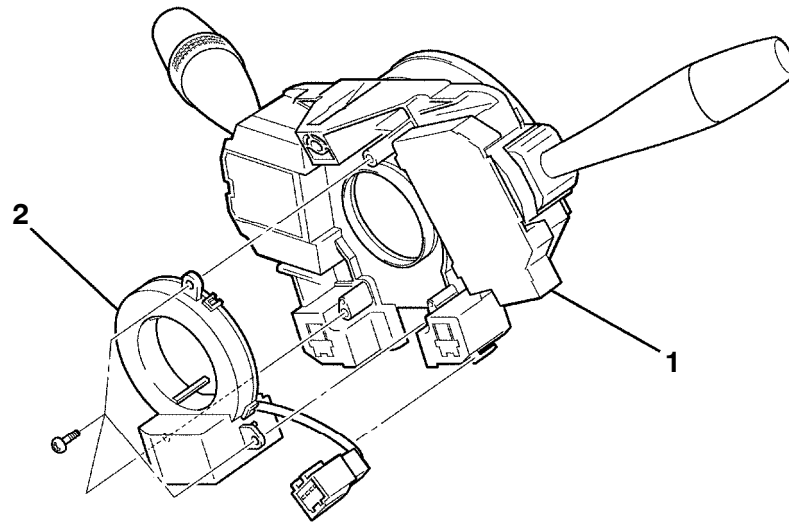
### REMOVAL AND INSTALLATION

**CAUTION:**

Before removing steering wheel airbag module assembly, always refer to GROUP 52B - Service Precautions, Airbag Modules and Clock Spring.

**Pre-removal and Post-installation Operations**

Removal and installation of steering wheel airbag module assembly and clock spring  
(Refer to GROUP 52B)



AC204272AB

**Removal steps**

- A◄
1. Column switch
  2. Steering wheel sensor

### INSTALLATION SERVICE POINT

**►A◄ INITIALIZATION OF STEERING WHEEL SENSOR**

When the battery is removed, the learned neutral point of the steering wheel sensor is erased, and Active Stability Control System OFF indicator illuminates, and DTC No. 83 is output. In this case, use either one of the following steps to initialize the steering wheel sensor:

**When using MUT-II:**

1. After turning the ignition switch to the LOCK (OFF) position, place MUT-II.
2. Turn the ignition switch to the ON position.
3. Rotate the steering wheel over 8°, and then maintain it in a neutral position (in the straight-ahead position of the vehicle).
4. Perform Item No. 14 of the actuator test.
5. Ensure that the active stability control system OFF indicator has been turned OFF.
6. Turn the ignition switch to the LOCK (OFF) position.
7. Remove MUT-II.

**When not using MUT-II:**

1. Rotate the steering wheel over 8°.
2. Drive the vehicle in a straight-ahead direction at 35 km/h or over for 1 second or more.
3. Ensure that the active stability control system OFF indicator has been turned OFF.