

# SERVICE BRAKES

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## GROUP 35A

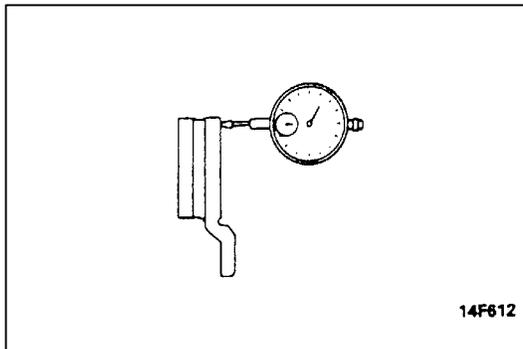
# BASIC BRAKE SYSTEM

### GENERAL

#### OUTLINE OF CHANGES

The proportioning valve has been discontinued due to the introduction of the Electronic Brake-force Distribution (EBD) function. In addition, the service specification and procedure have been revised.

- FRONT BRAKE DISC RUN-OUT
- FRONT DISC BRAKE DISASSEMBLY AND REASSEMBLY



### ON-VEHICLE SERVICE

#### BRAKE DISC ROTOR CHECK

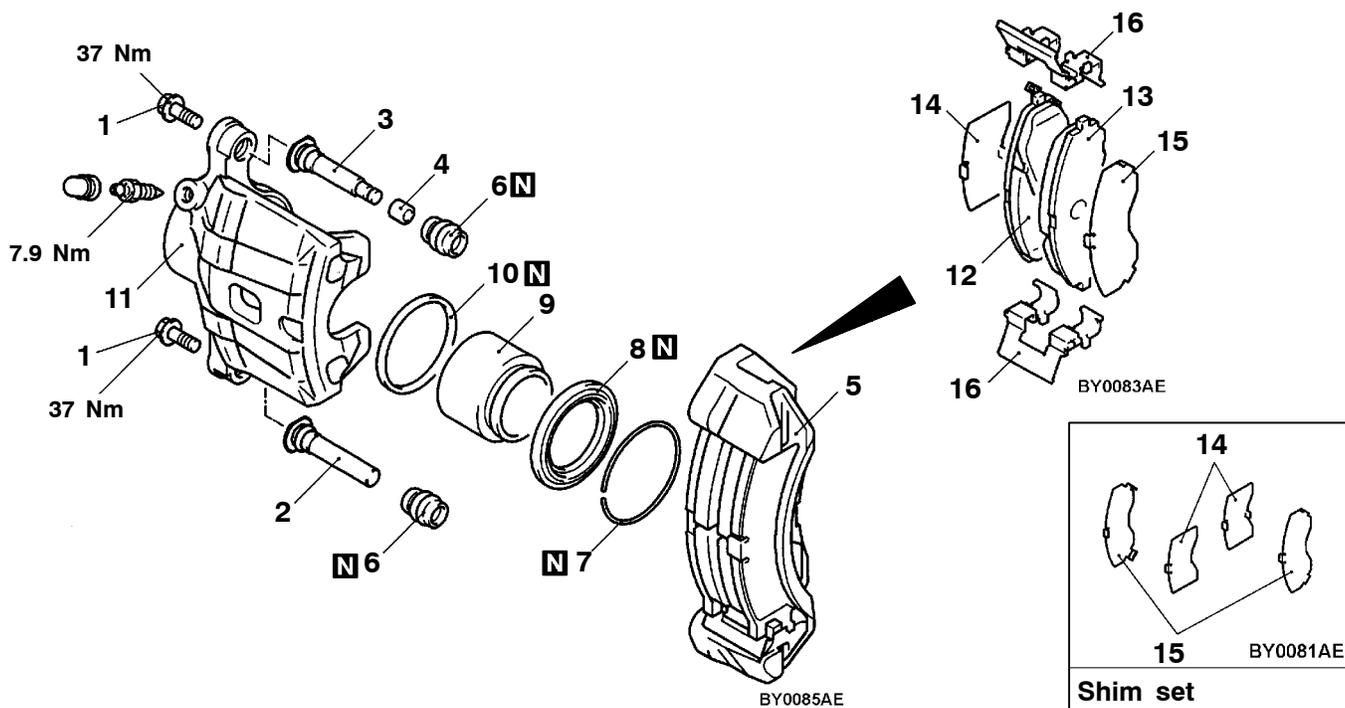
For the checking procedure, refer to the Basic Manual.

#### Front Brake Disc Run-out

**Limit: 0.03 mm or less**

# FRONT DISC BRAKE

## DISASSEMBLY AND REASSEMBLY



<p>BY0084AE</p>	<p>BY0080AE</p>	<p>BY0086AE</p>	<p>BY0082AE</p> <p>Grease</p>
<p><b>Brake caliper kit</b></p>	<p><b>Pad set</b></p>	<p><b>Clip set</b></p>	<p><b>Seal and boots kit</b></p>

### Disassembly steps

- |  |          |  |
|--|----------|--|
| <p>  1. Pin bolt<br/>  2. Guide pin<br/>  3. Lock pin<br/>  4. Bushing<br/>  5. Caliper support<br/>  6. Pin boot<br/>  7. Boot ring<br/>  8. Piston boot                 </p> | <p> </p> | <p>                 9. Piston<br/>                 10. Piston seal<br/>                 11. Caliper body<br/>                 12. Pad and wear indicator assembly<br/>                 13. Pad assembly<br/>                 14. Inner shim<br/>                 15. Outer shim<br/>                 16. Pad clip             </p> |
|--|----------|--|

LUBRICATION POINTS

Piston seal

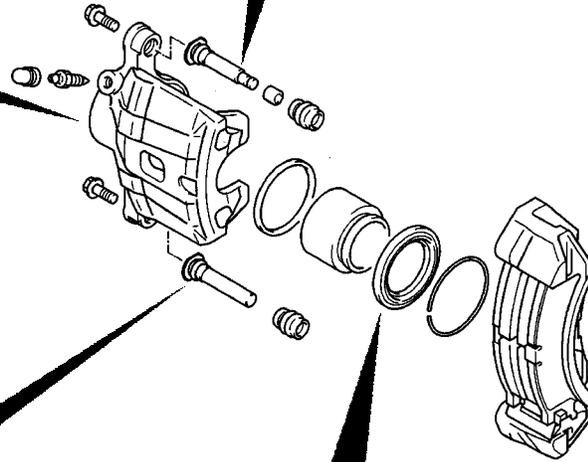
14X0302

**Caution**  
The piston seal inside the seal and boot kit is coated with special grease, so do not wipe this grease off.

Brake fluid: DOT3 or DOT4

14W0046

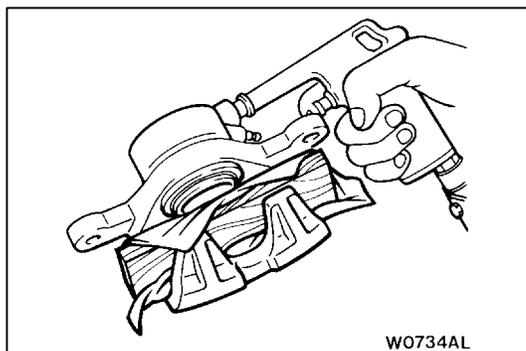
Grease: Repair kit grease



14A0541

Grease: Repair kit grease

Grease: Repair kit grease



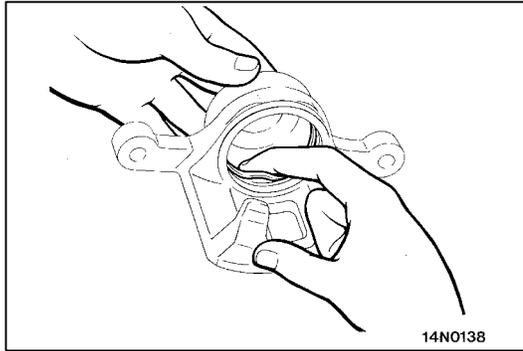
DISASSEMBLY SERVICE POINTS

◀▶ PISTON BOOT/PISTON REMOVAL

Use a piece of wood to protect the caliper body outer side, and then apply compressed air through the brake hose connection hole to withdraw the piston and piston boot.

**Caution**

If air is blown into the caliper body suddenly, the piston will pop out, causing damage to the caliper body. Be sure to apply compressed air gradually.



### ◀B▶ PISTON SEAL REMOVAL

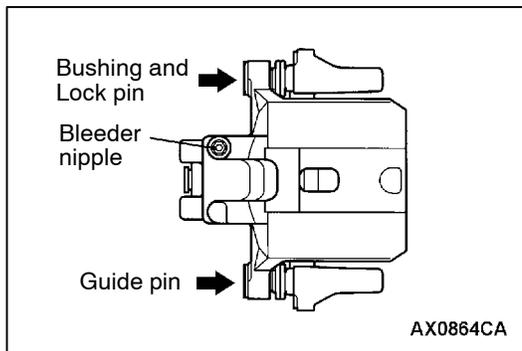
1. Remove the piston seal with finger tip.

#### Caution

**Do not use a flat-tipped screwdriver or other tool to prevent damage to inner cylinder.**

2. Clean piston surface and inner bore with trichloroethylene, alcohol or the specified brake fluid.

**Specified brake fluid: DOT3 or DOT4**



### REASSEMBLY SERVICE POINT

#### ▶A◀ BUSHING/LOCK PIN/GUIDE PIN INSTALLATION

Install the bushing and lock pin to the bleeder nipple side at the caliper body, the guide pin to its opposite side, respectively.

### INSPECTION

Refer to the Basic Manual.

## GROUP 35B

# ANTI-SKID BRAKING SYSTEM (ABS) <2WD>

## GENERAL

### OUTLINE OF CHANGES

The Electronic Brake-force Distribution (EBD) has been adopted. The EBD makes it possible to maintain the maximum amount of braking force for the rear wheels even when the vehicle's load is unevenly distributed.

### EBD CONTROL

In ABS, electronic control method is used whereby the rear wheel brake hydraulic pressure during braking is regulated by rear wheel control solenoid valves in accordance with the vehicle's rate of deceleration and the front and rear wheel slippage which are calculated from the signals received from the various wheel sensors. EBD control is a control system which provides a high level of control for both vehicle braking force and vehicle stability. The system has the following features.

- Because the system provides the optimum rear wheel braking force regardless of the vehicle

laden condition and the condition of the road surface, the system reduces the required pedal depression force, particularly when the vehicle is heavily laden or driving on road surfaces with high frictional coefficients.

- Because the duty placed on the front brakes has been reduced, the increases in pad temperature can be controlled during front brakes applying to improve the wear resistance characteristics of the pad.
- Control valves such as the proportioning valve are no longer required.

### NOTE

Only the description below has been changed due to the introduction of the EBD. The other service procedures are the same as before. (Refer to the Basic Manual.)

## ON-VEHICLE SERVICE

### REMEDY FOR A FLAT BATTERY

When booster cables are used to start the engine when the battery is completely flat and then the vehicle is immediately driven without waiting for the battery to recharge itself to some extent, the engine may misfire, and driving might not be possible.

This happens because ABS consumes a great amount of current for its self-check function; the remedy is to allow the battery to recharge sufficiently.

### Caution

**Do not drive the vehicle while the ABS is disabled (e.g. the ABS-ECU connector is disconnected), otherwise vehicle behaviour will become unstable when braking.**

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# ACTIVE STABILITY CONTROL (ASC) SYSTEM

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## GENERAL

### OUTLINE OF CHANGE

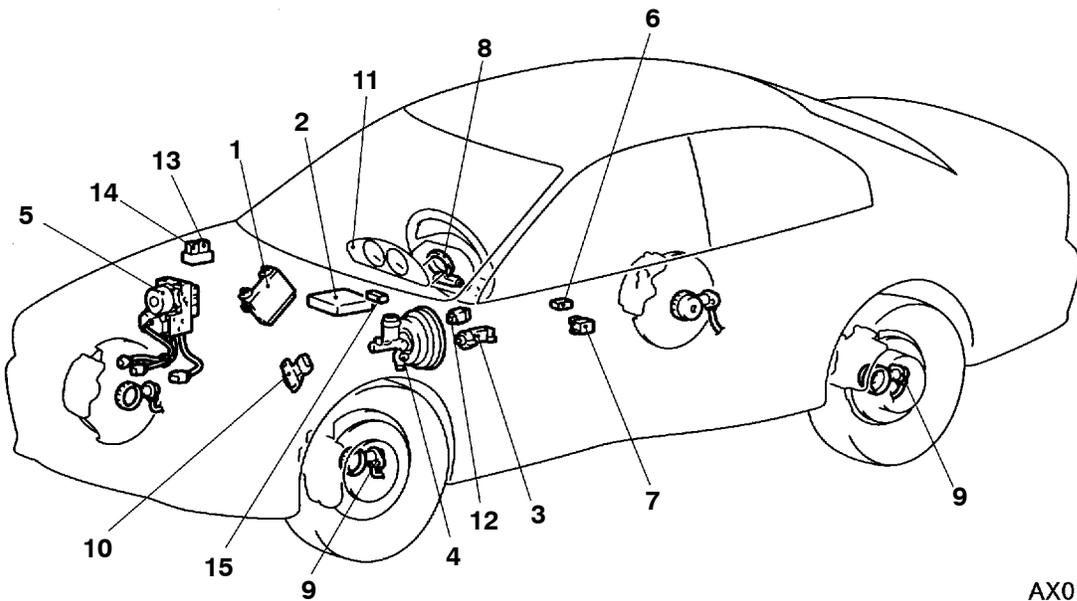
The following service procedures have been established to correspond to the addition of an Active Stability Control (ASC) system as an option. <2500>

### ACTIVE STABILITY CONTROL (ASC) SYSTEM

This system is a safety and accident-prevention system which augments the ABS and TCL functions by controlling the braking force independently for all four wheels; this controls the longitudinal and lateral forces applied to the vehicle in order to restrict any dangerous vehicle behaviour when driving under marginal conditions.

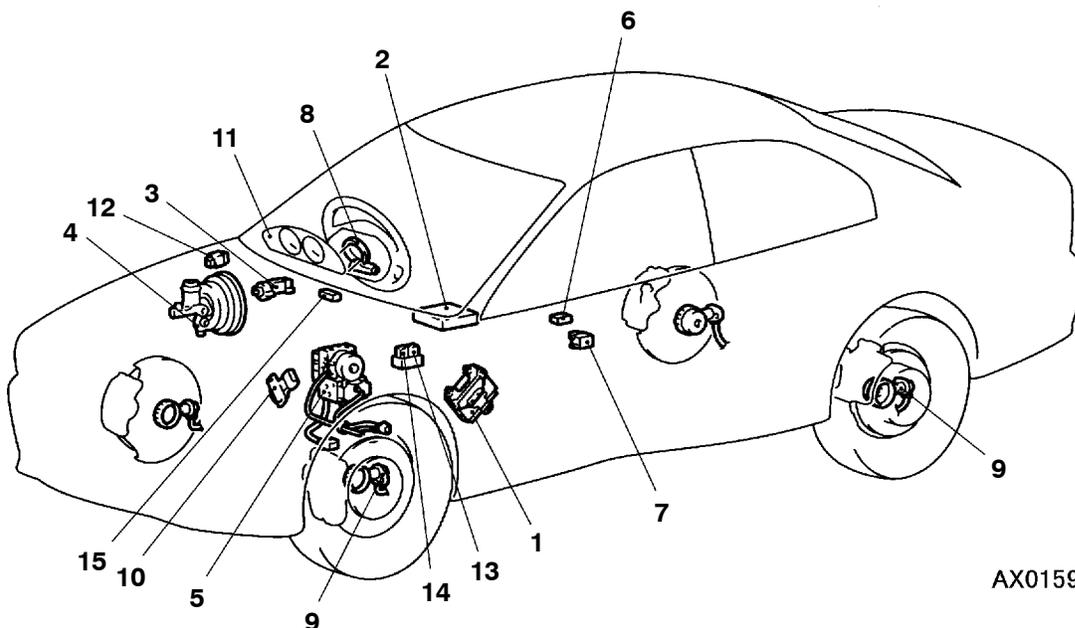
### CONSTRUCTION DIAGRAM

<L.H. drive vehicles>



AX0160BE

<R.H. drive vehicles>



AX0159BE

No.	Name of each component part	Outline of function
1	ASC control unit (ASC-ECU)	Processes the information from the various sensors to calculate factors such as the demand yaw moment based on the control model, and uses these calculations to control the brake hydraulic pressure for the four wheels and the engine output.
		Controls the diagnosis functions and fail-safe functions.
2	Engine control unit (Engine-ECU)	Sends the signals which are required by the ASC for engine control to the ASC-ECU.
		Carries out corrections in response to the engine condition (such as whether the engine is cold or warm) based on engine torque reduction requests and ignition timing retard requests, and also controls the ignition timing.
3	Stop lamp	Sends a signal to the ASC-ECU indicating whether the brake pedal is depressed or not.
4	Master cylinder pressure sensor	Detects the master cylinder output pressure and inputs this to the ASC-ECU.
5	Accumulator pressure sensor	Detects the accumulator hydraulic pressure and inputs this to the ASC-ECU.
6	Lateral G sensor	Detects the acceleration in the lateral vehicle direction and inputs this to the ASC-ECU.
7	Yaw rate sensor	Detects the angular velocity of the vehicle and inputs this to the ASC-ECU.
8	Steering sensor	Detects the steering wheel angle signal and inputs this to the ASC-ECU.
9	Wheel speed sensors	Detect the DC signals at frequencies which are proportional to the rotation speeds of the wheels, and input these to the ASC-ECU.
10	Accelerator pedal position sensor (APS)	Detects the accelerator pedal depression amount and inputs this to the ASC-ECU.
11	ASC/TCL operation lamp	Switched off when neither the ASC and TCL function is operating, and illuminates when either function is operating.
	ASC-OFF indication lamp	Illuminates when the ASC and TCL systems are cancelled. (the ASC switch is at OFF). In addition, the indicator lamp illuminates when the ASC-ECU fail-safe function cancels the system.
12	ASC switch	Sends a signal for switching the ASC/TCL control modes (ASC/TCL-ON, ASC/TCL-OFF) to the ASC-ECU. The ASC-ECU turns the entire system on and via the switch operation.
13	Motor relay	Turns ON to supply power to the motor inside the hydraulic unit when a signal is received from the ASC-ECU.
14	Valve relay	Turns ON to supply power to the solenoid valve inside the hydraulic unit when a signal is received from the ASC-ECU.
15	Diagnosis connector	Outputs diagnosis codes.

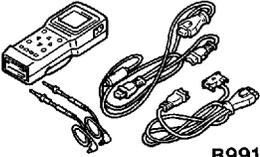
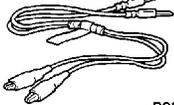
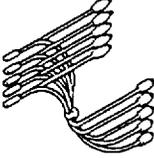
## NOTE

In the case of component parts which from a part of other systems also, only the functions of that part which relate to the ASC system are mentioned.

## SERVICE SPECIFICATIONS

Item			Standard value
Master cylinder pressure sensor output voltage V	Hydraulic pressure 0 MPa		0.4 - 0.6
	Hydraulic pressure 9.8 MPa		2.4 - 2.6
Resistance between ABS solenoid valve terminals $\Omega$	Front-right side Front-left side	IN	6.3 - 6.9
	Rear-right side Rear-left side	OUT	3.1 - 3.4
Resistance between ASC solenoid valve terminals $\Omega$	Diagonal accumulator valves	FR-RL	3.1 - 3.4
		FL-RR	3.1 - 3.4
	Diagonal cut valves	FR-RL	6.3 - 6.9
		FL-RR	6.3 - 6.9
G sensor output voltage V	When horizontal		2.4 - 2.6
	When label surface is facing sideways		3.3 - 3.7
Yaw rate sensor output voltage V	When stationary		2.4 - 2.6

## SPECIAL TOOLS

Tool	Number	Name	Use
 B991502	MB991502	MUT-II sub assembly	ASC inspection (diagnosis display using MUT-II)
 B991529	MB991529	Diagnosis code check harness	ASC inspection (diagnosis display using ASC/TCL operation lamp and ASC-OFF indication lamp)
 B991348	MB991348	Test harness set	Sensor inspection

## TROUBLESHOOTING

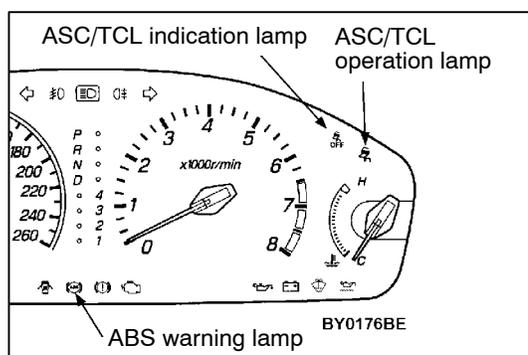
### BASIC FLOW FOR TROUBLE DIAGNOSIS

'97 GALANT Workshop Manual - Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points.

#### NOTE

Check that the followings are normal before judging that there is a problem.

- Is the proper steering wheel installed in the correct position to the centre of the steering column shaft?
- Are the sizes, specifications, air pressures, balance and wear for the tires and wheels normal?
- Is the wheel alignment normal?
- Have any modifications been made to areas such as the engine or suspension which might have an effect on the ASC system?



### DIAGNOSIS FUNCTION

#### READING DIAGNOSIS CODES

Use the MUT-II or the following lamp to take a reading of the diagnosis codes.

('97 GALANT Workshop Manual - Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points.)

ABS and ASC diagnosis code: ASC/TCL operation lamp

TCL diagnosis code: ASC-OFF indication lamp

#### NOTE

- (1) Connect the MUT-II to the 16-pin diagnosis connector.
- (2) ABS diagnosis codes can be read out by means of the ABS warning lamp if the valve relay has been removed.

#### ERASING DIAGNOSIS CODES

'97 GALANT Workshop Manual - Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points.

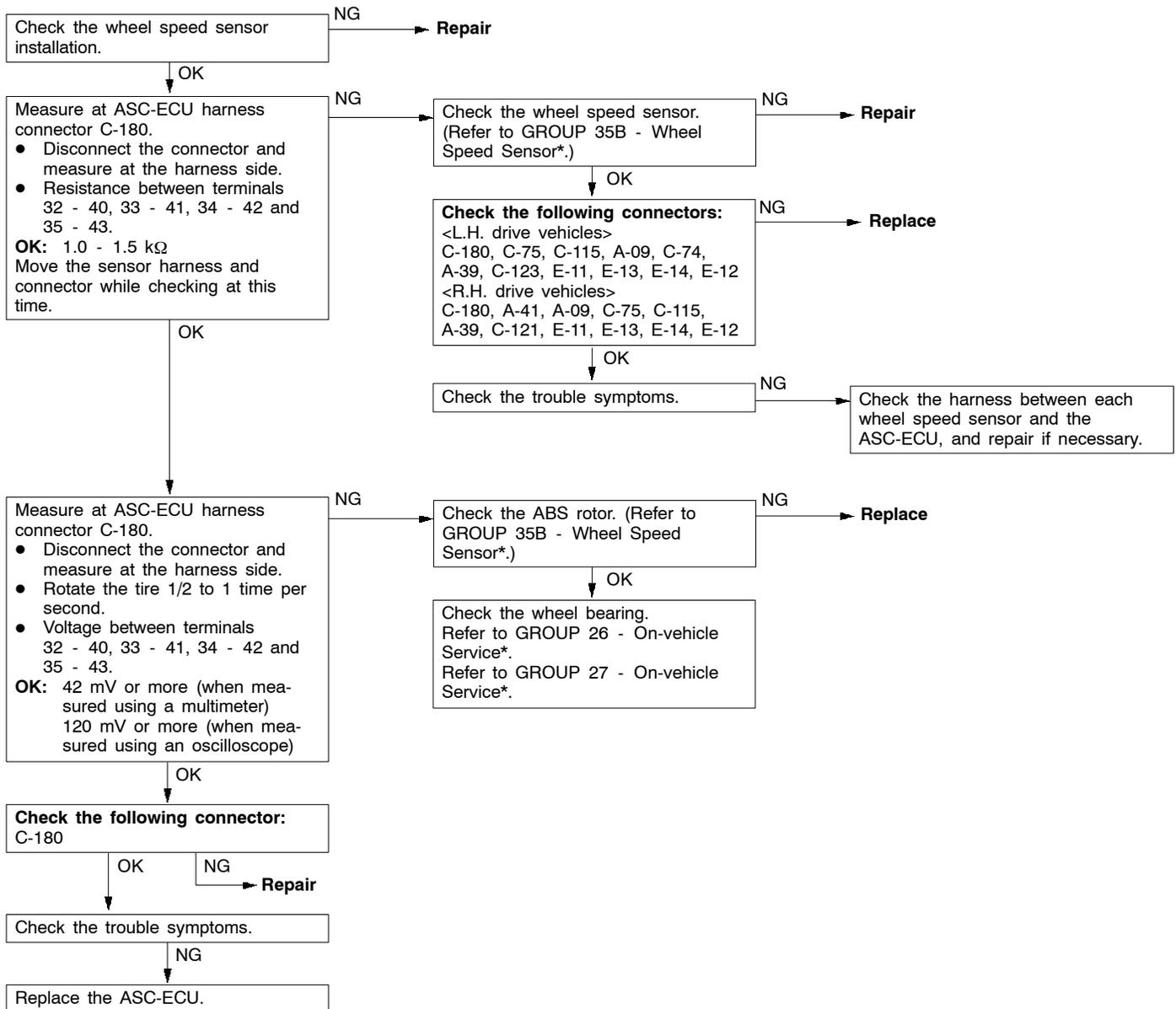
## INSPECTION CHART FOR DIAGNOSIS CODES

Code No.	Diagnosis item	Reference page
11	FR wheel speed sensor (open or short-circuit)	35C-8
12	FL wheel speed sensor (open or short-circuit)	
13	RR wheel speed sensor (open or short-circuit)	
14	RL wheel speed sensor (open or short-circuit)	
15	Wheel speed sensor system (output signal abnormality)	35C-9
16	ECU power supply voltage abnormality	35C-10
17	ASC switch system	35C-11
21	FR wheel speed sensor system	35C-8
22	FL wheel speed sensor system	
23	RR wheel speed sensor system	
24	RL wheel speed sensor system	
25	Rear wheel speed sensor system (open circuit in both left and right sensors)	35C-12
26	Rear wheel speed sensor system (malfunction in both left and right sensors)	
27	Front and rear wheel speed sensor system (open circuit in both front and rear sensors)	
31	Ignition switch (IG2) system	35C-12
33	Stop lamp switch system (open circuit or ON problem)	35C-13
35	Steering sensor system (ST-1, 2, N)	35C-14
36	Steering sensor system (ST-N)	35C-15
37	Steering sensor system (ST-1, 2)	35C-15
41	FR solenoid valve system	35C-16
42	FL solenoid valve system	
43	RR solenoid valve system	
44	RL solenoid valve system	
45	FR diagonal cut valve system	
46	FL diagonal cut valve system	
47	FR diagonal booster valve system	
48	FL diagonal booster valve system	
51	Valve relay system (ON malfunction)	35C-16
52	Valve relay system (OFF malfunction)	35C-17
53	Motor relay system (OFF malfunction)	35C-17
54	Motor relay system (ON malfunction)	35C-19

Code No.	Diagnosis item	Reference page
61	Communication system with A/T-ECU	35C-20
63	ECU failure	35C-20
65	APS or TPS system	35C-21
66	TPS or APS system	35C-22
67	APS system	35C-23
71	Lateral G sensor circuit system	35C-24
72	Yaw rate sensor circuit system (open or short-circuit)	35C-24
73	Master cylinder pressure sensor system	35C-25
74	Yaw rate or lateral G sensor system	35C-25
75	Engine-ECU system	35C-26
76	Communication system with engine-ECU	35C-26
77	TCL vacuum or ventilation solenoid valve system	35C-26
78	Accumulator stroke switch system	35C-27

## INSPECTION PROCEDURE CLASSIFIED BY DIAGNOSIS CODE

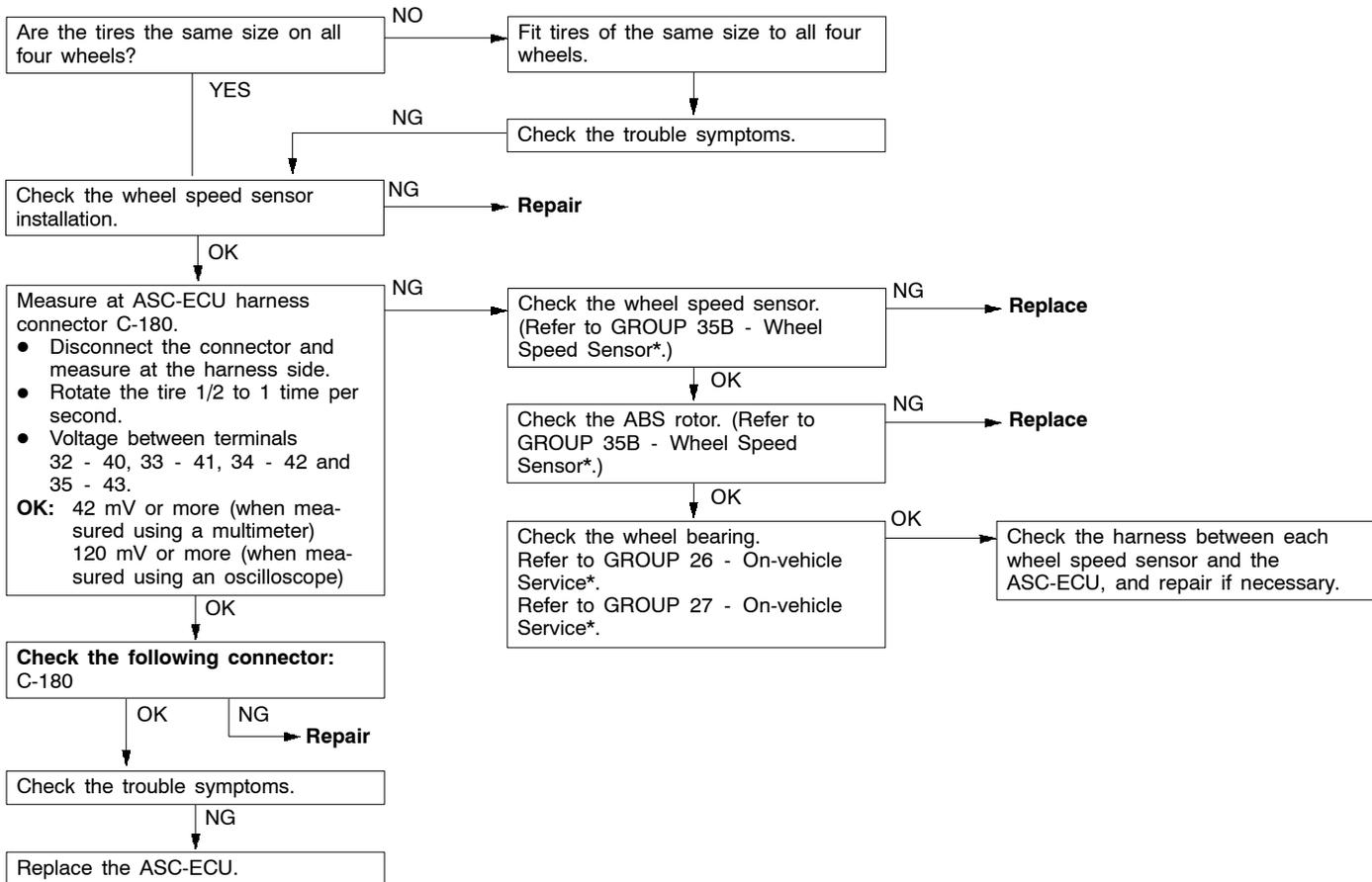
Code Nos. 11, 12, 13, 14 Wheel speed sensor system (open or short-circuit)	Probable cause
<b>Code Nos. 21, 22, 23, 24 Wheel speed sensor system</b>	
Code Nos. 11, 12, 13 and 14 are output if an open circuit or short-circuit is detected in the (+) or (-) line of one or more of the four wheel speed sensors because of an open circuit or short-circuit detected by the ASC-ECU hardware circuit.	<ul style="list-style-type: none"> <li>● Malfunction of wheel speed sensor</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of ASC-ECU</li> </ul>
Code Nos. 21, 22, 23 and 24 are output at the following times. <ul style="list-style-type: none"> <li>● If an open circuit cannot be confirmed, but there is no signal input received from one of the four wheel speed sensors when the vehicle speed is 8 km/h or higher.</li> <li>● If a chipped or blocked ABS rotor is detected, or if anti-lock brake control is continuously engaged because the sensor output drops due to of a sensor malfunction or a deformed ABS rotor.</li> </ul>	<ul style="list-style-type: none"> <li>● Malfunction of wheel speed sensor</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of ABS rotor</li> <li>● Excessive clearance between sensor and ABS rotor</li> <li>● Malfunction of ASC-ECU</li> <li>● Malfunction of wheel bearing</li> </ul>



## NOTE

\*: Refer to '97 GALANT Workshop Manual.

Code No. 15 Wheel speed sensor system (output signal abnormality)	Probable cause
This code is output if there is an abnormality (other than an open circuit or short-circuit) in any of the wheel speed sensor output signals.	<ul style="list-style-type: none"> <li>● Incorrect tire sizes for 4 wheels</li> <li>● Incorrect wheel speed sensor installation</li> <li>● Malfunction of wheel speed sensor</li> <li>● Malfunction of ABS rotor</li> <li>● Malfunction of wheel bearing</li> <li>● Malfunction of ASC-ECU</li> </ul>



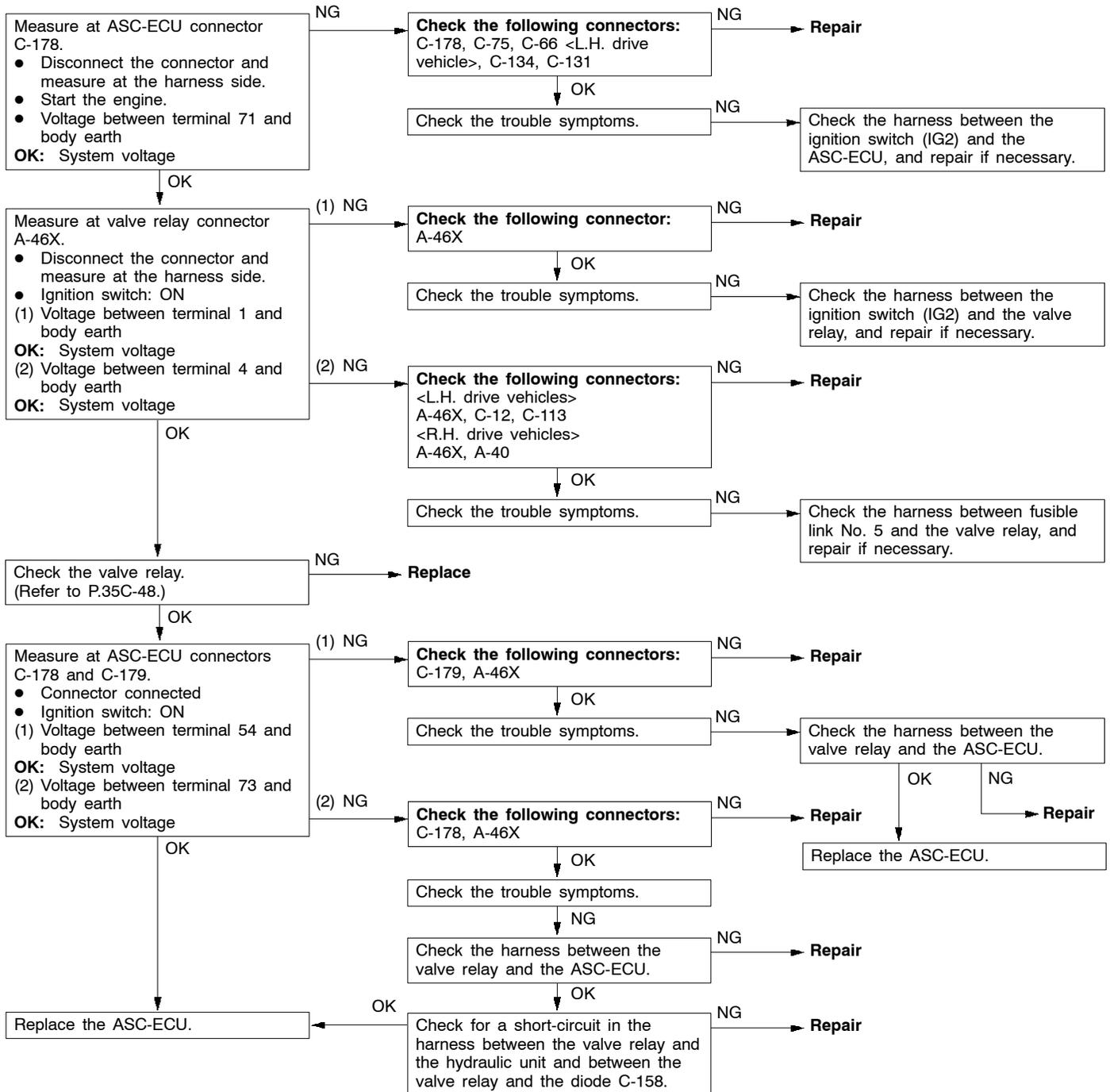
**NOTE**

\*: Refer to '97 GALANT Workshop Manual.

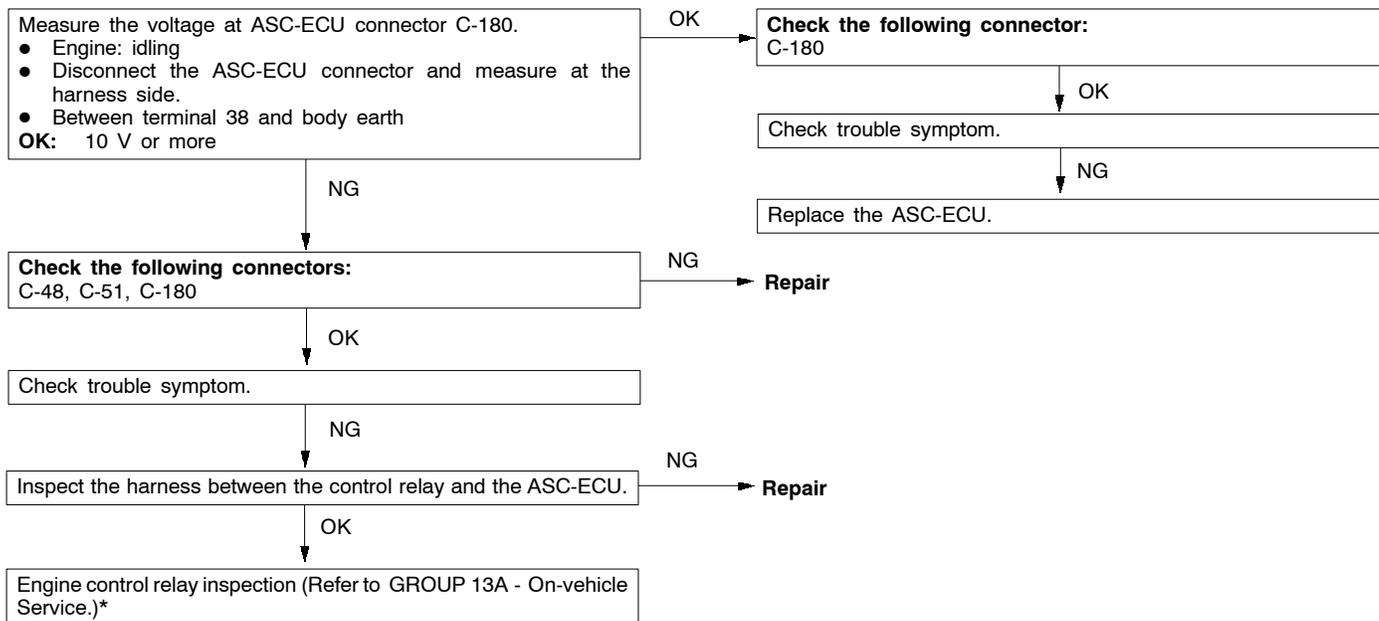
Code No. 16 ECU power supply voltage abnormality (when the ABS warning lamp is on)	Probable cause
This code is output if the ASC-ECU power supply voltage or valve relay power supply voltage drops below or rises above the standard level. Furthermore, the valve relay power supply voltage is detected from the voltage at the valve relay monitoring line.	<ul style="list-style-type: none"> <li>● Malfunction of battery</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of valve relay</li> <li>● Malfunction of ASC-ECU</li> </ul>

**Caution**

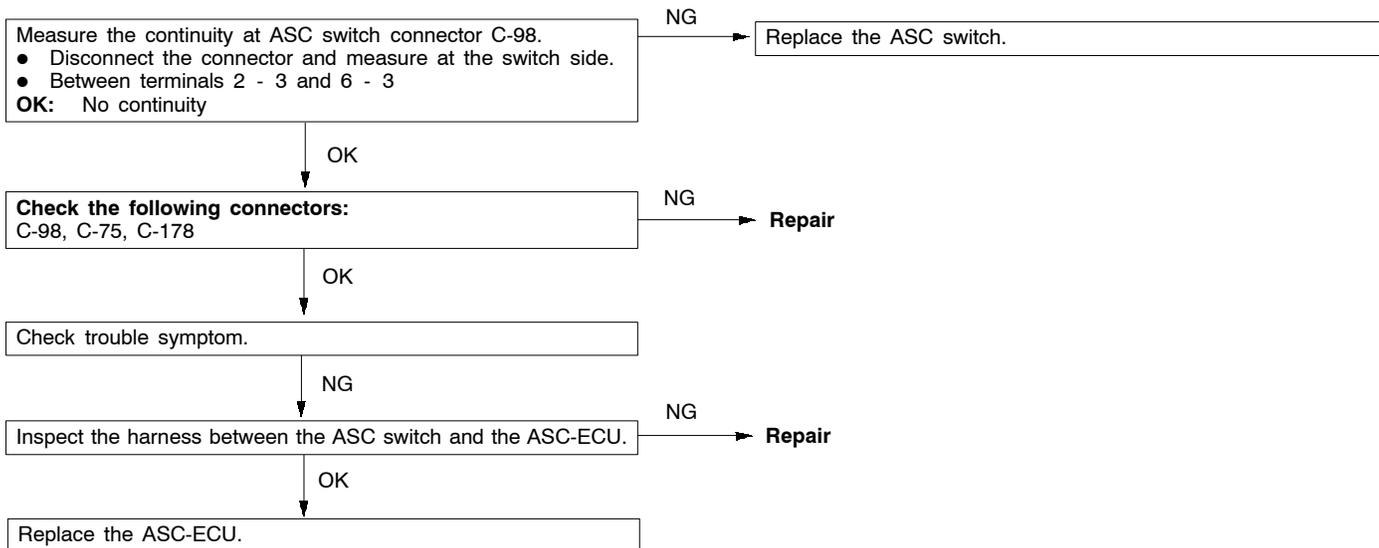
If the battery voltage drops or rises during inspection, this code may be output as a current problem and correct problem diagnosis may not be possible.



Code No. 16 ECU power supply voltage abnormality (when the ABS warning lamp is off)	Probable cause
This diagnosis code is output if the ASC-ECU power supply voltage (engine control relay supply voltage) is lower than the specified value. If the voltage returns to the specified value or greater, the diagnosis code is erased.	<ul style="list-style-type: none"> <li>● Malfunction of control relay</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of ASC-ECU</li> </ul>



Code No. 17 ASC switch circuit system	Probable cause
This diagnosis code is output if signals are input simultaneously from both the ASC-OFF and ASC-ON positions because of a short circuit in the ASC switch circuit.	<ul style="list-style-type: none"> <li>● Malfunction of the ASC switch</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of ASC-ECU</li> </ul>



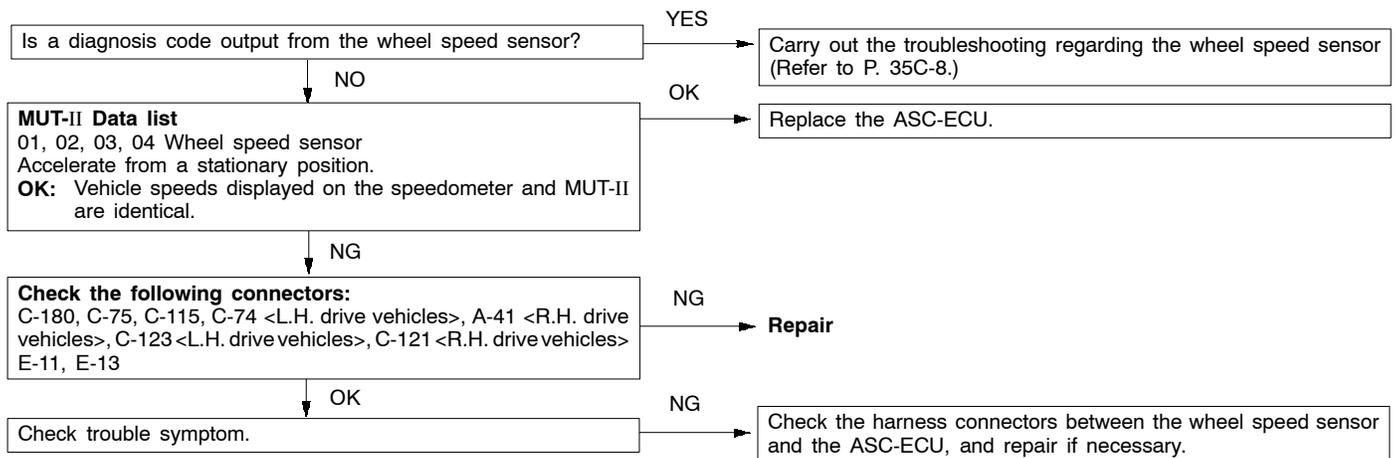
NOTE

\*: Refer to '97 GALANT Workshop Manual.

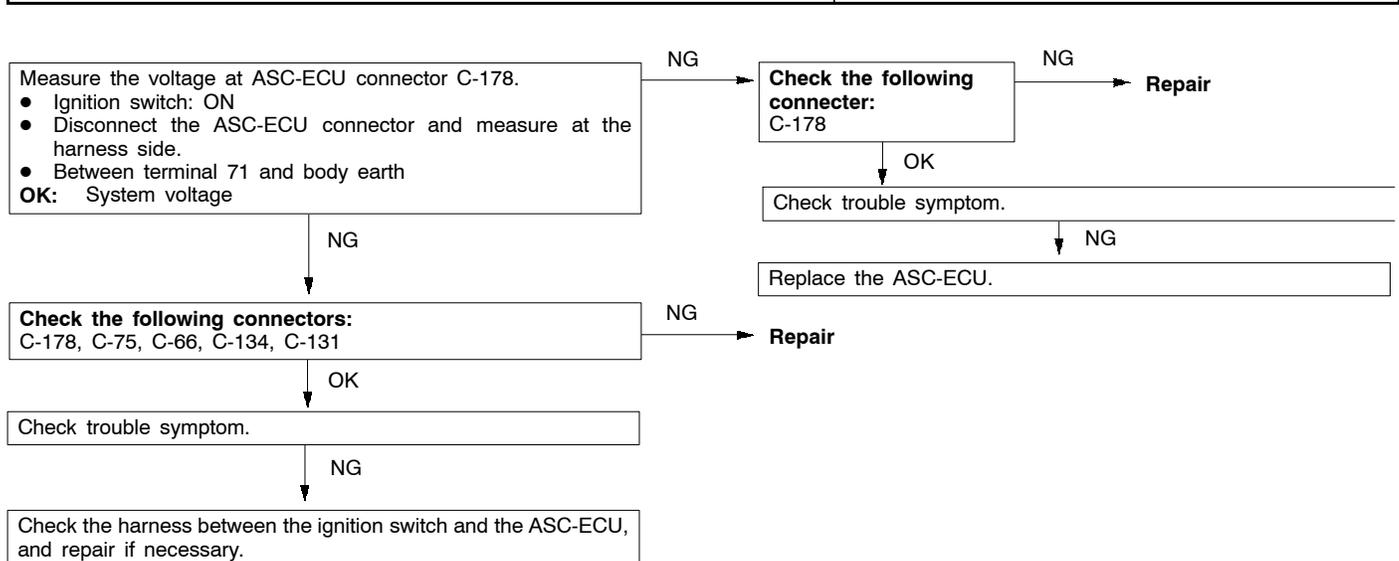
<p><b>Code No. 25 Rear wheel speed sensor circuit system (open circuit in both left and right rear wheel speed sensors)</b></p>	<p><b>Probable cause</b></p>
<p><b>Code No. 26 Rear wheel speed sensor circuit system (malfunction in both rear wheel speed sensors)</b></p>	
<p><b>Code No. 27 Front and rear wheel speed sensor system (malfunction in both front and rear wheel speed sensors)</b></p>	
<p>Diagnosis code No. 25 is output if the pulse signal from a rear wheel sensor is momentarily interrupted (0.02 sec.) because of a transient open circuit in a rear wheel speed sensor.                  Diagnosis code No. 26 is output if a rear wheel speed sensor abnormality is judged when the turning speed of both rear wheels is 0 km/h for 20 seconds or more while TCL is operating.                  Code No. 27 is displayed if a condition occurs continually where the difference in the average wheel speed between the front and rear wheels is 20 km/h or more for 10 seconds.</p>	<ul style="list-style-type: none"> <li>● Malfunction of wheel speed sensor</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of ASC-ECU</li> </ul>

**NOTE**

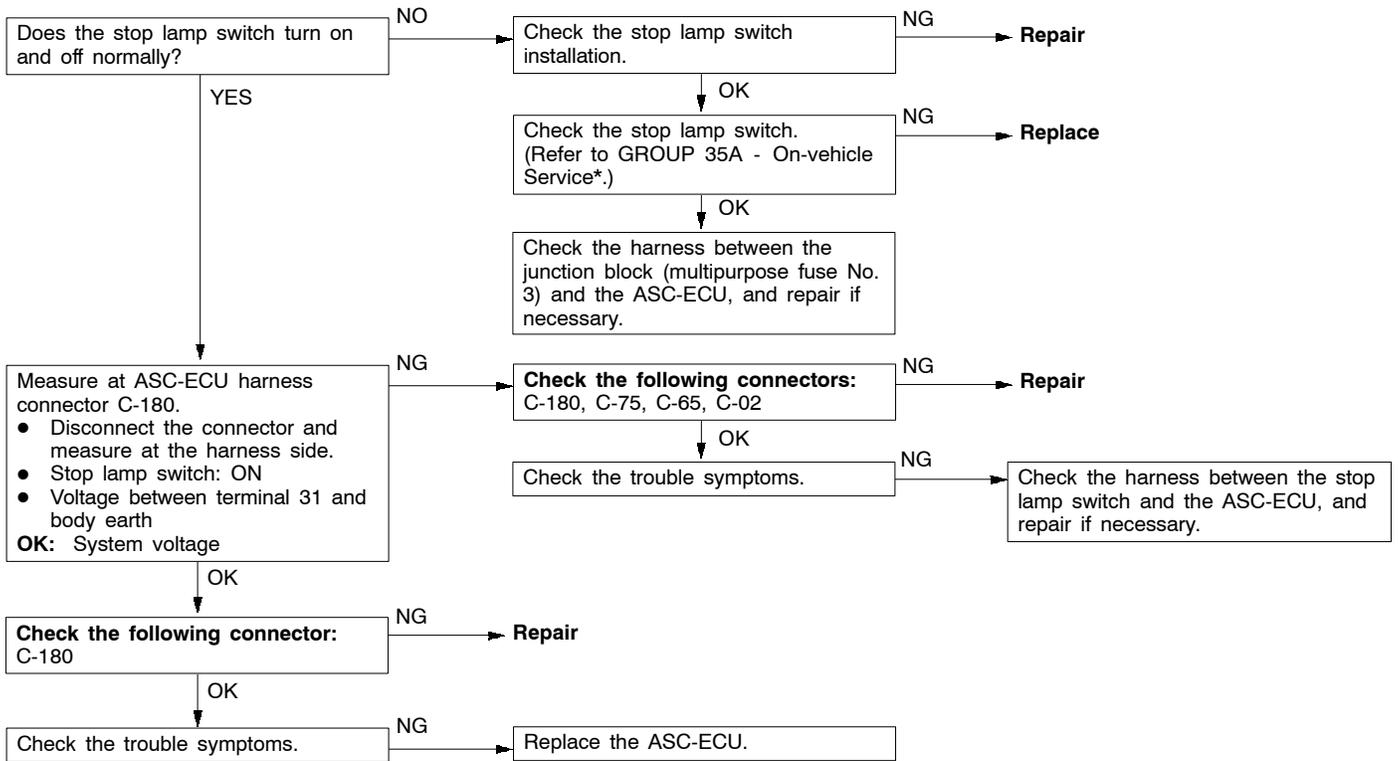
- (1) If the front wheels only are turning while the rear wheels are stationary (wheel slip), the ASC-OFF indicator will start flashing after 20 seconds, and the system will be isolated.
- (2) When these diagnosis codes are output, erase the diagnosis code memory after carrying out repairs, and then carry out a road test at 20 km/h or more and check to be sure that the diagnosis codes are not output again.



<p><b>Code No. 31 Ignition switch (IG2) circuit system</b></p> <p>This diagnosis code is output if the IG2 power supply is not distributed, even though the engine speed is 450 r/min or more.</p>	<p><b>Probable cause</b></p> <ul style="list-style-type: none"> <li>● Malfunction of harness or connector</li> <li>● Malfunction of ASC-ECU</li> </ul>
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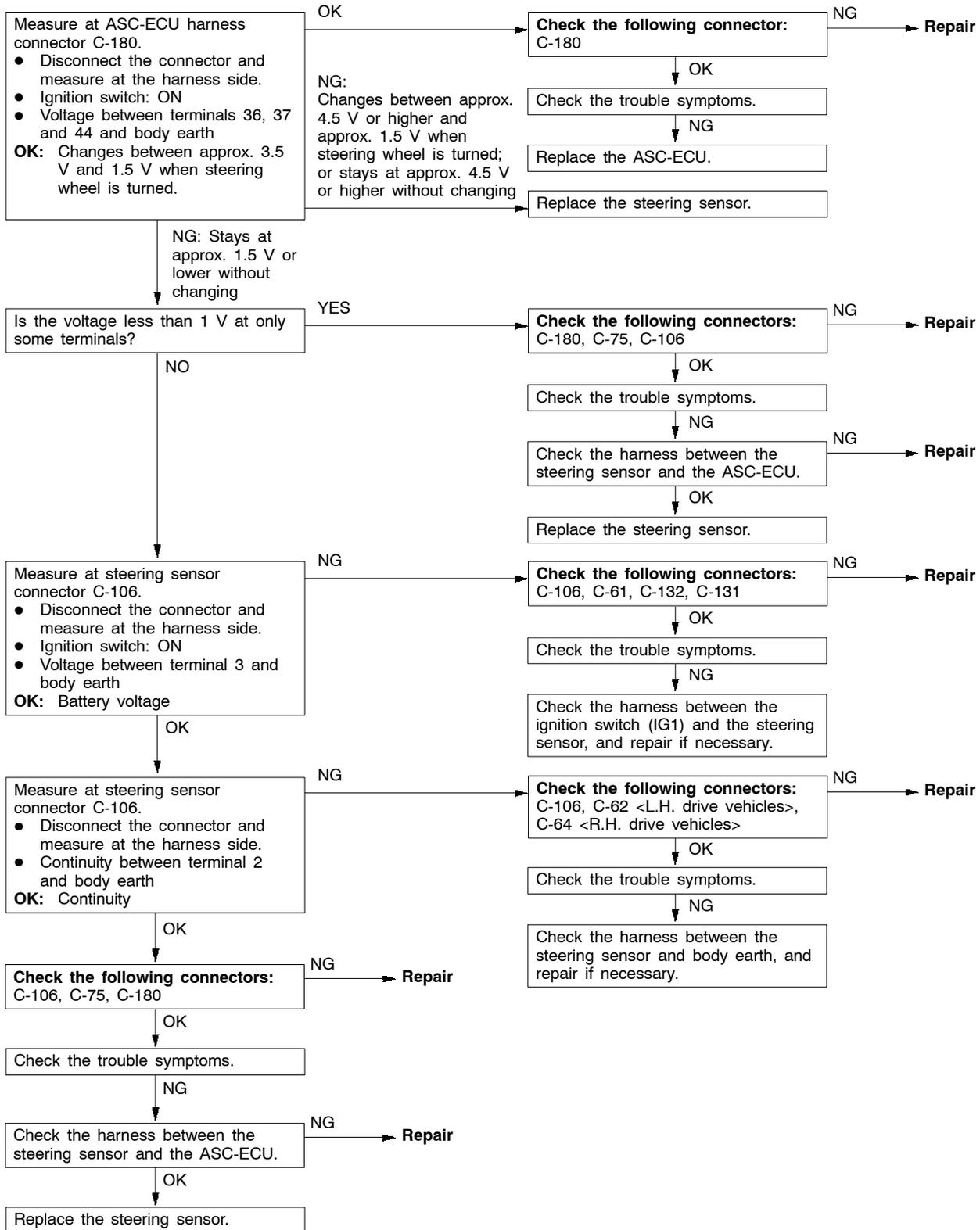
Code No. 33 Stop lamp switch system (open circuit or ON problem)	Probable cause
This code is output if there is a stop lamp switch ON malfunction (the stop lamp switch remains ON continuously for 15 minutes or more).	<ul style="list-style-type: none"> <li>● Malfunction of stop lamp switch</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of ASC-ECU</li> </ul>



**NOTE**

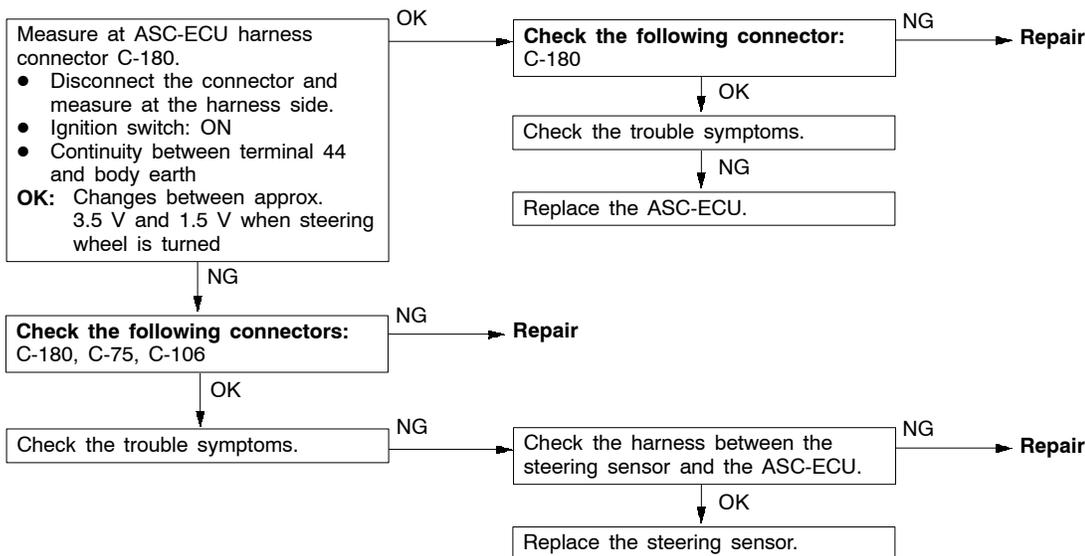
\*: Refer to '97 GALANT Workshop Manual.

Code No. 35 Steering sensor system (ST-1, 2, N)	Probable cause
This code is output if it is detected that there is an open circuit or short-circuit in any one of the steering sensor ST-1, ST-2 or ST-N output circuits, or if there is an open circuit in the steering sensor earth circuit, or if the output from any one of the ST-1, ST-2 or ST-N terminals is lower than approximately 1 V or higher than approximately 4.5 V.	<ul style="list-style-type: none"> <li>● Malfunction of harness or connector</li> <li>● Malfunction of steering sensor</li> <li>● Malfunction of ASC-ECU</li> </ul>

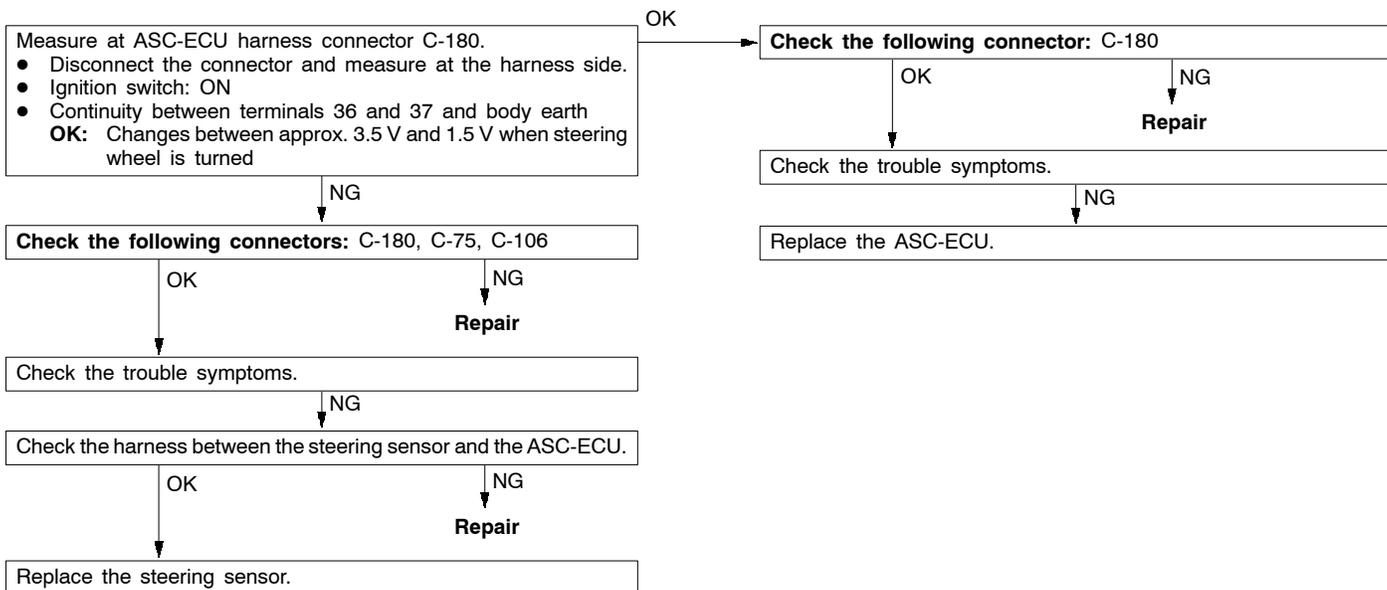


ASC - Troubleshooting

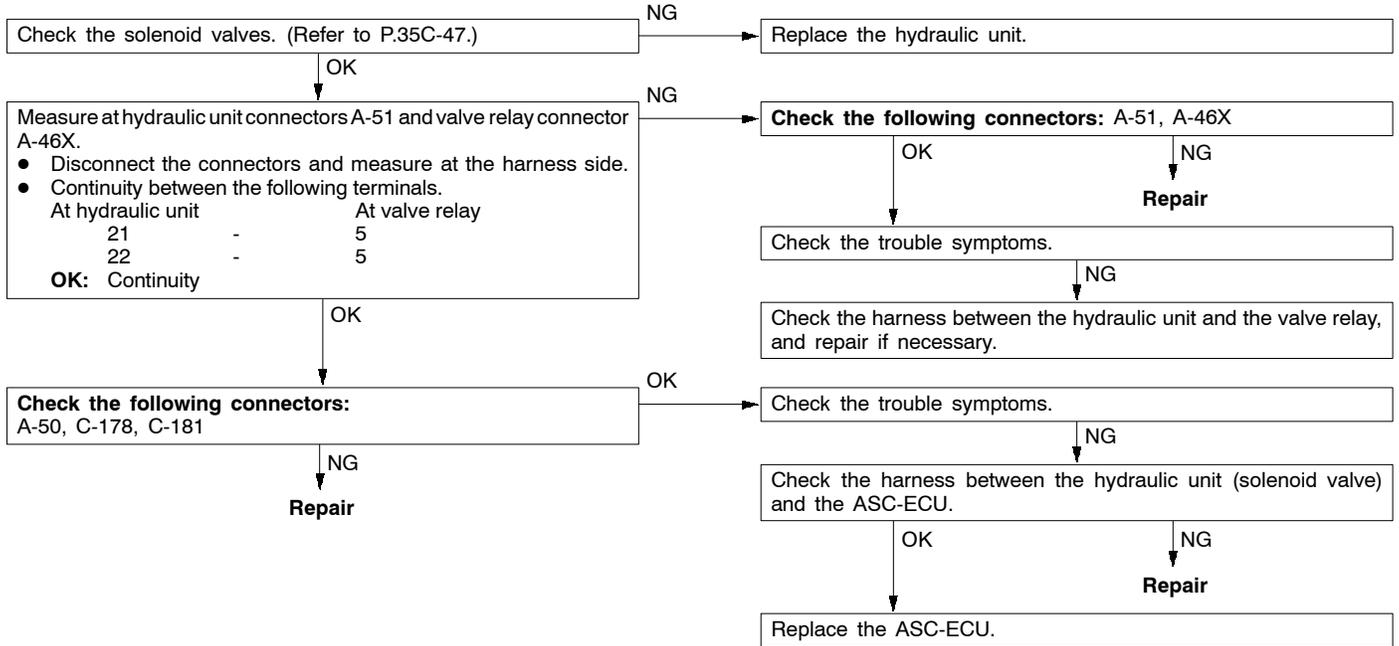
Code No. 36 Steering sensor system (ST-N)	Probable cause
This code is output if the neutral position is still detected when the steering wheel is turned 20° or more in either direction due to a cause such as a short-circuit in the steering sensor (ST-N).	<ul style="list-style-type: none"> <li>● Malfunction of steering sensor</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of ASC-ECU</li> </ul>



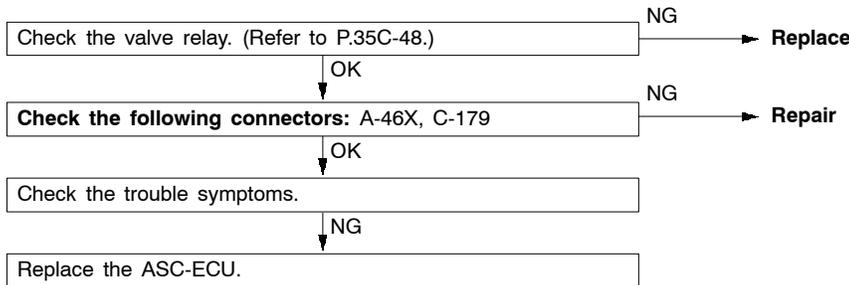
Code No. 37 Steering sensor system (ST-1, ST-2)	Probable cause
This code is output if there is a short-circuit in the steering sensor (ST-1) or the steering sensor (ST-2) and no steering angle signal is input when the average speed detected by the left and right rear wheel speed sensors is 15 km/h or more.	<ul style="list-style-type: none"> <li>● Malfunction of steering sensor</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of ASC-ECU</li> </ul>



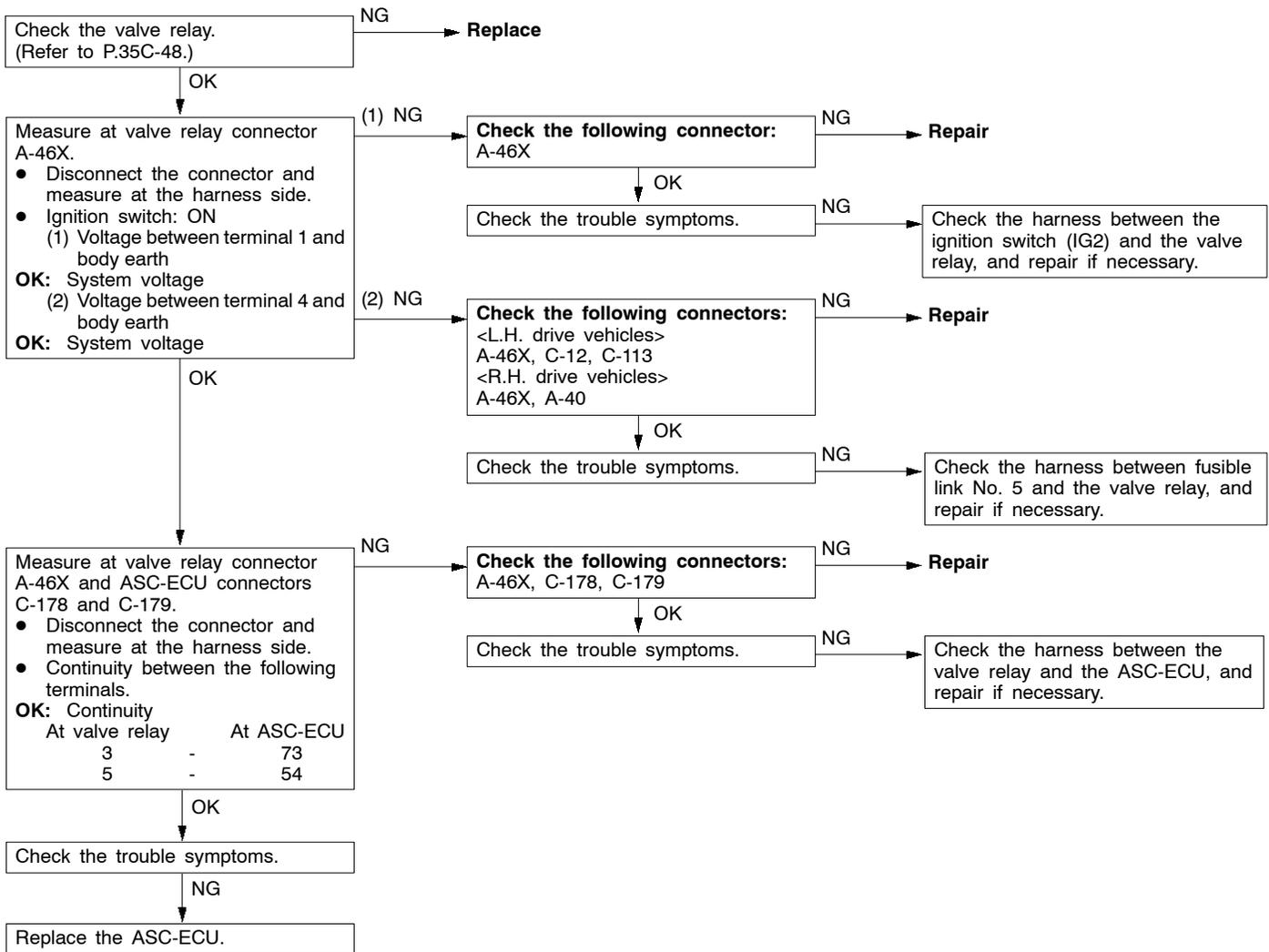
Code Nos. 41, 42, 43, 44, 45, 46, 47, 48 Solenoid valve system	Probable cause
<p>The ASC-ECU continually monitors the solenoid valve drive circuits. These codes are output if the ASC-ECU judges that there is an open circuit or short-circuit in a solenoid coil or an open circuit or short-circuit in a harness because current is not flowing even though the solenoid valve is ON, or current is flowing even though the solenoid valve is OFF.</p>	<ul style="list-style-type: none"> <li>● Malfunction of hydraulic unit</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of ASC-ECU</li> </ul>



Code No. 51 Valve relay system (ON malfunction)	Probable cause
<p>This code is output if the ASC-ECU judges that a relay contact is fused or that there is a short-circuit in the valve relay drive circuit because the valve relay is OFF but power is being supplied to the solenoid valves during the initial check when the ignition switch is turned to ON.</p>	<ul style="list-style-type: none"> <li>● Malfunction of ABS valve relay</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of ASC-ECU</li> </ul>



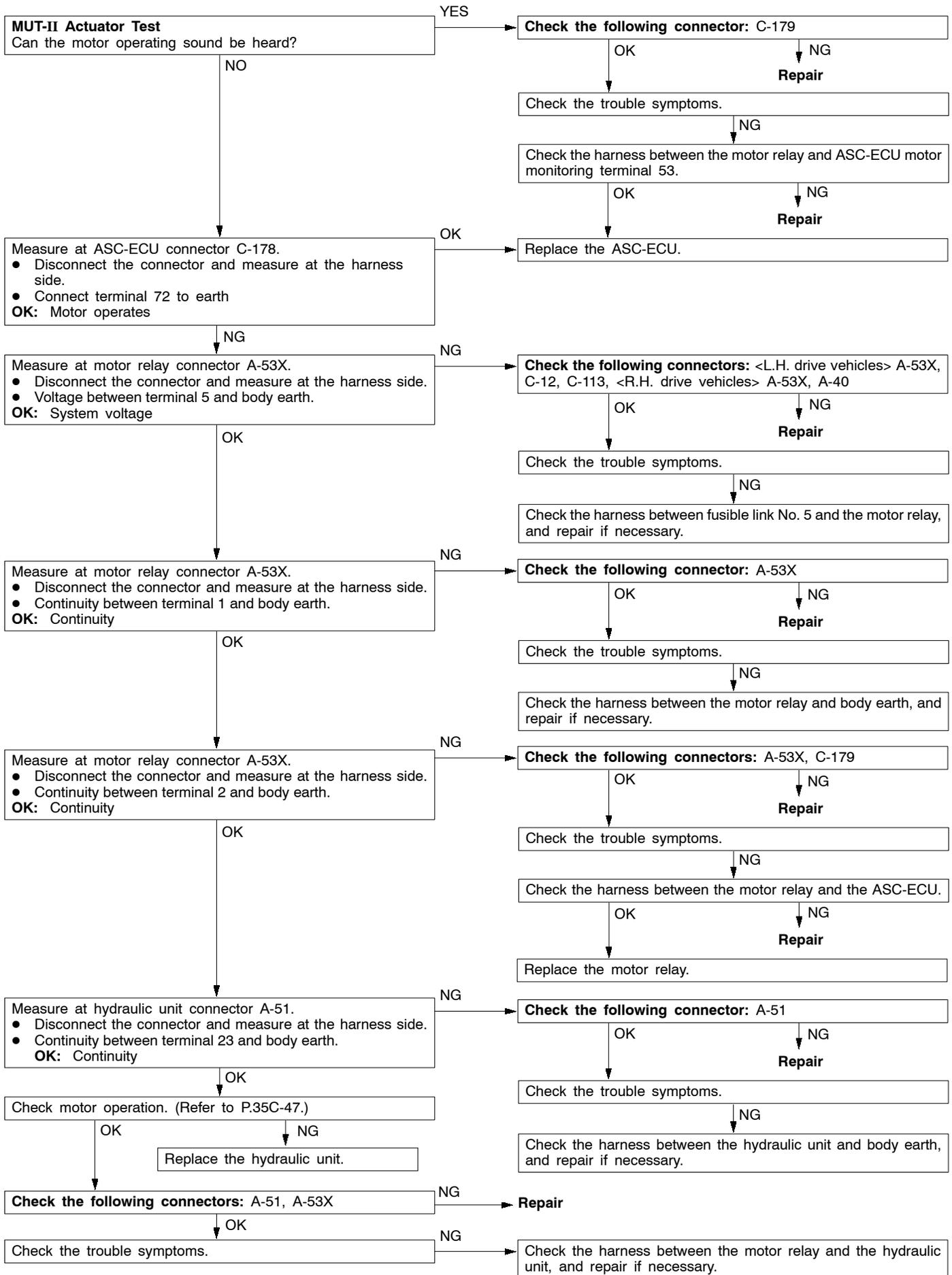
Code No. 52 Valve relay system (OFF malfunction)	Probable cause
This code is output if the ASC-ECU judges that there is a valve relay OFF malfunction because no voltage is being supplied to the solenoid valves when the ignition switch is at ON and the valve relay is on.	<ul style="list-style-type: none"> <li>● Malfunction of ABS valve relay</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of ASC-ECU</li> </ul>



Code No. 53 Motor relay system (OFF malfunction)	Probable cause
This code is output if motor monitoring is off (for example, when the motor is not operating) when the ASC-ECU gives a pump motor ON command.	<ul style="list-style-type: none"> <li>● Malfunction of harness or connector</li> <li>● Malfunction of motor relay</li> <li>● Malfunction of ASC-ECU</li> </ul>

**Caution**

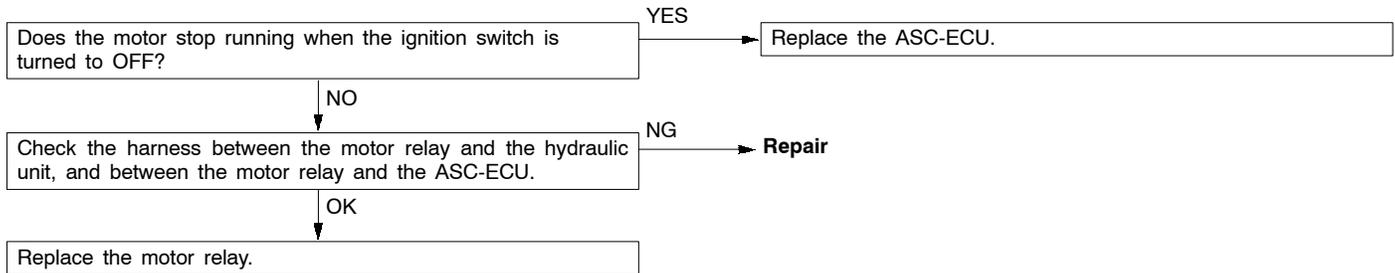
**Because driving the motor during actuator testing will drain the battery, start the engine and let it run for a while after testing is finished.**



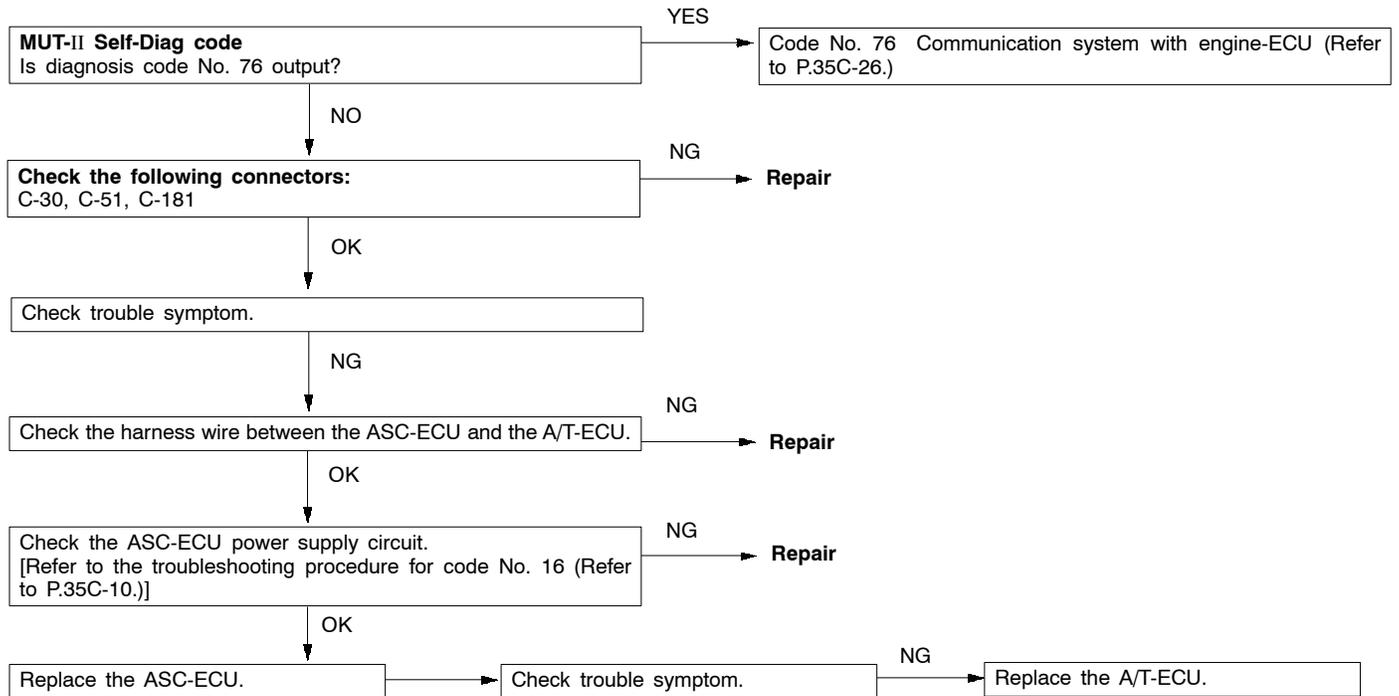
Code No. 54 Motor relay system (ON malfunction)	Probable cause
This code is output if the ASC-ECU judges that there is a motor relay ON malfunction when motor monitoring is on when the ASC-ECU gives a pump motor OFF command.	<ul style="list-style-type: none"> <li>● Malfunction of harness or connector</li> <li>● Malfunction of motor relay</li> <li>● Malfunction of ASC-ECU</li> </ul>

### Caution

- (1) If a motor relay ON malfunction occurs, the motor will continue operating even when the ignition switch is turned to OFF. If this happens, fusible link No. 5 (60 A) should be removed or hydraulic unit connector A-51 should be disconnected immediately. Excessive running of the motor will drain the battery.
- (2) The motor relay may become hot while the motor is running or immediately after it has been running, so take care when handling the motor relay.



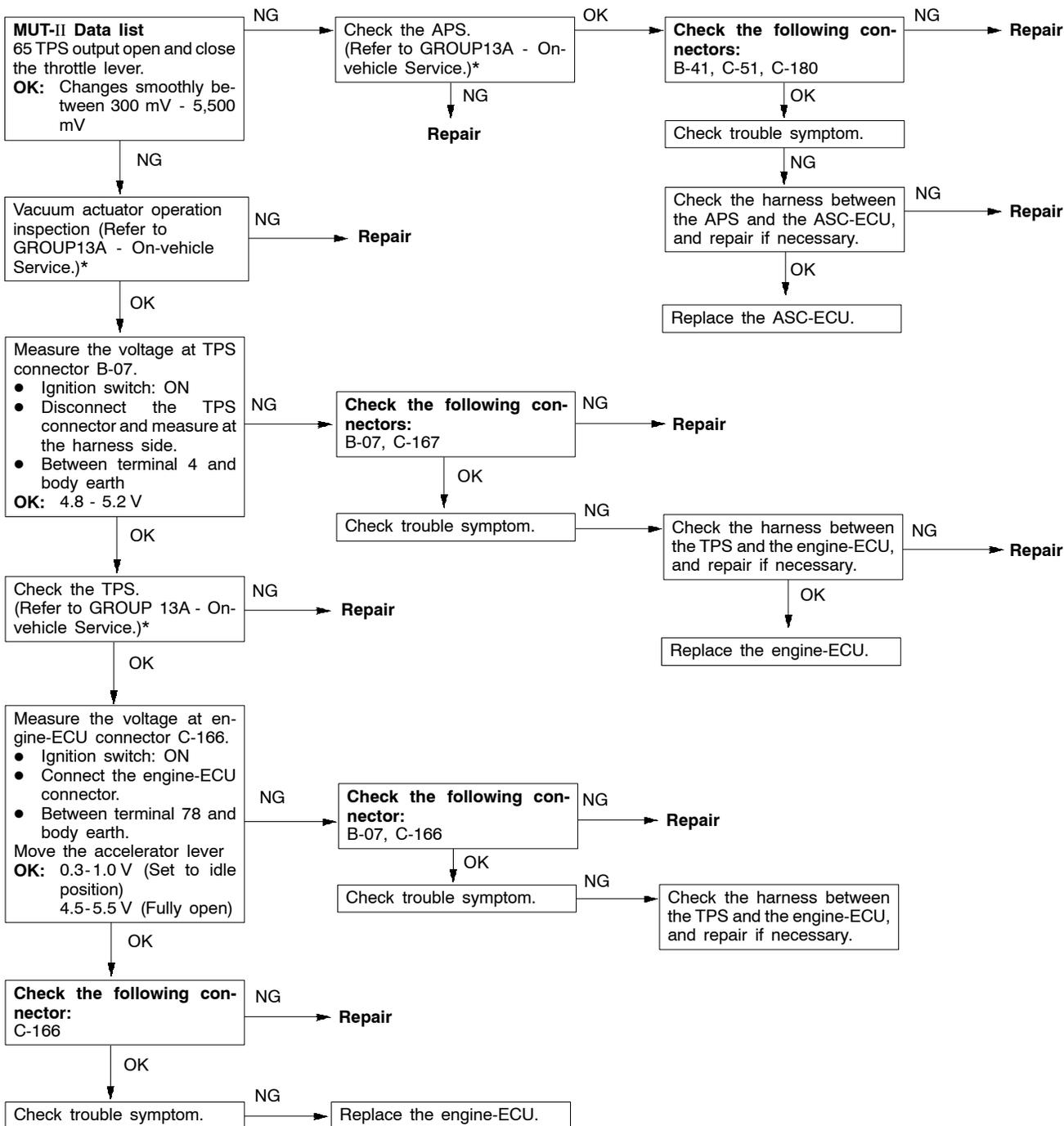
Code No. 61 Communication system between the A/T-ECU and the ASC-ECU	Probable cause
<p>This diagnosis code is output if an error is detected in the communication because of an open or short circuit in the serial communication circuit between the ASC-ECU and the A/T-ECU, a internal malfunction of the ECU or a improper shield wire. This code is also output when diagnosis code No.76 is output. Diagnosis code No.76 indicates that the communication with the A/T-ECU is suspended due to an error in the communication line between the ASC-ECU and the engine-ECU.</p>	<ul style="list-style-type: none"> <li>● Malfunction of harness or connector</li> <li>● Malfunction of ASC-ECU</li> <li>● Malfunction of A/T-ECU</li> <li>● Malfunction of engine-ECU</li> </ul>



Code No. 63 ECU failure	Probable cause
<p>This code is output if a malfunction occurs in the CPU inside the ASC-ECU.</p>	<ul style="list-style-type: none"> <li>● Malfunction of ASC-ECU</li> </ul>

Replace the ASC-ECU.

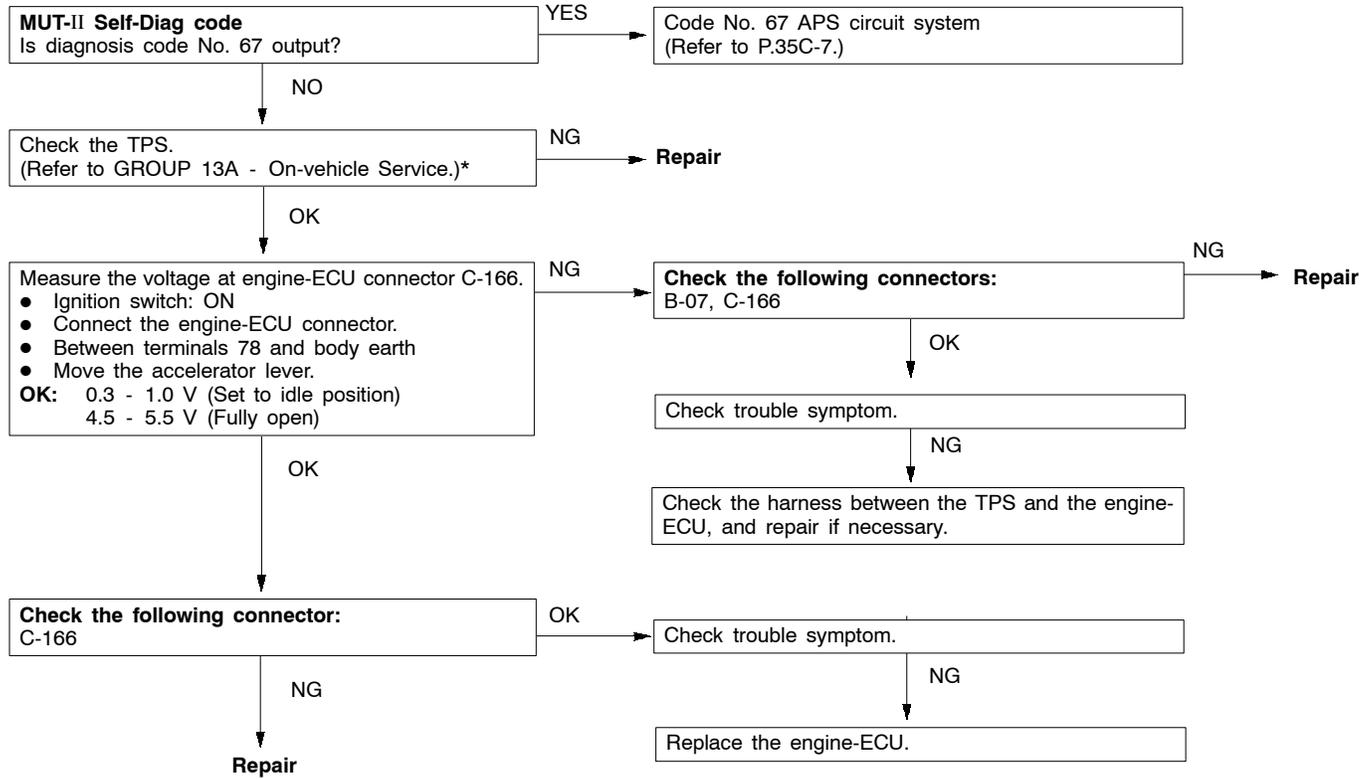
Code No. 65 APS or TPS circuit system	Probable cause
<p>This diagnosis code is output if the APS opening angle is 20° or greater than the TPS opening angle because of a short in the APS, an open circuit in the TPS or sticking of the vacuum actuator. As this detection condition can be applicable during throttle control, trouble diagnosis is invalid at this time.</p>	<ul style="list-style-type: none"> <li>● Malfunction of APS</li> <li>● Malfunction of TPS</li> <li>● Malfunction of ASC-ECU</li> <li>● Malfunction of engine-ECU</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of vacuum actuator</li> </ul>



NOTE

\*: Refer to '97 GALANT Workshop Manual.

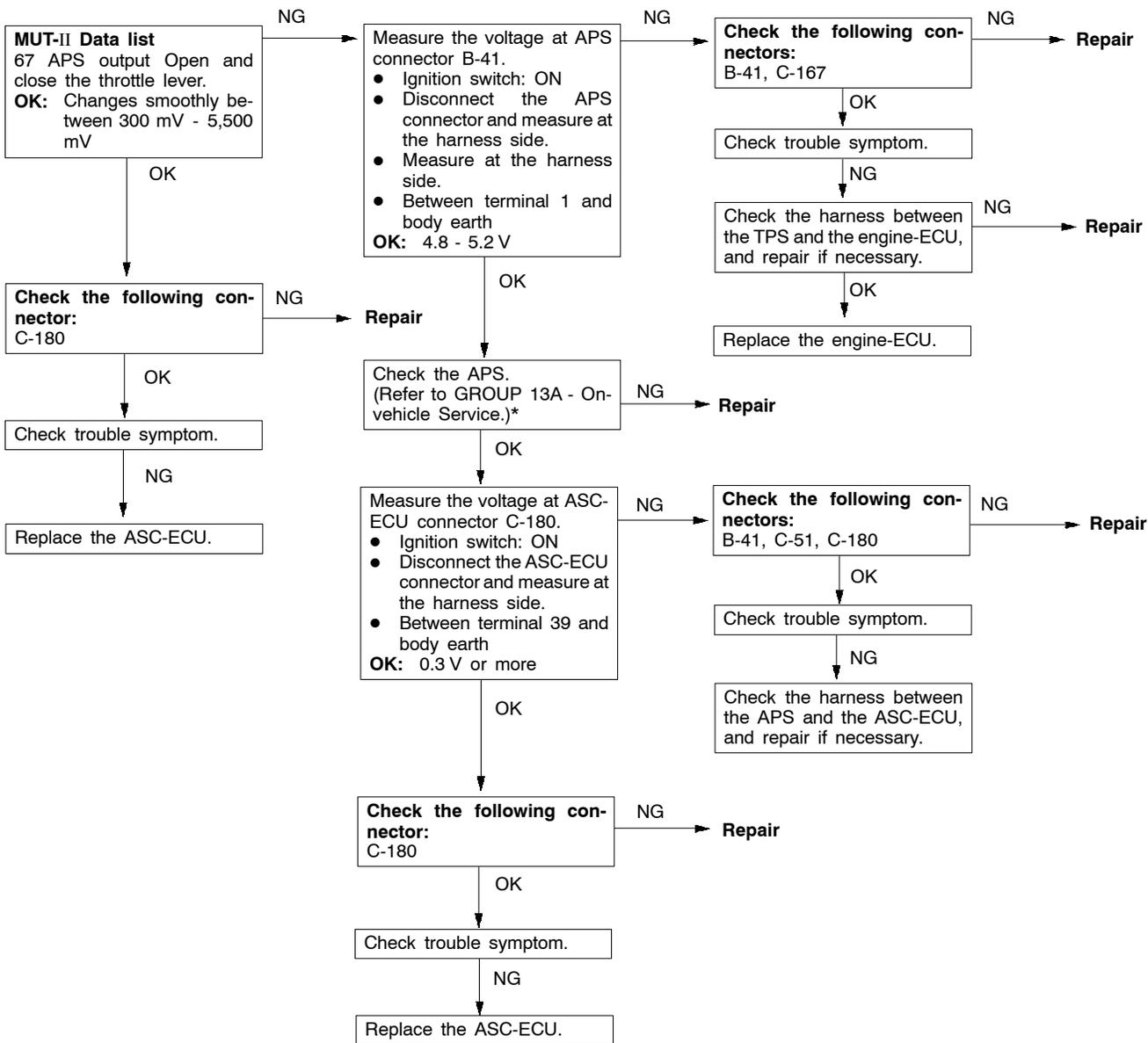
Code No. 66 TPS or APS circuit system	Probable cause
This diagnosis code is output if the TPS opening angle is 20° or greater than the APS opening angle because of a short in the TPS or an open circuit in the APS. If there is an open circuit in the APS, diagnosis code No. 67 is output at the same time. Accordingly, if only diagnosis code No. 67 is output, the cause is probably an abnormality in the TPS circuit system.	<ul style="list-style-type: none"> <li>● Malfunction of APS</li> <li>● Malfunction of TPS</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of engine-ECU</li> </ul>



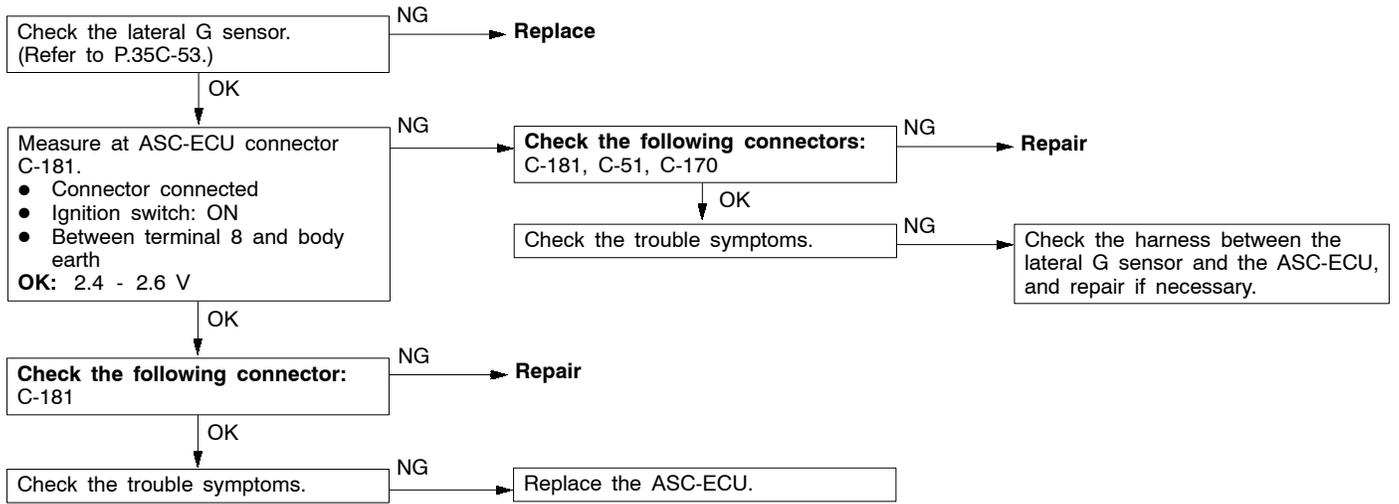
NOTE

\*: Refer to '97 GALANT Workshop Manual.

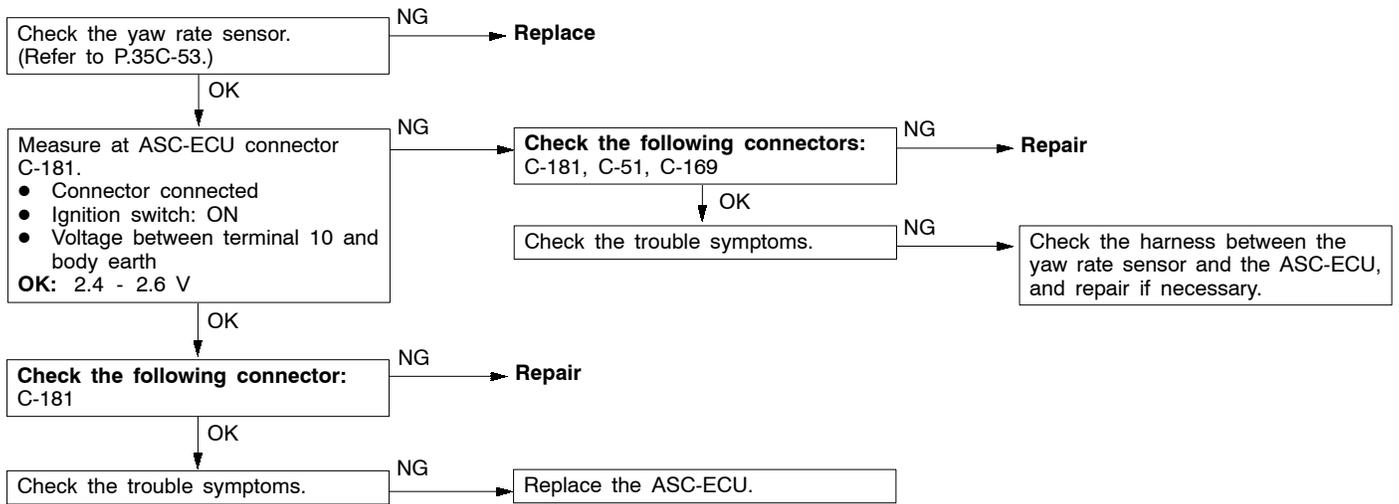
Code No. 67 APS circuit system	Probable cause
This diagnosis code is output if the APS output voltage is less than 0.2 V due to an open circuit or other malfunction in the APS circuit. The APS power supply and earth are supplied from the engine-ECU, and the output signal is used by the A/T-ECU and auto-cruise control-ECU as well as by the ASC-ECU.	<ul style="list-style-type: none"> <li>● Malfunction of APS</li> <li>● Malfunction of ASC-ECU</li> <li>● Malfunction of engine-ECU</li> <li>● Malfunction of harness or connector</li> </ul>



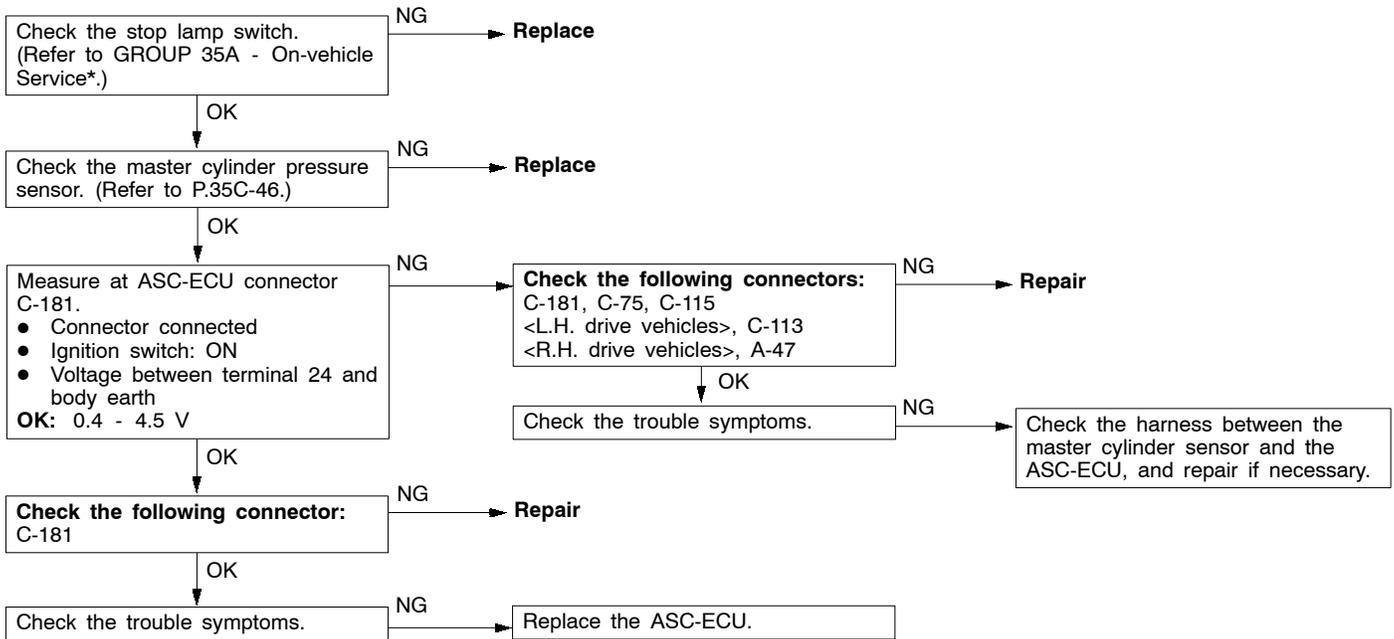
Code No. 71 Lateral G sensor circuit system	Probable cause
This code is output at the following times. <ul style="list-style-type: none"> <li>• If the G sensor output is less than 0.5 V or more than 4.5 V.</li> <li>• If there is an open circuit or short-circuit in a G sensor system harness.</li> </ul>	<ul style="list-style-type: none"> <li>• Malfunction of G sensor</li> <li>• Malfunction of harness or connector</li> <li>• Malfunction of ASC-ECU</li> </ul>



Code No. 72 Yaw rate sensor circuit system (open or short-circuit)	Probable cause
This code is output at the following times. <ul style="list-style-type: none"> <li>• If the yaw rate sensor output is less than 0.3 V or more than 4.7 V.</li> <li>• If there is an open circuit or short-circuit in a yaw rate sensor system harness.</li> </ul>	<ul style="list-style-type: none"> <li>• Malfunction of yaw rate sensor</li> <li>• Malfunction of harness or connector</li> <li>• Malfunction of ASC-ECU</li> </ul>



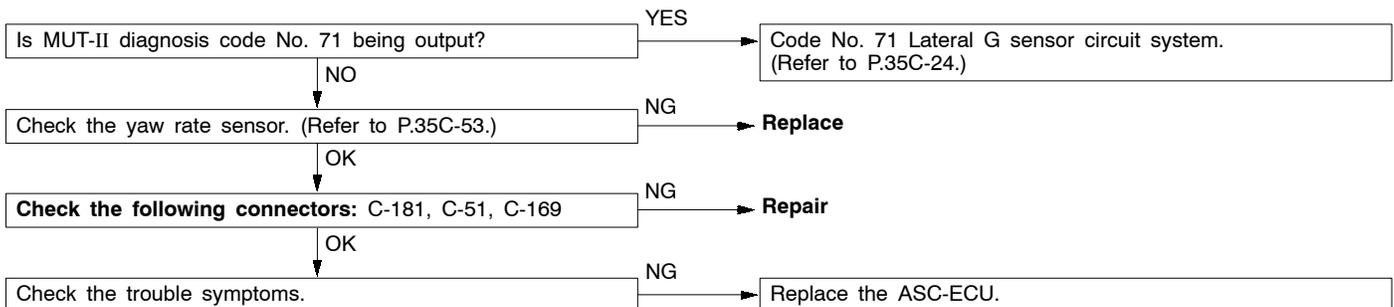
Code No. 73 Master cylinder pressure sensor system	Probable cause
This code is output at the following times. <ul style="list-style-type: none"> <li>• If there is an open circuit or short-circuit in a master cylinder pressure sensor system harness and the sensor output is less than 0.3 V or more than 4.7 V.</li> <li>• If the master cylinder pressure sensor and the stop lamp switch conditions are not identical.</li> </ul>	<ul style="list-style-type: none"> <li>• Malfunction of master cylinder pressure sensor</li> <li>• Malfunction of harness or connector</li> <li>• Malfunction of ASC-ECU</li> </ul>



NOTE

\*: Refer to '97 GALANT Workshop Manual.

Code No. 74 Yaw rate sensor or lateral G sensor system	Probable cause
This code is output if an open circuit cannot be confirmed, but the difference between the actual yaw rate value and the target yaw rate (the value calculated from the lateral G sensor value and the vehicle speed) is 5° or more when the vehicle speed is 40 km/h or higher.	<ul style="list-style-type: none"> <li>• Malfunction of yaw rate sensor</li> <li>• Malfunction of lateral G sensor</li> <li>• Malfunction of ASC-ECU</li> </ul>



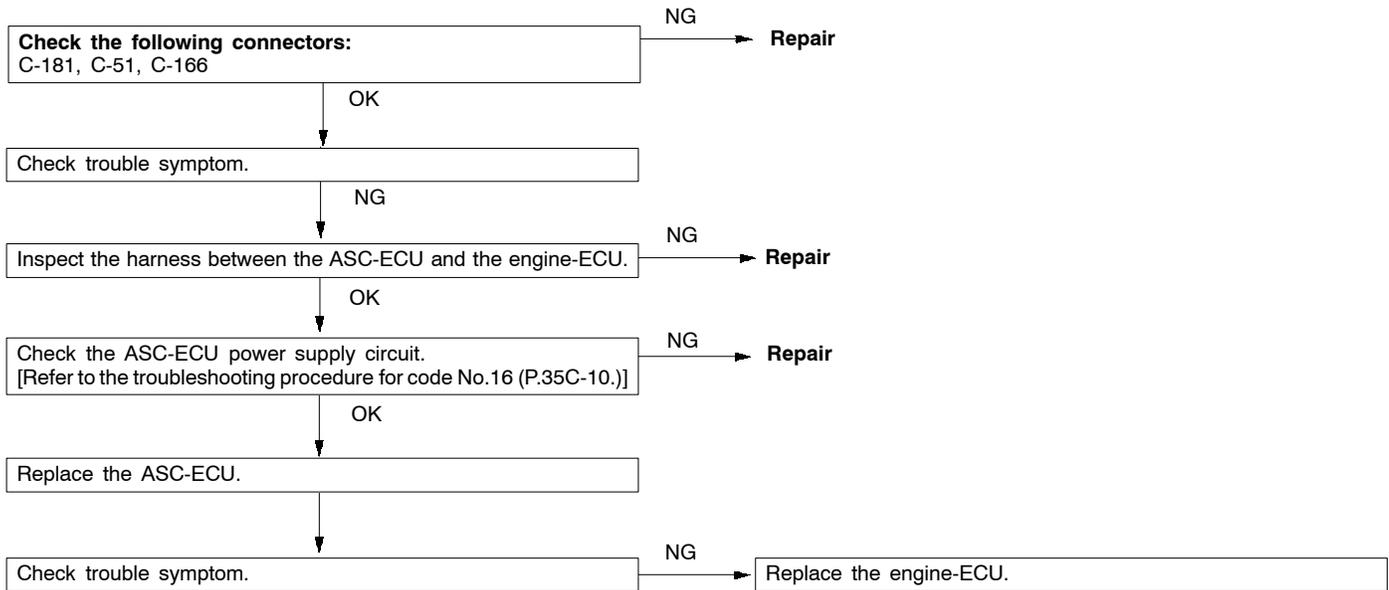
<b>Code No. 75 Engine-ECU system</b>	<b>Probable cause</b>
<b>Code No. 77 TCL vacuum or ventilation solenoid valve system</b>	
These codes are output when the engine-ECU detects a system abnormality. (MPI system abnormalities are transmitted from the engine-ECU to the ASC-ECU by serial communication.)	
<ul style="list-style-type: none"> <li>● Malfunction of MPI system</li> </ul>	

Carry out MPI system troubleshooting. (Refer to GROUP 13A - Troubleshooting.)\*

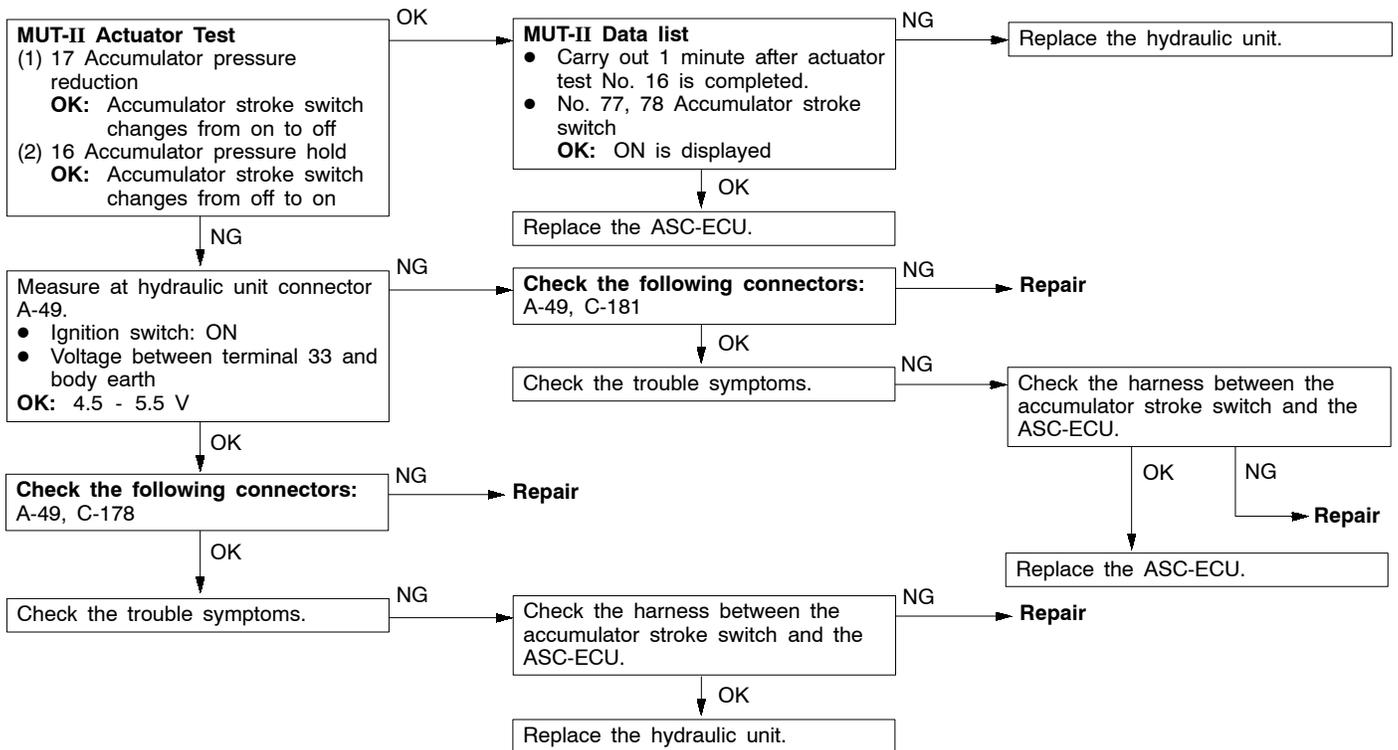
**NOTE**

\*: Refer to '97 GALANT Workshop Manual.

<b>Code No. 76 Communication system with engine-ECU</b>	<b>Probable cause</b>
This diagnosis code is output if an error is detected in the communication contents because of an open or short circuit in the serial communication circuit between the ASC-ECU and the engine-ECU, a malfunction of ECU and a defective shielding of the shield wire.	
<ul style="list-style-type: none"> <li>● Malfunction of harness or connector</li> <li>● Malfunction of ASC-ECU</li> <li>● Malfunction of engine-ECU</li> </ul>	



Code No. 78 Accumulator stroke switch system	Probable cause
<p>This code is output at the following times.</p> <ul style="list-style-type: none"> <li>● If the accumulator signal being is output continuously (open circuit or short-circuit in accumulator stroke switch circuit or incorrect accumulator pressure)</li> <li>● If the accumulator stroke switch does not turn from on to off during the initial check even though the diagonal accumulator valve is on (incorrect pressure reduction)</li> <li>● If the accumulator stroke switch turns from on to off within 1 minute after pressure accumulation is complete (fluid leak)</li> </ul>	<ul style="list-style-type: none"> <li>● Malfunction of accumulator stroke switch</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of hydraulic unit</li> <li>● Malfunction of ASC-ECU</li> </ul>



## INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom		Inspection procedure No.	Reference page
Communication is not possible between the MUT-II and all other systems.		1	35C-29
Communication is not possible between the MUT-II and the ASC-ECU.		2	35C-30
The ASC/TCL operation lamp display does not operate correctly.	The ASC/TCL operation lamp does not turn on when the ignition switch is turned to ON.	3	35C-31
	The ASC/TCL operation lamp stays on after the engine has been started.	4	35C-31
The ASC-OFF indication lamp display does not operate correctly.	The ASC-OFF indication lamp does not turn on when the ignition switch is turned to ON.	5	35C-32
	The ASC-OFF indication lamp stays on after the engine has been started.	6	35C-32
	The ASC-OFF indication lamp does not turn on even if the ASC switch is continuously pressed to the OFF side while the engine is idling.	7	35C-33
The ABS warning lamp display does not operate correctly.	The ABS warning lamp does not turn on when the ignition switch is turned to ON.	8	35C-34
	The ABS warning lamp stays on after the engine has been started.	9	35C-35
	The ABS warning lamp does not turn on when the ignition switch is turned to START.	10	35C-35
The brakes do not operate correctly.		11	35C-36
Malfunction of TCL operation	ASC/TCL operation lamp illuminates in the TCL operation range, but torque is not reduced.	12	35C-36
Poor starting Poor acceleration	Engine output is reduced in the TCL non-operation range (ASC/TCL operation lamp does not illuminate) and starting and acceleration performance is poor.		

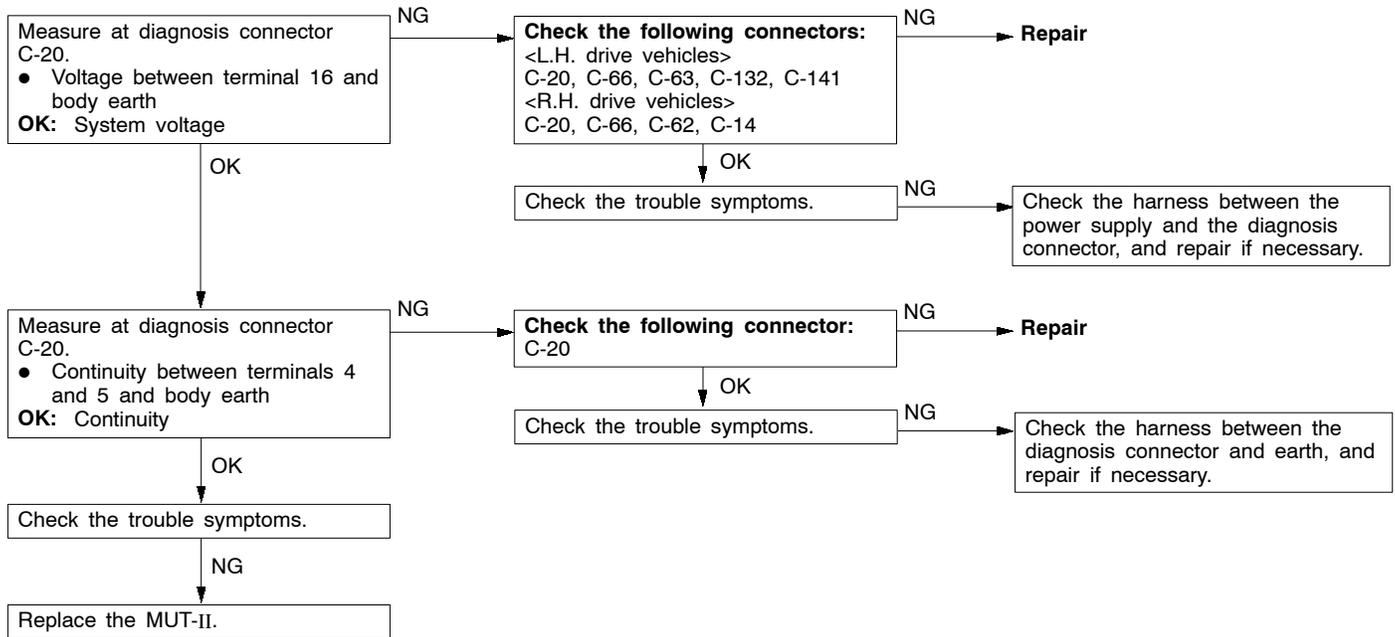
**Caution**

- (1) **The brake operation feeling changes (kickback conditions) during ASC operation in the same way as it changes during ABS operation. This happens because hydraulic pressure for certain wheels is being forced to increase or decrease, causing intermittent changes in the brake line pressure, and is not a sign of a problem.**
- (2) **The ASC system does not operate while the brake warning lights are on (such as if the brake fluid level is low or the parking brake has been applied).**

**INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS**

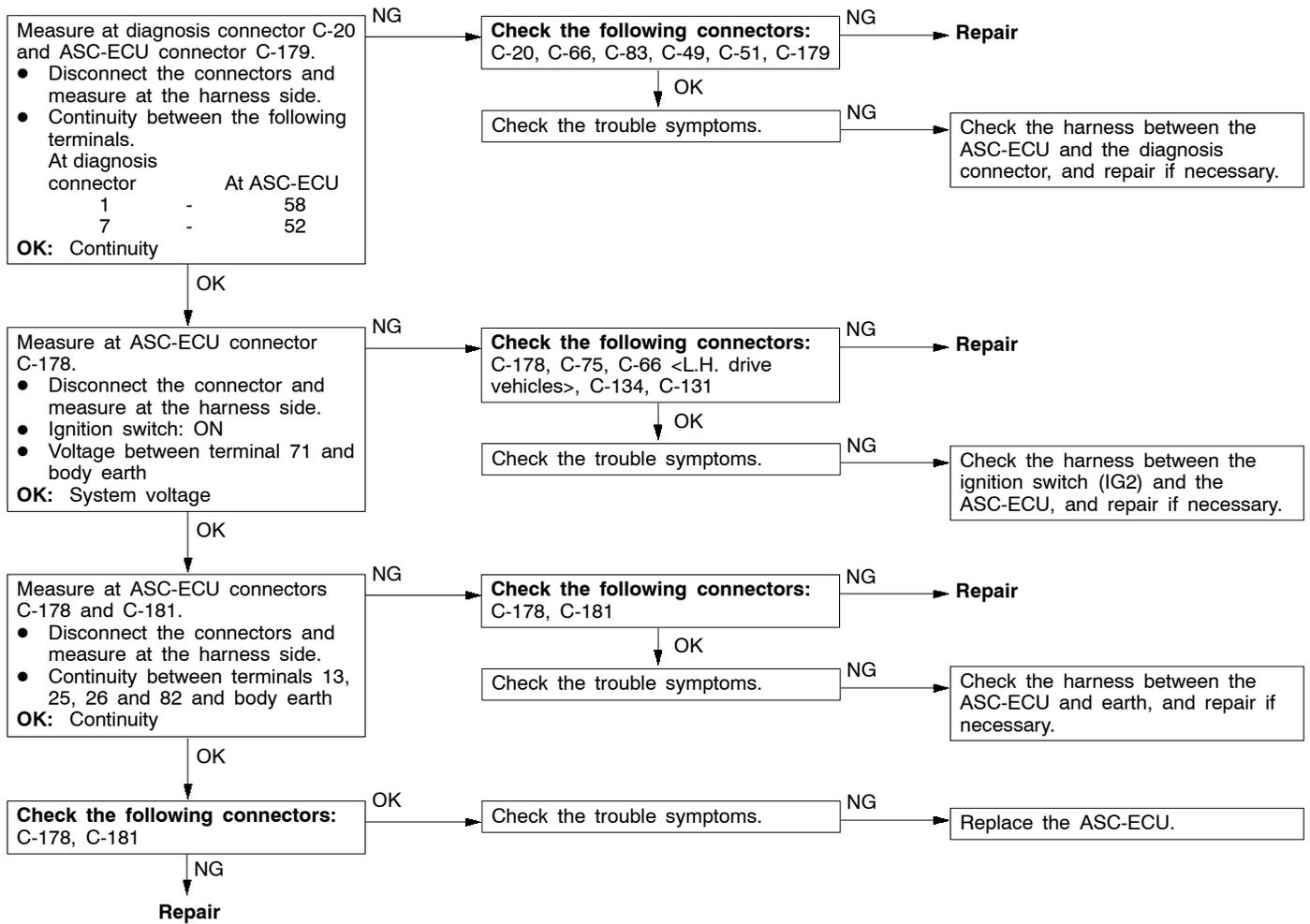
**Inspection procedure 1**

Communication is not possible between the MUT-II and all other systems.	Probable cause
The cause is probably a malfunction of the power supply circuit or earth circuit for the diagnosis connector.	<ul style="list-style-type: none"> <li>● Malfunction of diagnosis connector</li> <li>● Malfunction of harness or connector</li> </ul>



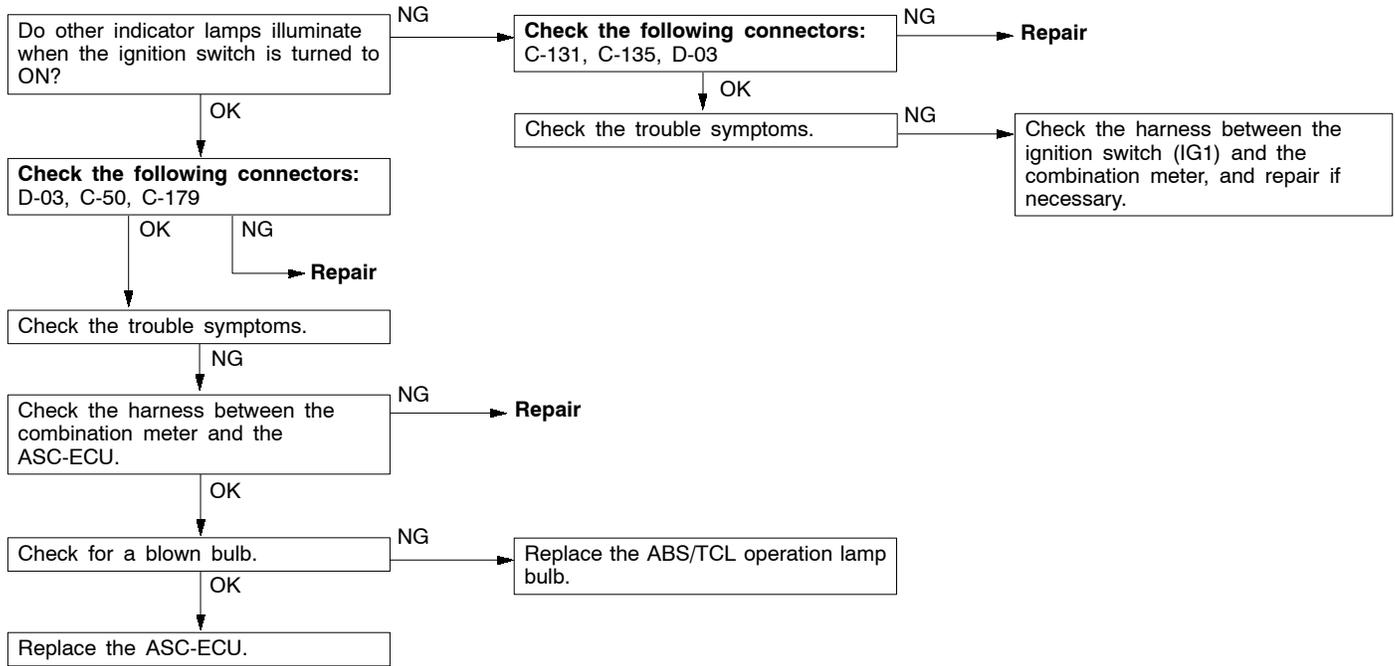
Inspection procedure 2

Communication is not possible between the MUT-II and the ASC-ECU.	Probable cause
The cause is probably an open circuit in the ASC-ECU power supply circuit or an open circuit in the diagnosis output circuit.	<ul style="list-style-type: none"> <li>● Blown fuse</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of ABS-ECU</li> </ul>



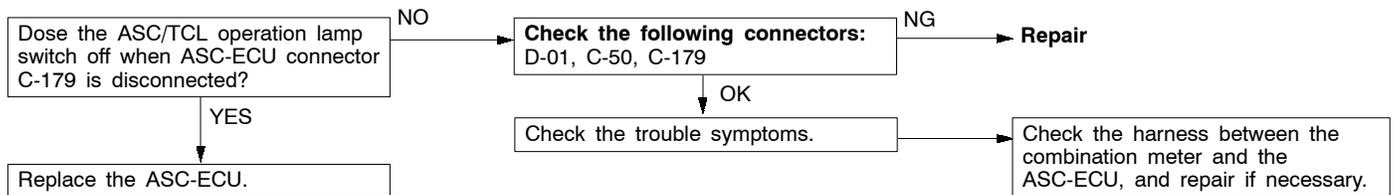
**Inspection procedure 3**

The ASC/TCL operation lamp does not turn on when the ignition switch is turned to ON.	Probable cause
The cause is usually an open circuit in the indicator circuit because of something such as a blown bulb.	<ul style="list-style-type: none"> <li>● Malfunction of harness or connector</li> <li>● Malfunction of ASC-ECU</li> <li>● Malfunction of indicator bulb</li> </ul>



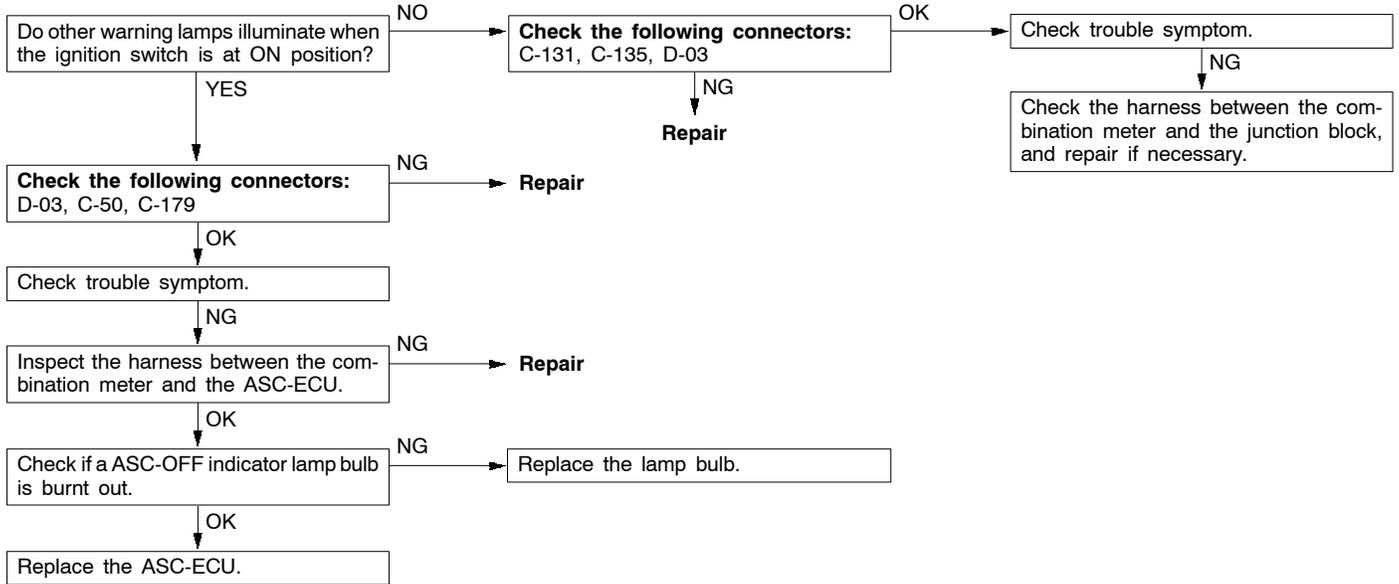
**Inspection procedure 4**

The ASC/TCL operation lamp stays on after the engine has been started.	Probable cause
The cause is probably a short-circuit in the ASC/TCL operation lamp illumination circuit.	<ul style="list-style-type: none"> <li>● Malfunction of harness or connector</li> <li>● Malfunction of ASC-ECU</li> </ul>



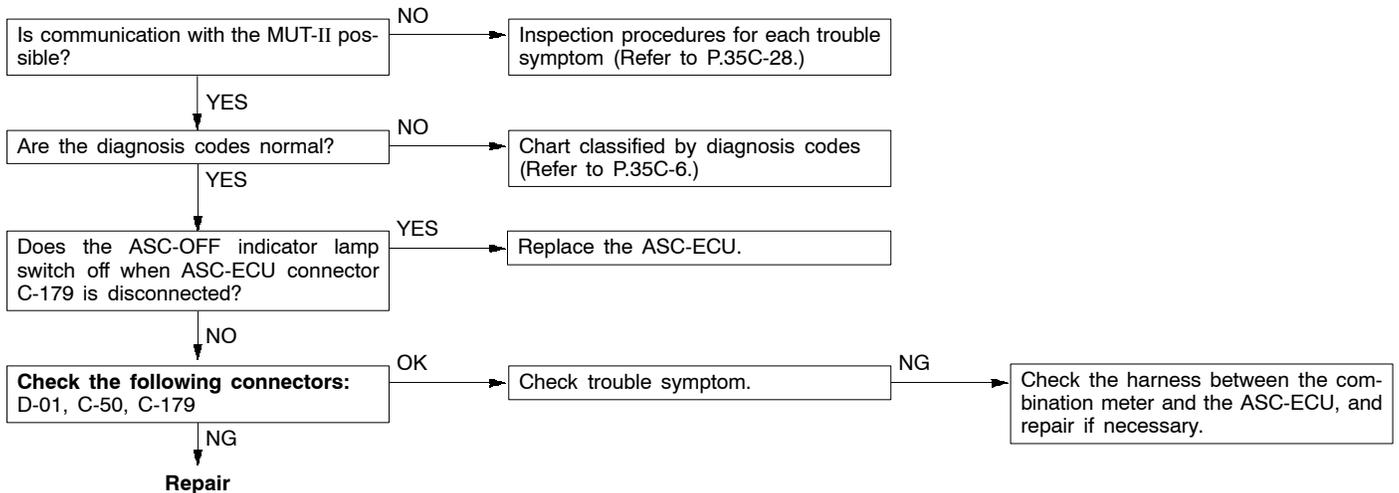
**Inspection Procedure 5**

<b>The ASC-OFF indication lamp does not turn on when the ignition switch is turned to ON.</b>	<b>Probable cause</b>
The main cause is an open circuit in the indicator circuit because of a burnt-out indicator lamp bulb.	<ul style="list-style-type: none"> <li>● Malfunction of harness or connector</li> <li>● Malfunction of ASC-ECU</li> <li>● Malfunction of indicator lamp bulb</li> </ul>



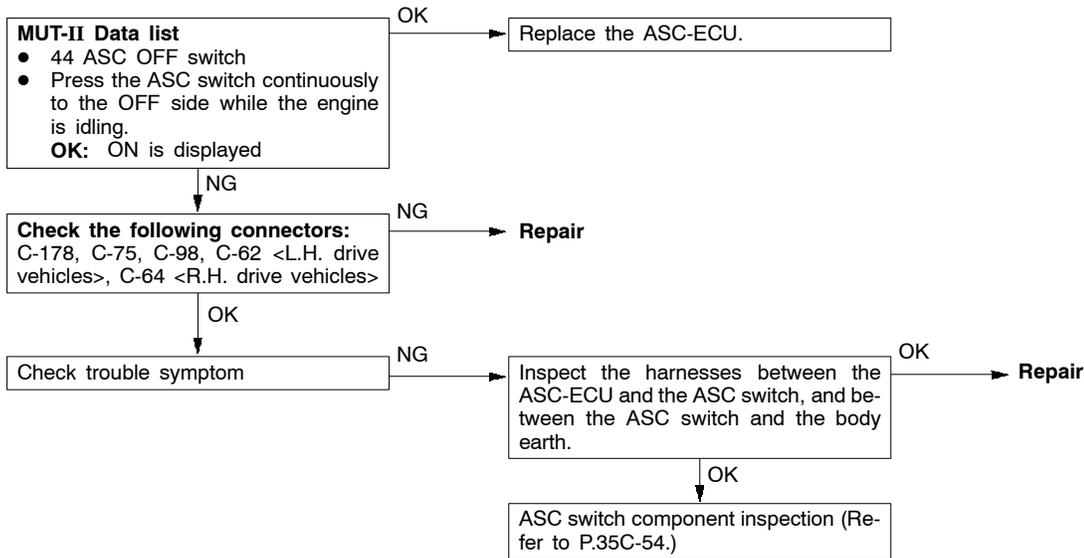
**Inspection Procedure 6**

<b>ASC-OFF indicator lamp stays on after the engine has been started.</b>	<b>Probable cause</b>
The ASC-OFF indication lamp also serve as a system warning lamp. This indication lamp illuminates when there is a problem with the system.	<ul style="list-style-type: none"> <li>● Other system related to the ASC</li> <li>● Malfunction of harness or connector</li> </ul>



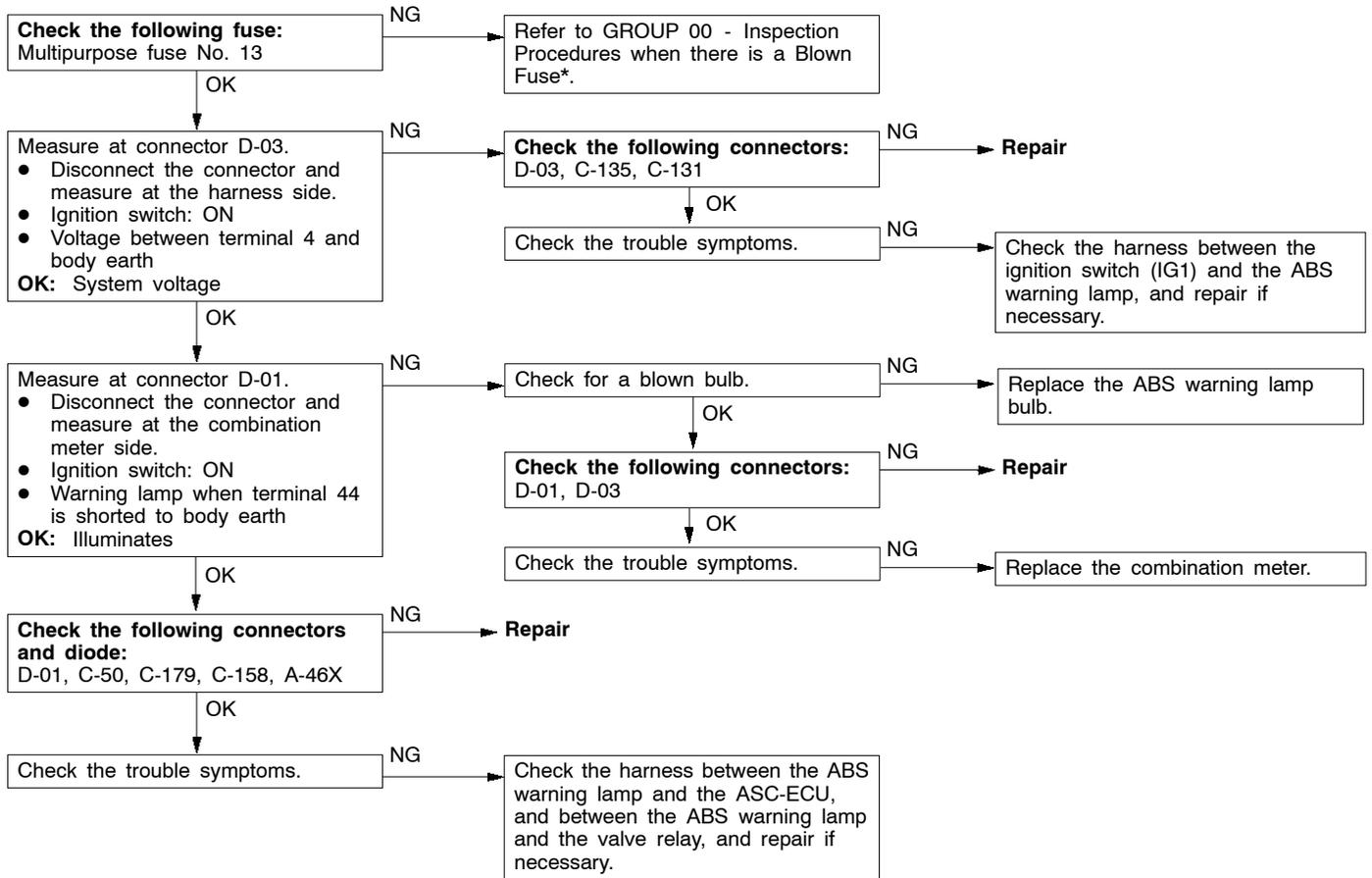
**Inspection Procedure 7**

<p><b>The ASC-OFF indication lamp does not turn on even if the ASC switch is continuously pressed to the OFF side while the engine is idling.</b></p>	<p><b>Probable cause</b></p>
<p>If the indicator lamp does not illuminate when the switch is operated, there is a malfunction in the switch, switch circuit or in the ASC-ECU.</p>	<ul style="list-style-type: none"> <li>● Malfunction of harness or connector</li> <li>● Malfunction of ASC switch</li> <li>● Malfunction of ASC-ECU</li> </ul>



Inspection procedure 8

The ABS warning lamp does not turn on when the ignition switch is turned to ON (engine stopped).	Probable cause
<p>When power is being supplied to the ASC power supply, the valve relay changes from OFF to ON, OFF and ON again as part of the initial check. Because of this, the ABS warning lamp illuminates twice when the valve relay is off, even if there is a problem in the circuit between the ABS warning lamp and the ASC-ECU.</p> <p>Accordingly, if the lamp does not illuminate, the cause may be an open circuit in the lamp power supply circuit, a blown lamp bulb, or an open circuit in the circuits between the ABS warning lamp and the ASC-ECU or between the ABS warning lamp and the valve relay.</p>	<ul style="list-style-type: none"> <li>● Blown fuse</li> <li>● Blown ABS warning lamp bulb</li> <li>● Malfunction of harness or connector</li> </ul>



NOTE

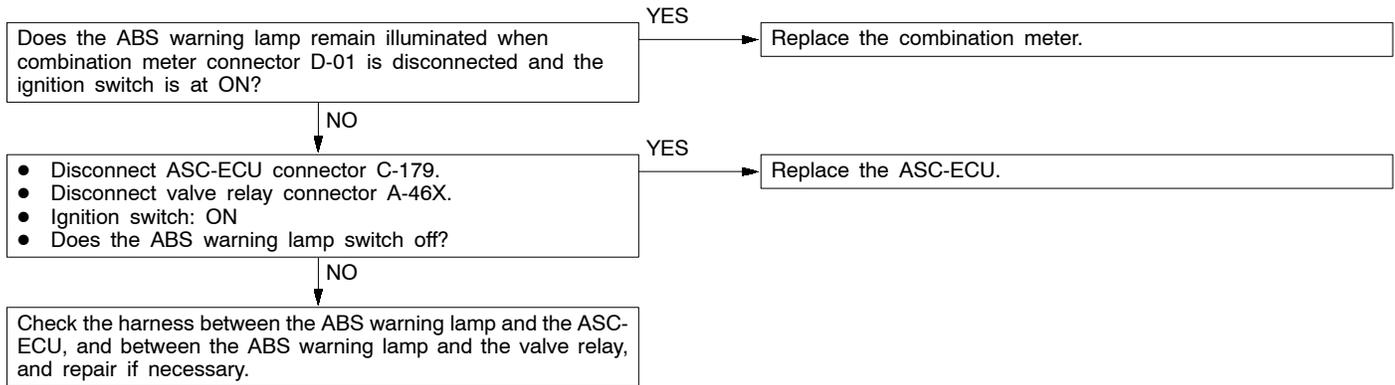
\*: Refer to '97 GALANT Workshop Manual.

**Inspection procedure 9**

The ABS warning lamp stays on after the engine has been started.	Probable cause
The cause is probably a short-circuit in the ABS warning lamp illumination circuit.	<ul style="list-style-type: none"> <li>● Malfunction of combination meter</li> <li>● Malfunction of ASC-ECU</li> <li>● Malfunction of harness (short-circuit)</li> </ul>

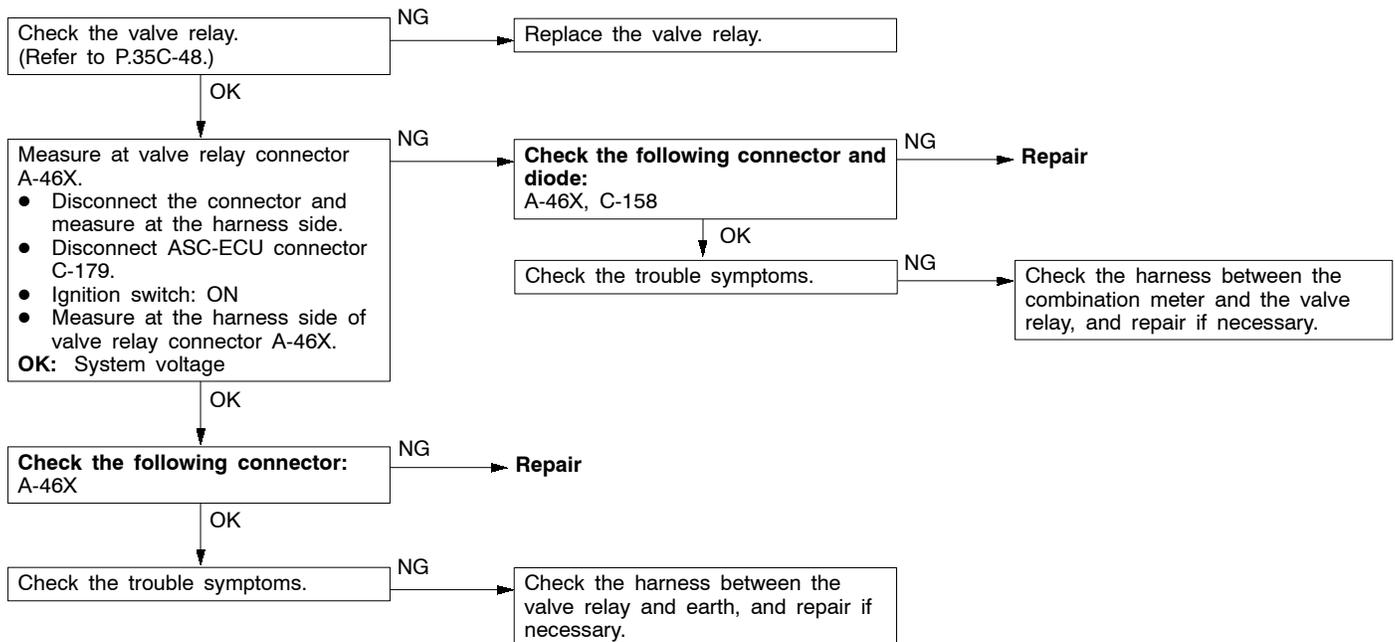
**NOTE**

This trouble symptom is limited to cases where communication with the MUT-II is possible (ASC-ECU power supply is normal) and a normal diagnosis code is output.



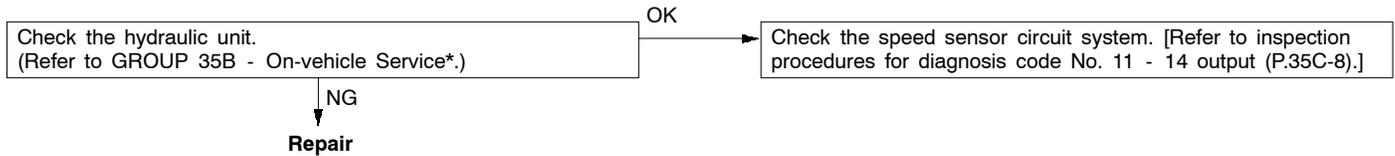
**Inspection procedure 10**

The ABS warning lamp does not turn on when the ignition switch is turned to START.	Probable cause
The ASC-ECU uses the IG2 power supply which is turned off when the ignition switch is at the START position. The ABS warning lamp uses the IG1 power supply which is not turned off when the ignition switch is at the START position. Thus the problem is with the lamp illumination circuit at the valve relay side.	<ul style="list-style-type: none"> <li>● Malfunction of valve relay</li> <li>● Malfunction of harness or connector</li> </ul>



## Inspection procedure 11

The brakes do not operate correctly.	Probable cause
The brake operating feel can change according to the driving conditions and road surface conditions, so it is difficult to judge that there is a problem, but if there is no diagnosis code output, carry out the following inspection.	<ul style="list-style-type: none"> <li>● Incorrect speed sensor installation</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of ABS rotor</li> <li>● Foreign material sticking to speed sensor</li> <li>● Malfunction of wheel bearing</li> <li>● Malfunction of hydraulic unit</li> <li>● Malfunction of ASC-ECU</li> </ul>



## NOTE

\*: Refer to '97 GALANT Workshop Manual.

## Inspection Procedure 12

<b>ASC/TCL operation lamp illuminates in the TCL operation range, but torque is not reduced.</b> <b>Engine output is reduced in the TCL non-operation range (ASC/TCL operation lamp does not illuminate) and starting and acceleration performance is poor.</b>	Probable cause
In cases such as the above, the electrical system is normal, and the cause is probably an abnormality in the mechanical system (vacuum actuator).	<ul style="list-style-type: none"> <li>● Malfunction of vacuum solenoid valve</li> <li>● Malfunction of ventilation solenoid valve</li> <li>● Malfunction of vacuum actuator</li> <li>● Incorrect vacuum hose connector</li> <li>● Malfunction of throttle link</li> <li>● Malfunction of vacuum tank</li> <li>● Blocked air cleaner element</li> </ul>

As the cause is probably a malfunction of the vacuum actuator system, carry out inspection of the following items in order.

- Vacuum solenoid valve operation inspection (Refer to GROUP 13A - On-vehicle Service.)\*
- Ventilation solenoid valve operation inspection (Refer to GROUP 13A - On-vehicle Service.)\*
- Disconnected or mis-connected vacuum hose inspection (Refer to GROUP 13A - On-vehicle Service.)\*
- Throttle link operation inspection (Refer to GROUP 13A - On-vehicle Service.)\*
- Vacuum tank inspection (Refer to GROUP 13A - On-vehicle Service.)\*
- Air cleaner element blockage inspection

## NOTE

\*: Refer to '97 GALANT Workshop Manual.

**DATA LIST REFERENCE TABLE**

The following ECU input data can be read by the MUT-II.

No.	Inspection item	Inspection contents		Normal condition
11	FR wheel speed	Actual driving		Speedometer display and MUT-II display are the same
12	FL wheel speed			
13	RR wheel speed			
14	RL wheel speed			
17	Engine speed	Engine: Idling		Tachometer display and MUT-II display are the same
18	ASC-ECU power supply and voltage	Ignition switch: ON		9 - 16 V
20	Lateral G sensor	Vehicle stopped		2.4 - 2.6 V
		Actual driving		Display value increases and decreases around 2.5 V
21	Yaw rate sensor	Vehicle stopped		2.4 - 2.6 V
		Actual driving	Turning to the right	2.4 - 4.7 V
			Turning to the left	0.3 - 2.6 V
22	Steering angle	Steering wheel position	Turned 90° to the right	+90°
			Turned 90° to the left	-90°
24	Master cylinder pressure sensor	Brake pedal position	Fully closed	Approx. 0.5 V
			Depressed	Increases to max. 4.5 V from the above value
28	Engine type	Ignition switch: ON		6A13
29	Engine specification 3	Ignition switch: ON		Normal
30	Engine specification 2	Ignition switch: ON		N/A
31	Engine specification 1	Ignition switch: ON		SOHC
32	Destination	Ignition switch: ON		EC
36	Stop lamp switch	Brake pedal position	Depressed	ON
			Released	OFF
41	Steering sensor (ST-N)	Steering wheel position Engine started	Neutral position	ON
			Turned 90° from neutral position	OFF
42	Steering sensor (ST-1)	Steering wheel position: Turned slowly to the left		Display alternates between OFF and ON
43	Steering sensor (ST-2)	Steering wheel position: Turned slowly to the right		Display alternates between OFF and ON

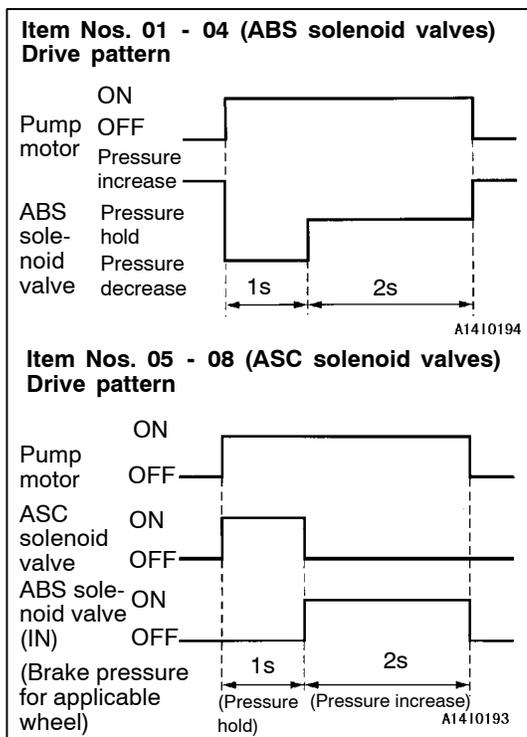
No.	Inspection item	Inspection contents	Normal condition	
44	ASC-OFF switch	ASC-OFF switch operation	Pressed	ON
			Released	OFF
45	ASC-ON switch	ASC-ON switch operation	Pressed	ON
			Released	OFF
46	Slip control	ASC switch: ON Driving on low i road	ASC/TCL operation lamp ON	ON
			ASC/TCL operation lamp OFF	OFF
65	TPS system	Accelerator pedal position Ignition switch: ON Selector lever position: P	Fully closed	300 - 1000 mV
			Depressed	Gradually increases from above value
			Fully open	4500 - 5500 mV
67	APS system	Accelerator pedal position Ignition switch: ON Selector lever position: P	Fully closed	300 - 1000 mV
			Depressed	Gradually increases from above value
			Fully open	4500 - 5500 mV
74	Trace control	ASC switch: ON Driving on low i road	ASC/TCL operation lamp ON	ON
			ASC/TCL operation lamp OFF	OFF
75	Idle switch	Accelerator pedal position	Fully closed	ON
			Fully open	OFF
76	Ignition switch	Ignition switch position	ON	ON
			OFF	OFF
77	Accumulator stroke switch (FR - RL)	Accumulator pressure (FR - RL) Held	ON	
		Accumulator pressure (FR - RL) Released	OFF	
78	Accumulator stroke switch (FL - RR)	Accumulator pressure (FL - RR) Held	ON	
		Accumulator pressure (FL - RR) Released	OFF	

## NOTE

The pressure inside the accumulators can be held and released by carrying out actuator tests. (Refer to P.35C-39.)

### ACTUATOR TEST REFERENCE TABLE

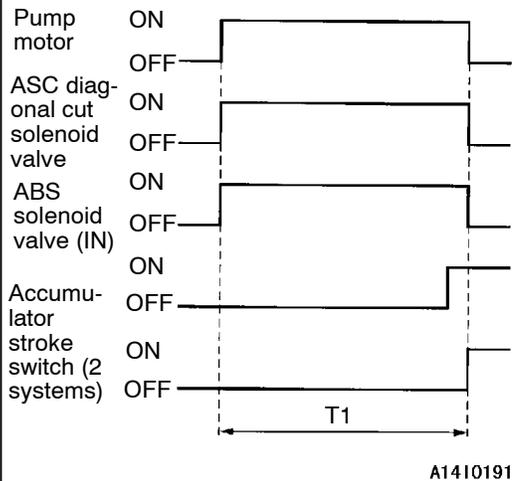
The MUT-II can be used to force-drive components in order to carry out the following actuator tests.



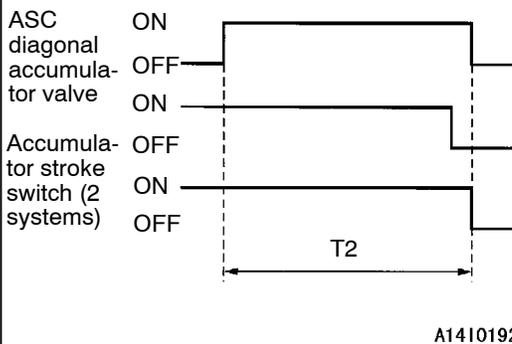
### Actuator test specifications

Item No.	Inspection item	Details
01	ABS solenoid valve (front-right) control	*1 Drives the ABS solenoid valves and pump motor for each channel in the hydraulic unit.
02	ABS solenoid valve (front-left) control	
03	ABS solenoid valve (rear-right) control	
04	ABS solenoid valve (rear-left) control	
05	ASC solenoid valve (front-right) control *4	*2 Drives the ASC solenoid valves, ABS solenoid valves and the pump motor. The wheel which is diagonally opposite the wheel being driven (example: the rear-left wheel when the front-right wheel is being driven) is set to holding mode.
06	ASC solenoid valve (front-left) control *4	
07	ASC solenoid valve (rear-right) control *4	
08	ASC solenoid valve (rear-left) control *4	
09	TCL throttle	*3 A torque request 0 signal and a fully-close instruction are sent to the engine-ECU for 3 seconds. Furthermore, service data item No. 65 APS and No. 67 TPS are displayed at the same time.

**Item No. 16 (Accumulator pressure holding) Drive pattern**



**Item No. 17 (Accumulator pressure reduction) Drive pattern**



Item No.	Inspection Item	Details
12	Pump motor	*1 The pump motor is driven for approximately 2 seconds.
16	Accumulator pressure holding	*2 The ASC solenoid valves (diagonal cut valves) and the pump motor are driven to that pressure builds up in the accumulator. Furthermore, service data Nos. 77 and 78 (accumulator stroke switches) are displayed at the same time.
17	Accumulator pressure reduction	The ASC solenoid valves (diagonal booster valves) and the pump motor are driven to that pressure is reduced in the accumulator. Furthermore, service data Nos. 77 and 78 (accumulator stroke switches) are displayed at the same time.

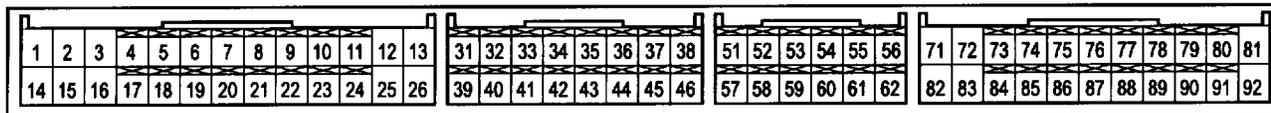
**NOTE**

- \*1: Actuator testing cannot be carried out if the ABS is in fail-safe mode, or if the speed of the fast of the four wheels is 10 km/h or more. In addition, the ABS warning lamp will flash and all control operations will be stopped during actuator testing.
  - \*2: Actuator testing cannot be carried out if the ASC is in fail-safe mode, or if the speed of the fast of the four wheels is 10 km/h or more. In addition, the ASC/TCL operation lamp will flash and all control operations will be stopped during actuator testing.
  - \*3: Actuator testing cannot be carried out if the TCL is in fail-safe mode, or if the speed of the fast of the four wheels is 10 km/h or more. In addition, the ASC/TCL operation lamp will flash and all control operations will be stopped during actuator testing.
  - \*4: The ASC solenoid valves indicate the diagonal cut valves and diagonal accumulator valves. Only the valves for the applicable wheel are driven during actuator testing.
- T1: Driven until the two accumulator stroke switch systems both turn on. (Driven for a maximum of 10 seconds if the systems do not turn on.)
- T2: Driven until the two accumulator stroke switch systems both turn off. (Driven for a maximum of 10 seconds if the systems do no turn off.)

**CHECK AT ASC-ECU**

**TERMINAL VOLTAGE CHECK CHART**

- (1) Voltage measurements are taken between each terminal and earth.
- (2) The terminal layout is shown in the diagram below.



X0131BE

Terminal No.	Check item	Check condition	Normal condition
1	ABS solenoid valve OUT (FL)	Ignition switch: ON (when initial check is complete)	System voltage
2	ABS solenoid valve OUT (RR)	Ignition switch: ON (when initial check is complete)	System voltage
3	Diagonal booster valve (FL - RR)	Ignition switch: ON (when initial check is complete)	System voltage
5	A/T-ECU data transmission	Engine: Idling	Other than 0 V
6	Engine-ECU data transmission	Engine: Idling	Other than 0 V
8	Lateral G sensor input	Ignition switch: ON	2.4 - 2.6 V (when horizontal)
10	Yaw rate sensor	Ignition switch: ON	2.4 - 2.6 V (when stopped)
11	Yaw rate sensor earth	At all times	0.5 V or less
12	Master cylinder pressure sensor and accumulator stroke switch power supply	Ignition switch: ON	4.8 - 5.2 V
13	ECU earth	At all times	1 V or less
14	ABS solenoid valve IN (FR)	Ignition switch: ON (when initial check is complete)	System voltage
15	ABS solenoid valve IN (RL)	Ignition switch: ON (when initial check is complete)	System voltage
16	Diagonal booster valve (FL - RR)	Ignition switch: ON (when initial check is complete)	System voltage
18	A/T-ECU data transmission	Engine: Idling	Other than 0 V
19	Engine-ECU data transmission	Engine: Idling	Other than 0 V
21	Lateral G sensor earth	At all times	0.5 V or less
23	Master cylinder pressure sensor earth	At all times	0.5 V or less

Terminal No.	Check item	Check condition		Normal condition
24	Master cylinder pressure sensor input	Ignition switch: ON Brake pedal depressed		0.4 - 4.5 V
25	ECU earth	At all times		1 V or less
26	ECU earth	At all times		1 V or less
31	Stop lamp switch	Ignition switch: ON	Stop lamp switch: ON	System voltage
			Stop lamp switch: OFF	1 V or less
36	Steering sensor (ST-1)	Engine: Idling Steering wheel turned slowly		Flashing between approx. 1.5 V and approx. 3.5 V
37	Steering sensor (ST-2)	Engine: Idling Steering wheel turned slowly		Flashing between approx. 1.5 V and approx. 3.5 V
38	ASC-ECU power supply	Ignition switch: ON		System voltage
39	APS	Ignition switch: ON	Accelerator pedal: Fully closed	0.3 - 1.0 V
			Accelerator pedal: Fully open	4.5 - 5.5 V
44	Steering sensor (ST-N)	Engine: Idling	Steering wheel: Neutral position	1.3 - 2.0 V
			Steering wheel: Turned 90° from neutral position	3.0 - 4.1 V
51	ECU backup power supply	At all times		System voltage
52	Diagnosis data input/output	When MUT-II is connected		Serial communication with MUT-II
		When MUT-II is not connected		1 V or less
53	Motor monitoring input	Ignition switch: ON	When motor is on	System voltage
			When motor is on	1 V or less
54	Valve relay monitoring input	Ignition switch: ON		System voltage
55	ABS warning lamp	Ignition switch: ON	When lamp is off	System voltage
			When lamp is on	1 V or less
56	ASC-OFF indicator	Ignition switch: ON	When lamp is off	System voltage
			When lamp is on	1 V or less
58	Diagnosis selection input	When MUT-II is connected		1 V or less
		When MUT-II is not connected		System voltage

Terminal No.	Check item	Check condition		Normal condition
62	ASC/TCL operation lamp	Ignition switch: ON	When lamp is off	System voltage
			When lamp is on	1 V or less
71	ASC-ECU power supply	Ignition switch: ON		System voltage
		Ignition switch: START		0 V
72	Motor relay output	Ignition switch: ON	When motor is on	1 V or less
			When motor is off	System voltage
73	Valve relay output	Ignition switch: ON	When relay turns on approx. 1 second after engine starts	1 V or less
			When system problem detection relay is OFF	System voltage
74	Backup lamp switch input <M/T>	Ignition switch: ON	Shift lever: Reverse	System voltage
			Shift lever: Other than above	1 V or less
78	Diagonal cut valve (FR - RL)	Ignition switch: ON (when initial check is complete)		System voltage
79	Diagonal cut valve (FL - RR)	Ignition switch: ON (when initial check is complete)		System voltage
80	ABS solenoid valve OUT (RL)	Ignition switch: ON (when initial check is complete)		System voltage
81	ABS solenoid valve OUT (FR)	Ignition switch: ON (when initial check is complete)		System voltage
82	ECU earth	At all times		1 V or less
83	ASC-OFF switch	Ignition switch: ON	ASC switch: Pressed to ON	1 V or less
			ASC switch: Released	System voltage
85	M/T identification input	At all times		1 V or less
86	ASC-ON switch	Ignition switch: ON	ASC switch: Pressed to ON	1 V or less
			ASC switch: Released	System voltage
88	Brake warning lamp	Ignition switch: ON	When lamp is off	System voltage
			When lamp is on	1 V or less
89	Accumulator stroke switch (FR - RL)	Ignition switch: ON	Accumulator pressure*: Held	4.5 - 5.5 V
			Accumulator pressure*: Released	0 V

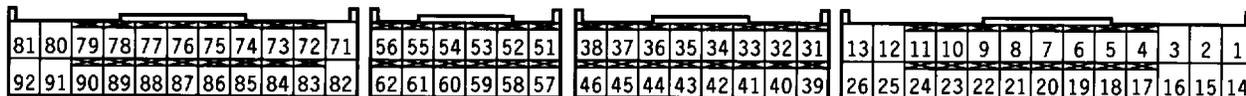
Terminal No.	Check item	Check condition	Normal condition
90	Accumulator stroke switch (FI - RR)	Ignition switch: ON	Accumulator pressure*: Held 4.5 - 5.5 V
			Accumulator pressure*: Released 0 V
91	ABS solenoid valve IN (RL)	Ignition switch: ON (when initial check is complete)	System voltage
92	ABS solenoid valve IN (FR)	Ignition switch: ON (when initial check is complete)	System voltage

## NOTE

\*: The pressure inside the accumulators can be held and released by carrying out actuator tests. (Refer to P.35C-39.)

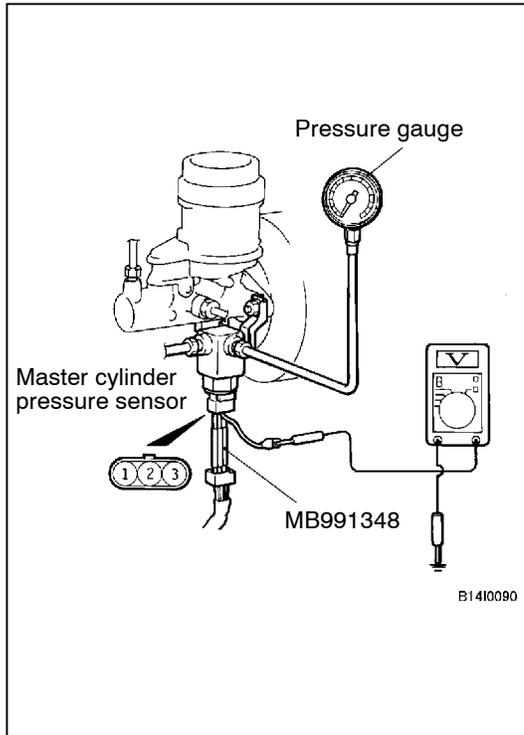
**RESISTANCE AND CONTINUITY BETWEEN HARNESS-SIDE CONNECTOR TERMINALS CHART**

- (1) Resistance measurements and continuity checks should be carried out with the ignition switch at OFF and the ASC-ECU connector disconnected.
- (2) Resistance measurements and continuity checks should be made between the terminals indicated below.
- (3) The square terminal layout is shown in the diagram below.



1410076

Terminal No.	Signal name	Normal condition
1 - Body earth	ABS OUT solenoid valve (FL)	3.1 - 3.4 Ω
2 - Body earth	ABS OUT solenoid valve (RR)	3.1 - 3.4 Ω
3 - Body earth	Diagonal booster valve (FR - RL)	6.3 - 6.9 Ω
13 - Body earth	ECU earth	Continuity
14 - Body earth	ABS IN solenoid valve (FL)	6.3 - 6.9 Ω
15 - Body earth	ABS IN solenoid valve (RR)	6.3 - 6.9 Ω
16 - Body earth	Diagonal booster valve (FL - RR)	6.3 - 6.9 Ω
25 - Body earth	ECU earth	Continuity
26 - Body earth		
32 - 40	Wheel speed sensor (RL)	1.0 - 1.5 kΩ
33 - 41	Wheel speed sensor (FR)	1.0 - 1.5 kΩ
34 - 42	Wheel speed sensor (RR)	1.0 - 1.5 kΩ
35 - 43	Wheel speed sensor (FL)	1.0 - 1.5 kΩ
53 - Body earth	Motor monitoring	Continuity
54 - Body earth	Valve relay monitoring	Continuity
78 - Body earth	Diagonal cut valve (FR - RL)	6.3 - 6.9 Ω
79 - Body earth	Diagonal cut valve (FL - RR)	6.3 - 6.9 Ω
80 - Body earth	ABS OUT solenoid valve (RL)	3.1 - 3.4 Ω
81 - Body earth	ABS OUT solenoid valve (FR)	3.1 - 3.4 Ω
85 - Body earth	M/T identification input	Continuity
82 - Body earth	ECU earth	Continuity
91 - Body earth	ABS IN solenoid valve (RL)	6.3 - 6.9 Ω
92 - Body earth	ABS IN solenoid valve (FR)	6.3 - 6.9 Ω



## ON-VEHICLE SERVICE

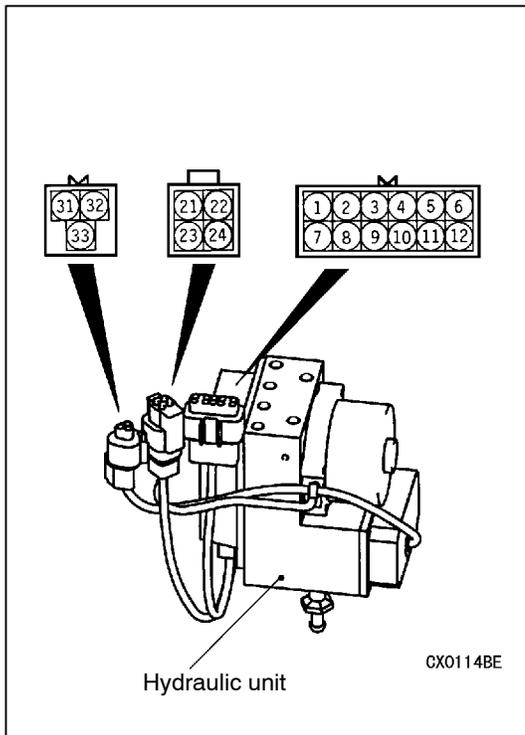
### MASTER CYLINDER PRESSURE SENSOR CHECK

1. Connect a pressure gauge to the output side of the pressure sensor's fluid line.
2. Bleed the air from the pressure sensor and the brake line.
3. Disconnect the pressure sensor connector and connect the special tool in between the connectors.
4. Start the engine and check that the output voltage between terminal (2) and earth is within the standard value range for the following hydraulic pressures when the brake pedal is depressed.

#### Standard values:

Hydraulic pressure MPa	Output voltage
0	0.4 - 0.6
9.8	2.4 - 2.6

5. If the output voltages are outside the standard value ranges, check that there are no problems in the power supply line and earth, and then replace the sensor.



## SOLENOID VALVE CHECKS

### ABS SOLENOID VALVES

1. Measure the resistances between the terminals and check that they are within the standard value ranges.

#### Standard values:

Item		Check terminals	Resistance between terminals
Front-right side	IN	11 - 22	6.3 - 6.9 Ω
	OUT	5 - 22	3.1 - 3.4 Ω
Front-left side	IN	12 - 21	6.3 - 6.9 Ω
	OUT	6 - 21	3.1 - 3.4 Ω
Rear-right side	IN	9 - 21	6.3 - 6.9 Ω
	OUT	3 - 21	3.1 - 3.4 Ω
Rear-left side	IN	10 - 22	6.3 - 6.9 Ω
	OUT	4 - 22	3.1 - 3.4 Ω

2. If the resistances between the terminals are higher than the standard values, replace the hydraulic unit.

### ASC solenoid valves

1. Measure the resistance between the terminals and check that they are within the standard value ranges.

#### Standard values:

Item		Check terminals	Resistance between terminals
Diagonal accumulator valve	FR - RL	2 - 21	3.1 - 3.4 Ω
	FL - RR	8 - 22	3.1 - 3.4 Ω
Diagonal cut valves	FR - RL	1 - 21	6.3 - 6.9 Ω
	FL - RR	7 - 22	6.3 - 6.9 Ω

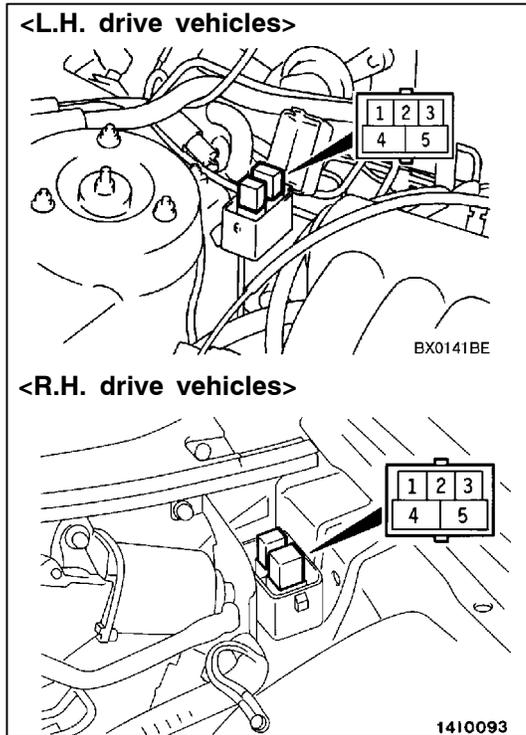
2. If the resistances between the terminals are higher than the standard values, replace the hydraulic unit.

## MOTOR OPERATION CHECK

Connect the battery (+) terminal to terminal (24) and the (-) terminal to terminal (23), and then check that the sound of the hydraulic unit motor operating can be heard.

### Caution

The battery power should not be applied for any more than 1 second.



**VALVE RELAY CONTINUITY CHECK**

Item	Terminal No.				
	1	2	3	4	5
When power is not supplied	○		○		○
When power is supplied	⊕		⊖	○	○

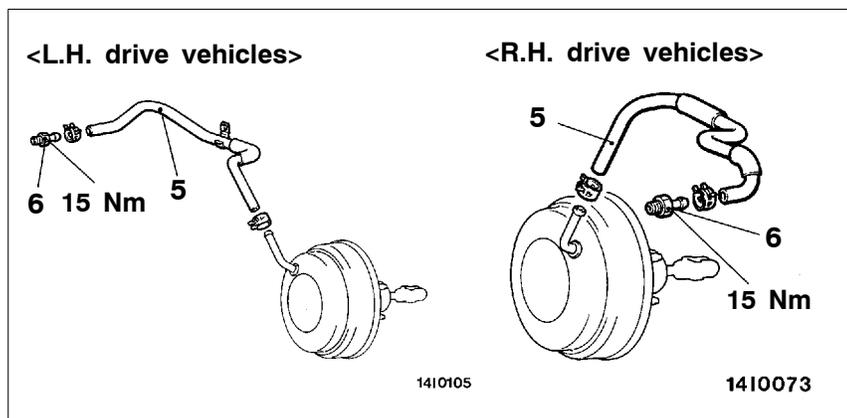
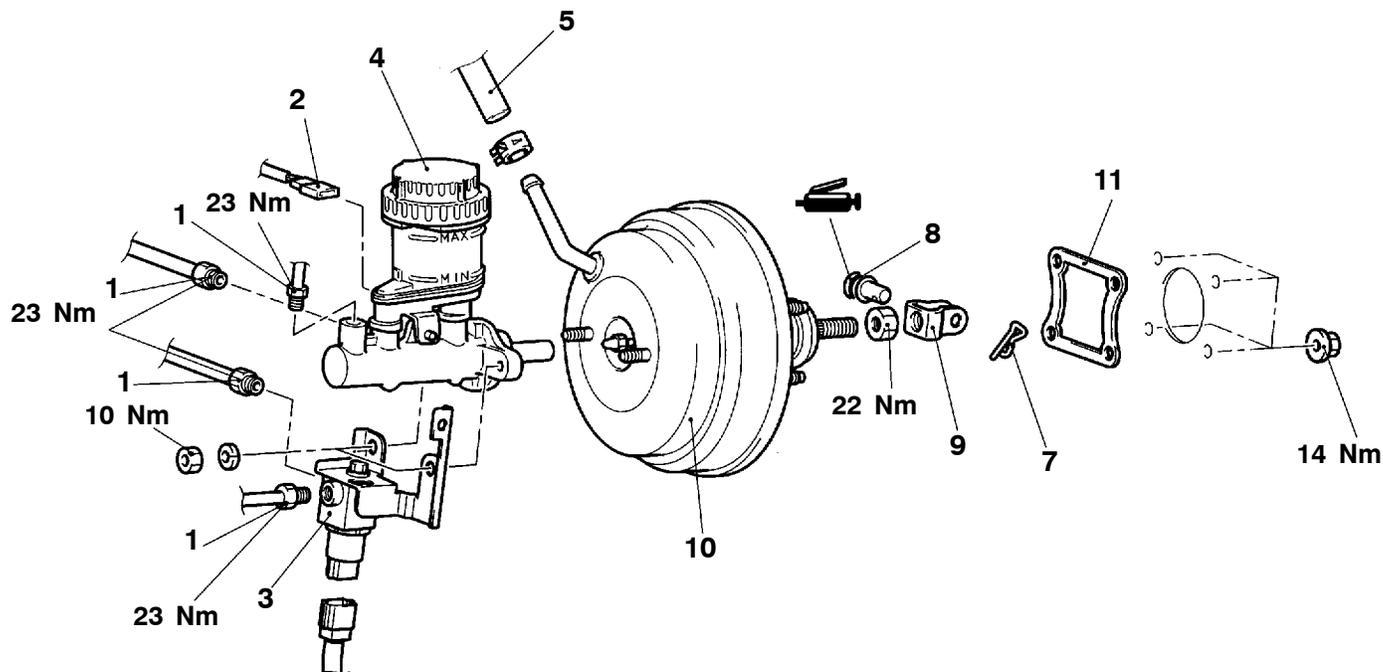
# MASTER CYLINDER AND BRAKE BOOSTER

## REMOVAL AND INSTALLATION

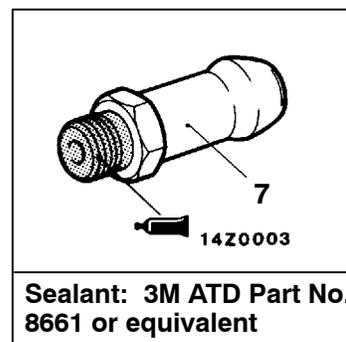
**Pre-removal Operation**  
Brake Fluid Draining

**Post-installation Operation**

- Brake Fluid Supplying
- Brake Line Bleeding
- Brake Pedal Adjustment



AX0134E



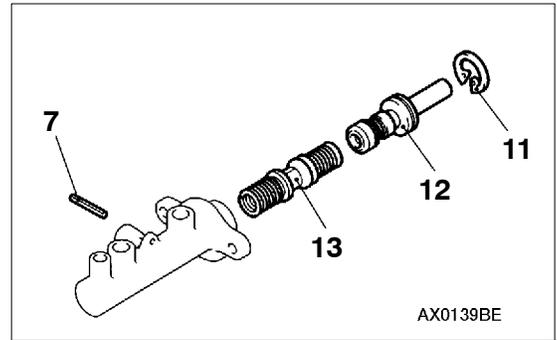
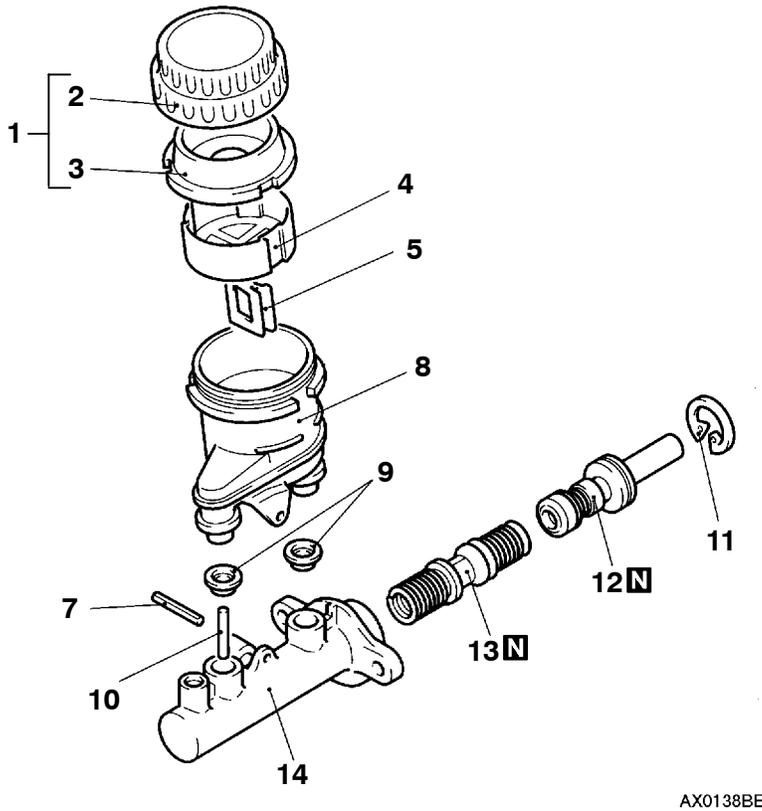
### Removal steps

1. Brake pipe connection
2. Brake fluid level sensor connector
3. Master cylinder pressure sensor
4. Master cylinder assembly
  - Push rod protruding length check and adjustment
5. Vacuum hose (with built-in check valve)
6. Fitting

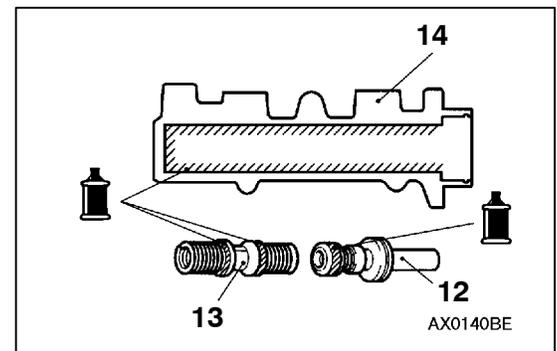
7. Snap pin
8. Pin assembly
9. Clevis
10. Brake booster
11. Sealer

**NOTE**  
Refer to GROUP 35A of the '97 GALANT Workshop Manual for installation service points.

**MASTER CYLINDER  
DISASSEMBLY AND REASSEMBLY**



**Master cylinder kit**



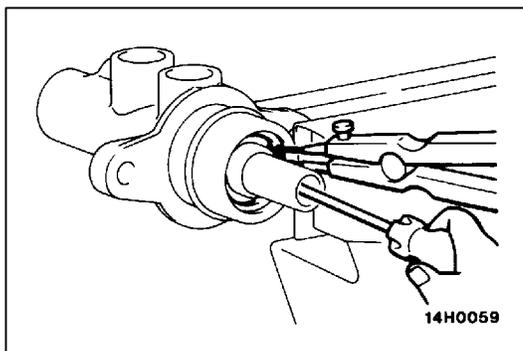
**Brake fluid: DOT3 or DOT4**

**Disassembly steps**

1. Reservoir cap assembly
2. Reservoir cap
3. Diaphragm
4. Filter
5. Brake fluid level indicator assembly
6. Float
7. Spring pin



8. Reservoir tank
9. Reservoir seal
10. Pin
11. Piston stopper ring
12. Primary piston assembly
13. Secondary piston assembly
14. Master cylinder body



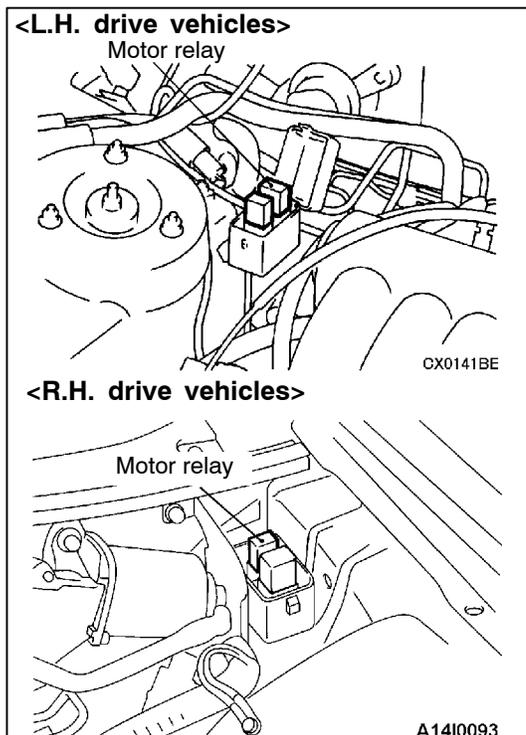
**DISASSEMBLY SERVICE POINT**

**◀A▶ PISTON STOPPER RING REMOVAL**

Remove the piston stopper ring while depressing the piston.

**INSPECTION**

- Check the inner surface of master cylinder body for rust or pitting.
- Check the primary and secondary pistons for rust, scoring, wear, damage or wear.
- Check the diaphragm for cracks and wear.



## MOTOR RELAY

### REMOVAL SERVICE POINT

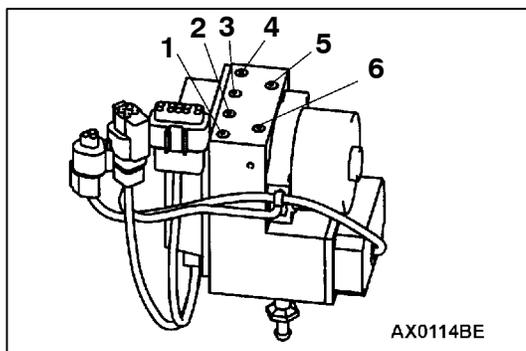
#### Caution

The motor relay may become hot immediately after driving, so take care when handling the motor relay.

## HYDRAULIC UNIT

### REMOVAL AND INSTALLATION

Refer to GROUP 35B of '97 GALANT Workshop Manual.



### INSTALLATION SERVICE POINT

#### BRAKE PIPE INSTALLATION

Install the brake pipes to the hydraulic unit as shown in the illustration.

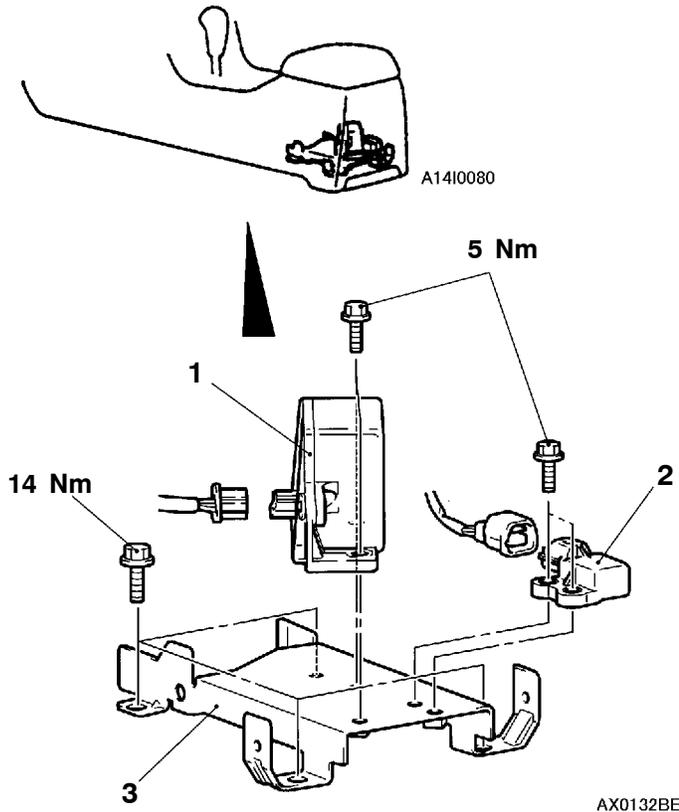
1. From master cylinder (primary)
2. To front brake (L.H.)
3. To proportioning valve (rear R.H. brake)
4. To proportioning valve (rear L.H. brake)
5. To front brake (R.H.)
6. From master cylinder (secondary)

## SENSORS

### REMOVAL AND INSTALLATION

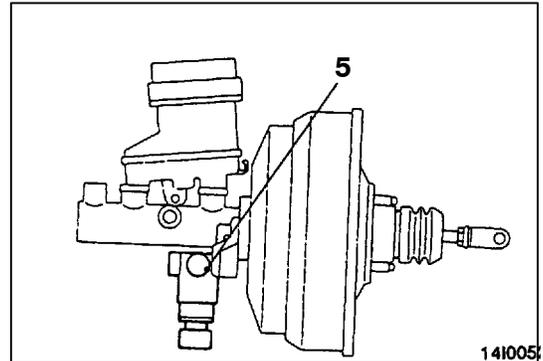
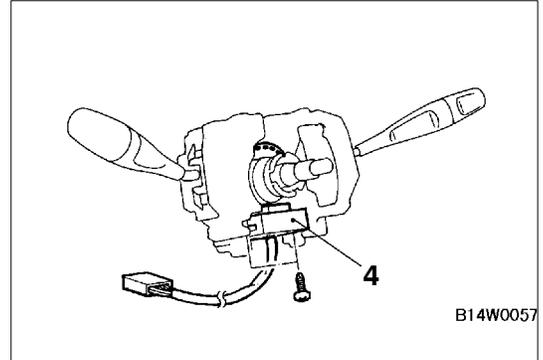
#### Caution

- (1) SRS: Before removal of air bag module and clock spring, refer to '97 GALANT Workshop Manual GROUP 52B - Service Precautions and Air Bag Module and Clock Spring.
- (2) Do not drop the sensors or subject them to shocks.



#### G sensor and yaw rate sensor removal steps

- Floor console
- 1. Yaw rate sensor
- 2. Lateral G sensor
- 3. G sensor bracket



#### Steering wheel sensor removal steps

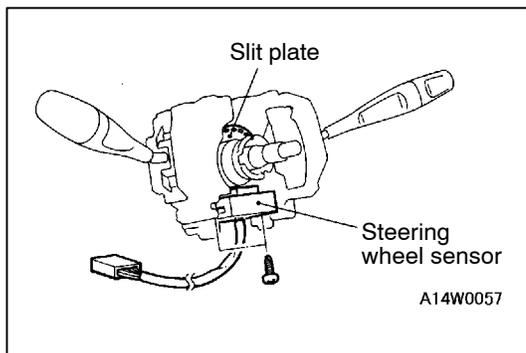
- Steering wheel and column cover (Refer to '97 GALANT Workshop Manual - GROUP 37A - Steering Wheel and Shaft.)
- 4. Steering wheel sensor

#### Pressure sensor removal steps

- 5. Master cylinder pressure sensor (Refer to P. 35C-49.)

#### NOTE

Refer to GROUP 35B of the '97 GALANT Workshop Manual for the wheel speed sensors.



## REMOVAL SERVICE POINT

### ◀▶ STEERING WHEEL SENSOR REMOVAL

#### Caution

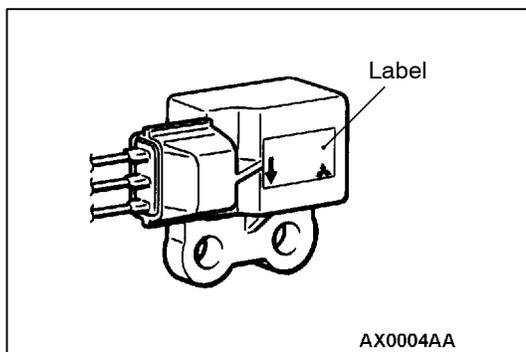
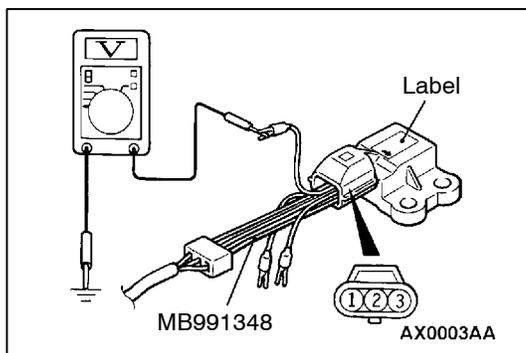
1. Do not adhere any dust or grease, etc. to the steering wheel sensor, which has a photo coupler in it.
2. Do not bend the slit plate of the column switch nor adhere any grease etc. to it.

## CHECKS

### LATERAL G SENSOR CHECK

1. Disconnect the G sensor connector and connect the special tool in between the connectors.
2. Turn the ignition switch to ON and take a reading of the output voltage between terminal No. 2 and body earth.

**Standard value: 2.4 - 2.6 V**



3. With the special tool connected, hold the sensor so that the label is facing sideways as shown in the illustration, and take a reading of the output voltage between terminal No. 2 and body earth.

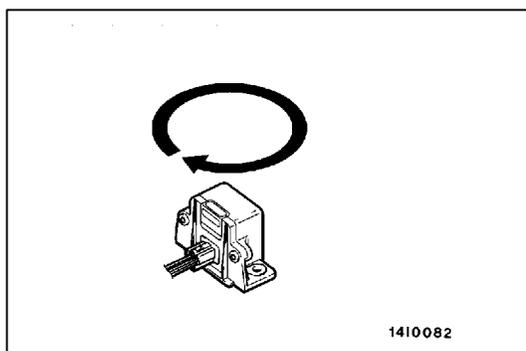
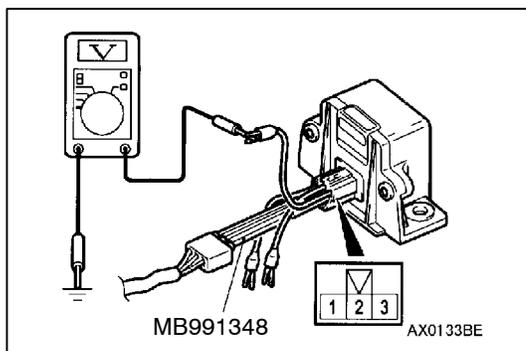
**Standard value: 3.3 - 3.7 V**

4. If the voltage is outside the standard value, check that there are no problems in the power supply line and earth, and then replace the sensor.

### YAW RATE SENSOR CHECK

1. Disconnect the yaw rate sensor connector and connect the special tool in between the connectors.
2. Turn the ignition switch to ON and take a reading of the output voltage between terminal No. 3 and body earth.

**Standard value: 2.4 - 2.6 V**



3. With the special tool connected, remove the yaw rate sensor from the G sensor bracket and take a reading of the output voltage between terminal No. 3 and body earth while turning the sensor to the left and right.

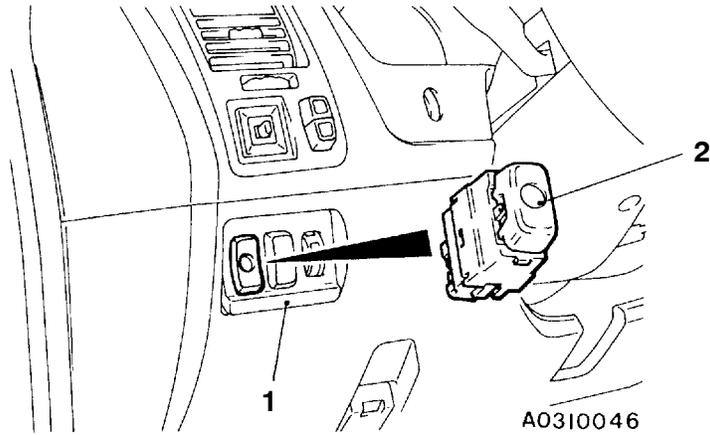
<Turned to the left> Voltage drops

<Turned to the right> Voltage rises

4. If the voltage does not drop when the sensor is turned to the left and rise when it is turned to the right, check that there are no problems in the power supply line and earth, and then replace the sensor.

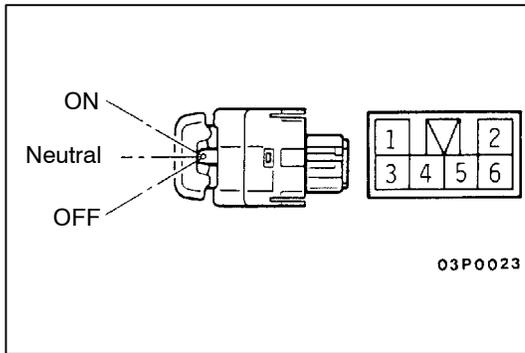
# ASC SWITCH

## REMOVAL AND INSTALLATION



### Removal steps

1. Switch bezel
2. ASC switch



### INSPECTION

#### ASC SWITCH CONTINUITY CHECK

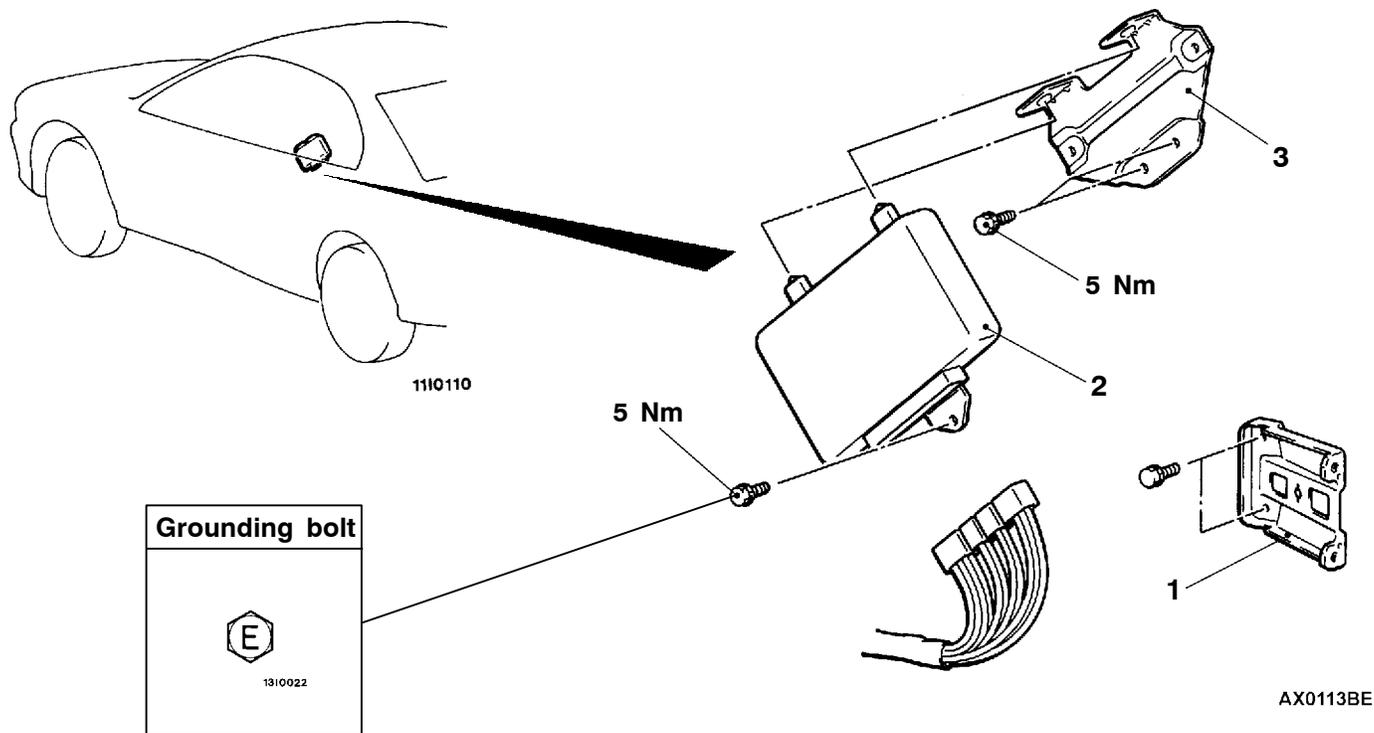
Switch position	Terminal No.						
	1	2	3	6	4	-	5
ON			○	○			
Neutral					○	○	○
OFF		○	○				

# ASC-ECU

## REMOVAL AND INSTALLATION

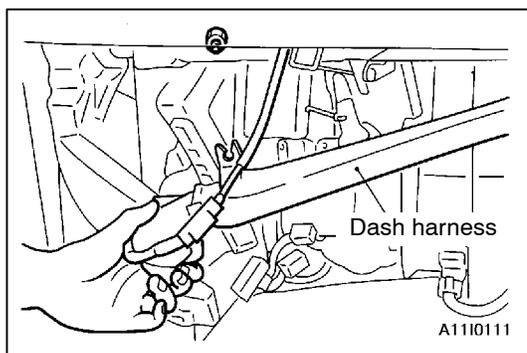
### Pre-removal and Post-installation Operations

Glove box, glove box frame, side cover and corner panel removal and installation



### Removal steps

1. Instrument panel lower passenger-side bracket
2. ASC-ECU
3. Lower bracket



### REMOVAL SERVICE POINT

#### ◀A▶ ASC-ECU REMOVAL

Loosen the dash harness mounting nut, lower the dash harness until the ASC-ECU can be removed, and then remove the ASC-ECU.

#### CHECKS

Refer to P.35C-41.