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, side impact sensors 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 (*).
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### Battery

#### Service Specification

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific gravity of the battery fluid</td>
<td>1.220 - 1.290 [20°C]</td>
</tr>
</tbody>
</table>

#### On-Vehicle Service

**Fluid Level and Specific Gravity Check**

1. Inspect whether or not the battery fluid is between the UPPER LEVEL and LOWER LEVEL marks.
2. Use a hydrometer and thermometer to check the specific gravity of the battery fluid.

**Standard value: 1.220-1.290 [20°C]**

The specific gravity of the battery fluid varies with the temperature, so use the following formula to calculate the specific gravity for 20°C. Use the calculated value to determine whether or not the specific gravity is satisfactory.

\[ D_{20} = D_t + 0.0007 (t - 20) \]

- \( D_{20} \): Specific gravity of the battery fluid calculated for 20°C.
- \( D_t \): Actually measured specific gravity
- \( t \): Actually measured temperature
CHARGING

1. When charging a battery while still installed in the vehicle, disconnect the battery cables to prevent damage to electrical parts.

2. The current normally used for charging a battery should be approximately 1/10th of the battery capacity.

3. When performing a quick-charging due to lack of time, etc., the charging current should never exceed the battery capacity as indicated in amperes.

4. Determining if charging is completed.
   (1) If the specific gravity of the battery fluid reaches 1.250 - 1.290 and remains constant for at least one hour.
   (2) If the voltage of each cell reaches 2.5 - 2.8 V and remains constant for at least one hour.

Caution
1. Be careful since the battery fluid level may rise during charging.
2. Keep all sources of fire away while charging because there is a danger of explosion.
3. Be careful not to do anything that could generate sparks while charging.
4. When charging is completed, replace the battery caps, pour clean water over the battery to remove any sulfuric acid and dry.
BATTERY TESTING PROCEDURE

TEST STEP

(1) Turn headlamps on for 15 seconds.
(2) Turn headlamps off for 2 minutes to allow battery voltage to stabilize.
(3) Disconnect cables.

OK

Read open circuit voltage.

OK: Open circuit voltage is more than 12.4 V (specific gravity: 1.240)

NG

Charge battery at 5 amps. (see LOAD TEST RATE CHART)

Retest

NG

Replace battery

OK

(1) Connect a load tester to the battery.
(2) Load the battery at the recommended discharge rate (see LOAD TEST RATE CHART) for 15 seconds.
(3) Read voltage after 15 seconds, then remove load.
(4) Compare the measured value with the minimum voltage (see LOAD TEST CHART).

OK: Higher than minimum voltage

LOAD TEST RATE CHART

<table>
<thead>
<tr>
<th>Battery type</th>
<th>75D26L</th>
<th>95D31L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charging time when fully discharged h [5-amp rated current charging]</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>Load test (Amps)</td>
<td>260</td>
<td>310</td>
</tr>
</tbody>
</table>

LOAD TEST CHART

<table>
<thead>
<tr>
<th>Temperature °C</th>
<th>21 and above</th>
<th>16</th>
<th>10</th>
<th>4</th>
<th>-1</th>
<th>-7</th>
<th>-12</th>
<th>-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum voltage V</td>
<td>9.6</td>
<td>9.5</td>
<td>9.4</td>
<td>9.3</td>
<td>9.1</td>
<td>8.9</td>
<td>8.7</td>
<td>8.5</td>
</tr>
</tbody>
</table>
IGNITION SWITCH, ETACS-ECU AND IMMOBILIZER SYSTEM

SPECIAL TOOL

<table>
<thead>
<tr>
<th>Tool</th>
<th>Number</th>
<th>Name</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUT-II sub assembly</td>
<td>MB991502</td>
<td>MB991502</td>
<td>Immobilizer system check</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(Diagnosis display using the MUT-II)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Registration of the ID code</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ETACS-ECU input signal checking</td>
</tr>
</tbody>
</table>

TROUBLESHOOTING

IGNITION SWITCH
DIAGNOSIS FUNCTION

INPUT SIGNAL INSPECTION POINTS <VEHICLES WITH ETACS-ECU>

1. Connect the MUT-II to the diagnosis connector.
2. If buzzer of the MUT-II sounds once when a switch is operated (ON/OFF), the ETACS-ECU input signal for that switch circuit system is normal.

INSPECTION CHART FOR TROUBLE SYMPTOMS

<table>
<thead>
<tr>
<th>Trouble symptom</th>
<th>Inspection procedure No.</th>
<th>Reference page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication with MUT-II is not possible.</td>
<td>Communication with all systems is not possible.</td>
<td>1</td>
</tr>
<tr>
<td>Communication with the one-shot pulse input signal only is not possible.</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>While key hole illumination lamp is illuminated, ignition key is turned to the ON position but key hole illumination lamp does not switch off. (However, it switch off after 10 seconds.)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Key hole illumination lamp remains illuminated.</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Even if driver’s side door is opened, key hole illumination lamp does not illuminate.</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>
INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

INSPECTION PROCEDURE 1

Communication with MUT-II is not possible. (Communication with all systems is not possible.)

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malfunction of connector</td>
</tr>
<tr>
<td>Malfunction of harness wire</td>
</tr>
</tbody>
</table>

The cause is probably a defect in the power supply system (including earth) for the diagnosis line.

Refer to GROUP 13A - Troubleshooting.

INSPECTION PROCEDURE 2

Communication with MUT-II is not possible. (Communication with the one-shot pulse input signal only is not possible.)

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malfunction of connector</td>
</tr>
<tr>
<td>Malfunction of harness wire</td>
</tr>
<tr>
<td>Malfunction of ECU</td>
</tr>
</tbody>
</table>

The cause is probably a defective one-shot pulse input signal circuit system of the diagnosis line.

Check the harness between the diagnosis connector and junction block.

<table>
<thead>
<tr>
<th>Check the following connectors: C-20, C-134 and C-144</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check trouble symptom.</td>
</tr>
</tbody>
</table>

OK → Replace the ECU.

NG → Repair

INSPECTION PROCEDURE 3

While key hole illumination lamp is illuminated, ignition key is turned to the ON position but key hole illumination lamp does not switch off. (However, it switch off after 10 seconds.)

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malfunction of connector</td>
</tr>
<tr>
<td>Malfunction of harness wire</td>
</tr>
<tr>
<td>Malfunction of ECU</td>
</tr>
</tbody>
</table>

The cause is probably a defective ignition switch input circuit or a defective ECU.

MUT-II Input Signal Inspection

Ignition switch input signal
OK: The MUT-II buzzer sounds once when the ignition key is turned to the ON or OFF position.

OK → Replace the ECU.

NG →Repair

Disconnect the junction block connector C-131, and measure at the harness side.
- Voltage between the terminal (6) and earth
- System voltage

OK → Check the following connectors: C-144 and C-131

NG → Repair

OK → Replace the ECU.

NG → Repair

Check the harness wire between the ignition switch (IG1) and junction block, and repair if necessary.
## INSPECTION PROCEDURE 4

### Key hole illumination lamp remains illuminated.

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Malfunction of harness wire</td>
</tr>
<tr>
<td>- Malfunction of ECU</td>
</tr>
</tbody>
</table>

### Probable cause

- The cause is probably a harness short or a defective ECU.

### Inspection Procedure

<table>
<thead>
<tr>
<th>Condition</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>When the connector C-134 of the junction block (1) is disconnected, does the lamp switch off?</td>
<td>Check the harness wire between the key reminder switch and junction block, and repair if necessary.</td>
</tr>
<tr>
<td>YES</td>
<td>Replace the ECU.</td>
</tr>
<tr>
<td>NO</td>
<td>YES</td>
</tr>
</tbody>
</table>

## INSPECTION PROCEDURE 5

### Even if driver’s side door is opened, key hole illumination lamp does not illuminate.

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Malfunction of driver’s side door switch</td>
</tr>
<tr>
<td>- Malfunction of bulb</td>
</tr>
<tr>
<td>- Malfunction of connector</td>
</tr>
<tr>
<td>- Malfunction of harness wire</td>
</tr>
<tr>
<td>- Malfunction of ECU</td>
</tr>
</tbody>
</table>

### Probable cause

- The cause is probably a defective key hole illumination lamp circuit system or a defective driver’s side door switch input circuit system.

### Inspection Procedure

<table>
<thead>
<tr>
<th>Condition</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key hole illumination lamp inspection</td>
<td>Replace</td>
</tr>
<tr>
<td>OK</td>
<td>NG</td>
</tr>
<tr>
<td>NG</td>
<td>OK</td>
</tr>
</tbody>
</table>

**MUT-II Input Signal Inspection**

**Driver’s side door switch input signal**

- **OK**: The MUT-II buzzer sounds once when the driver’s side door switch is ON.

**Key hole illumination lamp inspection**

- **OK**: System voltage

**Disconnect the key reminder switch connector C-109, and measure at the harness side.**

- **OK**: Voltage between the terminal (2) and earth

**Check the following connectors:**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-109, C-134 and C-144</td>
<td>NG</td>
</tr>
<tr>
<td>NG</td>
<td>Repair</td>
</tr>
<tr>
<td>NG</td>
<td>OK</td>
</tr>
</tbody>
</table>

**Check the following connectors:**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.H. drive vehicles: C-66, C-63, C-132, C-141</td>
<td>OK</td>
</tr>
<tr>
<td>R.H. drive vehicles: C-62, C-14</td>
<td>NG</td>
</tr>
</tbody>
</table>

**Check trouble symptom.**

**Check the harness wire between the key reminder switch and junction block, and repair if necessary.**

**Replace the ECU.**
INSPECTION PROCEDURE 6

Driver’s side door switch input circuit system inspection

Door switch inspection (Refer to GROUP 42 - Door Assembly)
   OK
   NG
   Replace

Door switch earth inspection
   OK
   NG
   Repair

Disconnect the door switch connector E-09 <L.H. drive vehicles>, E-08 <R.H. drive vehicles>, and measure at the harness side.

   Voltage between the terminal (2) and earth
   OK: System voltage
   NG
   Repair

Check trouble symptom.
   OK
   NG
   Replace the ECU.

IMMOBILIZER SYSTEM

Caution
The ID code should always be re-registered when replacing the immobilizer-ECU.

STANDARD FLOW OF DIAGNOSIS TROUBLESHOOTING
Refer to GROUP 00 - How To Use Troubleshooting/Inspection Service Points.

DIAGNOSIS FUNCTION

DIAGNOSIS CODES CHECK
Refer to GROUP 00 - How To Use Troubleshooting/Inspection Service Points.

ERASING DIAGNOSIS CODES
Refer to GROUP 00 - How To Use Troubleshooting/Inspection Service Points.

Caution
The diagnosis codes which result from disconnecting the battery cables cannot be erased.

INSPECTION CHART FOR DIAGNOSIS CODES

<table>
<thead>
<tr>
<th>Diagnosis code No.</th>
<th>Inspection items</th>
<th>Reference page</th>
</tr>
</thead>
<tbody>
<tr>
<td>11*</td>
<td>Transponder communication system</td>
<td>54-11</td>
</tr>
<tr>
<td>12*</td>
<td>ID code are not the same or are not registered</td>
<td>54-11</td>
</tr>
<tr>
<td>21</td>
<td>Communication system between immobilizer-ECU and engine-ECU</td>
<td>54-12</td>
</tr>
<tr>
<td>31</td>
<td>EEPROM abnormality inside immobilizer-ECU</td>
<td>54-12</td>
</tr>
<tr>
<td>32</td>
<td>Ignition switch IG signal circuit system</td>
<td>54-12</td>
</tr>
<tr>
<td>33*</td>
<td>Starting prevention system activated due to incorrect operation.</td>
<td>54-13</td>
</tr>
</tbody>
</table>

NOTE
*: Diagnosis code No. 11, No. 12 and No.33 are not recorded.
INSPECTION PROCEDURE FOR DIAGNOSIS CODES

**Code No. 11 Transponder communication system**

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Radio interference of ID codes</td>
</tr>
<tr>
<td>- Malfunction of the transponder</td>
</tr>
<tr>
<td>- Malfunction of the ignition key ring antenna</td>
</tr>
<tr>
<td>- Malfunction of harness or connector</td>
</tr>
<tr>
<td>- Malfunction of the immobilizer-ECU</td>
</tr>
</tbody>
</table>

**Are there any other ignition keys in the vicinity of the ignition key being used for starting?**

- **Yes**: Move other keys well away from the key being used.
- **No**: Check the trouble symptoms.

**Does the engine start using the spare ignition key which has had the ID code registered?**

- **OK**: Replace the ignition key that does not work.
- **NG**: Re-register the ID code.
  (Refer to P.54-19.)

**Diagnosis codes check**

- Code No. 11 occurs: Replace the key ring antenna. (Refer to P.54-18.)
- Code No. 12 occurs: To INSPECTION PROCEDURE FOR DIAGNOSIS CODE No. 12
  (Refer to P.54-11.)

**Check the following connectors:**

- C-68, C-104
  - **OK**: Repair
  - **NG**: Replace

**Check trouble symptoms.**

- NG: Check the harness wire between immobilizer-ECU and key ring antenna.
  - OK: Replace the immobilizer-ECU.

**Code No. 12 ID code are not the same or are not registered**

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>- The ID code in the ignition key being used has not been properly registered.</td>
</tr>
<tr>
<td>- Malfunction of the immobilizer-ECU</td>
</tr>
</tbody>
</table>

**Re-register the ID code.**

(Refer to P.54-19.)

**Check trouble symptoms.**

- NG: Replace the immobilizer-ECU.
### Code No.21 Communication system between immobilizer-ECU and engine-ECU

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malfunction of harness or connector</td>
</tr>
<tr>
<td>Malfunction of the engine-ECU</td>
</tr>
<tr>
<td>Malfunction of the immobilizer-ECU</td>
</tr>
</tbody>
</table>

After the ignition switch is turned to the ON position, the confirmation code is not received from the engine-ECU within the allowable time, or an abnormal code is received.

**Diagram**

- **Is diagnosis code No. 54 being generated by the engine-ECU?**
  - **NO**
    - Check the engine-ECU power source and the earth circuit. (Refer to GROUP 13A - Troubleshooting.)
  - **YES**
    - Check the following connectors:
      - C-68, C-81, C-38 <4G6>
      - C-37, <6A1>, C-54 <4D6>
      - Repair

- **Check the following connectors:**
  - C-68, C-81, C-38 <4G6>
  - C-37, <6A1>, C-54 <4D6>
  - NG
  - Repair

- **Check trouble symptoms.**
  - NG
  - Check the harness wire between engine-ECU and immobilizer-ECU.
  - NG
  - Check trouble symptoms.
  - NG
  - Replace the immobilizer-ECU.
  - OK
  - Check trouble symptoms.
  - NG
  - Replace the engine-ECU.

### Code No. 31 EEPROM abnormality inside immobilizer-ECU

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malfunction of the immobilizer-ECU</td>
</tr>
</tbody>
</table>

No data has been written to the EEPROM inside the immobilizer-ECU.

**Diagram**

- **Check trouble symptoms.**
  - NG
  - Replace the immobilizer-ECU.

### Code No.32 Ignition switch IG signal circuit system

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malfunction of harness or connector</td>
</tr>
<tr>
<td>Malfunction of the ignition switch</td>
</tr>
<tr>
<td>Malfunction of the immobilizer-ECU</td>
</tr>
</tbody>
</table>

The ignition switch signal is not being input to the immobilizer-ECU.

**Diagram**

- **Check the input of the ignition switch IG signal.**
  - Measure at the immobilizer-ECU connector C-68:
    - Disconnect the connector, and measure at the harness side.
    - Voltage between 2 and body earth (Ignition switch: ON position)
  - **OK** System voltage
  - **NG** System voltage
  - Repair

- **Check the following connectors:**
  - C-68, C-134, C-131
  - OK
  - Check trouble symptoms.
  - OK
  - Check the fuse and the harness wire between ignition switch (IG) and immobilizer-ECU.
  - **OK** System voltage
  - **NG** System voltage
  - Repair

- **Check trouble symptoms**
  - NG
  - Check the ignition switch. (Refer to 54-18.)
  - NG
  - Replace the immobilizer-ECU.
Code No.33 Starting prevention system activated due to incorrect operation

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Malfunction of the immobilizer-ECU</td>
</tr>
<tr>
<td>• Malfunction of the transponder</td>
</tr>
</tbody>
</table>

If the transponder ID code mismatches five times in succession, this code will be output. This code can be canceled by turning the ignition switch ON, and then turning it OFF after 16 minutes have passed.

Turn the ignition switch ON and then turn it OFF after 16 minutes have passed.

Re-register the ID code. (Refer to P.54-19.)

Check trouble symptoms.

NG

Replace the ignition key.

Check trouble symptoms.

NG

Replace the immobilizer-ECU

INSPECTION CHART FOR TROUBLE SYMPTOMS

<table>
<thead>
<tr>
<th>Trouble symptom</th>
<th>Inspection procedure No.</th>
<th>Reference page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication with MUT-II is impossible.</td>
<td>1</td>
<td>54-14</td>
</tr>
<tr>
<td>Diagnosis code No. 54 has been generated by the engine-ECU.</td>
<td>2</td>
<td>54-14</td>
</tr>
<tr>
<td>ID code cannot be registered using the MUT-II.</td>
<td>3</td>
<td>54-15</td>
</tr>
<tr>
<td>Engine does not start (Cranking but no initial combustion).</td>
<td>4</td>
<td>54-15</td>
</tr>
<tr>
<td>Malfunction of the immobilizer-ECU power source and earth circuit</td>
<td>5</td>
<td>54-16</td>
</tr>
</tbody>
</table>
**INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS**

**Inspection Procedure 1**

**Communication with MUT-II is impossible.**

<table>
<thead>
<tr>
<th>Probable cause</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Malfunction of the diagnosis line</td>
<td></td>
</tr>
<tr>
<td>Malfunction of harness or connector</td>
<td></td>
</tr>
<tr>
<td>Malfunction of the immobilizer</td>
<td></td>
</tr>
</tbody>
</table>

**Inspection Procedure 2**

**Diagnosis code No. 54 has been generated by the engine-ECU.**

<table>
<thead>
<tr>
<th>Probable cause</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Malfunction of harness or connector</td>
<td></td>
</tr>
<tr>
<td>Malfunction of the immobilizer-ECU</td>
<td></td>
</tr>
<tr>
<td>Malfunction of the engine-ECU</td>
<td></td>
</tr>
</tbody>
</table>
Inspection Procedure 3

**ID code cannot be registered using the MUT-II.**

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Malfunction of the transponder</td>
</tr>
<tr>
<td>- Malfunction of the ignition key ring antenna</td>
</tr>
<tr>
<td>- Malfunction of harness or connector</td>
</tr>
<tr>
<td>- Malfunction of the immobilizer-ECU</td>
</tr>
</tbody>
</table>

The cause is probably that there is no ID code registered in the immobilizer-ECU, or there is a malfunction of the immobilizer-ECU.

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Malfunction of the transponder</td>
</tr>
<tr>
<td>- Malfunction of the ignition key ring antenna</td>
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<tr>
<td>- Malfunction of harness or connector</td>
</tr>
<tr>
<td>- Malfunction of the immobilizer-ECU</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Malfunction of the transponder</td>
</tr>
<tr>
<td>- Malfunction of the ignition key ring antenna</td>
</tr>
<tr>
<td>- Malfunction of harness or connector</td>
</tr>
<tr>
<td>- Malfunction of the immobilizer-ECU</td>
</tr>
</tbody>
</table>

- No ignition key can be registered. 
- Replace the ignition key that cannot be registered. 
- Re-register the ID code. (Refer to P.54-19.)

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Malfunction of the transponder</td>
</tr>
<tr>
<td>- Malfunction of the ignition key ring antenna</td>
</tr>
<tr>
<td>- Malfunction of harness or connector</td>
</tr>
<tr>
<td>- Malfunction of the immobilizer-ECU</td>
</tr>
</tbody>
</table>

- Replace the immobilizer-ECU.

**Inspection Procedure 4**

**Engine does not start (cranking but no initial combustion).**

- If the fuel injectors are not operating, there might be a problem with the MPI system in addition to a malfunction of the immobilizer system. It is normal for this to occur if an attempt is made to start the engine using a key that has not been properly registered.

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Malfunction of the MPI system</td>
</tr>
<tr>
<td>- Malfunction of the immobilizer-ECU</td>
</tr>
</tbody>
</table>

- Check the system voltage during cranking. 
  - OK: 8V or more 
  - NG: Check the battery. (Refer to P.54-4.)

- Is the diagnosis code output? 
  - Yes: To INSPECTION CHART FOR DIAGNOSIS CODE (Refer to P.54-10.) 
  - No: Repair

- Check the fuel system (Refer to GROUP 13E - On-vehicle Service.) 
  - OK: Replace the injection pump assembly. 
  - NG: Repair

- Check the power supply and earth circuit of the immobilizer (Refer to INSPECTION PROCEDURE 5) 
  - OK: Check trouble symptoms. 
  - NG: Replace the immobilizer-ECU.

- Check trouble symptoms. 
  - NG: Replace the injection pump assembly.
Malfunction of the immobilizer-ECU power supply and earth circuit

1. NG

Measure at the immobilizer-ECU connector.
D Disconnect the connector and measure at the harness side.
1. Voltage between 1 and earth and between 9 and earth <Petrol-powered vehicles>
   OK: System voltage
2. Continuity between 8 and earth
   OK: Continuity
3. Continuity between 16 and body earth
   OK: Continuity

Check the following connectors:
C-81, C-47
OK
NG
Repair

Check the harness wire between immobilizer-ECU and engine control relay and repair if necessary.

CHECK AT IMMOBILIZER-ECU TERMINAL VOLTAGE CHECK CHART

<table>
<thead>
<tr>
<th>Terminal No.</th>
<th>Signal</th>
<th>Checking requirements</th>
<th>Terminal voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Immobilizer-ECU power supply</td>
<td>Ignition switch: ON</td>
<td>System voltage</td>
</tr>
<tr>
<td>2</td>
<td>Ignition switch-IG</td>
<td>Ignition switch: OFF</td>
<td>0V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ignition switch: ON</td>
<td>System voltage</td>
</tr>
<tr>
<td>8</td>
<td>Immobilizer-ECU earth</td>
<td>Always</td>
<td>0V</td>
</tr>
<tr>
<td>9</td>
<td>Immobilizer-ECU power supply</td>
<td>Ignition switch: ON</td>
<td>System voltage</td>
</tr>
<tr>
<td>16</td>
<td>Immobilizer-ECU earth</td>
<td>Always</td>
<td>0V</td>
</tr>
</tbody>
</table>
IGNITION SWITCH, ETACS-ECU AND IMMOBILIZER SYSTEM

Removal and Installation

Caution: SRS
Before removal of air bag module and clock spring, refer to GROUP 52B - Service Precautions and Air Bag Module and Clock Spring.

ETACS-ECU removal steps
1. Junction block
2. ETACS-ECU

Immobilizer-ECU removal steps
3. Hood lock release handle
4. Instrument under cover (Refer to GROUP 52A - Instrument Panel.)
5. Immobilizer-ECU

Ignition switch and ignition key ring antenna removal steps
3. Hood lock release handle
4. Instrument under cover (Refer to GROUP 52A - Instrument Panel.)
6. Steering wheel (Refer to GROUP 37A.)
7. Column cover, upper
8. Column cover, lower
9. Column switch (Refer to GROUP 37A - Steering Wheel and Shaft.)
10. Ignition key ring antenna
11. Steering lock cylinder
12. Ignition switch

Metal clip position
REMOVAL SERVICE POINTS
A. A* STEERING LOCK CYLINDER REMOVAL
1. Insert the key in the steering lock cylinder and turn it to the “ACC” position.
2. Using a cross-tip (+) screwdriver (small) or a similar tool, push the lock pin of the steering lock cylinder inward and then pull the steering lock cylinder toward you.

INSPECTION
IGNITION SWITCH CONTINUITY CHECK
1. Remove the column cover lower and upper.
2. Disconnect the wiring connector from the ignition switch.
3. Operate the switch, and check the continuity between the terminals.

<table>
<thead>
<tr>
<th>Ignition key position</th>
<th>Terminal No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>LOCK</td>
<td></td>
</tr>
<tr>
<td>ACC</td>
<td></td>
</tr>
<tr>
<td>ON</td>
<td></td>
</tr>
<tr>
<td>START</td>
<td></td>
</tr>
</tbody>
</table>

IGNITION KEY RING ANTENNA CONTINUITY CHECK
Use a circuit tester to check the continuity between the terminals.
ID CODE REGISTRATION METHOD

If using an ignition key that has just been newly purchased, or if the immobilizer-ECU has been replaced, you will need to register the ID codes for each ignition key being used into the immobilizer-ECU. (A maximum of eight different ID codes can be registered.) Moreover, when the immobilizer-ECU has been replaced, you will need to use the MUT-II to register the ID number that the user specifies into the immobilizer-ECU. (Refer to the MUT-II instruction manual for instructions on using the MUT-II.)

Caution
If registering of the ID codes is carried out all previously-registered codes will be erased. Accordingly, you should have ready all of the ignition keys that have already been registered.

1. Connect the MUT-II to the diagnosis connector.
   Caution
   Connection and disconnection of the MUT-II should always be carried out with the ignition switch in the OFF position.
2. Use the ignition key that is to be registered to turn the ignition switch to the ON position.
3. Use the MUT-II to register the ID code. If you are registering two or more codes, use the next key to be registered to turn the ignition switch to the ON position without disconnecting the MUT-II.
4. Disconnect the MUT-II. This completes the registration operation.
### COMBINATION METERS

#### SERVICE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Items</th>
<th>Standard value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speedometer indication error km/h (mph)</td>
<td></td>
</tr>
<tr>
<td>40 (20)</td>
<td>40 - 48 (20 - 25)</td>
</tr>
<tr>
<td>80 (40)</td>
<td>80 - 92 (40 - 47)</td>
</tr>
<tr>
<td>120 (60)</td>
<td>120 - 136 (60 - 69)</td>
</tr>
<tr>
<td>160 (80)</td>
<td>160 - 180 (80 - 91)</td>
</tr>
<tr>
<td>- (100)</td>
<td>- (100 - 114)</td>
</tr>
<tr>
<td>Tachometer indication error r/min</td>
<td></td>
</tr>
<tr>
<td>700</td>
<td>±100</td>
</tr>
<tr>
<td>3,000</td>
<td>±150</td>
</tr>
<tr>
<td>5,000</td>
<td>±250</td>
</tr>
<tr>
<td>6,000</td>
<td>±300</td>
</tr>
<tr>
<td>Fuel gauge unit resistance Ω</td>
<td></td>
</tr>
<tr>
<td>Float point F</td>
<td>4 ± 2</td>
</tr>
<tr>
<td>Float point E</td>
<td>112 ± 7</td>
</tr>
<tr>
<td>Fuel gauge unit float height mm</td>
<td></td>
</tr>
<tr>
<td>A (Float point F)</td>
<td>28.6</td>
</tr>
<tr>
<td>B (Float point E)</td>
<td>159.9</td>
</tr>
<tr>
<td>Fuel gauge resistance Ω</td>
<td></td>
</tr>
<tr>
<td>Power supply and earth</td>
<td>111.5</td>
</tr>
<tr>
<td>Power supply and fuel gauge</td>
<td>98.2</td>
</tr>
<tr>
<td>Fuel gauge and earth</td>
<td>101.0</td>
</tr>
<tr>
<td>Engine coolant temperature gauge resistance Ω</td>
<td></td>
</tr>
<tr>
<td>Power supply and earth</td>
<td>111.5</td>
</tr>
<tr>
<td>Power supply and engine coolant temperature gauge</td>
<td>53.6</td>
</tr>
<tr>
<td>Engine coolant temperature gauge and earth</td>
<td>165.0</td>
</tr>
</tbody>
</table>

#### SEALANT

<table>
<thead>
<tr>
<th>Items</th>
<th>Specified sealant</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine coolant temperature gauge unit threaded portion</td>
<td>3M Adhesive nut locking No. 4171 or equivalent</td>
<td>Drying sealant</td>
</tr>
</tbody>
</table>
## SPECIAL TOOLS

<table>
<thead>
<tr>
<th>Tool</th>
<th>Number</th>
<th>Name</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>MB991223</td>
<td>Harness set</td>
<td>Making voltage and resistance measurements during troubleshooting</td>
</tr>
<tr>
<td></td>
<td>A: MB991219</td>
<td>A: Test harness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B: MB991220</td>
<td>B: LED harness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C: MB991221</td>
<td>C: LED harness adapter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D: MB991222</td>
<td>D: Probe</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td>A: Connector pin contact pressure check</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td>B: Power circuit check</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
<td>C: Power circuit check</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>D: Commercial tester connection</td>
</tr>
</tbody>
</table>
TROUBLESHOOTING

INSPECTION CHART FOR TROUBLE SYMPTOMS

<table>
<thead>
<tr>
<th>Trouble symptom</th>
<th>Inspection procedure</th>
<th>Reference page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speedometer does not work.</td>
<td>1</td>
<td>54-22</td>
</tr>
<tr>
<td>Tachometer does not work.</td>
<td>2</td>
<td>54-23</td>
</tr>
</tbody>
</table>

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

**Inspection Procedure 1**

**Speedometer does not work.**

The cause may be a defective vehicle speed sensor circuit system or a defective speedometer. Vehicle speed sensor is also used by the engine-ECU and A/T-ECU.

Disconnect the combination meter connectors D-01, D-02 and D-03 and measure at the harness sides.

1. Measure the voltage between terminal No.25 and body earth when the vehicle is moved forwards and backwards.
   - **OK:** 4.7 V or more

2. Voltage between the terminal No.4 and body earth
   - **OK:** System voltage (Ignition switch: ON)

3. Continuity between the terminal No.46 and body earth
   - **OK:** Continuity

1. NG → **Vehicle speed sensor circuit system inspection (Refer to Inspection Procedure 3 on P.54-23.)**

2. NG → **Check the following connectors:**
   - **D-03, C-135, C-131**
     - **OK** → Check the harness wire between the power supply and combination meter, and repair if necessary.
     - **NG** → Repair

3. NG → **Check the following connectors:**
   - **C-25, D-01**
     - **OK** → Check the harness wire between the body earth and combination meter, and repair if necessary.
     - **NG** → Repair

**Probable cause**

- Malfunction of vehicle speed sensor
- Malfunction of speedometer
- Malfunction of harness or connector

Replace the speedometer.
**Inspection Procedure 2**

**Tachometer does not work.**

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Malfunction of tachometer</td>
</tr>
<tr>
<td>• Malfunction of harness or connector</td>
</tr>
</tbody>
</table>

Disconnect the combination meter connector D-03 and measure at the harness sides.

1. Measure the voltage between terminal No.8 and body earth.
   - OK: 6 V
2. Continuity between the terminal No.7 and body earth
   - OK: Continuity
3. Voltage between the terminal No.4 and body earth
   - OK: System voltage

1. NG
   - Check the following connectors: C-90, D-03
     - OK
     - NG
   - Check trouble symptom.

2. NG
   - Check the following connectors: C-45, C-90, D-03
     - OK
     - NG
   - Check trouble symptom.

3. NG
   - Check the following connectors: C-131, C-135, D-03
     - OK
     - NG
   - Check trouble symptom.

Replace the tachometer.

---

**Inspection Procedure 3**

**Vehicle speed sensor circuit system inspection**

Vehicle speed sensor inspection (Refer to P.54-29.)

- NG Replace

Disconnect the vehicle speed sensor connector B-67 <A/T> or B-66 <M/T> and measure at the harness side.

1. Voltage between the terminal No.3 and body earth
   - OK: 4.5 V or more
2. Continuity between terminal No.2 and body earth
   - OK: Continuity
3. Voltage between the terminal No.1 and body earth
   - OK: System voltage (Ignition switch: ON)

1. NG
   - Check the following connectors: D-02, C-25, C-66, C-83, B-67 <A/T>, B-66 <M/T>, B-85 <M/T>
     - NG
     - Check trouble symptom.

2. NG
   - Check the following connector: B-65 <M/T>, B-67 <A/T>, B-66 <M/T>
     - NG
     - Check the harness wire between the vehicle speed sensor and combination meter, and repair if necessary.

3. NG
   - Check the following connectors: B-65 <M/T>, C-90, C-135, C-131
     - NG
     - Repair
     - OK
   - Check trouble symptom.

Check the harness wire between the vehicle speed sensor and power supply, and repair if necessary.

Replace the speedometer.
ON-VEHICLE SERVICE

SPEEDOMETER CHECK
1. Adjust tire pressure to the specified level.
(Refer to GROUP 31 – Service Specifications.)
2. Set the vehicle onto a speedometer tester and use wheel chocks to hold the rear wheels.

3. To prevent the front wheel from moving from side to side, attach tension bars to the tie-down hook, and secure both ends to anchor plates.
4. To prevent the vehicle from launching, attach a chain or wire to the rear retraction hook, and make sure the end of the chain or wire is secured firmly.
5. Check if the speedometer indicator range is within the standard values.

Caution
Do not operate the clutch suddenly. Do not increase/decrease speed rapidly while testing.

Standard values:

<table>
<thead>
<tr>
<th>Standard indication km/h (mph)</th>
<th>Allowable range km/h (mph)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 (20)</td>
<td>40 - 48 (20 - 25)</td>
</tr>
<tr>
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<td>160 - 180 (80 - 91)</td>
</tr>
<tr>
<td>- (100)</td>
<td>- (100 - 114)</td>
</tr>
</tbody>
</table>

TACHOMETER CHECK
1. Insert a paper clip in the engine speed detection connector from the harness side, and attach an external high quality tachometer.

NOTE
For tachometer check, use an external high quality inductive tachometer.

2. Compare the readings of the vehicle tachometer and the external tachometer at every engine speed, and check if the variations are within the standard values.

Standard values:

- 700 r/min : ±100 r/min
- 3,000 r/min : ±150 r/min
- 5,000 r/min : ±250 r/min
- 6,000 r/min : ±300 r/min
FUEL GAUGE SIMPLE CHECK

Remove the fuel gauge unit connector.

Use the special tool to connect a test lamp (12 V - 3.4 W) to the harness connector.

When the ignition switch is turned to ON, the test lamp illuminates.

- OK: The needle of the fuel gauge moves.
- NG: Replace the fuel gauge unit.
- NG: Replace the fuel gauge.
- NG: Repair the harness.

FUEL GAUGE UNIT CHECK

Remove the fuel gauge unit from the fuel tank. (Refer to GROUP 13F.)

FUEL GAUGE UNIT RESISTANCE

1. Check that resistance value between the fuel gauge terminal and ground terminal is at standard value when fuel gauge unit float is at point F (highest) and point E (lowest).

   **Standard value:**
   - **Point F:** $4 \pm 2 \, \Omega$
   - **Point E:** $112 \pm 7 \, \Omega$

2. Check that resistance value changes smoothly when float moves slowly between point F (highest) and point E (lowest).
FUEL GAUGE UNIT FLOAT HEIGHT

Move float and measure the height A at point F (highest) and B at point E (lowest) with float arm touching stopper.

**Standard value:**
- A: 28.6 mm
- B: 159.9 mm

THERMISTOR

1. Connect fuel gauge unit (thermistor) to battery via test lamp (12 V - 3.4 W). Immerse in water.
2. Condition is good if lamp goes off when the thermistor is immersed in water and comes on when it is taken out of water.

**Caution**

After finishing this test, wipe the unit dry and install it in the fuel tank.
ENGINE COOLANT TEMPERATURE GAUGE SIMPLE CHECK

Remove the engine coolant gauge unit connector.

Connect a test lamp (12 V - 3.4 W) between the harness side connector and the earth.

When the ignition switch is turned to “ON”, the test lamp illuminates. OK

The needle of the engine coolant temperature gauge moves. NG

Replace the engine coolant temperature gauge.

Replace the engine coolant temperature gauge unit.

Repair the harness.

When the ignition switch is turned to “ON”, the test lamp illuminates. NG

ECU
ENGINE COOLANT TEMPERATURE GAUGE UNIT CHECK

1. Bleed the engine coolant.
   (Refer to GROUP 00 – Maintenance Service.)
2. Remove the engine coolant temperature gauge unit.
3. Immerse the unit in 70°C water to measure the resistance.
   Standard value: 104 ± 13.5 Ω

4. After checking, apply the specified adhesive around the thread of the engine coolant temperature gauge unit.
   Specified sealant: 3M Adhesive Nut Locking No. 4171 or equivalent

5. Add engine coolant.
   (Refer to GROUP 14 – On-vehicle Service.)

Vehicle speed sensor removal steps
- Air cleaner assembly
- 1. Vehicle speed sensor

Combination meter removal steps
- 2. Meter bezel
- 3. Combination meter
INSPECTION

VEHICLE SPEED SENSOR CHECK
1. Remove the vehicle speed sensor and connect a 3 - 10 kΩ resistance as shown in the illustration.
2. Turn the shaft of the vehicle speed sensor and check that there is voltage between terminals 2 - 3. (1 turn = 4 pulses)

FUEL GAUGE RESISTANCE CHECK
1. Remove the power supply tightening screw.
2. Use an ohmmeter to measure the resistance value between the terminals.

   Standard value:
   - Power supply - Earth: 111.5 Ω
   - Power supply - Fuel gauge: 98.2 Ω
   - Fuel gauge - Ground: 101.0 Ω

Caution
When inserting the testing probe into the power supply terminal, be careful not to touch the printed board.

ENGINE COOLANT TEMPERATURE GAUGE RESISTANCE CHECK
1. Remove the power supply tightening screw.
2. Use an ohmmeter to measure the resistance value between the terminals.

   Standard value:
   - Power supply - Earth: 111.5 Ω
   - Power supply - Engine coolant temperature gauge: 53.6 Ω
   - Engine coolant temperature gauge - Earth: 165.0 Ω

Caution
When inserting the testing probe into the power supply terminal, be careful not to touch the printed board.
HEADLAMP AND FRONT TURN-SIGNAL LAMP

SERVICE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Items</th>
<th>Standard value</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headlight aiming for low beam</td>
<td>Vertical direction: 60 mm below horizontal (H)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Horizontal direction: Position where the 15° sloping</td>
<td></td>
</tr>
<tr>
<td></td>
<td>section intersects the vertical line (V)</td>
<td></td>
</tr>
<tr>
<td>Headlamp aiming for high beam</td>
<td>Vertical direction: 22 mm below horizontal (H)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Horizontal direction: Parallel to direction of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>vehicle travel</td>
<td></td>
</tr>
<tr>
<td>Headlamp intensity cd</td>
<td>-</td>
<td>30,000 or more</td>
</tr>
</tbody>
</table>

SPECIAL TOOLS

<table>
<thead>
<tr>
<th>Tool</th>
<th>Number</th>
<th>Name</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MB991502</td>
<td>MUT-II sub assembly</td>
<td>ETACS-ECU input signal checking</td>
</tr>
<tr>
<td>A</td>
<td>MB991223</td>
<td>Harness set</td>
<td>Making voltage and resistance measurements</td>
</tr>
<tr>
<td></td>
<td>A: MB991219</td>
<td>Test harness</td>
<td>during troubleshooting</td>
</tr>
<tr>
<td></td>
<td>B: MB991220</td>
<td>LED harness</td>
<td>A: Connector pin contact pressure check</td>
</tr>
<tr>
<td></td>
<td>C: MB991221</td>
<td>LED harness adapter</td>
<td>B: Power circuit check</td>
</tr>
<tr>
<td></td>
<td>D: MB991222</td>
<td>Probe</td>
<td>C: Power circuit check</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>D: Commercial tester connection</td>
</tr>
</tbody>
</table>
The special tool (MB991223) should always be used to measure voltages and resistance when carrying out troubleshooting.

**DIAGNOSTIC FUNCTION**

**INPUT SIGNAL INSPECTION POINTS**

**<VEHICLES WITH ETACS-ECU>**

1. Connect the MUT-II to the diagnosis connector.
2. If a buzzer of the MUT-II sounds once when a switch is operated (ON/OFF), the ETACS-ECU input signal for that switch circuit system is normal.

**INSPECTION CHART FOR TROUBLE SYMPTOMS**

<table>
<thead>
<tr>
<th>Trouble symptoms</th>
<th>Trouble symptoms</th>
<th>Inspection procedure</th>
<th>Reference page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication with MUT-II is impossible. &lt;Vehicles with ETACS-ECU&gt;</td>
<td>Communication with all systems is impossible.</td>
<td>1</td>
<td>54-32</td>
</tr>
<tr>
<td></td>
<td>Communication with one-shot pulse input signal only is impossible.</td>
<td>2</td>
<td>54-32</td>
</tr>
</tbody>
</table>
| The lighting monitor buzzer doesn’t sound under the following conditions while tail lamps or headlamps illuminate.  
  - When the ignition switch is turned to OFF and the driver’s side door is open. | | 3 | 54-32 |
| Headlamp leveling does not occur when the headlamp leveling switch is operated. | | 5 | 54-34 |
| The headlamps do not illuminate when the vehicle is in the following condition and the ignition switch is at the ON position. However, the headlamps illuminate when the lighting switch is moved to the HEAD position.  
  <Vehicles with daytime running lamp system>  
  - Lighting switch: OFF  
  - Passing switch: OFF | | 6 | 54-35 |
| The headlamps do not switch off when the vehicle is in the following condition and the lighting switch is moved to the TAIL position.  
  <Vehicles with daytime running lamp system>  
  - Ignition switch: OFF  
  - Passing switch: OFF | | 7 | 54-36 |
## INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

### Inspection Procedure 1

<table>
<thead>
<tr>
<th>Communication with MUT-II is impossible. (Communication with all systems is impossible.)</th>
<th>Probable cause</th>
</tr>
</thead>
</table>
| The cause is probably a defective power supply system (including ground) for the diagnosis line. | - Malfunction of connector  
- Malfunction of harness wire |

Refer to GROUP 13A - Troubleshooting.

### Inspection Procedure 2

<table>
<thead>
<tr>
<th>Communication with the MUT-II is impossible. (Communication with the one-shot pulse input signal only is impossible.)</th>
<th>Probable cause</th>
</tr>
</thead>
</table>
| The cause is probably a defective one-shot pulse input circuit system of the diagnosis line. | - Malfunction of connector  
- Malfunction of harness wire  
- Malfunction of ETACS-ECU |

**Check the harness wire between the diagnosis connector and junction block.**

<table>
<thead>
<tr>
<th></th>
<th>OK</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repair</td>
<td>Check the following connectors: C-20, C-134</td>
<td>Repair</td>
</tr>
</tbody>
</table>

**Check trouble symptom.**

<table>
<thead>
<tr>
<th></th>
<th>OK</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td>NG</td>
<td>Replace the ETACS-ECU.</td>
<td></td>
</tr>
</tbody>
</table>

### Inspection Procedure 3

<table>
<thead>
<tr>
<th>The ignition switch is turned to the “OFF” position and the driver’s side door is opened while the tail lamps or headlamps are operating, but the lighting monitor buzzer does not sound.</th>
<th>Probable cause</th>
</tr>
</thead>
</table>
| The cause is probably a defective lighting switch input circuit system or a defective driver’s side door switch input circuit system. | - Malfunction of driver’s side door switch  
- Malfunction of harness or connector  
- Malfunction of BUZZER-ECU or ETACS-ECU |

**Driver’s side door switch input circuit system inspection (Refer to Inspection Procedure 4.)**

<table>
<thead>
<tr>
<th></th>
<th>OK</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repair</td>
<td>Check the following connectors: C-20, C-134</td>
<td>Repair</td>
</tr>
</tbody>
</table>

**Check trouble symptom.**

<table>
<thead>
<tr>
<th></th>
<th>OK</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td>NG</td>
<td>Replace the BUZZER-ECU or ETACS-ECU.</td>
<td>Repair</td>
</tr>
</tbody>
</table>

**Check the harness wire between the junction block and column switch.**

<table>
<thead>
<tr>
<th></th>
<th>OK</th>
<th>NG</th>
</tr>
</thead>
<tbody>
<tr>
<td>NG</td>
<td>Replace the BUZZER-ECU or ETACS-ECU.</td>
<td>Repair</td>
</tr>
</tbody>
</table>
## Injection Procedure 4

### Driver’s side door switch input circuit system inspection

<table>
<thead>
<tr>
<th>Door switch inspection (Refer to GROUP 42 – Door Assembly.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK</td>
</tr>
<tr>
<td>NG Replace</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Door switch earth inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK</td>
</tr>
<tr>
<td>NG Repair</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Disconnect the door switch connector E-19 &lt;L.H. drive vehicles&gt;, E-08 &lt;R.H. drive vehicles&gt; and measure at the harness side.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage between the terminal No. 2 and body earth</td>
</tr>
<tr>
<td>OK: 5 V</td>
</tr>
<tr>
<td>NG</td>
</tr>
<tr>
<td>Repair</td>
</tr>
</tbody>
</table>

Check trouble symptom.

<table>
<thead>
<tr>
<th>Replace the BUZZER-ECU or ETACS-ECU.</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK</td>
</tr>
<tr>
<td>NG</td>
</tr>
</tbody>
</table>

Check the following connectors:

- L.H. drive vehicles: E-19, C-144, C-145
- R.H. drive vehicles: E-08, C-144, C-145

Check the harness wire between the door switch and junction block, and repair if necessary.
### Inspection procedure 5

#### Headlamp leveling does not occur when the headlamp leveling switch is operated.

The cause is probably a malfunction of the headlamp leveling switch circuit system or a malfunction of the headlamp leveling unit circuit system. If there is a blown fuse, there may also be a short-circuit in a harness.

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Malfunction of fuse</td>
</tr>
<tr>
<td>• Malfunction of the headlamp leveling switch</td>
</tr>
<tr>
<td>• Malfunction of connector</td>
</tr>
<tr>
<td>• Malfunction of harness</td>
</tr>
<tr>
<td>• Malfunction of the headlamp leveling unit</td>
</tr>
</tbody>
</table>

#### Headlamp leveling switch check
(Refer to P.54-42.)

- NG → Replace

1. NG → Check the following connectors: C-94, A-33
2. OK → Check trouble symptoms.

#### Disconnect the headlamp leveling switch connector C-94 and measure at the harness side.

- OK: Continuity

#### NG → Check the following connectors: A-12, A-33, C-74, C-115

- OK → Check trouble symptoms.

1. NG → Check the harness between the headlamp relay and the headlamp leveling unit. Repair, if necessary.

#### Disconnect the headlamp leveling unit connectors A-12, A-33 and measure at the harness side. Both the left and right connectors of the headlamp leveling unit should be checked.

1. Voltage between terminal No.1 - earth
   - OK: System voltage
2. Continuity between terminal No.2 - earth
   - OK: Continuity

#### NG → Check the following connectors: A-12, A-33

- OK → Check trouble symptoms.

2. NG → Repair

#### NG → Check the harness between the body earth and the headlamp leveling unit. Repair, if necessary.

#### Disconnect the headlamp leveling unit (LH), headlamp leveling unit (RH) and headlamp leveling switch connectors A-12, A-33, C-94 and measure at the harness side.

- OK: Continuity

#### NG → Check the following connectors: A-12, A-33, C-115, C-74, C-94

- OK → Check trouble symptoms.

#### NG → Repair

#### NG → Check the harness between the headlamp leveling switch and the headlamp leveling unit (both). Repair, if necessary.

Malfunction of the headlamp leveling unit.

- Replace
The headlamps do not illuminate when the vehicle is in the following condition and the ignition switch is moved to the ON position. However, they illuminate when the lighting switch is moved to the HEAD position.

- Lighting switch: OFF
- Passing switch: OFF

The cause is probably a malfunction of the daytime running lamp control unit (DRL-ECU) circuit system. If there is a blown fuse, there may also be a short-circuit in a harness.

**Probable cause**
- Malfunction of fuse
- Malfunction of connector
- Malfunction of harness
- Malfunction of the DRL-ECU

---

### Inspection procedure 6

**Probable cause**

<table>
<thead>
<tr>
<th>NG</th>
<th>OK</th>
<th>NG</th>
<th>OK</th>
<th>NG</th>
<th>OK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malfunction of the DRL-ECU.</td>
<td>Replace</td>
<td>NG</td>
<td>Replace</td>
<td>NG</td>
<td>Repair</td>
</tr>
<tr>
<td>Headlamp relay check (Refer to P.54-42.)</td>
<td>OK</td>
<td>NG</td>
<td>Check the following connectors: A-37, C-14, C-63, C-132, C-131</td>
<td>NG</td>
<td>Repair</td>
</tr>
<tr>
<td>Disconnect the DRL-ECU connector A-37 and measure at the harness side.</td>
<td>OK</td>
<td>NG</td>
<td>Check trouble symptoms.</td>
<td>NG</td>
<td>Check the harness between the DRL-ECU and the ignition switch. Repair, if necessary.</td>
</tr>
<tr>
<td>• Ignition switch: ON</td>
<td>OK</td>
<td>NG</td>
<td>Check the following connectors: A-37, C-14</td>
<td>OK</td>
<td>Check trouble symptoms.</td>
</tr>
<tr>
<td>1. Voltage between terminal (No.1) and earth</td>
<td>OK</td>
<td>System voltage</td>
<td>NG</td>
<td>Check the harness between the DRL-ECU and the headlamp relay. Repair, if necessary.</td>
<td></td>
</tr>
<tr>
<td>2. Voltage between terminal (No.9) and earth</td>
<td>OK</td>
<td>System voltage</td>
<td>NG</td>
<td>Check the harness between the DRL-ECU and the body earth. Repair, if necessary.</td>
<td></td>
</tr>
<tr>
<td>3. Continuity between terminal (No.2) and earth</td>
<td>OK</td>
<td>Continuity</td>
<td>NG</td>
<td>Check trouble symptoms.</td>
<td></td>
</tr>
</tbody>
</table>
### Inspection procedure 7

<table>
<thead>
<tr>
<th>The headlamps do not switch off when the vehicle is in the following condition and the lighting switch is moved to the TAIL position.</th>
<th>Probable cause</th>
</tr>
</thead>
</table>
| **<Vehicles with daytime running lamp>** | • Malfunction of fuse  
• Malfunction of connector  
• Malfunction of harness  
• Malfunction of the tail lamp relay  
• Malfunction of the DRL-ECU |
| - Ignition switch: OFF  
- Passing switch: OFF | The cause is probably a malfunction of the daytime running lamp control unit (DRL-ECU) circuit system. If there is a blown fuse, there may also be a short-circuit in a harness. |

### Troubleshooting Diagram

- **Lighting switch check** (Refer to P.54-41.)
  - NG → Replace
  - OK

- Disconnect DRL-ECU connector A-37 and measure at the harness side.
  - Continuity between terminal (2) - earth
    - OK: Continuity
    - NG → Check the following connectors: A-37, C-14
      - OK  
      - NG → Repair
      - NG  
      - NG → Check trouble symptoms.

- Tail lamp relay check (Refer to P.54-40.)
  - OK → Replace
  - NG

- Disconnect the DRL-ECU connector A-37 and measure at the harness side.
  - Continuity between terminal (5) - earth
    - OK: System voltage
    - NG → Check the following connectors: A-37, C-14, C-116, B-14X
      - OK  
      - NG  
      - NG → Repair
      - NG → Check trouble symptoms.

- Malfunction of the DRL-ECU
  - OK → Replace
  - NG → {{36#1}}
ON-VEHICLE SERVICE

HEADLAMP AIMING

<USING A BEAMSETTING EQUIPMENT>
1. The headlamps should be aimed with the proper beamsetting equipment, and in accordance with the equipment manufacture’s instructions.

   NOTE
   If there are any regulations pertinent to the aiming of headlamps in the area where the vehicle is to be used, adjust so as to meet those requirements.

2. Alternately turn the adjusting screw to adjust the headlamp aiming. (Refer to P.54-38.)
3. With the engine running at 2,000 r/min. aim the headlamp.

<USING A SCREEN>
1. Inflate the tyres to the specified pressures and there should be no other load in the vehicles other than driver or substituted weight of approximately 75 kg placed in driver’s position.
2. Set the distance between the screen and the centre marks of the headlamps as shown in the illustration.
3. Check if the beam shining onto the screen is at the standard value.

   Standard value:
   <For lower beam adjustment>
   (Vertical direction)
   60 mm below horizontal (H)
   (Horizontal direction)
   Position where the 15° sloping section intersects the vertical line (V)
Standard value:

<For upper beam adjustment>

(Vertical direction)
22 mm below horizontal (H)

(Horizontal direction)
Parallel to direction of vehicle travel

Caution
1. When making the aiming adjustment, be sure to mask those lamps which are not being adjusted.
2. When it is difficult, because of outside light, to distinguish the light/dark dividing line, use a curtain, screen or similar material to reduce the effects of the outside light.

4. Alternately turn the adjusting screw to adjust the headlamp aiming.

Caution
Be sure to adjust the aiming adjustment screw in the tightening direction.

INTENSITY MEASUREMENT

Using a photometer, and following its manufacture’s instruction manual, measure the headlamp intensity and check to be sure that the limit value is satisfied.

Limit: 30,000 cd or more

NOTE
1. When measuring the intensity, maintain an engine speed of 2,000 r/min, with the battery in the charging condition.
2. There may be special local regulations pertaining to headlamp intensity, be sure to make any adjustments necessary to satisfy such regulations.
3. If an illuminometer is used to make the measurements, convert its values to photometer values by using the following formula.

\[ I = E r^2 \]

Where:
- \( I \) = intensity (cd)
- \( E \) = illumination (lux)
- \( r \) = distance (m) from headlamps to illuminometer
BULB REPLACEMENT

<Headlamp Bulb>
1. Disconnect the connector.
2. Remove the socket cover.

3. Unhook the spring which secures the bulb, and then remove the bulb.

   Caution
   Do not touch the surface of the bulb with hands or dirty gloves. If the surface does become dirty, clean it with alcohol or thinner, and let it dry thoroughly before installing.

<Position Lamp Bulb>
1. Disconnect the connector, and then remove the socket cover of headlamp lower beam.
2. Pinch the spring and pull out the position lamp bulb.

<Turn-signal Lamp Bulb>
1. Disconnect the connector.
2. Turn the bulb socket counterclockwise together with the bulb, and remove the bulb.

   Caution
   If the bulb socket is not securely installed, the lens will moisten, or water will get inside the lamp unit, so the bulb socket should be securely installed.
HEADLAMP AND FRONT TURN-SIGNAL LAMP

REMOVAL AND INSTALLATION

CAUTION: SRS
Before removal of air bag module and clock spring, refer to GROUP 52B - Service Precautions and Air Bag Module and Clock Spring.

1. Column switch <Lighting switch and dimmer/passing switch> (Refer to GROUP 37A - Steering Wheel and Shaft.)

Headlamp leveling switch removal steps
2. Switch bezel
3. Headlamp leveling switch

Headlamp removal steps
4. Radiator grille
5. Front turn-signal lamp
6. Headlamp
**REMOVAL SERVICE POINT**

* RADIATOR GRILLE REMOVAL

Remove the radiator grille by pushing the tab of the radiator grille clips in the direction of the arrows with a flat-tipped screwdriver, while lightly pulling the radiator grille towards you.

---

**INSPECTION**

**LIGHTING SWITCH, DIMMER/PASSING SWITCH AND TURN-SIGNAL LAMP SWITCH CHECK**

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Connector A- terminal No.</th>
<th>Connector B- terminal No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4 6</td>
<td>3 5 6 7 8 9 10</td>
</tr>
<tr>
<td><strong>LIGHTING SWITCH</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAIL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HEAD</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DIMMER/PASSING SWITCH</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOWER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UPPER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PASSING</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TURN-SIGNAL LAMP SWITCH</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LH</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE**

1. *1 indicates continuity when the dimmer switch is in the lower position.
2. *2 indicates continuity when the dimmer switch is in the upper position.
HEADLAMP RELAY AND TAIL LAMP RELAY CHECK

<table>
<thead>
<tr>
<th>Battery voltage</th>
<th>Terminal No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Supplied</td>
<td>+</td>
</tr>
<tr>
<td>Not supplied</td>
<td></td>
</tr>
</tbody>
</table>

HEADLAMP LEVELING SWITCH CHECK

Check the resistance between the terminals when the headlamp leveling switch is operated.

**Standard value:**

<table>
<thead>
<tr>
<th>Resistance measurement terminal No.</th>
<th>Switch position</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 1 2 3 4 5 6</td>
<td>0   1  2  3  4</td>
</tr>
<tr>
<td>Between 3 and 4 Ω</td>
<td>1,235 1,114 977 862 747</td>
</tr>
<tr>
<td>Between 4 and 6 Ω</td>
<td>548 669 806 921 1,036</td>
</tr>
<tr>
<td>Between 3 and 6 Ω</td>
<td>1,003</td>
</tr>
</tbody>
</table>

![Headlamp relay diagram](image1)

![Tail lamp relay diagram](image2)
### DAYTIME RUNNING LAMP RELAY CHECK

<table>
<thead>
<tr>
<th>Battery voltage</th>
<th>Terminal No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Supplied</td>
<td></td>
</tr>
<tr>
<td>Not supplied</td>
<td></td>
</tr>
</tbody>
</table>

![Diagram of daytime running lamp relay](image-url)
SIDE TURN-SIGNAL LAMP

SPECIAL TOOL

<table>
<thead>
<tr>
<th>Tool</th>
<th>Number</th>
<th>Name</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB990784</td>
<td>Ornament remover</td>
<td>Removal of side turn-signal lamp</td>
<td></td>
</tr>
</tbody>
</table>

REMOVAL SERVICE POINT

.Side Turn-Signal Lamp Removal

Use a special tool to remove the lock from the fender panel, and then remove the side turn-signal lamp.

INSTALLATION SERVICE POINT

.Side Turn-Signal Lamp Installation

1. Fit the lock into the fender panel.
2. Push the side turn-signal lamp into the fender, and secure it with the hook.
FRONT FOG LAMP

SERVICE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Items</th>
<th>Standard value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front fog lamp aiming</td>
<td>Vertical direction</td>
</tr>
<tr>
<td></td>
<td>100 mm below horizontal (H)</td>
</tr>
<tr>
<td></td>
<td>Horizontal direction</td>
</tr>
<tr>
<td></td>
<td>Parallel to direction of vehicle travel</td>
</tr>
</tbody>
</table>

SPECIAL TOOL

<table>
<thead>
<tr>
<th>Tool</th>
<th>Number</th>
<th>Name</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ornament remover</td>
<td>MB990784</td>
<td>Removal of switch garnish</td>
<td></td>
</tr>
</tbody>
</table>

ON-VEHICLE SERVICE

FRONT FOG LAMP AIMING

1. Measure the centre of the fog lamps, as shown in the illustration.

2. Set the distance between the screen and the centre of the fog lamps as shown in the illustration.

3. Inflate the tyres to the specified pressures and there should be no other load in the vehicles other than driver or substituted weight of approximately 75 kg placed in the driver’s position.

4. With the engine running at 2,000 r/min, aim the fog lamp.
5. Check if the beam shining onto the screen is at the standard value.

**Standard value:**
- **(Vertical direction)**
  - 100 mm below horizontal (H)
- **(Horizontal direction)**
  - Parallel to direction of vehicle travel

**NOTE**
The horizontal direction is non-adjustable. If the deviation of the light beam axis exceeds the standard value, check to be sure that the mounting location or some other point is not defective.

**Caution**
When making the aiming adjustment, be sure to mask those lamps which are not being adjusted.

---

**BULB REPLACEMENT**

1. Remove the fog lamp bezel.
2. Remove the fog lamp unit.

3. Undo the fog lamp rear cover.
4. Unhook the spring which secures the bulb and then remove the bulb.

**Caution**
Do not touch the surface of the bulb with hands or dirty gloves. If the surface does become dirty, clean it with alcohol or thinner, and let it dry thoroughly before installing.
FRONT FOG LAMP
REMOVAL AND INSTALLATION

Front fog lamp switch removal steps
1. Side air outlet
2. Front fog lamp switch

Front fog lamp removal steps
3. Fog lamp bezel
4. Fog lamp
   • Front bumper (Refer to GROUP 51.)
5. Fog lamp bracket
## REAR COMBINATION LAMP

### SPECIAL TOOLS

<table>
<thead>
<tr>
<th>Tool</th>
<th>Number</th>
<th>Name</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="MB991502" /></td>
<td>MB991502</td>
<td>MUT-II sub assembly</td>
<td>ETACS-ECU input signal checking</td>
</tr>
<tr>
<td><img src="image2.png" alt="MB990784" /></td>
<td>MB990784</td>
<td>Ornament remover</td>
<td>Removal of side air outlet (L.H.)</td>
</tr>
</tbody>
</table>
REAR COMBINATION LAMP

REMOVAL AND INSTALLATION

Caution: SRS
Before removal of air bag module and clock spring, refer to GROUP 52B - SRS Service Precautions and Air Bag Module and Clock Spring.

<SEDAN>

1. Column switch <Lighting switch and turn-signal lamp switch>
   (Refer to GROUP 37A - Steering Wheel and Shaft.)

Rear fog lamp switch removal steps
1. Column switch <Lighting switch and turn-signal lamp switch>
   (Refer to GROUP 37A - Steering Wheel and Shaft.)
2. Side air outlet
3. Rear fog lamp switch

<WAGON>

Rear combination lamp removal steps <WAGON>
5. Maintenance lid
6. Tailgate lamp lid
7. Rear combination lamp
   ● Tall gate waterproof film (Refer to GROUP 42.)
8. Tailgate lamp
9. Packing

Rear fog lamp switch removal steps <WAGON>
5. Maintenance lid
6. Tailgate lamp lid
7. Rear combination lamp
   ● Tall gate waterproof film (Refer to GROUP 42.)
8. Tailgate lamp
9. Packing
REMOVAL SERVICE POINT

**REAR COMBINATION LAMP REMOVAL <SEDAN>**

1. Turn up the trunk room rear side trim as shown in the figure, and remove the mounting nut and disconnect the connector.
2. Remove the rear combination lamp.

INSPECTION

**LIGHTING SWITCH AND TURN-SIGNAL LAMP SWITCH CHECK**

Refer to P.54-41.

**TAIL LAMP RELAY CHECK <Vehicles with Daytime Running Lamp System>**

Refer to P.54-42.
HIGH MOUNTED STOP LAMP

REMOVAL AND INSTALLATION

Removal steps <Sedan>
1. Socket assembly
2. Bulb
3. High mounted stop lamp

Removal steps <Wagon>
1. Cover
2. Lamp unit
3. Bulb
4. Socket assembly
**RHEOSTAT**

**REMOVAL AND INSTALLATION**

**Removal steps**
1. Meter bezel assembly
2. Rheostat

**INSPECTION**
1. Connect the battery and the test bulb (40W) as shown in the illustration.
2. Operate the rheostat, and if the brightness changes smoothly without switching off, then the rheostat function is normal.
HAZARD WARNING LAMP SWITCH

REMOVAL AND INSTALLATION

Removal steps
- Center console panel (Refer to GROUP 52A.)
- A/C-ECU or heater control panel
  (Refer to GROUP 55.)

1. Center outlet assembly
2. Hazard warning lamp switch

REMOVAL SERVICE POINT

CENTER OUTLET ASSEMBLY REMOVAL

Press the tabs indicated in the illustration, and pull the center outlet assembly to remove it.

INSPECTION

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Terminal No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>ON</td>
<td></td>
</tr>
</tbody>
</table>
**HORN**

**INSPECTION**

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Terminal No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Power is not supplied</td>
<td></td>
</tr>
<tr>
<td>Power is supplied</td>
<td>+</td>
</tr>
</tbody>
</table>

**CIGARETTE LIGHTER**

**INSPECTION**

- Take out the plug, and check for a worn edge on the element spot connection, and for shreds of tobacco or other material on the element.
- Using a circuit tester, check the continuity of the element.
SPECIAL TOOL

<table>
<thead>
<tr>
<th>Tool</th>
<th>Number</th>
<th>Name</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MB990784</td>
<td>Ornament remover</td>
<td>Removal of center display bezel</td>
</tr>
</tbody>
</table>

CLOCK

REMOVAL AND INSTALLATION

Removal steps
1. Center display bezel
2. Clock

REMOVAL SERVICE POINT

Use the special tool (MB990784) to pry up the tabs indicated in the illustration, and remove the center display bezel and the clock.
## RADIO AND TAPE PLAYER

### TROUBLESHOOTING

#### QUICK-REFERENCE TROUBLESHOOTING CHART

<table>
<thead>
<tr>
<th>Items</th>
<th>Problem symptom</th>
<th>Relevant chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise</td>
<td>Noise appears at certain places when travelling (AM).</td>
<td>A-1</td>
</tr>
<tr>
<td></td>
<td>Noise appears at certain places when travelling (FM).</td>
<td>A-2</td>
</tr>
<tr>
<td></td>
<td>Mixed with noise, only at night (AM).</td>
<td>A-3</td>
</tr>
<tr>
<td></td>
<td>Broadcasts can be heard but both AM and FM have a lot of noise.</td>
<td>A-4</td>
</tr>
<tr>
<td></td>
<td>There is more noise either on AM or on FM.</td>
<td>A-5</td>
</tr>
<tr>
<td></td>
<td>There is noise when starting the engine.</td>
<td>A-6</td>
</tr>
<tr>
<td></td>
<td>Some noise appears when there is vibration or shocks during travelling.</td>
<td>A-7</td>
</tr>
<tr>
<td></td>
<td>Noise sometimes appears on FM during travelling.</td>
<td>A-8</td>
</tr>
<tr>
<td></td>
<td>Ever-present noise.</td>
<td>A-9</td>
</tr>
<tr>
<td>Radio</td>
<td>When switch is set to ON, no power is available.</td>
<td>B-1</td>
</tr>
<tr>
<td></td>
<td>No sound from one speaker.</td>
<td>B-2</td>
</tr>
<tr>
<td></td>
<td>There is noise but no reception for both AM and FM or no sound from AM, or no sound from FM.</td>
<td>B-3</td>
</tr>
<tr>
<td></td>
<td>Insufficient sensitivity.</td>
<td>B-4</td>
</tr>
<tr>
<td></td>
<td>Distortion on AM or on both AM and FM.</td>
<td>B-5</td>
</tr>
<tr>
<td></td>
<td>Distortion on FM only.</td>
<td>B-6</td>
</tr>
<tr>
<td></td>
<td>Too few automatic select stations.</td>
<td>B-7</td>
</tr>
<tr>
<td></td>
<td>Insufficient memory (preset stations are erased).</td>
<td>B-8</td>
</tr>
</tbody>
</table>

**NOTE**  
Refer to problem symptoms of AM radio for MW radio.
<table>
<thead>
<tr>
<th>Items</th>
<th>Problem symptom</th>
<th>Relevant chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tape player</td>
<td>Cassette tape will not be inserted.</td>
<td>C-1</td>
</tr>
<tr>
<td></td>
<td>No sound.</td>
<td>C-2</td>
</tr>
<tr>
<td></td>
<td>No sound from one speaker.</td>
<td>C-3</td>
</tr>
<tr>
<td></td>
<td>Sound quality is poor, or sound is weak.</td>
<td>C-4</td>
</tr>
<tr>
<td></td>
<td>Cassette tape will not be ejected.</td>
<td>C-5</td>
</tr>
<tr>
<td></td>
<td>Uneven revolution. Tape speed is fast or slow.</td>
<td>C-6</td>
</tr>
<tr>
<td></td>
<td>Faulty auto reverse.</td>
<td>C-7</td>
</tr>
<tr>
<td></td>
<td>Tape gets caught in mechanism.</td>
<td>C-8</td>
</tr>
<tr>
<td>Motor antenna</td>
<td>Motor antenna won’t extend or retract.</td>
<td>D-1</td>
</tr>
<tr>
<td></td>
<td>Motor antenna extends and retract but does not receive.</td>
<td>D-2</td>
</tr>
</tbody>
</table>

**CHART**

**A. NOISE**

**A-1 Noise appears at certain places when travelling (AM).**

<table>
<thead>
<tr>
<th>Is there a particular structure?</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **No**
  - Do the following measures eliminate the noise?
    - Yes
      - OK
    - No
      - If due to vehicle noise:
        - It may not be possible to prevent noise if the signal is weak.
      - If due to external noise:
        - In almost all cases, prevention on the receiver side is impossible. Weak signals especially are susceptible to interference.
      - If there is more noise than other radios, find out the noise conditions and the name and frequency of the receiving stations from the user, and consult with the service centre.

- **Yes**
  - Find out the following information from the user:
    - Place
    - Locality conditions (valley, mountain, etc.)
    - Name and frequency of stations affected by noise
A-2 Noise appears at certain places when travelling (FM).

Do the following measures eliminate the noise?

- Change to a different station with a strong signal to boost resistance to interference.
- Suppress high tones to reduce noise.
- Extend antenna completely.

<table>
<thead>
<tr>
<th>Yes</th>
<th>OK</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

If there is more noise than other radios, find out the noise conditions and the name and frequency of the receiving stations from the user, and consult with the service centre.

NOTE
About FM waves:
FM waves have the same properties as light, and can be deflected and blocked. Wave reception is not possible in the shadow of obstructions such as buildings or mountains.

1. The signal becomes weak as the distance from the station’s transmission antenna increases. Although this may vary according to the signal strength of the transmitting station and intervening geographical formation or buildings, the area of good reception is approx. 20 - 25 km for stereo reception, and 30 - 40 km for monaural reception.

2. The signal becomes weak when an area of shadow from the transmitting antenna (places where there are obstructions such as mountains or buildings between the antenna and the car), and noise will appear. <This is called first fading, and gives a steady buzzing noise.>

3. If a direct signal hits the antenna at the same time as a signal reflected by obstructions such as mountains or buildings, interference of the two signals will generate noise. During travelling, noise will appear each time the vehicle’s antenna passes through this kind of obstructed area. The strength and interval of the noise varies according to the signal strength and the conditions of deflection. <This is called multipath noise, and is a repetitious buzzing.>

4. Since FM stereo transmission and reception has a weaker field than monaural, it is often accompanied by a hissing noise.
A-3 Mixed with noise, only at night (AM).

The following factors can be considered as possible causes of noise appearing at night.

1. Factors due to signal conditions: Due to the fact that long-distance signals are more easily received at night, even stations that are received without problem during the day may experience interference in a general worsening of reception conditions. The weaker a station is the more susceptible it is to interference, and a change to a different station or the appearance of a beating sound* may occur. Beat sound*: Two signals close in frequency interfere with each other, creating a repetitious high-pitched sound. This sound is generated not only by sound signals but by electrical waves as well.

2. Factors due to vehicle noise: Alternator noise may be a cause.

---

**Diagram**

- Is the noise still obvious even with the lamps OFF? 
  - No
  - Yes

- Do the following measures eliminate the noise? 
  - Yes 
  - No

  - Tune to a station with a strong signal.
  - Tune to a station with a strong signal without completely extending the antenna.

- Does the noise fade away when the vehicle harness is moved away from the radio chassis? (if the harness is not in the proper position.) 
  - Yes 
  - No

- If there is more noise than other radios, consult a service centre.
A-4 Broadcasts can be heard but both AM and FM have a lot of noise.

(1) Noise occurs when the engine is stopped.

Do the following measures eliminate the noise?

- Tune to a station with a strong signal.
- Extend the antenna completely.
- Adjust the sound quality to suppress high tones.

Yes

(2) Noise occurs when the engine is running.

Inspect the vehicle's noise suppressor. (Refer to A-6.)

Yes

- OK

No

Is the radio body earth mounted securely?

Yes

Securely tighten the nuts for the body earth.

No

Correctly attach the antenna plug.

Is the antenna plug properly connected to the radio?

Yes

Clean the antenna plug and earth wire mounting area. Mount the antenna securely.

No

Is the antenna itself in good condition or is it properly mounted?

Yes

No

Is the noise eliminated?

Yes

OK

If there is more noise than other radios, consult a service centre.

NOTE

About noise encountered during FM reception only.

Due to differences in FM and AM systems, FM is not as susceptible as AM to interference from engines, power lines, lightning, etc. On the other hand, there are cases due to the characteristics of FM waves of noise or distortion generated by typical noise interference (first fading and multipath). (Refer to A-2.)

<Noise (hissing) occurs in weak signal areas such as mountainous regions, but this is not due to a problem with the radio.>
A-5  There is more noise either on AM or on FM.

1. There is much noise only on AM.
   Due to differences in AM and FM systems, AM is more susceptible to noise interference.

   Were conditions such as the following present when noise was received?
   - Lightning was flashing. A motorcycle was passing.
   - A vehicle passed close by, but it appeared to be a vehicle generating a particularly large amount of noise radiation.
   - Passed beneath a power line. Passed under a bridge.
   - Passed beneath a telephone line.
   - Passed close by a signal generator.
   - Passed close by some other source of electrical noise.

   Continue to check for static; when static is detected, check for the conditions listed above.

   If the problem is particularly worse than other radios, consult a service centre.

2. There is much noise only on FM.
   Due to differences in FM and AM systems, FM is not as susceptible as AM to interference from engines, power lines, lightning, etc. On the other hand, there are cases due to the characteristics of FM waves of noise or distortion generated by typical noise interference (first fading and multipath). (Refer to A-2) <Noise (hissing) occurs in weak signal areas such as mountainous regions, but this is not due to a problem with the radio.>
A-6 There is noise when starting the engine.

<table>
<thead>
<tr>
<th>Noise type Sounds are in parentheses ( )</th>
<th>Conditions</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM, FM: Ignition noise (Popping, snapping, cracking, buzzing)</td>
<td>- Increasing the engine speed causing the popping sound to speed up, and volume decreases. - Disappears when the ignition switch is turned to ACC.</td>
<td>- Mainly due to the spark plugs. - Due to the engine noise.</td>
<td>- Check or replace the earth cable.</td>
</tr>
</tbody>
</table>

Other electrical components - Noise may appear as electrical components become older. Repair or replace electrical components.

Static electricity (Cracking, crinkling) - Disappears when the vehicle is completely stopped. - Severe when the clutch is engaged. - Various noises are produced depending on the body part of the vehicle. Occurs when parts or wiring move for some reason and contact metal parts of the body. Due to detachment from the body of the front hood, bumpers, exhaust pipe and muffler, suspension, etc. Tighten the mounting bolts securely. Cases where the problem is not eliminated by a single response to one area are common, due to several body parts being imperfectly earthed.

Caution
1. Connecting a high tension cable to the noise filter may destroy the noise filter and should never be done.
2. Check that there is no external noise. Since failure caused by this may result in misdiagnosis due to inability to identify the noise source, this operation must be performed.
3. Noise prevention should be performed by suppressing strong sources of noise step by step.

NOTE
1. Capacitor The capacitor does not pass D.C. current, but as the number of waves increases when it passes A.C. current, impedance (resistance against A.C.) decreases, and current flow is facilitated. A noise suppressing condenser which takes advantage of this property is inserted between the power line for the noise source and the earth. This suppresses noise by earthing the noise component (A.C. or pulse signal) to the body of the vehicle.

2. Coil The coil passes D.C. current, but impedance rises as the number of waves increases relative to the A.C. current. A noise suppressing coil which takes advantage of this property is inserted into the power line for the noise source, and works by preventing the noise component from flowing or radiating out of the line.
A-7 Some noise appears when there is vibration or shocks during travelling.

Are connectors properly connected?
- Yes
- No
  Ensure proper connection.

Does noise appear when the radio switch is turned on while the vehicle is stopped and the radio is struck while tuned away from a station?
- Yes
- No
  Static electricity noise:
  Body static electric from the shock absorber rubber bushings used to prevent vibration, tyres, etc. occurs because of separation from the earth, causing a buzzing noise. Since no measures can be taken on the radio side, other steps should be taken to discharge the static electricity of the vehicle body.

Is the radio correctly earthed? (Is the mounting screw tightened securely?)
- Yes
- No
  Tighten the screw securely.

Is the antenna correctly earthed? (If noise appears when the antenna is moved, this means the earth is not securely connected.)
- Yes
- No
  If rust is present at the antenna earth screw, clean and tighten the earth securely.

Repair or replace radio.

A-8 Noise sometimes appears on FM during travelling.

Does the problem clear up when returned?
- Yes
- No
  OK

Does the problem appear only in certain locations and only with certain stations?
- Yes
- No
  Due to electrical field conditions. (Multipath noise*, fading noise*).

Are connectors properly connected?
- Yes
- No
  Check connector connections.

Does noise appear when the radio switch is turned on while the vehicle is stopped and the radio is struck while tuned away from a station?
- Yes
- No
  Static electricity noise:
  Body static electric from the shock absorber rubber bushings used to prevent vibration, tyres, etc. occurs because of separation from the earth, causing a buzzing noise. Since no measures can be taken on the radio side, other steps should be taken to discharge the static electricity of the vehicle body.

Is the radio body correctly earthed? (Is the mounting screw tightened securely?)
- Yes
- No
  Tighten the screw securely.

Is the antenna correctly earthed? (If noise appears when the antenna is moved, this means the earth is not securely connected.)
- Yes
- No
  If rust is present at the antenna earth screw, clean and tighten the earth securely.

Repair or replace radio.

* About multipath noise and fading noise
Because the frequency of FM waves is extremely high, it is highly susceptible to effects from geological formations and buildings. These effects disrupt the broadcast signal and obstruct reception in several ways.
- Multipath noise
  This describes the echo that occurs when the broadcast signal is reflected by a large obstruction and enters the receiver with a slight time delay relative to the direct signal (repetitious buzzing).
- Fading noise
  This is a buzzing noise that occurs when the broadcast beam is disrupted by obstructing objects and the signal strength fluctuates intricately within a narrow range.
A-9 Ever-present noise.

Noise is often created by the following factors, and often the radio is OK when it is checked individually.

- Travelling conditions of the vehicle
- Terrain of area travelled through
- Surrounding buildings
- Signal conditions
- Time period

For this reason, if there are still problems with noise even after the measures described in steps A-1 to A-8 have been taken, get information on the factors listed above as well as determining whether the problem occurs with AM or FM, the station names, frequencies, etc., and contact a service centre.

B. RADIO

B-1 No power is supplied when the switch is set to ON.

Is dedicated fuse No. 6 blown or is the circuit open?

Yes  Replace fuse or repair harness.

No  Is the connector at the back of the radio connected properly?

Yes  Connect connector securely.

No  Disconnect and check the connector at the rear of the radio. Is the ACC power (12 V) being supplied to the radio?

Yes  Repair harness.

No  Repair or replace radio.

B-2 No sound from one speaker.

Check to see if there is any sound when attached to another radio.

Yes  Repair or replace radio.

No  Remove the connector on the back of the radio and check the speaker harness for conductance.

Yes  It conducts electricity but is shorted out.

Repair speaker harness.

No  Check the speaker for conductance.

Yes  Repair speaker harness and ensure proper connection of relay connectors.

No  Repair or replace speaker.
B-3 There is noise but no reception for both AM and FM or no sound from AM, or no sound from FM.

Is the check being conducted under special electrical field conditions?

Yes

No

Example: In an underground garage or inside a building.

Is proper performance obtained when the vehicle is moved?

Yes

OK

No

Does tuning solve the problem?

Yes

OK

No

Are the antenna plug and radio unit properly connected?

Yes

Reconnect

No

Does the problem disappear if connected to another radio?

Yes

Repair or replace radio.

No

Replace the antenna.

B-4 Insufficient sensitivity.

Is the check being conducted under special electrical field conditions?

Yes

No

Example: In an underground garage or inside a building.

Is proper performance obtained when the vehicle is moved?

Yes

OK

No

Does tuning solve the problem?

Yes

OK

No

Is the problem limited to the reception of a specific radio station from a specific position?

Yes

Electrical field condition related* (multipath noise or fading noise)

No

Is the antenna plug properly connected to the unit?

Yes

Ensure proper connection.

No

Does the problem disappear when a different radio is connected?

Yes

Repair or replace radio.

No

Replace the antenna.

* For multipath noise and fading noise problems, refer to P. 54-63.
B-5 Distortion on AM or on both AM and FM.

- **How much distortion is there?**
  - Occasional: Distortion in the vicinity of the radio station
  - Constant

- **Are the speaker cords in contact with the cone paper?**
  - Yes: Remove cords away from cone paper.
  - No

- **Remove the speakers and check for torn cone paper or foreign objects.**
  - Yes: Repair or replace speakers.
  - No

- **Check for deformation with speaker installed.**
  - Yes: Install speaker securely.
  - No

B-6 Distortion on FM only

- **Does the distortion persist when the radio is tuned to another station?**
  - No: Due to weak electrical field of radio station
  - Yes

- **Does distortion increase or decrease when the vehicle is moved?**
  - Yes: Due to multipath noise
  - No

B-7 Too few automatic select stations.

- **Is the check being conducted under special electrical field conditions?**
  - Yes
  - No: Example: In an underground garage or inside a building

- **Is proper performance obtained when the vehicle is moved?**
  - Yes: OK
  - No

- **Is the antenna plug properly connected to the equipment?**
  - Yes
  - No: Ensure proper connection.

- **Does the equipment work properly if the radio is changed?**
  - Yes
  - No: Repair or replace radio.

- **Replace the antenna.**
B-8 Insufficient memory (preset stations are erased).

<table>
<thead>
<tr>
<th>Condition</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is dedicated fuse No. 5 blown or is the circuit open? Yes</td>
<td>Replace fuse or repair harness.</td>
</tr>
<tr>
<td>No</td>
<td>Connect connector firmly.</td>
</tr>
<tr>
<td>Disconnect and check the connector at the rear of the radio. Is the memory backup (battery) power being supplied? No</td>
<td>Repair harness.</td>
</tr>
<tr>
<td>Yes</td>
<td>Repair or replace radio.</td>
</tr>
</tbody>
</table>

C. TAPE PLAYER

C-1 Cassette tape will not be inserted.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are there any foreign objects in the tape player? Yes</td>
<td>Remove the object(s)*1</td>
</tr>
<tr>
<td>No</td>
<td>Repair or replace tape player.</td>
</tr>
<tr>
<td>Does the tape player work if another tape is inserted? Yes</td>
<td>Replace tape*2</td>
</tr>
<tr>
<td>No</td>
<td>Repair or replace tape player.</td>
</tr>
</tbody>
</table>

*1 Attempting to force a foreign object (e.g., a coin or clip, etc.) out of the tape player may damage the mechanism. The player should be taken to a service dealer for repair.

*2 Ensure that the tape label is not loose, that the tape itself is not deformed and that the tape is tightly wound. Also, tape of C-120 or greater length often get caught in the mechanism and should not be used.

C-2 No sound (even after a tape has been inserted).

<table>
<thead>
<tr>
<th>Condition</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is dedicated fuse No. 6 blown or is the circuit open? Yes</td>
<td>Replace fuse or repair harness.</td>
</tr>
<tr>
<td>No</td>
<td>Repair or replace tape player.</td>
</tr>
<tr>
<td>Is connector at rear of radio connected tightly? No</td>
<td>Repair harness.</td>
</tr>
<tr>
<td>Yes</td>
<td>Connect connector firmly.</td>
</tr>
<tr>
<td>Disconnect connector at rear of radio. Is ACC power being supplied to the radio? Yes</td>
<td>Repair or replace tape player.</td>
</tr>
<tr>
<td>No</td>
<td>Repair harness.</td>
</tr>
</tbody>
</table>
C-3 No sound from one speaker.

- **Clean the tape player head and check again.**
  - Yes → OK
  - No → Replace the tape player and check again.
    - Yes → Repair or replace tape player.
    - No → Remove the connector on the back of the radio and check the speaker harness for conductance.
      - Yes → Repair harness.
      - No → Check the speaker for conductance.
        - Yes → Repair harness.
        - No → Repair or replace speaker.

C-4 Sound quality is poor, or sound is weak.

- Does the player play properly when another tape* is inserted? 
  - Yes → OK
  - No →
    - Does the player play properly when the tape player head is cleaned? 
      - Yes → OK
      - No →
        - Is proper operation obtained when the tape player is replaced? 
          - Yes → Repair or replace tape player.
          - No → Repair or replace speaker.

C-5 Cassette tape will not be ejected.

The problems covered here are all the result of the use of a bad tape (deformed or not properly tightened) or of a malfunction of the tape player itself. Malfunctions involving the tape becoming caught in the mechanism and ruining the case are also possible, and attempting to force the tape out of the player can cause damage to the mechanism. The player should be taken to a service dealer for repair.
C-6 Uneven revolution. Tape speed is fast or slow.

<table>
<thead>
<tr>
<th>Does the player play OK if the tape(^1) is changed?</th>
<th>Yes</th>
<th>OK</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) Ensure that the tape label is not loose, that the tape itself is not deformed and that the tape is tightly wound. Also, tape of C-120 or greater length often get caught in the mechanism and should not be used.

<table>
<thead>
<tr>
<th>Are there any foreign objects (^2) inside the tape player?</th>
<th>Yes</th>
<th>Remove foreign object(s).</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

\(^2\) Attempting to force a foreign object (e.g., a coin or clip, etc.) out of the tape player may damage the mechanism. The player should be taken to a service dealer for repair.

<table>
<thead>
<tr>
<th>Is the head or capstan roller dirty?</th>
<th>Yes</th>
<th>Clean.</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Repair or replace tape player.

C-7 Faulty auto reverse.

<table>
<thead>
<tr>
<th>Does the player play OK if the tape(^*) is changed?</th>
<th>Yes</th>
<th>OK</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

\(^*\) Ensure that the tape label is not loose, that the tape itself is not deformed and that the tape is tightly wound. Tapes of C-120 or greater length often get caught in the mechanism and should not be used.

<table>
<thead>
<tr>
<th>Does the problem only occur while the vehicle is being driven?</th>
<th>No</th>
<th>Repair or replace tape player.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is the tape player properly installed to the vehicle?</th>
<th>No</th>
<th>Ensure tape player installation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Repair or replace tape player.
**C-8 Tape gets caught in mechanism**

- *1 When the tape is caught in the mechanism, the case may not eject. When this occurs, do not try to force the tape out as this may damage the tape player mechanism. Take the cassette to a service dealer for repair.

<table>
<thead>
<tr>
<th>Does the player play OK if the tape is changed?</th>
<th>Yes → Tape used is bad</th>
<th>No → Repair or replace tape player</th>
</tr>
</thead>
</table>

- *2 Ensure that the tape label is not loose, that the tape itself is not deformed and that the tape is tightly wound. Also, tapes of C-120 or greater length often get caught in the mechanism and should not be used.

**D. MOTOR ANTENNA**

**D-1 Motor antenna won't extend or retract.**

Clean and polish the surface of the antenna rod.

<table>
<thead>
<tr>
<th>Is the radio power switch ON?</th>
<th>No → Switch it ON</th>
<th>Yes</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Is voltage (approx. 12 V) emitted to the radio's motor antenna terminal?</th>
<th>No → Repair or replace the radio</th>
<th>Yes</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Is the antenna bent?</th>
<th>No → Replace the antenna mast</th>
<th>Yes → Repair the bend, or replace the antenna mast</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Is the antenna relay OK?</th>
<th>No → Replace the antenna relay</th>
<th>Yes</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Is the motor OK?</th>
<th>No → Replace the motor</th>
<th>Yes → Repair the harness</th>
</tr>
</thead>
</table>
D-2 Motor antenna extends and retracts but does not receive.

Is the antenna itself OK?

A
B
C
D
E
F
G
H
Fender
A16N0087

<table>
<thead>
<tr>
<th>Ohmmeter measurement locations</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuits from F to A, B, C, D and E</td>
<td>Continuity</td>
</tr>
<tr>
<td>Circuit between G and H</td>
<td>Continuity</td>
</tr>
<tr>
<td>Circuits from H to A, B, C, D and E</td>
<td>No continuity</td>
</tr>
</tbody>
</table>

No → Repair or replace it.

Yes → Replace the feeder cable.

Is operation normal when a new antenna assembly is directly installed to the radio?

Yes → Refer to B "Radio troubleshooting".

No → Repair or replace it.
RADIO AND TAPE PLAYER
REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
Ashtray and Sunglasses Pocket Removal and Installation

NOTE
*: Metal clip position

Removal steps
1. Floor console panel
2. Centre console panel assembly
3. Radio and tape player
4. Radio bracket
5. Box
SPEAKER

REMOVAL AND INSTALLATION

<Sedan, Wagon>

1. Tweeter cover
2. Tweeter
3. Front door trim
4. Speaker
5. Speaker cover

Speaker (front door) removal steps

<Vehicles with 6 speakers>

<Sedan>  <Wagon>

6. Rear door trim
7. Speaker
8. Speaker cover

Speaker (rear door) removal steps

9. Speaker garnish
10. Speaker
11. Speaker bracket

Speaker (rear shelf) removal steps

<Sedan>
**ANTENNA**

**REMOVAL AND INSTALLATION**

*<Sedan - Vehicles with motor antenna>*

1. Radio and tape player
   - Instrument panel
     (Refer to GROUP 52A.)
   - Front pillar trim
     (Refer to GROUP 52A.)
   - Centre pillar trim
     (Refer to GROUP 52A.)
   - Rear pillar trim
     (Refer to GROUP 52A.)
   - Headlining
2. Antenna feeder cable removal steps

*<Sedan - Vehicles with pole antenna>*

Motor antenna or pole antenna removal steps

- Trunk side trim (L.H.)
  (Refer to GROUP 52A.)
- 3. Ring nut
- 4. Base
- 5. Motor antenna
- 6. Pole antenna
Antenna feeder cable removal steps
1. Radio and tape player
   • Instrument panel
   • Front pillar trim
     (Refer to GROUP 52A.)
   • Centre pillar trim
     (Refer to GROUP 52A.)
   • Quarter upper trim
     (Refer to GROUP 52A.)
   • Headlining
   2. Antenna feeder cable

Antenna (rear roof) removal steps
3. Rod assembly
   • Headlining
   4. Cover
   5. Packing
INSPECTION

MOTOR ANTENNA ASSEMBLY CHECK
1. Connect the circuit as indicated by the solid lines in the illustration.
2. Check that the motor antenna extends when the connection indicated by the broken line is made.
3. Check that the motor antenna retracts fully when the connection indicated by the broken line is removed.

ANTENNA POLE REPLACEMENT
1. Remove the ring nut.
2. After turning the ignition switch to ACC or ON, turn the radio switch to ON to raise the antenna pole, and remove it, together with the rack cable.

3. Draw out the antenna pole to the maximum extension.
   NOTE
   If there is a bend in the motor end of the rack cable, remove the bend.

4. Insert the rack cable into the motor assembly with the rack cable teeth facing the luggage compartment side.

5. Turn the rack cable teeth towards the rear of the vehicle (right 90°) so that the rack cable meshes with the motor gear.
6. If the rack cable pulls out with no resistance when it is lightly pulled, then the cable is not meshed with the motor gear, so check that there are no bends in the end of the rack cable, and then repeat steps 4 and 5 above.
7. Set the antenna pole vertically and turn the radio switch OFF to wind up the rack cable. Insert the antenna to the motor antenna side to align it with the wound-up rack cable.
8. After tightening the ring nut, check the movement of the antenna by turning the radio switch ON and OFF.
TROUBLESHOOTING

INSPECTION CHART FOR TROUBLE SYMPTOM

<table>
<thead>
<tr>
<th>Trouble symptom</th>
<th>Reference page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rear window defogger does not operate. &lt;Vehicles with automatic A/C&gt;</td>
<td>Refer to GROUP 55.</td>
</tr>
</tbody>
</table>

ON-VEHICLE SERVICE

PRINTED-HEATER LINE CHECK
1. Run engine at 2,000 r/min. Check heater element with battery at full.
2. Turn ON rear window defogger switch. Measure heater element voltage with circuit tester at rear window glass centre A.
   Condition is good if it indicates about 6V.
3. If 12 V is indicated at A, there is a break in the negative terminals from A.
   Move test bar slowly to negative terminal to detect where voltage changes suddenly (0V).
4. If 0 V is indicated at A, there is a break in the positive terminals from A. Detect where the voltage changes suddenly (12 V) in the same method described above.

REAR WINDOW DEFOGGER RELAY CONTINUITY CHECK

<table>
<thead>
<tr>
<th>Battery voltage</th>
<th>Terminal No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Power is not supplied</td>
<td></td>
</tr>
<tr>
<td>Power is supplied</td>
<td>O</td>
</tr>
</tbody>
</table>
REAR WINDOW DEFOGGER SWITCH
<VEHICLES WITH MANUAL A/C>

REMOVAL AND INSTALLATION
Refer to GROUP 55 - Heater Control Assembly, A/C Switch and Inside/Outside Air Changeover Switch.

INSPECTION
DEFOGGER SWITCH CONTINUITY CHECK

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Terminal No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>ON</td>
<td></td>
</tr>
</tbody>
</table>
SPECIAL TOOLS

<table>
<thead>
<tr>
<th>Tool</th>
<th>Number</th>
<th>Name</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MB991502</td>
<td>MUT-II sub assembly</td>
<td>ETACS-ECU input signal checking</td>
</tr>
<tr>
<td>A</td>
<td>MB991223</td>
<td>Harness set</td>
<td>Making voltage and resistance</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>A: Test harness</td>
<td>measurements during troubleshooting</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>B: LED harness</td>
<td>A: Connector pin contact pressure</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>C: LED harness adapter</td>
<td>B: Power circuit inspection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D: Probe</td>
<td>C: Power circuit inspection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>D: Commercial tester connection</td>
</tr>
</tbody>
</table>

TROUBLESHOOTING

The special tool (MB991223) should always be used to measure voltages and resistance when carrying out troubleshooting.

DIAGNOSTIC FUNCTION

INPUT SIGNAL INSPECTION POINTS
<VEHICLES WITH ETACS-ECU>

1. Connect the MUT-II to the diagnosis connector.
2. If a buzzer of the MUT-II sounds once when a switch is operated (ON/OFF), the ETACS-ECU input signal for that switch circuit system is normal.
## INSPECTION CHART FOR TROUBLE SYMPTOMS

<table>
<thead>
<tr>
<th>Trouble symptom</th>
<th>Inspection procedure No.</th>
<th>Reference page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication with MUT-II is not possible. &lt;Vehicles with ETACS-ECU&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication with all system is not possible.</td>
<td>1</td>
<td>54-80</td>
</tr>
<tr>
<td>Communication with one-shot pulse input signal only is not possible.</td>
<td>2</td>
<td>54-80</td>
</tr>
<tr>
<td>Arming/disarming relationship</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The system is not armed. (The security indicator lamp does not illuminate, and the alarm does not function.)</td>
<td>3</td>
<td>54-81</td>
</tr>
<tr>
<td>The arming procedures are followed, but the security indicator lamp does not illuminate. (There is an alarm, however, when an alarm test is conducted after about 20 seconds have passed.)</td>
<td>4</td>
<td>54-82</td>
</tr>
<tr>
<td>The alarm sounds in error when, the system is armed, a door or the tailgate is unlocked by using the key.</td>
<td>-</td>
<td>54-83</td>
</tr>
</tbody>
</table>

## INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

### INSPECTION PROCEDURE 1

**Communication with MUT-II is not possible. (Communication with all system is not possible.)**

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>The cause is probably a defect in the power supply system (including earth) for the diagnosis line.</td>
</tr>
</tbody>
</table>
| • Malfunction of connector  
| • Malfunction of harness wire |

Refer to GROUP 13A - Troubleshooting

### INSPECTION PROCEDURE 2

**Communication with MUT-II is not possible. (Communication with one-shot pulse input signal only is not possible.)**

<table>
<thead>
<tr>
<th>Probable cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>The cause is probably a defective one-shot pulse input signal circuit system of the diagnosis line.</td>
</tr>
</tbody>
</table>
| • Malfunction of connector  
| • Malfunction of harness wire  
| • Malfunction of ECU |

- Check the harness wire between the diagnosis connector and junction block.
  - OK: Check the following connectors: C-20, C-134, C-144
  - NG: Repair
- Check the following connectors: C-20, C-134, C-144
  - OK: Repair
  - NG: Replace the ETACS-ECU.
The system is not armed. (The security indicator lamp does not illuminate, and the alarm does not function.)

1. Check the dedicated fuse No.14.
   - NG: Replace the fuse.
   - OK: Next step.

2. Check the fusible link No.2.
   - NG: Replace the fusible link.
   - OK: Next step.

3. Disconnect the ETACS-ECU connector C-43 and measure at the harness side connector.
   - Voltage between the terminal (2) and earth
     - OK: System voltage
     - NG: Check the following connectors:
       - L.H. drive vehicles: C-144, C-141
       - R.H. drive vehicles: C-144, C-141, C-62, C-14
       - NG: Repair
       - OK: Check trouble symptom.

4. Measure at the harness side connector.
   - Continuity between the terminal (1) and body earth
     - OK: Continuity
     - NG: Check the following connectors:
       - C-131 and C-144
       - NG: Repair
       - OK: Check trouble symptom.

5. Check the harness wire between the ETACS-ECU and body earth.
   - NG: Repair, if necessary.
INSPECTION PROCEDURE 4

The arming procedures are followed, but the security indicator lamp does not illuminate. (There is an alarm, however, when an alarm test is conducted after about 20 seconds have passed.)

- Remove the combination meter and check if the security indicator lamp bulb is burnt out.
  - NG: Replace
  - OK

- Disconnect the combination meter connector D-03, and measure at the combination meter side.
  - Continuity between terminals (10) and (11)
    - OK: Continuity
    - NG: Replace the combination meter.

- Measure at the harness side of the same connector.
  - Voltage between the terminal (11) and earth
    - OK: System voltage
    - NG: Check the following connectors:
      - L.H. drive vehicles: D-03, C-135, C-144, C-141
      - R.H. drive vehicles: D-03, C-135, C-144, C-141, C-62, C-141
      - OK
      - NG: Check trouble symptoms.

- Disconnect the ETACS-ECU connector C-139, and measure at the harness side.
  - Earth the terminal (49) and check if the security indicator lamp illuminates.
    - OK: Illuminates
    - NG: Check the following connectors:
      - C-139, C-25, D-03
      - OK
      - NG: Replace the ETACS-ECU.
### MEASUREMENT AT ECU TERMINALS

<table>
<thead>
<tr>
<th>Terminal No.</th>
<th>Item</th>
<th>Check condition</th>
<th>Normal value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Earth</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>ECU power supply</td>
<td>At all times</td>
<td>System voltage</td>
</tr>
<tr>
<td>7</td>
<td>Ignition switch (ACC)</td>
<td>ON</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF</td>
<td>0 V</td>
</tr>
<tr>
<td>11</td>
<td>Ignition switch (IG1)</td>
<td>ON</td>
<td>System voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF</td>
<td>0 V</td>
</tr>
<tr>
<td>13,19</td>
<td>Front door switch (L.H.)</td>
<td>Door open</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Door closed</td>
<td>5 V</td>
</tr>
<tr>
<td>17</td>
<td>Key reminder switch</td>
<td>Ignition switch</td>
<td>ON (Removed) 0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OFF (Inserted) 5 V</td>
</tr>
<tr>
<td>28</td>
<td>Keyless entry receiver-ECU</td>
<td>Receiver output signal</td>
<td>ON 0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OFF 5 V</td>
</tr>
<tr>
<td>29</td>
<td>Theft-alarm horn relay</td>
<td>ON</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF</td>
<td>System voltage</td>
</tr>
<tr>
<td>33</td>
<td>Front door lock actuator switch (R.H.)</td>
<td>Lock</td>
<td>5 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unlock</td>
<td>0 V</td>
</tr>
<tr>
<td>34</td>
<td></td>
<td>Lock</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unlock</td>
<td>5 V</td>
</tr>
<tr>
<td>35</td>
<td>Front door lock actuator switch (L.H.)</td>
<td>Lock</td>
<td>5 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unlock</td>
<td>0 V</td>
</tr>
<tr>
<td>36</td>
<td></td>
<td>Lock</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unlock</td>
<td>5 V</td>
</tr>
<tr>
<td>41</td>
<td>Rear door lock actuator switch (R.H.)</td>
<td>Lock</td>
<td>5 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unlock</td>
<td>0 V</td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>Lock</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unlock</td>
<td>5 V</td>
</tr>
<tr>
<td>43</td>
<td>Trunk lid latch switch &lt;Sedan&gt;</td>
<td>ON</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF</td>
<td>5 V</td>
</tr>
<tr>
<td>Terminal No.</td>
<td>Item</td>
<td>Check condition</td>
<td>Normal value</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------------------</td>
<td>-----------------</td>
<td>--------------</td>
</tr>
<tr>
<td>44</td>
<td>Trunk lid lock key cylinder switch &lt;Sedan&gt;</td>
<td>ON</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF</td>
<td>5 V</td>
</tr>
<tr>
<td>45</td>
<td>Tailgate lock actuator &lt;Wagon&gt;</td>
<td>Lock</td>
<td>5 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unlock</td>
<td>0 V</td>
</tr>
<tr>
<td>46</td>
<td></td>
<td>Lock</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unlock</td>
<td>5 V</td>
</tr>
<tr>
<td>47</td>
<td>Door lock key cylinder switch</td>
<td>Unlock</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Neutral</td>
<td>5 V</td>
</tr>
<tr>
<td>48</td>
<td></td>
<td>Lock</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Neutral</td>
<td>5 V</td>
</tr>
<tr>
<td>49</td>
<td>Combination meter (Security indicator lamp)</td>
<td>ON</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF</td>
<td>System voltage</td>
</tr>
<tr>
<td>50</td>
<td>Front door switch (R.H.)</td>
<td>ON</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF</td>
<td>5 V</td>
</tr>
<tr>
<td>51</td>
<td>Hood switch</td>
<td>ON</td>
<td>0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF</td>
<td>5 V</td>
</tr>
</tbody>
</table>