1994 IMPORT SERVICE MANUAL

STEALTH

ELECTRICAL
Volume — 2

CHRYSLER CORPORATION
SAFETY NOTICE
CAUTION

ALL SERVICE AND REBUILDING INSTRUCTIONS CONTAINED HEREIN ARE APPLICABLE TO, AND FOR THE CONVENIENCE OF, THE AUTOMOTIVE TRADE ONLY. All test and repair procedures on components or assemblies in non-automotive applications should be repaired in accordance with instructions supplied by the manufacturer of the total product.

Proper service and repair is important to the safe, reliable, operation of all motor vehicles. The service procedures recommended and described in this publication were developed for professional service personnel and are effective methods for performing vehicle repair. Following these procedures will help assure efficient economical vehicle performance and service reliability. Some of these service procedures require the use of special tools designed for specific procedures. These special tools should be used when recommended throughout this publication.

Special attention should be exercised when working with spring or tension loaded fasteners and devices such as E-Clips, Circlips, Snap rings, etc., as careless removal may cause personal injury. Always wear safety goggles whenever working on vehicles or vehicle components.

It is important to note that this publication contains various Cautions and Warnings. These should be carefully read in order to minimize the risk of personal injury, or the possibility that improper service methods may damage the vehicle or render it unsafe. It is important to note that these Cautions and Warnings cover only the situations and procedures Chrysler Corporation has encountered and recommended. Chrysler Corporation could not possibly know, evaluate, and advise the service trade of all conceivable ways that service may be performed, or of the possible hazards of each. Consequently, Chrysler Corporation has not undertaken any such broad service review. Accordingly, anyone who uses a service procedure, or tool, that is not recommended in this publication must assure oneself thoroughly that neither personal safety, nor vehicle safety, be jeopardized by the service methods they select.

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FOREWORD
This Service Manual has been prepared with the latest service information available at the time of publication. It is subdivided into various group categories and each section contains diagnosis, disassembly, repair, and installation procedures along with complete specifications and tightening references. Use of this manual will aid in properly performing any servicing necessary to maintain or restore the high levels of performance and reliability designed into these outstanding vehicles.
8-2 FUSIBLE LINK, FUSE AND IOD OR STORAGE CONNECTOR LOCATION

FUSIBLE LINK, FUSE AND IOD OR STORAGE CONNECTOR LOCATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated fuse ① to ⑦</td>
<td>B</td>
<td>Fusible link</td>
<td>A</td>
</tr>
<tr>
<td>Dedicated fuse ⑧⑨</td>
<td>C</td>
<td>IOD or Storage connector</td>
<td>B</td>
</tr>
<tr>
<td>Dedicated fuse ⑩</td>
<td>E</td>
<td>Multi-purpose fuse</td>
<td>D</td>
</tr>
</tbody>
</table>

NOTE
The "Name" column is arranged in alphabetical order.

<Engine compartment>

16F0262

16F0263

<Interior>

19F0134
### INSPECTION TERMINAL LOCATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data link connector</td>
<td>B</td>
<td>Fuel pump check connector</td>
<td>A</td>
</tr>
<tr>
<td>Engine speed detection connector &lt;DOHC&gt;</td>
<td>A</td>
<td>Ignition timing adjustment connector</td>
<td>A</td>
</tr>
</tbody>
</table>

**NOTE**
The “Name” column is arranged in alphabetical order.

#### <Engine compartment>

![Engine compartment diagram]

#### <Interior>

![Interior diagram]

---

16F00502

19F0134

---
GROUNDING LOCATION

<Interior>

5

6

Center reinforcement (RH)

19F0134

16FO255

Front deck crossmember

16F0014

16F0267

7

8

Front floor crossmember

ABS control unit

16F0258

16F0021
## RELAY LOCATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS power relay</td>
<td>A</td>
<td>Magnetic clutch relay</td>
<td>D</td>
</tr>
<tr>
<td>Auto-cruise relay</td>
<td>J</td>
<td>MFI relay</td>
<td>K</td>
</tr>
<tr>
<td>Blower motor relay</td>
<td>F</td>
<td>Motor relay (ABS hydraulic unit)</td>
<td>B</td>
</tr>
<tr>
<td>Blower motor relay (HI)</td>
<td>L</td>
<td>Power window relay</td>
<td>G</td>
</tr>
<tr>
<td>Condenser fan motor relay (HI)</td>
<td>D</td>
<td>Radiator fan motor relay (HI)</td>
<td>A</td>
</tr>
<tr>
<td>Condenser fan motor relay (LO)</td>
<td>D</td>
<td>Radiator fan motor relay (LO)</td>
<td>A</td>
</tr>
<tr>
<td>Defogger relay</td>
<td>G</td>
<td>Rear intermittent wiper relay</td>
<td>M</td>
</tr>
<tr>
<td>Doorlock power relay 1</td>
<td>G</td>
<td>Starter relay</td>
<td>A</td>
</tr>
<tr>
<td>Doorlock power relay 2</td>
<td>M</td>
<td>Taillight relay</td>
<td>A</td>
</tr>
<tr>
<td>Fog light relay</td>
<td>A</td>
<td>Theft-alarm horn relay*</td>
<td>F</td>
</tr>
<tr>
<td>Fuel pump relay</td>
<td>C</td>
<td>Theft-alarm starter relay*</td>
<td>I</td>
</tr>
<tr>
<td>Generator relay</td>
<td>A</td>
<td>Turn-signal and hazard flasher unit</td>
<td>H</td>
</tr>
<tr>
<td>Headlight relay</td>
<td>A</td>
<td>Upper beam relay</td>
<td>E</td>
</tr>
<tr>
<td>Horn relay</td>
<td>A</td>
<td>Valve relay (ABS hydraulic unit)</td>
<td>B</td>
</tr>
</tbody>
</table>

**NOTE**

1. *: Vehicles with theft-alarm system.
2. Names are listed in alphabetical order.

### <Engine compartment>

![Engine compartment diagram](image-url)
<Instrument panel>

- Fuel pump relay
- Relay box
- Upper beam relay
- Strut assembly

D: Condenser fan motor relay (LO)
- Magnetic clutch relay

E: Condenser fan motor relay (HI)

F: Blower motor relay
- Theft-alarm horn relay

G: Defogger relay
- Door lock power relay
- Power window relay

H: Turn-signal and hazard flasher unit

I: Theft-alarm starter relay

J: Auto-cruise control relay
<Quarter panel>

M <Vehicles with keyless entry system>

Rear intermittent wiper relay
Door lock power relay 2

M <Vehicles without keyless entry system>

Rear intermittent wiper relay
## SENSOR LOCATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS front speed sensor</td>
<td>W</td>
<td>Heated oxygen sensor</td>
<td>F</td>
</tr>
<tr>
<td>ABS rear speed sensor</td>
<td>X</td>
<td>Interior temperature sensor</td>
<td>U</td>
</tr>
<tr>
<td>Air inlet sensor (for A/C)</td>
<td>Q</td>
<td>Kickdown servo switch</td>
<td>L</td>
</tr>
<tr>
<td>Air thermosensor (for A/C)</td>
<td>P</td>
<td>Knock sensor &lt;DOHC&gt;</td>
<td>D</td>
</tr>
<tr>
<td>Automatic transaxle oil temperature sensor &lt;A/T&gt;</td>
<td>L</td>
<td>Photosensor</td>
<td>R</td>
</tr>
<tr>
<td>Camshaft position sensor and crankshaft position sensor &lt;SOHC&gt;</td>
<td>M</td>
<td>Power steering pressure switch</td>
<td>E</td>
</tr>
<tr>
<td>Camshaft position sensor &lt;DOHC&gt;</td>
<td>G</td>
<td>Pulse generator A, B &lt;A/T&gt;</td>
<td>L</td>
</tr>
<tr>
<td>Crankshaft position sensor &lt;DOHC&gt;</td>
<td>H</td>
<td>Revolution pick-up sensor</td>
<td>I</td>
</tr>
<tr>
<td>EGR temperature sensor &lt;Turbo, Non Turbo (California)&gt;</td>
<td>C</td>
<td>Steering wheel angle speed sensor</td>
<td>N</td>
</tr>
<tr>
<td>Engine coolant temperature sensor (for A/C)</td>
<td>O</td>
<td>Thermostat</td>
<td>I</td>
</tr>
<tr>
<td>Engine coolant temperature sensor (for engine control)</td>
<td>K</td>
<td>Throttle position sensor</td>
<td>J</td>
</tr>
<tr>
<td>Front impact sensor</td>
<td>V</td>
<td>Vehicle speed sensor</td>
<td>B</td>
</tr>
<tr>
<td>G sensor (for ABS)</td>
<td>S</td>
<td>Volume air flow sensor</td>
<td>A</td>
</tr>
<tr>
<td>G sensor (for ECS)</td>
<td>T</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE**
Names are listed in alphabetical order.

### <Engine compartment>

#### <DOHC>

#### <SOHC>

![Diagram of sensor locations in DOHC and SOHC compartments]
8-12 SENSOR LOCATION

H
Crankshaft position sensor

J
Compressor
Revolution pick-up sensor
Thermostat

J
<SOHC>
Throttle position sensor (with built-in closed throttle position switch)

J
<DOHC>
Throttle position sensor (with built-in closed throttle position switch)

K
Engine coolant temperature sensor (for engine control)
Ignition coil

L
<A/T>
Kickdown servo switch
Pulse generator B
Pulse generator A
Automatic transaxle oil temperature sensor

M
Camshaft position sensor and crankshaft position sensor
<Instrument panel>

N

O

P

Q

R

S

19F0134

N <ECS>

Steering wheel angle speed sensor

12F0072

O

Engine coolant temperature sensor

20F0065

P

Evaporator

Air-thermo sensor

16F0051

Q

Air-inlet sensor

16F0047

R

Photo sensor

16F0281

S <ABS>

G sensor

16F0051

T <ECS>

G sensor

16F0134
<Roof>

<Front under floor>

<Rear under floor>
### CONTROL UNIT LOCATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS control unit</td>
<td>J</td>
<td>Electronic control suspension unit</td>
<td>I</td>
</tr>
<tr>
<td>Active exhaust control module</td>
<td>H</td>
<td>Engine control module</td>
<td>C</td>
</tr>
<tr>
<td>Air conditioning compressor lock controller</td>
<td>D</td>
<td>ETACS control unit</td>
<td>B</td>
</tr>
<tr>
<td>Air conditioning control unit</td>
<td>C</td>
<td>Keyless entry control unit</td>
<td>F</td>
</tr>
<tr>
<td>Auto-cruise control unit</td>
<td>D</td>
<td>Light automatic shut-off unit</td>
<td>F</td>
</tr>
<tr>
<td>Daytime running light control unit</td>
<td>A</td>
<td>Motor antenna control unit</td>
<td>G</td>
</tr>
<tr>
<td>ELC-4 A/T control module</td>
<td>C</td>
<td>SRS diagnosis unit</td>
<td>E</td>
</tr>
</tbody>
</table>

**NOTE**
Names are listed in alphabetical order.

*<Engine compartment>*

*<Instrument panel>*
<Quarter panel, luggage compartment>

F. <Vehicles with keyless entry system>
- Keyless entry control unit
- Light automatic shut-off unit

G. Motor antenna control unit
- Motor antenna

H. Active exhaust control module

I. Electronic control suspension control unit

J. ABS control unit
## SOLENOID, SOLENOID VALVE LOCATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGR solenoid &lt;Turbo, Non Turbo (California)&gt;</td>
<td>C</td>
<td>Fuel pressure solenoid &lt;Turbo&gt;</td>
<td>A</td>
</tr>
<tr>
<td>Evaporative emission purge solenoid</td>
<td>B</td>
<td>Turbocharger waste gate solenoid &lt;Turbo&gt;</td>
<td>D</td>
</tr>
</tbody>
</table>

**NOTE**
Names are listed in alphabetical order.

**<DOHC>**

- **A** <Turbo> Fuel pressure solenoid
- **B** <DOHC> Evaporative emission purge solenoid

**<SOHC>**

- **C** <SOHC> Evaporative emission purge solenoid
- **D** <Turbo> EGR solenoid
- **D** <Turbo> Turbocharger waste gate solenoid
DIODE LOCATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diode (ABS circuit)</td>
<td>A</td>
<td>Diode (Theft-alarm circuit)</td>
<td>C</td>
</tr>
<tr>
<td>Diode (MFI circuit)</td>
<td>B</td>
<td>Diode (4WS fluid level warning light circuit)</td>
<td>D</td>
</tr>
<tr>
<td>Diode (Seat belt warning circuit)</td>
<td>C</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<Engine compartment>

<Dash panel>

<Instrument panel>
Remarks
(1) Alphabets assigned to the connectors are keyed to those assigned to connectors on P. 8-20.
(2) Terminals of the harness side connector are indicated in parentheses ( ).
JUNCTION BLOCK

Front

- To roof wiring harness
- To front wiring harness
- Blower motor relay
- To instrument panel wiring harness
- Theft-alarm horn relay
- Fuse block (Multi-purpose fuses)

Back

- To body wiring harness (LH)

16F0304

16F0058
# CENTRALIZED JUNCTION

## FUSIBLE LINK (Relay box in engine compartment)

<table>
<thead>
<tr>
<th>No.</th>
<th>Circuit</th>
<th>Housing color</th>
<th>Rated capacity (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Generator circuit</td>
<td>Wine red</td>
<td>120</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Lighting circuit</td>
<td>Green</td>
<td>40</td>
</tr>
<tr>
<td>4</td>
<td>Ignition switch circuit</td>
<td>Pink</td>
<td>30</td>
</tr>
<tr>
<td>5</td>
<td>Radiator fan motor and condenser fan motor circuit</td>
<td>Green</td>
<td>40</td>
</tr>
<tr>
<td>6</td>
<td>Junction block (Multipurpose fuse ①, ⑥, ⑩, ⑬, ⑭, ⑮)</td>
<td>Green</td>
<td>40</td>
</tr>
<tr>
<td>7</td>
<td>ABS circuit</td>
<td>Yellow</td>
<td>60</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Power window circuit</td>
<td>Pink</td>
<td>30</td>
</tr>
<tr>
<td>10</td>
<td>Defogger circuit</td>
<td>Green</td>
<td>40</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![Diagram of the fuse box](image-url)
## DEDICATED FUSE

<table>
<thead>
<tr>
<th>Power supply circuit</th>
<th>No.</th>
<th>Rated capacity (A)</th>
<th>Housing color</th>
<th>Circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery</td>
<td>1</td>
<td>20</td>
<td>Yellow</td>
<td>MFI circuit</td>
</tr>
<tr>
<td>Taillight relay</td>
<td>2</td>
<td>15</td>
<td>Blue</td>
<td>Taillight circuit</td>
</tr>
<tr>
<td>Fusible link (6)</td>
<td>3</td>
<td>10</td>
<td>Red</td>
<td>Horn circuit</td>
</tr>
<tr>
<td>Fusible link (3)</td>
<td>4</td>
<td>15</td>
<td>Red</td>
<td>Fog light circuit</td>
</tr>
<tr>
<td>Headlight relay</td>
<td>5</td>
<td>10</td>
<td>Red</td>
<td>Upper beam circuit</td>
</tr>
<tr>
<td>Battery</td>
<td>6</td>
<td>10</td>
<td>Red</td>
<td>Hazard light circuit</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>10</td>
<td>Red</td>
<td>ABS circuit</td>
</tr>
<tr>
<td>Fusible link (5)</td>
<td>8</td>
<td>20</td>
<td>Yellow</td>
<td>Condenser fan motor circuit</td>
</tr>
<tr>
<td>Defogger relay</td>
<td>9</td>
<td>10</td>
<td>Red</td>
<td>Air conditioning circuit</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>10</td>
<td>Red</td>
<td>Remote controlled mirror heater circuit</td>
</tr>
</tbody>
</table>

<Relay box in engine compartment>

<Air conditioning relay box in engine compartment>

<Interior relay box>
## MULTI-PURPOSE FUSE (In junction block)

<table>
<thead>
<tr>
<th>Power supply circuit</th>
<th>No.</th>
<th>Rated capacity (A)</th>
<th>Load circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery</td>
<td>1</td>
<td>10</td>
<td>Seat belt solenoid, MFI relay</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ignition switch IG₂</td>
<td>3</td>
<td>10</td>
<td>Radiator fan motor relay, Air conditioning compressor lock controller, Blower motor relay, Air conditioning control unit, ABS relay, ECS control unit, Condenser fan motor relay</td>
</tr>
<tr>
<td>ACC</td>
<td>4</td>
<td>10</td>
<td>Audio, Motor antenna control unit, Auto-cruise control unit, ETACS unit</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>15</td>
<td>Remote controlled mirror, Cigarette lighter</td>
</tr>
<tr>
<td>Battery</td>
<td>6</td>
<td>10</td>
<td>Door lock power relay, Motor antenna control unit</td>
</tr>
<tr>
<td>Ignition switch IG₂</td>
<td>7</td>
<td>10</td>
<td>ELC-4A/T control module</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ignition switch ACC</td>
<td>9</td>
<td>15</td>
<td>Wiper relay, Wiper motor, Washer motor, Rear intermittent wiper relay, Keyless control unit</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>15</td>
<td>Accessory socket, ETACS unit</td>
</tr>
<tr>
<td>Ignition switch IG₁</td>
<td>11</td>
<td>15</td>
<td>Combination meter, Combination gauge, ETACS unit, Speed sensor, Motor antenna control unit, Turn signal and hazard flasher unit, Auto-cruise control main switch, SRS diagnosis unit, Auto-cruise relay</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>15</td>
<td>Ignition coil, Power transistor, MFI relay, Engine control module</td>
</tr>
<tr>
<td>Battery</td>
<td>13</td>
<td>15</td>
<td>Amplifier</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>10</td>
<td>Theft-alarm horn, Theft-alarm horn relay</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battery</td>
<td>16</td>
<td>30</td>
<td>Blower motor</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>15</td>
<td>Stop light, High-mounted stop light</td>
</tr>
<tr>
<td>Ignition switch IG₁</td>
<td>18</td>
<td>10</td>
<td>Back-up light, Light automatic shut-OFF unit, SRS diagnosis unit</td>
</tr>
<tr>
<td>Battery</td>
<td>19</td>
<td>10</td>
<td>Engine control module, ELC-4A/T control module, ETACS unit, Dome light, Foot light, Door light, Luggage compartment light, Combination meter, Air conditioning control unit, Auto-cruise control unit, Ignition key cylinder illumination light, Audio, Light automatic shut-OFF unit, ECS control unit</td>
</tr>
</tbody>
</table>

### Diagram

![Multi-purpose fuse](16F0304)
### CENTRALIZED RELAY

<table>
<thead>
<tr>
<th>Classification</th>
<th>Name</th>
<th>Classification</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relay box</td>
<td></td>
<td>Air conditioning relay box in engine compartment</td>
<td></td>
</tr>
<tr>
<td>in engine</td>
<td>A-01X Headlight relay</td>
<td>A-31X</td>
<td>Condenser fan motor relay (HI)</td>
</tr>
<tr>
<td>compartment</td>
<td>A-02X ABS power relay</td>
<td>A-32X</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>A-03X Fog light relay</td>
<td>A-33X</td>
<td>Magnetic clutch relay</td>
</tr>
<tr>
<td></td>
<td>A-04X Radiator fan motor relay (LO)</td>
<td>A-34X</td>
<td>Condenser fan motor relay (LO)</td>
</tr>
<tr>
<td></td>
<td>A-05X Taillight relay</td>
<td>Interior relay box</td>
<td>C-04X Door lock power relay 1</td>
</tr>
<tr>
<td></td>
<td>A-06X Horn relay</td>
<td></td>
<td>C-05X</td>
</tr>
<tr>
<td></td>
<td>A-07X Radiator fan motor relay (HI)</td>
<td>C-06X</td>
<td>Defogger relay</td>
</tr>
<tr>
<td></td>
<td>A-08X --</td>
<td></td>
<td>C-07X Power window relay</td>
</tr>
<tr>
<td></td>
<td>A-09X Starter relay</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>A-10X Generator relay</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>A-11X IOD or Storage connector</td>
<td></td>
<td>--</td>
</tr>
</tbody>
</table>

**NOTE**
IOD: Ignition Off Draw

---

**<Relay box in engine compartment>**

![Relay box in engine compartment](16F0256)

**<Air conditioning relay box in engine compartment>**

![Air conditioning relay box in engine compartment](16F0002)

**<Interior relay box>**

![Interior relay box](16F0431)
HARNESS CONNECTOR INSPECTION

CONNECTOR CONTINUITY AND VOLTAGE TEST

When checking continuity and/or voltage at the waterproof connectors, follow the steps below to avoid poor connector contact and/or reduced waterproof performance of connectors.

1. When checking is performed with the circuit in the state of continuity, be sure to use the special tool (harness connector).
   Never insert a test bar from the harness side, because to do so will reduce the waterproof performance and result in corrosion.

2. When the connector is disconnected for checking the female pin (the harness for checking the contact pressure of connector pins should be used.
   Never force the insertion of a test bar, because to do so will cause poor contact.

3. When the male pin is to be checked, apply the test bar against the pin directly.
   Care must be taken not to short-circuit the connector pins.

TERMINAL ENGAGEMENT CHECK

When the terminal stopper of connector is out of order, engagement of male and female terminals becomes improper even when the connector itself is engaged perfectly and the terminal sometimes slips out to the rear side of connector.

Ascertain, therefore, that each terminal does not come off the connector by pulling each harness wire.

CONNECTOR TERMINAL ENGAGEMENT AND DISENGAGEMENT

Connectors which are loose shall be rectified by removing the female terminal from connector housing and raising its lance to establish a more secure engagement. Removal of connector terminal used for MFI and 4 A/T control circuit shall be done in the following manner.

COMPUTER CONNECTOR

(1) Insert screwdriver [1.4 mm (.06 in.) width] as shown in the figure, disengage front holder and remove it.
(2) Insert harness of terminal to be rectified deep into connector from harness side and hold it there.

(3) Insert tip of screwdriver [1.4 mm (.06 in.) width] into connector in a manner as shown in the figure, raise housing lance slightly with it and pull out harness.

**Caution**

Tool No. 753787-I supplied by AMP can be used instead of screwdriver.

(4) Insert needle through a hole provided on terminal and raise contact point of male terminal.

## ROUND WATERPROOF CONNECTOR

(1) Remove waterproof cap by using a screwdriver.
(2) Insert tip of screwdriver [1.4 mm (.06 in.) or 2.0 mm (.08 in.) width] into connector in a manner as shown in the figure, raise housing lance slightly with it and pull out harness.

(3) Insert screwdriver through a hole provided on terminal and raise contact point of male terminal.
RECTANGULAR WATERPROOF CONNECTOR

(1) Disengage front holder by using a screwdriver and remove it.

(2) Insert tip of screwdriver [*0.8 mm (.03 in.) width] into connector in a manner as shown in the figure, push it lightly to raise housing lance and pull out harness.
*If right size screwdriver is not available, convert a conventional driver to suit the size.

(3) Press contact point of male terminal down by holding a screwdriver [1.4 mm (.06 in.) width] in a manner as shown in the figure.

INJECTOR CONNECTOR

(1) Remove waterproof cap.

(2) Insert tip of screwdriver [1.4 mm (.06 in.) width] into connector in a manner as shown in the figure, press in terminal lance and pull out harness.

(3) Press contact point of male terminal down by holding a screwdriver [1.4 mm (.06 in.) width] in a manner as shown in the figure.

Caution
Make sure that lance is in proper condition before terminal is inserted into connector.
HOW TO DIAGNOSE

The most important point in troubleshooting is to determine "Probable Causes". Once the probable causes are determined, parts to be checked can be limited to those associated with such probable causes. Therefore, unnecessary checks can be eliminated. The determination of the probable causes must be based on a theory and be supported by facts and must not be based on intuition only.

TROUBLESHOOTING STEPS

If an attempt is made to solve a problem without going through correct steps for troubleshooting, the problem symptoms could become more complicated, resulting in failure to determine the causes correctly and making incorrect repairs. The four steps below should be followed in troubleshooting.

1. Observation of Problem Symptoms
   Check if there are also other problems.

2. Determination of Probable Causes
   In determining the probable causes, it is necessary to check the wiring diagram to understand the circuit as a system. Knowledge of switches, relays and other parts is necessary for accurate determination. The causes of similar problems in the past must be taken into account.

3. Checking of Parts Associated with Probable Causes and Determination of Faulty Parts
   Troubleshooting is carried out by making step by step checks until the true cause is found. Always go through the procedures considering what check is to be made where for the best results.

4. Repair and Confirmation
   After the problems are corrected, be sure to check that the system operates correctly. Also, check that new problems have not been caused by the repair.

INFORMATION FOR DIAGNOSIS

This manual contains the cable diagrams as well as the individual circuit drawings, operational explanations, and troubleshooting hints for each component required to facilitate the task of troubleshooting. The information is compiled in the following manner:

(1) Cable diagrams show the connector positions, etc., on the actual vehicle as well as the harness path.
(2) Circuit drawings show the configuration of the circuit with all switches in their normal positions.
(3) Operational explanations include circuit drawings of voltage flow when the switch is operated and how the component operates in reaction.
(4) Troubleshooting hints include numerous examples of problems which might occur, traced backward in a common-sense manner to the origin of the trouble.

Problems whose origins may not be found in this manner are pursued through the various system circuits.

NOTE
Components of MFI, ETACS, ECS, etc. with ECU do not include 3 and 4 above. For this information, refer to a manual which includes details of these components.
INSPECTION

1. Visual and aural checks

Check relay operation, blower motor rotation, light illumination, etc. visually or aurally. The flow of current is invisible but can be checked by the operation of the parts.

2. Simple checks

For example, if a headlight does not come on and a faulty fuse or poor grounding is suspected, replace the fuse with a new one or ground the light to the body by a jumper wire to determine which part is responsible for the problem.

3. Checking with instruments

Use an appropriate instrument in an adequate range and read the indication correctly. You must have sufficient knowledge and experience to handle instruments correctly.

INSPECTION INSTRUMENTS

In inspection, make use of the following instruments.

1. Test lights

A test light consists of a 12V bulb and lead wires. It is used to check voltages or shortcircuits.

2. Self-power test light

A self-power test light consists of a bulb, battery and lead wires connected in series. It is used to check continuity or grounding.
3. **Jumper wire**
   A jumper wire is used to close an open circuit. Never use one to connect a power supply directly to a load.

4. **Voltmeter**
   A voltmeter is used to measure the circuit voltage. Normally, the positive (red lead) probe is applied to the point of voltage measurement and the negative (black lead) probe to the body ground.

5. **Ohmmeter**
   An ohmmeter is used to check continuity or measure resistance of a switch or coil. If the measuring range has been changed, the zero point must be adjusted before measurement.

### CHECKING SWITCHES

In a circuit diagram, a switch is represented by a symbol and in the idle state.

1. **Normal open or normal close switch**
   Switches are classified into those which make the circuit open and those which make the circuit closed when off.
2. SWITCH CONNECTION

This figure illustrates a complex switch. The continuity between terminals at each position is as indicated in the table below.

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st stage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd stage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd stage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th stage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE
O-O denotes continuity between terminals.

CHECKING RELAYS

1. When current flows through the coil of a relay, its core is magnetized to attract the iron piece, closing (ON) the contact at the tip of the iron piece. When the coil current is turned off, the iron piece is made to return to its original position by a spring, opening the contact (OFF).

2. By using a relay, a heavy current can be turned on and off by a switch of small capacity. For example, in the circuit shown here, when the switch is turned on (closed), current flows to the coil of the relay. Then, its contact is turned on (closed) and the light comes on. The current flowing at this time to the switch is the relay coil current only and is very small.

3. The relays may be classified into the normal open type and the normal close type by their contact construction.

NOTE
The deenergized state means that no current is flowing through the coil and the energized state means that current is flowing through the coil.
When a normal close type relay as illustrated here is checked, there should be continuity between terminals (1) and (2) and between terminals 3 and 4 when the relay is deenergized, and the continuity should be lost between terminals 3 and 4 when the battery voltage is applied to the terminals 1 and 2. A relay can be checked in this manner and it cannot be determined if a relay is okay or faulty by checking its state only when it is deenergized (or energized).

### CHECKING FUSES

A blade type fuse has test taps provided to allow checking of the fuse itself without removing it from the fuse block. The fuse is okay if the test light comes on when its one lead is connected to the test taps (one at a time) and the other lead is grounded. (Change the ignition switch position adequately so that the fuse circuit becomes live.)

### CAUTIONS IN EVENT OF BLOWN FUSE

When a fuse is blown, there are two probable causes as follows: One is that it is blown due to flow of current exceeding its rating. The other is that it is blown due to repeated on/off current flowing through it. Which of the two causes is responsible can be easily determined by visual check as described below.

1. **Fuse blown due to current exceeding rating**
   The illustration shows the state of a fuse blown due to this cause. In this case, do not replace the fuse with a new one hastily since a current heavy enough to blow the fuse has flowed through it. First, check the circuit for shorting and check for abnormal electric parts. Only after the correction of such shorting or parts, fuse of the same capacity should be used as a replacement. Never use a fuse of larger capacity than the one that has blown. If such a fuse is used, electric parts or wirings could be damaged before the fuse blows in the event an overcurrent occurs again.

2. **Fuse blown due to repeated current on/off**
   The illustration shows the state of a fuse blown due to repeated current on/off. Normally, this type of problem occurs after fairly long period of use and hence is less frequent than the above type. In this case, you may simply replace with a new fuse of the same capacity.
CHECKING CABLES AND WIRES
1. Check connections for looseness, rust and stains.
2. Check terminals and wires for corrosion by battery electrolyte, etc.
3. Check terminals and wires for open circuit or impending open circuit.
4. Check wire insulation and coating for damage, cracks and degrading.
5. Check conductive parts of terminals for contact with other metallic parts (vehicle body and other parts).
6. Check grounding parts to verify that there is complete continuity between attaching bolt(s) and vehicle body.
7. Check for incorrect wiring.
8. Check that wirings are so clamped as to prevent contact with sharp corners of the vehicle body, etc. or hot parts (exhaust manifold, pipe, etc.).
9. Check that wirings are clamped firmly to secure enough clearance from the fan pulley, fan belt and other rotating or moving parts.
10. Check that the wirings between the fixed parts such as the vehicle body and the vibrating parts such as the engine are made with adequate allowance for vibrations.

HANDLING ON-VEHICLE BATTERY
When checking or servicing does not require power from the on-vehicle battery, be sure to disconnect the cable from the battery (—) terminal. This is to prevent problems that could be caused by a short circuit. Disconnect the (—) terminal first and reconnect it last.

Caution
1. Before connecting or disconnecting the negative cable, be sure to turn off the ignition switch and the lighting switch. (If this is not done, there is the possibility of semiconductor parts being damaged.)
2. After completion of the work steps [when the battery’s negative (—) terminal is connected], warm up the engine and allow it to idle for approximately five minutes under the conditions described below, in order to stabilize the engine control conditions, and then check to be sure that the idling is satisfactory.

Engine coolant temperature: 85 — 95°C (185 — 203°F)
Lights, electric fans, accessories: OFF
Transaxle: neutral position
(A/T models: “N” or “P”)
Steering wheel: neutral (center) position
GENERAL ELECTRICAL SYSTEM CHECKS

A circuit consists of the power supply, switch, relay, load, ground, etc. There are various methods to check a circuit including an overall check, voltage check, shortcircuit check and continuity check. Each of these methods is briefly described in the following.

1. VOLTAGE CHECK

   (1) Ground one lead wire of the test light. If a voltmeter is used instead of the test light, ground the grounding side lead wire.

   (2) Connect the other lead wire of the test light to the power side terminal of the switch connector. The test light should come on or the voltmeter should indicate a voltage.

   (3) Then, connect the test light or voltmeter to the motor connector. The test light should not come on, or the voltmeter should indicate no voltage. When the switch is turned on in this state, the test light should come on, or the voltmeter should indicate a voltage, with motor starting to run.

   (4) The circuit illustrated here is normal but if there is any problem such as the motor failing to run, check voltages beginning at the connector nearest to the motor until the faulty part is identified.
2. SHORT CIRCUIT CHECK

A blown fuse indicates that a circuit is shorted. The circuit responsible can be determined by the following procedures.

- **Remove the blown fuse and connect a test light in its place** (Switch is in the OFF position)

  - **Test light comes on** → Short circuit between fuse block and switch  
  - **Test light does not come on** → Short circuit between the switch and illumination light connector

- **Turn on the switch** (Test light comes on but the illumination light does not come on)

  - Disconnect the illumination light connector

- **Test light comes on** → Short circuit between the switch and illumination light connector

- **Test light does not come on** → Short circuit between the illumination light connector and illumination light connector
3. CONTINUITY CHECK

(1) When the switch is in the OFF position, the self power test light should come on or the ohmmeter should read 0 ohm only when the terminals 1 and 2 are interconnected.

(2) When the switch is in the ON position, the self power test light should come on or the ohmmeter should read 0 ohm only when the terminals 3 and 4 are interconnected.
# CONFIGURATION DIAGRAMS

## CONTENTS

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<td>Overall Configuration Diagram</td>
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</table>
HOW TO READ CONFIGURATION DIAGRAM

The wiring harness diagrams clearly show the connector locations and harness routings at each site on actual vehicles.

Denotes connector No.
The same connector No. is used throughout the circuit diagrams to facilitate connector location searches.
The first alphabetical symbol indicates the location site of the connector and a number that follows in the unique number.
Numbers are assigned to parts in clockwise order on the diagram.
In case connectors of the same shape (same number of poles) are located close to each other, connector colors are shown to aid in identification.
Example: A-12

Number specific to connector (serial number)
Connector location site symbol
A: Engine compartment
B: Engine and transaxle
C: Dash panel
D: Instrument panel and floor console
E: Interior
F: Luggage compartment

Denotes a section covered by a corrugated tube.

Denotes ground point.
Same ground number is used throughout circuit diagrams to facilitate search of ground point. Refer to GROUNDING LOCATION for details of ground points.
ENGINE COMPARTMENT

Connector symbol

A

<Turbo>

A-69 A-70 A-20 A-21
A-72 A-71 A-22

A-01X Headlight relay
A-02X ABS power relay
A-03X Foglight relay
A-04X Radiator fan motor relay (LO)
A-05X Taillight relay
A-06X Horn relay
A-07X Radiator fan motor relay (HI)
A-08X -
A-09X Starter relay
A-10X Generator relay
A-11X IOD or Storage connector
A-12 ABS front speed sensor (RH)
A-13 ECS front shock absorber (RH)
A-14 Washer fluid level sensor
A-15 Front wiper motor
A-16 Engine speed detection connector <DOHC>
A-17 Fuel pump check connector
A-18 Ignition timing adjustment connector
A-19 Front washer motor
A-20 Evaporative emission purge solenoid
A-21 EGR solenoid <Turbo, Non Turbo (California)>
A-22 EGR temperature sensor <Turbo, Non Turbo (California)>
A-23 -
A-24 Brake fluid level sensor
A-25 ECS front shock absorber (LH)
A-26 Theft-alarm horn
A-27 Auto-cruise vacuum pump
A-28 ABS front speed sensor (LH)
A-29 4WS fluid level sensor <Turbo>
ENGINE HOOD

A-73

A-31X  A-34X
A-41  Headlight (LO, LH)
A-42  Fog light (LH)
A-43  —
A-44  —
A-45  —
A-46  —
A-47  —
A-48  —
A-49  —
A-50  —
A-51  Fuel pump resistor <Turbo>
A-52  —
A-53  —
A-54  —
A-55  Radiator fan motor
A-56  Engine coolant level sensor
A-57  —
A-58  Fog light (RH)
A-59  —
A-60  —
A-61  Headlight (LO, RH)
A-62  Front combination light (RH)
A-63  SRS front impact sensor (RH)
A-64  —
A-65  —
A-66  —
A-67  Front wiring harness and control wiring harness combination
A-68  Diode for ABS circuit
A-69  —
A-70  —
A-71  Turbocharger waste gate solenoid <Turbo>
A-72  Fuel pressure solenoid <Turbo>
A-73  Control wiring harness and solenoid valve harness combination
A-74  Inspection light
A-75  —
A-76  —
A-77  —
A-78  No connection <Turbo>

Remarks
(1) The mark ★ shows the standard mounting position of wiring harness.
(2) For details concerning the ground point (example: ●), refer to P.8-4.
(3) "—" means that the connector with code number is not used.

A-31X Condenser fan motor relay (HI)
A-32X —
A-33X Magnetic clutch relay
A-34X Condenser fan motor relay (LO)
A-35 Dual pressure switch
A-36 Air conditioning relay box
A-37 A-38 SRS front impact sensor (LH)
A-39 Front combination light (LH)
A-40 Inspection light switch

Refer to CENTRALIZED JUNCTION

36F0086
ENGINE AND TRANSAXLE <SOHC>

Front View

- Engine coolant temperature gauge unit
- Engine coolant temperature sensor
- Crankshaft position sensor
- Camshaft position sensor
- Throttle position sensor
- Control wiring harness and injector wiring harness combination
- Injector No. 5
- Injector No. 3
- Injector No. 1
- Ignition coil
- Magnet clutch
- Power transistor
- Starter motor
- Left bank heated oxygen sensor (front) <California>
- Right bank heated oxygen sensor (front) <California>
- Generator
- Magnetic clutch
- Power transistor
- Starter motor
Rear View

B-25  Back-up light switch <M/T>
B-26  Park/Neutral position switch <A/T>
B-27  ELC-4 A/T control solenoid valve <A/T>
B-28  
B-29  Volume air flow sensor (with intake air temperature sensor and atmospheric sensor)
B-30  Control wiring harness and battery cable combination
B-31  Injector No. 2
B-32  Injector No. 4
B-33  Injector No. 6
B-34  Speed sensor
B-35  Idle air control motor (stepper motor)
B-36  Oil pressure gauge unit
B-37  Oil pressure switch
B-38  Power steering pressure switch
B-39  Condenser assembly
B-40  
B-41  
B-42  Kickdown servo switch
B-43  A/T temperature sensor
B-44  Right bank heated oxygen sensor (rear)
   <California>
B-45  Left bank heated oxygen sensor (rear)
   <California>

Remarks:
(1) The mark ★ shows the standard mounting position of wiring harness.
(2) For details concerning the ground point (example: 3), refer to P.8-4.
(3) "—" means that the connector with code-number is not used.
ENGINE AND TRANSAXLE <DOHC-M/T>

Connector symbol

Front View

B-01 Engine coolant temperature gauge unit
B-02 Engine coolant temperature sensor
B-03 -
B-04 -
B-05 Throttle position sensor
B-06 Control wiring harness and oil pressure wiring harness combination
B-07 Control wiring harness and injector wiring harness combination
B-08 Knock sensor
B-09 Variable induction servomotor (with intake control valve position sensor) <Non-Turbo>

B-11 Injector No. 5
B-12 Injector No. 3
B-13 Injector No. 1
B-14 Ignition coil
B-15 Capacitor
B-16 Left bank heated oxygen sensor (front) <Turbo, Non-Turbo – California>
B-17 Generator
B-18 -
B-19 Right bank heated oxygen sensor (front)
B-20 Magnetic clutch
B-21 -
B-22 Power transistor
Rear View

B-23  Starter motor
B-24
B-25  Back-up light switch
B-26
B-27
B-28  Fuel pump relay <Turbo>
B-29  Volume air flow sensor (with intake air temperature sensor and atmospheric sensor)
B-30  Control wiring harness and battery cable combination
B-31  Injector No. 2
B-32  Injector No. 4
B-33  Injector No. 6
B-34  Speed sensor
B-35  Idle air control motor (stepper motor)
B-36  Oil pressure gauge unit
B-37  Oil pressure switch
B-38  Power steering pressure switch
B-39
B-40  Camshaft position sensor
B-41  Crankshaft position sensor
B-42
B-43
B-44  Right bank heated oxygen sensor (rear) <California>
B-45  Left bank heated oxygen sensor (rear) <California>

Remarks
(1) The mark ★ shows the standard mounting position of wiring harness.
(2) For details concerning the ground point (example; □), refer to P.8-4.
(3) “—” means that the connector with code-number is not used.
ENGINE AND TRANSAXLE <DOHC-A/T>

Connector symbol

B

Front View

B-01 Engine coolant temperature gauge unit
B-02 Engine coolant temperature sensor
B-03
B-04
B-05 Throttle position sensor
B-06 Control wiring harness and oil pressure wiring harness combination
B-07 Control wiring harness and injector wiring harness combination
B-08 Knock sensor
B-09 Variable induction servo motor
B-10 (with intake control valve position sensor)
B-11 Injector No. 5
B-12 Injector No. 3
B-13 Injector No. 1
B-14 Ignition coil
B-15 Capacitor
B-16 Left bank heated oxygen sensor (front) <California>
B-17 Generator
B-18
B-19 Right bank heated oxygen sensor (front)
B-20 Magnetic clutch
B-21 Power transistor
B-22
B-23  Starter motor
B-24  
B-26  Park/Neutral position switch
B-27  ELC-4 A/T control solenoid valve
B-28  
B-29  Volume air flow sensor (with intake air temperature sensor and atmospheric sensor)
B-30  Control wiring harness and battery cable combination
B-31  Injector No. 2
B-32  Injector No. 4
B-33  Injector No. 6
B-34  Speed sensor
B-35  Idle air control motor (stepper motor)
B-36  Oil pressure gauge unit
B-37  Oil pressure switch
B-38  Power steering pressure switch

B-39  
B-40  Camshaft position sensor
B-41  Crankshaft position sensor
B-42  Kickdown servo switch
B-43  A/T fluid temperature sensor
B-44  Right bank heated oxygen sensor (rear)  
<California>
B-45  Left bank heated oxygen sensor (rear)  
<California>

Remarks
(1) The mark ★ shows the standard mounting position of wiring harness.
(2) For details concerning the ground point (example: □), refer to P.8-4.
(3) "…” means that the connector with code number is not used.
DASH PANEL

Connector symbol

JUNCTION BLOCK

<Front side>

C-68  C-69
C-70
C-71
C-72

<Non Turbo>

C-63
C-64

<Non Turbo>

C-63
C-64

<Turbo>

C-10
C-11
C-12

C-04X  C-05X  C-06X  C-07X

C-01
C-02
C-03

36F0079

C-73
C-74
C-76
C-77
C-78
C-80
C-81
C-82
C-83

<Turbo>

C-09
C-09

C-61

C-67
C-68
C-69
C-70
C-71
C-72
C-73
C-74
C-76
C-77
C-78
C-80
C-81
C-82
C-83

36F0003

C-01 Body wiring harness (LH)
C-02 | and front wiring harness combination
C-03  Door lock power relay 1
C-04X Defogger relay
C-05X Power window relay
C-07X Power window relay
C-08  Diode (for seat belt warning circuit)
C-09
C-10  Column switch
C-11
C-12  Diode (for theft-alarm circuit)
C-13
C-14  Control wiring harness and instrument panel wiring harness combination
C-15  Body wiring harness (LH) and instrument panel wiring harness combination
C-16  Air conditioning control panel
C-17
C-18  Air conditioning switch
C-19  Blower switch
C-20  Heater control panel illumination light
C-21  Blend air damper control motor

C-22  Mode selection damper control motor
C-23  Power transistor (for full-auto air conditioning circuit)
C-24  Blower resistor
C-25  Air conditioning control unit
C-26  Air-inlet sensor (full-auto air conditioning)
C-27  Air selection damper control motor
C-28  Body wiring harness (LH) and control harness combination
C-29  Body wiring harness (RH) and front wiring harness combination
C-30  Wiring harness combination
C-31  Body wiring harness (LH) and front wiring harness combination
C-32  Body wiring harness (RH) and front wiring harness combination
C-33  Body wiring harness (RH) and control wiring harness combination
C-34
C-35  Foot light (RH)
C-36  Body wiring harness (RH) and control wiring harness combination
C-37  Auto-cruise control unit
C-38  Blower motor
C-39  Blower motor relay (HI)
C-40  Air conditioning compressor lock controller
C-41  Air-inlet sensor (manual air conditioning)
C-42  Air-thermo sensor
C-43  Engine coolant temperature sensor
C-44  Engine control relay
C-45  Overdrive and power/economy switch
C-46  ELC-4 A/T control module
C-47  ELC-4 control module
C-48 - Air conditioning control unit  
C-49 - <Full-auto air conditioning>  
C-50 -  
C-51 -  
C-52 - Engine control module  
C-53 -  
C-54 -  
C-55 - Leftbank heated oxygen sensor (front)  
<Non Turbo except California>  
C-56 - Theft-alarm starter relay  
C-57 - Clock spring  
C-58 - Key reminder switch  
C-59 - Ignition switch  
C-60 - Steering wheel angle speed sensor  
C-61 - Stop light switch  
C-62 - Clutch pedal position switch (for auto-cruise control circuit)  
C-63 - Clutch pedal position switch (for theft-alarm circuit)  
C-64 -  
C-65 - ETACS unit  
C-66 -  
C-67 - Foot light (LH)  
C-68 - Front wiring harness and junction block combination  
C-69 -  
C-70 -  
C-71 - Adapter wiring harness and junction block combination  
C-72 - Theft-alarm horn relay  
C-73 - Blower motor relay  
C-74 - Roof wiring harness and junction block combination  
C-75 -  
C-76 - Body wiring harness (LH) and junction block combination  
C-77 - Data link connector  
C-78 -  
C-79 -  
C-80 - Auto cruise relay  
C-81 -  
C-82 - Body wiring harness (LH) and junction block combination  
C-83 -  
C-84 -  
C-85 -  
C-86 - Passenger’s airbag module  
C-87 - No connection <Turbo>  
C-88 - Control wiring harness and front wiring harness combination  
C-89 - Body wiring harness (LH) and body wiring harness (RH) combination  
C-90 - Engine control module <Turbo, Non Turbo - California>  

Remarks  
(1) The mark ★ shows the standard mounting position of wiring harness.  
(2) The details concerning the ground point (example: ☐), refer to P. 8-4.
INSTRUMENT PANEL AND FLOOR CONSOLE

Connector symbol

D

D-01 Foglight switch
D-02 Front speaker (LH)
D-03 Combination meter
D-04 Defogger switch and ECS switch
D-05 Hazard switch
D-06 Combination gauge
D-07 Diode (for 4WS fluid level warning light circuit)
D-08 Glove box illumination light
D-09 Photosensor
D-10 Front speaker (RHI)
D-11 Glove box illumination light switch
D-12 Instrument panel wiring harness and control wiring harness combination
D-13 Instrument panel wiring harness and body wiring harness (RHI) combination
D-14 Ashtray illumination light
D-15 Power seat switch
D-16 Cigarette lighter
D-17 Cigarette lighter illumination light
D-18 Body wiring harness (LH) and console wiring harness combination
D-23 SRS diagnosis unit
D-24
D-25
D-26 SRS diagnosis unit
D-27 ABS G sensor
D-28 Parking brake switch
D-29
D-30 Accessory socket
D-31
D-32 Auto-cruise main switch
D-33 Seatbelt warning buzzer
D-34 Radio
D-35
D-36
D-37 Rear wiper and washer switch
D-38 Active exhaust switch
D-39 Remote control mirror switch
D-40 Rheostat
D-41 Instrument panel wiring harness and
body wiring harness (LH) combination
D-42
D-43
D-44 Instrument panel wiring harness and adapter
wiring harness combination
D-45 Instrument panel wiring harness and front
wiring harness combination
D-46
D-47 Radio

Remarks
(1) The mark ★ shows the standard mounting position of wiring harness.
(2) "-" means that the connector with code number is not used.
**INTERIOR**

**Connector symbol**

- E-01: Body wiring harness (RH) and door wiring harness (RH) combination
- E-02: Vanity mirror illumination light (LH)
- E-03: Door mirror (RH)
- E-04: Door speaker (RH)
- E-05: Dome light
- E-06: Power window sub switch
- E-07: Vanity mirror illumination light (RH)
- E-08: Power window motor (RH)
- E-09: Doorlight (RH)
- E-10: Door key cylinder unlock switch (RH)
- E-11: Door lock actuator (RH)
- E-12: ABS control unit
- E-13: ABS resistor <AWD>
- E-14: Front seat belt solenoid (RH)
- E-15: Door switch (RH)
- E-16: ABS rear speed sensor (RH)
- E-17: Light automatic shut-OFF unit
- E-18: Rear intermittent wiper relay
- E-19: ABS rear speed sensor (LH)
- E-20: Front seat belt solenoid (LH)
- E-21: Door switch (LH)
E-22 Door lock actuator (LH)
E-23 Door key cylinder unlock switch (LH)
E-24 Front seat belt switch (RH)
E-25 Door light (LH)
E-26 Front seat belt switch (LH)
E-27 Power seat assembly
E-28 ECS G sensor
E-29 Door speaker
E-30 Turn signal and hazard flasher unit
E-31 Diode (for MFI circuit)
E-32 Body wiring harness (LH) and door wiring harness (LH) combination
E-33 Door mirror (LH)
E-34 Power window main switch
E-35 Power window motor (LH)
E-36 –
E-37 Keyless control unit
E-38 Door lock power relay 2 (for keyless control system)
E-39 Amplifier

Remarks
(1) The mark ★ shows the standard mounting position of wiring harness.
(2) For details concerning the ground point (example: 7), refer to P. 8-4.
(3) “-” means that the connector with code-number is not used.
LUGGAGE COMPARTMENT

Connector symbol

F

- F-01 Interior temperature sensor
- F-02 Defogger (+)
- F-03 Rear wiper motor
- F-04 High-mounted stoplight
- F-05 Defogger (-)
- F-06 Rear speaker (RH)
- F-07 ECS rear shock absorber (RH)
- F-08 Luggage compartment light
- F-09 ABS resistor <FWD>
- F-10 Rear combination light (RH)
- F-11 Back-up light (RH)
- F-12 ECS control unit
- F-13 License plate light (RH)
- F-14 Body wiring harness (RH) and fuel tank wiring harness combination
- F-15 Rear washer motor
- F-16 Fuel tank
- F-17 License plate light (RH)
- F-18 Body wiring harness (RH) and rear bumper wiring harness combination
- F-19 Body wiring harness (LH) and body
- F-20 Wire harness (RH) combination
- F-21 License plate light (LH)
- F-22 Luggage compartment light switch
- F-23 Liftgate cylinder lock switch
- F-24 Liftgate switch
- F-25 Back-up light (LH)
- F-26 Active exhaust control unit
- F-27 ) -
- F-28 ) -
- F-29 Active exhaust actuator assembly
- F-30 Rear combination light (LH)
- F-31 Motor antenna control unit
- F-32 ECS rear shock absorber (LH)
- F-33 Rear speaker (LH)
- F-34 Body wiring harness (LH) and liftgate wiring harness combination
- F-35 ) -
- F-36 ) -
- F-37 -
- F-38 -
- F-39 -
- F-40 CD changer

Remarks
(1) The mark ★ shows the standard mounting position of wiring harness.
(2) For details concerning the ground point (example: [10]), refer to P.8-4.
(3) "-" means that the connector with code number is not used.
# CIRCUIT DIAGRAMS

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<td>Central Door Locking Circuit</td>
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<td>Headlight Circuit</td>
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</table>
HOW TO READ CIRCUIT DIAGRAMS

The circuit of each system from the fuse (or fusible link) to ground is shown. The power supply is shown at the top and the ground at the bottom to facilitate understanding of how the current flows.

Indicates power takeout.

Indicates connector No. The same No. as in the wiring harness diagram is used.

If the same connector is shown at two or more locations, the connector is indicated by with connector symbol shown inside.

An "X" at the end of a connector No. indicates that the connector is connected to a centralized junction that is shown in the section "Centralized Junction".

Indicates the operating conditions of the engine coolant switch, etc.

Indicates that the diagram is continued at on the next page.

Indicates shield wire.
A broken line indicates that these connectors are the same intermediate connectors.

Indicates that the diagram is continued from \( \Rightarrow \) on the previous page.

In case two or more connectors are connected to the same device, markings indicating the same connector are connected by a broken line.

Indicates input/output to/from control unit (current flow direction).

Input/Output

Indicates current flow downward or upward as controlled by the control unit.

Indicates harness junction where wire diameter or color changes.

Indicates J/B (Junction Block).

Indicates vehicle body ground point (Same No. as that of ground point in GROUNDING LOCATION)

Indicates continuity of harnesses on the opposite page of a double page circuit diagram.

Indicates that the terminal is a spare on the device (sensor in this case) is not provided.
<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Symbol</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td><img src="image" alt="Male Connector Diagram" /></td>
<td>Double connector contour lines indicate male connector terminals and single contour lines indicates female terminals as illustrated here.</td>
</tr>
<tr>
<td>2</td>
<td>Device</td>
<td><img src="image" alt="Device Symbol" /></td>
<td>The symbol indicates the connector as viewed from the illustrated direction. At the connection with a device, the connector symbol on the device side is shown, and for an intermediate connector, the male connector symbol is shown. However, the data link connector is indicated in a different way. For details, refer to MUT-II Operating Instruction.</td>
</tr>
<tr>
<td>3</td>
<td>Direct connection type</td>
<td><img src="image" alt="Direct Connection Type" /></td>
<td>A connection between a device and connector on the harness side is either by direct insertion in the device (direct connection type) or by connection with a harness connector furnished on the device side (harness connection type). The two types are indicated as illustrated.</td>
</tr>
<tr>
<td>4</td>
<td>Harness connection type</td>
<td><img src="image" alt="Harness Connection Type" /></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Intermediate connector</td>
<td><img src="image" alt="Intermediate Connector" /></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Body ground</td>
<td><img src="image" alt="Body Ground" /></td>
<td>Grounding is either by body ground, device ground or control unit interior ground. These are indicated as illustrated.</td>
</tr>
<tr>
<td>7</td>
<td>Device ground</td>
<td><img src="image" alt="Device Ground" /></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Ground in control unit</td>
<td><img src="image" alt="Ground in Control Unit" /></td>
<td></td>
</tr>
</tbody>
</table>
# Circuit Diagram Symbols

Devices appearing in circuit diagrams are indicated by the following symbols.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Battery" /></td>
<td>Battery</td>
</tr>
<tr>
<td><img src="image" alt="Bodyground" /></td>
<td>Bodyground</td>
</tr>
<tr>
<td><img src="image" alt="Single bulb" /></td>
<td>Single bulb</td>
</tr>
<tr>
<td><img src="image" alt="Resistor" /></td>
<td>Resistor</td>
</tr>
<tr>
<td><img src="image" alt="Diode" /></td>
<td>Diode</td>
</tr>
<tr>
<td><img src="image" alt="Capacitor" /></td>
<td>Capacitor</td>
</tr>
<tr>
<td><img src="image" alt="Fuse" /></td>
<td>Fuse</td>
</tr>
<tr>
<td><img src="image" alt="Equipment ground" /></td>
<td>Equipment ground</td>
</tr>
<tr>
<td><img src="image" alt="Dual bulb" /></td>
<td>Dual bulb</td>
</tr>
<tr>
<td><img src="image" alt="Variable resistor" /></td>
<td>Variable resistor</td>
</tr>
<tr>
<td><img src="image" alt="Zener diode" /></td>
<td>Zener diode</td>
</tr>
<tr>
<td><img src="image" alt="Crossing of wires without connection" /></td>
<td>Crossing of wires without connection</td>
</tr>
<tr>
<td><img src="image" alt="Fusible link" /></td>
<td>Fusible link</td>
</tr>
<tr>
<td><img src="image" alt="ECU interior ground" /></td>
<td>ECU interior ground</td>
</tr>
<tr>
<td><img src="image" alt="Speaker" /></td>
<td>Speaker</td>
</tr>
<tr>
<td><img src="image" alt="Coil" /></td>
<td>Coil</td>
</tr>
<tr>
<td><img src="image" alt="Transistor with" /></td>
<td>Transistor with</td>
</tr>
<tr>
<td><img src="image" alt="Crossing of wires connection" /></td>
<td>Crossing of wires connection</td>
</tr>
<tr>
<td><img src="image" alt="Connector" /></td>
<td>Connector</td>
</tr>
<tr>
<td><img src="image" alt="Female side" /></td>
<td>Female side</td>
</tr>
<tr>
<td><img src="image" alt="Male side" /></td>
<td>Male side</td>
</tr>
<tr>
<td><img src="image" alt="Motor" /></td>
<td>Motor</td>
</tr>
<tr>
<td><img src="image" alt="Horn" /></td>
<td>Horn</td>
</tr>
<tr>
<td><img src="image" alt="Pulse generator" /></td>
<td>Pulse generator</td>
</tr>
<tr>
<td><img src="image" alt="Buzzer" /></td>
<td>Buzzer</td>
</tr>
<tr>
<td><img src="image" alt="Chime" /></td>
<td>Chime</td>
</tr>
<tr>
<td><img src="image" alt="Thyristor" /></td>
<td>Thyristor</td>
</tr>
<tr>
<td><img src="image" alt="Piezoelectric device" /></td>
<td>Piezoelectric device</td>
</tr>
<tr>
<td><img src="image" alt="Thermistor" /></td>
<td>Thermistor</td>
</tr>
<tr>
<td><img src="image" alt="Light-emitting diode" /></td>
<td>Light-emitting diode</td>
</tr>
<tr>
<td><img src="image" alt="Photo diode" /></td>
<td>Photo diode</td>
</tr>
<tr>
<td><img src="image" alt="Photo transistor" /></td>
<td>Photo transistor</td>
</tr>
</tbody>
</table>
WIRE COLOR CODES

Wire colors are identified by the following color codes.

<table>
<thead>
<tr>
<th>Code</th>
<th>Wire color</th>
<th>Code</th>
<th>Wire color</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Black</td>
<td>P</td>
<td>Pink</td>
</tr>
<tr>
<td>BR</td>
<td>Brown</td>
<td>R</td>
<td>Red</td>
</tr>
<tr>
<td>G</td>
<td>Green</td>
<td>SB</td>
<td>Sky blue</td>
</tr>
<tr>
<td>GR</td>
<td>Gray</td>
<td>V</td>
<td>Violet</td>
</tr>
<tr>
<td>L</td>
<td>Blue</td>
<td>W</td>
<td>White</td>
</tr>
<tr>
<td>LG</td>
<td>Light green</td>
<td>Y</td>
<td>Yellow</td>
</tr>
<tr>
<td>O</td>
<td>Orange</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE**
If a cable has two colors, the first of the two color code characters indicates the basic color (color of the cable coating) and the second indicates the marking color.

Example: <F> 1.25G - B

- <F>: Flexible wire
- <T>: Twisted wire

Wire size (mm²)
- (1) No code indicates 0.5 mm² (.0008 in²).
- (2) Cable color code in parentheses indicates 0.3 mm² (.0005 in²).
POWER DISTRIBUTION CIRCUIT

NOTE:
1: VEHICLES WITH GENERATOR RATED OUTPUT 90A
2: VEHICLES WITH GENERATOR RATED OUTPUT 110A
The above circuit diagram shows the current flow at the ignition key position "ACC", "ON" and "ST" combined. Be sure to trace the appropriate circuit depending on the ignition key position.
COMPONENT LOCATION

Fusible link

Dedicated fuse 1 to 7

Dedicated fuse 8 to 9

Headlight relay, Taillight relay

Defogger relay

Junction block
MFI CIRCUIT <SOHC> (CALIFORNIA) (CONTINUED)

MAGNETIC RELAY

CLUTCH

IGNITION POWER TRANSISTOR

RADIATOR FAN (LO) RELAY

RADIATOR FAN (HI) RELAY

AIR CONDITIONING CONTROL UNIT

MAGNETIC CLUTCH
## COMPONENT LOCATION
### <SOHC>

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air conditioning relay</td>
<td>O</td>
<td>Idic air control motor (steppe motor)</td>
<td>L</td>
</tr>
<tr>
<td>Air conditioning switch</td>
<td>G</td>
<td>Ignition coil (ignition power transistor)</td>
<td>M</td>
</tr>
<tr>
<td>Camshaft position sensor and crankshaft position sensor</td>
<td>D</td>
<td>Ignition timing adjusting terminal</td>
<td>Q</td>
</tr>
<tr>
<td>Check engine/malfunction indicator lamp</td>
<td>P</td>
<td>Injector</td>
<td>K</td>
</tr>
<tr>
<td>Diagnostic output terminal and diagnostic test mode control terminal</td>
<td>R</td>
<td>Multiport fuel injection (MFI) relay</td>
<td>N</td>
</tr>
<tr>
<td>EGR solenoid &lt;California&gt;</td>
<td>V</td>
<td>Park/Neutral position switch &lt;A/T&gt;</td>
<td>I</td>
</tr>
<tr>
<td>EGR temperature sensor &lt;California&gt;</td>
<td>T</td>
<td>Power steering pressure switch</td>
<td>H</td>
</tr>
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<td>Engine control module</td>
<td>S</td>
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<td>C</td>
</tr>
<tr>
<td>Engine coolant temperature sensor</td>
<td>B</td>
<td>Variable air intake control servo (DC motor) (with built-in air intake control valve position sensor)</td>
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<tr>
<td>Evaporative emission purge solenoid</td>
<td>U</td>
<td>Vehicle speed sensor (reed switch)</td>
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</tr>
<tr>
<td>Heated oxygen sensor</td>
<td>E</td>
<td>Volume air flow sensor (with built-in intake air temperature sensor and barometric pressure sensor)</td>
<td>A</td>
</tr>
</tbody>
</table>

### NOTE
The "Name" column is arranged in alphabetical order.
Volume air flow sensor (with built-in intake air temperature sensor and barometric pressure sensor)

Engine coolant temperature sensor

Throttle position sensor (with built-in closed throttle position switch)

Camshaft position sensor and crankshaft position sensor

Vehicle speed sensor (reed switch)

Air conditioning switch

Power steering pressure switch

Heated oxygen sensor

Right bank heated oxygen sensor (front)

Left bank heated oxygen sensor (front)

Left bank heated oxygen sensor (rear)

Right bank heated oxygen sensor (rear)
# Component Location

### <DOHC NON TURBO> (FEDERAL AND CANADA)

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air conditioning relay</td>
<td>O</td>
<td>Ignition coil (ignition power transistor)</td>
<td>M</td>
</tr>
<tr>
<td>Air conditioning switch</td>
<td>G</td>
<td>Ignition timing adjusting terminal</td>
<td>Q</td>
</tr>
<tr>
<td>Camshaft position sensor</td>
<td>V</td>
<td>Injector</td>
<td>K</td>
</tr>
<tr>
<td>Check engine/malfunction indicator lamp</td>
<td>P</td>
<td>Knock sensor</td>
<td>T</td>
</tr>
<tr>
<td>Crankshaft position sensor</td>
<td>D</td>
<td>Multiport fuel injection (MFI) relay</td>
<td>N</td>
</tr>
<tr>
<td>Diagnostic output terminal and diagnostic test mode control terminal</td>
<td>R</td>
<td>Park/Neutral position switch &lt;A/T&gt;</td>
<td>I</td>
</tr>
<tr>
<td>Engine control module</td>
<td>S</td>
<td>Power steering pressure switch</td>
<td>H</td>
</tr>
<tr>
<td>Engine coolant temperature sensor</td>
<td>B</td>
<td>Throttle position sensor (with built-in closed throttle position switch)</td>
<td>C</td>
</tr>
<tr>
<td>Evaporative emission purge solenoid</td>
<td>U</td>
<td>Variable induction control motor (DC motor) (with built-in induction control valve position sensor)</td>
<td>J</td>
</tr>
<tr>
<td>Heated oxygen sensor</td>
<td>E</td>
<td>Vehicle speed sensor</td>
<td>F</td>
</tr>
<tr>
<td>Idle air control motor (stepper motor)</td>
<td>L</td>
<td>Volume air flow sensor (with built-in intake air temperature sensor and barometric pressure sensor)</td>
<td>A</td>
</tr>
</tbody>
</table>

**NOTE**

The "Name" column is in alphabetical order.
Evaporative emission purge solenoid

Camshaft position sensor
## COMPONENT LOCATION
**<TURBO, DOHC NON TURBO (CALIFORNIA)>**

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air conditioning relay</td>
<td>O</td>
<td>Ignition coil (ignition power transistor)</td>
<td>M</td>
</tr>
<tr>
<td>Air conditioning switch</td>
<td>G</td>
<td>Ignition timing adjusting terminal</td>
<td>Q</td>
</tr>
<tr>
<td>Camshaft position sensor</td>
<td>AA</td>
<td>Injector</td>
<td>K</td>
</tr>
<tr>
<td>Check engine/malfunction indicator lamp</td>
<td>P</td>
<td>Knock sensor</td>
<td>T</td>
</tr>
<tr>
<td>Crankshaft position sensor</td>
<td>D</td>
<td>Multiport fuel injection (MFI relay)</td>
<td>N</td>
</tr>
<tr>
<td>Diagnostic output terminal and diagnostic test mode control terminal</td>
<td>R</td>
<td>Park/Neutral position switch &lt;AVT&gt;</td>
<td>I</td>
</tr>
<tr>
<td>EGR solenoid</td>
<td>Z</td>
<td>Power steering pressure switch</td>
<td>H</td>
</tr>
<tr>
<td>EGR temperature sensor</td>
<td>Y</td>
<td>Resistor &lt;Turbo&gt;</td>
<td>W</td>
</tr>
<tr>
<td>Engine control module</td>
<td>S</td>
<td>Throttle position sensor (with built-in closed throttle position switch)</td>
<td>C</td>
</tr>
<tr>
<td>Engine coolant temperature sensor</td>
<td>B</td>
<td>Turbocharger waste gate solenoid &lt;Turbo&gt;</td>
<td>U</td>
</tr>
<tr>
<td>Evaporative emission purge solenoid</td>
<td>X</td>
<td>Variable induction control motor (DC motor) (with built-in induction control valve position sensor) &lt;Non Turbo&gt;</td>
<td>J</td>
</tr>
<tr>
<td>Fuel pressure solenoid &lt;Turbo&gt;</td>
<td>V</td>
<td>Vehicle speed sensor (reed switch)</td>
<td>G</td>
</tr>
<tr>
<td>Heated oxygen sensor</td>
<td>E</td>
<td>Volume air flow sensor (with built-in intake air temperature sensor and barometric pressure sensor)</td>
<td>A</td>
</tr>
<tr>
<td>Idle air control motor (stepper motor)</td>
<td>L</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE**
The "Name" column is in alphabetical order.
Volume air flow sensor (with built-in intake air temperature sensor and barometric pressure sensor)

Engine coolant temperature sensor

Throttle position sensor (with built-in closed throttle position switch)

Crankshaft position sensor

Vehicle speed sensor (reed switch)

Vehicle speed sensor

Air conditioning switch
MFI Circuit - TURBO, DOHC NON TURBO (CALIFORNIA)

- H: Power steering pressure switch
- I: Park/Neutral position switch
- J: Non Turbo 
  - Variable induction control motor (DC motor) (with built-in induction control valve position sensor)
- K: Injector
- L: Idle air control motor (stepper motor)
- M: Ignition coil (ignition power transistor)
- N: MFI relay
- O: Air conditioning relay
- P: Check engine/malfunction indicator lamp
- Q: Ignition timing adjusting terminal
COOLING CIRCUIT

<NON TURBO> (FEDERAL AND CANADA)
COMPONENT LOCATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
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</thead>
<tbody>
<tr>
<td>Air conditioning compressor lock controller</td>
<td>D</td>
<td>Condenser fan motor relay (LO)</td>
<td>B</td>
</tr>
<tr>
<td>Air conditioning control unit</td>
<td>C</td>
<td>Radiator fan motor relay (HI)</td>
<td>A</td>
</tr>
<tr>
<td>Condenser fan motor relay (HI)</td>
<td>B</td>
<td>Radiator fan motor relay (LO)</td>
<td>A</td>
</tr>
</tbody>
</table>
ELC-4 A/T CIRCUIT (FEDERAL AND CANADA) (CONTINUED)
ELC-4 A/T CIRCUIT (CALIFORNIA) (CONTINUED)

ENGINE CONTROL MODULE

PULSE GENERATOR B
PULSE GENERATOR A

THROTTLE POSITION SENSOR

B-05

B-27

Solenoid Valve
COMPONENT LOCATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA fluid temperature sensor</td>
<td>A</td>
<td>Engine control module</td>
<td>E</td>
</tr>
<tr>
<td>A/T solenoid valve assembly (within the valve body)</td>
<td>B</td>
<td>Kickdown servo switch</td>
<td>A</td>
</tr>
<tr>
<td>Auto-cruise control unit</td>
<td>F</td>
<td>Pulse generator</td>
<td>A</td>
</tr>
<tr>
<td>Data link connector</td>
<td>D</td>
<td>Throttle position sensor</td>
<td>C</td>
</tr>
<tr>
<td>ELC-4 AA control module</td>
<td>E</td>
<td>-</td>
<td>-</td>
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</table>
## COMPONENT LOCATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
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</thead>
<tbody>
<tr>
<td>Buzzer</td>
<td>C</td>
<td>ETACS unit</td>
<td>A</td>
</tr>
<tr>
<td>Diode (seat belt warning)</td>
<td>B</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![Buzzer Circuit Diagram](image1)

![Diode (Seat belt warning circuit) Diagram](image2)

![ETACS unit Diagram](image3)

![Buzzer Diagram](image4)
POWER WINDOW CIRCUIT

FUSIBLE LINK (6)

POWER WINDOWS RELAY C-07X

POWER WINDOW MAIN SWITCH

ONE-TOUCH DOWN CIRCUIT

POWER WINDOW SUB SWITCH E-06

ETACS UNIT

POWER WINDOW MOTOR

X35-AC-R1101-W4C
## COMPONENT LOCATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data link connector</td>
<td>C</td>
<td>Power window relay</td>
<td>B</td>
</tr>
<tr>
<td>ETACS unit</td>
<td>A</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

![Diagram of a vehicle interior showing the location of Data link connector, ETACS unit, and Power window relay.](image1)

### Diagrams

- **A**
  - ETACS unit
  - Image: [16F0354](image2)

- **B**
  - Power window relay
  - Image: [16F0494](image3)

- **C**
  - Data link connector
  - Image: [16F0496](image4)
CENTRAL DOOR LOCKING CIRCUIT
(Vehicles without keyless entry system)
CENTRAL DOOR LOCKING CIRCUIT (Vehicles without keyless entry system) (CONTINUED)
**COMPONENT LOCATION**

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data link connector</td>
<td>C</td>
<td>Door lock power relay 1</td>
<td>B</td>
</tr>
<tr>
<td>Door lock actuator</td>
<td>D</td>
<td>ETACS unit</td>
<td>A</td>
</tr>
</tbody>
</table>
CENTRAL DOOR LOCKING CIRCUIT
(Vehicles with keyless entry system)

FUSIBLE LINK (6)
C-68
J/B
C-78
0.8 BR-B

DOOR LOCK
POWER RELAY 2
E-38

DOOR LOCK
POWER RELAY 1
C-04X

DOOR LOCK
SWITCH (LH)
E-34

DOOR LOCK
(Actuator (LH)
E-22

DOOR LOCK
(Actuator (RH)
E-11

L-R
Y-B
BR-W

BR-W
Y-B
BR-L

\#1: VEHICLES WITHOUT POWER WINDOW
\#2: VEHICLES WITH POWER WINDOW
CIRCUIT DIAGRAMS – Central Door Locking Circuit

FUSIBLE LINK (6)

IGNITION SWITCH (ACC)

KEYLESS ENTRY CONTROL UNIT

E-37

FEEDER ANTENNA

TRANSMITTER

KEY REMINDER SWITCH

VEHICLES WITH THEFT-ALARM

12 6 13 14 11

R-G

1

C-74

C-58

E-05

B-L

C-81

C-74

1

C-72

5 C-82

15A

1

J/B

6 C-58

C-81

C-74

R-B

ON

OFF

ON

OFF

ON

OFF

ON

VEHICLES WITH THEFT-ALARM

(VEHICLES WITH THEFT-ALARM)

J/B

B-L

R-G

C-74

R-B
<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data link connector</td>
<td>C</td>
<td>Door lock power relay 2 (keyless entry system)</td>
<td>E</td>
</tr>
<tr>
<td>Door lock actuator</td>
<td>D</td>
<td>ETACS unit</td>
<td>A</td>
</tr>
<tr>
<td>Door lock power relay 1</td>
<td>B</td>
<td>Keyless entry control unit</td>
<td>E</td>
</tr>
</tbody>
</table>

![Diagram of Central Door Locking Circuit](image-url)
HEATER CIRCUIT

FUSIBLE LINK (G)
C-68
30A
1

IGNITION SWITCH (G2)
IGN 2
2
C-82

TAIL LIGHT RELAY
1.25R-W
6 C-69

DEDICATED FUSE
G-W
3 C-83

HEATER CONTROL PANEL
ILLUMINATION
J/B
C-20

RHEOSTAT

BLOWER MOTOR RELAY
OFF
3
GN

BLOWER MOTOR
C-38

BLOWER RESISTOR
C-24

BLOWER SWITCH
C-19

LO
OFF
HI

LO
HI
MI

W-B
2B

2B-W
3B-W

C-82

C-83

C-83

C-83

C-83
## COMPONENT LOCATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blower motor relay</td>
<td>A</td>
<td>Blower resistor</td>
<td>B</td>
</tr>
<tr>
<td>Blower motor relay (HI)</td>
<td>C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Diagram A**
- Blower motor relay
- Blower resistor

**Diagram B**
- Blower resistor

**Diagram C**
- Blower motor relay (HI)
MANUAL AIR CONDITIONING CIRCUIT

<SOHC>

FUSIBLE LINK

IGNITION SWITCH (IG2)

RADIATOR FAN ASSEMBLY (RADIATOR FAN MOTOR) A-55

RADIATOR FAN MOTOR RELAY (LO) (HI)

IGNITION SWITCH (IG2)

ENGINE COOLANT TEMPERATURE SENSOR B-02

VEHICLE SPEED SENSOR

ENGINE CONTROL MODULE

MANUAL AIR CONDITIONING CIRCUIT <SOHC>
MANUAL AIR CONDITIONING CIRCUIT
<TURBO, DOHC NON TURBO (CALIFORNIA)>

FUSIBLE LINK

RADIATOR FAN ASSEMBLY
(RADIATOR MOTOR)
A-55

IGNITION SWIT
(1G2)

C-82

J/B

C-69

C-83

G-B

L-R

A-04X

OFF
ON

RADIATOR FAN MOTOR RELAY
(LD) (HI)

A-07X

G-B

2L-G

L-R

L-R

A-55

RESISTOR

RADIATOR FAN ASSEMBLY
(RESISTOR)

VEHICLE SPEED SENSOR

ENGINE COOLANT TEMPERATURE SENSOR

ENGINE CONTROL MODULE
MANUAL AIR CONDITIONING CIRCUIT
<TURBO, DOHC NON TURBO (CALIFORNIA)>
(CONTINUED)
MANUAL AIR CONDITIONING CIRCUIT <TURBO, DOHC NON TURBO (CALIFORNIA)>

(CONTINUED)

AIR CONDITIONING SWITCH

J/B (MULTI-PURPOSE)

ENGINE SPEED OPERATION CIRCUIT

IGNITION POWER TRANSISTOR

COMBINATION METER (TACHO)

POWER SOURCE

CIRCUIT 1
FULL AUTO 'AIR CONDITIONING CIRCUIT
<DOHC NON TURBO> (FEDERAL AND CANADA)
FULL AUTO AIR CONDITIONING CIRCUIT
<TURBO, DOHC NON TURBO (CALIFORNIA)> (CONTINUED)
FULL AUTO AIR CONDITIONING CIRCUIT
<TURBO, DOHC NON TURBO (CALIFORNIA)>
(CONTINUED)
CIRCUIT DIAGRAMS – Full Auto Air Conditioning Circuit

TAILLIGHT RELAY

DEDICATED FUSE

J/B

C-69

C-83

C-15

RHEOSTAT

ENGINE COOLANT TEMPERATURE SENSOR
OFF-ON:
22.5-30.5°C
(72.5-86°F)
C-43

AIR INLET SENSOR
C-27

AIR THERMO SENSOR
C-42

ILL

BUZZER

POWER SOURCE

AIR-CONDITIONING GRAPHIC

8-175
# COMPONENT LOCATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air conditioning compressor lock controller</td>
<td>H</td>
<td>Dual pressure switch</td>
<td>B</td>
</tr>
<tr>
<td>Air conditioning control unit</td>
<td>D</td>
<td>ELC-4 AA control module</td>
<td>D</td>
</tr>
<tr>
<td>Air-inlet sensor</td>
<td>G</td>
<td>Engine control module</td>
<td>D</td>
</tr>
<tr>
<td>Air-thermo sensor</td>
<td>E</td>
<td>Engine coolant temperature sensor</td>
<td>I</td>
</tr>
<tr>
<td>Blower motor relay</td>
<td>K</td>
<td>Interior temperature sensor</td>
<td>L</td>
</tr>
<tr>
<td>Blower motor relay (HI)</td>
<td>H</td>
<td>Magnetic clutch relay</td>
<td>A</td>
</tr>
<tr>
<td>Condenser fan motor relay (HI)</td>
<td>A</td>
<td>Photo sensor</td>
<td>F</td>
</tr>
<tr>
<td>Condenser fan motor relay (LO)</td>
<td>A</td>
<td>Revolution sensor</td>
<td>C</td>
</tr>
<tr>
<td>Data link connector</td>
<td>J</td>
<td>Thermostat</td>
<td>C</td>
</tr>
</tbody>
</table>

![Diagrams](16F0502, 19F0134, 18F0499, 20F0101, 20N0269, 16F0292)
CIRCUIT DIAGRAMS – Anti-lock Braking System (ABS) Circuit <FWD>

- IGNITION SWITCH (IG2)
- IGNITION SWITCH (IG1)
- FUSIBLE LINK (G)
- COMBINATION METER
- STOP LIGHT SWITCH

Components include:
- 2L-B
- 2B-W
- C-82
- 6 C-71
- 5W-B
- C-68
- 1 C-61
- 0.85G
- 0.85B
- 0.85W
- 0.85R
- 15A
- 10A

Connections and labels:
- IGNITION SWITCH (IG2)
- IGNITION SWITCH (IG1)
- FUSIBLE LINK (G)
- COMBINATION METER
- STOP LIGHT SWITCH

Diagram details show electrical pathways and labels for various components.

---

(Circuit diagram showing connections and labels for various components related to anti-lock braking system.)
### COMPONENT LOCATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS control unit</td>
<td>F</td>
<td>G sensor</td>
<td>D</td>
</tr>
<tr>
<td>ABS power relay</td>
<td>C</td>
<td>Hydraulic unit</td>
<td>A</td>
</tr>
<tr>
<td>Data link connector</td>
<td>E</td>
<td>Motor relay</td>
<td>A</td>
</tr>
<tr>
<td>Diode</td>
<td>B</td>
<td>Rear speed sensor</td>
<td>H</td>
</tr>
<tr>
<td>Front speed sensor</td>
<td>G</td>
<td>Valve relay</td>
<td>A</td>
</tr>
</tbody>
</table>

**Diagrams:**

- **A:** Motor relay and hydraulic unit
- **B:** Diode (ABS circuit)
- **C:** ABS power relay
- **D:** G sensor
- **E:** Data link connector
### Component Location

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data link connector</td>
<td>E</td>
<td>G sensor</td>
<td>D</td>
</tr>
<tr>
<td>ECS control unit</td>
<td>F</td>
<td>Steering wheel angle speed sensor</td>
<td>B</td>
</tr>
<tr>
<td>Engine control module</td>
<td>C</td>
<td>Throttle position sensor</td>
<td>A</td>
</tr>
</tbody>
</table>

![Diagram of ECS control unit and components]
ACTIVE EXHAUST SYSTEM CIRCUIT

TAillIGHT
RELAY

1.25R-W

DEDICATED
FUSE

15A

C-69
J/B

C-71

D-44

G-W

D-05

112

12V

ACTIVE
EXHAUST
SWITCH
D-38

R-Y

RHEOSTAT

IGNITION
SWITCH(IG1)

2B-W

C-82
J/B

15A

6

D-44

0.85B-W

C-71

D-04

5G

COMBINATION
METER

OFF-TON

SPORT

TOUR

ACTIVE
EXHAUST
SWITCH
D-38

1

2

3

4

5

6

7

8

R

12V
## COMPONENT LOCATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active exhaust control unit</td>
<td>C</td>
<td>Engine control module</td>
<td>B</td>
</tr>
<tr>
<td>Actuator assembly</td>
<td>D</td>
<td>Power window relay</td>
<td>A</td>
</tr>
</tbody>
</table>

### Diagrams

- **A:** Power window relay
- **B:** Engine control module
- **C:** Active exhaust control unit
- **D:** Actuator assembly
IGNITION SWITCH (IG1)

C-77

D-26

CLOCK SPRING

DRIVER'S AIR BAG MODULE (SQUIB)

DATA LINK CONNECTOR

CONNECTOR LOCK SWITCH

COMBINATION METER

CIRCUIT DIAGRAMS - Supplemental Restraint System (SRS) Circuit 8-197

CAUTION: Carefully read and observe the SRS SERVICE PRECAUTIONS (Refer to GROUP 23B) prior to any service.
COMPONENT LOCATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
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</thead>
<tbody>
<tr>
<td>Data link connector</td>
<td>C</td>
</tr>
<tr>
<td>Front impact sensor</td>
<td>A</td>
</tr>
<tr>
<td>SRS diagnosis unit</td>
<td>B</td>
</tr>
</tbody>
</table>
AUTO-CRUISE CONTROL CIRCUIT

<A/T> SOHC, DOHC NON TURBO (FEDERAL AND CANADA)

IGNITION SWITCH (ACC)

J/B

C-70

2L-W

3

4

C-82

V

A-11X

IOD OR STORAGE CONNECTOR

THROTTLE POSITION SENSOR

B-05

5V

ENGINE CONTROL MODULE

C-53

64

61

72

67

(Y)-R

(Y)-R

(Y)-R

5

13

C-30

C-29

9

5

5V

GND

GND

GND

CLOCK SPRING

CANCEL

SET

REBUNE

AUTO-CRUISE CONTROL SWITCH

DATA LINK CONNECTOR

C-79

W-R

2B

B

R-B

Y-B

W-R

14

13

5

4

12

11

10

9

8

7

6

5

4

3

2

1

18
AUTO-CRUISE CONTROL CIRCUIT <A/T> SOHC, DOHC NON TURBO (FEDERAL AND CANADA) (CONTINUED)

IGNITION SWITCH (IG2)

POWER SOURCE

4A/T CONTROL MODULE

OVER DRIVE AND POWER/ECONOMY SWITCH

STARTER

BATTERY

PARK/NEUTRAL POSITION SWITCH B-26

STarter

B-23 208-R

B-30

B-31

B-3-R

PR-Y

2B-Y

L-R

L-R

L-R

L-R

1

11

14

15

25

37

5

3

12

CIRCUIT DIAGRAMS - Auto-cruise Control Circuit <A/T>
COMPONENT LOCATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto-cruise control unit</td>
<td>B</td>
<td>Engine control module</td>
<td>C</td>
</tr>
<tr>
<td>Auto-cruise relay</td>
<td>C</td>
<td>Throttle position sensor</td>
<td>A</td>
</tr>
<tr>
<td>Data link connector</td>
<td>D</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![Diagram of component location]
POWER SEAT CIRCUIT

NOTE
1: VEHICLES WITHOUT THEFT ALARM SYSTEM
2: VEHICLES WITH THEFT ALARM SYSTEM
### COMPONENT LOCATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data link connector</td>
<td>B</td>
<td>Front seat belt solenoid</td>
<td>C</td>
</tr>
<tr>
<td>ETACS unit</td>
<td>A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: * indicates that this component is used on the right side as well.
# ENGINE ELECTRICAL

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<td></td>
</tr>
<tr>
<td>Crankshaft Position Sensor Inspection</td>
<td></td>
</tr>
<tr>
<td>Refer to GROUP 14 (ON-VEHICLE INSPECTION OF MFI COMPONENTS)</td>
<td></td>
</tr>
<tr>
<td>Ignition Timing Adjustment</td>
<td></td>
</tr>
<tr>
<td>Refer to GROUP 9</td>
<td></td>
</tr>
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<td>SPECIFICATIONS</td>
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<tr>
<td>General Specifications</td>
<td>247</td>
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<td>SPECIFICATIONS</td>
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<td>General Specifications</td>
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<td>STARTER MOTOR</td>
<td>240</td>
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<tr>
<td>TROUBLESHOOTING</td>
<td>237</td>
</tr>
</tbody>
</table>
## CHARGING SYSTEM

### SPECIFICATIONS

#### GENERAL SPECIFICATIONS

#### GENERATOR

<table>
<thead>
<tr>
<th>Items</th>
<th>SOHC</th>
<th>DOHC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Battery voltage sensing</td>
<td>Battery voltage sensing</td>
</tr>
<tr>
<td>Rated output V/A</td>
<td>12/90</td>
<td>12/110</td>
</tr>
<tr>
<td>Voltage regulator</td>
<td>Electronic type</td>
<td>Electronic type</td>
</tr>
</tbody>
</table>

#### SERVICE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generator Standard value</td>
<td></td>
</tr>
<tr>
<td>Regulated voltage</td>
<td></td>
</tr>
<tr>
<td>Ambient temp. at voltage regulator V</td>
<td></td>
</tr>
<tr>
<td>-20°C (-4°F)</td>
<td>14.2 – 15.4</td>
</tr>
<tr>
<td>20°C (68°F)</td>
<td>13.9 – 14.9</td>
</tr>
<tr>
<td>60°C (140°F)</td>
<td>13.4 – 14.6</td>
</tr>
<tr>
<td>80°C (176°F)</td>
<td>13.1 – 14.5</td>
</tr>
<tr>
<td>Slip ring O.D. mm (in.)</td>
<td></td>
</tr>
<tr>
<td>SOHC</td>
<td>23 (.91)</td>
</tr>
<tr>
<td>DOHC</td>
<td>26.7 (1.05)</td>
</tr>
<tr>
<td>Field coil resistance Ω</td>
<td>Approx. 3 – 5</td>
</tr>
<tr>
<td>Limit Output current</td>
<td>70% of nominal output current</td>
</tr>
<tr>
<td>Slip ring O.D. mm (in.)</td>
<td></td>
</tr>
<tr>
<td>SOHC</td>
<td>22.2 (.87)</td>
</tr>
<tr>
<td>DOHC</td>
<td>26.1 (1.03)</td>
</tr>
</tbody>
</table>
TROUBLESHOOTING
CIRCUIT DIAGRAM
<SOHC>

NOTE
1: VEHICLES WITH GENERATOR RATED OUTPUT 90A
2: VEHICLES WITH GENERATOR RATED OUTPUT 110A
OPERATION

When engine is stopped
When the ignition switch is switched to the “ON” position, electricity flows from the “L” terminal of the generator to the field coil, and at the same time the charging warning light illuminates.

When engine is being started/has started
When the engine is started, charging voltage is applied to the “L” terminal of the generator, with the result that the charging warning light is extinguished.
In addition, because battery voltage is applied to the “S” terminal of the generator, this battery voltage is monitored at the IC voltage regulator, thus switching ON and OFF the current to the field coil and thereby controlling the output voltage of the generator.
Power is supplied to each load from the “B” terminal of the generator.

NOTE
The generator relay functions as a back-up for the flow of electricity to the field coil if there is a disconnection or damaged wiring of the charging warning light.

COMPONENT LOCATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generator relay</td>
<td>A</td>
</tr>
</tbody>
</table>

TROUBLESHOOTING HINTS

1. Charging warning light does not go on when the ignition switch is turned to “ON”, before the engine starts.
   - Check the bulb.

2. Charging warning light fails to go off once the engine starts.
   - Check the IC voltage regulator (located within the generator).

3. Discharged or overcharged battery.
   - Check the IC voltage regulator (located within the generator).

4. The charging warning light illuminates dimly.
   - Check the diode (within the combination meter) for a short-circuit.
SERVICE ADJUSTMENT PROCEDURES

CHARGING SYSTEM INSPECTION

GENERATOR OUTPUT LINE VOLTAGE DROP TEST

The test is performed to check whether the wiring between terminal B of the generator and the positive terminal of the battery (including the fusible link) is good or not.

(1) Before the test is performed, be sure to check the following items:
   - Mounted condition of generator
   - Generator drive belt tension (Refer to GROUP 0 – Maintenance Service.)
   - Fusible link condition
   - Whether strange sound is heard from generator during engine rotation

(2) Set the ignition switch to “OFF”.

(3) Disconnect the negative cable of the battery.

(4) Disconnect the output line of the generator from terminal B of the generator.

(5) Connect a 0-100A test DC ammeter between terminal B and the disconnected output line in series. (Connect the positive lead wire of the ammeter to terminal B and connect the negative lead wire of the ammeter to the disconnected output line.)

NOTE:
- Use of a clamp type ammeter is recommended, as it allows measurements to be made without disconnecting the output line of the generator. Why is a clamp type ammeter recommended? When you check a vehicle in which a low output current exists due to incompletely connected terminal B of the generator, you may be unable to detect the cause of the trouble, because direct loosening of terminal B and connection of an ammeter to terminal B completes the connection.

(6) Connect a digital voltmeter between terminal B of the generator and the positive terminal of the battery. (Connect the positive lead wire of the voltmeter to terminal B and connect the negative lead wire of the voltmeter to the positive terminal of the battery.)
(7) Set an engine tachometer.

**NOTE:**
- For engine tachometer setting procedure, refer to GROUP 9 - Service Adjustment Procedures.

(8) Connect the negative cable of the battery.
(9) Leave the engine hood opened.
(10) Start the engine.
(11) Adjust the generator load by turning the headlamps or smaller lamps ON or OFF so that the ammeter will indicate a somewhat higher value than 30A with the engine running at 2500 rpm.
(12) Slowly lower the engine speed to adjust the engine speed so that the ammeter will indicate 30A. Take the reading of the voltmeter at the time.

**Limit value:** 0.3V max.
(0.4V max. in case of ammeter reading of 40A)

(13) If the voltmeter reading is in excess of the limit value, a defective generator output line is suspected. Check the wiring (including fusible link) between terminal B of the generator and the positive terminal of the battery. If there are problems like loosely tightened terminals, discolored harness due to overheating, etc., make repairs and perform the test thereafter.

(14) After the test has been completed, let the engine run at idle. Turn off the lamps and other devices and place the ignition switch at “OFF”.
(15) Disconnect the negative cable of the battery.
(16) Remove the test ammeter, voltmeter and engine tachometer.
(17) Connect the output line of the generator to terminal B of the generator.
(18) Reconnect the negative cable of the battery.

**OUTPUT CURRENT TEST**

The test is performed to check whether the generator has the capability to output expected current.

(1) Before the output current test is performed, be sure to check the following items.
- Mounted condition of generator
- Battery condition (Refer to GROUP 8 - Battery.)

**NOTE:**
The battery used for output current test is preferably in a slightly discharged condition. With a fully charged battery, shortage of load could result in incorrect test.
- Generator drive belt tension (Refer to GROUP 0 - Maintenance Service.)
- Fusible link condition
- Whether strange sound is heard from generator during engine rotation

(2) Place the ignition switch at “OFF”.
(3) Disconnect the negative cable of the battery.
(4) Disconnect the output line of the generator from terminal B of the generator.
(5) Connect a 0-100A test DC ammeter between terminal B and the disconnected output line in series. (Connect the positive lead wire of the ammeter to terminal B and connect the negative lead wire of the ammeter to the disconnected output line.)

**CAUTION:**
- Since a large current flows, firmly secure all the connections with bolts and nuts. Be sure to avoid the method of fastening connections with clips.

**NOTE:**
- Use of a clamp type ammeter is recommended, as it allows measurements to be made without disconnecting the output line of the generator.

(6) Connect a 0-20V test voltmeter between terminal B and ground. (Connect the positive lead wire of the voltmeter to terminal B and connect the negative lead wire of the voltmeter to a good ground.)
Engine Electrical System

- Ignition switch
- Generator relay
- Charging indicator
- Generator
- Voltmeter
- Ammeter
- Battery
- Load
(7) Set an engine tachometer.
NOTE:
- For engine tachometer setting procedure, refer to GROUP 9 – Service Adjustment Procedures.
(8) Connect the negative cable of the battery.
(9) Leave the engine hood opened.
(10) Check that the voltmeter reading is equal to the battery voltage.
NOTE:
- When the voltmeter reading is OV, an open-circuited wiring or fusible link between terminal B of the generator and the positive terminal of the battery is suspected.
(11) Set the lighting switch to “ON” to light the headlamps, and then start the engine.
(12) Set the headlamps to high beam and set the heater blower switch to HI. Immediately increase the engine speed to 2,500 rpm and read the maximum output current value indicated by the ammeter.
**Limit value: 70% of nominal output current**
NOTES:
- For the nominal output current value, refer to General Specifications.
- Since the charge current abruptly decreases after starting the engine, perform the above-mentioned operations quickly when reading the maximum current value.
- The output current value varies with the size of electric load and the temperature of the generator itself.
  When the electric load of the vehicle under test is small, the specified output current may be unavailable even if there is nothing wrong with the generator. In such a case, leave the headlamps lighted to discharge the battery, or get another car and use the lamps and other devices of the car to increase the electric load, and then re-perform the test.
  If the temperature of the generator itself or the ambient temperature is too high, the specified output current may be unavailable, either. In such a case, let the generator cool down before retesting.
(13) Check to ensure that the ammeter reading is in excess of the limit value. If the reading is lower than the limit value, and there is nothing wrong with the output line of the generator, remove the generator from the engine and check it.
(14) After the output current test has been completed, reduce the engine speed to the idling speed.

REGULATOR VOLTAGE TEST
The test is performed to check whether the voltage regulator is properly controlling the output voltage of the generator.
(1) Before the regulator voltage test is performed, be sure to check the following items:
- Mounted condition of generator
- Check to ensure that the battery mounted in the vehicle is in fully charged condition. (Refer to GROUP 8 – Battery.)
- Generator drive belt tension (Refer to GROUP 0 – Maintenance Service.)
- Fusible link condition
- Whether strange sound is heard from generator during engine rotation
(2) Place the ignition switch at “OFF”.
(3) Disconnect the negative cable of the battery.
(4) Connect a digital voltmeter between terminal S of the generator and ground. (Connect the positive lead wire of the voltmeter to terminal S. Connect the negative lead wire of the voltmeter to a good ground or the battery negative terminal.)
(5) Disconnect the output line of the generator from terminal B of the generator.
(6) Connect a 0-100A test DC ammeter between terminal B and the disconnected output line in series. (Connect the positive lead wire of the ammeter to terminal B and connect the negative lead wire of the ammeter to the disconnected output line.)
(15) Place the ignition switch at “OFF”.
(16) Disconnect the negative cable of the battery.
(17) Remove the test ammeter, voltmeter and engine tachometer.
(18) Connect the output line of the generator to terminal B of the generator.
(19) Reconnect the negative cable of the battery.
(7) Set an engine tachometer.
   NOTE:
   • For engine tachometer setting procedure, refer to
     GROUP 9 – Service Adjustment Procedures.
(8) Connect the negative cable of the battery.
(9) Place the ignition switch at “ON” and check that the
    voltmeter reading is equal to the battery voltage.
   NOTE:
   When the voltmeter reading is OV, an open-circuited wiring
   or fusible link between terminal S of the generator and the
   positive terminal of the battery is suspected.
(10) Check to ensure that all of the lamps and accessories are
     “OFF”.
(11) Start the engine.
(12) Increase the engine speed to 2,500 rpm.
(13) When the output current of the generator has decreased to
     less than 10A, read the value indicated by the voltmeter.
(14) If the reading is equal to a value in the regulator voltage
     table, it follows that the voltage regulator is performing
     well. If the reading is out of the standard limits, the voltage
     regulator or generator is out of order.

### Regulator Voltage Table

<table>
<thead>
<tr>
<th>Detecting Terminal</th>
<th>Voltage Regulator Ambient Temperature (°C/°F)</th>
<th>Standard Limits (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal “S”</td>
<td>-20 (–4)</td>
<td>14.2 – 15.4</td>
</tr>
<tr>
<td></td>
<td>20 (68)</td>
<td>13.9 – 14.9</td>
</tr>
<tr>
<td></td>
<td>60 (140)</td>
<td>13.4 – 14.6</td>
</tr>
<tr>
<td></td>
<td>80 (176)</td>
<td>13.1 – 14.5</td>
</tr>
</tbody>
</table>

(15) After the test has been completed, let the engine run at
     idle.
(16) Place the ignition switch at “OFF”.
(17) Disconnect the negative cable of the battery.
(18) Remove the test ammeter, voltmeter and engine tachometer.
(19) Connect the output line of the generator to terminal B of the
     generator.
(20) Reconnect the negative cable of the battery.
**GENERATOR <DOHC>**

**REMOVAL AND INSTALLATION**

---

**Pre-removal and Post-installation Operation**
- Removal and Installation of Right Bank Warm Up Three-Way Catalytic Converter
  (Refer to GROUP 11 – Exhaust Pipe, Main Muffler and Catalytic Converter)

---

**Removal steps**

1. Air hose E <Turbo>
2. Air pipe C <Turbo>
3. Clamp nuts of suction hose
   <Vehicles with air conditioning>
4. Drive belt
   (Refer to GROUP 9 – Service Adjustment Procedures.)
5. Generator connector
6. Heated oxygen sensor connector
7. Generator and generator bracket assembly
8. Generator bracket
9. Generator

---

**SERVICE POINT OF REMOVAL**

**3. REMOVAL OF CLAMP NUT**

On vehicles with air conditioning, remove the clamp nut, raise the suction hose and suspend it from the engine hood using a cord.
**ENGINE ELECTRICAL – Charging System**

**GENERATOR <SOHC>**

**REMOVAL AND INSTALLATION**

---

**Post-installation Operation**
- Adjustment of Accelerator Cable
  (Refer to GROUP 14 – Engine Control)

---

**Removal steps**
1. Drive belt
   (Refer to GROUP 9 – Service Adjustment Procedures.)
2. Accelerator cable
3. Connection of brake booster vacuum hose
4. EGR valve <Vehicles for California>
5. Connection of generator connector
6. Generator

---

**SERVICE POINT OF REMOVAL**

6. **REMOVAL OF GENERATOR**

Take out the generator from behind the surge tank at the center of the vehicle.
DISASSEMBLY AND REASSEMBLY

Disassembly steps
- 1. Generator pulley
- 2. Rotor assembly
- 3. Rear bearing
- 4. Bearing retainer
- 5. Front bearing
- 6. Front bracket
- 7. Stator
- 8. Insulator
- 9. Plate
- 10. Regulator and brush holder
- 11. Slinger
- 12. Rectifier
- 13. Brush
- 14. Brush spring
- 15. Rear bracket

SERVICE POINTS OF DISASSEMBLY
SEPARATING THE STATOR AND FRONT BRACKET
Insert plain screwdriver between front bracket and stator core and pry downward.
Caution
Do not insert screwdriver too deep, as there is danger of damage to stator coil.
1. REMOVAL OF GENERATOR PULLEY
   (1) Clamp the rotor in a vise with soft jaws.
   (2) After removing the nut, remove the pulley and front bracket from the rotor.

7. REMOVAL OF STATOR / REGULATOR AND BRUSH HOLDER
   (1) When removing the stator, unsolder stator lead wire from the main diode of the rectifier.
   (2) When removing the brush holder, unsolder it from the rectifier.
   Caution
   (1) When soldering or unsoldering, use care to make sure that heat of soldering iron is not transmitted to diodes for a long period. Finish soldering or unsoldering in as short a time as possible.
   (2) Use care that no undue force is exerted to leads of diodes.

INSPECTION

ROTOR
   (1) Check field coil for continuity. Check to ensure that there is continuity between slip rings.
      If resistance is extremely small, it means that there is a short. If there is no continuity or if there is short circuit, replace rotor assembly.
      Resistance value: Approx 3 – 5 Ω
   (2) Check field coil for grounding. Check to ensure that there is no continuity between slip ring and core. If there is continuity, replace rotor assembly.

STATOR
   (1) Make continuity test on stator coil. Check to ensure that there is continuity between coil leads.
      If there is no continuity, replace stator assembly.
(2) Check coil for grounding. Check to ensure that there is no continuity between coil and core. If there is continuity, replace stator assembly.

RECTIFIERS

(1) Positive Rectifier Test
Check for continuity between positive rectifier and stator coil lead connection terminal with a circuit tester. If there is continuity in both directions, diode is shorted. Replace rectifier assembly.

(2) Negative Rectifier Test
Check for continuity between negative rectifier and stator coil lead connection terminal. If there is continuity in both directions, diode is shorted, and rectifier assembly must be replaced.

(3) Diode Trio Test
Check three diodes for continuity by connecting an ammeter to both ends of each diode. If there is no continuity in both directions, diode is faulty and heatsink assembly must be replaced.

BRUSH REPLACEMENT

(1) Replace brush by the following procedures if it has been worn to limit line.
(2) Unsolder pigtail and remove old brush and spring.

(3) Install brush spring and new brush in brush holder.
(4) Insert the brush to where there is a space 2 to 3 mm (.079 to .118 in.) between the limit line and the end of the brush holder.

(5) Solder pigtail to brush holder as shown in the illustration.

**SERVICE POINT OF REASSEMBLY**

2. **INSTALLATION OF ROTOR ASSEMBLY**

Before rotor is attached to rear bracket, insert wire through small hole made in rear bracket to lift brush. After rotor has
## STARTING SYSTEM SPECIFICATIONS

### GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Items</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starter motor</td>
<td>Reduction drive (with planetary gear)</td>
</tr>
<tr>
<td>Type</td>
<td>1.2/12</td>
</tr>
<tr>
<td>Rated output kW/V</td>
<td>8</td>
</tr>
<tr>
<td>No. of pinion teeth</td>
<td></td>
</tr>
</tbody>
</table>

### SERVICE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard value</td>
<td></td>
</tr>
<tr>
<td>Starter motor</td>
<td></td>
</tr>
<tr>
<td>Free running characteristics</td>
<td></td>
</tr>
<tr>
<td>Terminal voltage V</td>
<td>11</td>
</tr>
<tr>
<td>Current A</td>
<td>90 or less</td>
</tr>
<tr>
<td>Speed rpm</td>
<td>3,000 or more</td>
</tr>
<tr>
<td>Pinion gap mm (in.)</td>
<td>0.5 – 2.0 (.020 – .079)</td>
</tr>
<tr>
<td>Commutator runout mm (in.)</td>
<td>0.05 (.002)</td>
</tr>
<tr>
<td>Commutator diameter mm (in.)</td>
<td>29.4 (1.158)</td>
</tr>
<tr>
<td>Undercut depth mm (in.)</td>
<td>0.5 (.020)</td>
</tr>
<tr>
<td>Limit</td>
<td></td>
</tr>
<tr>
<td>Commutator runout mm (in.)</td>
<td>0.1 (.004)</td>
</tr>
<tr>
<td>Commutator diameter mm (in.)</td>
<td>28.4 (1.118)</td>
</tr>
</tbody>
</table>
TROUBLESHOOTING
CIRCUIT DIAGRAM
<VEHICLES WITHOUT THEFT-ALARM SYSTEM>
(M/T)
OPERATION

- For models equipped with the M/T, the clutch
  when the clutch pedal is depressed; when the
  ignition switch is then switched to the “ST”
  position, electricity flows to the starter relay and
  the starter motor, the contact (magnetic switch)
  of the starter is switched ON and the starter
  motor is activated.

NOTE

If the ignition switch is switched to the “ST”
position without the clutch pedal being de-
pressed, electricity flows to the starter relay
(coil), the clutch pedal position switch (contacts)
and to ground, with the result that the contacts
of the starter relay are switched OFF, and,
because the power to the starter motor is
thereby interrupted, the starter motor is not
activated.

- For models equipped with the A/T, when the
  ignition switch is switched to the “ST” position
  while the selector lever is at the “P” or “N”
  position, the contact (magnetic switch) of the
  starter is switched ON and the starter motor is
  activated.

TROUBLESHOOTING HINTS

- Check the starter (coil).
- Check for poor contact at the battery terminals
  and starter.
- Check Park/Neutral position switch.
- Check clutch pedal position switch.
- Check starter relay.
- Check theft-alarm starter relay.
- Check key reminder switch.
STARTER MOTOR

REMOVAL AND INSTALLATION
Refer to GROUP 21 – Transaxle.

INSPECTION

PINION GAP ADJUSTMENT
(1) Disconnect field coil wire from M-terminal of magnetic switch.

(2) Connect a 12V battery between S-terminal and M-terminal.

(3) Set switch to “ON”, and pinion will move out.

Caution
This test must be performed quickly (in less than 10 seconds) to prevent coil from burning.

(4) Check pinion to stopper clearance (pinion gap) with a feeler gauge.

Pinion gap: 0.5 – 2.0 mm (.020 – .079 in.)

(5) If pinion gap is out of specification, adjust by adding or removing gaskets between magnetic switch and front bracket.

PULL-IN TEST OF MAGNETIC SWITCH
(1) Disconnect field coil wire from M-terminal of magnetic switch.

(2) Connect a 12V battery between S-terminal and M-terminal.

Caution
This test must be performed quickly (in less than 10 seconds) to prevent coil from burning.

(3) If pinion moves out, then pull-in coil is good. If it doesn’t, replace magnetic switch.

HOLD-IN TEST OF MAGNETIC SWITCH
(1) Disconnect field coil wire from M-terminal of magnetic switch.

(2) Connect a 12V battery between S-terminal and body.

Caution
This test must be performed quickly (in less than 10 seconds) to prevent coil from burning.

(3) If pinion remains out, everything is in order. If pinion moves in, hold-in circuit is open. Replace magnetic switch.
FREE RUNNING TEST
(1) Place starter motor in a vise equipped with soft jaws and connect a fully-charged 12-volt battery to starter motor as follows:
(2) Connect a test ammeter (100-ampere scale) and carbon pile rheostat in series with battery positive post and starter motor terminal.
(3) Connect a voltmeter (15-volt scale) across starter motor.
(4) Rotate carbon pile to full-resistance position.
(5) Connect battery cable from battery negative post to starter motor body.
(6) Adjust rheostat until the battery voltage shown by the voltmeter is 1 IV.
(7) Confirm that the maximum amperage is within the specifications and that the starter motor turns smoothly and freely.

Current: max. 90 Amps

RETURN TEST OF MAGNETIC SWITCH
(1) Disconnect field coil wire from M-terminal of magnetic switch.
(2) Connect a 12V battery between M-terminal and body.

Caution
This test must be performed quickly (in less than 10 seconds) to prevent coil from burning.
(3) Pull pinion out and release. If pinion quickly returns to its original position, everything is in order. If it doesn't, replace magnetic switch.

STARTER RELAY
(1) Remove the starter relay from the relay box.
(2) Connect battery to terminal 2 and check continuity between terminals with terminal 4 grounded.

<table>
<thead>
<tr>
<th>Power is supplied</th>
<th>3-4 terminals</th>
<th>No continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3-5 terminals</td>
<td>Continuity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power is not supplied</th>
<th>3-4 terminals</th>
<th>Continuity</th>
</tr>
</thead>
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<td></td>
</tr>
<tr>
<td>1-2 terminals</td>
<td>Continuity</td>
<td></td>
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</tbody>
</table>
STARTER MOTOR

DISASSEMBLY AND REASSEMBLY

<EXCEPT CALIFORNIA VERSION>

Disassembly steps

1. Screw
2. Magnetic switch
3. Screw
4. Screw
5. Rear bracket
6. Brush holder
7. Brush
8. Rear bearing
9. Armature
10. Yoke assembly
11. Ball
12. Packing A
13. Packing B
14. Plate
15. Planetary gear
16. Lever
17. Snap ring
18. Stop ring
19. Overrunning clutch
20. Internal gear
21. Planetary gear holder
22. Front bracket
DISASSEMBLY AND REASSEMBLY

<CALIFORNIA VERSION>

Disassembly steps

1. Screw
2. Magnetic switch
3. Screw
4. Starter cover
5. Rear bracket
6. Brush holder
7. Brush
8. Brush
9. Armature
10. Yoke assembly
11. Ball
12. Packing A
13. Packing B
14. Plate
15. Planetary gear
16. Lever
17. Snap ring
18. Stop ring
19. Overrunning clutch
20. Internal gear
21. Planetary gear holder
22. Front bracket

SERVICE POINTS OF DISASSEMBLY

9. REMOVAL OF ARMATURE / 11. BALL

Caution
When removing the armature, take care not to lose the ball (which is used as a bearing) in the armature end.
17. REMOVAL OF SNAP RING / 18. STOP RING
(1) Press the stop ring, by using an appropriate socket wrench, to the snap ring side.

(2) After removing the snap ring (by using snap-ring pliers), remove the stop ring and the overrunning clutch.

CLEANING STARTER MOTOR PARTS
1. Do not immerse parts in cleaning solvent. Immersing the yoke and field coil assembly and/or armature will damage insulation. Wipe these parts with a cloth only.
2. Do not immerse drive unit in cleaning solvent. Overrunning clutch is pre-lubricated at the factory and solvent will wash lubrication from clutch.
3. The drive unit may be cleaned with a brush moistened with cleaning solvent and wiped dry with a cloth.

INSPECTION
CHECKING THE COMMUTATOR
(1) Place the armature on a pair of V-blocks, and check the deflection by using a dial gauge.
   Standard value: 0.05 mm (.0020 in.)
   Limit: 0.1 mm (.0040 in.)

(2) Check the outer diameter of the commutator.
   Standard value: 29.4 mm (1.158 in.)
   Limit: 28.4 mm (1.118 in.)
(3) Check the depth of the undercut between segments.
Standard value: 0.5 mm (.020 in.)

BRUSH HOLDER
Check for continuity between brush holder plate and brush holder.
The normal condition is non-continuity.

OVERRUNNING CLUTCH
1. While holding clutch housing, rotate the pinion. Drive pinion should rotate smoothly in one direction, but should not rotate in opposite direction. If clutch does not function properly, replace overrunning clutch assembly.
2. Inspect pinion for wear or burrs. If pinion is worn or burred, replace overrunning clutch assembly. If pinion is damaged, also inspect ring gear for wear or burrs.

FRONT AND REAR BRACKET BUSHING
Inspect bushing for wear or burrs. If bushing is worn or burred, replace front bracket assembly or rear bracket assembly.

REPLACEMENT OF BRUSHES AND SPRINGS
1. Brushes that are worn beyond wear limit line, or oil-soaked, should be replaced.
2. When replacing field coil brushes, crush worn brush with pliers, taking care not to damage pigtail.
3. Sand pigtail end with sandpaper to ensure good soldering.
4. Insert pigtail into hole provided in new brush and solder it. Make sure that pigtail and excess solder do not come out onto brush surface.
5. When replacing ground brush, slide the brush from brush holder by prying retaining spring back.

TESTING ARMATURE

TESTING ARMATURE FOR SHORT-CIRCUIT
1. Place armature in a growler.
2. Hold a thin steel blade parallel and just above while rotating armature slowly in growler. A shorted armature will cause blade to vibrate and be attracted to the core. Replace shorted armature.

TESTING ARMATURE FOR GROUNDING
Check the insulation between the armature coil cores and the commutator segments. They are normal if there is no continuity.

CHECKING FOR ARMATURE COIL WIRING DAMAGE / DISCONNECTION
Check for continuity between segments. The condition is normal if there is continuity.

SERVICE POINTS OF REASSEMBLY
18. INSTALLATION OF STOP RING / 17. SNAP RING
Using a suitable pulling tool, pull overrunning clutch stop ring over snap ring.
## IGNITION SYSTEM

### SPECIFICATIONS

#### GENERAL SPECIFICATIONS

**DISTRIBUTOR**

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<tr>
<th>Items</th>
<th>SOHC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Contact pointless type</td>
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<tr>
<td>Identification No.</td>
<td>T5T42671</td>
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<tr>
<td>Part No.</td>
<td>MD1 47874</td>
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<tr>
<td>Advance mechanism</td>
<td>Controlled by engine control unit</td>
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<tr>
<td>Firing order</td>
<td>1-2-3-4-5-6</td>
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**IGNITION COIL**

<table>
<thead>
<tr>
<th>Items</th>
<th>SOHC</th>
<th>DOHC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Mold single-coil</td>
<td>Mold 3-coil</td>
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<tr>
<td>Identification No.</td>
<td>F-504</td>
<td>F-536</td>
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<tr>
<td>Part No.</td>
<td>MD160532</td>
<td>MD1 52648</td>
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**SPARK PLUG**

<table>
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<tr>
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<th>SOHC</th>
<th>DOHC</th>
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<tr>
<td>NGK</td>
<td>BPR5ES-11</td>
<td>PFR6J-11</td>
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<td>NIPPON DENS0</td>
<td>WI6EPR11</td>
<td>PK20PR-P11</td>
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<td>Items</td>
<td>Specifications</td>
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<tr>
<td>Ignition coil</td>
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<tr>
<td>Primary coil resistance</td>
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<td></td>
</tr>
<tr>
<td>20°C (68°F) Ω</td>
<td>0.72 – 0.88</td>
<td></td>
</tr>
<tr>
<td>&lt;SOHC&gt;</td>
<td>0.67 – 0.81</td>
<td></td>
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<tr>
<td>&lt;DOHC&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary coil resistance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20°C (68°F) kΩ</td>
<td>10.29 – 13.92</td>
<td></td>
</tr>
<tr>
<td>&lt;SOHC&gt;</td>
<td>11.31 – 15.30</td>
<td></td>
</tr>
<tr>
<td>&lt;DOHC&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spark plug gap</td>
<td>1.0 – 1.1 (.39 – .43)</td>
<td></td>
</tr>
</tbody>
</table>
ENGINE ELECTRICAL – Ignition System

<DOHC>

IGNITION SWITCH (G1)

J/B

C-71

D-44

D-15

1.25B-W

CAPACITOR

B-15

ELC-4A/T CONTROL MODULE

COMBINATION METER (TACHO)

ENGINE CONTROL MODULE

IGNITION TIMING ADJUSTMENT CONNECTOR

NOTE:
1: TURBO, NON TURBO (CALIFORNIA)
2: NON TURBO (FEDERAL CANADA)
OPERATION

<SOHC>
- Turn ignition switch to “ON” position, and battery voltage will be applied to primary winding of ignition coil.
- When crankshaft position sensor and camshaft position sensor signal is input to engine control module, ON-OFF control of power transistor is performed by engine control module.
- When power transistor is turned on, current flows from ignition coil (primary winding) to ground through power transistor.
- When power transistor is turned off, high voltage is generated in primary winding of ignition coil which induces even higher voltage in the secondary winding, causing a spark at the spark plug(s).

<DOHC>
- When crankshaft position sensor and camshaft position sensor signal is input to engine control module, engine control module makes ON-OFF control of power transistors one by one.
- When power transistor A is turned from ON to OFF, the spark plugs of No. 1 and No. 4 cylinders spark. Turning of power transistor B from ON to OFF will produce sparking in spark plugs of No. 2 and No. 5 cylinders. Furthermore, when power transistor C is turned from ON to OFF, sparking is produced in spark plugs of No. 5 and No. 6 cylinders.
- The rest of operation is the same as described for SOHC engine.

TROUBLESHOOTING HINTS

1. Engine cranks, but does not start.
   (1) Spark is insufficient or does not occur at all (on spark plug).
      - Check ignition coil.
      - Check distributor. <SOHC Engine>
      - Check crankshaft position sensor and camshaft position sensor <DOHC Engine>
      - Check power transistor.
      - Check spark plugs.
      - Check spark plug cable.
   (2) Spark is good.
      - Check ignition timing.

2. Engine idles roughly or stalls.
   - Check spark plugs.
   - Check ignition timing.
   - Check ignition coil.
   - Check spark plug cable.

3. Poor acceleration
   - Check ignition timing.
   - Check spark plug cable.
   - Check ignition coil.
SERVICE ADJUSTMENT PROCEDURES

SPARK PLUG CABLE TEST
(1) Disconnect, one at a time, each of the spark plug cables while the engine is idling to check whether the engine's running performance changes or not.

Caution
Wear rubber gloves while doing so.

(2) If the engine performance does not change, check the resistance of the spark plug cable, and check the spark plug itself.

SPARK PLUG TEST
(1) Remove the spark plug and connect to the spark plug cable.
(2) Ground the spark plug outer electrode (body), and crank the engine. Check to be sure that there is an electrical discharge between the electrodes at this time.

HIGH TENSION CABLE SPARK TEST <SOHC>
(1) Disconnect the high-tension cable from the distributor cap.
(2) Hold the high tension cable about 6 – 8 mm (.24 – .31 in.) away from engine proper (grounding portion such as cylinder block) and crank engine to verify that sparks are produced.
IGNITION SYSTEM
REMOVAL AND INSTALLATION <SOHC>

Removal steps
1. High tension cable
2. Spark plug cable
3. Spark plug
4. Distributor
5. O-ring
6. Ignition coil
7. Ignition power transistor

25Nm 18 ft.lbs.

14 Nm 11 ft.lbs.

5 Nm 4 ft.lbs.

2.5Nm 1.8 ft.lbs.
INSPECTION

SPARK PLUG
Check plug gap using a plug gap gauge and adjust if it is not as specified.
Standard value: 1.0 – 1.1 mm (.040 – .043 in.)

SPARK PLUG CABLE
(1) Check cap and coating for cracks.
(2) Measure resistance.
Limit: Max. 22 kΩ

IGNITION POWER TRANSISTOR

NOTE
An analog-type circuit tester should be used.

(1) Connect the negative (−) terminal of the 1.5V power supply to terminal ② of the ignition power transistor; then check whether there is continuity between terminal ③ and terminal ② when terminal ① and the positive (+) terminal are connected and disconnected.

NOTE
Connect the (−) probe of the circuit tester to terminal ③.

<table>
<thead>
<tr>
<th>Terminal 1 and (+) terminal</th>
<th>Terminal 3 and terminal 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connected</td>
<td>Continuity</td>
</tr>
<tr>
<td>Unconnected</td>
<td>No continuity</td>
</tr>
</tbody>
</table>

(2) Replace the ignition power transistor if there is a malfunction.

IGNITION COIL

Primary Coil Resistance
Measure the resistance of the positive (+) terminal and negative (−) terminal of the ignition coil.
Standard value: 0.72 – 0.88 Ω

Secondary Coil Resistance
Measure the resistance of the positive (+) terminal and the high-voltage terminal.
Standard value: 10.29 – 13.92 kΩ
SERVICE POINTS OF INSTALLATION

4. INSTALLATION OF DISTRIBUTOR

1. Turn the crankshaft so that the No. 1 cylinder is at compression top dead center.

   **Caution**
   Be careful not to turn it to the No. 4 cylinder compression top dead center by mistake.

2. Align the distributor housing and gear mating marks.

3. Install the distributor to the engine while aligning the distributor's installation flange with the center of the distributor installation stud.

2. INSTALLATION OF SPARK PLUG CABLE

Improper arrangement of spark plug cables will induce voltage between the cables, causing miss firing and developing a surge at acceleration in high-speed operation. Therefore, be careful to arrange the spark plug cables properly by the following procedure.

1. Install the spark plug cable clamps as shown in the illustration.

2. The numerals on the support and clamp indicate the spark plug cable No.

3. Pay attention to the following items when the spark plug cables are installed.

   1. Install the cables securely to avoid possible contact with metal parts.

   2. Install the cables neatly, ensuring they are not too tight, loose, twisted or kinked.
Removal steps

1. Center cover
2. Spark plug cable
3. Spark plug
4. Ignition coil
5. Ignition power transistor
6. Clamp

Pre-removal and Post-installation Operation
- Removal and Installation of Intake Manifold Plenum
  (Refer to GROUP 11 - Intake Manifold.)
7. Camshaft position sensor
8. Crankshaft position sensor

**Pre-removal and Post-installation Operation**
- Removal and Installation of Timing Belt Cover
  (Refer to GROUP 9 - Timing Belt.)
INSPECTION

SPARK PLUG
Check the plug gap and replace if the limit is exceeded.

Standard value: 1.0 – 1.1 mm (.039 – .043 in.)
Limit: 1.3 mm (.051 in.)

Caution
1. Do not attempt to adjust the gap of the platinum plug.
2. Cleaning of the platinum plug may damage the platinum tip. Therefore, if carbon deposits must be removed, use a plug cleaner and complete cleaning within 20 seconds for protection of the electrode. Do not use wire brushes.

SPARK PLUG CABLE
(1) Check cap and coating for cracks.
(2) Measure resistance.
Limit: Max. 22 kΩ

IGNITION POWER TRANSISTOR

NOTE
An analog-type circuit tester should be used.

No. 1 – No. 4 coil side
(1) Connect the negative (–) terminal of the 1.5V power supply to terminal 4 of the ignition power transistor; then check whether there is continuity between terminal 13 and terminal 4 when terminal 3 and the positive (+) terminal are connected and disconnected.

NOTE
Connect the (–) probe of the circuit tester to terminal 13.

<table>
<thead>
<tr>
<th>Terminal 3 and (+) terminal</th>
<th>Terminal 13 and terminal 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connected</td>
<td>Continuity</td>
</tr>
<tr>
<td>Unconnected</td>
<td>No continuity</td>
</tr>
</tbody>
</table>

(2) Replace the ignition power transistor if there is a malfunction.

No. 2 – No. 5 coil side
(1) Connect the negative (–) terminal of the 1.5V power supply to terminal 4 of the ignition power transistor; then check whether there is continuity between terminal 12 and terminal 4 when terminal 2 and the positive (+) terminal are connected and disconnected.

NOTE
Connect the (–) probe of the circuit tester to terminal 12.
(2) Replace the ignition power transistor if there is a malfunction.

**No. 3 – No. 6 coil side**

(1) Connect the negative (−) terminal of the 1.5V power supply to terminal 4 of the ignition power transistor; then check whether there is continuity between terminal 1 and terminal 4 when terminal 1 and the positive (+) terminal are connected and disconnected.

**NOTE**
Connect the (−) probe of the circuit tester to terminal 11.

<table>
<thead>
<tr>
<th>Terminal 1 and (+) terminal</th>
<th>Terminal 11 and terminal 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connected</td>
<td>Continuity</td>
</tr>
<tr>
<td>Unconnected</td>
<td>No continuity</td>
</tr>
</tbody>
</table>

(2) Replace the ignition power transistor if there is a malfunction.

**IGNITION COIL**

**Primary Coil Resistance**
Measure the resistance between connector terminal 3 (power) and each coil terminal.

**Measuring point:**
- Coil A (No. 1 – No. 4 cylinder side coil) ……………… 2 – 3
- Coil B (No. 2 – No. 5 cylinder side coil) ……………… 8 – 8
- Coil C (No. 3 – No. 6 cylinder side coil) ……………… 8 – 8

Standard value: 0.67 – 0.81 Ω

**Secondary Coil Resistance**
Measure the resistance between each coil high voltage terminals.

**Measuring point:**
- Coil A (No. 1 – No. 4 cylinder side coil)
- Coil B (No. 2 – No. 5 cylinder side coil)
- Coil C (No. 3 – No. 6 cylinder side coil)

Standard value: 11.3 – 15.3 kΩ
SERVICE POINTS OF INSTALLATION

2. INSTALLATION OF SPARK PLUG CABLE

Improper arrangement of spark plug cables will induce voltage between the cables, causing miss firing and developing a surge at acceleration in high-speed operation. Therefore, be careful to arrange the spark plug cables properly by the following procedure.

1. Install the spark plug cable clamps as shown in the illustration.
2. The numerals on the support and clamp indicate the spark plug cable No.
3. Pay attention to the following items when the spark plug cables are installed.
   (1) Install the cables securely to avoid possible contact with metal parts.
   (2) Install the cables neatly, ensuring they are not too tight, loose, twisted or kinked.
DISTRIBUTOR
DISASSEMBLY AND REASSEMBLY

Disassembly steps
1. Distributor cap
2. O-ring
3. Contact carbon
4. Rotor
5. O-ring
6. Housing & crankshaft position sensor assembly

INSPECTION
Check the following points; repair or replace if a problem is found.

CAP AND ROTOR
(1) There must be no cracking in the cap.
(2) There must be no damage to the cap’s electrode or the rotor’s electrode.
(3) Clean away any dirt from the cap and rotor.

CAMSHAFT POSITION SENSOR, CRANKSHAFT POSITION SENSOR
Refer to GROUP 14 – On-vehicle Inspection of MFI Components.
## CHASSIS ELECTRICAL

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

**WARNING**

1. Improper service or maintenance of any component of the SRS, or any SRS-related component, can lead to personal injury or death to service personnel (from inadvertent firing of the air bag) or to the driver (from rendering the SRS inoperative).

2. Service or maintenance of any SRS component or SRS-related component must be performed only at an authorized CHRYSLER dealer.

3. CHRYSLER dealer personnel must thoroughly review this manual, and especially its GROUP 23B – Supplemental Restraint System (SRS), GROUP 0 – Maintenance Service, before beginning any service or maintenance of any component of the SRS or any SRS-related component.

### NOTE

The SRS includes the following components: impact sensors, SRS diagnosis unit, SRS warning light, air bag module, clock spring and interconnecting wiring. Other SRS-related components (that may have to be removed/installed in connection with SRS service or maintenance) are indicated in the table of contents by an asterisk (*).
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<td>400</td>
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<td>401</td>
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<td>Troubleshooting</td>
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</tr>
<tr>
<td>Whip Antenna * Antenna Feeder Cable * Amplifier</td>
<td>403</td>
</tr>
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</table>
BATTERY

SPECIFICATIONS

GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>75D23R-MF</td>
</tr>
<tr>
<td>Ampere hours (5HR) Ah</td>
<td>52</td>
</tr>
<tr>
<td>Cranking rating [at ~ 18°C (0°F)] A</td>
<td>520</td>
</tr>
<tr>
<td>Reserve capacity min.</td>
<td>118</td>
</tr>
</tbody>
</table>

NOTES
1. CRANKING RATING is the current a battery can deliver for 30 seconds and maintain a terminal voltage of 7.2 volts or greater at a specified temperature.
2. RESERVE CAPACITY RATING is the amount of time a battery can deliver 25A and maintain a minimum terminal voltage of 10.5 at 27°C (80°F).

SERVICE ADJUSTMENT PROCEDURES

BATTERY INSPECTION

BATTERY VISUAL INSPECTION (1)
The battery contains a visual test indicator which gives blue signal when an adequate charge level exists, and white signal when charging is required.

BATTERY VISUAL INSPECTION (2)
Make sure ignition switch is in Off position and all battery feed accessories are Off.
1. Disconnect ground cable from battery before disconnecting (+) cable.
2. Remove battery from vehicle.
   Caution
   Care should be taken in the event battery case is cracked or leaking to protect hands from the electrolyte. A suitable pair of rubber gloves (not the household type) should be worn when removing battery by hand.
3. Inspect battery carrier for damage caused by loss of acid from battery. If acid damage is present, it will be necessary to clean area with a solution of clean warm water and baking soda. Scrub area with a stiff bristle brush and wipe off with a cloth moistened with ammonia or baking soda in water.
4. Clean top of battery with same solutions as described in step (3).
5. Inspect battery case and cover for cracks. If cracks are present, battery must be replaced.
6. Clean the battery post with a suitable battery post cleaning tool.
7. Clean the inside surfaces of the terminal clamps with a suitable battery terminal cleaning tool. Replace damaged or frayed cables and broken terminals clamps.
8. Install the battery in vehicle.
9. Connect (+) and (−) cables to battery in the order of mention.
10. Tighten the clamp nut securely.

**BATTERY CHARGING**

*Caution*

When batteries are being charged, an explosive gas forms beneath the cover of each cell. Do not smoke near batteries on charge or which have recently been charged.

**Do not break live circuits at the terminals of the batteries on charge.** A spark will occur where the live circuit is broken.

**Keep all open flames away from the battery.**

Battery electrolyte temperature may temporarily be allowed to rise to 55°C (131°F). Increase of electrolyte temperature above 55°C (131°F) is harmful to the battery, causing deformation of battery cell, decrease in life of battery, etc.

**CHARGE RATE**

If the test indicator is white, the battery should be charged as outlined below.

When the dot appears or when maximum charge shown below is reached, charging should be stopped.

*NOTE*

When the charging is performed at 5 amps, charging is virtually 100% three hours after the indicator's indication changes from white to green.

Use fast charging only in an emergency.

If the indicator does not turn to green even after the battery is charged, the battery should be replaced; do not overcharge.

**Charge Rate Chart**

<table>
<thead>
<tr>
<th>Battery</th>
<th>Slow Charging</th>
<th>Fast Charging</th>
</tr>
</thead>
<tbody>
<tr>
<td>75D23R-MF</td>
<td>5 amps 15 hrs.</td>
<td>20 amps 3 hrs.</td>
</tr>
<tr>
<td>(520 amps)</td>
<td>10 amps 7.5 hrs.</td>
<td>30 amps 2.5 hrs.</td>
</tr>
</tbody>
</table>
# BATTERY TEST

<table>
<thead>
<tr>
<th>TEST STEP</th>
<th>RESULT</th>
<th>ACTION TO TAKE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A0 VISUAL INSPECTION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Remove negative cable, then positive cable.</td>
<td>OK→</td>
<td>CLEAN terminals and clamps. GO to A1.</td>
</tr>
<tr>
<td>• Check for dirty or corroded connections.</td>
<td>OK→</td>
<td>GO to A1.</td>
</tr>
<tr>
<td>A1 LOOSE BATTERY POST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Check for loose battery post.</td>
<td>OK→</td>
<td>REPLACE battery.</td>
</tr>
<tr>
<td>A2 CRACKED BATTERY COVER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Remove holddowns and shields.</td>
<td>OK→</td>
<td>REPLACE battery.</td>
</tr>
<tr>
<td>• Check for broken/cracked case or cover.</td>
<td>OK→</td>
<td>GO to A2.</td>
</tr>
<tr>
<td>A3 TEST INDICATOR / OPEN CIRCUIT VOLTAGE TEST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Turn headlights on for 15 seconds.</td>
<td>OK→</td>
<td>CHARGE battery at 5 amps. then GO to A3.</td>
</tr>
<tr>
<td>• Turn headlights off for 2 minutes to allow battery voltage to stabilize.</td>
<td>OK→</td>
<td></td>
</tr>
<tr>
<td>• Disconnect cables.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Read open circuit voltage.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A4 LOAD TEST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Connect a load tester to the battery.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Load the battery at the recommended discharge rate (See LOAD TEST RATE CHART) for 15 seconds.</td>
<td>OK→</td>
<td>REPLACE battery.</td>
</tr>
<tr>
<td>• Read voltage after 15 seconds, then remove load.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## LOAD TEST RATE CHART

<table>
<thead>
<tr>
<th>Load test (Amps)</th>
<th>Cranking Rating 0°F</th>
<th>Reserve Capacity</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>240 amps</td>
<td>520 amps</td>
<td>118 minutes</td>
<td>75023R-MF</td>
</tr>
</tbody>
</table>

## LOAD TEST CHART

| Minimum voltage | Temperature | | | |
|-----------------|-------------|---------|-------|
|                 | °F          | °C      |       |
| 9.6             | 70 and above | 21 and above |       |
| 9.5             | 60          | 16      |       |
| 9.4             | 50          | 10      |       |
| 9.3             | 40          | 4       |       |
| 9.1             | 30          | –1      |       |
| 8.9             | 20          | –1      |       |
| 8.7             | 10          | –12     |       |
| 8.5             | 0           | –18     |       |
IGNITION SWITCH
SPECIAL TOOL

<table>
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<tr>
<th>Tool number and tool name</th>
<th>Replaced by Miller tool number</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB990803</td>
<td>General service tool</td>
<td>Removal of steering wheel</td>
</tr>
<tr>
<td>Steering wheel puller</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

IGNITION SWITCH
REMOVAL AND INSTALLATION

CAUTION: SRS
Before removal of air bag module, refer to GROUP 23B – SRS Service Precautions and Air Bag Module and Clock Spring.

Removal steps of ignition switch segment
1. Air bag module (Refer to GROUP 23B – Air Bag Module and Clock Spring.)
2. Steering wheel
3. Knee protector (Refer to GROUP 23A – Instrument Panel.)
4. Column cover lower
5. Column cover upper
6. Lap cooler duct and foot shower duct
7. Column switch and clock spring assembly
8. Ignition key illumination ring
9. Steering lock cylinder
10. Key reminder switch segment
11. Ignition switch segment

Removal steps of steering lock cylinder
1. Air bag module (Refer to GROUP 23B – Air Bag Module and Clock Spring.)
2. Steering wheel
3. Knee protector (Refer to GROUP 23A – Instrument Panel.)
4. Column cover lower
5. Column cover upper
6. Lap cooler duct and foot shower duct
7. Column switch and clock spring assembly
8. Ignition key illumination ring
9. Steering lock cylinder
10. Key reminder switch segment
11. Ignition switch segment

SERVICE POINTS OF REMOVAL

2. REMOVAL OF STEERING WHEEL

Remove the steering wheel by using the special tool.

Caution
Do not hammer on the steering wheel to remove it; doing so may damage the collapsible mechanism.
4. REMOVAL OF COLUMN COVER LOWER / 5. COLUMN COVER UPPER
After the screws have been removed, remove the covers, while making sure not to break the grippers.

9. REMOVAL OF STEERING LOCK CYLINDER
(1) Insert the ignition key into the steering lock cylinder and place the key in the ACC position.
(2) Press the lock pin down with a Phillips head screwdriver (small-size one) to remove the steering lock cylinder.

INSPECTION
IGNITION SWITCH INSPECTION
(1) Remove the knee protector, the column cover lower and the column cover upper. (Refer to GROUP 23A – Instrument Panel.)
(2) Disconnect the wiring connector from the ignition switch and key reminder switch, and connect an ohmmeter to the switch side connector.
(3) Operate the switch, and check the continuity between the terminals.

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<tr>
<th>Terminal</th>
<th>Ignition switch</th>
<th>Key reminder switch</th>
<th>Ignition key illumination light</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 10 11 12</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE
O-O indicates that there is continuity between the terminals.
7. INSTALLATION OF COLUMN SWITCH AND CLOCK SPRING ASSEMBLY

Line up the “NEUTRAL” mark of the clock spring with the mating mark to center the clock spring.

Caution

If the clock spring is not centered, problems such as intermediate failure of the steering wheel to turn, broken ribbon cable in the clock spring, or the like could occur. As a result, they might hinder proper operation of the SRS, resulting in serious injury.
## METERS AND GAUGES

### SPECIFICATIONS

#### GENERAL SPECIFICATIONS

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<td>Electrical type</td>
</tr>
<tr>
<td><strong>Tachometer</strong></td>
<td>Pulse type</td>
</tr>
<tr>
<td><strong>Fuel gauge</strong></td>
<td>Coil type</td>
</tr>
<tr>
<td><strong>Fuel gauge unit</strong></td>
<td>Variable resistance type</td>
</tr>
<tr>
<td><strong>Engine coolant temperature gauge</strong></td>
<td>Coil type</td>
</tr>
<tr>
<td><strong>Engine coolant temperature gauge unit</strong></td>
<td>Thermistor type</td>
</tr>
<tr>
<td><strong>Oil pressure gauge</strong></td>
<td>Bi-metal type</td>
</tr>
<tr>
<td><strong>Oil pressure gauge unit</strong></td>
<td>Bi-metal type</td>
</tr>
<tr>
<td><strong>Pressure gauge &lt;Turbo&gt;</strong></td>
<td>Moving coil type</td>
</tr>
<tr>
<td><strong>Voltage gauge &lt;Non-turbo&gt;</strong></td>
<td>Moving iron type</td>
</tr>
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<th>Specifications</th>
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<tr>
<td>Turn signal indicator light</td>
<td>3.0</td>
</tr>
<tr>
<td>High beam indicator light</td>
<td>1.4 (74)</td>
</tr>
<tr>
<td>Charging system warning light</td>
<td>1.4 (74)</td>
</tr>
<tr>
<td>Oil pressure warning light</td>
<td>1.4 (74)</td>
</tr>
<tr>
<td>Door-ajar warning light</td>
<td>1.4 (74)</td>
</tr>
<tr>
<td>Brake warning light</td>
<td>1.4 (74)</td>
</tr>
<tr>
<td>Low fuel warning light</td>
<td>3.4 (158)</td>
</tr>
<tr>
<td>Seat belt warning light</td>
<td>1.4 (74)</td>
</tr>
<tr>
<td>Cruise control indicator light</td>
<td>1.4 (74)</td>
</tr>
<tr>
<td>Engine coolant level warning light</td>
<td>1.4 (74)</td>
</tr>
<tr>
<td>Check engine warning light</td>
<td>1.4 (74)</td>
</tr>
<tr>
<td>Security indicator light*1</td>
<td>1.4 (74)</td>
</tr>
<tr>
<td>Power/economy changeover indicator light &lt;A/T&gt;</td>
<td>1.12</td>
</tr>
<tr>
<td>Overdrive indicator light &lt;A/T&gt;</td>
<td>1.12</td>
</tr>
<tr>
<td>Supplemental restraint system warning light</td>
<td>1.4 (74) x 2</td>
</tr>
<tr>
<td>Anti-lock braking system warning light</td>
<td>1.4 (74)</td>
</tr>
<tr>
<td>Washer fluid level indicator light</td>
<td>1.4 (74)</td>
</tr>
<tr>
<td>4-wheel steering oil level warning light &lt;4WD&gt;</td>
<td>1.4 (74)</td>
</tr>
<tr>
<td>Cruise control ON indicator light</td>
<td>1.4 (74)</td>
</tr>
<tr>
<td>Tour/sport mode indicator light*2</td>
<td>1.12</td>
</tr>
<tr>
<td>Tour mode indicator light*3</td>
<td>1.12</td>
</tr>
</tbody>
</table>

**NOTE**

1. The values in parentheses denote SAE trade numbers.
2. The * symbol indicates vehicles with theft-alarm system.
3. The *2 symbol indicates vehicles with Electronic Control Suspension.
4. The *3 symbol indicates vehicles with Active Exhaust System.
### SERVICE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
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</thead>
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<tr>
<td><strong>Speedometer indication error</strong></td>
<td></td>
</tr>
<tr>
<td>20 mph</td>
<td>19-22</td>
</tr>
<tr>
<td>40 mph</td>
<td>38-44</td>
</tr>
<tr>
<td>60 mph</td>
<td>57-66</td>
</tr>
<tr>
<td>80 mph</td>
<td>76-88</td>
</tr>
<tr>
<td>100 mph</td>
<td>94-110</td>
</tr>
<tr>
<td>40 km/h</td>
<td>37-44</td>
</tr>
<tr>
<td>80 km/h</td>
<td>75-88</td>
</tr>
<tr>
<td>120 km/h</td>
<td>113-132</td>
</tr>
<tr>
<td>160 km/h</td>
<td>150-176</td>
</tr>
<tr>
<td><strong>Tachometer indication error</strong> rpm</td>
<td></td>
</tr>
<tr>
<td>1,000</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><strong>Fuel gauge unit resistance Ω</strong></td>
<td></td>
</tr>
<tr>
<td>Point F</td>
<td>3 ± 2</td>
</tr>
<tr>
<td>Point E</td>
<td>110 ± 7</td>
</tr>
<tr>
<td><strong>Fuel gauge unit float height mm (in.)</strong></td>
<td></td>
</tr>
<tr>
<td>Point F</td>
<td>18.6 – 21.6 (.73 – .85)</td>
</tr>
<tr>
<td>Point E</td>
<td>193.4 – 196.4 (7.61 – 7.73)</td>
</tr>
<tr>
<td><strong>Engine coolant temperature gauge unit resistance Ω</strong> [at 70°C(158°F)]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>104 ± 13.5</td>
</tr>
<tr>
<td><strong>Fuel gauge resistance Ω</strong></td>
<td></td>
</tr>
<tr>
<td>Between A- B</td>
<td>Approx. 254</td>
</tr>
<tr>
<td>Between A- C</td>
<td>Approx. 101</td>
</tr>
<tr>
<td>Between B- C</td>
<td>Approx. 153</td>
</tr>
<tr>
<td><strong>Engine coolant temperature gauge resistance Ω</strong></td>
<td></td>
</tr>
<tr>
<td>Between A- B</td>
<td>Approx. 51</td>
</tr>
<tr>
<td>Between A- C</td>
<td>Approx. 139</td>
</tr>
<tr>
<td>Between B- C</td>
<td>Approx. 190</td>
</tr>
<tr>
<td><strong>Oil pressure gauge resistance Ω</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Approx. 42</td>
</tr>
<tr>
<td><strong>Pressure meter resistance &lt;Turbo&gt; Ω</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Approx. 72</td>
</tr>
</tbody>
</table>

### SEALANTS AND ADHESIVES

<table>
<thead>
<tr>
<th>Items</th>
<th>Specified sealants and adhesives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine coolant temperature gauge unit</td>
<td>MOPAR Part No. 4318034 or equivalent</td>
</tr>
</tbody>
</table>
OPERATION

<Fuel gauge>
- When the ignition key is at the “ON” position, the fuel gauge is activated.
- When there is much fuel, the unit’s resistance is small and the current flowing in the circuit is great, so the gauge’s indicator indicates in the “F” area.
- When there is little fuel, the unit’s resistance is high and the current flowing in the circuit is small, so the gauge’s indicator indicates in the “E” area.

<Engine coolant temperature gauge>
- When the ignition key is at the “ON” position, the engine coolant temperature gauge is activated.
- When the engine coolant temperature is high, the unit’s resistance is low and there is a great flow of current in the circuit, so the gauge’s indicator indicates in the “H” area.
- When the engine coolant temperature is low, the unit’s resistance is high and there is a small flow of current in the circuit, so the gauge’s indicator indicates in the “C” area.

<Speed sensor>
- Pulses are produced in accordance with the vehicle speed, and vehicle-speed signals are input to systems (the MFI system, etc.) that regulate according to the vehicle speed.

Oil pressure gauge>
- When the ignition key is at the “ON” position, the oil pressure gauge is activated.
- When oil pressure is high, the internal contacts of the gauge unit are kept closed for a longer period of time. This causes more current to flow in the circuit, and the gauge pointer swings to the high pressure side.
- When oil pressure is low, the internal contacts of the gauge unit open in a shorter period of time. Therefore, there is less current flowing in the circuit and the gauge pointer swings to the low pressure side.

Pressure (TURBO) gauge>
- When the ignition key is set to the “ON” position, the gauge indicator will be at “0”.
- When the engine is started, the indicator will move from “0” to the minus (−) side, and then, as the boost level increases, it will move to the plus (+) side.

Voltage gauge (NON-TURBO)
- When the ignition key is placed in the “ON” position, the voltage gauge operates and indicates a battery voltage of approximately 12V.
- When the engine is started, the voltage gauge indicates a battery voltage of 12 to 16V, indicating that the battery is on charge.

TROUBLESHOOTING HINTS

1. The fuel gauge doesn’t function, or shows the incorrect indication.
   (1) Disconnect the connector of the fuel pump and gauge unit assembly; the “F” side is indicated when terminal 5 is then grounded.
   - Check the fuel gauge.

2. The engine coolant temperature gauge doesn’t function, or shows the incorrect indication.
   (1) The “H” side is indicated when the connector of the engine coolant temperature gauge unit is disconnected and then grounded.
   - Check the engine coolant temperature gauge unit.

3. Systems dependent upon control according to the vehicle speed do not function correctly.
   - Check the speed sensor.

4. The oil pressure gauge doesn’t function, or shows the incorrect indication.
   (1) The “H” side is indicated when the connector of the oil pressure gauge unit is disconnected and then grounded.
   - Check the oil pressure gauge unit.

5. The meter illumination light does not illuminate.
   (1) The tail lights illuminate.
   - Check the rheostat.

6. The voltage gauge doesn’t function, or shows the incorrect indication.
   - Check the voltage gauge.
METER AND GAUGES CIRCUIT
CIRCUIT DIAGRAM

COMPONENT LOCATION
Engine control module

IGNITION ON (IG1)

E-W 0.85B-W 0.95B-W

59 D-04

D-44

METER AND GAUGES CIRCUIT

FUEL GAUGE UNIT

ENGINE CONTROL MODULE

SPEED SENSOR B-34

28

28

C-14

6

D-15

4

D-05

F-16

3

IGNITION POWER TRANSISTOR (DOHC) OR CONDENSER ASSEMBLY (SOHC)

IGNITION ON (IG1)

54 D-04

10

32

B-44

16

C-82

5 C-82

16 C-71

54 D-04

B

3 D-16

3

V

V

D-44

3 D-16

109

D-05

B-W

B-W

B-W

D-41

2

3

D-41

2

3

D-41

2

3

D-41

2

3
METER AND GAUGES CIRCUIT (CONTINUED)
WARNING LIGHT CIRCUIT
CIRCUIT DIAGRAM

IGNITION SWITCH (IG1)

J/B

C-71

D-44

B-W

B-W

63

59

OIL PRESSURE SWITCH

PARKING BRAKE SWITCH

OIL PRESSURE SENSOR

BRAKE FLUID LEVEL SENSOR

D-28

A-24

OFF-ON

1

D-45

C-15

DOHC

SOHC

F-16

B-06

D-15

D-03

FUEL

OIL

67

61

D-04

6

1

2

3

4

5

2

1

2

1

4

6

8

0

6

15A

l

m

n

---

---

---

---

---
WARNING LIGHT CIRCUIT (CONTINUED)

IGNITION SWITCH (ST)

IGNITION SWITCH (IG1)

STARTER RELAY

AWS FLUID LEVEL SENSOR

DIODE

COMBINATION METER
SERVICE ADJUSTMENT PROCEDURES

INSPECTION

SPEEDOMETER INSPECTION

(1) Assure tire pressure at standard value. (Refer to GROUP 22 — Specifications.)
(2) Set the vehicle on a speedometer tester.
(3) Set free rollers securely on the floor according to the wheelbase and rear tread of the vehicle (when rear wheels are to be set on free rollers).
(4) Raise the rear wheels on a jack and place rigid racks to support the specified positions of the side sills (when rear wheels are to be raised on a jack).
(5) Make sure the parking brake has been set. <FWD>

(6) Attach anchoring bars on the tie-down brackets and secure their ends to the anchor plates.
(7) Make sure the tension on the right and left bars is the same. Also be sure there is enough tension on each bar.
(8) Attach a chain or wire to the rear tie-down hole. Make sure the end of the wire or chain is secured firmly.
(9) Take all other necessary precautions.
(10) Use a speedometer tester to measure the speedometer’s indication error.

Standard value:

<table>
<thead>
<tr>
<th>Standard indication</th>
<th>Allowable range</th>
</tr>
</thead>
<tbody>
<tr>
<td>mph</td>
<td>mph</td>
</tr>
<tr>
<td>20</td>
<td>19 – 22</td>
</tr>
<tr>
<td>40</td>
<td>38 – 44</td>
</tr>
<tr>
<td>60</td>
<td>57 – 66</td>
</tr>
<tr>
<td>80</td>
<td>76 – 88</td>
</tr>
<tr>
<td>100</td>
<td>94 – 110</td>
</tr>
<tr>
<td>km/h</td>
<td>km/h</td>
</tr>
<tr>
<td>40</td>
<td>37 – 44</td>
</tr>
<tr>
<td>80</td>
<td>75 – 88</td>
</tr>
<tr>
<td>120</td>
<td>113 – 132</td>
</tr>
<tr>
<td>160</td>
<td>150 – 176</td>
</tr>
</tbody>
</table>

Caution

Do not operate the clutch or accelerator abruptly or decelerate during the operations.
TACHOMETER INSPECTION

1. Insert paper clip into the engine revolution speed detection terminal provided in the engine compartment, and connect the engine tachometer to the inserted paper clip.

Caution
As the tachometer is negative grounded, do not connect battery conversely to prevent damaging transistor and diode.

NOTE
For tachometer inspection, use of a fluxmeter-type engine tachometer is recommended. (Because a fluxmeter only needs to be clipped to the high tension cable.)

2. Connect the engine tachometer and compare the engine tachometer and tachometer readings. Replace tachometer if difference is excessive.

Standard value:

- 1,000 ± 100 rpm
- 3,000 ± 150 rpm
- 5,000 ± 250 rpm
- 6,000 ± 300 rpm

Caution
The engine speed signal output from the DOHC engine is one-third of the actual speed. When the engine speed is measured, make sure that the engine tachometer is placed in the 2-cylinder range. (The real speed is indicated.)

FUEL GAUGE SIMPLE INSPECTION

1. Remove the fuel gauge unit coupling connector.

2. Connect a test light to the harness connector.

3. Place the ignition switch in the ON position.

4. Check the test light and gauge conditions.

   1. Test light lights. (Pointer of gauge does not swing.)
   - Replace fuel gauge.

   2. Test light lights. (Pointer of gauge swings.)
   - Replace fuel gauge unit.

   3. Test light does not light. (Pointer of gauge does not swing.)
   - Correct harness.
FUEL GAUGE UNIT INSPECTION

To check, remove fuel gauge unit from fuel tank. (Refer to GROUP 14 – Fuel Tank.)

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: 3±2 Ω  
                    Point E: 110±7 Ω

(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 at point F (highest) and point E (lowest) with float arm touching stopper.

   Standard value:  
                   Point F: 18.6 – 21.6 mm (.73 – .85 in.)  
                   Point E: 193.4 – 196.4 mm (7.61 – 7.73 in.)

FUEL SENSOR INSPECTION

Connect fuel gauge unit to battery via test light (12V – 3.4W). Immerse in water. Condition good if light goes off when unit thermistor is in water and lights when unit is removed from water.

Caution

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

Remove the water temperature gauge unit coupling connector.

Connect the harness connector via a test light to the ground.

Place the ignition switch in the ON position.

Check the test light and gauge conditions.

1. Test light lights. (Pointer of gauge does not swing.)
   - Replace water temperature gauge.

2. Test light lights. (Pointer of gauge swings.)
   - Replace water temperature gauge unit.

@ Test light does not light. (Pointer of gauge does not swing.)
   - Correct harness.

ENGINE COOLANT TEMPERATURE GAUGE UNIT INSPECTION

To check, remove engine coolant temperature gauge unit from the intake manifold of the SOHC engine or from the thermostat housing of the DOHC engine.

Engine Coolant Temperature Gauge Unit Resistance

(1) Immerse unit in 70°C (158°F) water to measure resistance.
   
   **Standard value:** $104 \pm 13.5 \, \Omega$

(2) After checking, apply the specified sealant around the thread of engine coolant temperature gauge unit and install on the intake manifold of the SOHC engine or on the thermostat housing of the DOHC engine.

**Specified sealant:** MOPAR Part No. 4318034 or equivalent
OIL PRESSURE GAUGE SIMPLE INSPECTION

Remove the oil pressure gauge unit coupling connector.

harness connector it to the ground.

Place the ignition switch in the ON position.

Check the test light and gauge conditions.

1. Test light lights. (Pointer of gauge does not swing.)
   - Replace oil pressure gauge.

2. Test light lights. (Pointer of gauge swings.)
   - Replace oil pressure gauge unit.

3. Test light does not light. (Pointer of gauge does not swing.)
   - Correct harness.

VOLTAGE GAUGE SIMPLE TEST

Connect voltmeter to battery.

Check voltage gauge for conditions,

1. Voltage indicated by voltmeter differs from voltage indicated by voltage gauge (position indicated by pointer).
   - Replace gauge.

2. Gauge does not operate.
   - Correct harness or replace gauge.
COMBINATION METERS
REMOVAL AND INSTALLATION

Removal steps
1. Knee protector (Refer to GROUP 23A – Instrument Panel.)
2. Column cover lower
3. Column cover upper
4. Meter bezel
5. Combination meter
6. Vehicles speed sensor

SERVICE POINTS OF REMOVAL
2. REMOVAL OF COLUMN COVER LOWER / 3. COLUMN COVER UPPER
After the screws have been removed, remove the covers, while making sure not to break the grippers.
INSPECTION

VEHICLES SPEED SENSOR INSPECTION

(1) Remove the vehicles speed sensor and connect as shown in the illustration, using a $3 - 10 \text{k} \Omega$ resistance.

(2) Use a voltmeter to check for voltage at terminals (2) and (3) when the pulse generator shaft is turning. (One revolution is four pulses.)

FUEL GAUGE INSPECTION

Measure resistance between terminals with circuit tester.

Standard value:

- A - B  Approx. 254 $\Omega$
- A - C  Approx. 101 $\Omega$
- B - C  Approx. 153 $\Omega$

DISASSEMBLY AND REASSEMBLY

Disassembly steps

1. Trip counter reset knob
2. Meter glass
3. Window plate
4. Speedometer
5. Fuel gauge
6. Tachometer
7. Printed-circuit board
8. Meter case
COMBINATION GAUGES
REMOVAL AND INSTALLATION

Removal steps
1. Instrument panel
   (Refer to GROUP 23A - Instrument Panel.)
   Distribution duct
   [Refer to GROUP 24 - Ventilators
   (Instrument Panel)].
2. Combination gauge

INSPECTION
PRESSURE GAUGE INSPECTION <Turbo>
Measure resistance between terminals with circuit tester.
Standard value: Approx. 72 \( \Omega \)

VOLTAGE GAUGE INSPECTION <Non-Turbo>
Refer to P.8-283

OIL PRESSURE GAUGE INSPECTION
Measure resistance between terminals with circuit tester.
Standard value: Approx. 42 \( \Omega \)

ENGINE COOLANT TEMPERATURE GAUGE INSPECTION
(1) Remove the IG terminal screw from area A.
(2) Measure resistance between terminals with circuit tester.

Caution
For inspection, use a circuit tester which uses a measurement current of 4mA or less.
Standard value:
- A - B Approx. 51 \( \Omega \)
- A - C Approx. 139 \( \Omega \)
- B - C Approx. 190 \( \Omega \)
Disassembly steps
1. Gauge bracket
2. Gauge glass
3. Window plate
4. Voltage gauge <Non-Turbo> or Pressure gauge <Turbo>
5. Oil pressure gauge
6. Engine coolant temperature gauge
7. Printed-circuit board
8. Gauge case
# LIGHTING SYSTEM
## SPECIFICATIONS
### GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exterior lights</td>
<td></td>
</tr>
<tr>
<td>Headlight W</td>
<td>65155</td>
</tr>
<tr>
<td>Fog light W</td>
<td>35<em>1 or 55</em>2</td>
</tr>
<tr>
<td>Front combination light</td>
<td></td>
</tr>
<tr>
<td>Turn-signal light / side marker light CP</td>
<td>43/3 (3496)</td>
</tr>
<tr>
<td>Rear combination light</td>
<td></td>
</tr>
<tr>
<td>Turn-signal light / side marker and tail light CP</td>
<td>32/2 (2057)*1</td>
</tr>
<tr>
<td>Stop light / tail light CP</td>
<td>32/2 (2057)*1</td>
</tr>
<tr>
<td>Turn-signal and stop light / side marker and tail light CP</td>
<td>3212 (2057)*1</td>
</tr>
<tr>
<td>Side marker and tail light CP</td>
<td>3 (168)*2</td>
</tr>
<tr>
<td>Back-up light CP</td>
<td>21</td>
</tr>
<tr>
<td>License plate light CP</td>
<td>3 (168)</td>
</tr>
<tr>
<td>High-mounted stop light CP</td>
<td>32 (1156) or LED*3: Light Emitting Diode</td>
</tr>
<tr>
<td>Engine compartment inspection light W</td>
<td>3.8 (194)</td>
</tr>
<tr>
<td>Interior lights</td>
<td></td>
</tr>
<tr>
<td>Foot light W</td>
<td>3.4 (158)</td>
</tr>
<tr>
<td>Dome light W</td>
<td>8</td>
</tr>
<tr>
<td>Spot light W</td>
<td>8</td>
</tr>
<tr>
<td>Door light W</td>
<td>5</td>
</tr>
<tr>
<td>Glove compartment light W</td>
<td>3.4 (158)</td>
</tr>
<tr>
<td>Luggage compartment light W</td>
<td>5</td>
</tr>
</tbody>
</table>

**NOTE**

1. *1*: Vehicles with small bumper
2. *2*: Vehicles with large bumper
3. *3*: Vehicles with rear spoiler
4. The values in parentheses denote SAE trade number.

## SERVICE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limit</td>
<td></td>
</tr>
<tr>
<td>Headlight intensity</td>
<td>20,000 cd or more</td>
</tr>
</tbody>
</table>

## SPECIAL TOOL

<table>
<thead>
<tr>
<th>Tool number and tool name</th>
<th>Replaced by Miller tool number</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB991 502 Scan Tool (MUT-II)</td>
<td>DRB-II Scan Tool</td>
<td>Checking the lighting system</td>
</tr>
<tr>
<td>MB991 529</td>
<td>MB991 529</td>
<td>Checking the lighting system using a voltmeter</td>
</tr>
</tbody>
</table>
TROUBLESHOOTING

HEADLIGHT CIRCUIT (VEHICLES FOR U.S.)
<Vehicles without theft-alarm system>

CIRCUIT DIAGRAM
HEADLIGHT CIRCUIT (VEHICLES FOR U.S.) <VEHICLES WITHOUT THEFT-ALARM SYSTEM>

(CONTINUED)
CHASSIS ELECTRICAL – Lighting System

<VEHICLES WITH THEFT-ALARM SYSTEM>
CIRCUIT DIAGRAM
(VEHICLES FOR CANADA)
<VEHICLES WITHOUT THEFT-ALARM SYSTEM>
CIRCUIT DIAGRAM

[Diagram of lighting system circuitry, including fuse, relay, and wiring connections.]
<VEHICLES WITH THEFT-ALARM SYSTEM>

CIRCUIT DIAGRAM

CHASSIS ELECTRICAL – Lighting System

8-299
<VEHICLES WITH THEFT-ALARM SYSTEM> (CONTINUED)
COMPONENT LOCATION

Headlight relay/Tail light relay

Data link connector

Light automatic shut-off unit

< Vehicles with keyless entry system>

Light automatic shut-off unit

< Vehicles without keyless entry system>

ETACS unit

Daytime running light control unit/
Upper beam relay

Daytime running light control unit
OPERATION

<Headlights ON operation>
- Turn the lighting switch to “HEAD”, and the contact point of the headlight relay will be closed to turn “ON” the headlight relay.
- When the dimmer switch is placed in the LO position, the headlight low-beams go on. When the switch is placed in the HI position, the headlight low-beams and high-beams go on.

<High-beam indicator light>
- When the high-beam is lit or when the passing switch is activated, the high-beam indicator light will be lit.

<Light automatic shut-OFF system>
- If the driver’s door is opened after the ignition switch is turned to “OFF” or the ignition switch is turned to “OFF” after the driver’s door is opened when the headlights are lit, the current which flows to the coil side of the headlight relay will be cut off by the light automatic shut-OFF unit opening the contact point, and the headlight relay will be turned “OFF” to automatically shut off the headlights.
- To turn the headlights on again after they are automatically shut off, turn the lighting switch to “OFF” once and then back to “HEAD”, or turn the ignition switch to “ACC” or “ON”, and the automatic shut-OFF will be cancelled and the current will flow from the light automatic shut-OFF unit to the coil side of the headlight relay again to close the contact point. Thus, the headlight relay will be turned “ON” to turn on the headlights.

NOTE
When the lighting switch is at “HEAD”, the light automatic shut-OFF system is valid for tail lights, parking and side marker lights, license plate light, illumination light, etc.
(Refer to P.8-315.)
## TROUBLESHOOTING HINTS

<table>
<thead>
<tr>
<th>Phenomenon</th>
<th>Checking method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headlights don't come on.</td>
<td>But the tail lights do illuminate.</td>
</tr>
<tr>
<td></td>
<td>• Check the headlight relay. (Refer to P.8-338.)</td>
</tr>
<tr>
<td></td>
<td>• Check the lighting switch. (Refer to P.8-344.)</td>
</tr>
<tr>
<td></td>
<td>• Check the light automatic shut-OFF unit. (Refer to P.8-339.)</td>
</tr>
<tr>
<td></td>
<td>The tail lights also don't illuminate.</td>
</tr>
<tr>
<td></td>
<td>• Check the fusible link (3).</td>
</tr>
<tr>
<td>The low beam at both sides doesn't illuminate.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Check the “LO” contacts of the dimmer switch.</td>
</tr>
<tr>
<td>The upper beam at both sides doesn't illuminate.</td>
<td>The passing signal functions OK.</td>
</tr>
<tr>
<td></td>
<td>• Check the “HI” contacts of the dimmer switch.</td>
</tr>
<tr>
<td></td>
<td>The passing signal doesn't function.</td>
</tr>
<tr>
<td></td>
<td>• Check the dimmer switch. (Refer to P.8-344.)</td>
</tr>
<tr>
<td>One headlight doesn't illuminate.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Check the bulb.</td>
</tr>
<tr>
<td>Can't switch from low to high beam or vice versa.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Check the dimmer switch. (Refer to P.8-344.)</td>
</tr>
<tr>
<td>The high beam indicator light doesn't illuminate.</td>
<td>The high beam of the headlights is normal.</td>
</tr>
<tr>
<td></td>
<td>• Check dedicated fuse No. (6).</td>
</tr>
<tr>
<td></td>
<td>• Check the bulb.</td>
</tr>
<tr>
<td>Headlights are not automatically shut off.</td>
<td>Tail lights are automatically shut off.</td>
</tr>
<tr>
<td></td>
<td>• Check the light automatic shut-OFF unit. (Refer to P.8-339.)</td>
</tr>
<tr>
<td></td>
<td>Tail lights are not automatically shut off either.</td>
</tr>
<tr>
<td></td>
<td>• Check the driver's side door switch. (Refer to GROUP 23A – Door Assembly).</td>
</tr>
<tr>
<td></td>
<td>• Check the light automatic shut-OFF unit. (Refer to P.8-339.)</td>
</tr>
</tbody>
</table>

**NOTE**
For information concerning the theft-alarm system, refer to P.8-412.
Input Signal
Using the scan tool or voltmeter, check whether or not the input signals from each switch are being input to the ETACS unit.

When using the scan tool
(1) Connect the scan tool to the data link connector.

Caution
Turn off the ignition switch beforehand whenever the scan tool is connected or disconnected.

(2) If the scan tool makes a peep sound when each switch is operated (turned ON/OFF), the input signal to ECU is normally sent from the switch circuit system.

When using a voltmeter
(1) Connect a voltmeter to the ETACS terminal and the ground terminal of the data link connector using the special tool.

(2) If the voltmeter pointer deflects once when each switch is operated (turned ON/OFF), the input signal to ECU is normally sent from the switch circuit system.
OPERATION

- When the fog light switch is placed in the ON position with the lighting switch in the HEAD position and the dimmer switch in the LO position, current flows through the dedicated fuse (4) to the coil of the fog light relay, the fog light switch, the dimmer switch and ground, causing the contacts of the fog light relay to close.

  When the contacts of the fog light relay close, current flows through the dedicated fuse (4) to the contacts of the fog light relay, the fog lights and ground, causing the fog lights to come on.

- When the dimmer switch is placed in the HI position or the lighting switch is placed in the TAIL or OFF position while the fog lights are ON, current supply to the fog light relay or headlight relay is cut off. As a result, the contacts of the fog light relay open, and the fog lights go out.

NOTE
The fog lights are included in the light automatic shut-OFF system operation. (Refer to P.8-304.) The illumination lights are also included in the same system operation.

### Fog Lights Operation Conditions

<table>
<thead>
<tr>
<th>Fog light switch</th>
<th>Lighting switch</th>
<th>Dimmer switch</th>
<th>Fog lights</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON position</td>
<td>OFF position or TAIL position</td>
<td>LO position</td>
<td>OFF</td>
</tr>
<tr>
<td></td>
<td>HEAD position</td>
<td>HI position</td>
<td>OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LO position</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HI position</td>
<td>OFF</td>
</tr>
</tbody>
</table>
TROUBLESHOOTING HINTS
1. The right or left fog lights only go on.
   - Check the bulb.
2. Fog lights do not go on when the fog light switch is set at ON.
   - Check the dedicated fuse (4).
   - Check the fog light relay. (Refer to P.8-338.)
   - Check the fog light switch.

NOTE
For the light automatic shut-OFF system troubleshooting hints, refer to P.8-305.
TAIL LIGHT, PARKING/SIDE MARKER LIGHT AND LICENSE PLATE LIGHT CIRCUIT
<VEHICLES WITH SMALL BUMPER>
CIRCUIT DIAGRAM

FUSIBLE LINK ③

IGNITION SWITCH (IG1)

FUSIBLE LINK@

TAIL LIGHT RELAY

12V 10A

J/B

TAIL LIGHT, PARKING/SIDE MARKER LIGHT AND LICENSE PLATE LIGHT CIRCUIT
<VEHICLES WITH SMALL BUMPER>

CIRCUIT DIAGRAM

FUSIBLE LINK ③

IGNITION SWITCH (IG1)

FUSIBLE LINK@
TAIL LIGHT, PARKING/SIDE MARKER LIGHT AND LICENSE PLATE LIGHT CIRCUIT
<Vehicles with Small Bumper> (Continued)
CHASSIS ELECTRICAL – Lighting System

<VEHICLES WITH LARGE BUMPER>

CIRCUIT DIAGRAM

FUSIBLE LINK ③
2R-B

TAILLIGHT RELAY A-05X
1.25R-W

IGNIT ON SWITCH (IG1)

FUSIBLE LINK②

1 C-70
R

1 A-11X
IOD OR STORAGE CONNECTOR

LIGHT AUTOMATIC SHUT-OFF UNIT E-17

COLUMN SWITCH (LIGHTING) SWITCH c-10

DOOR SWITCH (LH)

HEAD TAIL

J/B

C-82

C-83

C-77

C-82

C-83

C-70

R

10A 0

J/B

10A 0

C-68

J/B

C-82

18

10A 0

C-83

11

2

R-Y

R

16

1

C-70

R

G-Y

12

10

C-Y

C-78

J/B

C-82

5

2B

2

E-21

OFF ON (IGN)

FUSIBLE LINK①

HEAD TAIL

J/B

1 C-70
R

1 A-11X
IOD OR STORAGE CONNECTOR

LIGHT AUTOMATIC SHUT-OFF UNIT E-17

COLUMN SWITCH (LIGHTING) SWITCH c-10

DOOR SWITCH (LH)

HEAD TAIL

J/B

C-82

5

2B

2

E-21

OFF ON (IGN)
<VEHICLES WITH LARGE BUMPER> (CONTINUED)
OPERATION

- When the lighting switch is placed in the TAIL or HEAD position, current flows through the coil of the tail light relay to the lighting switch and ground, causing the contacts of the tail light relay to close. Then current flows through the contacts of the tail light relay to the dedicated fuse, the individual lights and ground, causing the tail lights, parking/side marker lights and license plate lights to go ON.

<Light automatic shut-OFF system>

- If the driver’s door is opened after the ignition switch is turned to “OFF” or the ignition switch is turned to “OFF” after the driver’s door is opened when the tail lights are lit, the current which flows to the coil side of the tail light relay will be cut off by the light automatic shut-OFF unit opening the contact point, and the tail light relay will be turned “OFF” to automatically shut off the tail lights, parking and front side marker lights and license plate light.

- To turn on the tail lights, parking and front side marker lights and license plate light again after they are automatically shut off, turn the lighting switch to “OFF” once and to “HEAD” again, or turn the ignition switch to “ACC” or “ON”, and the automatic shut-off will be cancelled and the current will flow from the light automatic shut-OFF unit to the coil side of the tail light relay to close the contact point. Thus, the tail light relay will be turned “ON” to turn on the tail lights, parking and front marker lights and license plate light.

NOTE

When the lighting switch is at the “HEAD” position, the light automatic shut-OFF system will be also activated for the headlights. (Refer to P.8-304.) The same system will also be activated for the illumination lights, etc.

TROUBLESHOOTING HINTS

1. All lights don’t illuminate.
   - (1) The headlights don’t illuminate, either.
     - Check the fusible link (3).
     - Check the dedicated fuse (2).
     - Check the lighting switch. (Refer to P.8-344.)
     - Check the light automatic shut-OFF unit. (Refer to P.8-339.)
   - (2) The headlights illuminate.
     - Check the tail light relay. (Refer to P.8-338.)
     - Check the dedicated fuse (2).
     - Check the lighting switch. (Refer to P.8-344.)
     - Check the light automatic shut-OFF unit. (Refer to P.8-339.)

2. Some light does not come on.
   - Check the bulb.
   - Check the grounding circuit.

3. Some light is not automatically shut off.
   - Check the driver’s side door switch. (Refer to GROUP 23A — Door Assembly.)
   - Check the automatic shut-OFF unit. (Refer to P.8-339.)

COMPONENT LOCATION

Taillight relay

<Light automatic shut-off unit>

<Vehicles without keyless entry system>

<Light automatic shut-off unit>

<Vehicles with keyless entry system>
DOME LIGHT, FOOT LIGHT AND IGNITION KEY CYLINDER ILLUMINATION LIGHT CIRCUIT

OPERATION

<Dome light>
- Battery voltage is always applied to the dome light. When the dome light switch is turned to “ON”, the dome light will remain lit. After either door is opened if the dome light switch is at “DOOR” position, the dome light will come on.
- With the dome light turned on (with the ignition switch in the OFF position and with the dome light switch in the DOOR position), close all doors, and the timer circuit in the ETACS unit will be activated to gradually vary the voltage for approx. 6 seconds owing to the duty control, and the voltage will be output to transistor Tr. Since the voltage applied to the dome light gradually decreases, the dome light will be dimmed.
- If the ignition switch is turned to “ON” while the dome light is lit (while the timer is activated), the timer circuit will be opened to turn “off” transistor Tr. This will immediately turn off the dome light without dimming.

<Foot lights and ignition key illumination light>
- Battery voltage is always applied to the foot lights and ignition key illumination light.
  - With the ignition switch in the OFF position, open any door, and all lights will come on.
  - With all lights turned on (with the ignition switch in the OFF position), close all doors, and the timer circuit inside the ETACS unit will operate in the same manner as the dome light to dim all lights. When the ignition switch is placed in the ON position with all lights turned on (with the timer in operation), the same operation as the dome light will take place.

TROUBLESHOOTING HINTS

<table>
<thead>
<tr>
<th>Phenomenon</th>
<th>Checking method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dome light does not come on when a door is opened with the dome light switch in the DOOR position.</td>
<td>The foot lights and ignition key cylinder illumination light don’t illuminate, either.</td>
</tr>
</tbody>
</table>
| | • Check the door switch input signal. (Refer to P.8-317.)  
  | • Check the door switch. (Refer to GROUP 23B – Door Assembly.)  
  | The foot lights and ignition key cylinder illumination light illuminate. | • Check the dome light switch.  
  | • Check the dome light bulb. |
| Dome light, foot lights and ignition key illumination light go out at once when doors are closed. |  
| Even if ignition switch is turned on while lights are being dimmed, lights do not go out at the same time. | • Check the door switch input signal. (Refer to P.8-317.)  
  | • Check the ignition switch input signal. (Refer to P.8-317.) |

COMPONENT LOCATION

ETACS unit

Data link connector
Input Signal
Using the scan tool or voltmeter, check whether or not the input signals from each switch are being input to the ETACS unit.

When using the scan tool
(1) Connect the scan tool to the data link connector.
   Caution
   Turn off the ignition switch beforehand whenever the scan tool is connected or disconnected.
(2) If the scan tool makes a peep sound when each switch is operated (turned ON/OFF), the input signal to ECU is normally sent from the switch circuit system.

When using a voltmeter
(1) Connect a voltmeter to the ETACS terminal and the ground terminal of the data link connector using the special tool.
(2) If the voltmeter pointer deflects once when each switch is operated (turned ON/OFF), the input signal to ECU is normally sent from the switch circuit system.
DOME LIGHT, FOOT LIGHT AND IGNITION KEY CYLINDER ILLUMINATION LIGHT CIRCUIT

CIRCUIT DIAGRAM
OPERATION

- Battery voltage is always applied (via sub-fusible link No. ⑥ and multipurpose fuse No. ⑬) to the luggage compartment light and door light.
- When the door is opened, the door switch is switched ON and the door light illuminates.
- When the liftgate is opened, the luggage compartment light switch is switched ON and the luggage compartment light illuminates.
GLOVE BOX LIGHT, VANITY MIRROR LIGHT AND INSPECTION LIGHT CIRCUIT

CIRCUIT DIAGRAM

OPERATION

- When the lighting switch is placed in the TAIL or HEAD position, and the contacts of the tail light relay close, battery voltage is applied via the dedicated fuse to the glove box light, the vanity mirror light and the inspection light.
- When the glove box is opened, the glove box illumination light switch is switched ON and the glove box illumination light illuminates.
- When the vanity mirror lid is opened, the vanity mirror light switch is switched ON and the vanity mirror light illuminates.
- When the engine hood is opened, the inspection light switch is switched ON and the inspection light illuminates.

NOTE
The light automatic shut-OFF system is valid for the glove box light, vanity mirror light and inspection light. (Refer to P.8-315.)
OPERATION

- When, with the ignition switch at the “ON” position, the shift lever (or the selector lever) is moved to the “R” position, the backup light switch (M/T) is switched ON (or the park/neutral position switch (A/T) is switched to the “R” position), and the backup light illuminates.
TURN-SIGNAL LIGHT AND HAZARD LIGHT CIRCUIT
<VEHICLES WITH SMALL BUMPER – TYPE 1>

CIRCUIT DIAGRAM
OPERATION

1. When operation is normal
   - When the ignition switch is switched to the ON position, battery voltage is applied (via the multi-purpose fuse and hazard switch) to the turn-signal and hazard flasher unit.
   - When the turn-signal switch is switched to the LH (or RH) position, Tr (within the flasher unit) is switched ON and OFF repeatedly. Then the contacts of the relay (also within the flasher unit) repeatedly switch from ON to OFF, causing the turn-signal lights and turn-signal indicator light LH (or RH) to flash.

2. If one of the bulbs is burned out
   - If either of the turn-signal light bulbs is burned-out, the resistance of the turn-signal circuit as a whole increases, resulting in shorter ON and OFF intervals of the Tr and a higher flashing rate of the lights.

<Hazard-warning lights>

- When the hazard-warning switch is switched to the "ON" position, the relay contact of the turn signal and hazard flasher unit is switched ON and OFF repeatedly, in the same manner as for the operation of the turn-signal lights, and the left and right turn-signal lights and turn-signal indicator lights simultaneously flash repeatedly.

   NOTE
   (1) The number of flashes of the hazard-warning lights does not change if there is damaged or disconnected wiring of one light.
   (2) The light automatic shut-OFF system is valid for the illumination light of the hazard switch. (Refer to P.8-315.)

TROUBLESHOOTING HINTS

1. The turn-signal lights and hazard-warning lights do not operate at all.
   - Check the hazard switch contact (power supply side).
   - Check the turn-signal and hazard flasher unit.

2. All turn-signal lights at the left (or right) side do not function.
   (1) The hazard-warning lights function normally.
   - Check the hazard switch contact (turn-signal side).
   - Check the turn-signal switch.

3. The number of flashes of the turn-signal lights is excessive.
   - Check the bulbs.

4. The hazard-warning lights do not function.
   (1) The turn-signal lights function normally.
   - Check the hazard switch contact (hazard-warning light side).

   NOTE
   For the troubleshooting hints of the automatic light shut-OFF system, refer to P.8-315.

COMPONENT LOCATION

Turn-signal and hazard flasher unit

[Diagram of Turn-signal and hazard flasher unit]
OPERATION

1. When operation is normal
   • When the ignition switch is switched to the ON position, battery voltage is applied (via the multi-purpose fuse and hazard switch)
   • When the turn-signal switch is switched to the LH position, Tr1 (within the flasher unit) is switched ON and OFF repeatedly. Then the contacts of the relay 1 (also within the flasher unit) repeatedly switch from ON to OFF, causing the turn-signal lights and turn-signal indicator light LH to flash.
   • When the turn-signal switch is switched to the RH position, Tr2 (within the flasher unit) is switched ON and OFF repeatedly. Then the contacts of relay 2 (also within the flasher unit) repeatedly switch from ON to OFF, causing the turn-signal lights and turn-signal indicator light RH to flash.

2. If one of the bulbs is burned out
   • If the LH (or RH) turn-signal light bulb is burned-out, the resistance of the turn-signal circuit as a whole increases, resulting in shorter ON and OFF intervals of the LH Tr1 (or RH Tr2) and a higher flashing rate of the LH lights (or RH lights).

<Hazard-warning lights>

- When the hazard-warning switch is switched to the “ON” position, the relay contact of the turn signal and hazard flasher unit is switched ON and OFF repeatedly, in the same manner as for the operation of the turn-signal lights, and the left and right turn-signal lights and turn-signal indicator lights simultaneously flash repeatedly.

NOTE
(1) The number of flashes of the hazard-warning lights does not change if there is damaged or disconnected wiring of one light.
(2) The light automatic shut-OFF system is valid for the illumination light of the hazard switch. (Refer to P.8-315.)

TROUBLESHOOTING HINTS

1. The turn-signal lights and hazard-warning lights do not operate at all.
   • Check the hazard switch contact (power supply side).
   • Check the turn-signal and hazard flasher unit.

2. All turn-signal lights at the left (or right) side do not function.
   (1) The hazard-warning lights function normally.
   • Check the hazard switch contact (turn-signal side).
   • Check the turn-signal switch.

3. The number of flashes of the turn-signal lights is excessive.
   • Check the bulbs.

4. The hazard-warning lights do not function.
   (1) The turn-signal lights function normally.
   • Check the hazard switch contact (hazard-warning light side).

NOTE
For the troubleshooting hints of the automatic light shut-OFF system, refer to P.8-315.

COMPONENT LOCATION

Turn-signal and hazard flasher unit

[Diagram of Turn-signal and hazard flasher unit]
TURN-SIGNAL LIGHT, HAZARD LIGHT AND STOP LIGHT CIRCUIT
<VEHICLES WITH LARGE BUMPER>
CIRCUIT DIAGRAM

IGNITION SWITCH (IG1) → BATTERY → TAILLIGHT RELAY

DEDICATED FUSE

J/B

C-71, C-72, C-73, C-74

D-40, D-41, D-42, D-43

HAZARD SWITCH D-OS

COLUMN SWITCH (TURN-SIGNAL) SWITCH C-10

RHEOSTAT

TURN SIGNAL AND HAZARD FLASHER UNIT E-30

KX35-AC-RG12-NC
8-330

CHASSIS ELECTRICAL – Lighting System

OPERATION

1. When operation is normal
   - When the ignition switch is switched to the
     ON position, battery voltage is applied (via
     the multi-purpose fuse and hazard switch)
     to the turn-signal and hazard flasher unit.
     Battery voltage is also always applied via the
     multi-purpose fuse and the stop light
     switch to the turn-signal and hazard flasher
     unit.
   - When the turn-signal switch is placed in the
     LH (or RH) position, the LH Trl (or RH Tr2)
     repeatedly switches from ON to OFF. At the
     same time, the contacts of LH relay 1 (or the
     contacts of RH Tr2) repeatedly switch from
     ON to OFF, causing the turn-signal lights and
     turn-signal indicator light LH (or RH) to flash.
   - When the brake pedal is depressed while
     the turn-signal lights LH (or RH) are flashing,
     the stop light switch enters the ON state.
     Then the LH (or RH) rear combination lights
     that are indicating the turning direction con-
     tinue to flash. In the other rear combination
     lights that are not indicating the turning
     direction, however, the stop light comes on.

2. If one of the bulbs is burned-out
   - If the LH (or RH) turn-signal light bulb is
     burned-out, the resistance of the turn-signal
     circuit as a whole increases, resulting in
     shorter ON and OFF intervals of the LH Trl
     (or RH Tr2) and a higher flashing rate of the
     LH lights (or RH lights).
     When the turn-signal switch is placed in the
     LH (or RH) position, if the contacts of the LH
     relay 3 (or the contacts of the RH relay 4) continue to be OFF, the front combination
     lights alone will flash at a higher rate just like
     when a turn-signal light bulb is burned-out, whereas the rear combination lights cease
     to flash.

COMPONENT LOCATION

Turn-signal and hazard flasher unit

<Hazard-warning lights>

- When the hazard-warning switch is switched to
  the "ON" position, the relay contact of the turn
  signal and hazard flasher unit is switched ON
  and OFF repeatedly, in the same manner as for
  the operation of the turn-signal lights, and the
  left and right turn-signal lights and turn-signal
  indicator lights simultaneously flash repeatedly.

NOTE
(1) The number of flashes of the hazard-warning
    lights does not change if there is damaged or
    disconnected wiring of one light.
(2) The light automatic shut-OFF system is valid
    for the illumination light of the hazard switch.
    (Refer to P.8-315.)

TROUBLESHOOTING HINTS

1. The turn-signal lights and hazard-warning lights
   do not operate at all.
   - Check the hazard switch contact (power
     supply side).
   - Check the turn-signal and hazard flasher unit.

2. All turn-signal lights at the left (or right) side do
   not function.
   (1) The hazard-warning lights function normally.
       - Check the hazard switch contact (turn-
         signal side).
       - Check the turn-signal switch.

3. The number of flashes of the turn-signal lights is
   excessive.
   - Check the bulbs.

4. The turn-signal lights of the front combination
   lights flash at a higher rate.
   (1) The turn-signal lights of the rear combination
       lights do not flash but the stop light illumi-
       nates.
       - Check the turn-signal and hazard flasher
         unit.

5. The hazard-warning lights do not function.
   (1) The turn-signal lights function normally.
       - Check the hazard switch contact (hazard-
         warning light side).

NOTE
For the troubleshooting hints of the automatic
light shut-OFF system, refer to P.8-315.
STOP LIGHT CIRCUIT
<VEHICLES WITH SMALL BUMPER>
CIRCUIT DIAGRAM
SERVICE ADJUSTMENT PROCEDURES

HEADLIGHT AIMING

PRE-AIMING INSTRUCTIONS
1. Inspect for badly rusted or faulty headlight assemblies. These conditions must be corrected before a satisfactory adjustment can be made.
2. Place vehicle on a level floor.
3. Bounce front suspension through three (3) oscillations by applying body weight to hood or bumper.
4. Inspect tire inflation.
5. Rock vehicle sideways to allow vehicle to assume its normal position.
6. If fuel tank is not full, place a weight in trunk of vehicle to simulate weight of a full tank [3 kg (6.5 lbs.) per gallon].
7. There should be no other load in the vehicle other than driver or substituted weight of approximately 70 kg (150 lbs.) placed in driver’s position.
8. Thoroughly clean headlight lenses.

VERTICAL ADJUSTING
Adjust the vertical angle with the vertical adjusting gear so that the bubble of the vertical angle gauge is aligned with the “0” mark position.

NOTE
The beam angle will change about 0°12’ with on mark.

HORIZONTAL ADJUSTING
Insert a screwdriver in the horizontal adjusting hole and turn until the “0” mark and the center line are in alignment.

NOTE
The beam angle will change about 0°23’ with on mark.
AIMING WITH SCREEN

HEADLIGHT AIM PREPARATION

Place vehicle on a known level floor 7.6 m (25 feet) from aiming screen or light colored wall. Four lines of adhesive tape or like are required on screen or wall:

1. Position a vertical tape so that it is aligned with the vehicle center line.
2. Position a horizontal tape with reference to center line of headlight.
3. Position a vertical tape on the screen with reference to the center line of each of headlights.

VISUAL HEADLIGHT ADJUSTMENT

1. A properly aimed lower beam will appear on the aiming screen 7.6 m (25 feet) in front of the vehicle. The shaded area as shown in the illustration indicates high intensity zone.
2. Adjust low beam of headlights to match the low beam pattern of the right and left headlights.

NOTE
If the visual headlight adjustment at low beam is made, the adjustment at high beam is not necessary.

3. Check to see that the bubble in the headlight vertical angle gauge is in the illustrated position.
4. If the bubble is out of position, adjust by turning the adjusting screw.
5. Confirm that the “0” mark on the headlight horizontal angle adjusting gear (B) is in alignment with the center line.
6. If not, perform the adjustment as follows.
   (1) Pull up the stopper.
   (2) Push the gear (B) in the arrow direction to disengage it from the gear (A).
   (3) Align the “0” mark on the gear (B) with the center line.
   (4) Push down the stopper to engage the gear (B) with the gear (A).

LUMINOUS INTENSITY MEASUREMENT

Measure the luminous intensity of headlights with a photometer in accordance with the instruction manual prepared by the manufacturer of the photometer and make sure that the luminous intensity is within the following limit.

Limit: 20,000 cd or more

NOTE
(1) When measuring the luminous intensity of headlight, keep the engine at 2,000 rpm and have the battery charged.
(2) If there are specific regulations for luminous intensity of headlights in the region where the vehicle is operated, make sure that the intensity conforms to the requirements of such regulations.
FOG LIGHT AIMING

1. Place vehicle on a known level floor 7.6 m (25 feet) from aiming screen or light colored wall.
2. Adjust the adjusting screw so that the top end of high intensity area may come to the same level as the fog light center height.

BULB REPLACEMENT

1. Disconnect the connector.
2. Turn the bulb socket counterclockwise to pull it out.

Caution
Do not touch the surface of the headlight bulb with hands or dirty gloves. If the surface dies become dirty, clean it with alcohol or thinner, and let it dry thoroughly before installing.
HEADLIGHT
REMOVAL AND INSTALLATION

Removal steps
1. Front combination light
2. Headlight

FOG LIGHT
REMOVAL AND INSTALLATION

<Vehicles with small bumper>

Removal steps
1. Front air side spoiler
2. Fog light assembly
• + 5. Bulb

<Vehicles with large bumper>

Fog light removal steps
1. Front air side spoiler
2. Fog light assembly

Bulb replacement removal steps
3. Lens
4. Projector unit
• 4. 5. Bulb
6. Bracket
SERVICE POINT OF REMOVAL

5. REMOVAL OF BULB

(1) Remove the socket cover (vehicles with small bumper fog light) or projector unit (vehicles with larger bumper fog light).

(2) Remove the bulb mounting spring and remove the bulb.

Caution
Do not touch the surface of the headlight bulb with bare hands or dirty gloves.
If there are deposits on the surface, loosen and remove the deposits with a cloth dipped in alcohol or thinner, and let the surface dry before mounting the bulb.

FRONT COMBINATION LIGHT
REMOVAL AND INSTALLATION
REAR COMBINATION LIGHT - BACK-UP LIGHT AND LICENSE PLATE LIGHT

REMOVAL AND INSTALLATION

<Vehicles with small bumper>

Removal steps
1. Rear combination light unit
2. Bulb
   Rear side trim (Refer to GROUP 23A – Trims.)
3. Socket assembly

<Vehicles with large bumper>

Removal steps
1. Rear combination light unit
2. Bulb
3. Socket assembly
HIGH MOUNTED STOP LIGHT
REMOVAL AND INSTALLATION

<Vehicles with rear spoiler>

Removal steps
1. Liftgate lower trim
   (Refer to GROUP 23A – Trims.)
2. Air spoiler
   (Refer to GROUP 23A – Aero Parts.)
3. High mounted stop light

<Vehicles without rear spoiler>

Removal steps
1. Liftgate lower trim
   (Refer to GROUP 23A – Trims.)
2. High mounted stop light cover
3. High mounted stop light lens and bracket
4. Gasket

SERVICE POINT OF REMOVAL
3. REMOVAL OF HIGH-MOUNTED STOP LIGHT
   (Vehicles with rear spoiler)
   Remove the air spoiler center stay mounting screws before removing the high-mounted stop light.

RELAY

INSPECTION
HEADLIGHT RELAY / TAILLIGHT RELAY / FOG LIGHT RELAY
Connect battery to terminal 1 and check continuity between terminals with terminal 3 grounded.

<table>
<thead>
<tr>
<th>Power is supplied</th>
<th>4 – 5 terminals</th>
<th>Continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power is not supplied</td>
<td>4 – 5 terminals</td>
<td>No continuity</td>
</tr>
<tr>
<td></td>
<td>1 – 3 terminals</td>
<td>Continuity</td>
</tr>
</tbody>
</table>
UPPER BEAM RELAY  
(VEHICLES FOR CANADA)  
Connect battery to terminal 1 and check continuity between terminals with terminal 2 grounded.

<table>
<thead>
<tr>
<th>Power is supplied</th>
<th>3 – 4 terminals</th>
<th>Continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power is not supplied</td>
<td>3 – 4 terminals</td>
<td>No continuity</td>
</tr>
<tr>
<td></td>
<td>1 – 2 terminals</td>
<td>Continuity</td>
</tr>
</tbody>
</table>

LIGHT AUTOMATIC SHUT-OFF UNIT
(1) Remove the quarter trim. (Refer to GROUP 23A — Trim.)
(2) Keeping the connector connected to the light automatic shut-OFF unit, connect the test light (12V – 3.4W) from the harness side to terminal No. 6 (for tail lights) or No. 7 (for headlights). Under the following conditions, check the operation of the test light.

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Test light</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Ignition switch and lighting switch are at “OFF” position.</td>
<td>Illuminated</td>
</tr>
<tr>
<td>(2) Lighting switch is at “TAIL” or “HEAD” with ignition switch at “ACC” or “ON” position.</td>
<td>Illuminated</td>
</tr>
<tr>
<td>(3) Driver’s door is opened after ignition switch is turned from state (2) to “OFF” position. (Reverse procedure is also allowable.)</td>
<td>Illuminated</td>
</tr>
<tr>
<td>(4) Ignition switch is once turned from state (3) “OFF”, then turned to “TAIL” or “HEAD”.</td>
<td>Extinguished</td>
</tr>
<tr>
<td>(5) Ignition switch is turned from state (3) to “ACC” or “ON” position.</td>
<td>Illuminated</td>
</tr>
</tbody>
</table>
FOG LIGHT SWITCH
REMOVAL AND INSTALLATION

Removal steps
1. Knee protector
   (Refer to GROUP 23A – Instrument Panel.)
2. Column cover lower
3. Column cover upper
4. Meter bezel
5. Fog light switch
6. Rear window defogger switch

SERVICE POINTS OF REMOVAL
2. REMOVAL OF COLUMN COVER LOWER / 3. COLUMN COVER UPPER
   After the screws have been removed, remove the covers, while making sure not to break the grippers.

INSPECTION
Operate the switch to check for continuity between terminals.

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Terminal 1</th>
<th>Terminal 5</th>
<th>Terminal 3</th>
<th>Terminal 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
<td>→ Illumination light</td>
</tr>
</tbody>
</table>

NOTE
(1) ○○ indicates that there is continuity between the terminals.
(2) Refer to P.8-410. Check the rear window defogger switch.
**RHEOSTAT**

**INSPECTION**

(1) Remove the instrument panel switch from the knee protector.

(2) Connect the battery and a test bulb (40W) as shown in the figure.

(3) The function of the rheostat is normal if the intensity of illumination changes smoothly, without flashing or flickering, when the rheostat is operated.

**HAZARD SWITCH**

**INSPECTION**

(1) Remove the center air outlet assembly from instrument panel. [Refer to GROUP 24 - VENTILATORS (Instrument Panel)].

(2) Operate the switch to check for continuity between terminals.

<table>
<thead>
<tr>
<th>Terminal</th>
<th>1</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch position</td>
<td></td>
<td></td>
<td></td>
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<td>ON</td>
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<td>OFF</td>
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</tr>
</tbody>
</table>

**NOTE**

○○○ indicates that there is continuity between the terminals.
COLUMN SWITCH

SPECIFICATIONS

GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column switch</td>
<td></td>
</tr>
<tr>
<td>Lighting switch</td>
<td></td>
</tr>
<tr>
<td>Rated load A</td>
<td>0.22 ± 0.05</td>
</tr>
<tr>
<td>Voltage drop V</td>
<td>0.2 or less</td>
</tr>
<tr>
<td>Turn-signal switch</td>
<td></td>
</tr>
<tr>
<td>Rated load A</td>
<td>6.6 ± 0.5</td>
</tr>
<tr>
<td>Voltage drop V</td>
<td>0.2 or less</td>
</tr>
<tr>
<td>Dimmer/passing switch</td>
<td></td>
</tr>
<tr>
<td>Rated load A</td>
<td></td>
</tr>
<tr>
<td>High beam</td>
<td>10.7 ± 0.8</td>
</tr>
<tr>
<td>Low beam</td>
<td>9.8 ± 0.7</td>
</tr>
<tr>
<td>Passing</td>
<td>20.5 ± 1.5</td>
</tr>
<tr>
<td>Voltage drop V</td>
<td>0.2 or less</td>
</tr>
</tbody>
</table>

NOTE
For the wiper and washer switch, refer to P.8-355.

SPECIAL TOOL

<table>
<thead>
<tr>
<th>Tool number and tool name</th>
<th>Replaced by Miller tool number</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 8990803</td>
<td>General service tool</td>
<td>Removal of steering wheel</td>
</tr>
<tr>
<td>Steering wheel puller</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
COLUMN SWITCH

REMOVAL AND INSTALLATION

CAUTION: SRS
Before removal of air bag module, refer to GROUP 23B - SRS Service Precautions and Air Bag Module and Clock Spring.

1. Air bag module (Refer to GROUP 23B - Air Bag Module and Clock Spring.)
2. Steering wheel
3. Knee protector
   (Refer to GROUP 23A - Instrument Panel.)
4. Column cover lower
5. Column cover upper
6. Lap cooler duct and foot shower duct
7. Column switch left (For lighting switch, dimmer/passing switch and turn signal switch)
8. Column switch right (For wiper and washer switch)

SERVICE POINTS OF REMOVAL

2. REMOVAL OF STEERING WHEEL
   Remove the steering wheel by using the special tool.
   Caution
   Do not hammer on the steering wheel. Doing so may damage the collapsible column mechanism.

4. REMOVAL OF COLUMN COVER LOWER / 5. COLUMN COVER UPPER
INSPECTION
(1) Remove the knee protector and the column cover. (Refer to GROUP 23A — Instrument Panel.)
(2) Disconnect the column switch left connector (16 terminals) and check the continuity between the terminals for each switch.

LIGHTING SWITCH
Operate the switch and check the continuity between the terminals.

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE
〇—〇 indicates that there is continuity between the terminals.

TURN SIGNAL SWITCH
Operate the switch and check the continuity between the terminals.

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Left</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td></td>
</tr>
</tbody>
</table>

NOTE
〇—〇 indicates that there is continuity between the terminals.

DIMMER/PASSING SWITCH
Operate the switch and check the continuity, between the terminals.

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Dimmer switch</td>
<td>LOW</td>
</tr>
<tr>
<td></td>
<td>HIGH</td>
</tr>
<tr>
<td>Passing switch</td>
<td></td>
</tr>
</tbody>
</table>

NOTE
〇—〇 indicates that there is continuity between the terminals.

WIPER AND WASHER SWITCH
Refer to P.8-355.
SERVICE POINTS OF INSTALLATION

2. INSTALLATION OF STEERING WHEEL

To center the clock spring, line up the “NEUTRAL” mark of the clock spring with the mating mark.

Caution
If the clock spring’s mating mark is not properly aligned, the steering wheel may not be completely rotational during a turn, or the flat cable within the clock spring may be severed, obstructing normal operation of the SRS and possibly leading to serious injury to the vehicle’s driver.
## WIPEr AND WASHER SYSTEM

### SPECIFICATIONS

#### GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Term</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windshield wiper motor</td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Ferrite-magnet type</td>
</tr>
<tr>
<td>Speed control system</td>
<td>Third brush system</td>
</tr>
<tr>
<td>Braking system</td>
<td>Dynamic brake system</td>
</tr>
<tr>
<td>rpm at load of 1 Nm (0.72 ft.lbs.)</td>
<td></td>
</tr>
<tr>
<td>Low speed</td>
<td>48 ± 4</td>
</tr>
<tr>
<td>High speed</td>
<td>70 ± 7</td>
</tr>
<tr>
<td>Nominal torque Nm (ft.lbs.)</td>
<td>24 (17)</td>
</tr>
<tr>
<td>Rear wiper motor</td>
<td></td>
</tr>
<tr>
<td>Motor type</td>
<td>Ferrite-magnet type</td>
</tr>
<tr>
<td>Braking system</td>
<td>Dynamic brake system</td>
</tr>
<tr>
<td>rpm at load of 0.6 Nm (0.43 ft.lbs.)</td>
<td>38 ± 5</td>
</tr>
<tr>
<td>Windshield wiper blade</td>
<td></td>
</tr>
<tr>
<td>Wiping angle</td>
<td></td>
</tr>
<tr>
<td>Driver’s side</td>
<td>89”</td>
</tr>
<tr>
<td>Passenger’s side</td>
<td>91”</td>
</tr>
<tr>
<td>Wiper blade length mm (in.)</td>
<td></td>
</tr>
<tr>
<td>Driver’s side</td>
<td>525 (20.7)</td>
</tr>
<tr>
<td>Passenger’s side</td>
<td>500 (19.7)</td>
</tr>
<tr>
<td>Rear wiper blade</td>
<td></td>
</tr>
<tr>
<td>Wiping angle</td>
<td>87” ± 1.5”</td>
</tr>
<tr>
<td>Wiper blade length mm (in.)</td>
<td>550 (21.7)</td>
</tr>
<tr>
<td>Window washer motor and pump</td>
<td></td>
</tr>
<tr>
<td>Motor type</td>
<td>Direct current ferrite magnet type</td>
</tr>
<tr>
<td>Pump type</td>
<td>Centrifugal type</td>
</tr>
<tr>
<td>Power consumption A</td>
<td>3.8 or less</td>
</tr>
<tr>
<td>Time of continuous use sec.</td>
<td></td>
</tr>
<tr>
<td>With washer fluid</td>
<td>Max. 60</td>
</tr>
<tr>
<td>Empty operation</td>
<td>Max. 20</td>
</tr>
<tr>
<td>Nozzle jet pressure kPa (psi)</td>
<td>120 (17) or more</td>
</tr>
<tr>
<td>Tank capacity lit. (qts.)</td>
<td>2.0 (2.1) or more</td>
</tr>
<tr>
<td>Rear window washer motor and pump</td>
<td></td>
</tr>
<tr>
<td>Motor type</td>
<td>Direct current ferrite magnet type</td>
</tr>
<tr>
<td>Pump type</td>
<td>Centrifugal type</td>
</tr>
<tr>
<td>Power consumption A</td>
<td>3.8 or less</td>
</tr>
<tr>
<td>Time of continuous use sec.</td>
<td></td>
</tr>
<tr>
<td>With washer fluid</td>
<td>Max. 60</td>
</tr>
<tr>
<td>Empty operation</td>
<td>Max. 20</td>
</tr>
<tr>
<td>Nozzle jet pressure kPa (psi)</td>
<td>120 (17) or more</td>
</tr>
<tr>
<td>Tank capacity lit. (qts.)</td>
<td>1.2 (1.3) or more</td>
</tr>
<tr>
<td>Items</td>
<td>Specifications</td>
</tr>
<tr>
<td>-------</td>
<td>----------------</td>
</tr>
<tr>
<td>Wiper and washer switch</td>
<td></td>
</tr>
<tr>
<td>Rated load A</td>
<td></td>
</tr>
<tr>
<td>Wiper switch</td>
<td>LO, HI 4</td>
</tr>
<tr>
<td>INT</td>
<td>0.22 ± 0.05</td>
</tr>
<tr>
<td>Washer switch</td>
<td>Max. 4</td>
</tr>
<tr>
<td>Voltage drop (at 12V and the rated load) V</td>
<td>Wiper switch 0.2 or less</td>
</tr>
<tr>
<td>Washer switch</td>
<td>0.5 or less</td>
</tr>
<tr>
<td>Rear wiper and washer switch</td>
<td></td>
</tr>
<tr>
<td>Rated load A</td>
<td></td>
</tr>
<tr>
<td>Wiper switch</td>
<td>5</td>
</tr>
<tr>
<td>Washer switch</td>
<td>5</td>
</tr>
<tr>
<td>Voltage drop V</td>
<td>0.1 or less</td>
</tr>
<tr>
<td>Intermittent wiper relay</td>
<td></td>
</tr>
<tr>
<td>&lt;Front (incorporated in column switch)&gt; Intermittent interval (min.-max.) sec.</td>
<td>Approx. 3 – 12</td>
</tr>
<tr>
<td>Variable-interval intermittent wiper Delay time in washer moving sec.</td>
<td>0.6</td>
</tr>
<tr>
<td>&lt;Rear&gt; Intermittent interval sec.</td>
<td>8 ± 2</td>
</tr>
</tbody>
</table>

### SERVICE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard value</td>
<td></td>
</tr>
<tr>
<td>Front wiper blade park position (A) mm (in.)</td>
<td>15 ±5 (6 ±2)</td>
</tr>
</tbody>
</table>

### SPECIAL TOOL

<table>
<thead>
<tr>
<th>Tool number and tool name</th>
<th>Replaced by Miller tool number</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB990449 Window moulding remover</td>
<td>MB990449</td>
<td>Removal of liftgate moulding, upper</td>
</tr>
<tr>
<td>MB991502 Scan Tool (MUT-II)</td>
<td>DRB-II Scan Tool</td>
<td>Checking the wiper and washer system</td>
</tr>
<tr>
<td>MB991529 Diagnostic trouble code check harness</td>
<td>MB991529</td>
<td>Checking the wiper and washer system using a voltmeter</td>
</tr>
</tbody>
</table>
TROUBLESHOOTING

WINDSHIELD WIPER AND WASHER CIRCUIT

CIRCUIT DIAGRAM
CHASSIS ELECTRICAL – Wiper and Washer System

Data link connector

ETACS unit

Wiper relay

VEHICLES WITHOUT THEFT-ALARM SYSTEM

VEHICLES WITH THEFT-ALARM SYSTEM
OPERATION

<Low-speed (and high-speed) wiper>
- When the wiper switch is placed in the LO position with the ignition switch in the ACC or ON position, wipers operate continuously at low speed.
- Placing the wiper switch in the HI position causes the wipers to operate at high speed.

<Intermittent wiper>
- If the wiper switch is turned to the INT position when the ignition switch is in the ON or ACC position, the voltage value from the intermittent variable volume switch is input to the intermittent time detection circuit.
- The intermittent time detection circuit outputs an H signal at the intermittent time according to the set value of the intermittent variable volume switch and, via OR, turns the Tr on and off to operate the wiper.

<TROUBLESHOOTING HINTS>

<table>
<thead>
<tr>
<th>Phenomenon</th>
<th>Inspection method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wipers do not operate continuously</td>
<td>- Check the multi-purpose fuse No. 9.</td>
</tr>
<tr>
<td>Washer does not operate.</td>
<td></td>
</tr>
<tr>
<td>Washer operates.</td>
<td>- Check the wiper motor. (Refer to P.8-355.)</td>
</tr>
<tr>
<td>Low-speed (or high-speed) wiper operation only is inoperative.</td>
<td>- Check the column switch. (Refer to P.8-355.)</td>
</tr>
<tr>
<td>Wipers do not operate intermittently.</td>
<td>- Check the wiper switch “INT” input signal. (Refer to P.8-351.)</td>
</tr>
<tr>
<td>(They operate continuously.)</td>
<td>- Check the column switch. (Refer to P.8-355.)</td>
</tr>
<tr>
<td>Wipers do not stop.</td>
<td>- Check the wiper switch “INT” input signal. (Refer to P.8-351.)</td>
</tr>
<tr>
<td></td>
<td>- Check the column switch; (Refer to P.8-355.)</td>
</tr>
<tr>
<td></td>
<td>- Check the wiper motor. (Refer to P.8-355.)</td>
</tr>
<tr>
<td>The intermittent time will not vary even if the variable intermittent wiper control switch is operated.</td>
<td>- Check the variable intermittent wiper control switch input signal. (Refer to P.8-351.)</td>
</tr>
<tr>
<td></td>
<td>- Check the column switch. (Refer to P.8-355.)</td>
</tr>
<tr>
<td>Even if the washer switch is on for 0.6 second or more, the washer will not operate.</td>
<td>- Check the washer motor. (Refer to P.8-355.)</td>
</tr>
<tr>
<td>The wipers linked with the washer operate.</td>
<td>- Check the washer nozzle and washer tube.</td>
</tr>
<tr>
<td>The wipers linked with the washer do not operate.</td>
<td>- Check the washer switch input signal. (Refer to P.8-351.)</td>
</tr>
<tr>
<td></td>
<td>- Check the washer switch. (Refer to P.8-355.)</td>
</tr>
</tbody>
</table>

<Auto wiper stop>
- When the wiper switch is placed in the OFF position, the cam contacts of wiper motor causes current to flow through the auto wiper stop circuit, allowing the wiper blades to cycle before they reach to the stop positions.

<Mist wiper>
- If the washer switch is on for 0.6 second or less when the ignition switch is at ON or ACC with the wiper switch turned off, the washer liquid will not be poured but the transistor will be turned on to operate the wipers one time.

<Wiper linked with washer>
- If the washer switch is on for 0.6 second or more when the ignition switch is at ON or ACC with the wiper switch turned off, the washer liquid will be poured and the transistor will be turned on 0.6 second later to operate the wipers two or three times.
INPUT SIGNAL
Using the scan tool or voltmeter, check whether or not the input signals from each switch are being input to the ETACS unit.

When using the scan tool
(1) Connect the scan tool to the data link connector.
   Caution
   Turn off the ignition switch beforehand whenever the scan tool is connected or disconnected.
(2) If the scan tool makes a peep sound when each switch is operated (turned ON/OFF), the input signal to ECU is normally sent from the switch circuit system.

When using a voltmeter
(1) Connect a voltmeter to the ETACS terminal and the ground terminal of the data link connector using the special tool.
(2) If the voltmeter pointer deflects once when each switch is operated (turned ON/OFF), the input signal to ECU is normally sent from the switch circuit system.
REAR WIPER AND WASHER CIRCUIT

OPERATION

<Low-speed wiper>
- When the rear wiper switch is placed in the ON position with the ignition switch in the ACC or ON position, wipers operate continuously at low speed.

<Auto wiper stop>
- When the rear wiper switch is placed in the OFF position, the cam contacts of wiper motor cause current to flow through the auto wiper stop circuit, allowing the wiper blades to cycle before they reach to the stop positions.

<Intermittent wiper>
- When the rear wiper switch is placed in the INT position with the ignition switch in ACC or ON position, the rear intermittent wiper relay is energized causing the rear intermittent wiper relay contacts to close and open repeatedly.
- When the contacts are closed, the wiper motor is energized.
- When the rear wiper motor is energized, the rear intermittent wiper relay contacts open; however, the cam contacts keep the rear wiper motor energized until the wiper blades return to their stop position.

TROUBLESHOOTING HINTS

1. Wipers do not operate.
   - Washer is not operative, either.
     - Check multi-purpose fuse No. 9.
     - Check ground.

2. Low-speed wiper operation only is inoperative.
   - Check wiper switch.

3. Wipers do not stop.
   - Check wiper motor.
   - Check rear intermittent wiper relay.
   - Check rear wiper switch.

4. Intermittent wiper operation is inoperative.
   - Check terminal voltage of the rear intermittent wiper relay energized.
     (Refer to P.8-359 for information concerning the installation position of the intermittent wiper relay.)

<table>
<thead>
<tr>
<th>Terminal No.</th>
<th>Voltage</th>
<th>Check</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0V</td>
<td>Rear intermittent wiper relay or rear wiper switch</td>
</tr>
<tr>
<td></td>
<td>12V</td>
<td>Rear intermittent wiper relay</td>
</tr>
<tr>
<td></td>
<td>0 ↔ 12V (alternating)</td>
<td>(Normal)</td>
</tr>
</tbody>
</table>

5. Washer is inoperative.
   - Check washer motor.
   - Check washer switch.

COMPONENT LOCATION

Rear intermittent wiper relay

<Vehicles without keyless entry system>

<Vehicles with keyless entry system>
CHASSIS ELECTRICAL

WIPER AND WASHER SYSTEM

WINDSHIELD WIPER AND WASHER
REMOVAL AND INSTALLATION

Removal steps of linkage
1. Wiper blade
2. Wiper arm
3. Front deck garnish
4. Air inlet garnish (RH)
5. Hole cover
6. Wiper motor
7. Linkage

Removal steps of wiper motor
1. Wiper blade
2. Wiper arm
5. Hole cover
6. Wiper motor

Removal of column switch (wiper washer switch)
15. Column switch (Refer to P.8-343.)

Removal steps of washer tank
8. Battery
9. Battery tray
10. Washer tank
11. Washer motor
12. Washer fluid level sensor

Removal steps of washer tube
8. Battery
9. Battery tray
13. Washer nozzle
14. Washer tube
SERVICE POINTS OF REMOVAL

6. REMOVAL OF WIPER MOTOR

(1) Remove the wiper motor mounting bolts.
(2) Using a plain screwdriver, detach the crank arm of the wiper motor from the linkage to remove the wiper motor.

Caution
Do not remove the crank arm from the wiper motor except when necessary, as the auto stop angle has been preset. When the crank arm is to be removed, make a mark on both of them before removal.

INSPECTION

INSPECTION OF WIPER MOTOR
Inspect the wiper motor mounted on the vehicle with its connector disconnected.

Inspection of Wiper Motor Operation at LOW and HIGH Speeds
Connect the battery to the wiper motor as shown, and check its operation at LOW and HIGH speeds.

Inspection of Wiper Motor STOP Position
(1) Operate the wiper motor at LOW speed and intermediately disconnect the battery to let the wiper motor stop.
(2) Connect the terminals as well as the battery, as shown, and check that the wiper motor stops at the automatically-stopped position following LOW-speed operation.

INSPECTION OF COLUMN SWITCH

(1) Remove the knee protector.
(Refer to GROUP 23A – Instrument Panel.)
(2) Remove the column cover.
(3) Remove the column switch right coupling connector (11 terminals).

Inspection of Wiper and Washer Switch
Operate the switch to check for continuity between the terminals.

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Terminal No.</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wiper switch</td>
<td>Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Int</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable intermittent wiper control switch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Washer switch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE
○ ○ denotes that there is continuity between the terminals.
Inspection of Wiper Relay (Built-in Column Switch)
(1) Check to ensure that there is continuity between terminals 5 and 11 and between the terminals 6 and 10, and that there is no continuity between terminals 6 and 11.
(2) Connect the positive terminal of the battery to terminal 5 and the negative terminal to terminal 11 to check that the battery voltage is available at terminal 6.

INSPECTION OF WASHER MOTOR
(1) When the washer motor is inspected, make sure that it is mounted on the washer tank and that the washer tank is filled with water.
(2) Connect the battery as shown to check whether water is pumped out.

INSPECTION OF WASHER FLUID LEVEL SENSOR
(1) Connect a circuit tester to the connector of the level sensor as shown.
(2) Check that when the float is moved down, the circuit is closed and that when the float is moved up, the circuit is opened.

SERVICE POINTS OF INSTALLATION
2. INSTALLATION OF WIPER ARM
(1) The wiper arms, right and left, are different in shape.
Check the identification symbol.
(2) After the wiper blades have been set, install them in such a way that the ends of the wiper blades will stop at the specified positions (standard values).

Standard value: (A) $15 \pm 0.5$ in. (A)
REAR WIPER AND WASHER
REMOVAL AND INSTALLATION

Removal steps of wiper motor
- Rear spoiler (Refer to GROUP 23A – Aero Parts.)
- 1. Wiper blade
- 2. Wiper arm
- 3. Spacer
- Liftgate lower trim (Refer to GROUP 23A – Trim.)
- 4. Wiper motor

Removal steps of washer tube
- Front pillar trim (RH)
- Quarter trim (RH)
- Quarter upper trim (RH)
- Rear roof rail trim
- Rear side trim (RH)
- Liftgate moulding, upper
- 8. Washer nozzle
- 9. Tube and grommet assembly
- 10. Washertube

Removal steps of washer tank
- Rear end trim (Refer to GROUP 23A – Trim.)
- 5. Cap
- 6. Washer tank
- 7. Washer motor
8. REMOVAL OF LIFTGATE MOULDING, UPPER

Using a special tool, pry the clip portion to remove the upper liftgate moulding.

INSPECTION

WIPER MOTOR

Check the wiper motor with it mounted on the vehicle and with its harness connector disconnected.

Operation of Wiper Motor

Connect a battery to the wiper motor, as shown, to check the operation of the wiper motor.

Wiper Motor Stop Position

(1) Operate the wiper motor by the procedure described above and intermediately disconnect the battery to let the wiper motor stop.

(2) Reconnect the battery as shown and check that the wiper motor stops at the automatically-stopped position after operation.

WIPER WASHER SWITCH

(1) Remove switch garnish B from the knee protector.

(2) Operate the switch to check for continuity between the terminals.

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Terminal 2</th>
<th>Terminal 4</th>
<th>Terminal 5</th>
<th>Terminal 6</th>
<th>Terminal 7</th>
<th>Terminal 8</th>
<th>Terminal 1</th>
<th>Terminal 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wiper switch</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>INT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Washer switch</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE

O-O denotes that there is continuity between the terminals
INTERMITTENT WIPER RELAY

(1) Remove the quarter trim. (Refer to Group 23A – Trim.)
(2) With the intermittent wiper relay connected to the wiring harness connector, let the wiper operate intermittently and check the voltage at terminal (2).

<table>
<thead>
<tr>
<th>Condition</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>When wiper is stationary</td>
<td>0v</td>
</tr>
<tr>
<td>When wiper is in operation</td>
<td>Battery voltage</td>
</tr>
</tbody>
</table>

WASHER MOTOR

(1) When the washer motor is inspected, make sure that it is mounted on the washer tank and that the washer tank is filled with water.
(2) Connect the battery as shown to check whether water is pumped out.

SERVICE POINT OF INSTALLATION

2. INSTALLATION OF WIPER ARM

After assembling the wiper blade to the wiper arm, install the wiper arm with its tip positioned along the ceramic part.
HORN

SPECIFICATIONS

GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Flat type</td>
</tr>
<tr>
<td>Effective sounding voltage V</td>
<td>11.5-15</td>
</tr>
<tr>
<td>Power consumption A</td>
<td>3.0</td>
</tr>
<tr>
<td>Sound level dB</td>
<td></td>
</tr>
<tr>
<td>“low” sound</td>
<td>100-112</td>
</tr>
<tr>
<td>“high” sound</td>
<td>100-112</td>
</tr>
<tr>
<td>Fundamental frequency Hz</td>
<td></td>
</tr>
<tr>
<td>“low” sound</td>
<td>350-390</td>
</tr>
<tr>
<td>“high” sound</td>
<td>395-435</td>
</tr>
<tr>
<td>Flat type*</td>
<td>11-14.5”</td>
</tr>
<tr>
<td>Max. 3.5”</td>
<td></td>
</tr>
<tr>
<td>105-120*</td>
<td></td>
</tr>
<tr>
<td>405-435”</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: The * symbol is applicable to vehicles equipped with the theft-alarm horn.

TROUBLESHOOTING

<VEHICLES WITHOUT THEFT-ALARM SYSTEM>

CIRCUIT DIAGRAM

COMPONENT LOCATION

Horn relay
<VEHICLES WITH THEFT-ALARM SYSTEM>
CIRCUIT DIAGRAM

[Diagram of the circuit diagram for vehicles with theft-alarm system, showing various components such as the horn relay, fuse, and theft-alarm components.]
COMPONENT LOCATION

Theft-alarm horn relay

OPERATION
- The horn switch always receives battery voltage via the dedicated fuse and the coil of the horn relay.
- When the horn switch is set to ON, the contacts of the horn relay close. Then current flows through the dedicated fuse to the contacts of the horn relay, the horn and ground, causing the horn to sound.

TROUBLESHOOTING HINTS
One of the horn does not sound.
- Check the horn.

2. Horns do not sound.
- Check the horn switch.
- Check the dedicated fuse.

NOTE
(1) For vehicles equipped with the theft-alarm system, refer to P.8-412.
(2) For information concerning the horn relay and theft-alarm horn relay, refer to P.8-363.

HORN SWITCH
REMOVAL AND INSTALLATION

CAUTION: SRS
Before removal of air bag module, refer to GROUP 23B – SRS Service Precautions and Air Bag Module and Clock Spring.

Removal steps:
1. Air bag module (Refer to GROUP 23B – Air Bag Module and Clock Spring.)
2. Horn switch (Steering wheel assembly)
RELAY INSPECTION

HORN RELAY
Connect battery to terminal 1 and check continuity between terminals with terminal 3 grounded.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Terminals</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power is supplied</td>
<td>4 – 5</td>
<td>Continuity</td>
</tr>
<tr>
<td>Power is not supplied</td>
<td>4 – 5</td>
<td>No continuity</td>
</tr>
<tr>
<td></td>
<td>1 – 3</td>
<td>Continuity</td>
</tr>
</tbody>
</table>

THEFT-ALARM HORN RELAY
Connect battery to terminal 2 and check continuity between terminals with terminal 4 grounded.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Terminals</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power is supplied</td>
<td>1 – 3</td>
<td>Continuity</td>
</tr>
<tr>
<td>Power is not supplied</td>
<td>1 – 3</td>
<td>No continuity</td>
</tr>
<tr>
<td></td>
<td>2 – 4</td>
<td>Continuity</td>
</tr>
</tbody>
</table>
CIGARETTE LIGHTER
SPECIFICATIONS
GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. input W</td>
<td>120</td>
</tr>
<tr>
<td>Reset time second</td>
<td>Within 18</td>
</tr>
<tr>
<td>Thermal fuse fusion temperature °C (°F)</td>
<td>180 – 250 (356 – 482)</td>
</tr>
</tbody>
</table>

TROUBLESHOOTING

CIRCUIT DIAGRAM
CIGARETTE LIGHTER
REMOVAL AND INSTALLATION

Removal steps
1. Console side cover (RH)
2. Plug
3. Fixing ring
4. Socket case
5. Plate
6. Socket
7. Protector

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 an ohmmeter, check the continuity of the element.

CAUTIONS FOR USE OF THE CIGARETTE LIGHTER SOCKET AS AUXILIARY POWER SOURCE
1. When using a “plug-in” type of accessory, do not use anything with a load of more than 120W.
2. It is recommended that only the lighter be inserted in the receptacle.
   Use of “plug-in” type accessories may damage the receptacle and result in poor retention of the lighter.

NOTE
The specified load should be strictly observed, because overloaded cord burns the ignition switch and harness.
RADIO AND TAPE PLAYER

TROUBLESHOOTING

<RADIO AND TAPE PLAYER (WITH AMPLIFIER)>

CIRCUIT DIAGRAM
<RADIO AND TAPE PLAYER (WITHOUT AMPLIFIER)>
CIRCUIT DIAGRAM
<VEHICLES HARNESS WITHOUT RADIO AND TAPE PLAYER>

CIRCUIT DIAGRAM

(RADIO AND TAPE PLAYER)
COMPONENT LOCATION

Motor antenna control unit
## TROUBLESHOOTING CHART

<table>
<thead>
<tr>
<th>Item</th>
<th>Problem symptom</th>
<th>Relevant chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise</td>
<td>Noise appears at certain places when traveling (AM).</td>
<td>A-1</td>
</tr>
<tr>
<td>Noise</td>
<td>Noise appears at certain places when traveling (FM).</td>
<td>A-2</td>
</tr>
<tr>
<td>Noise</td>
<td>Mixed with noise, only at night (AM).</td>
<td>A-3</td>
</tr>
<tr>
<td>Noise</td>
<td>Broadcasts can be heard but both AM and FM have a lot of noise.</td>
<td>A-4</td>
</tr>
<tr>
<td>Noise</td>
<td>There is more noise either on AM or on FM.</td>
<td>A-5</td>
</tr>
<tr>
<td>Noise</td>
<td>There is noise when starting the engine.</td>
<td>A-6</td>
</tr>
<tr>
<td>Noise</td>
<td>Some noise appears when there is vibration or shocks during traveling.</td>
<td>A-7</td>
</tr>
<tr>
<td>Noise</td>
<td>Noise sometimes appears on FM during traveling.</td>
<td>A-8</td>
</tr>
<tr>
<td>Noise</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>Radio</td>
<td>No sound from one speaker.</td>
<td>B-2</td>
</tr>
<tr>
<td>Radio</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>Radio</td>
<td>Insufficient sensitivity.</td>
<td>B-4</td>
</tr>
<tr>
<td>Radio</td>
<td>Distortion on AM or on both AM and FM.</td>
<td>B-5</td>
</tr>
<tr>
<td>Radio</td>
<td>Distortion on FM only.</td>
<td>B-6</td>
</tr>
<tr>
<td>Radio</td>
<td>Too few automatic select stations.</td>
<td>B-7</td>
</tr>
<tr>
<td>Radio</td>
<td>Insufficient memory (preset stations are erased).</td>
<td>B-8</td>
</tr>
<tr>
<td>Cassette player</td>
<td>Cassette tape will not insert.</td>
<td>C-1</td>
</tr>
<tr>
<td>Cassette player</td>
<td>No sound.</td>
<td>C-2</td>
</tr>
<tr>
<td>Cassette player</td>
<td>No sound from one speaker.</td>
<td>C-3</td>
</tr>
<tr>
<td>Cassette player</td>
<td>Sound quality is poor, or sound is weak.</td>
<td>C-4</td>
</tr>
<tr>
<td>Cassette player</td>
<td>Cassette tape will not eject.</td>
<td>C-5</td>
</tr>
<tr>
<td>Cassette player</td>
<td>Uneven revolution. Tape speed is fast or slow.</td>
<td>C-6</td>
</tr>
<tr>
<td>Cassette player</td>
<td>Automatic search does not work.</td>
<td>C-7</td>
</tr>
<tr>
<td>Cassette player</td>
<td>Faulty auto reverse.</td>
<td>C-8</td>
</tr>
<tr>
<td>Cassette player</td>
<td>Tape gets caught in mechanism.</td>
<td>C-9</td>
</tr>
<tr>
<td>CD player</td>
<td>CD will not be accepted.</td>
<td>D-1</td>
</tr>
<tr>
<td>CD player</td>
<td>No sound.</td>
<td>D-2</td>
</tr>
<tr>
<td>CD player</td>
<td>CD sound skips.</td>
<td>D-3</td>
</tr>
<tr>
<td>CD player</td>
<td>Sound quality is poor.</td>
<td>D-4</td>
</tr>
<tr>
<td>CD player</td>
<td>CD will not be ejected.</td>
<td>D-5</td>
</tr>
<tr>
<td>CD player</td>
<td>No sound from one speaker.</td>
<td>D-6</td>
</tr>
<tr>
<td>Motor antenna</td>
<td>Motor antenna won't extend or retract.</td>
<td>E-1</td>
</tr>
<tr>
<td>Motor antenna</td>
<td>Motor antenna extends and retracts but does not receive.</td>
<td>E-2</td>
</tr>
</tbody>
</table>
CHART
A. NOISE

A-I Noise appears at certain places when traveling (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>

Do the following measures eliminate the noise?

Yes | OK

Find out the following information from the user:

1. Place
2. Locality conditions (valley, mountain, etc.)
3. Name and frequency of stations affected by noise

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 center.
Noise appears at certain places when traveling (FM).

<table>
<thead>
<tr>
<th>Do the following measures eliminate the noise?</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Change to a different station with a strong signal to boost resistance to interference.</td>
</tr>
<tr>
<td>• Suppress high tones to reduce noise.</td>
</tr>
<tr>
<td>• Extend antenna completely. (Whip antenna)</td>
</tr>
<tr>
<td><strong>Yes</strong></td>
</tr>
<tr>
<td><strong>OK</strong></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 center.

**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 formations or buildings, the area of good reception is approx. 20 – 25 km (12 – 16 miles) for stereo reception, and 30 – 40 km (19 – 25 miles) 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 traveling, 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.
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: Generator noise may be a cause.

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

   Do the following measures eliminate the noise?
   - Tune to a station with a strong signal.
   - Tune to a station with a strong signal without completely extending the antenna.
   - Yes
   - No

   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 center.
A-4 Broadcasts can be heard but both AM and FM have a lot of noise.

(1) Noise occurs when the engine is stopped.

- 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. (Whip antenna)
  - Adjust the sound quality to suppress high tones.

  ![Flowchart Diagram](chart.png)

- Is the radio body ground mounted securely?
  - Yes
  - Is the antenna plug properly connected to the radio?
    - Yes
    - Is the antenna itself in good condition or is it properly mounted?
      - Yes
      - Is the noise eliminated?
        - Yes
        - OK
        - If there is more noise than other radios, consult a service center.
      - No
        - Correctly attach the antenna plug.
  - No
    - Securely tighten the nuts for the body ground.

(2) Noise occurs when the engine is running.

- Inspect the vehicle’s noise suppressor. (refer to A-6.)

- Yes
- No

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.

   Yes

   Noise prevention on the radio side is difficult. If the problem is particularly worse than other radios, consult a service center.

   No

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

   No

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

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.>
## There is noise when starting the engine.

<table>
<thead>
<tr>
<th>Noise type</th>
<th>Conditions</th>
<th>Cause</th>
<th>Inspection or replacement</th>
</tr>
</thead>
</table>
| AM, FM: Ignition noise (Popping, Snapping, Cracking, Buzzing) | • Increasing the engine speed causing the popping sound to speed up, and volume decreases.  
• Disappears when the ignition switch is turned to ACC. | • Mainly due to the spark plugs.  
• Due to the engine noise. | Noise filter  
Ground cable  
Noise condenser |
| Other electrical components         | Sound 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. | Return parts or wiring to their proper position. |

### 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 to do 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. Condenser
   The condenser 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 ground. This suppresses noise by grounding 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.
NOISE SUPPRESSION PARTS MOUNTING POSITIONS

1. Noise condenser

2. Noise filter
   Ground cable
   Noise condenser

3. Ground cable

4. Ground cable
A-7 Some noise appears when there is vibration or shocks during traveling.

Are connectors properly connected?  
No → Ensure proper connection
Yes

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?  
No → Static electricity noise: Body static electric from the shock absorber rubber bushings used to prevent vibration, tires, etc. occurs because of separation from the ground, causing a buzzing noise. Since no measures can be taken on the radio side, steps should be taken to discharge the static electricity of the vehicle body.
Yes

Is the radio correctly grounded?  
(Is the mounting screw tightened securely?)  
No → Tighten the screw securely.
Yes

Is the antenna correctly grounded?  
(If noise appears when the antenna is moved, this means the ground is not securely connected.)  
No → If rust is present on the antenna ground screw, clean and tighten the ground securely.
Yes → Repair or replace radio.
A-8  Noise sometimes appears on FM during traveling.

- Is the antenna completely extended?  
  - Yes
  - No  
  
- Does the problem clear up when retuned?  
  - Yes  
  
- Does the problem appear only in certain locations and only with certain stations?  
  - Yes  
  
- Are connectors properly connected?  
  - Yes
  - No  
  
- 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  
  
- Is the radio body correctly grounded? (Is the mounting screw tightened securely?)  
  - Yes
  - No  
  
- Is the antenna correctly grounded? (If noise appears when the antenna is moved, this means the ground is not securely connected.)  
  - Yes
  - No  

**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.
- Traveling conditions of the vehicle
- Terrain of area traveled 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 center.

B. RADIO

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

- Is multi-purpose fuse No. 4 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: Disconnect and check the connector at the rear of the radio. Is the ACC power (12V) being supplied to the radio?
      - Yes: Repair or replace radio.
      - No: Repair harness.
    - No: Connect connector securely.

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 unit.
  - 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.
    - No: Check the speaker for conductance.
      - Yes: Repair speaker harness and ensure proper connection of relay connectors.
      - No: Repair speaker.
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? (Example: in an underground garage or inside a building.)
  - Yes
    - Is proper performance obtained when the vehicle is moved?
      - Yes → OK
      - No
  - No

- Is the antenna completely extended?
  - Yes
  - No → On a vehicle with a whip antenna, extend the whip antenna all the way. On a vehicle with a motor antenna, check the antenna itself. (Refer to E-l, 2.)

- Does tuning solve the problem?
  - Yes → OK
  - No

- Are the antenna plug and radio unit properly connected?
  - Yes
  - No → Reconnect

- Does the problem disappear if connected to another radio?
  - Yes → Repair or replace radio
  - No → Repair or replace the antenna (Refer to E-l, 2.)
B-4 | Insufficient sensitivity.

Is the check being conducted under special electrical field conditions?

- Yes
  - Example: in an underground garage or inside a building

- No
  - Is proper performance obtained when the vehicle is moved?
    - Yes
      - OK
    - No
      - Is the antenna completely extended?
        - Yes
          - On a vehicle with a whip antenna, extend the whip antenna all the way. On a vehicle with a motor antenna, check the antenna itself. (Refer to E-l, 2.)
        - 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
                          - Repair or replace the antenna (Refer to E-l, 2.)

* For multipath noise and fading noise problems, refer to P.8-384.
**B-5 Distortion on AM or on both AM and FM.**

- **How much distortion is there?**
  - **Occasional**
  - **Yes** → Excessive antenna input
  - **No**

- **Distortion in the vicinity of the radio station**
  - **Yes**
  - **No**

- **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**

  Repair or replace radio.

---

**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**

  Repair or replace radio.
B-7  Too few automatic select stations.

Is the check being conducted under special electrical field conditions? Yes

Example: in an underground garage or inside a building

No

Is proper performance obtained when the vehicle is moved? Yes

OK

No

Is the antenna completely extended? No

On a vehicle with a whip antenna, extend the whip antenna all the way. On a vehicle with a motor antenna, check the antenna itself. (Refer to E-l, 2.)

Yes

Is the antenna plug properly connected to the equipment? No

Ensure proper connection.

Yes

Does the equipment work properly if the radio is changed? Yes

Repair or replace radio.

No

Antenna not properly mounted.

B-8  Insufficient memory (preset stations are erased).

Is multi-purpose fuse No. 19 blown or is the circuit open? Yes

Replace fuse or repair harness.

No

Disconnect and check the connector at the rear of the radio. Is the memory backup (battery) power being supplied? No

Repair harness.

Yes

Repair or replace radio.
C. CASSETTE PLAYER

C-1  Cassette tape will not be inserted.

Are there any foreign objects in the cassette player?  
Yes  Remove the object(s)*

No  

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

Does the cassette player work if another tape is inserted?  
Yes  Replace tape *2

No  Repair or replace cassette player.

*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-1 20 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).

Is multi-purpose fuse No. 4 blown or is the circuit open?  
Yes  Replace fuse or repair harness.

No  

Is connector at rear of radio connected tightly?  
No  Connect connector firmly.

Yes  

Disconnect connector at rear of radio. Is ACC power being supplied to the radio?  
Yes  Repair or replace cassette player.

No  Repair harness.
C-3 | No sound from one speaker.

1. Clean the cassette player head and check again.
   - Yes: OK
   - No: Replace the cassette player and check again.
     - Yes: Repair or replace cassette player.
     - 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. Repair speaker harness and ensure proper connection of relay connectors.

2. 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  *
- 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-1 20 or greater length often get caught in the mechanism and should not be used.

Does the player play properly when the tape player head is cleaned?  
Yes  OK

No

Is proper operation obtained when the cassette player is replaced?  
Yes  Repair or replace cassette player.

No

Repair or replace speaker.

C-5  Cassette tape will not eject.

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 cassette 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.

- Does the player play OK if the tape is changed? Yes → OK
  No

- Are there any foreign objects inside the cassette player? Yes → Remove foreign object(s).
  No

- Is the head or capstan roller dirty?
  - Yes → Clean.
  - No

- Repair or replace cassette player.

C-7 Automatic search does not work.

- Does the MSS (automatic search) button*1 depress properly? No → Button improperly operated.
  Yes

- Does the player play OK if the tape*2 is changed? Yes → Tape used is bad.
  No

  *1 When the time between songs on a tape is less than three seconds, or when there is a three second period in the middle of a song in which the volume level is extremely low, the automatic search function may not work properly.

  *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-1 20 or greater length often get caught in the mechanism and should not be used.

- Repair or replace the cassette player
C-9 Faulty auto reverse.

Does the player play OK if the tape is changed? Yes OK

No
- 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-I 20 or greater length often get caught in the mechanism and should not be used.

Does the problem only occur while the vehicle is being driven? No Repair or replace cassette player.

Yes

Is the cassette player properly installed to the vehicle? No Ensure cassette player installation.

Yes

Repair or replace cassette player.

C-9 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.

Does the player play OK if the tape* is changed? Yes Tape used is bad.

No

*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-I 20 or greater length often get caught in the mechanism and should not be used.

Repair or replace cassette player.
D. CD PLAYER

D-I CD will not be accepted.

Does the shutter open when a CD is inserted? *1

Yes

Is CD rejected from approx. 15 mm depth of the insertion panel though CD can be inserted? *2

Yes

Though CD is completely inserted once, “error” is displayed and the CD is rejected? *3

Yes

Check CD.
- Is the labeled side faced downward?
- Is the recorded face of the CD dirty?
- Does dew exit on the recorded face of the CD?

No

Replace CD.

No

Take out the CD.

No

OK

Yes

OK

Insert the CD correctly or check to see if the CD is defective.

*1 If the CD is already loaded, doesn’t the shutter open to allow insertion when another CD is inserted?

*2 If the key switch is not at ACC or ON, the CD stops at depth of 15 mm below the panel surface even when it is inserted, and it will be rejected when pushed farther?

*3 Even though the CD is loaded, E (error) is sometimes displayed with the CD rejected because of vibration/shock or dew on the CD face or optical lens.
D-2 No sound.

- Does it play if an existing proper CD is inserted? Yes → Replace defective CD. No →
  - Does "WAIT" indicator flicker? Yes → Return it to normal temperature, and recheck operation. Does it operate properly? Yes → OK. No →
    - Are the radio set and CD player connected securely? Yes → Securely connect them. No → Repair or replace CD player.

(The combined radio cassette must operate properly.)

D-3 CD sound skips.

1. Sound sometimes skips during parking.

- Is CD face scratched or dirty? Yes → CD is defective, or clean CD. No →
  - Does it play properly if CD is replaced with an existing proper CD? Yes → Replace CD. No → Repair or replace CD player.

2. Sound sometimes skips during driving.
   (Stop vehicle, and check it.)
   (Check it by using a proper CD which is free of scratch, dirt or other abnormality.)

- Does sound skip when the side of CD player is tapped? No → Check the sound skipping state during driving in detail, and contact a service shop. Yes → Securely mount the CD player.
D-4 Sound quality is poor.

Does it play properly if another proper CD is loaded?

Yes

Replace CD.

No

Repair or replace CD player.

D-5 CD will not be ejected.

Is the key switch (ignition key) at ACC or ON?

Yes

Is the combined amplifier or radio set connected securely?

No

Turn the key to ON.

Yes

Securely connect the subjected one.

If CD is not ejected, don’t reject it.
The player may be damaged. Therefore, contact a service shop for repairs.

D-6 No sound from one speaker.

Is CD player securely connected to the combined radio set?

No

Securely connect them.

Yes

Does it play properly if another CD player is combined?

Yes

Repair or replace CD player.

No

Repair or replace the combined radio set.
E. MOTOR ANTENNA

E-I | Motor antenna won’t extend or retract.

Clean and polish the surface of the antenna rod.

Is the radio power switch ON?

Yes

Is voltage (approx. 12V) emitted to the radio’s motor antenna terminal?

Yes

Is the antenna bent?

Yes

Repair the bend, or replace the antenna mast.

No

Is the antenna relay OK?

Yes

Is the motor OK?

Yes

Repair the harness.

No

No

Repair or replace the radio.

Replace the antenna relay.

Replace the motor.
Motor antenna extends and retracts but does not receive.

- Is the antenna* itself OK?  
  - Yes
  - No  
    - Repair or replace it.

- Is operation normal when a new antenna assembly is directly installed to the radio?  
  - Yes
  - No  
    - Refer to B. “Radio trouble shooting”.

Replace the feeder cable.

Checking the antenna*

<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>
RADIO REMOTE-CONTROL
REMOVAL AND INSTALLATION

CAUTION: SRS
When removing and installing the radio remote control switch, don’t allow any impact or shock to the air bag module.

Radio remote control switch.

2.5 Nm
1.8 ft.lbs.

RADIO AND TAPE PLAYER
REMOVAL AND INSTALLATION

Removal steps
1. Radio panel
2. Radio and tape player
3. CD player
4. Radio bracket
5. Front console assembly (Refer to GROUP 23A – Console Box.)
SPEAKER
<DOOR SPEAKER>
REMOVAL AND INSTALLATION

Removal steps
1. Door trim (Refer to GROUP 23A – Door Trim and Waterproof Film.)
2. Speaker garnish
3. Speaker
4. Speaker cover

<REAR SPEAKER>
REMOVAL AND INSTALLATION

Removal steps
1. Quarter trim (Refer to GROUP 23A – Trim.)
2. Speaker garnish
3. Speaker
4. Speaker box
MOTOR ANTENNA · ANTENNA FEEDER CABLE · AMPLIFIER
REMOVAL AND INSTALLATION

Removal steps of motor antenna

1. Ring nut
2. Base
3. Antenna pole
4. Antenna feeder cable and motor antenna connection
5. Motor antenna

Removal steps of antenna feeder cable

1. Ring nut
2. Base
3. Antenna pole
4. Antenna feeder cable and motor antenna connection
5. Motor antenna
6. Rear seat cushion
7. Rear seatback
8. Inner seat belt
9. Console side cover (LH)
10. Antenna feeder cable
11. Sub antenna feeder cable
12. Amplifier (under passenger’s seat)
WHIP ANTENNA • ANTENNA FEEDER CABLE • AMPLIFIER REMOVAL AND INSTALLATION

Removal steps of whip antenna

1. Mast antenna
2. Mounting nut
3. Mounting insulator and packing
4. Antenna base and antenna feeder connection
5. Antenna base

Removal steps of antenna feeder

1. Mast antenna
2. Mounting nut
3. Mounting insulator and packing
4. Antenna base and antenna feeder connection
5. Antenna base
6. Rear seat cushion
7. Rear seatback
8. Inner seat belt
9. Console side cover (LH)
10. Antenna feeder cable
11. Sub antenna feeder cable
12. Amplifier (under passenger's seat)

SERVICE POINT OF REMOVAL
6. REMOVAL OF REAR SEAT CUSHION
Raise and remove the seat cushion with the lever pulled.

INSPECTION

INSPECTION OF ANTENNA MOTOR <VEHICLE WITH MOTOR ANTENNA>
Disconnect the motor antenna control unit connector, connect the positive terminal of the power supply to terminal 1 and connect the negative terminal to terminal 4 to check that the antenna goes up, and that when the connections are reversed, the antenna goes down.
INSPECTION OF MOTOR ANTENNA CONTROL UNIT
<VEHICLE WITH MOTOR ANTENNA>
(1) Connect the harness connector to the motor antenna. (Body harness)
(2) Disconnect the antenna motor connector.
(3) With the ignition switch in the ACC or ON position, operate the radio switch and check the voltage between the terminals during the period when the antenna is going up or going down.

<table>
<thead>
<tr>
<th>Antenna operating direction</th>
<th>Terminals to check</th>
<th>Voltage (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Down</td>
<td>1 - 3</td>
<td>10 – 13</td>
</tr>
<tr>
<td>Up</td>
<td>3 - 4</td>
<td>10 – 13</td>
</tr>
</tbody>
</table>

SERVICE POINT OF INSTALLATION
6. INSTALLATION OF REAR SEAT CUSHION
(1) Securely fit the attachment wire of the seat cushion under the seatback.
(2) Pass the inner seat belt buckles through the cushion.
(3) Securely fit the lock plates of the seat cushion into the holes in the floor.

REPLACEMENT OF ANTENNA POLE <VEHICLE WITH MOTOR ANTENNA>
(1) Remove the ring nut.

(2) Set the radio switch to ON. After the antenna pole has extended, remove the antenna pole and rack cable as an assembly.
(3) Extend the antenna pole up to its farthest point.

NOTE
If the motor end of the rack cable is bent, straighten it.

(4) Force the rack cable into the motor assembly with the tooth side of the rack cable toward the luggage compartment.

(5) Turn the tooth side of the rack cable toward the rear of the vehicle (90° clockwise) to bring the rack cable into mesh with the motor gear.

(6) Lightly pull the rack cable. If it comes out without resistance, it means that the rack cable is not in mesh with the motor gear. Recheck that the rack cable end is not bent before repeating the above-mentioned steps (2) and (3).

(7) With the antenna pole upright and the radio switch at OFF, take up the rack cable. As the rack cable is taken up, insert the antenna pole toward the motor antenna.

(8) After the ring nut has been tightened, set the radio switch to ON and OFF to check the operation of the antenna pole.

CD AUTO CHANGER
REMOVAL AND INSTALLATION

Removal steps
1. CD changer cover
   Luggage compartment floor carpet, high floor center board.
2. CD auto changer
3. CD changer bracket (front)
4. CD changer bracket (rear)
# REAR WINDOW DEFOGGER

## SPECIAL TOOL

<table>
<thead>
<tr>
<th>Tool number and tool name</th>
<th>Replaced by Miller tool number</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB991 502</td>
<td>MB991 502 DRB-II Scan Tool</td>
<td>Checking the rear window defogger system</td>
</tr>
<tr>
<td>MB991 529</td>
<td>M B991529</td>
<td>Checking the rear window defogger system using a voltmeter</td>
</tr>
</tbody>
</table>
TROUBLESHOOTING
CIRCUIT DIAGRAM

CHASSIS ELECTRICAL – Rear Window Defogger
OPERATION

- If the defogger switch is turned to “ON” when the generator is generating electricity (L terminal exceeds 1 OV.) with the ignition switch at the “ON” position, the timer circuit in the ETACS unit will be operated to keep the transistor “on” for 11 minutes to close the contact point of the defogger relay. When the defogger relay is “on”, the defogger and mirror heater will be activated. Moreover, the indicator light of the defogger switch is lit to inform that the defogger and mirror heater are activated.

- When 11 minutes have passed, the defogger and mirror heater will stop activating even if the defogger switch is at “ON”. When the defogger and mirror heater are activated (the timer is activated), they will also stop activating even if the defogger switch is set at “ON” again or if the generator stops generating electricity (the terminal is 3.5V or less.)

NOTE
The light automatic shut-off system is valid for the illumination light of the defogger switch. (Refer to P.8-304.)

TROUBLESHOOTING HINTS

<table>
<thead>
<tr>
<th>Phenomenon</th>
<th>Checking method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mirror heater operates but defogger does not operate.</td>
<td>• Check the defogger (Refer to P.8-410.)</td>
</tr>
<tr>
<td>Defogger operates but mirror heater does not operate.</td>
<td>• Check the dedicated fuse No. @.</td>
</tr>
<tr>
<td></td>
<td>• Check the mirror heater. (Refer to GROUP 23A – Door Mirror.)</td>
</tr>
<tr>
<td>Neither defogger nor mirror heater operates.</td>
<td>• Check the multi-purpose fuse No. 3.</td>
</tr>
<tr>
<td></td>
<td>• Check the defogger relay. (Refer to P.8-411.)</td>
</tr>
<tr>
<td></td>
<td>• Check the defogger switch. (Refer to P.8-410.)</td>
</tr>
<tr>
<td></td>
<td>• Check the defogger switch input signal. (Refer to P.8-409.)</td>
</tr>
<tr>
<td></td>
<td>• Check the ignition switch input signal. (Refer to P.8-409.)</td>
</tr>
<tr>
<td></td>
<td>• Check the generator. (Refer to P.8-233.)</td>
</tr>
<tr>
<td>Illumination light of defogger switch does not come on or is dim.</td>
<td>• Check the illumination light bulb.</td>
</tr>
<tr>
<td></td>
<td>• Check the rheostat. (Refer to P.8-341.)</td>
</tr>
</tbody>
</table>

NOTE
For the troubleshooting hints of the automatic light shut-OFF system, refer to P.8-315

COMPONENT LOCATION

Data link connector

Defogger relay

ETACS unit

Junction block
Input Signal

Using the scan tool or voltmeter, check whether or not the input signals from each switch are being input to the ETACS unit.

When using the scan tool

(1) Connect the scan tool to the data link connector.

   Caution
   Turn off the ignition switch beforehand whenever the scan tool is connected or disconnected.

(2) If the scan tool makes a peep sound when each switch is operated (turned ON/OFF), the input signal to ECU is normally sent from the switch circuit system.

When using a voltmeter

(1) Connect a voltmeter to the ETACS terminal and the ground terminal of the data link connector using the special tool.

(2) If the voltmeter pointer deflects once when each switch is operated (turned ON/OFF), the input signal to ECU is normally sent from the switch circuit system.
SERVICE ADJUSTMENT PROCEDURES

THE PRINTED-HEATER LINES CHECK

(1) Run engine at 2,000 rpm. 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 center A. Condition good if indicating about 6 V.

(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 (0 V).

(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) with the same method described.

THE PRINTED-HEATER LINES REPAIR

REQUIRED MATERIALS
- Thinner
- Lead-free gasoline
- Tape
- Fine brush
- Conductive paint

(1) Clean disconnected area with lead-free gasoline. Tape along both sides of heater element.

(2) Mix conductive paint thoroughly. Thin the required amount of paint in a separate container with a small amount of thinner and paint break three times at 15 minute intervals.

(3) Remove tape and leave for a while before use (circuit complete).

(4) When completely dry (after 24 hours) finish exterior with a knife.

Caution
Clean glass with a soft cloth (dry or damp) along defogger heater element.

REAR WINDOW DEFOGGER SWITCH

(1) Remove rear window defogger switch from the meter bezel. (Refer to P.8-340.)
(2) Operate the switch and check the continuity between the terminals.

<table>
<thead>
<tr>
<th>Switch position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ON</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE
○ ○ indicates that there is continuity between the terminals.
DEFOGGER RELAY

INSPECTION

Connect battery power source to terminal 1. Check circuit between terminals with terminal 3 grounded.

<table>
<thead>
<tr>
<th>Power is supplied</th>
<th>4 ~ 5 terminals</th>
<th>Continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power is not supplied</td>
<td>4 ~ 5 terminals</td>
<td>No continuity</td>
</tr>
<tr>
<td></td>
<td>1 ~ 3 terminals</td>
<td>Continuity</td>
</tr>
</tbody>
</table>

THEFT-ALARM SYSTEM

SPECIAL TOOL

<table>
<thead>
<tr>
<th>Tool number and tool name</th>
<th>Replaced by Miller tool number</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB991 502 Scan Tool (MUT-II)</td>
<td>DRB-II Scan Tool</td>
<td>Checking the theft-alarm system</td>
</tr>
<tr>
<td>MB991 529 Diagnostic trouble code check harness</td>
<td>MB991529</td>
<td>Checking the theft-alarm system using a voltmeter</td>
</tr>
</tbody>
</table>
TROUBLESHOOTING
CIRCUIT DIAGRAM
## COMPONENT LOCATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data link connector</td>
<td>F</td>
<td>Light automatic shut-off unit</td>
<td>G</td>
</tr>
<tr>
<td>Diode</td>
<td>D</td>
<td>Starter relay</td>
<td>A</td>
</tr>
<tr>
<td>ETACS unit</td>
<td>C</td>
<td>Theft-alarm horn relay</td>
<td>B</td>
</tr>
<tr>
<td>Headlight relay</td>
<td>A</td>
<td>Theft-alarm starter relay</td>
<td>E</td>
</tr>
<tr>
<td>Horn relay</td>
<td>A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![Diagram of component locations](image-url)
CHASSIS ELECTRICAL – Theft-alarm System

**Vehicles with keyless entry system**
- Light automatic shut-off unit

**Vehicles without keyless entry system**
- Light automatic shut-off unit

16F0268
16F0012
16F0464
TROUBLESHOOTING GUIDE
CHECKING THE INPUT

When using the scan tool
1. Connect the scan tool to the data link connector.
   Caution
   Turn off the ignition switch beforehand whenever the
   scan tool is connected or disconnected.

When using a voltmeter
1. Connect a voltmeter to the ETACS terminal and the ground
   terminal of the data link connector using the special tool.
2. Make sure that when the following switches are turned on,
   the output shown in the illustration is delivered. (Only those
   switches which are related to the theft-alarm system are
   listed here.)
   • Driver and front passenger door switches
   • Headlight switch
   • Driver and front passenger door lock switches
   • Passing light switch
   • Hood switch
   • Liftgate switch
   • Door key cylinder switch
   • Liftgate switch

<table>
<thead>
<tr>
<th>Tester</th>
<th>output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltmeter</td>
<td>Rectangular wave ( \frac{1}{2} ) 100 ms is output</td>
</tr>
<tr>
<td>Scan tool</td>
<td>Buzzer sound</td>
</tr>
</tbody>
</table>

If there is no output of a voltage pattern at all, check for a
malfunction of that switch or for damaged or disconnected
wiring.
## TROUBLESHOOTING QUICK-REFERENCE TABLE

For information concerning the locations of electrical components, refer to P.8-416.

### 1. ARMING / DISARMING RELATIONSHIP

<table>
<thead>
<tr>
<th>Trouble symptom</th>
<th>Cause</th>
<th>Check method</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>The system is not armed (The SECURITY light doesn’t illuminate, and the alarm doesn’t function.) (The central door locking system functions normally. If the central locking system does not function normally, refer to P.8-423.)</td>
<td>Damaged or disconnected wiring of ECU power supply circuit</td>
<td>Check by using check chart P.8-421.</td>
<td>Replace the fusible link No. (6) or the fuse No. 18. Repair the harness.</td>
</tr>
<tr>
<td></td>
<td>Damaged or disconnected wiring of door switch input circuit</td>
<td>Check by using check chart P.8-422.</td>
<td>Repair the harness or replace the door switch.</td>
</tr>
<tr>
<td>The arming procedures are followed, but the SECURITY light does not illuminate. (There is an alarm, however, when an alarm test is conducted after about 20 seconds have passed.)</td>
<td>Damaged or disconnected wiring of SECURITY light activation circuit</td>
<td>Check by using check chart P.8-426.</td>
<td>Replace the fusible link No. 18 or the fuse No. 18. Repair the harness.</td>
</tr>
<tr>
<td></td>
<td>Blown SECURITY light bulb</td>
<td></td>
<td>Replace the bulb.</td>
</tr>
<tr>
<td></td>
<td>Malfunction of the ECU</td>
<td></td>
<td>Replace the ECU.</td>
</tr>
<tr>
<td>The alarm sounds in error when, while the system is armed, a door or the liftgate is unlocked by using the key.</td>
<td>Damaged or disconnected wiring of a door key cylinder and the liftgate unlock switch input circuit.</td>
<td>If input checks P.8-418 indicate a malfunction, check by using check chart P.8-423.</td>
<td>Repair the harness or replace a door key cylinder and the liftgate unlock switch.</td>
</tr>
<tr>
<td></td>
<td>Malfunction of a door key cylinder and the liftgate unlock switch.</td>
<td></td>
<td>Replace the ECU.</td>
</tr>
</tbody>
</table>

### 2. ACTIVATION / DEACTIVATION RELATIONSHIP

<table>
<thead>
<tr>
<th>Trouble symptom</th>
<th>Cause</th>
<th>Check method</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is no alarm when, as an alarm test, a door is opened without using the key. (The arming and disarming are normal, and the alarm is activated when the liftgate or hood is opened.)</td>
<td>Damaged or disconnected wiring of door switch (all doors) input circuit</td>
<td>If input checks P.8-418 indicate a malfunction, check by using check chart P.8-422.</td>
<td>Repair the harness or replace the door switch.</td>
</tr>
<tr>
<td></td>
<td>Malfunction of the door switch</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Malfunction of the ECU</td>
<td></td>
<td>Replace the ECU.</td>
</tr>
<tr>
<td>There is no alarm when, as an alarm test, the liftgate is opened without using the key. (The alarm is activated, however, by opening a door or the hood.)</td>
<td>Damaged or disconnected wiring of liftgate switch input circuit</td>
<td>If input checks P.8-418 indicate a malfunction, check by using check chart P.8-425.</td>
<td>Repair the harness or replace the liftgate switch.</td>
</tr>
<tr>
<td></td>
<td>Malfunction of the liftgate switch</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Malfunction of the ECU</td>
<td></td>
<td>Replace the ECU.</td>
</tr>
<tr>
<td>There is no alarm when, as an alarm test, the hood is opened from within the vehicle. (The alarm is activated, however, by opening a door or the liftgate.)</td>
<td>Damaged or disconnected wiring of hood switch input circuit.</td>
<td>If input checks P.8-418 indicate a malfunction, check by using check chart P.8-422.</td>
<td>Repair the harness or replace the hood switch.</td>
</tr>
<tr>
<td></td>
<td>Malfunction of the hood switch.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Malfunction of the ECU</td>
<td></td>
<td>Replace the ECU.</td>
</tr>
</tbody>
</table>

---

**Note:**
- For more detailed checks, refer to the check charts provided in P.8-421 and P.8-422.
- Repair or replace components as indicated.
- Ensure all connections are secure and not damaged.

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*CHASSIS ELECTRICAL – Theft-alarm System 8-419*
<table>
<thead>
<tr>
<th>Trouble symptom</th>
<th>Cause</th>
<th>Check method</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine would not start</td>
<td>There is a short-circuit of the starter relay activation circuit</td>
<td>Check by using check chart P.8-429.</td>
<td>Repair the harness.</td>
</tr>
<tr>
<td>When, as a test of the alarm, a door or the liftgate is opened without using the key, or the hood is opened from within the vehicle, the horn and the theft-alarm horn sound but the headlights don't flash.</td>
<td>Damaged or disconnected wiring of headlight power supply circuit or headlight activation circuit</td>
<td>Check by using check chart P.8-428, 429.</td>
<td>Repair the harness or replace the diode $D_2$. Replace the headlight relay or the headlight.</td>
</tr>
<tr>
<td>The headlights flash during an alarm test but the horn or the theft alarm horn does not sound.</td>
<td>Damaged or disconnected wiring of horn relay power supply circuit or horn activation circuit</td>
<td>Check by using check chart P.8-426, 427, 428.</td>
<td>Repair the harness. Replace the horn. Replace dedicated fuse No. (6) or the fusible link No. (6).</td>
</tr>
<tr>
<td>The system is not deactivated when, during an alarm test in which the alarm is intentionally activated, the door or liftgate is unlocked by using the key. (The system also cannot be disarmed.)</td>
<td>Damaged or disconnected wiring of door key cylinder and liftgate unlock switch input circuit</td>
<td>If input checks (P.8-418) indicate a malfunction, check by using check chart P.8-424, 425.</td>
<td>Repair the harness. Replace the key cylinder switch or the liftgate switch.</td>
</tr>
</tbody>
</table>

ECU: Electronic Control Unit

NOTE
(1) If the liftgate unlock switch or door key cylinder unlock switch is operated roughly, or if these switches have been installed incorrectly or switches themselves are defective the ECU may not accept the warning or alarm cancelling signal. In such case, the alarm operation will take place when the door is opened using a key. [When the door key cylinder switch has been shorted, however, if the ignition switch is turned ON, the ECU judges the detection switch as faulty and thereafter, it will prevent setting of (warning) alarm until the shorting is corrected.]

(2) If the liftgate is opened using a key and is left opened when the door key cylinder switch system has a trouble (wiring harness damage, open circuit, etc.), the ECU judges it as the liftgate holding mode and does not produce alarm even when the door is opened.
CHECKING THE CIRCUIT AND INDIVIDUAL PART
1. ETACS POWER-SUPPLY AND GROUND CIRCUITS

Description of operation
The battery supplies a stabilized 5V power supply to the ECU, via the constant-voltage circuit and terminal 51 (which is directly connected to the battery).

ECU terminal voltage (Connection condition of the ECU connector).

<table>
<thead>
<tr>
<th>ECU terminal No.</th>
<th>Signal</th>
<th>Condition</th>
<th>Terminal voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td>ECU power supply</td>
<td>At all times</td>
<td>12V</td>
</tr>
</tbody>
</table>

2. KEY-REMINDER SWITCH INPUT CIRCUIT

Description of operation
The key-reminder switch is switched OFF and HIGH-level signals are sent to the ECU when the key is inserted into the ignition key cylinder: when the key is removed, the key-reminder switch is switched ON and LOW-level signals are sent to the ECU.

ECU terminal voltage (Connection condition of the ECU connector).

<table>
<thead>
<tr>
<th>ECU terminal No.</th>
<th>Signal</th>
<th>Condition</th>
<th>Terminal voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>64</td>
<td>Key-reminder switch</td>
<td>Key removed</td>
<td>12V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Key inserted</td>
<td>0V</td>
</tr>
</tbody>
</table>
3. HOOD SWITCH INPUT CIRCUIT

**Description of operation**

When the hood is closed (the hood switch is switched OFF), HIGH-level signals are sent to the ECU.
When the hood is opened (the hood switch is switched ON), LOW-level signals are sent to the ECU.

ECU terminal voltage (Connection condition of the ECU connector).

<table>
<thead>
<tr>
<th>ECU terminal No.</th>
<th>Signal</th>
<th>Condition</th>
<th>Terminal voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>Hood switch</td>
<td>Open</td>
<td>0V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Closed</td>
<td>5V*</td>
</tr>
</tbody>
</table>

* Measurement is not possible by using a voltmeter, but is possible by using an oscilloscope.

4. DOOR SWITCH INPUT CIRCUIT

**Description of operation**

When the door is closed (the door switch is switched OFF), HIGH-level signals are sent to the ECU.
When the door is opened (the door switch is switched ON), LOW-level signals are sent to the ECU.

ECU terminal voltage (Connection condition of the ECU)

<table>
<thead>
<tr>
<th>ECU terminal No.</th>
<th>Signal</th>
<th>Condition</th>
<th>Terminal voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Driver door switch</td>
<td>Driver door</td>
<td>Open</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Closed</td>
</tr>
<tr>
<td></td>
<td>Passenger door switch</td>
<td>Passenger door</td>
<td>Open</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Closed</td>
</tr>
</tbody>
</table>

* Measurement is not possible by using a voltmeter, but is possible by using an oscilloscope.
5. DOOR LOCK ACTUATOR SWITCH INPUT CIRCUIT

Description of operation
When a door is locked by the lock knob or the key, the door lock actuator switch is switched OFF, and HIGH-level signals are sent to the ECU. These signals activate the timer circuit of the ECU, thereby causing the activation circuit to function, thus activating the door lock actuator of all doors.

ECU terminal voltage (Connection condition of the ECU connector).

<table>
<thead>
<tr>
<th>ECU terminal No.</th>
<th>Signal</th>
<th>Condition</th>
<th>Terminal voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Door lock actuator switch (driver door)</td>
<td>Lock: OFF</td>
<td>5V*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unlock: ON</td>
<td>0V</td>
</tr>
<tr>
<td>14</td>
<td>Door lock actuator switch (passenger door)</td>
<td>Lock: OFF</td>
<td>5V*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unlock: ON</td>
<td>0V</td>
</tr>
</tbody>
</table>

* Measurement is not possible by using a voltmeter, but is possible by using an oscilloscope.
6. DOOR KEY CYLINDER UNLOCK AND LIFTGATE CYLINDER LOCK SWITCH INPUT CIRCUIT

Description of operation

When the door key is rotated or the liftgate key is unlocked, LOW-level signals are sent to the ECU.
ECU terminal voltage (Connection condition of the ECU connector).

<table>
<thead>
<tr>
<th>ECU terminal No.</th>
<th>Signal</th>
<th>Condition</th>
<th>Terminal voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>Door key cylinder unlock switch</td>
<td>Door key cylinder (LH)</td>
<td>Not rotate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rotate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Door key cylinder (RH)</td>
<td>Not rotate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rotate</td>
</tr>
<tr>
<td>20</td>
<td>Liftgate unlock switch</td>
<td>Liftgate</td>
<td>Lock</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unlock</td>
</tr>
</tbody>
</table>
Description of operation

When the liftgate is closed (the liftgate switch is switched OFF), HIGH-level signals are sent to the ECU. When the liftgate is opened (the liftgate switch is switched ON), LOW-level signals are sent to the ECU.

<table>
<thead>
<tr>
<th>ECU terminal No.</th>
<th>Signal</th>
<th>Condition</th>
<th>Terminal voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>Liftgate switch</td>
<td>Liftgate Open</td>
<td>0V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Liftgate Closed</td>
<td>5V*</td>
</tr>
</tbody>
</table>

* Measurement is not possible by using a voltmeter, but is possible by using an oscilloscope.
8. SECURITY LIGHT ACTIVATION CIRCUIT

**Description of operation**

If all doors are in locked state after key-less locking, the ECU transistor is turned ON and the security light comes on.

Checking the security light activation circuit (Disconnect the connector of the ECU and check at the wiring harness side.)

<table>
<thead>
<tr>
<th>Step</th>
<th>Check object</th>
<th>Judgement</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>D-04 connector terminal voltage 51</td>
<td>12V 0V</td>
<td>Fuse damaged or disconnected</td>
<td>Replace the fuse</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Harness damaged or disconnected, or short-circuit</td>
<td>Repair the harness</td>
</tr>
<tr>
<td>2</td>
<td>D-04 connector terminal voltage 52</td>
<td>12V 0V</td>
<td>Damaged or disconnected wiring of SECURITY light bulb</td>
<td>Replace the bulb</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Harness damaged or disconnected</td>
<td>Repair the harness</td>
</tr>
<tr>
<td>3</td>
<td>ECU terminal voltage 57</td>
<td>12V 0V</td>
<td>Harness damaged or disconnected, or short-circuit</td>
<td>Repair the harness</td>
</tr>
</tbody>
</table>

9. HORN RELAY POWER-SUPPLY CIRCUIT

**Description of operation**

Power voltage is always supplied to the horn relay.

Checking the horn relay power-supply circuit (Disconnect the horn relay)

<table>
<thead>
<tr>
<th>Check object</th>
<th>Judgement</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>HORN RELAY connector terminal voltage 5</td>
<td>12V 0V</td>
<td>Dedicated fuse damaged or disconnected</td>
<td>Replace the fuse</td>
</tr>
<tr>
<td>HORN RELAY terminal voltage 5</td>
<td>12V 0V</td>
<td>Damaged or disconnected harness</td>
<td>Repair the harness</td>
</tr>
</tbody>
</table>
10. HORN ACTIVATION CIRCUIT

Description of operation
The ECU transistor is turned 'ON if the vehicle door, etc. are opened without use of the key. This energizes the horn relay to activate the horn.

Checking the horn activation circuit (Disconnect the connector of the ECU, then short-circuit terminal connector No. 58, and activate the horn relay.)

<table>
<thead>
<tr>
<th>Step</th>
<th>Check object</th>
<th>Judgement</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Normal</td>
<td>Malfunction</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Horn relay terminal voltage (4-Ground)</td>
<td>12V</td>
<td>0V</td>
<td>Malfunction of the horn relay</td>
</tr>
<tr>
<td>2</td>
<td>Horn terminal voltage (LH &amp; RH) (1-Ground)</td>
<td>12V</td>
<td>0V</td>
<td>Harness damaged or disconnected</td>
</tr>
<tr>
<td>3</td>
<td>Horn terminal voltage (LH &amp; RH) (1'-Ground)</td>
<td>Horn sounds (0V)</td>
<td>Horn doesn't sound (0V)</td>
<td>Malfunction of the horn</td>
</tr>
</tbody>
</table>

11. THEFT ALARM HORN RELAY POWER-SUPPLY CIRCUIT

Description of operation
Power voltage is always supplied to the theft alarm horn relay.

Checking the horn relay power-supply circuit (Disconnect the theft alarm horn relay)

<table>
<thead>
<tr>
<th>Check object</th>
<th>Judgement</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>Malfunction</td>
<td></td>
</tr>
<tr>
<td>THEFT ALARM HORN RELAY connector terminal voltage</td>
<td>12V</td>
<td>0V</td>
<td>Fuse or damaged or disconnected</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Damaged or disconnected harness</td>
</tr>
</tbody>
</table>
12. THEFT ALARM HORN ACTIVATION CIRCUIT

Description of operation

The ECU transistor is turned ON if the vehicle door, etc. are opened without use of the key. This energizes the theft alarm horn relay to activate the horn.

Checking the horn activation circuit (Disconnect the connector of the ECU, then short-circuit terminal connector No. 58, and activate the theft alarm horn relay.)

<table>
<thead>
<tr>
<th>Step</th>
<th>Check object</th>
<th>Judgement</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Horn relay terminal voltage (1-Ground)</td>
<td>12V 0V</td>
<td>Malfunction of the horn relay</td>
<td>Check the horn relay (Refer to P.8-363.)</td>
</tr>
<tr>
<td>2</td>
<td>Horn terminal voltage (1-Ground)</td>
<td>12V 0V</td>
<td>Harness damaged or disconnected</td>
<td>Repair the harness</td>
</tr>
<tr>
<td>3</td>
<td>Horn terminal voltage (1'-Ground)</td>
<td>Horn doesn't sound (0V)</td>
<td>Malfunction of the horn</td>
<td>Replace the horn</td>
</tr>
<tr>
<td></td>
<td>Battery voltage</td>
<td>Damaged or disconnected wiring of ground circuit</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

13. HEADLIGHT POWER-SUPPLY CIRCUIT

Description of operation

Power voltage is always supplied to the headlight relay.

Checking the headlight power-supply circuit (Disconnect the headlight relay)

<table>
<thead>
<tr>
<th>Check object</th>
<th>Judgement</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Wiring harness side) terminal voltage (5-Ground)</td>
<td>12V 0V</td>
<td>Fusible link (3) blown</td>
<td>Replace the fusible link</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Damaged or disconnected harness</td>
<td>Repair the harness</td>
</tr>
</tbody>
</table>
14. HEADLIGHT ACTIVATION CIRCUIT

Description of operation
The ECU transistor is turned ON if the vehicle door, etc. are opened without use of the key. This energizes the headlight relay to activate the headlight.

Checking the headlight activation circuit (Disconnect the connector of the ECU, then short-circuit terminal connector No. 2, and activate the headlight relay.)

<table>
<thead>
<tr>
<th>Step</th>
<th>Check object</th>
<th>Judgement</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Headlight relay terminal voltage (4-Ground)</td>
<td>12V</td>
<td>0V</td>
<td>Malfunction of the headlight relay</td>
</tr>
<tr>
<td>2</td>
<td>Headlight terminal voltage (2-Ground)</td>
<td>12V</td>
<td>0V</td>
<td>Harness damaged or disconnected</td>
</tr>
<tr>
<td>3</td>
<td>Headlight terminal voltage</td>
<td>Column switch</td>
<td>Hi</td>
<td>Malfunction of the headlight. Harness damaged or disconnected, Malfunction of column switch</td>
</tr>
</tbody>
</table>

15. STARTER RELAY ACTIVATION CIRCUIT

Description of operation
The ECU transistor is turned ON if the vehicle door etc. are opened without use of the key. This turns OFF the starter relay and power ceases to be supplied to the starter magnet switch.

Checking the starter relay activation circuit (Disconnect the connector of the ECU, depress fully the clutch pedal and activate the starter relay)

<table>
<thead>
<tr>
<th>Step</th>
<th>Check object</th>
<th>Judgement</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Starter relay terminal voltage (2-Ground)</td>
<td>12V</td>
<td>0V</td>
<td>Malfunction of the starter relay</td>
</tr>
<tr>
<td>2</td>
<td>Starter motor terminal (1-Ground)</td>
<td>12V</td>
<td>0V</td>
<td>Harness damaged or disconnected</td>
</tr>
<tr>
<td>3</td>
<td>Continuity between &quot;B-24&quot; connector and ground</td>
<td>0 Ω</td>
<td>※Ω</td>
<td>Damaged magnet switch</td>
</tr>
</tbody>
</table>

RJHY307090-432
The special service tools referred to herein are required for certain service operations. These special service tools or their equivalent, if not obtainable through a local source are available through the following outlet.

12842 Farmington Road, Livonia, Michigan 48150, U.S.A.

MILLER SPECIAL TOOLS
SPX Corporation

Telephone (313) 522-6717
FAX (313) 522-6505

C & D Riley Enterprises Ltd., P.O. Box 243, Amherstburg, Ontario N9V 2Z4

Telephone (519) 736-4600
FAX (519) 736-8433

12842 Farmington Road, Livonia, Michigan 48150, U.S.A.

MILLER SPECIAL TOOLS
SPX Corporation

Telephone (313) 522-6717
FAX (313) 522-6505