

SECTION **CHG**  
CHARGING SYSTEM

A  
B  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
N  
O  
P

CONTENTS

|  |   |                                       |    |
|--|---|---------------------------------------|----|
| <b>PRECAUTION</b> .....                                | 2 | <b>SOLAR CELL MODULE</b> .....        | 7  |
| <b>PRECAUTIONS</b> .....                               | 2 | Wiring Diagram .....                  | 7  |
| Precaution for Technicians Using Medical Electric..... | 2 | <b>BASIC INSPECTION</b> .....         | 10 |
| Point to Be Checked Before Starting Maintenance        |   | <b>DARK CURRENT</b> .....             | 10 |
| Work .....   | 2 | Work Procedure .....                  | 10 |
| Precaution for Supplemental Restraint System           |   | <b>DTC/CIRCUIT DIAGNOSIS</b> .....    | 11 |
| (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" .....    | 2 | <b>SOLAR CELL MODULE</b> .....        | 11 |
| Precautions for Removing Battery Terminal .....        | 3 | Diagnosis Procedure .....             | 11 |
| <b>SYSTEM DESCRIPTION</b> .....                        | 5 | <b>SYMPTOM DIAGNOSIS</b> .....        | 13 |
| <b>COMPONENT PARTS</b> .....                           | 5 | <b>DISCHARGED 12V BATTERY</b> .....   | 13 |
| Solar Cell Module .....                                | 5 | Description .....                     | 13 |
| <b>SYSTEM</b> .....                                    | 6 | Diagnosis Procedure .....             | 14 |
| <b>SOLAR CELL MODULE</b> .....                         | 6 | <b>REMOVAL AND INSTALLATION</b> ..... | 16 |
| SOLAR CELL MODULE : System Description .....           | 6 | <b>SOLAR CELL MODULE</b> .....        | 16 |
| <b>WIRING DIAGRAM</b> .....                            | 7 | Exploded View .....                   | 16 |
|  |   | Removal and Installation .....        | 16 |

**CHG**

# PRECAUTIONS

< PRECAUTION >

## PRECAUTION

### PRECAUTIONS

#### Precaution for Technicians Using Medical Electric

INFOID:000000007072461

##### OPERATION PROHIBITION

###### **WARNING:**

- Parts with strong magnet is used in this vehicle.
- Technicians using a medical electric device such as pacemaker must never perform operation on the vehicle, as magnetic field can affect the device function by approaching to such parts.

##### NORMAL CHARGE PRECAUTION

###### **WARNING:**

- If a technician uses a medical electric device such as an implantable cardiac pacemaker or an implantable cardioverter defibrillator, the possible effects on the devices must be checked with the device manufacturer before starting the charge operation.
- As radiated electromagnetic wave generated by on board charger at normal charge operation may effect medical electric devices, a technician using a medical electric device such as implantable cardiac pacemaker or an implantable cardioverter defibrillator must not enter the vehicle compartment (including luggage room) during normal charge operation.

##### PRECAUTION AT TELEMATICS SYSTEM OPERATION

###### **WARNING:**

- If a technician uses implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), avoid the device implanted part from approaching within approximately 220 mm (8.66 in) from interior/exterior antenna.
- The electromagnetic wave of TCU might affect the function of the implantable cardiac pacemaker or the implantable cardioverter defibrillator (ICD), when using the service, etc.
- If a technician uses other medical electric devices than implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), the electromagnetic wave of TCU might affect the function of the device. The possible effects on the devices must be checked with the device manufacturer before TCU use.

##### PRECAUTION AT INTELLIGENT KEY SYSTEM OPERATION

###### **WARNING:**

- If a technician uses implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), avoid the device implanted part from approaching within approximately 220 mm (8.66 in) from interior/exterior antenna.
- The electromagnetic wave of Intelligent Key might affect the function of the implantable cardiac pacemaker or the implantable cardioverter defibrillator (ICD), at door operation, at each request switch operation, or at engine starting.
- If a technician uses other medical electric devices than implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), the electromagnetic wave of Intelligent Key might affect the function of the device. The possible effects on the devices must be checked with the device manufacturer before Intelligent Key use.

#### Point to Be Checked Before Starting Maintenance Work

INFOID:000000007079403

The high voltage system may starts automatically. It is required to check that the timer air conditioner and timer charge (during EVSE connection) are not set before starting maintenance work.

###### **NOTE:**

If the timer air conditioner or timer charge (during EVSE connection) is set, the high voltage system starts automatically even when the power switch is in OFF state.

#### Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:000000007014951

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS

# PRECAUTIONS

## < PRECAUTION >

system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the “SRS AIR BAG” and “SEAT BELT” of this Service Manual.

### **WARNING:**

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see “SRS AIR BAG”.
- Never use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

## PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

### **WARNING:**

Always observe the following items for preventing accidental activation.

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the power switch ON, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the power switch OFF, disconnect the 12V battery, and wait at least 3 minutes before performing any service.

## Precautions for Removing Battery Terminal

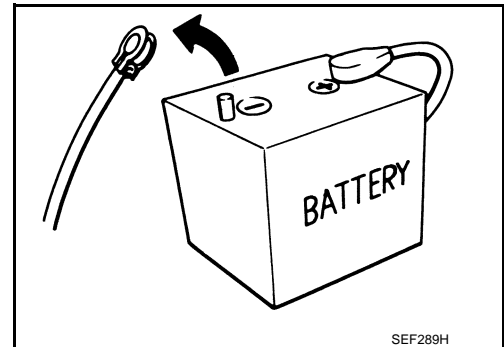
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- When removing the 12V battery terminal, turn OFF the power switch and wait at least 5 minutes.

### **NOTE:**

ECU may be active for several minutes after the power switch is turned OFF. If the battery terminal is removed before ECU stops, then a DTC detection error or ECU data corruption may occur.

- Always disconnect the battery terminal within 60 minutes after turning OFF the power switch. Even when the power switch is OFF, the 12V battery automatic charge control may automatically start after a lapse of 60 minutes from power switch OFF.
- Disconnect 12V battery terminal according to the following steps.



## WORK PROCEDURE

1. Check that EVSE is not connected.

### **NOTE:**

If EVSE is connected, the air conditioning system may be automatically activated by the timer A/C function.

2. Turn the power switch OFF → ON → OFF. Get out of the vehicle. Close all doors (including back door).
3. Check that the charge status indicator lamp does not blink and wait for 5 minutes or more.

### **NOTE:**

If the battery is removed within 5 minutes after the power switch is turned OFF, plural DTCs may be detected.

4. Remove 12V battery terminal within 60 minutes after turning the power switch OFF → ON → OFF.

### **CAUTION:**

- After all doors (including back door) are closed, if a door (including back door) is opened before battery terminals are disconnected, start over from Step 1.
- After turning the power switch OFF, if “Remote A/C” is activated by user operation, stop the air conditioner and start over from Step 1.

### **NOTE:**

Once the power switch is turned ON → OFF, the 12V battery automatic charge control does not start for approximately 1 hour.

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## PRECAUTIONS

### < PRECAUTION >

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- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the power switch.

**NOTE:**

If the power switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.

- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.

**NOTE:**

The removal of 12V battery may cause a DTC detection error.

# COMPONENT PARTS

< SYSTEM DESCRIPTION >

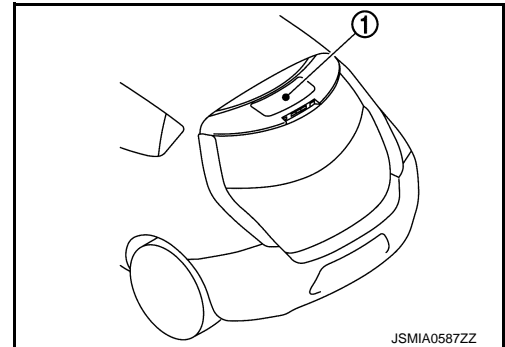
## SYSTEM DESCRIPTION

### COMPONENT PARTS

#### Solar Cell Module

INFOID:000000007014778

- Solar cell module (1) is installed on the upper part of rear spoiler.
- Since the amount of power generation of the solar cell module depends on the amount of solar radiation, the 12V battery is not recharged when power generation amount is low.



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# SYSTEM

< SYSTEM DESCRIPTION >

## SYSTEM

### SOLAR CELL MODULE

#### SOLAR CELL MODULE : System Description

INFOID:000000007014779

#### Operating conditions

- The 12V battery is recharged according to the amount of power generation of the solar cell module. Therefore, the 12V battery is not recharged when power generation amount of the solar cell module is low.

#### Reference conditions

| Item                        | Environment  |
|-----------------------------|--|
| Solar radiation amount      | Sufficient amount of solar radiation is required. <ul style="list-style-type: none"><li>• Example) Weather: Fair, Ambient temperature: 25°C, Period of time: 11:00 - 14:00</li></ul> |
| Solar cell module condition | <ul style="list-style-type: none"><li>• Solar cell module must be in sunlight.</li><li>• The surface of Solar cell module must be free from fallen leaves or dirt.</li></ul>         |

#### Recharging 12V battery

- When electromotive force  $\alpha$  (unit: V) of the solar cell module exceeds 12V battery voltage in the sun, the 12V battery is recharged at a current responsive to  $\alpha$ .
- The 12V battery is not recharged when electromotive force  $\alpha$  falls below battery voltage.

# SOLAR CELL MODULE

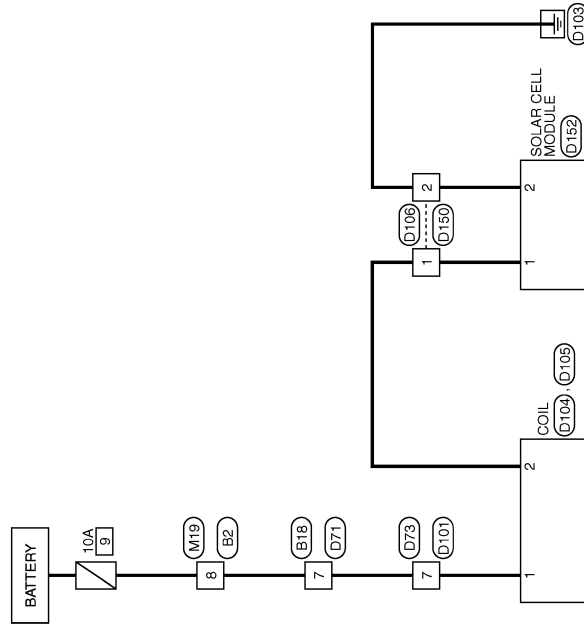
< WIRING DIAGRAM >

## WIRING DIAGRAM

### SOLAR CELL MODULE

Wiring Diagram

INFOID:000000007014780



SOLAR CELL MODULE

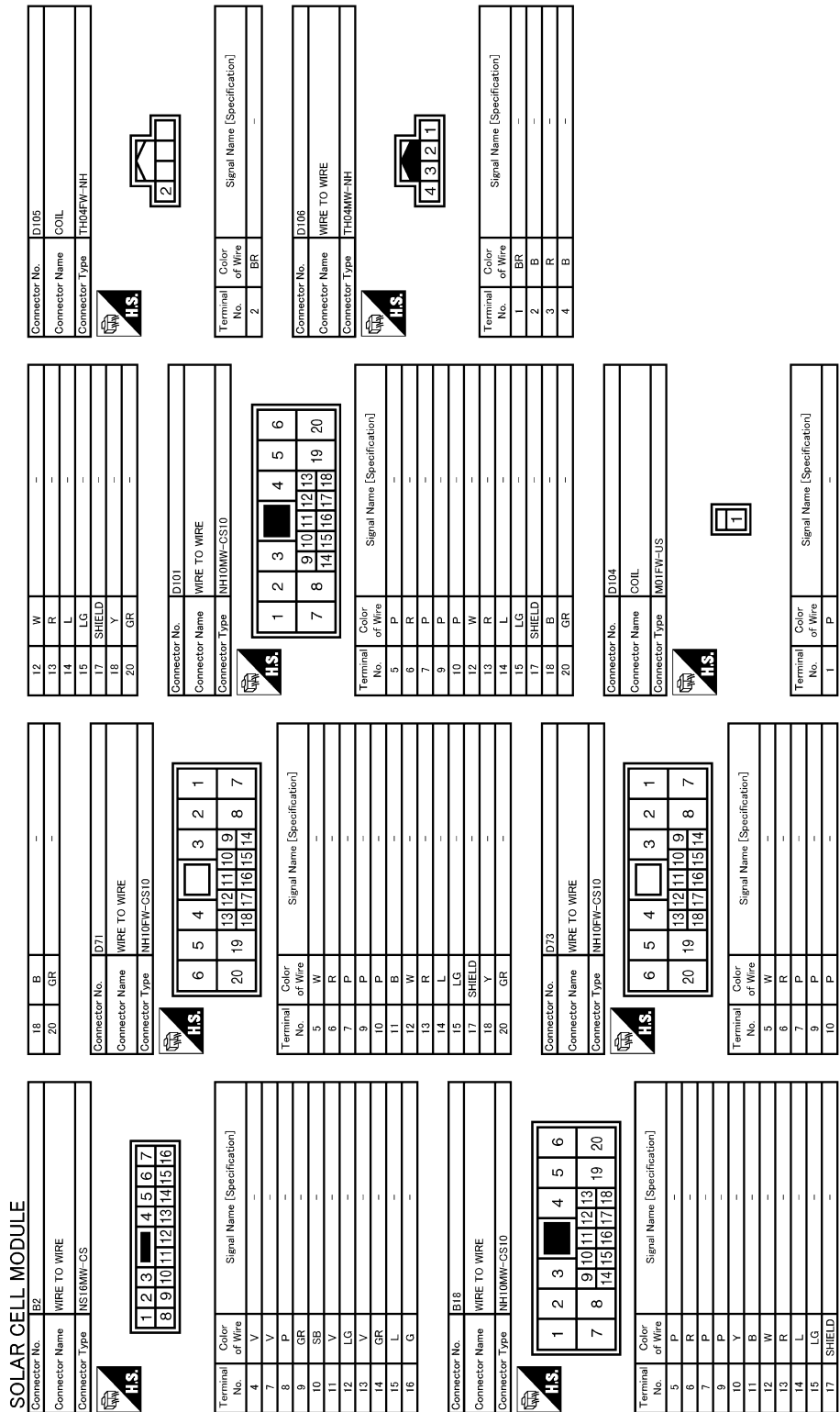
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# SOLAR CELL MODULE

< WIRING DIAGRAM >



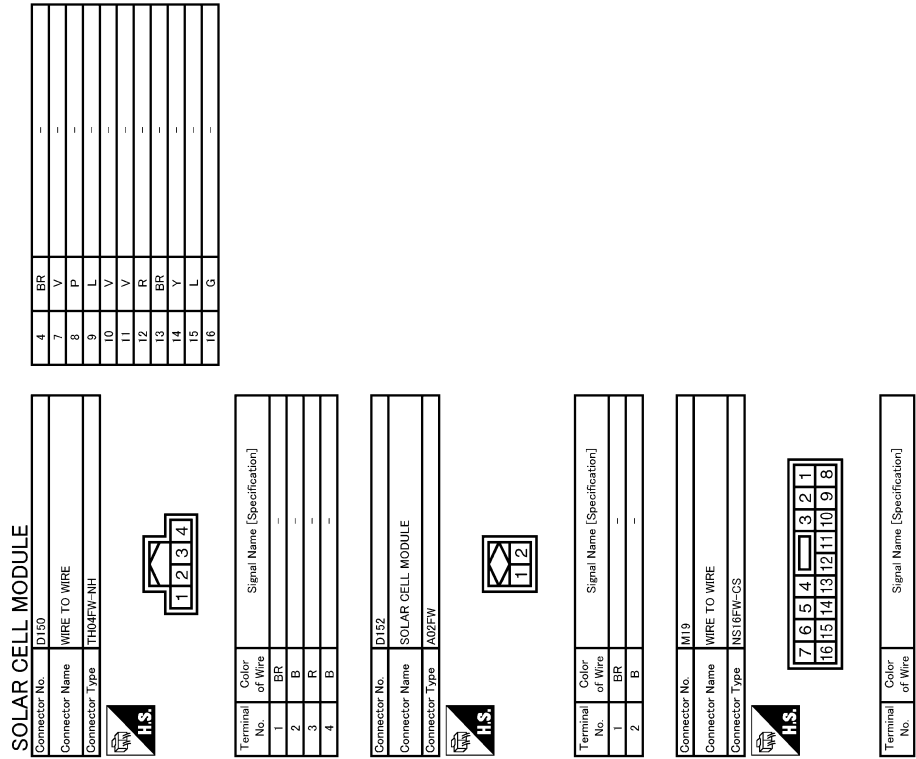
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# SOLAR CELL MODULE

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# DARK CURRENT

< BASIC INSPECTION >

## BASIC INSPECTION

### DARK CURRENT

#### Work Procedure

INFOID:000000007014781

#### CAUTION:

If the negative terminal cable of the 12V battery is disconnected from the battery terminal, the large dark current state may not be reproduced. If the 12V battery becomes dead, never disconnect the 12V battery terminal when installing an ammeter.

#### 1. CHECK DARK CURRENT

1. Install ammeter side probe (2) to negative terminal cable of 12V battery (1).

A : Current direction mark

2. Check that all of the electrical equipment is turned OFF.
3. Close and lock the door. Check that the room lamp is OFF.
4. Measure dark current.

Reference value : 50mA or less

#### CAUTION:

The time of stable dark current depends on vehicle equipment and specification. If dark current does not decrease to 50 mA or less after waiting for approximately one minute, measure again after waiting at least for 30 minutes.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

#### 2. CHECK CIRCUIT

1. Disconnect and connect fuses one at a time to find one that dark current changes sharply.

#### CAUTION:

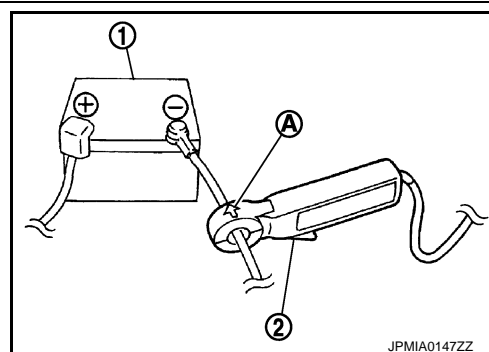
Dark current decreases sharply when a fuse is disconnected. When the fuse is reconnected, dark current may not decrease so much. In this case, the circuit of the fuse is probably questionable.

2. Check change in dark current by swinging harness of questionable circuit.

Does dark current change?

YES >> Check harness for short.

NO >> There is a possibility that the electronic unit in the circuit does not enter into Power-saving mode when the power switch is turned OFF. If this is assumed to be true, replace electronic unit.



# SOLAR CELL MODULE

< DTC/CIRCUIT DIAGNOSIS >

## DTC/CIRCUIT DIAGNOSIS

### SOLAR CELL MODULE

#### Diagnosis Procedure

INFOID:000000007014782

#### 1. CHECK VEHICLE CONDITION

Visually check the appearance of the solar cell module for scratches, cracks, and dirt.

>> GO TO 2.

#### 2. CHECK SOLAR CELL MODULE FUNCTION

1. Disconnect 12V battery negative terminal. Refer to [GI-27, "Precautions for Removing Battery Terminal"](#).
2. Move vehicle to an area (indoor acceptable) that the solar cell module can get sufficient sunlight.
3. Cover the solar cell module with a black cloth to shut out the sunlight.
4. Check voltage between 12V battery positive terminal and negative cable terminal.
5. Repeat covering and uncovering the solar cell module with black cloth, and check the voltage change.

**When normal : voltage change is observed**

#### NOTE:

If the voltage change is too small to judge, put a light source close or perform the operation outside where sunlight is available.

Is the inspection result normal?

YES >> GO TO 7.

Voltage does not change at 0 V.>>GO TO 3.

Voltage does not change at a constant voltage. >>There is a possibility of diffraction by other circuits. Repair diffraction to start inspection.

#### 3. CHECK HARNESS

1. Install 12V battery positive terminal and negative terminal.
2. Check voltage between coil and body ground.

| (+)       |          | (-)    | Voltage (Approx.) |
|-----------|----------|--------|-------------------|
| Coil      |          |        |                   |
| Connector | Terminal | Ground | Battery voltage   |
| D104      | 1        |        |                   |

Is the inspection result normal?

YES >> GO TO 4.

NO >> Check the following items.

- 10 A fuse (#9)
- Harness or connector between 12V battery and coil for a break or short

#### 4. CHECK COIL

Check voltage between coil and ground.

| (+)       |          | (-)    | Voltage (Approx.) |
|-----------|----------|--------|-------------------|
| Coil      |          |        |                   |
| Connector | Terminal | Ground | Battery voltage   |
| D104      | 2        |        |                   |

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace coil.

#### 5. CHECK HARNESS

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# SOLAR CELL MODULE

## < DTC/CIRCUIT DIAGNOSIS >

Check voltage between solar cell module and ground.

| (+) Solar cell module |          | (-)<br>Ground | Voltage (Approx.)<br>Battery voltage |
|-----------------------|----------|---------------|--------------------------------------|
| Connector             | Terminal |               |                                      |
| D152                  | 1        |               |                                      |

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair harness or connector between coil and solar cell module.

## 6.CHECK HARNESS

Check continuity between solar cell module and ground.

| Solar cell module |          | —<br>Ground | Continuity<br>Existed |
|-------------------|----------|-------------|-----------------------|
| Connector         | Terminal |             |                       |
| D152              | 2        |             |                       |

Is the inspection result normal?

YES >> Replace solar cell module.

NO >> Repair harness of connector.

## 7.CHECK DARK CURRENT

1. Install 12V battery positive terminal and negative terminal.

2. Check dark current. Refer to [CHG-10, "Work Procedure"](#).

### NOTE:

If the diode in solar cell module has a malfunction (poor commutation), dark current of 150 mA flows.

Is dark current normal?

YES >> INSPECTION END

NO >> GO TO 8.

## 8.CHECK DARK CURRENT

Remove 10 A fuse (#9) to check dark current.

Is dark current normal?

YES >> GO TO 9.

NO >> Excessive dark current in other circuit.

## 9.CHECK SOLAR CELL MODULE

1. Install 10 A fuse (#9).

2. Disconnect connector of solar cell module to check dark current.

Is dark current normal?

YES >> Replace solar cell module.

NO >> Excessive dark current in other circuit.

# DISCHARGED 12V BATTERY

< SYMPTOM DIAGNOSIS >

## SYMPTOM DIAGNOSIS

### DISCHARGED 12V BATTERY

#### Description

INFOID:000000007014783

#### DESCRIPTION

12V batteries go dead due to diverse factors, such as 12V battery deterioration, poor power generation in DC/DC junction box, driving condition, malfunctioning wiring or control unit. In this case, it is important for the correct diagnosis to check vehicle condition, battery saver function condition, and operating state of the power consumption control system (sleep function), in addition to an interview to the customer.

#### NOTE:

For battery saver function and the power consumption control system (sleep function), refer to the following items:

- Exterior lamp battery saver system: [EXL-31. "EXTERIOR LAMP BATTERY SAVER SYSTEM : System Description"](#)
- Interior room lamp battery saver system: [INL-11. "INTERIOR ROOM LAMP BATTERY SAVER SYSTEM : System Description"](#)
- Power consumption control system (sleep function): [BCS-12. "POWER CONSUMPTION CONTROL SYSTEM : System Description"](#)

For an interview, obtain detailed information about the following items as much as possible:

- History of 12V battery replacement by the customer
- Usual usage pattern
- Usage pattern immediately before the 12V battery goes dead or the situation at parking.

#### INTERVIEW

##### Work history

|  |                |                       |         |
|--|----------------|-----------------------|---------|
| 12V battery type   |                |                       |         |
| Latest 12V battery replacement   | Never replaced | Replacement date:     | No data |
| Equipment of commercial after-sales parts (grounding cable, day light, large - capacity audio amplifier, etc.) | •              | (Date of equipment: ) |         |
|  | •              | (Date of equipment: ) |         |
|  | •              | (Date of equipment: ) |         |

##### Usual usage pattern

| Frequency in use         | Daily  | Every 2 or 3 days                        | Weekly               | Others |
|--------------------------|--|--|----------------------|--------|
| Mileage/time per driving | Less than 5 km (3.11 miles)  | 5 km (3.11 miles) or more ( km or miles) | Driving time ( min.) |        |
| Main hours of use        | Head lamp use required morning/eveningDaytime  |  | Daytime              |        |
| Special situation        | Example: Parked at idle during standby, Light ON continuously during daytime, parked with hazard lamp ON, etc. |  |                      |        |

##### Usage pattern immediately before the occurrence of malfunction

|                           |   |
|---------------------------|---|
| Mileage                   |   |
| Driving time              |   |
| Road condition            |   |
| Used electrical equipment | Example: Air conditioner AUTO, light control system ON, NAVI screen displayed, music replayed, etc. |

##### Situation at parking immediately before the occurrence of the malfunction

# DISCHARGED 12V BATTERY

## < SYMPTOM DIAGNOSIS >

|   |                                    |                        |                   |                  |
|---|------------------------------------|------------------------|-------------------|------------------|
| Date of parking                                     |                                    |                        |                   |                  |
| Weather   | Fair                               | Cloudy                 | Rainy             | Others ( )       |
| Door open/close state at getting out of the vehicle | Driver's door                      | Front passenger's door | Rear seat door    | Trunk / tailgate |
| Door lock state                                     | Remote control key                 | Request SW             | Door key cylinder | Door unlocked    |
| Lamp operation                                      | Example: Room lamp turned ON, etc. |                        |                   |                  |

### Vehicle condition at the occurrence of malfunction

|  |  |                        |                |                  |
|--|--|------------------------|----------------|------------------|
| Date and time of occurrence (Recognized date and time)   |  |                        |                |                  |
| Weather at occurrence                                    | Fair   | Cloudy                 | Rainy          | Others ( )       |
| Place of occurrence                                      | Home parking area                                    | Others ( )             |                |                  |
| Door condition (half-shut or not)                        | Driver's door  | Front passenger's door | Rear seat door | Trunk / tailgate |
| Unlocking with remote key                                | Operable   |                        | Inoperative    |                  |
| Lamp switch condition                                    | Example: Room lamp SW ON, light SW 2ND, etc.         |                        |                |                  |
| Meter illumination and warning lamp state at power SW ON | Normal   | Slightly ON            | OFF            | —                |
| Electric equipment operation at power SW ON              | Example: air conditioner ON, light ON, NAVI ON, etc. |                        |                |                  |
| Others   |  |                        |                |                  |

## Diagnosis Procedure

INFOID:000000007014784

### 1. CHECK INTERVIEW RESULT AND VEHICLE CONDITION

Check the use pattern of before and after the occurrence of malfunction and the vehicle condition of after the occurrence of the malfunction. Refer to [CHG-13. "Description"](#).

#### **CAUTION:**

**To perform a field repair for a dead 12V battery, check the vehicle condition before restarting with a booster cable and measure battery voltage, specific gravity of battery fluid, and dark current (with/without the jumping battery connection) to perform a correct diagnosis.**

>> GO TO 2.

### 2. CHECK 12V BATTERY

Check 12V battery. Refer to [PG-105. "Work Flow"](#).

>> GO TO 3.

### 3. CHECK 12V BATTERY CHARGE WARNING LAMP

1. Set the vehicle to READY.
2. Be sure that 12V battery charge warning lamp is turned off.

#### Inspection result

Turned off >> GO TO 4.

## DISCHARGED 12V BATTERY

### < SYMPTOM DIAGNOSIS >

Not turned off>>Perform VCM self-diagnosis. Refer to [EVC-55. "CONSULT Function"](#).

### 4.CHECK DARK CURRENT

Check dark current. Refer to [CHG-10. "Work Procedure"](#).

#### Is the inspection result normal?

YES >> It can be considered that the current consumer is more than the power generation capacity of the DC/DC junction box. Recheck the installation condition of commercial after parts and the customer's use pattern.

NO >> Check and repair applicable part, according to the inspection result.

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# SOLAR CELL MODULE

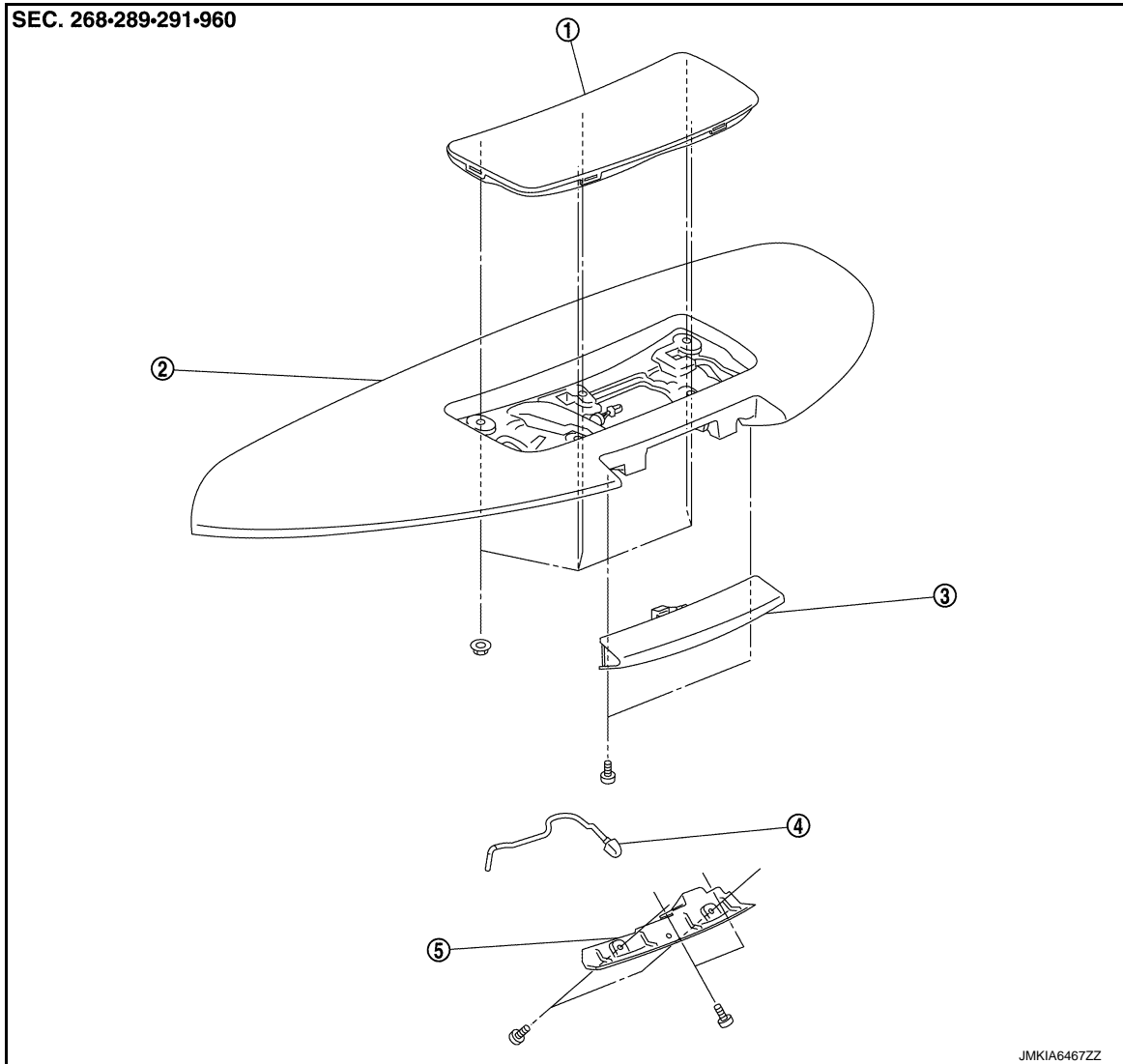
< REMOVAL AND INSTALLATION >

## REMOVAL AND INSTALLATION

### SOLAR CELL MODULE

Exploded View

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- |                       |                                 |                           |
|-----------------------|---------------------------------|---------------------------|
| 1. Solar cell module  | 2. Rear spoiler                 | 3. High-mounted stop lamp |
| 4. Rear washer nozzle | 5. High-mounted stop lamp cover |                           |

### Removal and Installation

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#### REMOVAL

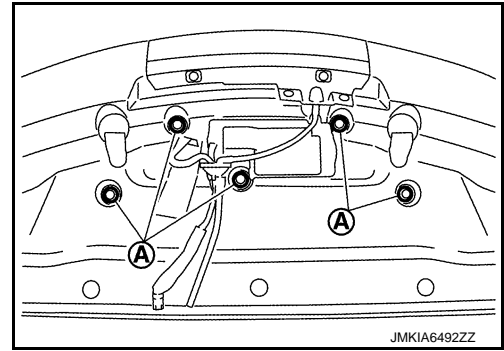
1. Remove rear spoiler. Refer to [EXT-36, "Removal and Installation"](#).



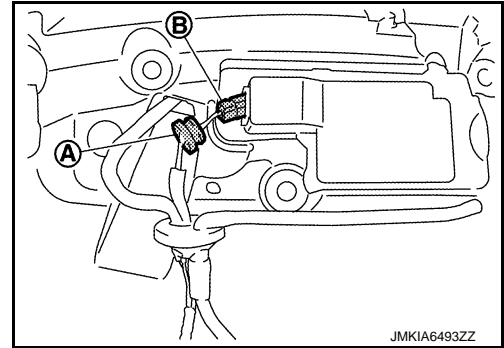
# SOLAR CELL MODULE

## < REMOVAL AND INSTALLATION >

2. Remove solar cell module mounting nuts (A).



3. Remove harness grommet (A), and then disconnect harness connector (B).



4. Remove solar cell module from rear spoiler.

## INSTALLATION

Install in the reverse order of removal.

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