

A

# SECTION STR

STR

## STARTING SYSTEM

C

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# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

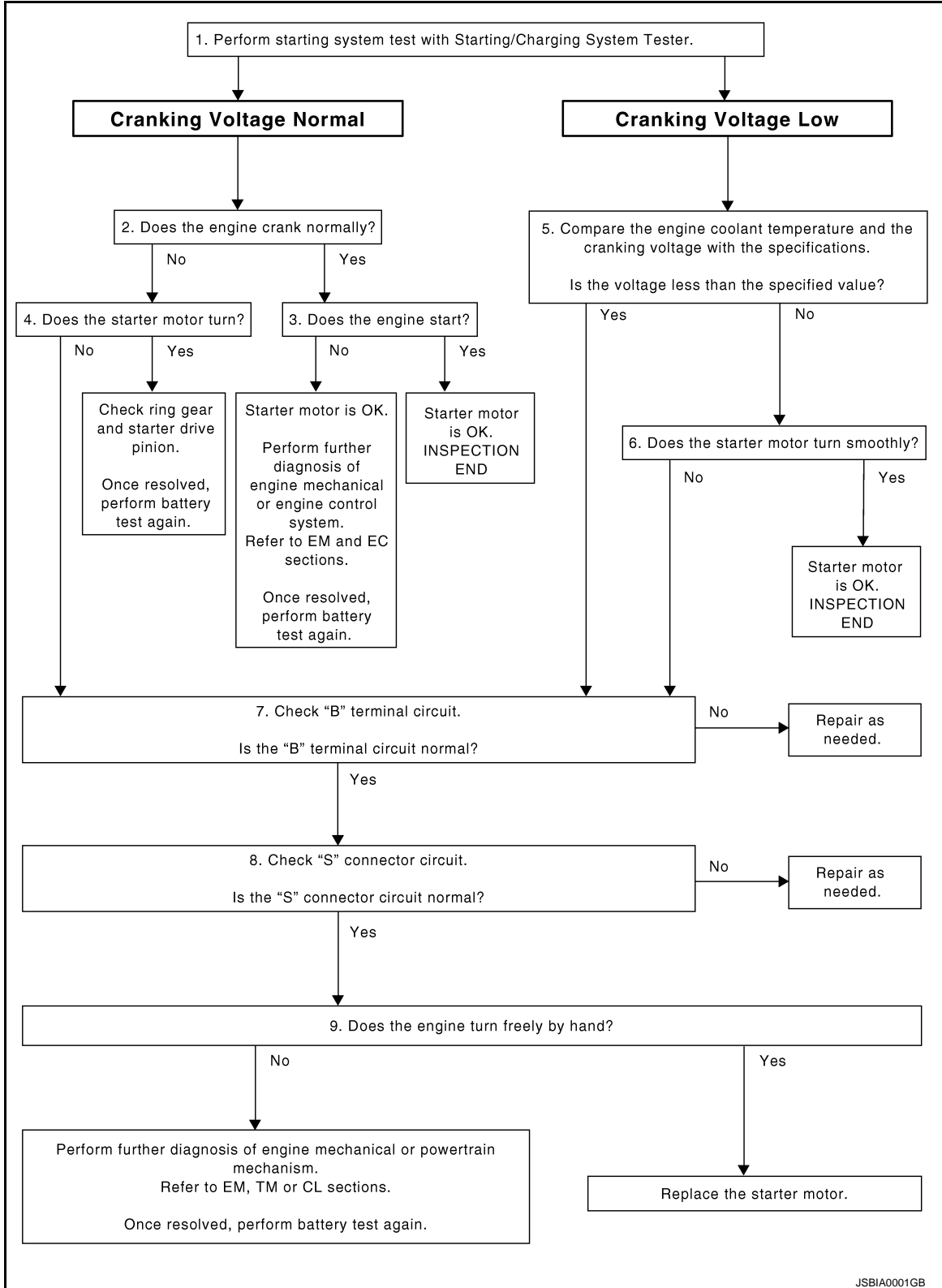
## BASIC INSPECTION

### DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000004804415

#### OVERALL SEQUENCE



#### DETAILED FLOW

# DIAGNOSIS AND REPAIR WORKFLOW

## < BASIC INSPECTION >

### NOTE:

To ensure a complete and thorough diagnosis, the battery, starter motor and alternator test segments must be done as a set from start to finish.

## 1. DIAGNOSIS WITH STARTING/CHARGING SYSTEM TESTER

Perform the starting system test with Starting/Charging System Tester (SST: J-44373). For details and operating instructions, refer to Technical Service Bulletin.

### Test result

CRANKING VOLTAGE NORMAL>>GO TO 2.

CRANKING VOLTAGE LOW>>GO TO 5.

CHARGE BATTERY>>Perform the slow battery charging procedure. (Initial rate of charge is 10A for 12 hours.) Perform battery test again. Refer to Technical Service Bulletin.

REPLACE BATTERY>>Before replacing battery, clean the battery cable clamps and battery posts. Perform battery test again. Refer to Technical Service Bulletin. If second test result is "REPLACE BATTERY", then do so. Perform battery test again to confirm repair.

## 2. CRANKING CHECK

Check that the starter motor operates correctly.

### Does the engine crank normally?

YES >> GO TO 3.

NO >> GO TO 4.

## 3. ENGINE START CHECK

Check that the engine starts.

### Does the engine start?

YES >> Starter motor is OK. INSPECTION END

NO >> Starter motor is OK. Perform further diagnosis of engine mechanical or engine control system. Refer EM and EC sections. Once resolved, perform battery test again.

## 4. STARTER MOTOR ACTIVATION

Check that the starter motor operates.

### Does the starter motor turn?

YES >> Check ring gear and starter motor drive pinion. Once resolved, perform battery test again.

NO >> GO TO 7.

## 5. COMPARISON BETWEEN ENGINE COOLANT AND CRANKING VOLTAGE

Compare the engine coolant temperature and the cranking voltage with the specifications.

Minimum Specification of Cranking Voltage Referencing Coolant Temperature

| Engine coolant temperature [°C (°F)] | Voltage [V] |
|--------------------------------------|-------------|
| -30 to -20 (-22 to -4)               | 8.6         |
| -19 to -10 (-2 to 14)                | 9.1         |
| -9 to 0 (16 to 32)                   | 9.5         |
| More than 1 (More than 34)           | 9.9         |

### Is the voltage less than the specified value?

YES >> GO TO 7.

NO >> GO TO 6.

## 6. STARTER OPERATION

Check the starter operation status.

### Does the starter motor turn smoothly?

YES >> Starter motor is OK. INSPECTION END

NO >> GO TO 7.

## 7. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to [STR-8, "Diagnosis Procedure"](#).

### Is "B" terminal circuit normal?

## DIAGNOSIS AND REPAIR WORKFLOW

### < BASIC INSPECTION >

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- YES >> GO TO 8.
- NO >> Repair as needed.

### 8. "S" CONNECTOR CIRCUIT INSPECTION

---

Check "S" connector circuit. Refer to [STR-9. "Diagnosis Procedure"](#).

#### Is "S" connector circuit normal?

- YES >> GO TO 9.
- NO >> Repair as needed.

### 9. ENGINE ROTATION STATUS

---

Check that the engine can be rotated by hand.

#### Does the engine turn freely by hand?

- YES >> Replace starter motor.
- NO >> Perform further diagnosis of engine mechanical or powertrain mechanism. Refer to EM, TM or CL sections. Once resolved, perform battery test again. Refer to Technical Service Bulletin.

# STARTING SYSTEM

< SYSTEM DESCRIPTION >

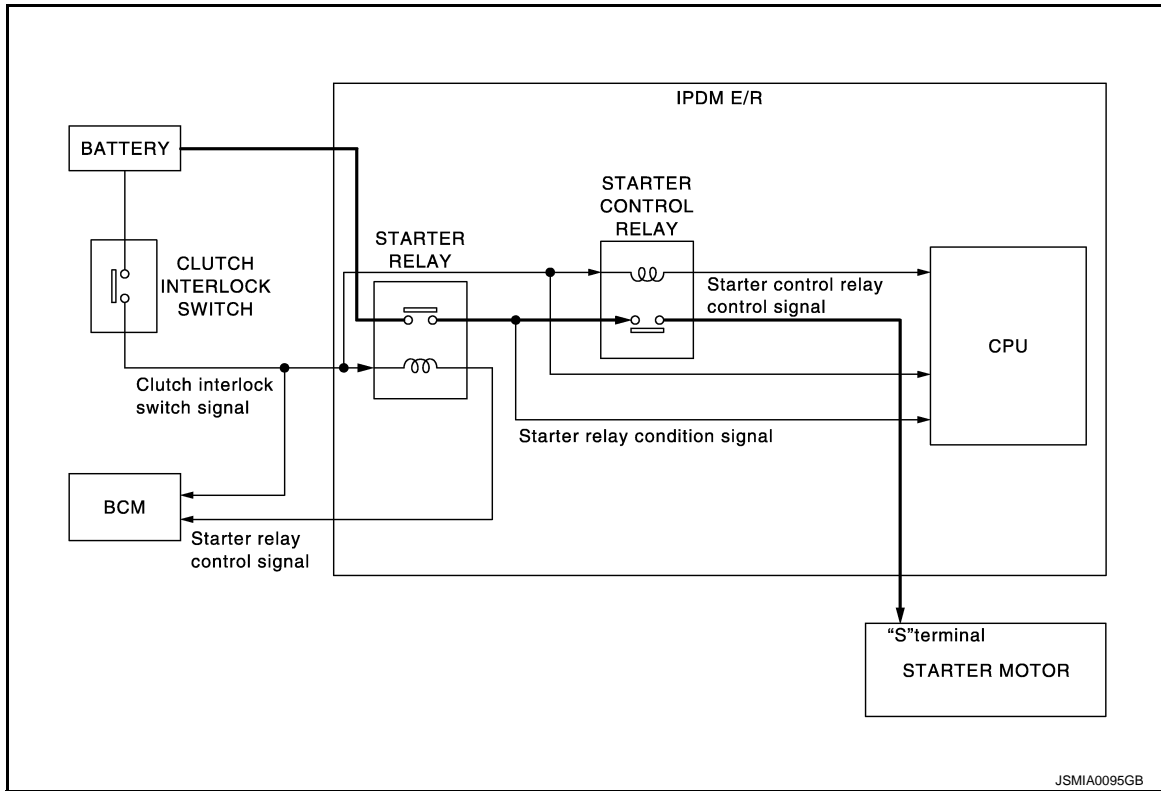
## SYSTEM DESCRIPTION

### STARTING SYSTEM

M/T

M/T : System Diagram

INFOID:000000004994551



M/T : System Description

INFOID:000000004994552

- When the clutch interlock switch is turned ON, power is supplied to starter relay and starter control relay. And BCM and IPDM E/R (CPU) detect clutch interlock switch condition by the inputted signal.
- When starter operating condition is satisfied, IPDM E/R turns starter control relay ON by starter control relay control signal.
- When engine cranking condition is satisfied, BCM turns starter relay ON by starter relay control signal.
- Then battery power is supplied to starter motor ("S" terminal) through starter control relay and starter relay. And IPDM E/R (CPU) detect starter relay condition by the inputted signal.

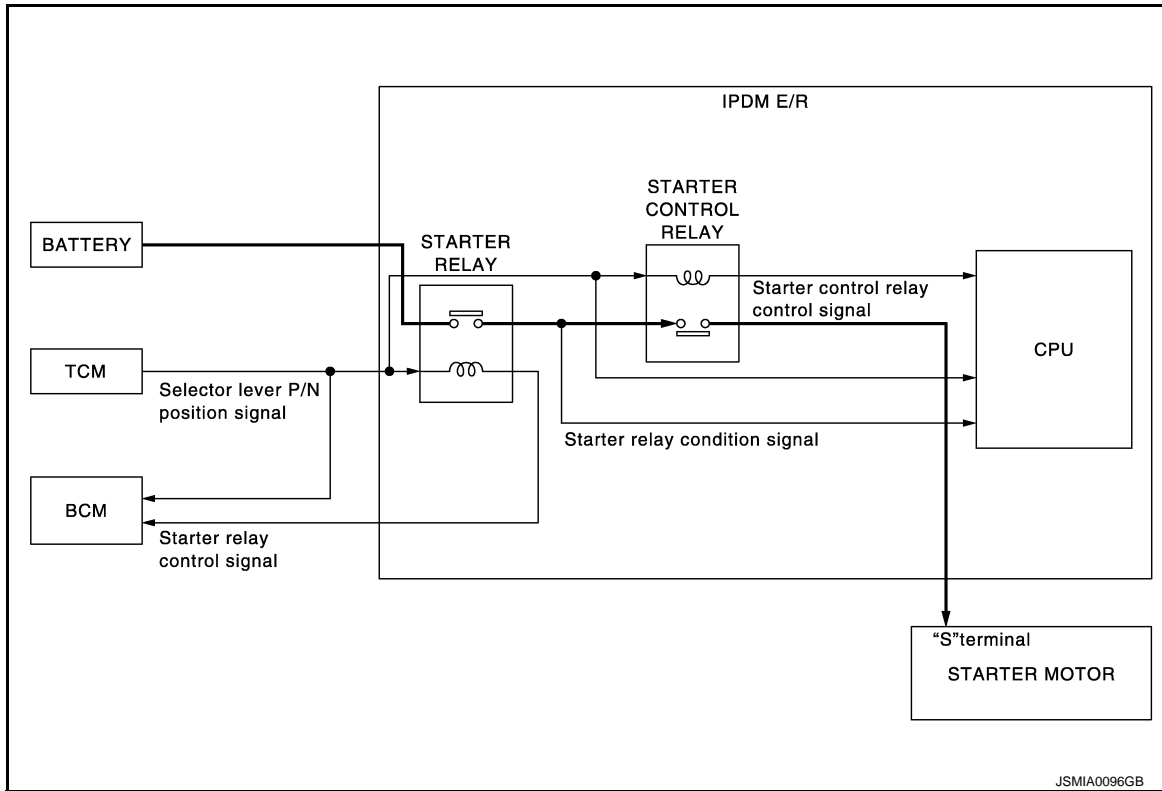
A/T

# STARTING SYSTEM

< SYSTEM DESCRIPTION >

A/T : System Diagram

INFOID:000000004994555



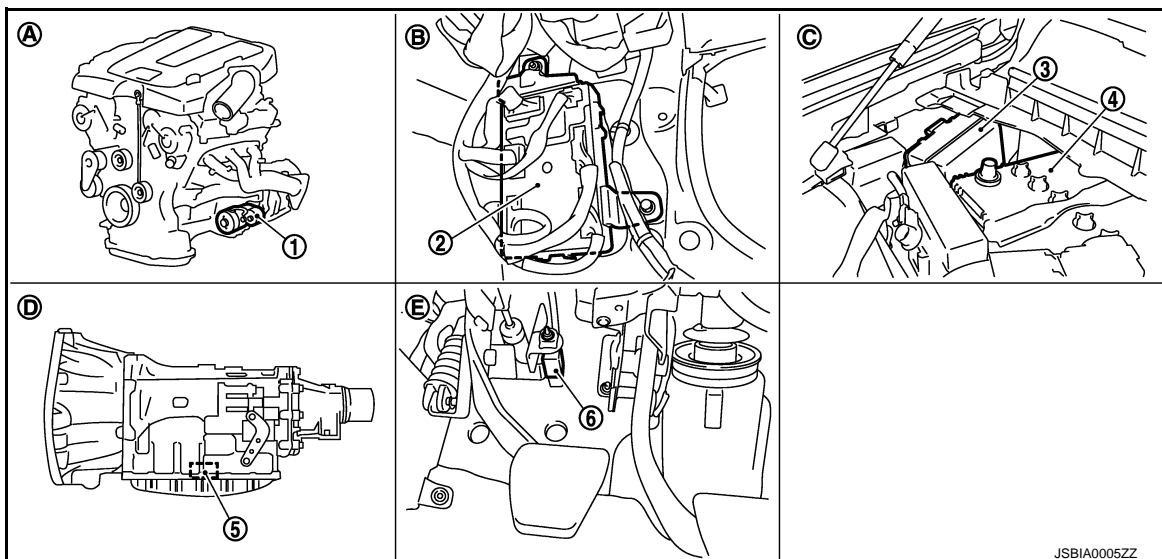
A/T : System Description

INFOID:000000004994556

- When selector lever is P or N, power is supplied to starter relay and starter control relay by TCM. And BCM and IPDM E/R (CPU) detect selector lever P/N condition by the inputted signal.
- When starter operating condition is satisfied, IPDM E/R turns starter control relay ON by starter control relay control signal.
- When engine cranking condition is satisfied, BCM turns starter relay ON by starter relay control signal.
- Then battery power is supplied to starter motor ("S" terminal) through starter control relay and starter relay. And IPDM E/R (CPU) detect starter relay condition by the inputted signal.

Component Parts Location

INFOID:000000004804418



# STARTING SYSTEM

## < SYSTEM DESCRIPTION >

- |                                   |                                     |                                |
|-----------------------------------|-------------------------------------|--------------------------------|
| 1. Starter motor                  | 2. BCM                              | 3. IPDM E/R                    |
| 4. Battery                        | 5. TCM                              | 6. Clutch interlock switch     |
| A. Engine                         | B. Dash side lower (passenger side) | C. Engine room dash panel (RH) |
| D. Inside of A/T (built into A/T) | E. Clutch pedal                     |                                |

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## Component Description

INFOID:000000004804419

| Component part          | Description  |
|-------------------------|--|
| TCM                     | TCM supplies power to the starter relay and starter control relay inside IPDM E/R when the selector lever is shifted to the P or N position.                           |
| Clutch interlock switch | The switch turns ON and electric power is supplied to the starter relay and starter control relay inside IPDM E/R when the clutch pedal is depressed.                  |
| BCM                     | BCM controls the starter relay inside IPDM E/R.  |
| IPDM E/R                | CPU inside IPDM E/R controls the starter control relay.  |
| Starter motor           | The starter motor plunger closes and the motor is supplied with battery power, which in turn cranks the engine, when the "S" terminal is supplied with electric power. |

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# B TERMINAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

## DTC/CIRCUIT DIAGNOSIS

### B TERMINAL CIRCUIT

#### Description

INFOID:000000004804420

The "B" terminal is constantly supplied with battery power.

#### Diagnosis Procedure

INFOID:000000004804421

#### CAUTION:

Perform diagnosis under the condition that engine cannot start by the following procedure.

1. Remove fuel pump fuse.
2. Crank or start the engine (where possible) until the fuel pressure is released.

#### 1. CHECK "B" TERMINAL CIRCUIT

1. Turn ignition switch OFF.
2. Check that starter motor "B" terminal connection is clean and tight.
3. Check voltage between starter motor "B" terminal and ground.

| Terminals                  |          | Voltage (Approx.) |
|----------------------------|----------|-------------------|
| (+)                        | (-)      |                   |
| Starter motor "B" terminal | Terminal | Battery voltage   |
| E204                       | 2        |                   |
|                            | Ground   |                   |

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check harness between battery and starter motor for open circuit.

#### 2. CHECK BATTERY CABLE CONNECTION STATUS (VOLTAGE DROP TEST)

1. Shift A/T selector lever to "P" or "N" position. (A/T models)  
Keep depressing clutch pedal fully. (M/T models)
2. Check voltage between battery positive terminal and starter motor "B" terminal.

| Terminals                 |                            | Condition                                     | Voltage (Approx.) |
|---------------------------|----------------------------|---|-------------------|
| (+)                       | (-)                        |   |                   |
|                           | Starter motor "B" terminal | When the ignition switch is in START position | Less than 0.5 V   |
|                           | Terminal                   |   |                   |
| Battery positive terminal | E204                       |   |                   |
|                           | 2                          |   |                   |

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check harness between the battery and the starter motor for poor continuity.

#### 3. CHECK GROUND CIRCUIT STATUS (VOLTAGE DROP TEST)

1. Shift A/T selector lever to "P" or "N" position. (A/T models)  
Keep depressing clutch pedal fully. (M/T models)
2. Check voltage between starter motor case and battery negative terminal.

| Terminals          |                           | Condition                                     | Voltage (Approx.) |
|--------------------|---------------------------|---|-------------------|
| (+)                | (-)                       |   |                   |
| Starter motor case | Battery negative terminal | When the ignition switch is in START position | Less than 0.2 V   |
|                    |                           |   |                   |

Is the inspection result normal?

YES >> "B" terminal circuit is OK. Further inspection is necessary. Refer to [STR-2, "Work Flow"](#).

NO >> Check the starter motor case and ground for poor continuity.



# S CONNECTOR CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

## S CONNECTOR CIRCUIT

### Description

INFOID:000000004804422

The starter motor magnetic switch is supplied with power when the ignition switch is turned to the START position while the selector lever is in the P or N position for A/T models or the clutch pedal is depressed for M/T models.

### Diagnosis Procedure

INFOID:000000004804423

#### CAUTION:

Perform diagnosis under the condition that engine cannot start by the following procedure.

1. Remove fuel pump fuse.
2. Crank or start the engine (where possible) until the fuel pressure is released.

#### 1. CHECK "S" CONNECTOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect starter motor connector.
3. Shift A/T selector lever to "P" or "N" position. (A/T models)  
Keep depressing clutch pedal fully. (M/T models)
4. Check voltage between starter motor harness connector and ground.

| Terminals                       |          | (-)    | Condition                                     | Voltage (Approx.) |
|---------------------------------|----------|--------|---|-------------------|
| (+)                             | Terminal |        |   |                   |
| Starter motor harness connector |          |        |   |                   |
| F52                             | 1        | Ground | When the ignition switch is in START position | Battery voltage   |

#### Is the inspection result normal?

YES >> "S" connector circuit is OK. Further inspection is necessary. Refer to [STR-2, "Work Flow"](#).

NO >> GO TO 2.

#### 2. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect IPDM E/R connector.
2. Check continuity between starter motor harness connector and IPDM E/R harness connector.

| Starter motor harness connector |              | IPDM E/R harness connector |              | Continuity |
|---------------------------------|--------------|----------------------------|--------------|------------|
| Connector No.                   | Terminal No. | Connector No.              | Terminal No. |            |
| F52                             | 1            | E7                         | 80           | Existed    |

#### Is the inspection result normal?

YES >> Further inspection is necessary. Refer to [STR-2, "Work Flow"](#) in SEC section.

NO >> Repair the harness.

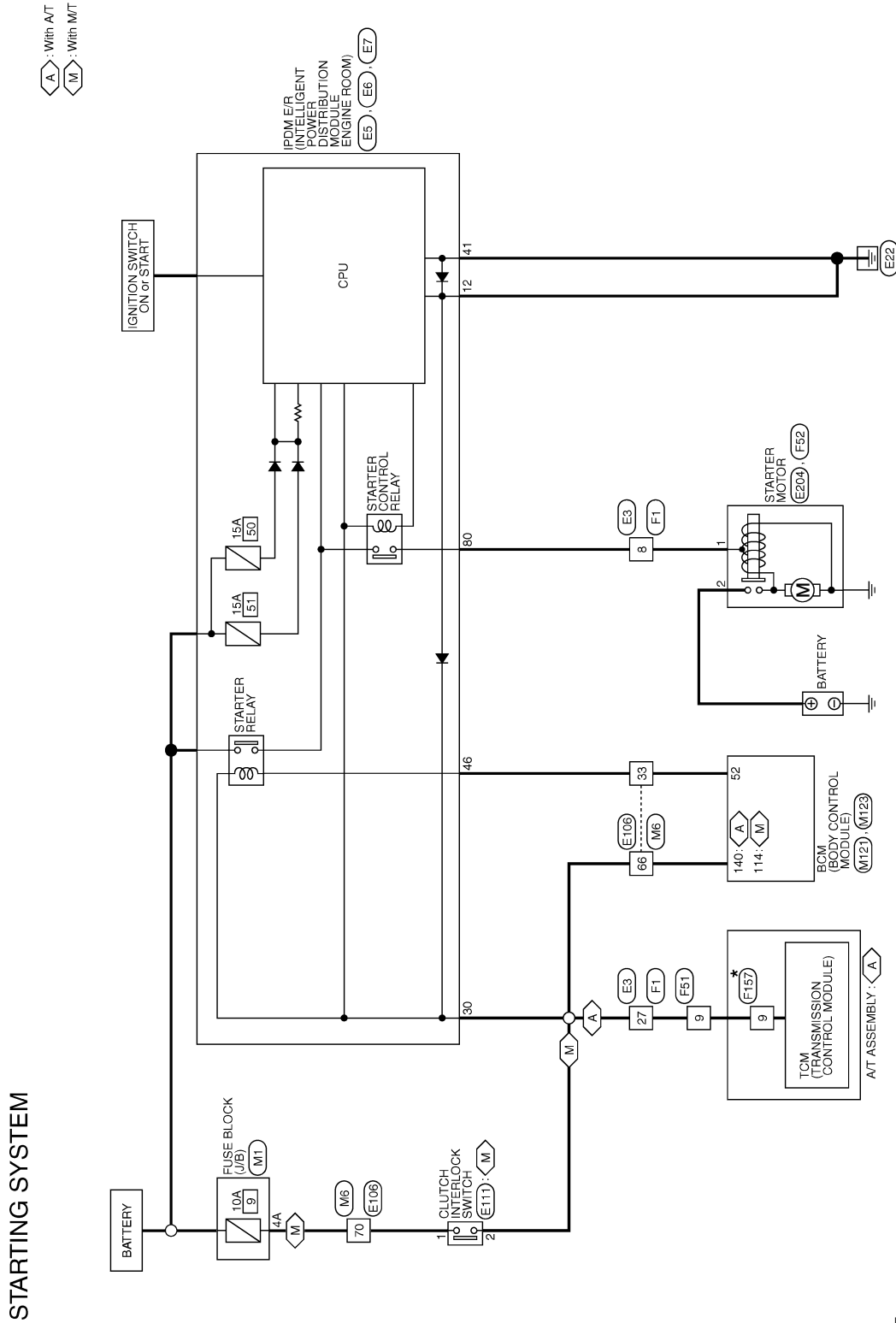
# STARTING SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

## STARTING SYSTEM

### Wiring Diagram - STARTING SYSTEM -

INFOID:000000004804424



\*: This connector is not shown in "Harness Layout".

2009/02/27

JCBWA1359GB

# STARTING SYSTEM

## < DTC/CIRCUIT DIAGNOSIS >

### STARTING SYSTEM

|  |  |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
|--|--|------|----------------|--|----------------|-------------------|--|--------------|----|-----|---|--|--------------|----|-----|--|--------------|----|-----|--|--------------|----|----|--|--------------|----|----|--|--------------|----|---|--|
| <table border="1"> <tr> <td>Connector No.</td> <td>E3</td> </tr> <tr> <td>Connector Name</td> <td>WIRE TO WIRE</td> </tr> <tr> <td>Connector Type</td> <td>SAA38FB-RSS-SH28</td> </tr> </table>  | Connector No.  | E3   | Connector Name | WIRE TO WIRE   | Connector Type | SAA38FB-RSS-SH28  | <table border="1"> <tr> <td>Terminal No.</td> <td>8</td> <td>W</td> <td></td> </tr> <tr> <td>Terminal No.</td> <td>27</td> <td>GR</td> <td></td> </tr> </table>  | Terminal No. | 8  | W   |   | Terminal No.   | 27           | GR |     | <table border="1"> <tr> <td>Terminal No.</td> <td>8</td> <td>W</td> <td></td> </tr> <tr> <td>Terminal No.</td> <td>27</td> <td>GR</td> <td></td> </tr> </table>    | Terminal No. | 8  | W   |  | Terminal No. | 27 | GR |  |              |    |    |  |              |    |   |  |
| Connector No.  | E3   |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Connector Name   | WIRE TO WIRE   |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Connector Type   | SAA38FB-RSS-SH28   |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 8  | W    |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 27   | GR   |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 8  | W    |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 27   | GR   |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| <table border="1"> <tr> <td>Connector No.</td> <td>E5</td> </tr> <tr> <td>Connector Name</td> <td>SOLENOID INTELLENT POWER DISTRIBUTION MODULE (ENGINE ROOM)</td> </tr> <tr> <td>Connector Type</td> <td>TH20FW-CS12-M4-TV</td> </tr> </table> | Connector No.  | E5   | Connector Name | SOLENOID INTELLENT POWER DISTRIBUTION MODULE (ENGINE ROOM) | Connector Type | TH20FW-CS12-M4-TV | <table border="1"> <tr> <td>Terminal No.</td> <td>12</td> <td>B/W</td> <td></td> </tr> <tr> <td>Terminal No.</td> <td>30</td> <td>GR</td> <td></td> </tr> </table>   | Terminal No. | 12 | B/W |   | Terminal No.   | 30           | GR |     | <table border="1"> <tr> <td>Terminal No.</td> <td>12</td> <td>B/W</td> <td></td> </tr> <tr> <td>Terminal No.</td> <td>30</td> <td>GR</td> <td></td> </tr> </table> | Terminal No. | 12 | B/W |  | Terminal No. | 30 | GR |  |              |    |    |  |              |    |   |  |
| Connector No.  | E5   |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Connector Name   | SOLENOID INTELLENT POWER DISTRIBUTION MODULE (ENGINE ROOM) |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Connector Type   | TH20FW-CS12-M4-TV  |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 12   | B/W  |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 30   | GR   |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 12   | B/W  |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 30   | GR   |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| <table border="1"> <tr> <td>Connector No.</td> <td>E6</td> </tr> <tr> <td>Connector Name</td> <td>SOLENOID INTELLENT POWER DISTRIBUTION MODULE (ENGINE ROOM)</td> </tr> <tr> <td>Connector Type</td> <td>TH08FW-NH</td> </tr> </table>         | Connector No.  | E6   | Connector Name | SOLENOID INTELLENT POWER DISTRIBUTION MODULE (ENGINE ROOM) | Connector Type | TH08FW-NH         | <table border="1"> <tr> <td>Terminal No.</td> <td>41</td> <td>B/W</td> <td>R</td> </tr> <tr> <td>Terminal No.</td> <td>46</td> <td>R</td> <td></td> </tr> </table>   | Terminal No. | 41 | B/W | R | Terminal No.   | 46           | R  |     | <table border="1"> <tr> <td>Terminal No.</td> <td>41</td> <td>B/W</td> <td>R</td> </tr> <tr> <td>Terminal No.</td> <td>46</td> <td>R</td> <td></td> </tr> </table> | Terminal No. | 41 | B/W | R  | Terminal No. | 46 | R  |  |              |    |    |  |              |    |   |  |
| Connector No.  | E6   |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Connector Name   | SOLENOID INTELLENT POWER DISTRIBUTION MODULE (ENGINE ROOM) |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Connector Type   | TH08FW-NH  |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 41   | B/W  | R              |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 46   | R    |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 41   | B/W  | R              |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 46   | R    |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| <table border="1"> <tr> <td>Connector No.</td> <td>E7</td> </tr> <tr> <td>Connector Name</td> <td>SOLENOID INTELLENT POWER DISTRIBUTION MODULE (ENGINE ROOM)</td> </tr> <tr> <td>Connector Type</td> <td>TH20FW-CS12-M4</td> </tr> </table>    | Connector No.  | E7   | Connector Name | SOLENOID INTELLENT POWER DISTRIBUTION MODULE (ENGINE ROOM) | Connector Type | TH20FW-CS12-M4    | <table border="1"> <tr> <td>Terminal No.</td> <td>80</td> <td>W</td> <td></td> </tr> </table>  | Terminal No. | 80 | W   |   | <table border="1"> <tr> <td>Terminal No.</td> <td>80</td> <td>W</td> <td></td> </tr> </table>  | Terminal No. | 80 | W   |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Connector No.  | E7   |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Connector Name   | SOLENOID INTELLENT POWER DISTRIBUTION MODULE (ENGINE ROOM) |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Connector Type   | TH20FW-CS12-M4   |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 80   | W    |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 80   | W    |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| <table border="1"> <tr> <td>Connector No.</td> <td>E108</td> </tr> <tr> <td>Connector Name</td> <td>WIRE TO WIRE</td> </tr> <tr> <td>Connector Type</td> <td>TH09FW-CS16-TM4</td> </tr> </table>   | Connector No.  | E108 | Connector Name | WIRE TO WIRE   | Connector Type | TH09FW-CS16-TM4   | <table border="1"> <tr> <td>Terminal No.</td> <td>33</td> <td>R</td> <td></td> </tr> <tr> <td>Terminal No.</td> <td>66</td> <td>GR</td> <td></td> </tr> <tr> <td>Terminal No.</td> <td>70</td> <td>G</td> <td></td> </tr> </table> | Terminal No. | 33 | R   |   | Terminal No.   | 66           | GR |     | Terminal No.   | 70           | G  |     | <table border="1"> <tr> <td>Terminal No.</td> <td>33</td> <td>R</td> <td></td> </tr> <tr> <td>Terminal No.</td> <td>66</td> <td>GR</td> <td></td> </tr> <tr> <td>Terminal No.</td> <td>70</td> <td>G</td> <td></td> </tr> </table> | Terminal No. | 33 | R  |  | Terminal No. | 66 | GR |  | Terminal No. | 70 | G |  |
| Connector No.  | E108   |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Connector Name   | WIRE TO WIRE   |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Connector Type   | TH09FW-CS16-TM4  |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 33   | R    |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 66   | GR   |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 70   | G    |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 33   | R    |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 66   | GR   |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 70   | G    |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| <table border="1"> <tr> <td>Connector No.</td> <td>E11</td> </tr> <tr> <td>Connector Name</td> <td>CLUTCH INTERLOCK SWITCH</td> </tr> <tr> <td>Connector Type</td> <td>SG2FL</td> </tr> </table>   | Connector No.  | E11  | Connector Name | CLUTCH INTERLOCK SWITCH                                    | Connector Type | SG2FL             | <table border="1"> <tr> <td>Terminal No.</td> <td>1</td> <td>G</td> <td></td> </tr> <tr> <td>Terminal No.</td> <td>2</td> <td>GR</td> <td></td> </tr> </table>   | Terminal No. | 1  | G   |   | Terminal No.   | 2            | GR |     | <table border="1"> <tr> <td>Terminal No.</td> <td>1</td> <td>G</td> <td></td> </tr> <tr> <td>Terminal No.</td> <td>2</td> <td>GR</td> <td></td> </tr> </table>     | Terminal No. | 1  | G   |  | Terminal No. | 2  | GR |  |              |    |    |  |              |    |   |  |
| Connector No.  | E11  |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Connector Name   | CLUTCH INTERLOCK SWITCH                                    |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Connector Type   | SG2FL  |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 1  | G    |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 2  | GR   |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 1  | G    |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 2  | GR   |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| <table border="1"> <tr> <td>Connector No.</td> <td>E204</td> </tr> <tr> <td>Connector Name</td> <td>STARTER MOTOR</td> </tr> <tr> <td>Connector Type</td> <td>2434S 51E61</td> </tr> </table>  | Connector No.  | E204 | Connector Name | STARTER MOTOR  | Connector Type | 2434S 51E61       | <table border="1"> <tr> <td>Terminal No.</td> <td>2</td> <td>B/Y</td> <td></td> </tr> </table>   | Terminal No. | 2  | B/Y |   | <table border="1"> <tr> <td>Terminal No.</td> <td>2</td> <td>B/Y</td> <td></td> </tr> </table> | Terminal No. | 2  | B/Y |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Connector No.  | E204   |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Connector Name   | STARTER MOTOR  |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Connector Type   | 2434S 51E61  |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 2  | B/Y  |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 2  | B/Y  |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| <table border="1"> <tr> <td>Connector No.</td> <td>F1</td> </tr> <tr> <td>Connector Name</td> <td>WIRE TO WIRE</td> </tr> <tr> <td>Connector Type</td> <td>SAA38FB-RSS-SH28</td> </tr> </table>  | Connector No.  | F1   | Connector Name | WIRE TO WIRE   | Connector Type | SAA38FB-RSS-SH28  | <table border="1"> <tr> <td>Terminal No.</td> <td>8</td> <td>W</td> <td></td> </tr> <tr> <td>Terminal No.</td> <td>27</td> <td>GR</td> <td></td> </tr> </table>  | Terminal No. | 8  | W   |   | Terminal No.   | 27           | GR |     | <table border="1"> <tr> <td>Terminal No.</td> <td>8</td> <td>W</td> <td></td> </tr> <tr> <td>Terminal No.</td> <td>27</td> <td>GR</td> <td></td> </tr> </table>    | Terminal No. | 8  | W   |  | Terminal No. | 27 | GR |  |              |    |    |  |              |    |   |  |
| Connector No.  | F1   |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Connector Name   | WIRE TO WIRE   |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Connector Type   | SAA38FB-RSS-SH28   |      |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 8  | W    |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 27   | GR   |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 8  | W    |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |
| Terminal No.   | 27   | GR   |                |  |                |                   |  |              |    |     |   |  |              |    |     |  |              |    |     |  |              |    |    |  |              |    |    |  |              |    |   |  |

JCBWA1360GB

# STARTING SYSTEM

## < DTC/CIRCUIT DIAGNOSIS >

### STARTING SYSTEM

|                |              |
|----------------|--------------|
| Connector No.  | F51          |
| Connector Name | A/T ASSEMBLY |
| Connector Type | RK10FG-D0Y   |



|                             |   |    |   |
|-----------------------------|---|----|---|
| Terminal No.                | 9 | GR | — |
| Color of Wire               |   |    |   |
| Signal Name [Specification] |   |    |   |

|                |               |
|----------------|---------------|
| Connector No.  | F52           |
| Connector Name | STARTER MOTOR |
| Connector Type | X01MGY        |



|                             |   |   |   |
|-----------------------------|---|---|---|
| Terminal No.                | 1 | W | — |
| Color of Wire               |   |   |   |
| Signal Name [Specification] |   |   |   |

|                |                                   |
|----------------|-----------------------------------|
| Connector No.  | F157                              |
| Connector Name | TOM (TRANSMISSION CONTROL MODULE) |
| Connector Type | SP10FG                            |



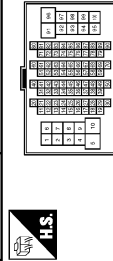
|                             |   |   |             |
|-----------------------------|---|---|-------------|
| Terminal No.                | 9 | Y | STARTER RLY |
| Color of Wire               |   |   |             |
| Signal Name [Specification] |   |   |             |

|                |                  |
|----------------|------------------|
| Connector No.  | M1               |
| Connector Name | FUSE BLOCK (J/B) |
| Connector Type | NS06FW-M2        |



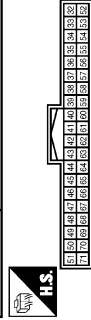
|                             |    |   |   |
|-----------------------------|----|---|---|
| Terminal No.                | 4A | P | — |
| Color of Wire               |    |   |   |
| Signal Name [Specification] |    |   |   |

|                |                 |
|----------------|-----------------|
| Connector No.  | M6              |
| Connector Name | WIRE TO WIRE    |
| Connector Type | TH03MW-CS16-TM4 |



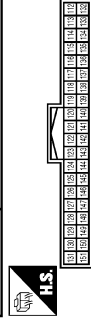
|                             |    |    |              |
|-----------------------------|----|----|--------------|
| Terminal No.                | 33 | SB | —            |
| Color of Wire               |    |    |              |
| Signal Name [Specification] |    |    |              |
| Terminal No.                | 66 | GR | — [With A/T] |
| Color of Wire               |    |    |              |
| Signal Name [Specification] |    |    |              |
| Terminal No.                | 66 | R  | — [With M/T] |
| Color of Wire               |    |    |              |
| Signal Name [Specification] |    |    |              |
| Terminal No.                | 70 | G  | —            |
| Color of Wire               |    |    |              |
| Signal Name [Specification] |    |    |              |

|                |                           |
|----------------|---------------------------|
| Connector No.  | M121                      |
| Connector Name | BCM (BODY CONTROL MODULE) |
| Connector Type | TH40FGY-NH                |



|                             |    |    |                     |
|-----------------------------|----|----|---------------------|
| Terminal No.                | 52 | SB | STARTER RELAY COINT |
| Color of Wire               |    |    |                     |
| Signal Name [Specification] |    |    |                     |

|                |                           |
|----------------|---------------------------|
| Connector No.  | M123                      |
| Connector Name | BCM (BODY CONTROL MODULE) |
| Connector Type | TH40FG-NH                 |



|                             |     |    |                     |
|-----------------------------|-----|----|---------------------|
| Terminal No.                | 114 | R  | CLUTCH INTERLOCK SW |
| Color of Wire               |     |    |                     |
| Signal Name [Specification] |     |    |                     |
| Terminal No.                | 140 | GR | SHIFT N/P           |
| Color of Wire               |     |    |                     |
| Signal Name [Specification] |     |    |                     |

JCBWA1361GB

# STARTING SYSTEM

< SYMPTOM DIAGNOSIS >

## SYMPTOM DIAGNOSIS

### STARTING SYSTEM

#### Symptom Table

INFOID:000000004804425

A

STR

| Symptom                       | Reference                                     |
|-------------------------------|---|
| No normal cranking            | Refer to <a href="#">STR-2, "Work Flow"</a> . |
| Starter motor does not rotate |   |

C

D

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# PRECAUTIONS

< PRECAUTION >

## PRECAUTION

### PRECAUTIONS

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

INFOID:000000005151055

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 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:**

- 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 the "SRS AIR BAG".
- Do not 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:**

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, DO NOT 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 ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

#### Service Procedure Precautions for Models with a Pop-up Roll Bar

INFOID:000000005157970

#### **WARNING:**

- Risk of passenger injury or death may increase if the pop-up roll bar does not deploy during a roll over collision. In order to reduce the chance of an incident where the pop-up roll bar is inoperative, all maintenance must be performed by a NISSAN or INFINITI dealer.
- Before removing and installing the pop-up roll bar component parts and harness, always turn the ignition switch OFF, disconnect the battery negative terminal, and wait for 3 minutes or more. (The purpose of this operation is to discharge electricity that is accumulated in the auxiliary power supply circuit in the air bag diagnosis sensor unit.)
- When repairing, removing, and installing a pop-up roll bar, always refer to SRS AIR BAG and SRS AIR BAG CONTROL warnings in the Service Manual.

#### Precaution for Battery Service

INFOID:000000004804427

Before disconnecting the battery, lower both the driver and passenger windows. This will prevent any interference between the window edge and the vehicle when the door is opened/closed. During normal operation, the window slightly raises and lowers automatically to prevent any window to vehicle interference. The automatic window function will not work with the battery disconnected.

# PREPARATION

< PREPARATION >

## PREPARATION

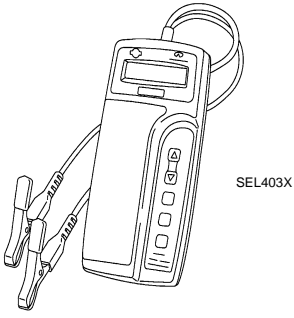
### PREPARATION

#### Special Service Tools

INFOID:000000004804428

A

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| Tool number<br>(Kent-Moore No.)<br>Tool name   | Description  |
|--|--|
| <p>—<br/>(J-44373 Model MCR620)<br/>Starting/Charging System Tester</p>  <p>SEL403X</p> | <p>Tests starting and charging systems.<br/>For operating instructions, refer to Technical Service Bulletin.</p> |

C

D

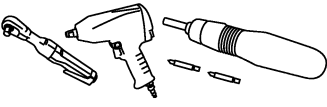
E

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#### Commercial Service Tools

INFOID:000000004804429

| Tool name  | Description                             |
|--|---|
| <p>Power tool</p>  <p>PIIB1407E</p> | <p>Loosening bolts, nuts and screws</p> |

H

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P

# STARTER MOTOR

< REMOVAL AND INSTALLATION >

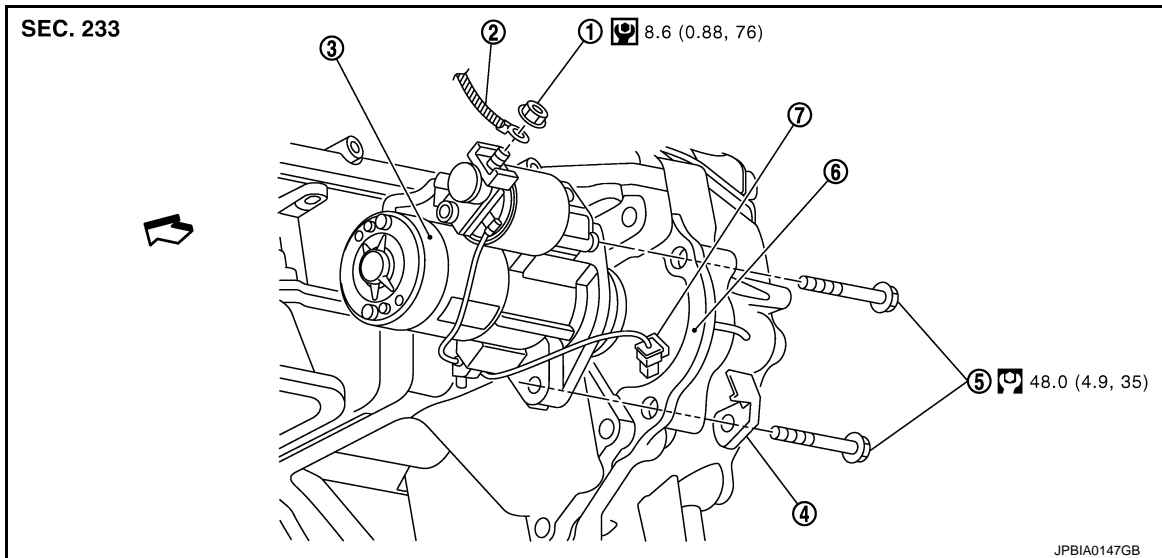
## REMOVAL AND INSTALLATION

### STARTER MOTOR

Exploded View

INFOID:000000004804430

#### REMOVAL



- |                         |                                |   |
|-------------------------|--------------------------------|---|
| 1. "B" terminal nut     | 2. "B" terminal harness        | 3. Starter motor  |
| 4. Harness clip bracket | 5. Starter motor mounting bolt | 6. Converter housing (A/T models)<br>Transmission case (M/T models) |
| 7. "S" connector        |                                |   |

↔ : Vehicle front

Refer to [GI-4, "Components"](#) for symbols in the figure.

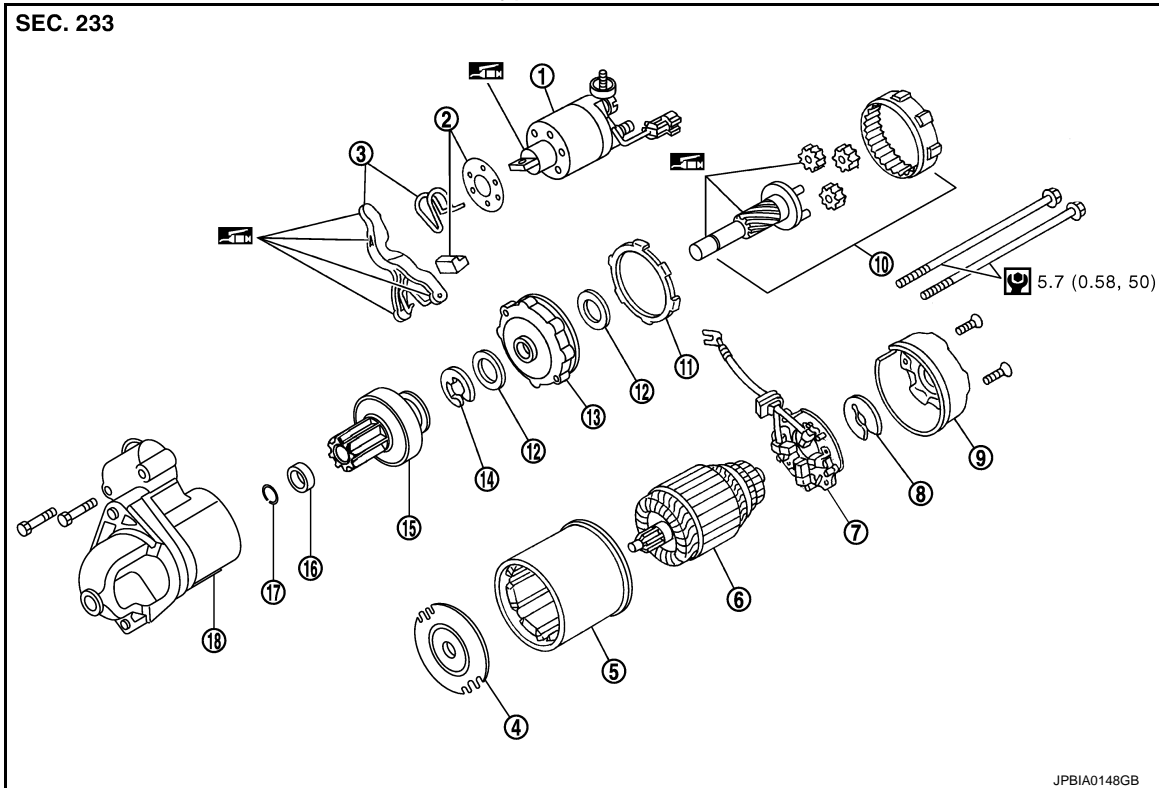
#### DISASSEMBLY




# STARTER MOTOR

< REMOVAL AND INSTALLATION >

Type: S114-932



- |                             |                         |                        |
|-----------------------------|-------------------------|------------------------|
| 1. Magnetic switch assembly | 2. Dust cover kit       | 3. Shift lever set     |
| 4. Center bracket (A)       | 5. Yoke assembly        | 6. Armature assembly   |
| 7. Brush holder assembly    | 8. Thrust washer        | 9. Rear cover assembly |
| 10. Shaft gear assembly     | 11. Packing             | 12. Thrust washer      |
| 13. Center bracket (P)      | 14. E-ring              | 15. Pinion assembly    |
| 16. Pinion stopper          | 17. Pinion stopper clip | 18. Gear case assembly |

: High-temperature grease point

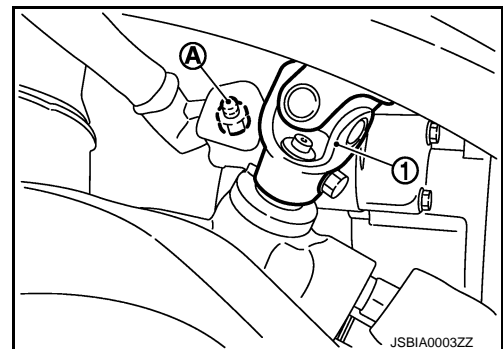
Refer to [GI-4, "Components"](#) for symbols not described on the above.

## Removal and Installation

INFOID:000000004804431

### REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove engine undercover, using power tools.
3. Remove road wheel and tire (Front LH), using power tools.
4. Disconnect steering lower joint (1), then remove it. Refer to [ST-21, "Exploded View"](#).
5. Remove engine mounting insulator (LH) mounting nut (Lower). Refer to [EM-68, "Exploded View"](#).
6. Jack up the engine front side to create clearance for removing starter motor.
7. Remove "B" terminal nut (A).



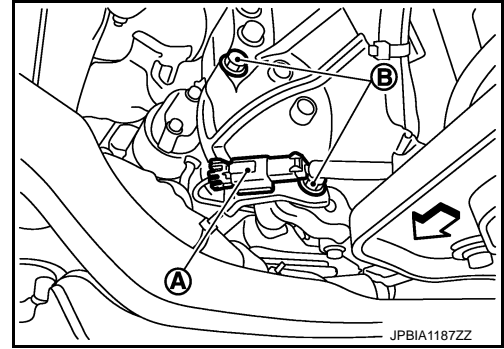
# STARTER MOTOR

## < REMOVAL AND INSTALLATION >

8. Disconnect "S" connector (A).

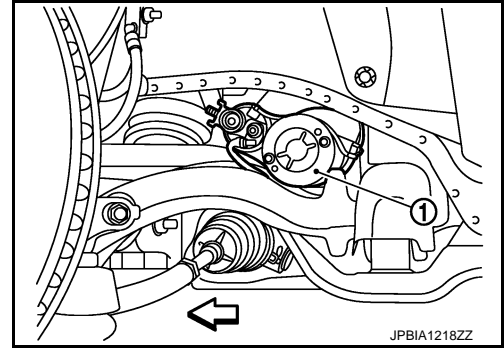
↔ : Vehicle front

9. Remove starter motor mounting bolts (B), using power tools.



10. Remove starter motor (1) from the side of the vehicle.

↔ : Vehicle front



## INSTALLATION

Install in the reverse order of removal.

### **CAUTION:**

**Be sure to tighten "B" terminal nut carefully.**

## Inspection

INFOID:000000004804432

## INSPECTION AFTER DISASSEMBLY

### Pinion/Clutch Check

1. Inspect pinion teeth.
  - Replace pinion if teeth are worn or damaged. (Also check condition of ring gear teeth.)
2. Inspect reduction gear (shaft gear assembly) teeth.
  - Replace reduction gear (shaft gear assembly) if teeth are worn or damaged. (Also check condition of armature shaft gear teeth.)
3. Check to see if pinion locks in one direction and rotates smoothly in the opposite direction.
  - If it locks or rotates in both directions, or unusual resistance is evident, replace.

# SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

## SERVICE DATA AND SPECIFICATIONS (SDS)

### SERVICE DATA AND SPECIFICATIONS (SDS)

Starter Motor

INFOID:000000004804433

A

STR

|  |                     |                           |                 |
|--|---------------------|---------------------------|-----------------|
| Type   | S114-932            |                           |                 |
|  | HITACHI make        |                           |                 |
|  | Reduction gear type |                           |                 |
| System voltage   | [V]                 | 12                        |                 |
| No-load  | Terminal voltage    | [V]                       | 11              |
|  | Current             | [A]                       | Less than 110   |
|  | Revolution          | [rpm]                     | More than 2,700 |
| Minimum diameter of commutator                         | [mm (in)]           | 28.0 (1.102)              |                 |
| Minimum length of brush                                | [mm (in)]           | 10.5 (0.413)              |                 |
| Brush spring tension                                   | [N (kg, lb)]        | 16.2 (1.65, 3.6)          |                 |
| Clearance between bearing metal and armature shaft     | [mm (in)]           | Less than 0.2 (0.008)     |                 |
| Clearance between pinion front edge and pinion stopper | [mm (in)]           | 0.3 - 2.5 (0.012 - 0.098) |                 |

C

D

E

F

G

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K

L

M

N

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