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# SECTION STR

## STARTING SYSTEM

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# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

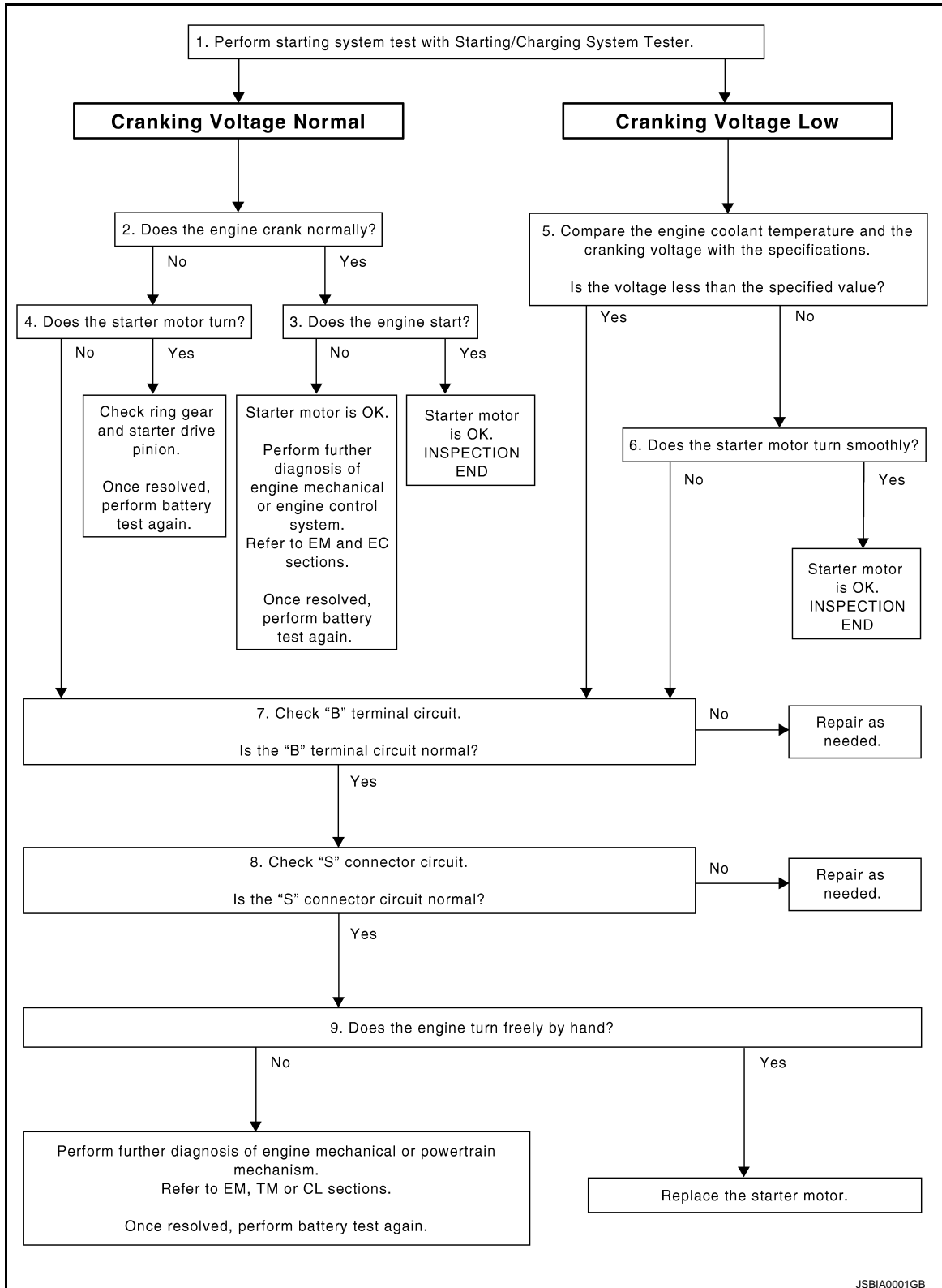
## BASIC INSPECTION

### DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000006202737

#### OVERALL SEQUENCE



JSBIA0001GB

#### 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 >> 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-7, "Diagnosis Procedure"](#).

### Is "B" terminal circuit normal?

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## 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-8. "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.

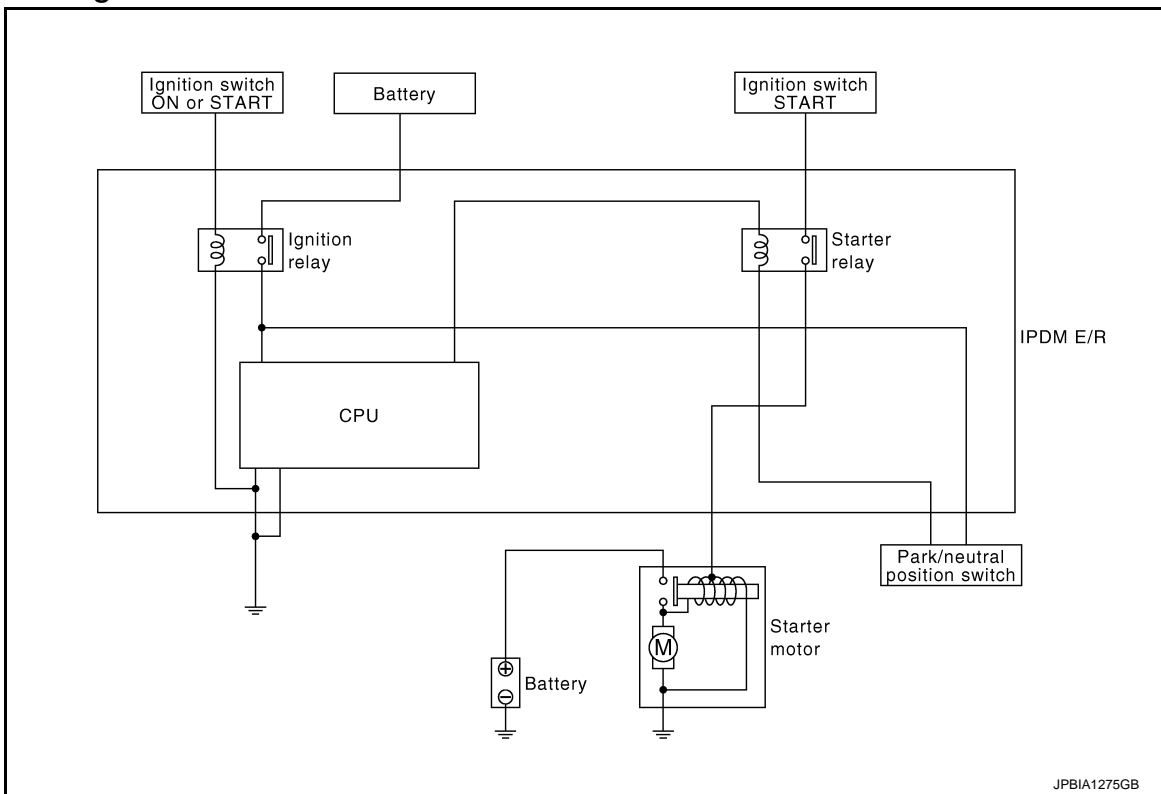
# STARTING SYSTEM

< SYSTEM DESCRIPTION >

## SYSTEM DESCRIPTION

### STARTING SYSTEM

#### System Diagram



INFOID:000000006202738

STR

#### System Description

INFOID:000000006202739

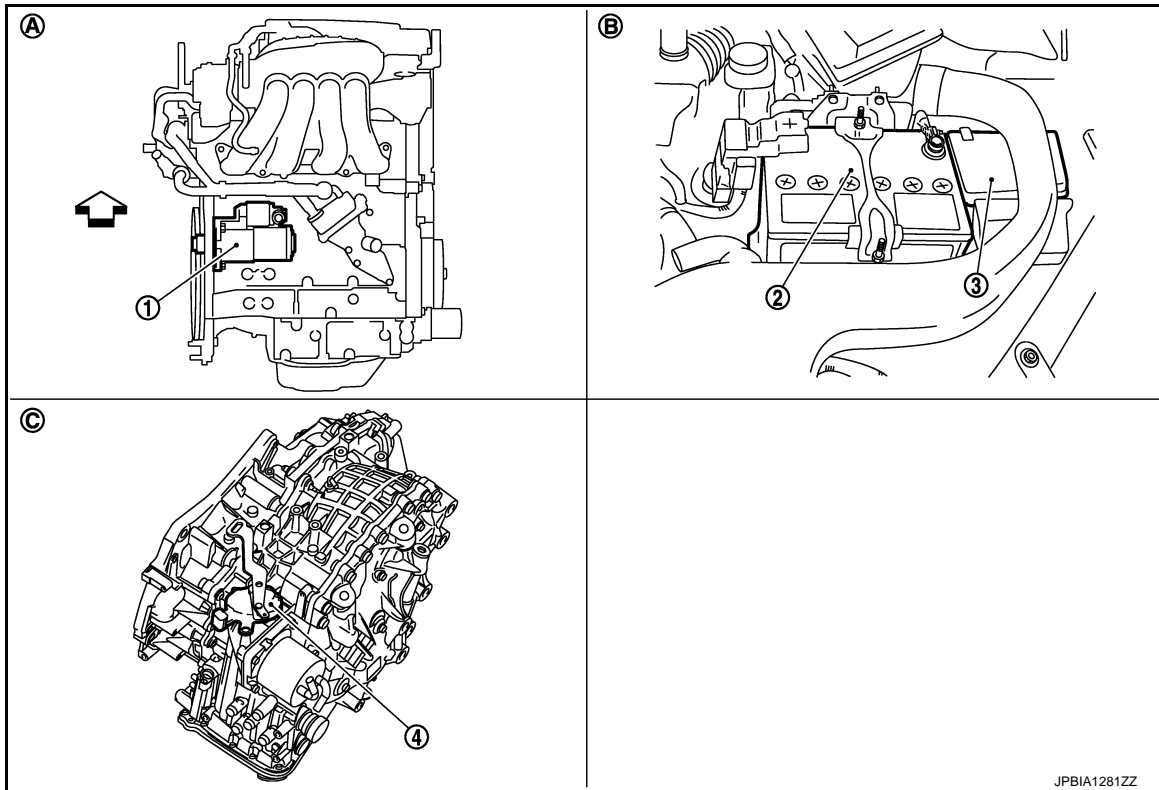
The starter motor plunger closes and provides a closed circuit between the battery and starter motor. The starter motor is grounded to the engine block. With power and ground supplied, cranking occurs and the engine starts.

# STARTING SYSTEM

< SYSTEM DESCRIPTION >

## Component Parts Location

INFOID:000000006202740



- |                              |                     |                 |
|------------------------------|---------------------|-----------------|
| 1. Starter motor             | 2. Battery          | 3. IPDM E/R     |
| 4. Transmission range switch | B. Engine room (LH) | C. CVT assembly |
| A. Engine                    |                     |                 |
- ↔ : Vehicle front

## Component Description

INFOID:000000006202741

Component part	Description
Transmission range switch	Transmission range switch supplies power to the starter relay inside IPDM E/R when the selector lever is shifted to the P or N position.
IPDM E/R	CPU inside IPDM E/R controls the starter relay. Ignition relay inside IPDM E/R supplies power to the transmission range switch when ignition switch is ON or START.
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.

# B TERMINAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

## DTC/CIRCUIT DIAGNOSIS

### B TERMINAL CIRCUIT

#### Description

INFOID:0000000006202742

STR

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

#### Diagnosis Procedure

INFOID:0000000006202743

#### 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
F49	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 CVT selector lever to "P" or "N" position.
2. Check voltage between battery positive terminal and starter motor "B" terminal.

Terminals			Condition	Voltage (Approx.)
(+)	(-)			
	Starter motor "B" terminal	Terminal	When the ignition switch is in START position	Less than 0.5 V
Battery positive terminal	F49	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 CVT selector lever to "P" or "N" position.
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:000000006202744

The starter motor magnetic switch is supplied with power when the ignition switch is turned to START with the selector lever "P" or "N" position.

### Diagnosis Procedure

INFOID:000000006202745

#### 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 CVT selector lever to "P" or "N" position.
4. Check voltage between starter motor harness connector and ground.

Terminals		Condition	Voltage (Approx.)
(+)	(-)		
Starter motor harness connector	Terminal		
F47	1	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 CONNECTOR

1. Turn ignition switch OFF.
2. Check the following terminals and connectors for damage, bend and loose connection.
  - Harness connector E8
  - Harness connector F122

Is the inspection result normal?

- YES >> GO TO 3.  
NO >> Repair the terminal and connector.

#### 3. 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.	
F47	1	E10	3	Existed

Is the inspection result normal?

- YES >> Inspect IPDM E/R and power supply circuit. Refer to [SEC-6. "Work Flow"](#).  
NO >> Repair the harness.



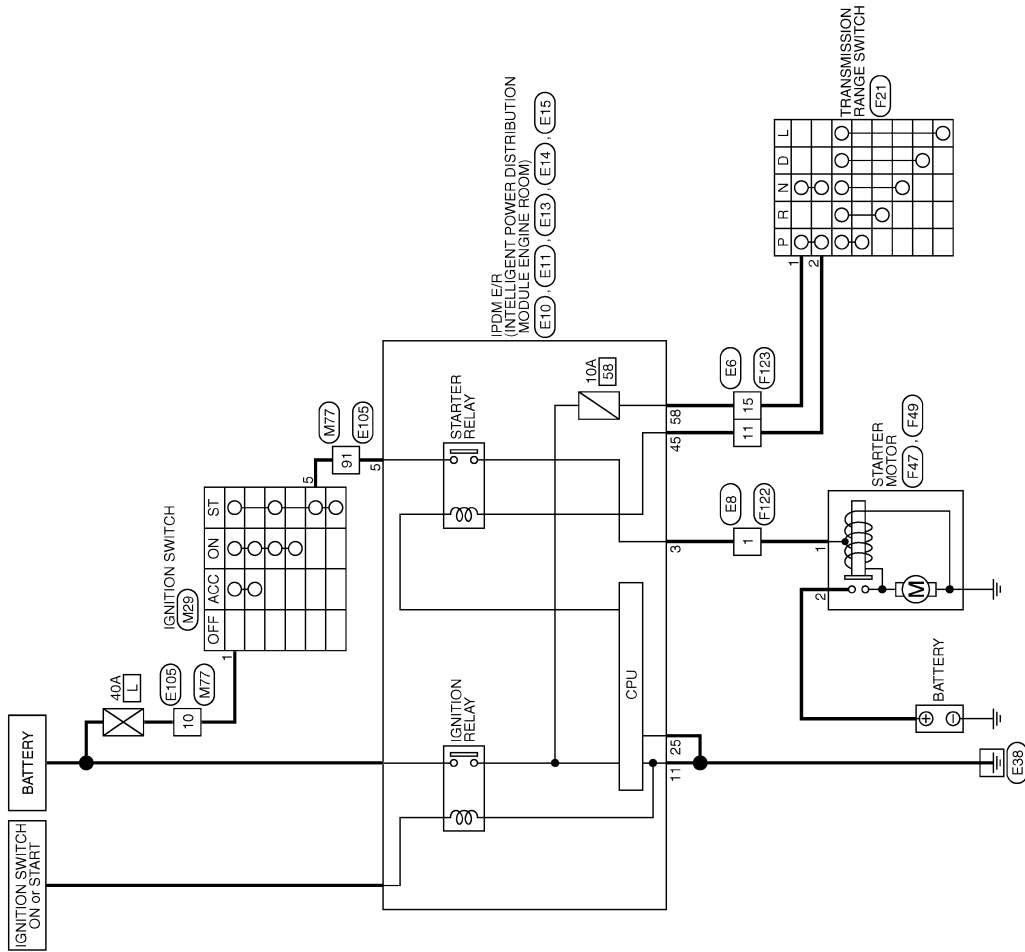
# STARTING SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

## STARTING SYSTEM

### Wiring Diagram - STARTING SYSTEM -

INFOID:000000006202746



STARTING SYSTEM

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# STARTING SYSTEM

## < DTC/CIRCUIT DIAGNOSIS >

### STARTING SYSTEM

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK2AMW-1V

1	2	3	4	5	6	7	8	9	10	11		
12	13	14	15	16	17	18	19	20	21	22	23	24



Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	SB	-
3	G	-
4	LG	-
5	L	-
6	BR	-
8	O	-
10	LG	-
11	Y	-
12	P	-
13	L	-
15	LG	-
16	R	-
18	L	-
19	Y	-
20	W	-
21	GR	-
23	W	-
24	L	-



Connector No.	E8
Connector Name	WIRE TO WIRE
Connector Type	MO2AMW-LC

1	2
---	---

Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	R	-

Connector No.	E10
Connector Name	ENGINE R INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	MO6FW-LC

5	4	3
8	7	6



Terminal No.	Color of Wire	Signal Name [Specification]
3	O	-
4	W	-
5	R	-
6	BR	-
7	P	-
8	G	-

Connector No.	E11
Connector Name	ENGINE R INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	MO6FB-LC



11	10	9
14	13	12

Terminal No.	Color of Wire	Signal Name [Specification]
11	B	-
12	O	-

Connector No.	E13
Connector Name	ENGINE R INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	TH12FW-NH



28	27	26	25	24	23
34	33	32	31	30	29

Terminal No.	Color of Wire	Signal Name [Specification]
23	W	-
24	Y	-
25	B	-
26	P	-
27	L	-
31	LG	-
32	V	-
33	GR	-
34	W	-

Connector No.	E14
Connector Name	ENGINE R INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	NS12FBR-CS



39	38	37	36	35		
46	45	44	43	42	41	40

Terminal No.	Color of Wire	Signal Name [Specification]
37	R	-
38	R	-
39	GR	-
40	BR	-
41	O	-
42	L	-
43	G	-
45	Y	-
46	W	-

Connector No.	E15
Connector Name	ENGINE R INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	NS16FW-CS



53	52	51	50	49	48	47		
62	61	60	59	58	57	56	55	54

Terminal No.	Color of Wire	Signal Name [Specification]
-	-	-

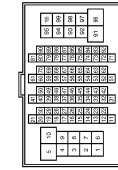
47	BR	-
48	R	-
50	G	-
51	L	-
52	P	-
55	O	-
56	SB	-
57	V	-
58	LG	-
59	BR	-
60	SB	-
61	R	-

# STARTING SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

## STARTING SYSTEM

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80PW-CS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	O	-
3	LG	-
4	V	-
5	Y	-
6	G	-
7	R	-
8	GR	-
9	BR	-
10	L	-
11	GR	-
12	P	-
14	L	-
15	V	-
19	R	-
20	P	-
21	L	-
22	L	-
24	LG	-
25	SB	-
30	L	-
31	BR	-
42	Y	-
43	SHIELD	-
51	L	-
52	W	-
53	BR	-
54	Y	-
60	O	-
61	BR	-
62	R	-
63	P	-
69	G	-
70	B	-
71	O	-
72	LG	-
78	L	-
78	V	-

80	Y	-
81	W	-
82	R	-
83	L	-
88	BR	-
89	R	-
90	GR	-
91	R	-
92	O	-
93	BR	-
94	W	-
96	BR	-
97	G	-
99	SB	-
100	L	-

Connector No.	F21
Connector Name	TRANSMISSION RANGE SWITCH
Connector Type	PK08FG



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	-
2	R	-
3	SB	-
4	L	-
5	G	-
6	Y	-
7	W	-
8	V	-

Connector No.	F47
Connector Name	STARTER MOTOR
Connector Type	X01MGY



Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-

Connector No.	F49
Connector Name	STARTER MOTOR
Connector Type	-



Terminal No.	Color of Wire	Signal Name [Specification]
2	B/R	-

Connector No.	F122
Connector Name	WIRE TO WIRE
Connector Type	IM02PW-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	R	-

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24PW-IV



Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	SB	-
3	G	-
4	Y	-
5	L	-
6	BR	-
8	O	-
10	P	-
11	R	-
12	P	-
13	L	-
15	LG	-
16	R	-
18	L	-
19	Y	-
20	W	-
21	GR	-
23	W	-
24	L	-

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# STARTING SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

STARTING SYSTEM		M29	
Connector No.	M29	22	L
Connector Name	IGNITION SWITCH	24	BR
Connector Type	M08RW-LC	25	W
		30	L
		31	W
		42	O
		43	SHIELD
		51	W
		52	SB
		53	L
		54	Y
		60	O
		61	BR
		62	G
		63	P
		69	W
		70	B
		71	P
		72	O
		78	SB
		79	Y
		80	L
		81	W
		82	B
		83	LG
		88	BR
		89	G
		90	GR
		91	R
		92	L
		93	P
		94	W
		96	BR
		97	G
		99	SB
		100	Y

STARTING SYSTEM		M77	
Connector No.	M77		
Connector Name	WIRE TO WIRE		
Connector Type	TH80MW-CS16-TM4		

STARTING SYSTEM		M77	
Terminal No.	Color of Wire	Signal Name [Specification]	
1	L	-	
2	BR	-	
3	P	-	
4	P	-	
5	R	-	

STARTING SYSTEM		M77	
Terminal No.	Color of Wire	Signal Name [Specification]	
1	BR	-	
2	O	-	
3	LG	-	
4	Y	-	
5	Y	-	
6	G	-	
7	R	-	
8	GR	-	
9	BR	-	
10	L	-	
11	GR	-	
12	P	-	
14	SB	-	
15	V	-	
19	R	-	
20	P	-	
21	O	-	

JCBWM2314GB

# STARTING SYSTEM

< SYMPTOM DIAGNOSIS >

## SYMPTOM DIAGNOSIS

### STARTING SYSTEM

#### Symptom Table

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

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# PRECAUTIONS

< PRECAUTION >

## PRECAUTION

### PRECAUTIONS

#### FOR USA AND CANADA

#### FOR USA AND CANADA : Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:000000006202748

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 "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:**

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, 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 ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

#### FOR USA AND CANADA : Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:000000006417485

#### **NOTE:**

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition switch in the "LOCK" position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.

For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.

If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

#### OPERATION PROCEDURE

1. Connect both battery cables.

#### **NOTE:**

Supply power using jumper cables if battery is discharged.

2. Use the Intelligent Key or mechanical key to turn the ignition switch to the "ACC" position. At this time, the steering lock will be released.

# PRECAUTIONS

## < PRECAUTION >

3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the "LOCK" position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

## FOR MEXICO

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

INFOID:000000006202749

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. 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 which 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:**

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, 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 ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

### FOR MEXICO : Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:000000006417486

#### **NOTE:**

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition switch in the "LOCK" position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.

For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.

If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

### OPERATION PROCEDURE

1. Connect both battery cables.

#### **NOTE:**

Supply power using jumper cables if battery is discharged.

2. Use the Intelligent Key or mechanical key to turn the ignition switch to the "ACC" position. At this time, the steering lock will be released.

## PRECAUTIONS

### < PRECAUTION >

---

3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the "LOCK" position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.



# PREPARATION

< PREPARATION >

## PREPARATION

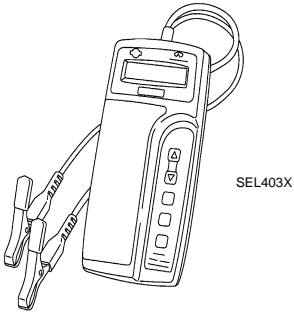
### PREPARATION

#### Special Service Tools

INFOID:000000006202750

A

STR

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

C

D

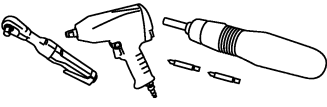
E

F

G

#### Commercial Service Tools

INFOID:000000006202751

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

H

I

J

K

L

M

N

O

P

# STARTER MOTOR

< REMOVAL AND INSTALLATION >

## REMOVAL AND INSTALLATION

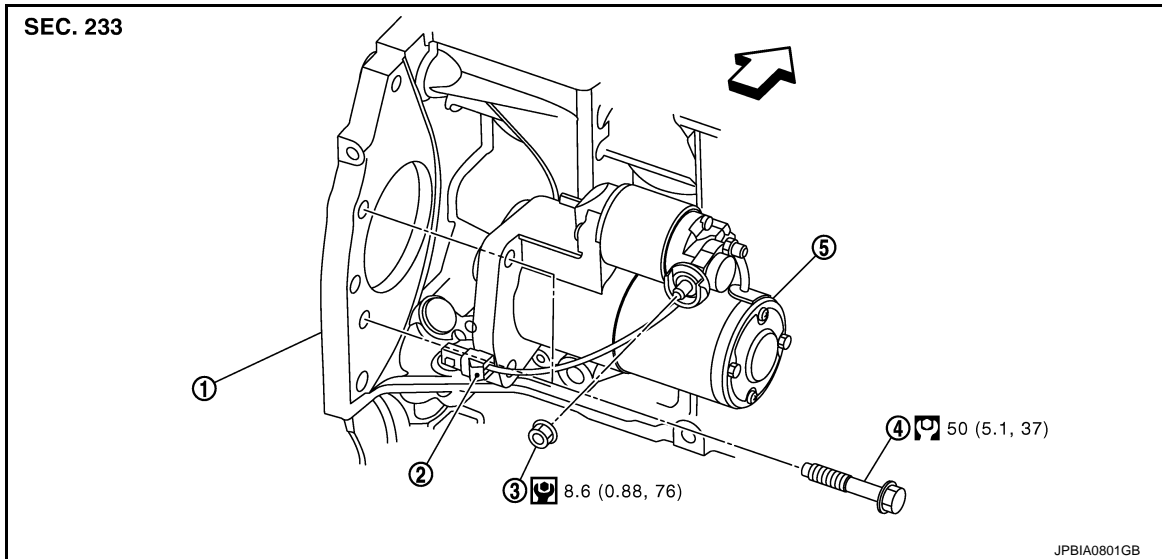
### STARTER MOTOR

2WD

2WD : Exploded View

INFOID:000000006202752

#### REMOVAL



1. Cylinder block
2. "S" connector
3. "B" terminal nut
4. Starter motor mounting bolt
5. Starter motor

↔ : Vehicle front

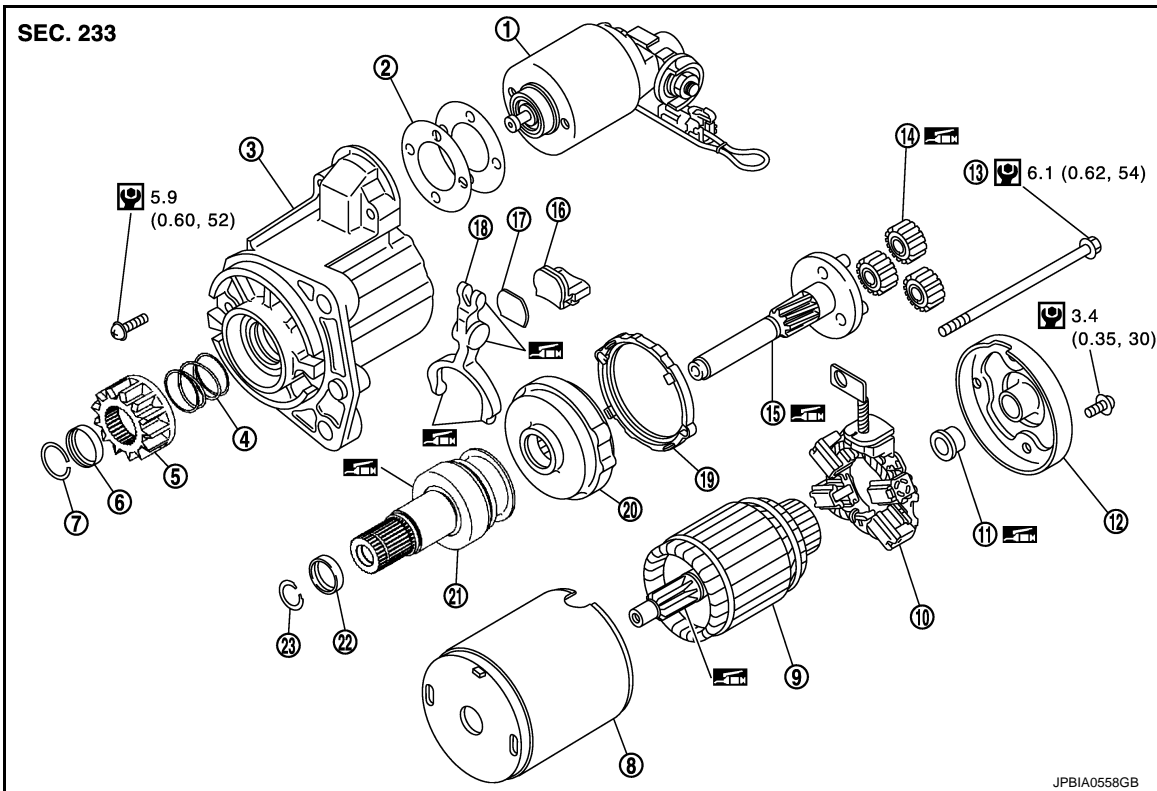
Refer to [GI-4, "Components"](#) for symbols in the figure.

#### DISASSEMBLY


Type: M000TA0271

# STARTER MOTOR

## < REMOVAL AND INSTALLATION >



- |                             |                    |                         |
|-----------------------------|--------------------|-------------------------|
| 1. Magnetic switch assembly | 2. Adjusting plate | 3. Gear case            |
| 4. Spring                   | 5. Pinion          | 6. Pinion stopper       |
| 7. Stopper ring             | 8. Yoke            | 9. Armature             |
| 10. Brush holder assembly   | 11. Metal RR       | 12. Rear cover          |
| 13. Through bolt            | 14. Planetary gear | 15. Gear shaft          |
| 16. Packing                 | 17. Plate          | 18. Shift lever         |
| 19. Packing                 | 20. Internal gear  | 21. Over running clutch |
| 22. Retainer ring           | 23. Snap ring      |                         |

 : High-temperature grease point

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

## 2WD : Removal and Installation

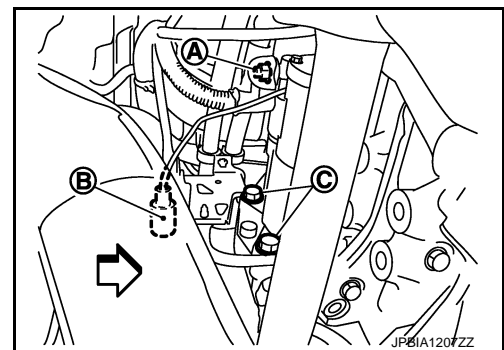
INFOID:000000006202753

### REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove "B" terminal nut (A) and "B" terminal harness.

 : Vehicle front

3. Disconnect "S" connector (B).
4. Remove starter motor mounting bolts (C), using power tools.



5. Remove starter motor downward from the vehicle.

### INSTALLATION

# STARTER MOTOR

## < REMOVAL AND INSTALLATION >

Install in the reverse order of removal.

### CAUTION:

Be sure to tighten "B" terminal nut carefully.

2WD : Inspection

INFOID:000000006202754

## INSPECTION AFTER DISASSEMBLY

Pinion/Clutch Check

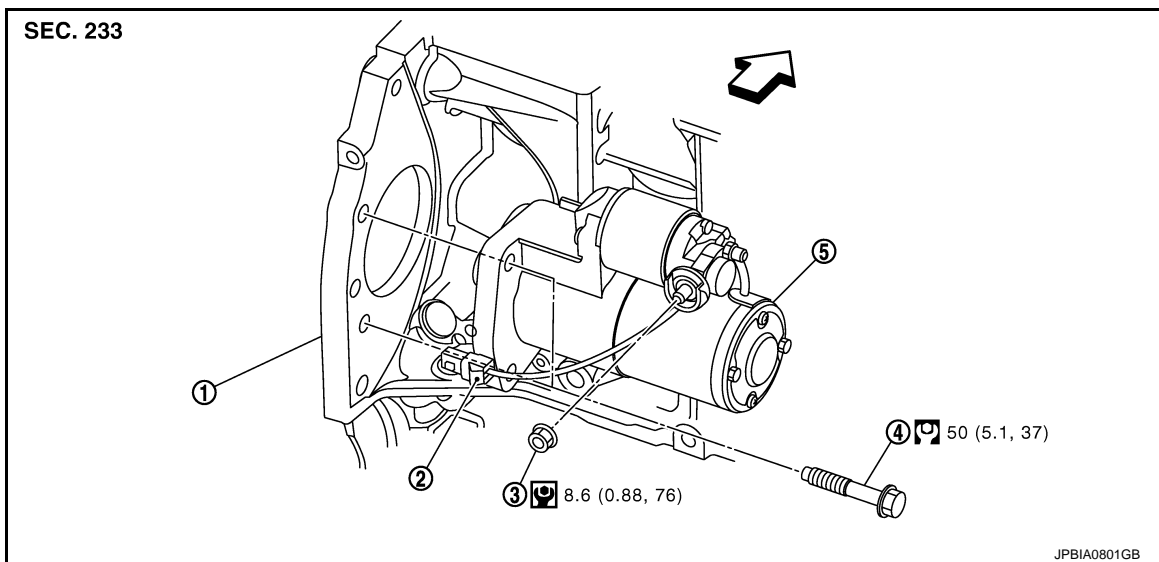
1. Inspect pinion teeth.
  - Replace pinion if teeth are worn or damaged. (Also check condition of ring gear teeth.)
2. Inspect reduction gear teeth.
  - Replace reduction gear if teeth are worn or damaged. (Also check condition of armature shaft gear teeth.)
3. Check to see if pinion locks in one direction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

AWD

AWD : Exploded View

INFOID:000000006202755

## REMOVAL



- |                                |                  |                     |
|--------------------------------|------------------|---------------------|
| 1. Cylinder block              | 2. "S" connector | 3. "B" terminal nut |
| 4. Starter motor mounting bolt | 5. Starter motor |                     |

↔ : Vehicle front

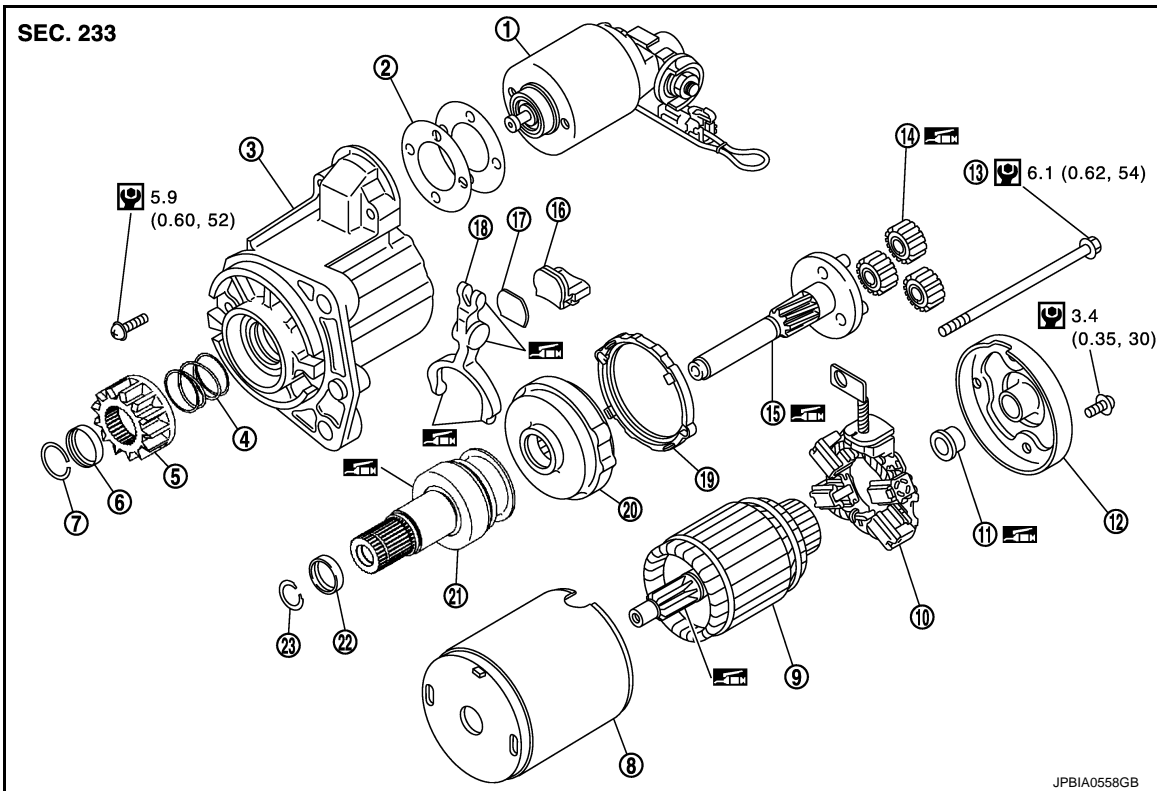
Refer to [GI-4, "Components"](#) for symbols in the figure.

## DISASSEMBLY

Type: M000TA0271

# STARTER MOTOR

## < REMOVAL AND INSTALLATION >



- |                             |                    |                         |
|-----------------------------|--------------------|-------------------------|
| 1. Magnetic switch assembly | 2. Adjusting plate | 3. Gear case            |
| 4. Spring                   | 5. Pinion          | 6. Pinion stopper       |
| 7. Stopper ring             | 8. Yoke            | 9. Armature             |
| 10. Brush holder assembly   | 11. Metal RR       | 12. Rear cover          |
| 13. Through bolt            | 14. Planetary gear | 15. Gear shaft          |
| 16. Packing                 | 17. Plate          | 18. Shift lever         |
| 19. Packing                 | 20. Internal gear  | 21. Over running clutch |
| 22. Retainer ring           | 23. Snap ring      |                         |

: High-temperature grease point

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

## AWD : Removal and Installation

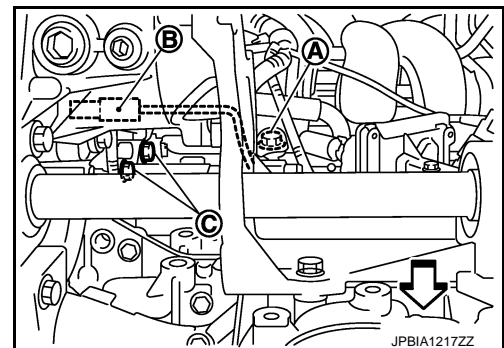
INFOID:000000006202756

### REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove front wheel and tire (RH).
3. Remove "B" terminal nut (A) and "B" terminal harness.

: Vehicle front

4. Disconnect "S" connector (B).
5. Remove starter motor mounting bolts (C), using power tools.



6. Slide the alternator out and remove.

# STARTER MOTOR

## < REMOVAL AND INSTALLATION >

---

### INSTALLATION

Install in the reverse order of removal.

**CAUTION:**

**Be sure to tighten “B” terminal nut carefully.**

AWD : Inspection

INFOID:000000006202757

### 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 teeth.
  - Replace reduction gear 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:000000006202758

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

**STR**

Applied model		QR25DE
Type		M000TA0271
		MITSUBISHI make
		Reduction gear type
System voltage	[V]	12
No-load	Terminal voltage	[V] 11
	Current	[A] Less than 90
	Revolution	[rpm] More than 2,400
Minimum diameter of commutator	[mm (in)]	28.8 (1.134)
Minimum length of brush	[mm (in)]	5.5 (0.217)
Brush spring tension	[N (kg, lb)]	15.0 - 20.4 (1.53 - 2.08, 3.4 - 4.6)
Clearance between bearing metal and armature shaft	[mm (in)]	Less than 0.2 (0.008)
Movement in height of pinion assembly	[mm (in)]	0.5 - 2.0 (0.020 - 0.079)