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SECTION STR

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STARTING SYSTEM

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DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

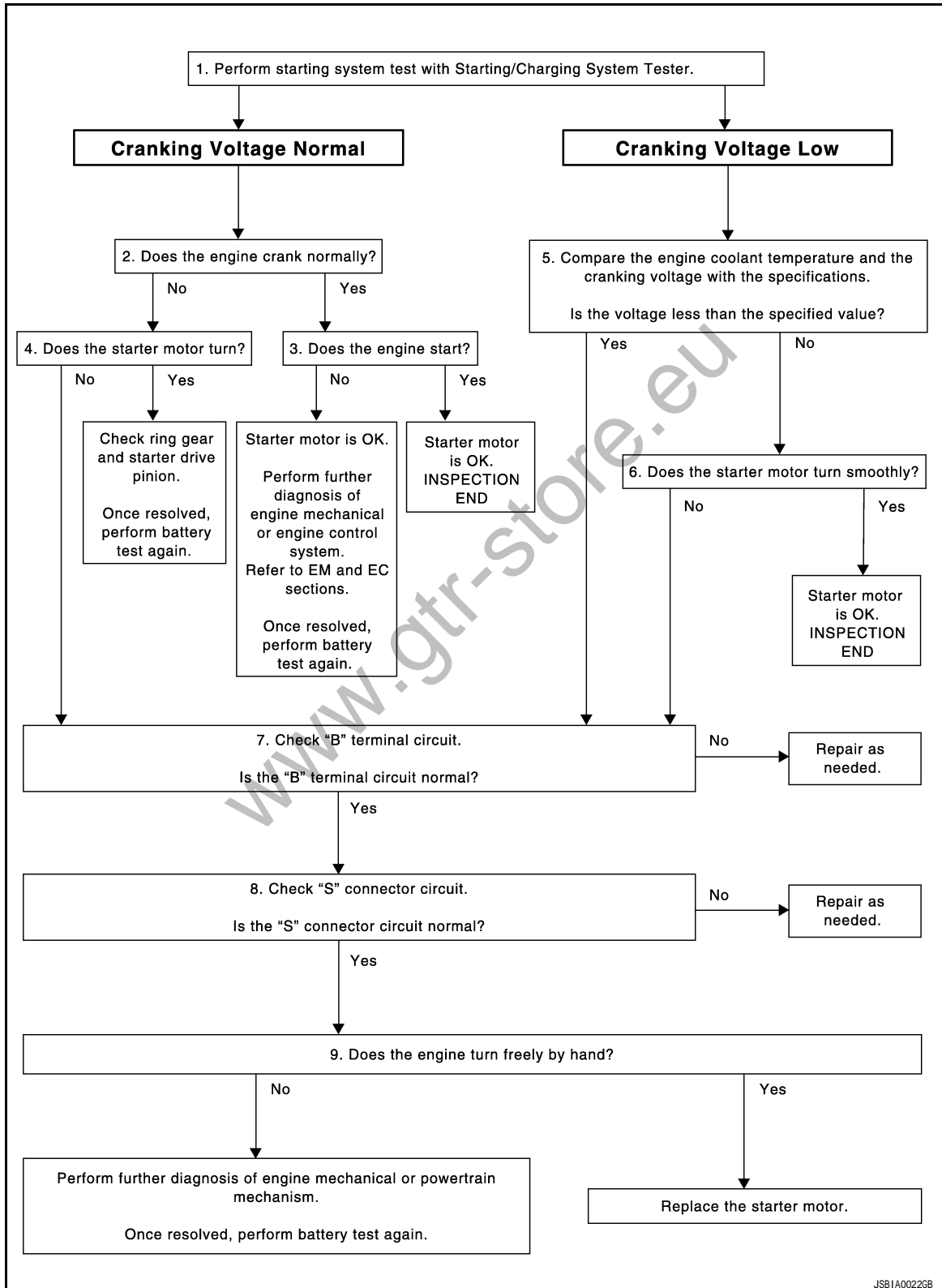
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow (GT-R certified NISSAN dealer)

INFOID:000000003897135

OVERALL SEQUENCE



JSBIA0022GB

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. 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 \(GT-R certified NISSAN dealer\)"](#).

Is "B" terminal circuit normal?

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

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

8. "S" CONNECTOR CIRCUIT INSPECTION

Check "S" connector circuit. Refer to [STR-8. "Diagnosis Procedure \(GT-R certified NISSAN dealer\)"](#).

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. Once resolved, perform battery test again. Refer to Technical Service Bulletin.

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STARTING SYSTEM

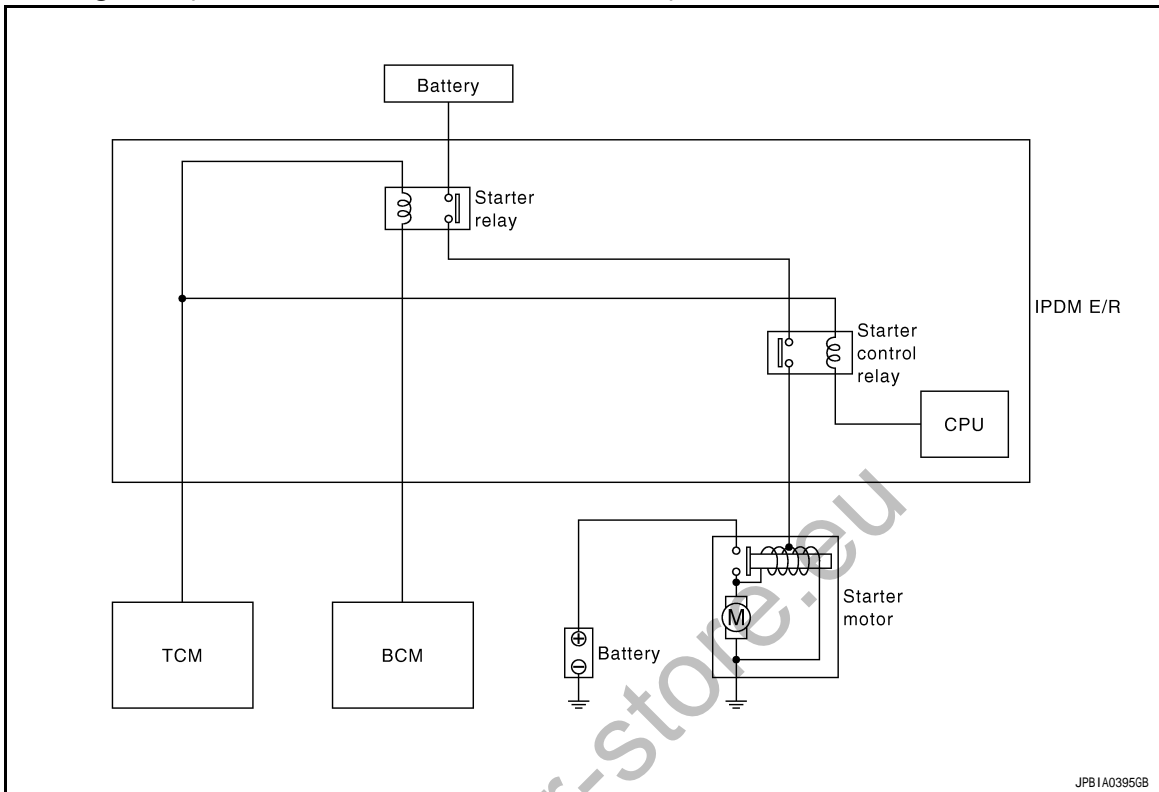
< FUNCTION DIAGNOSIS >

FUNCTION DIAGNOSIS

STARTING SYSTEM

System Diagram (GT-R certified NISSAN dealer)

INFOID:000000003897136



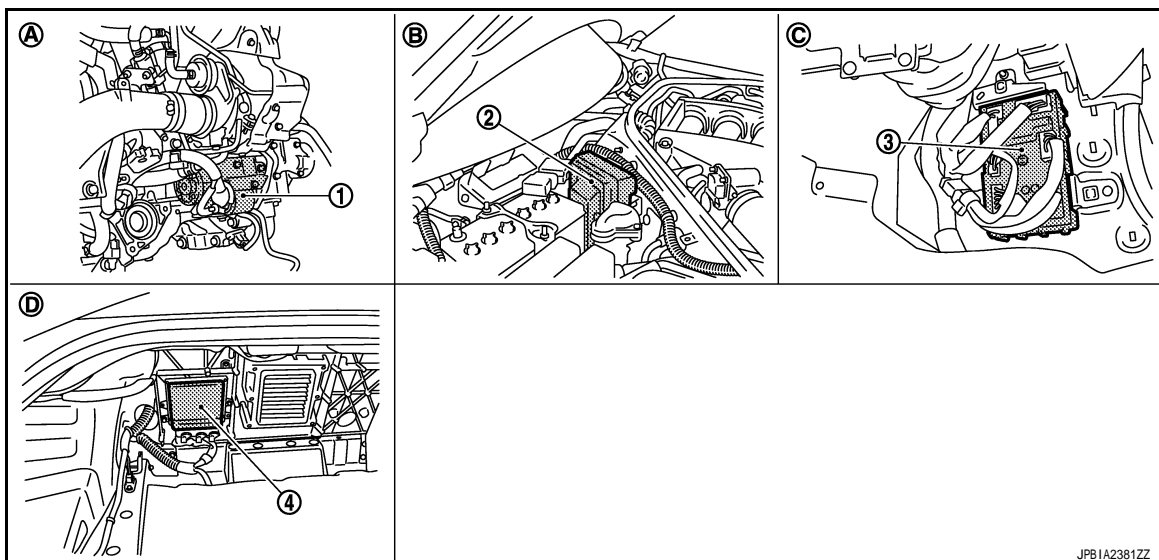
System Description (GT-R certified NISSAN dealer)

INFOID:000000003897137

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.

Component Parts Location (GT-R certified NISSAN dealer)

INFOID:000000003897138



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STARTING SYSTEM

< FUNCTION DIAGNOSIS >

- | | | |
|-------------------------------|--------------------------------|-------------------------------------|
| 1. Starter motor | 2. IPDM E/R | 3. BCM |
| 4. TCM | | |
| A. Cylinder block bank2 side | B. Engine room dash panel (RH) | C. Dash side lower (Passenger side) |
| D. Trunk front finisher inner | | |

Component Description (GT-R certified NISSAN dealer)

INFOID:000000003897139

Component part	Description
TCM	TCM supplies power to the starter relay and starter control relay inside IPDM E/R when the shift lever is shifted to the P or N position.
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

< COMPONENT DIAGNOSIS >

COMPONENT DIAGNOSIS

B TERMINAL CIRCUIT

Description (GT-R certified NISSAN dealer)

INFOID:000000003897144

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

Diagnosis Procedure (GT-R certified NISSAN dealer)

INFOID:000000003897145

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
E205	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 the shift 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	E205	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 the shift 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 \(GT-R certified NISSAN dealer\)"](#).

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

S CONNECTOR CIRCUIT

< COMPONENT DIAGNOSIS >

S CONNECTOR CIRCUIT

Description (GT-R certified NISSAN dealer)

INFOID:000000003897146

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

Diagnosis Procedure (GT-R certified NISSAN dealer)

INFOID:000000003897147

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 the shift lever to "P" or "N" position.
4. Check voltage between starter motor harness connector and ground.

Terminals		(-)	Condition	Voltage (Approx.)
(+)	Terminal			
Starter motor harness connector				
F206	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 \(GT-R certified NISSAN dealer\)".](#)

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.	
F206	1	E6	80	Existed

Is the inspection result normal?

YES >> Further inspection is necessary. Refer to [STR-2. "Work Flow \(GT-R certified NISSAN dealer\)".](#)

NO >> Repair the harness.

STARTING SYSTEM

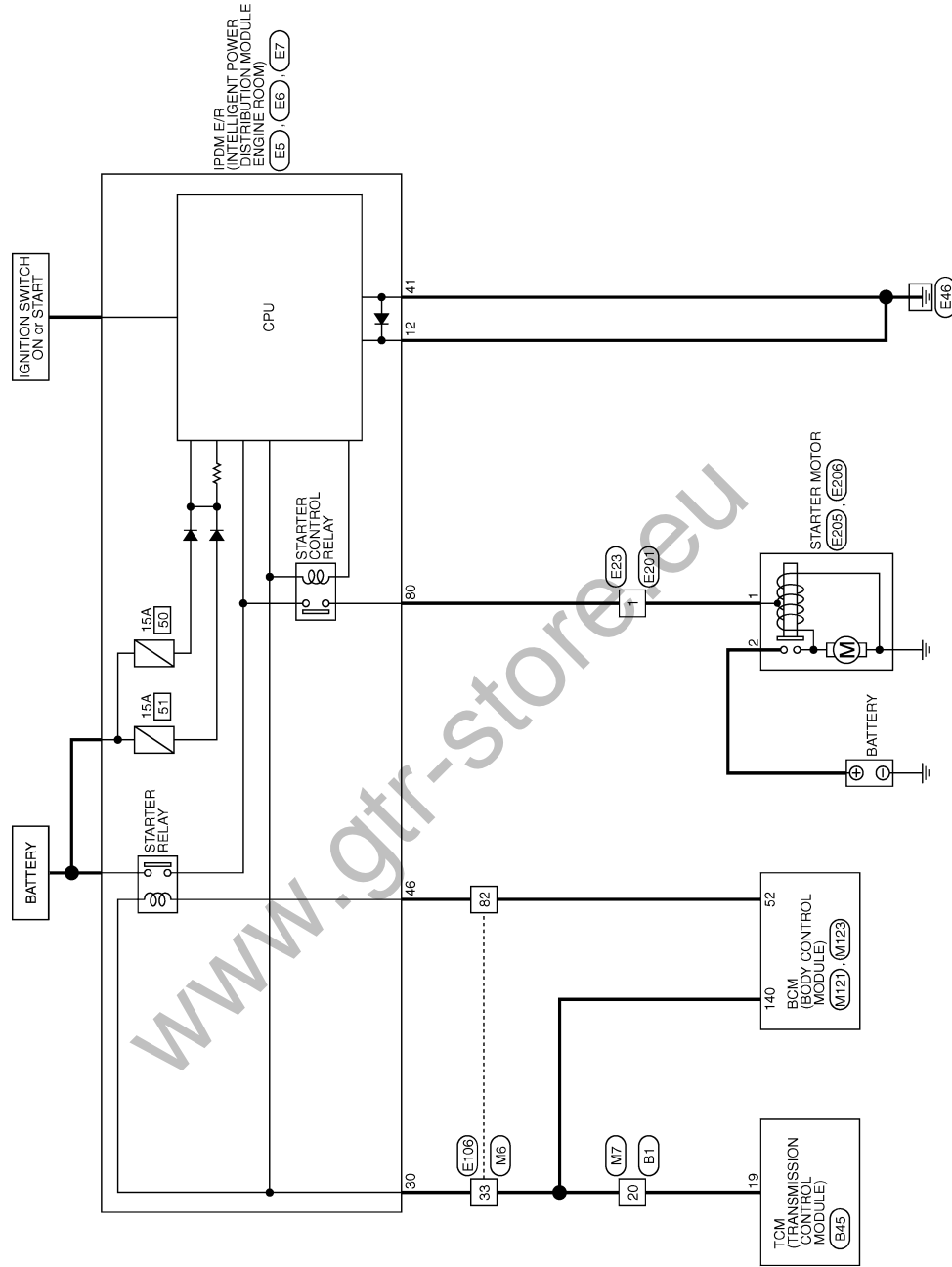
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STARTING SYSTEM

Wiring Diagram - STARTING SYSTEM - (GT-R certified NISSAN dealer)

INFOID:000000003897148

STARTING SYSTEM



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STARTING SYSTEM

< COMPONENT DIAGNOSIS >

STARTING SYSTEM

Connector No.	E205
Connector Name	STARTER MOTOR
Connector Type	24348.5/E44



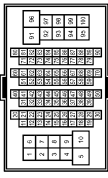
Terminal No.	2	Color of Wire	B/R	Signal Name [Specification]	-
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Connector No.	E206
Connector Name	STARTER MOTOR
Connector Type	X01MGY



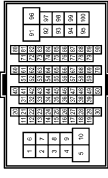
Terminal No.	1	Color of Wire	W	Signal Name [Specification]	-
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Connector No.	M6
Connector Name	WIRE TO WIRE
Connector Type	TH80MM-CS/6-TM4



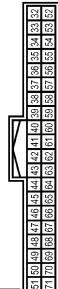
Terminal No.	-33	Color of Wire	GR	Signal Name [Specification]	-
	82		SB		

Connector No.	M7
Connector Name	WIRE TO WIRE
Connector Type	TH80MM-CS/6-TM4



Terminal No.	20	Color of Wire	GR	Signal Name [Specification]	-
--------------	----	---------------	----	-----------------------------	---

Connector No.	M121
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	TH40FG-NH



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

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



Terminal No.	140	Color of Wire	BR	Signal Name [Specification]	SHIFT N/P
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STARTING SYSTEM

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS

STARTING SYSTEM

Symptom Table (GT-R certified NISSAN dealer)

INFOID:000000003897149

Symptom	Reference
No normal cranking	Refer to STR-2, "Work Flow (GT-R certified NISSAN dealer)" .
Starter motor does not rotate	

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PRECAUTIONS

< PRECAUTION >

PRECAUTION

PRECAUTIONS

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

INFOID:000000003901449

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 AIRBAG" 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 the "SRS AIRBAG".
- 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.

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PREPARATION

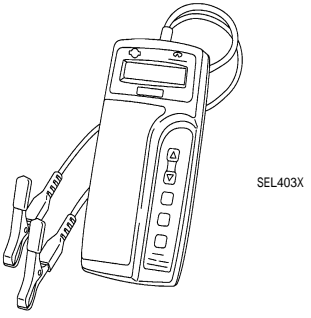
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PREPARATION

PREPARATION


Special Service Tools

INFOID:000000003897151

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>

Commercial Service Tools

INFOID:000000003897152

Tool name	Description
<p>Power tool</p>  <p>PI1B1407E</p>	<p>Loosening bolts, nuts and screws</p>

STARTER MOTOR

< ON-VEHICLE REPAIR >

ON-VEHICLE REPAIR

STARTER MOTOR

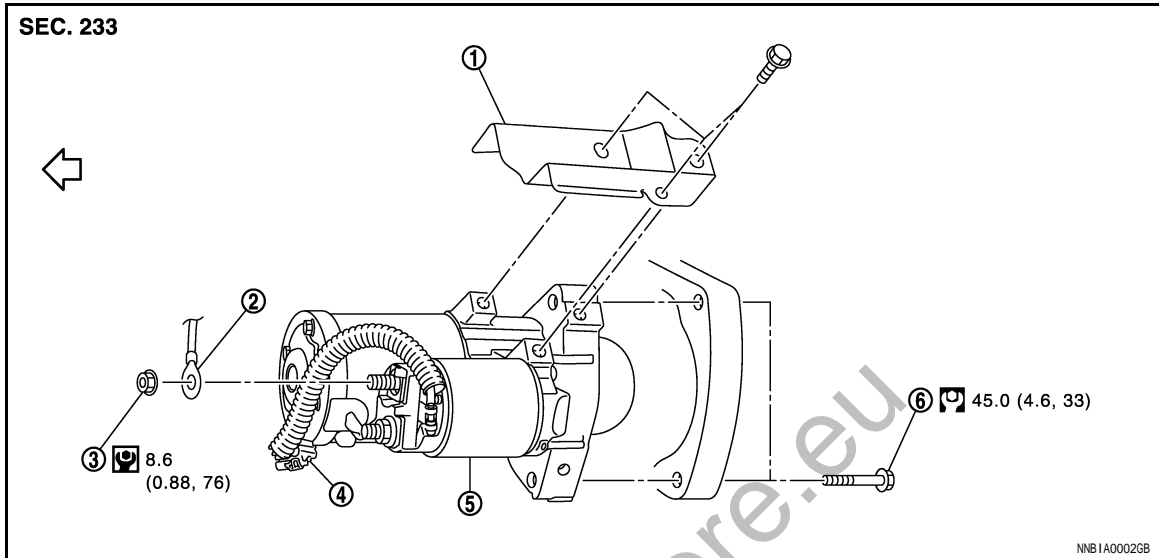
Exploded View (GT-R certified NISSAN dealer)

INFOID:000000003897153

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REMOVAL



- | | | |
|----------------------------|-------------------------|-----------------------------------|
| 1. Starter motor protector | 2. "B" terminal harness | 3. Starter motor "B" terminal nut |
| 4. "S" connector | 5. Starter motor | 6. Starter motor mounting bolt |

← Engine front

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

DISASSEMBLY

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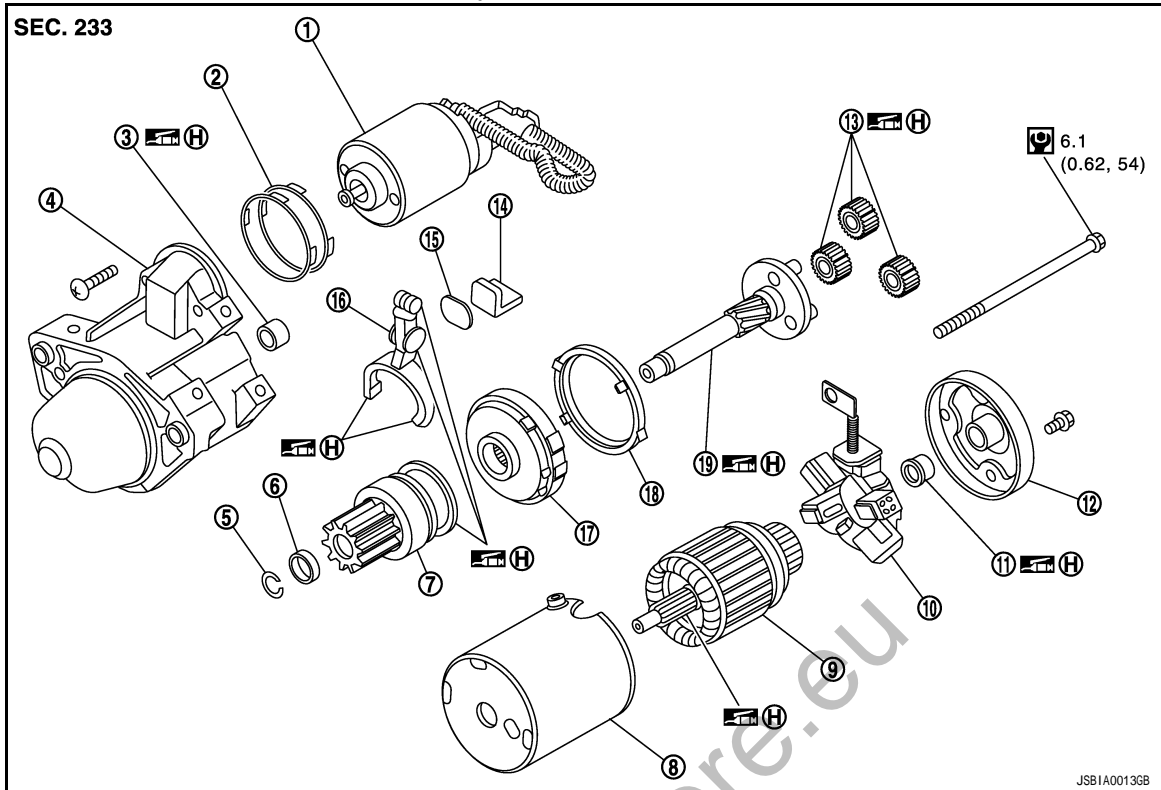
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STARTER MOTOR

< ON-VEHICLE REPAIR >

Type: M000T22771



- | | | |
|-----------------------------|--------------------|-------------------------|
| 1. Magnetic switch assembly | 2. Adjusting plate | 3. Metal FR |
| 4. Gear case assembly | 5. Stopper ring | 6. Stopper |
| 7. Pinion assembly | 8. Yoke assembly | 9. Armature assembly |
| 10. Brush holder assembly | 11. Metal RR | 12. Rear cover assembly |
| 13. Planetary gear | 14. Packing | 15. Plate |
| 16. Shift lever set | 17. Internal gear | 18. Packing |
| 19. Gear shaft | | |

 High-temperature grease point

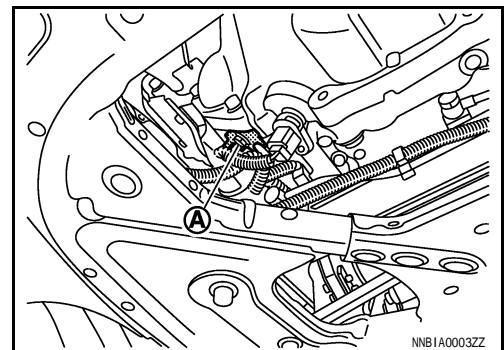
Refer to [GI-4, "Components"](#) for symbols not described on the above.

Removal and Installation (GT-R certified NISSAN dealer)

INFOID:000000003897154

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove engine rear undercover, using power tools.
3. Remove harness bracket mounting bolts (A) and harness bracket.



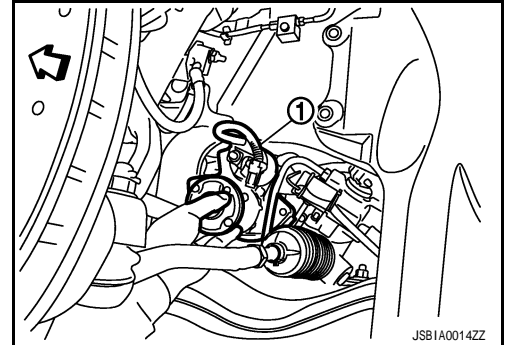
4. Disconnect "S" connector.
5. Remove "B" terminal nut.
6. Remove starter motor mounting bolts.

STARTER MOTOR

< ON-VEHICLE REPAIR >

7. Remove front drive shaft left side housing bolts. Refer to [FAX-14, "Exploded View \(GT-R certified NISSAN dealer\)"](#).
8. Move a front drive shaft left side forward keep a service area.
9. Remove starter motor (1) to left side from the vehicle.

↔ : Vehicle front



INSTALLATION

Install in the reverse order of removal.

CAUTION:

Be sure to tighten "B" terminal nut carefully.

Inspection (GT-R certified NISSAN dealer)

INFOID:000000003897156

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 (GT-R certified NISSAN dealer)

INFOID:000000003897160

Type			M000T22771
			MITSUBISHII 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 – 20.5 (1.5 – 3.4, 2.1 – 4.6)
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)]		0.5 – 2.0 (0.02 – 0.079)