

A

SECTION STR

STR

STARTING SYSTEM

C

CONTENTS

D

E

VQ35DE	STARTING SYSTEM	13
BASIC INSPECTION	Symptom Table	13
DIAGNOSIS AND REPAIR WORKFLOW	PRECAUTION	14
Work Flow	PRECAUTIONS	14
SYSTEM DESCRIPTION	Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TEN- SIONER"	14
STARTING SYSTEM	Precaution for Power Generation Voltage Variable Control System	14
System Diagram	PREPARATION	15
System Description	PREPARATION	15
Component Description	Special Service Tool	15
DTC/CIRCUIT DIAGNOSIS	Commercial Service Tools	15
B TERMINAL CIRCUIT	REMOVAL AND INSTALLATION	16
Description	STARTER MOTOR	16
Diagnosis Procedure	Removal and Installation	16
S CONNECTOR CIRCUIT	SERVICE DATA AND SPECIFICATIONS (SDS)	17
Description	STARTER MOTOR	17
Diagnosis Procedure	Starter	17
WIRING DIAGRAM		
STARTING SYSTEM		
Wiring Diagram		
SYMPTOM DIAGNOSIS		

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[VQ35DE]

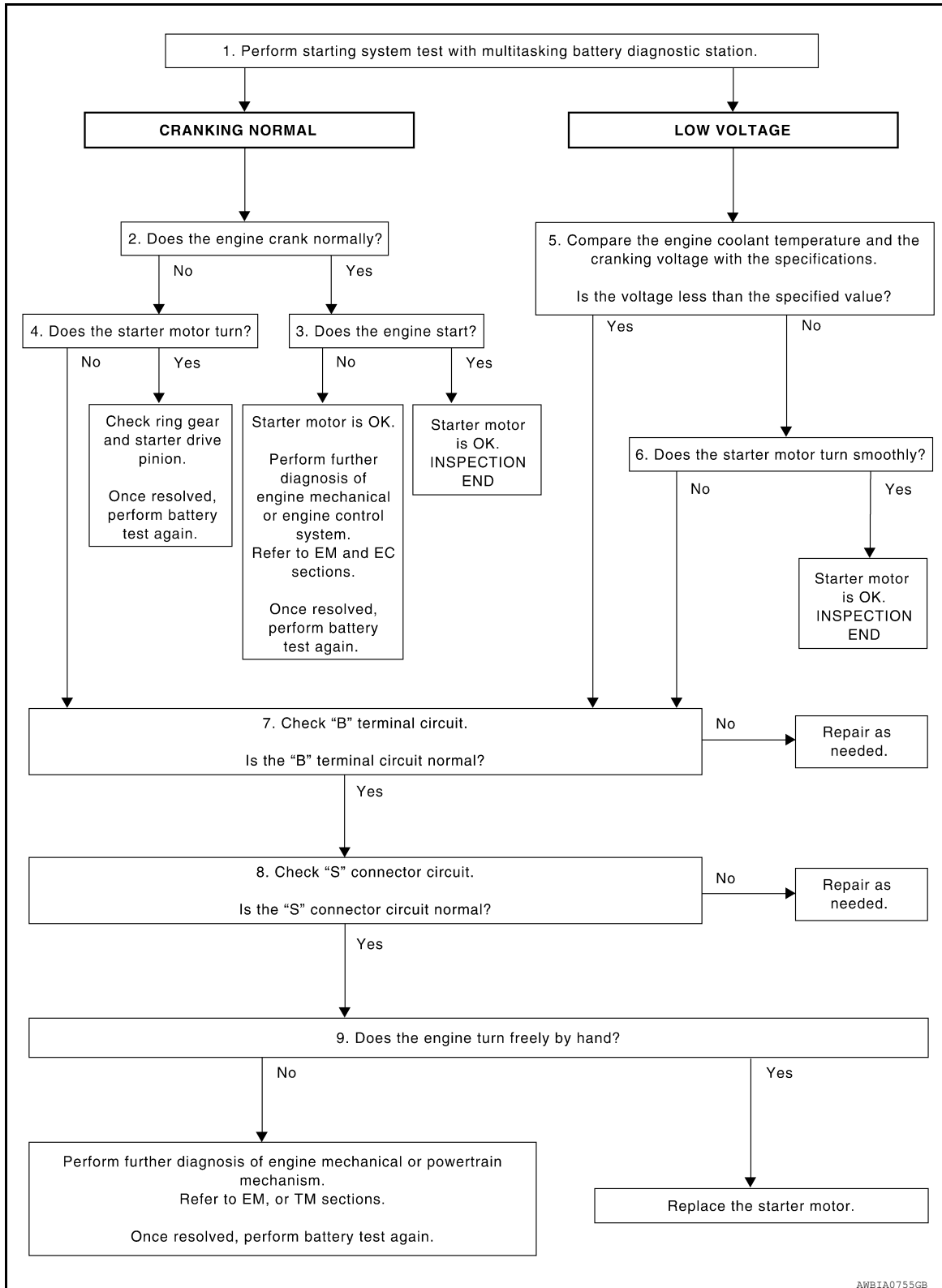
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000006237670

OVERALL SEQUENCE



DETAILED FLOW

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[VQ35DE]

NOTE:

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

1. DIAGNOSIS WITH MULTITASKING BATTERY DIAGNOSTIC STATION

Perform the starting system test with multitasking battery diagnostic station. For details and operating instructions, refer to diagnostic station instruction manual.

Test result

CRANKING NORMAL >> GO TO 2

LOW VOLTAGE >> 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 diagnostic station instruction manual.

REPLACE BATTERY >> Before replacing battery, clean the battery cable clamps and battery posts. Perform battery test again. Refer to diagnostic station instruction manual. 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 properly.

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 to 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 verify the cranking voltage is within specification.

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.

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-6, "Diagnosis Procedure"](#).

Is "B" terminal circuit normal?

DIAGNOSIS AND REPAIR WORKFLOW

[VQ35DE]

< 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"](#).

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. Refer to [STR-16. "Removal and Installation"](#).
- 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 diagnostic station instruction manual.

STARTING SYSTEM

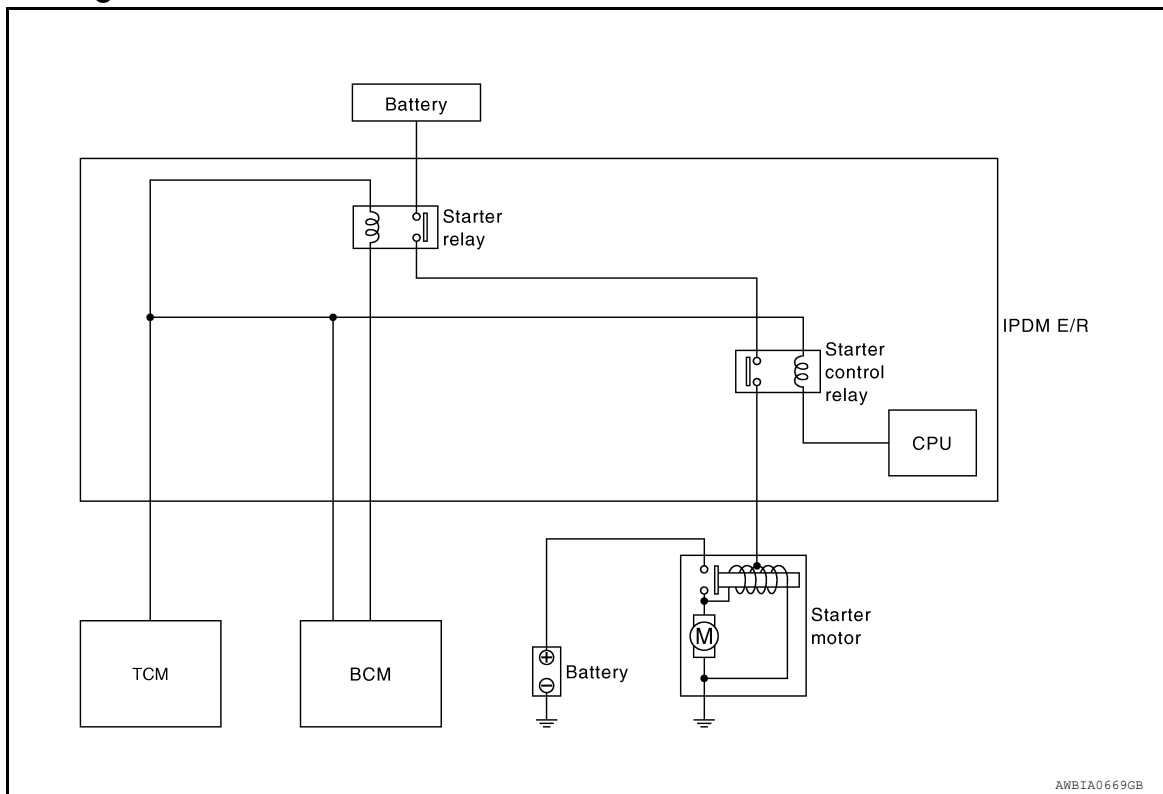
< SYSTEM DESCRIPTION >

[VQ35DE]

SYSTEM DESCRIPTION

STARTING SYSTEM

System Diagram



System Description

INFOID:000000006237672

The starter motor plunger closes and provides a closed circuit between the battery and the starter motor. The starter motor is grounded to the cylinder block. With power and ground supplied, the starter motor operates.

Component Description

INFOID:000000006237673

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.
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.

DTC/CIRCUIT DIAGNOSIS

B TERMINAL CIRCUIT

Description

INFOID:000000006237674

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

Diagnosis Procedure

INFOID:000000006237675

Regarding Wiring Diagram information, refer to [STR-9. "Wiring Diagram"](#).

CAUTION:

Perform diagnosis under the condition that the 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 depleted.**

1. CHECK TERMINAL B POWER SUPPLY VOLTAGE

1. Turn ignition switch OFF.
2. Make sure that starter motor connector F27 terminal B connection is clean and tight.
3. Check voltage between starter motor connector F27 terminal B and ground.

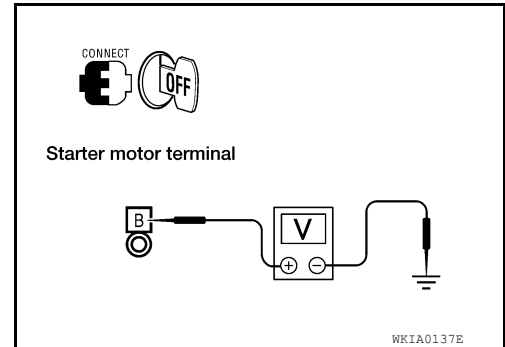
B - ground

Battery voltage

Is there battery voltage present?

YES >> GO TO 2

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



2. CHECK BATTERY CABLE (VOLTAGE DROP TEST)

1. Shift CVT selector lever to "P" or "N" position.
2. Check voltage between battery positive terminal and starter motor connector F27 terminal B while cranking the engine.

While cranking the engine

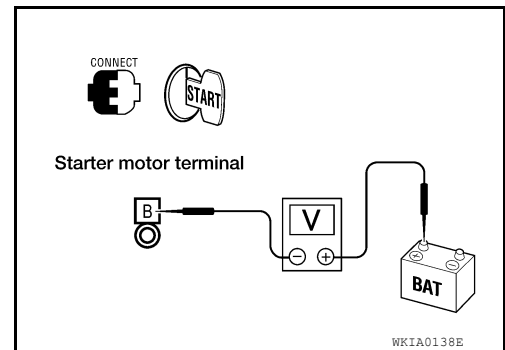
Terminal B - B+ terminal

Less than 0.5V

Is the voltage drop less than 0.5V?

YES >> GO TO 3

NO >> Check harness between the battery and the starter motor for high resistance.



3. CHECK GROUND CIRCUIT STATUS (VOLTAGE DROP TEST)

1. Shift CVT selector lever to "P" or "N" position.

B TERMINAL CIRCUIT

[VQ35DE]

< DTC/CIRCUIT DIAGNOSIS >

2. Check voltage between starter motor case and battery negative terminal while cranking the engine.

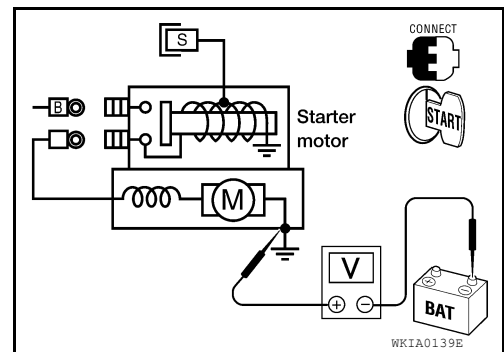
While cranking the engine

Starter case - B- terminal

Less than 0.2V

Is the voltage drop less than 0.2V?

- YES >> Terminal B circuit is OK. Further inspection necessary.
Refer to [STR-2. "Work Flow"](#).
- NO >> Check the starter motor case to engine mounting for high resistance.



A

STR

C

D

E

F

G

H

I

J

K

L

M

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S CONNECTOR CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

S CONNECTOR CIRCUIT

Description

INFOID:000000006237676

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.

Diagnosis Procedure

INFOID:000000006237677

Regarding Wiring Diagram information, refer to [STR-9, "Wiring Diagram"](#).

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 F28.
3. Shift CVT selector lever to "P" or "N" position.
4. Check voltage between starter motor harness connector F28 terminal S and ground with the ignition in START.

With ignition switch in START
S - ground **Battery voltage**

Is battery voltage present?

YES >> "S" circuit is OK. Further inspection 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, bent pins and loose connections.
 - IPDM E/R harness connector F10
 - Starter motor harness connector F28

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair the terminal and connector.

3. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

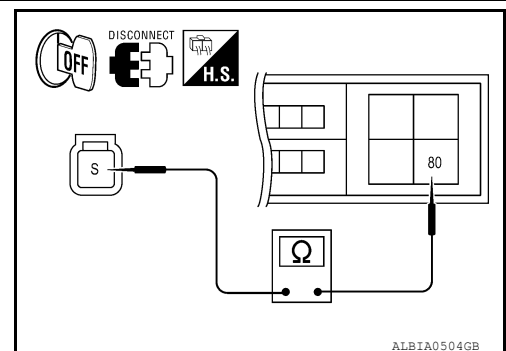
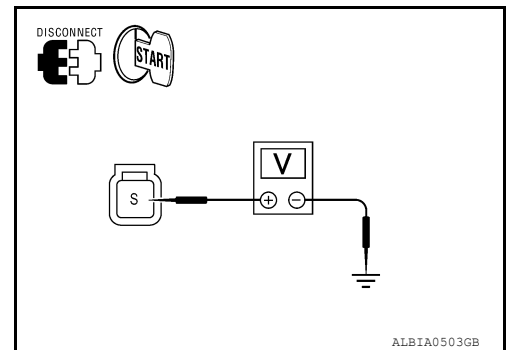
1. Disconnect the following harness connectors.
 - IPDM E/R connector F10
 - Starter motor connector F28
2. Check continuity between starter motor harness connector F28 terminal S and IPDM E/R harness connector F10 terminal 80.

S - 80 **Continuity exists**

Is there proper continuity between the two pins?

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

NO >> Repair the harness.



STARTING SYSTEM

< WIRING DIAGRAM >

[VQ35DE]

WIRING DIAGRAM

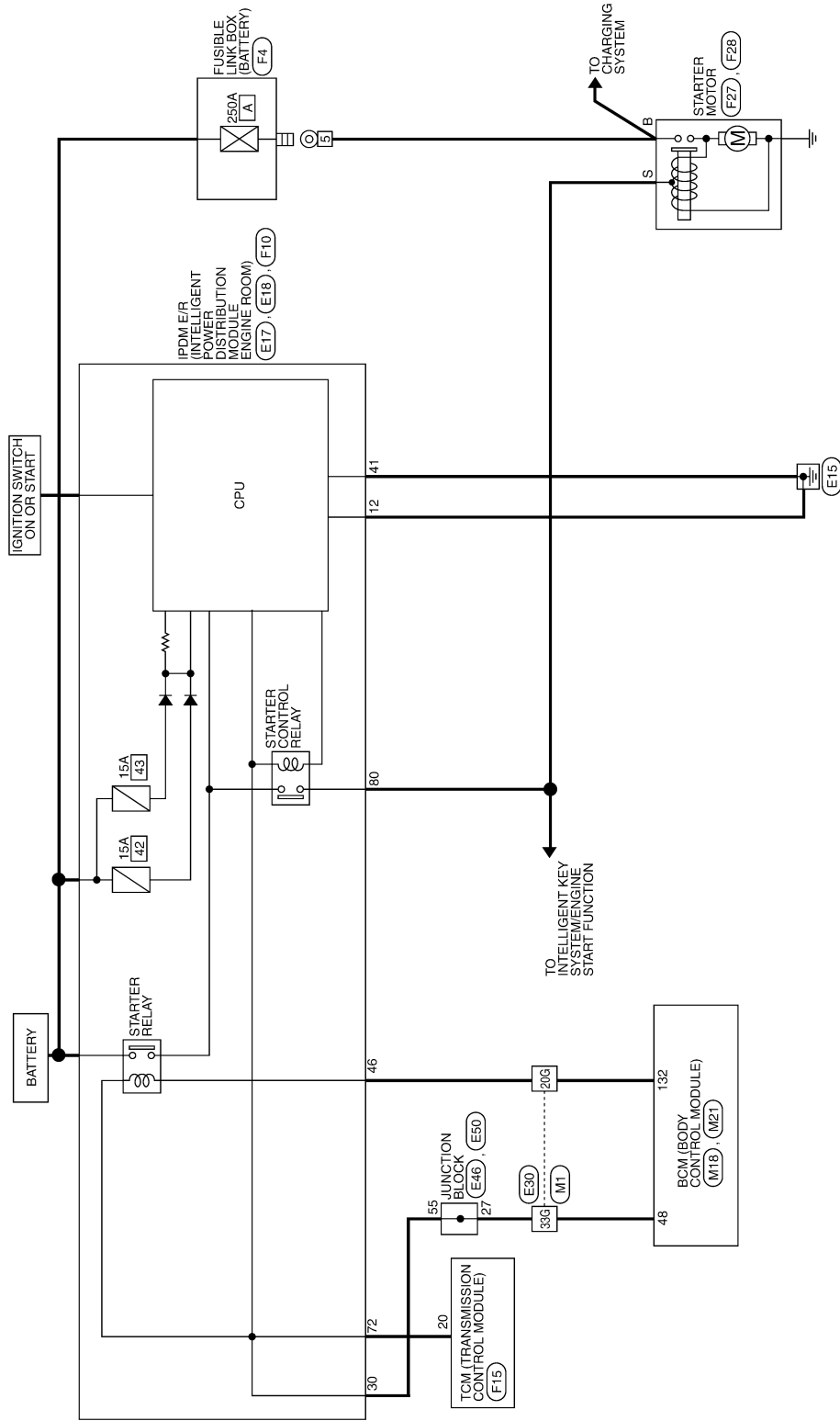
STARTING SYSTEM

Wiring Diagram

INFOID:000000006428768

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STARTING SYSTEM

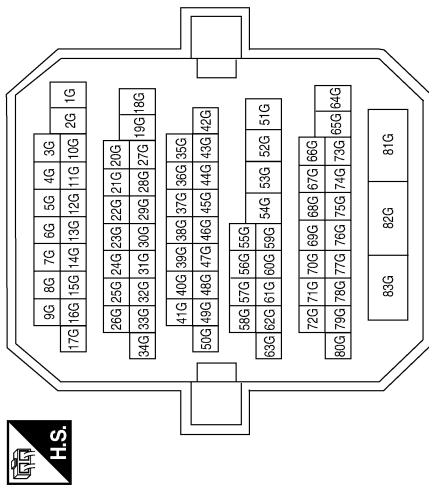


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STARTING SYSTEM CONNECTORS

Connector No.	M1
Connector Name	WIRE TO WIRE
Connector Color	WHITE



39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20
59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40

Terminal No.	Color of Wire	Signal Name
48	R/G	SHIFT N/P/NEUTRAL SW

Terminal No.	Color of Wire	Signal Name
20G	R	-
33G	R/G	-

Connector No.	M18
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	GREEN

Connector No.	M21
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	GRAY



Terminal No.	Color of Wire	Signal Name
132	R	ST RELAY OUTPUT

Connector No.	E17
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
41	B	GND (SIGNAL)
46	BR	START CONT

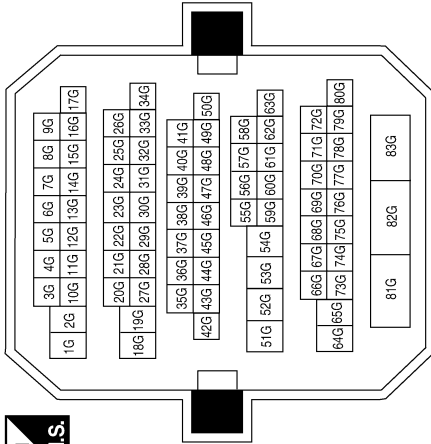
STARTING SYSTEM

< WIRING DIAGRAM >

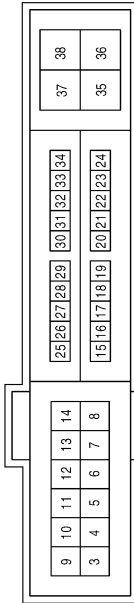
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Terminal No.	Color of Wire	Signal Name
20G	BR	-
33G	BR	-

Connector No.	E30
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Connector No.	E18
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
12	B	GND (POWER)
30	BR	AT ECU

Connector No.	F4
Connector Name	FUSIBLE LINK BOX (BATTERY)
Connector Color	-



Terminal No.	Color of Wire	Signal Name
5	B/R	-

Connector No.	E50
Connector Name	JUNCTION BLOCK
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
55	BR	-

Connector No.	E46
Connector Name	JUNCTION BLOCK
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
27	BR	-

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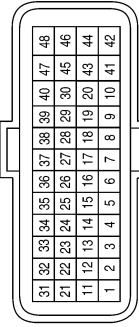
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STARTING SYSTEM

< WIRING DIAGRAM >

[VQ35DE]


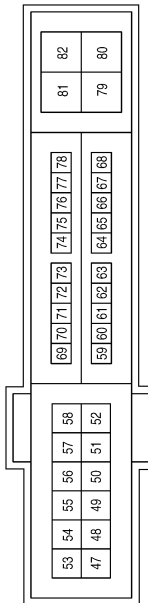
Connector No.	F15
Connector Name	TCM (TRANSMISSION CONTROL MODULE)
Connector Color	BLACK

Terminal No.	Color of Wire	Signal Name
20	R/B	ST RLY

Terminal No.	Color of Wire	Signal Name
72	R/B	NP SW
80	B	STARTER MOTOR

Connector No.	F10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

Connector No.	F28
Connector Name	STARTER MOTOR
Connector Color	GRAY




Connector No.	F27
Connector Name	STARTER MOTOR
Connector Color	-




Terminal No.	Color of Wire	Signal Name
S	B	START

Terminal No.	Color of Wire	Signal Name
B	B/R	BATT

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STARTING SYSTEM

< SYMPTOM DIAGNOSIS >

[VQ35DE]

SYMPTOM DIAGNOSIS

STARTING SYSTEM

Symptom Table

INFOID:000000006237679

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Symptom	Reference
No normal cranking	Refer to STR-2, "Work Flow" .
Starter motor does not rotate	

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

INFOID:000000006627271

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 SR and SB section 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 SR section.
- 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 Airbag Diagnosis Sensor Unit or other Airbag 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.

Precaution for Power Generation Voltage Variable Control System

INFOID:000000008166073

CAUTION:

For this model, the battery current sensor that is installed to the battery cable at the negative terminal measures the charging/discharging current of the battery, and performs various controls. If the electrical component or the ground wire is connected directly to the battery terminal, the current other than that being measured with the battery current sensor is charging to or discharging from the battery. This condition causes the malfunction of the control, and then the battery discharge may occur. Do not connect the electrical component or the ground wire directly to the battery terminal.

PREPARATION

< PREPARATION >

[VQ35DE]

PREPARATION

PREPARATION


Special Service Tool

INFOID:000000008130225

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The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
<p>— (—) Model GR8-1200 NI Multitasking battery and electrical diagnostic station</p>  <p style="text-align: right; font-size: small;">AWI1A12392Z</p>	<p>Tests batteries, starting and charging systems and charges batteries. For operating instructions, refer to diagnostic station instruction manual.</p>


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Commercial Service Tools

INFOID:000000008130216

Tool name	Description
<p>Power tools</p>  <p style="text-align: right; font-size: small;">PIIB1407E</p>	<p>Loosening bolts, screws and nuts.</p>

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STARTER MOTOR

< REMOVAL AND INSTALLATION >

[VQ35DE]

REMOVAL AND INSTALLATION

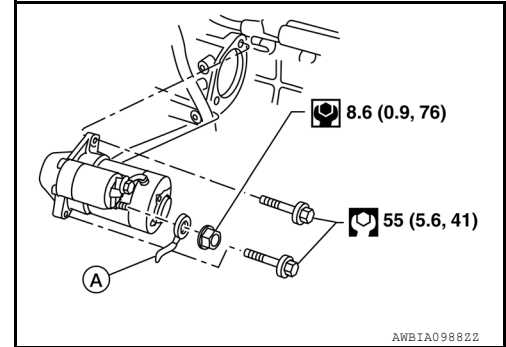
STARTER MOTOR

Removal and Installation

INFOID:000000006237684

REMOVAL

1. Remove the battery tray. Refer to [PG-69, "Removal and Installation \(Battery Tray\)"](#).
2. Disconnect the battery cable (A) and starter harness connector.
3. Remove the starter bolts, then remove the starter.



INSTALLATION

Installation is in the reverse order of removal.

- Reset electronic systems as necessary. Refer to [PG-5, "ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Special Repair Requirement"](#)

CAUTION:

Carefully tighten the battery cable nut.

STARTER MOTOR

< SERVICE DATA AND SPECIFICATIONS (SDS)

[VQ35DE]

SERVICE DATA AND SPECIFICATIONS (SDS)

STARTER MOTOR

Starter

INFOID:000000006237685

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Application		VQ35DE	C
		CVT model	
Type*		Mitsubishi M000TA0072	D
		Reduction gear type	
System voltage		12V	E
No-load	Terminal voltage	11V	
	Current	Less than 90A	
	Revolution	More than 2,400 rpm	

*: Always check with the Parts Department for the latest parts information.

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