

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

SECTION STR

STARTING SYSTEM

CONTENTS

<p>PRECAUTION 3</p> <p>PRECAUTIONS 3</p> <p style="padding-left: 20px;">Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"3</p> <p style="padding-left: 20px;">Precaution for Power Generation Variable Voltage Control System3</p> <p>PREPARATION 4</p> <p>PREPARATION 4</p> <p style="padding-left: 20px;">Special Service Tool4</p> <p style="padding-left: 20px;">Commercial Service Tool4</p> <p>BASIC INSPECTION 5</p> <p>DIAGNOSIS AND REPAIR WORKFLOW 5</p> <p style="padding-left: 20px;">Work Flow (With GR8-1200 NI)5</p> <p style="padding-left: 20px;">Work Flow (Without GR8-1200 NI)9</p> <p>SYSTEM DESCRIPTION11</p> <p>STARTING SYSTEM11</p> <p>A/T 11</p> <p style="padding-left: 20px;">A/T : System Diagram 11</p> <p style="padding-left: 20px;">A/T : System Description 11</p> <p style="padding-left: 20px;">A/T : Component Parts Location 11</p> <p style="padding-left: 20px;">A/T : Component Description 12</p> <p>M/T WITH CLUTCH INTERLOCK CANCEL SYSTEM12</p> <p style="padding-left: 20px;">M/T WITH CLUTCH INTERLOCK CANCEL SYSTEM : System Diagram 12</p> <p style="padding-left: 20px;">M/T WITH CLUTCH INTERLOCK CANCEL SYSTEM : System Description 12</p> <p style="padding-left: 20px;">M/T WITH CLUTCH INTERLOCK CANCEL SYSTEM : Component Parts Location 13</p> <p style="padding-left: 20px;">M/T WITH CLUTCH INTERLOCK CANCEL SYSTEM : Component Description 13</p>	<p>M/T WITHOUT CLUTCH INTERLOCK CANCEL SYSTEM13</p> <p style="padding-left: 20px;">M/T WITHOUT CLUTCH INTERLOCK CANCEL SYSTEM : System Diagram14</p> <p style="padding-left: 20px;">M/T WITHOUT CLUTCH INTERLOCK CANCEL SYSTEM : System Description14</p> <p style="padding-left: 20px;">M/T WITHOUT CLUTCH INTERLOCK CANCEL SYSTEM : Component Parts Location14</p> <p style="padding-left: 20px;">M/T WITHOUT CLUTCH INTERLOCK CANCEL SYSTEM : Component Description15</p> <p>DTC/CIRCUIT DIAGNOSIS 16</p> <p>B TERMINAL CIRCUIT 16</p> <p style="padding-left: 20px;">Description16</p> <p style="padding-left: 20px;">Diagnosis Procedure16</p> <p>S CONNECTOR CIRCUIT 18</p> <p style="padding-left: 20px;">Description18</p> <p style="padding-left: 20px;">Diagnosis Procedure18</p> <p>WIRING DIAGRAM19</p> <p>STARTING SYSTEM19</p> <p style="padding-left: 20px;">Wiring Diagram - VQ40DE With Clutch Interlock Cancel System19</p> <p style="padding-left: 20px;">Wiring Diagram - VQ40DE Without Clutch Interlock Cancel System25</p> <p style="padding-left: 20px;">Wiring Diagram - QR25DE29</p> <p>SYMPTOM DIAGNOSIS 33</p> <p>STARTING SYSTEM33</p> <p style="padding-left: 20px;">Symptom Table33</p> <p>REMOVAL AND INSTALLATION34</p> <p>STARTER MOTOR34</p> <p style="padding-left: 20px;">Removal and Installation (QR25DE)34</p> <p style="padding-left: 20px;">Removal and Installation (VQ40DE)35</p>
--	---

SERVICE DATA AND SPECIFICATIONS	STARTER MOTOR	36
(SDS)	Starter	36

PRECAUTIONS

< PRECAUTION >

PRECAUTION

PRECAUTIONS

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

INFOID:000000012568933

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 three minutes before performing any service.

Precaution for Power Generation Variable Voltage Control System

INFOID:000000012568934

CAUTION:

For this model, the battery current sensor that is installed to the negative battery cable measures the charging/discharging current of the battery and performs various engine controls. If an electrical component is connected directly to the negative battery terminal, the current flowing through that component will not be measured by the battery current sensor. This condition may cause a malfunction of the engine control system and battery discharge may occur. Do not connect an electrical component or ground wire directly to the battery terminal.

A

STR

C

D

E

F

G

H

I

J

K

L

M

N

O

P

PREPARATION

< PREPARATION >


PREPARATION

PREPARATION

Special Service Tool


INFOID:000000012568936

The actual shape of the tools may differ from those illustrated here.

Tool number (TechMate No.) Tool name	Description
<p>(—) Model GR8-1200 NI Multitasking battery and electrical diagnostic station</p>  <p style="text-align: right;">AWIIA1239ZZ</p>	<p>Tests batteries, starting and charging systems and charges batteries. For operating instructions, refer to diagnostic station instruction manual.</p>

Commercial Service Tool

INFOID:000000012568937

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

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow (With GR8-1200 NI)

INFOID:0000000012568938

A

STR

STARTING SYSTEM DIAGNOSIS WITH GR8-1200 NI

To test the starting system, use the following special service tool:

- GR8-1200 NI Multitasking battery and electrical diagnostic station

NOTE:

Refer to the diagnostic station Instruction Manual for proper starting system diagnosis procedures.

C

D

E

F

G

H

I

J

K

L

M

N

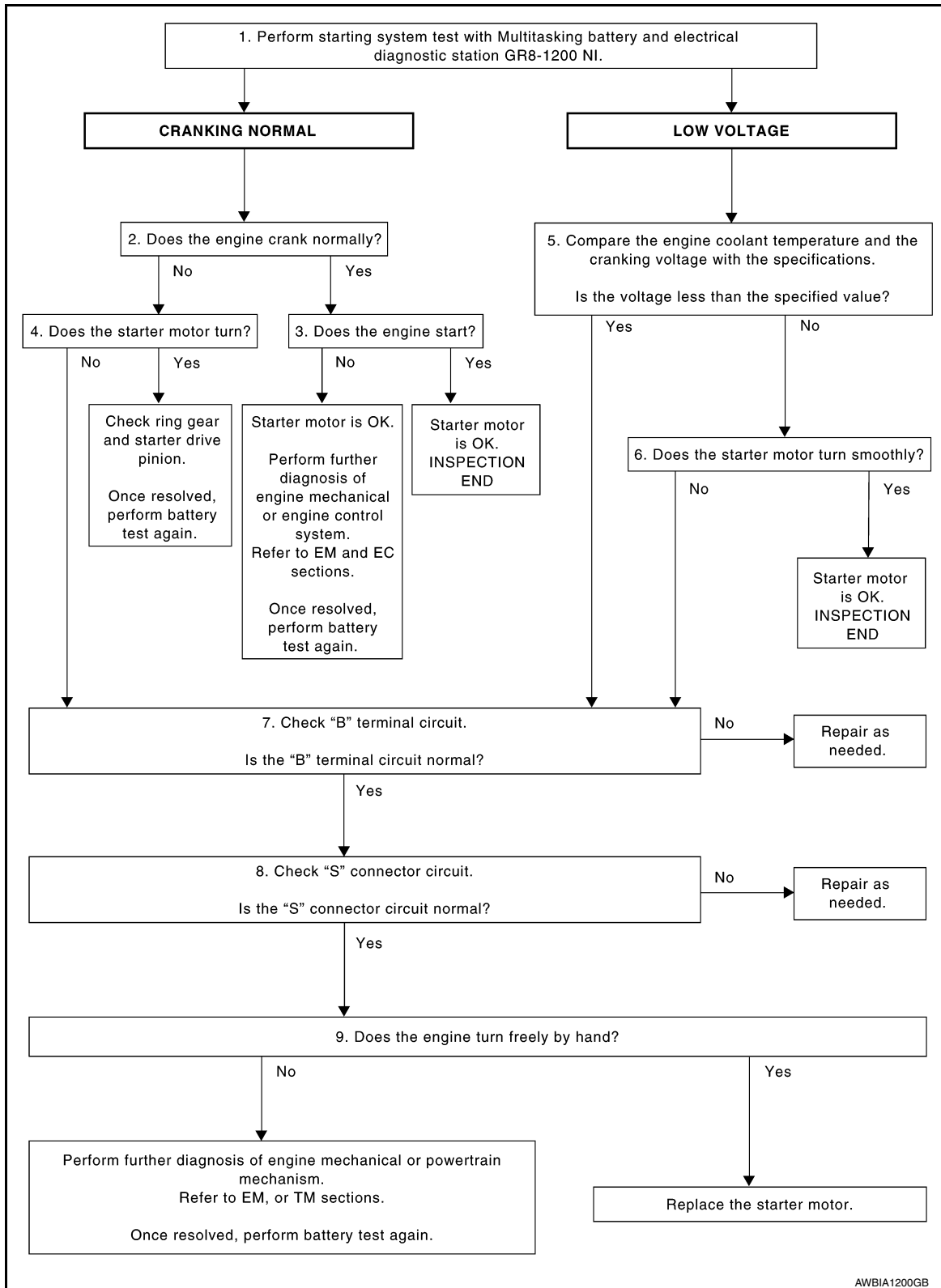
O

P

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

OVERALL SEQUENCE



DETAILED FLOW

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 AND ELECTRICAL DIAGNOSTIC STATION GR8-1200 NI

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

Perform the starting system test with Multitasking battery and electrical diagnostic station GR8-1200 NI. 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 >> 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 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.

Does the starter motor turn smoothly?

YES >> Inspection End.

NO >> GO TO 7.

7. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to [STR-16, "Diagnosis Procedure"](#).

Is "B" terminal circuit normal?

YES >> GO TO 8.

NO >> Repair as needed.

8. "S" CONNECTOR CIRCUIT INSPECTION

Check "S" connector circuit. Refer to [STR-18, "Diagnosis Procedure"](#).

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

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-34. "Removal and Installation \(QR25DE\)"](#) or [STR-35. "Removal and Installation \(VQ40DE\)"](#).
- NO >> Perform further diagnosis of engine mechanical or powertrain mechanism. Once resolved, perform battery test again using Multitasking battery and electrical diagnostic station GR8-1200 NI. Refer to the diagnostic station Instruction Manual for proper testing procedures.

DIAGNOSIS AND REPAIR WORKFLOW

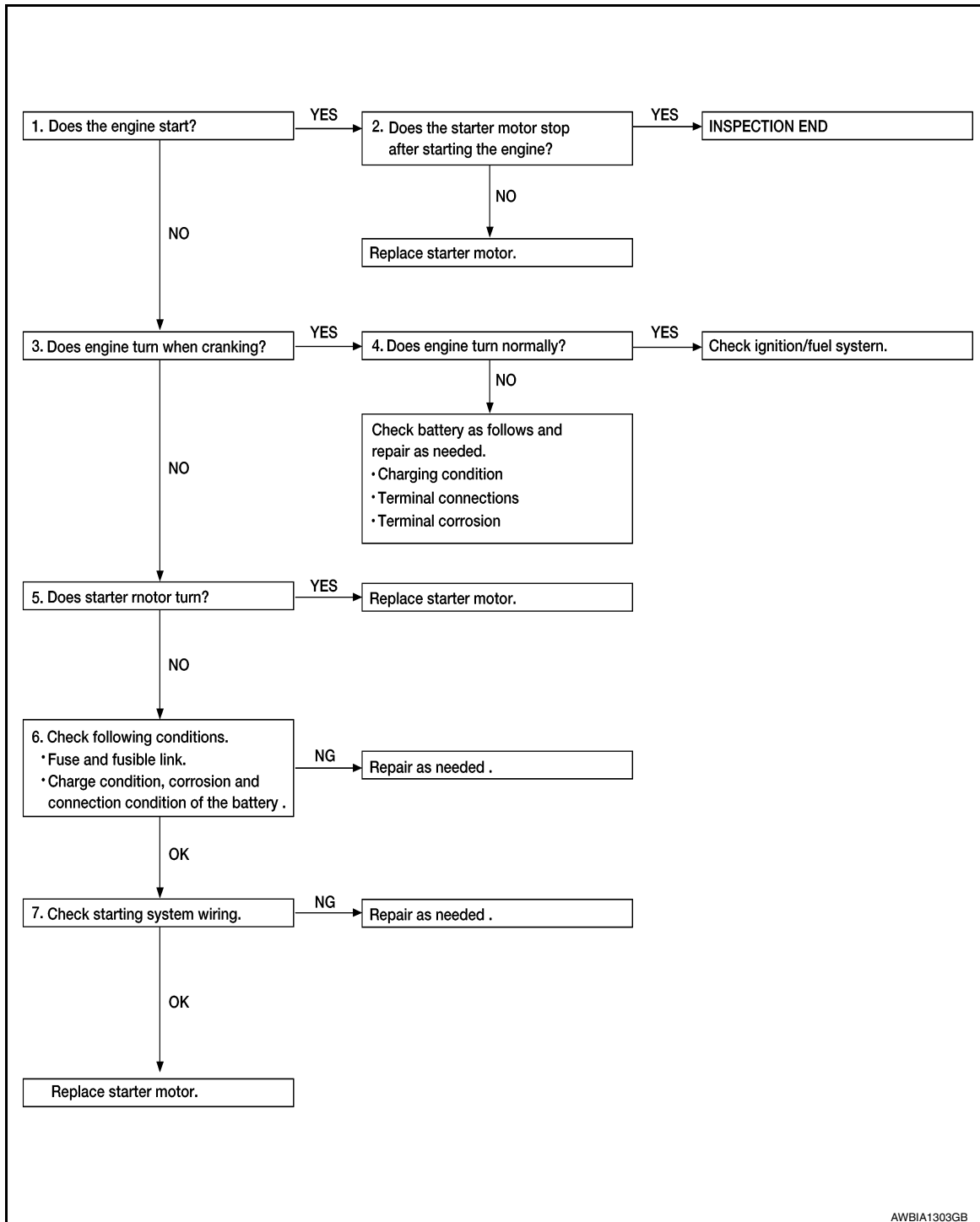
< BASIC INSPECTION >

Work Flow (Without GR8-1200 NI)

INFOID:000000012568939

A

OVERALL SEQUENCE



STR

C

D

E

F

G

H

I

J

K

L

M

N

O

DETAILED FLOW

NOTE:

If any malfunction is found, immediately disconnect the battery cable from the negative terminal.

1. CHECK ENGINE START

Crank the engine and check that the engine starts.

Does the engine start?

- YES >> GO TO 2.
- NO >> GO TO 3.

P

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

2. CHECK THAT THE STARTER MOTOR STOPS

Check that the starter motor stops after starting the engine.

Does the starter motor stop?

YES >> Inspection End.

NO >> Replace starter motor. Refer to [STR-34, "Removal and Installation \(QR25DE\)"](#) or [STR-35, "Removal and Installation \(VQ40DE\)"](#).

3. CHECK THAT THE ENGINE TURNS WHEN CRANKING

Check that the engine turns when cranking.

Does engine turn when cranking?

YES >> GO TO 4.

NO >> GO TO 5.

4. CHECK THE ENGINE SPEED WHEN CRANKING

Check that the engine speed is not low when cranking.

Does engine turn normally?

YES >> Check ignition/fuel system.

NO >> Check charge condition, corrosion and connection condition of the battery.

5. CHECK STARTER MOTOR ACTIVATION

Check that the starter motor runs at cranking.

Does starter motor turn?

YES >> Replace starter motor. Refer to [STR-34, "Removal and Installation \(QR25DE\)"](#) or [STR-35, "Removal and Installation \(VQ40DE\)"](#).

NO >> GO TO 6.

6. CHECK POWER SUPPLY CIRCUIT

Check the following conditions:

- Fuse and fusible link
- Charge condition, corrosion and connection of the battery.

Are these inspection results normal?

YES >> GO TO 7.

NO >> Repair as needed.

7. CHECK STARTING SYSTEM WIRING

Check the following:

- "B" terminal circuit. Refer to [STR-16, "Diagnosis Procedure"](#).
- "S" terminal circuit. Refer to [STR-18, "Diagnosis Procedure"](#).

Are the inspection results normal?

YES >> Replace starter motor. Refer to [STR-34, "Removal and Installation \(QR25DE\)"](#) or [STR-35, "Removal and Installation \(VQ40DE\)"](#).

NO >> Repair as needed.

STARTING SYSTEM

< SYSTEM DESCRIPTION >

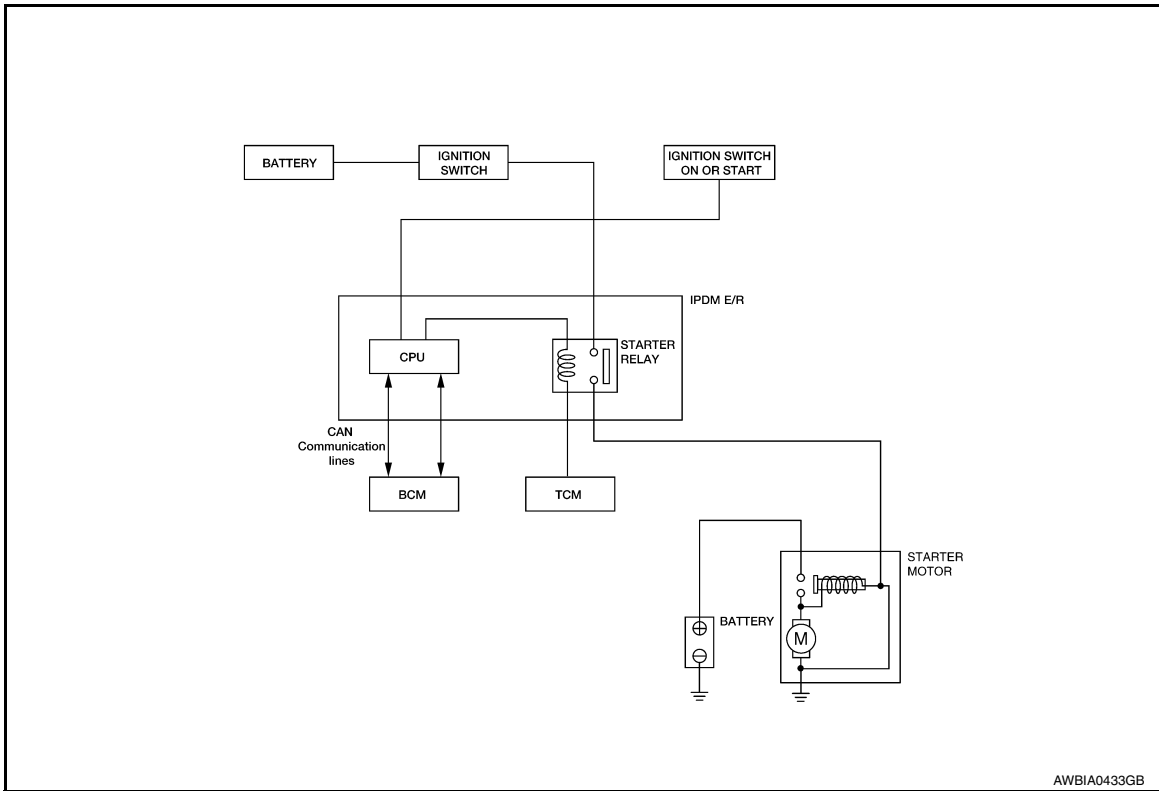
SYSTEM DESCRIPTION

STARTING SYSTEM

A/T

A/T : System Diagram

INFOID:000000012568940



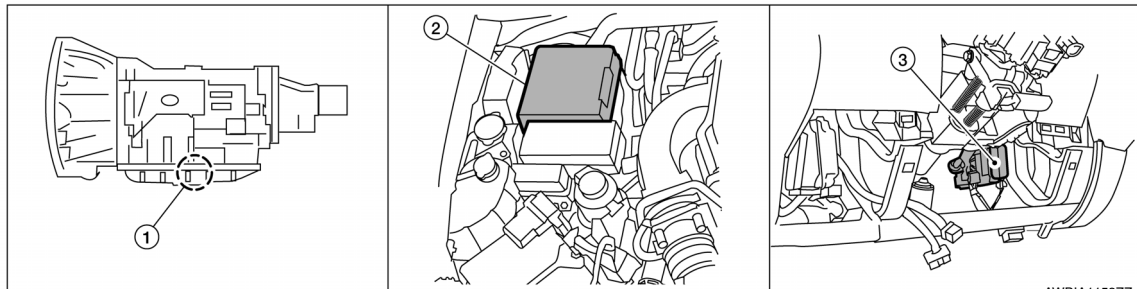
A/T : System Description

INFOID:000000012568941

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.

A/T : Component Parts Location

INFOID:000000012568942



AWBIA1153ZZ

1. A/T assembly F9 (with built in TCM F502)
2. IPDM E/R E119, E120, E122, E124
3. BCM M18 (view with lower instrument panel LH removed)

STARTING SYSTEM

< SYSTEM DESCRIPTION >

A/T : Component Description

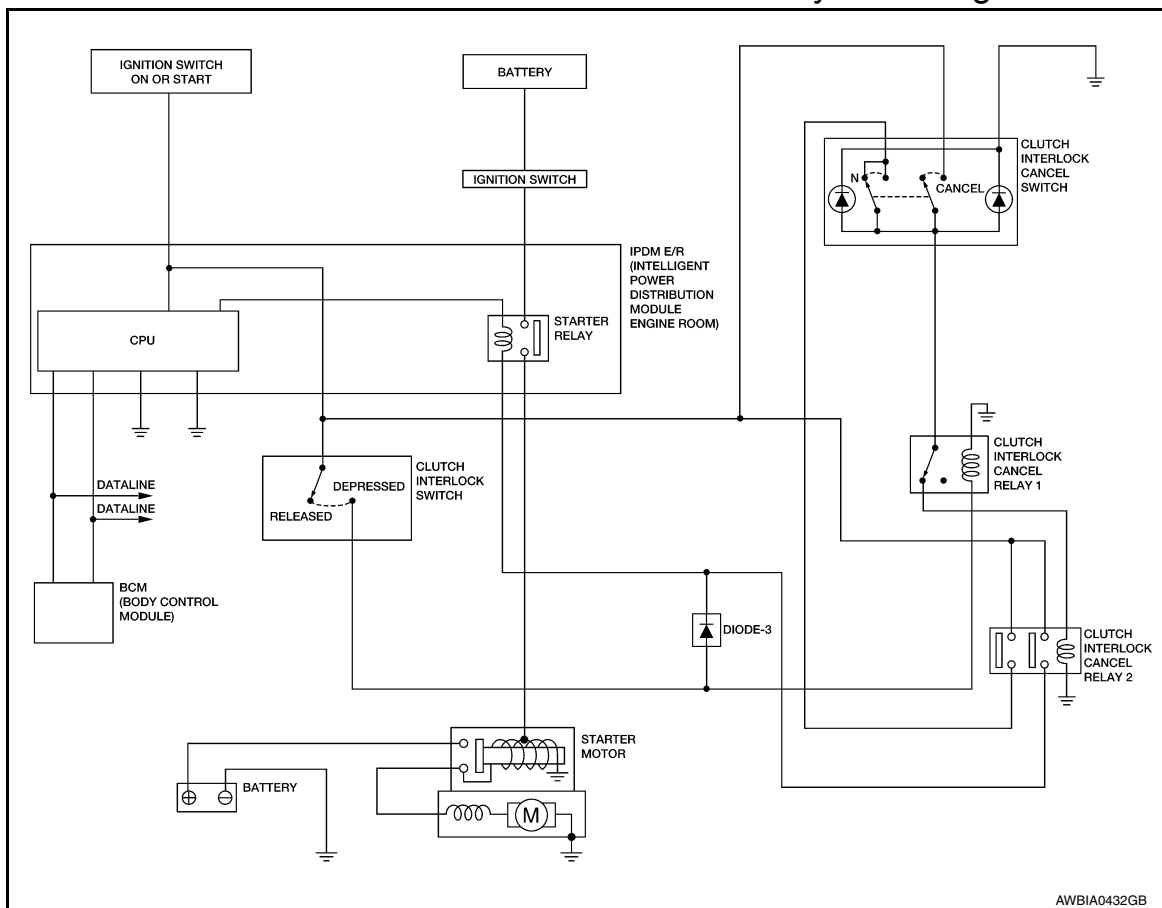
INFOID:000000012568943

Component part	Description
TCM	TCM supplies power to the starter relay inside the IPDM E/R when the selector lever is shifted to the P or N position.
BCM	BCM sends a starter request signal to the CPU of the IPDM E/R over the CAN communication lines.
IPDM E/R	CPU inside IPDM E/R operates the starter relay at the request of the BCM over the CAN communication lines.
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.

M/T WITH CLUTCH INTERLOCK CANCEL SYSTEM

M/T WITH CLUTCH INTERLOCK CANCEL SYSTEM : System Diagram

INFOID:000000012568944



M/T WITH CLUTCH INTERLOCK CANCEL SYSTEM : System Description

INFOID:000000012568945

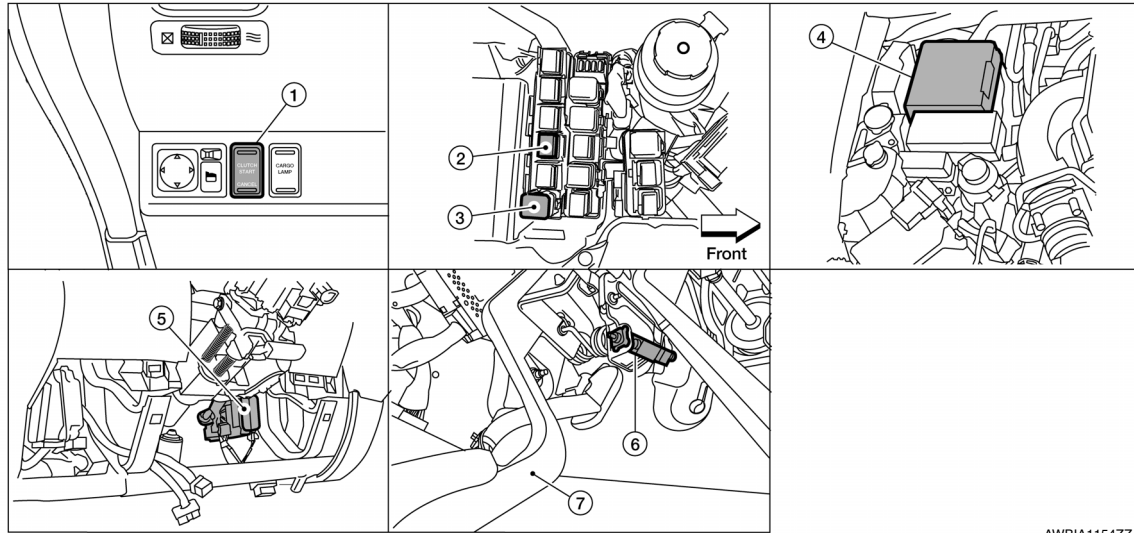
The clutch interlock cancel (clutch start) switch allows for starting the engine without depressing the clutch pedal by bypassing the clutch interlock switch. The clutch interlock cancel system is canceled once the ignition switch is turned OFF. Once the clutch interlock cancel system is activated, the 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.

STARTING SYSTEM

< SYSTEM DESCRIPTION >

M/T WITH CLUTCH INTERLOCK CANCEL SYSTEM : Component Parts Location

INFOID:000000012568946



AWBIA1154ZZ

1. Clutch interlock cancel switch M163
2. Clutch interlock cancel relay 1 E171
3. Clutch interlock cancel relay 2 E166
4. IPDM E/R E119, E120, E122, E124
5. BCM M18 (view with lower instrument panel LH removed)
6. Clutch interlock switch E163
7. Clutch pedal

M/T WITH CLUTCH INTERLOCK CANCEL SYSTEM : Component Description

INFOID:000000012568947

Component part	Description
Clutch interlock switch	Clutch interlock switch supplies power to the coil side of the starter relay when the clutch pedal is depressed to crank the engine.
Clutch interlock cancel switch	Clutch interlock cancel switch bypasses the clutch interlock switch and supplies power to the coil side of the starter relay to crank the engine without the clutch pedal being depressed.
BCM	BCM sends a starter request signal to the CPU of the IPDM E/R over the CAN communication lines.
IPDM E/R	CPU inside IPDM E/R operates the starter relay at the request of the BCM over the CAN communication lines.
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.

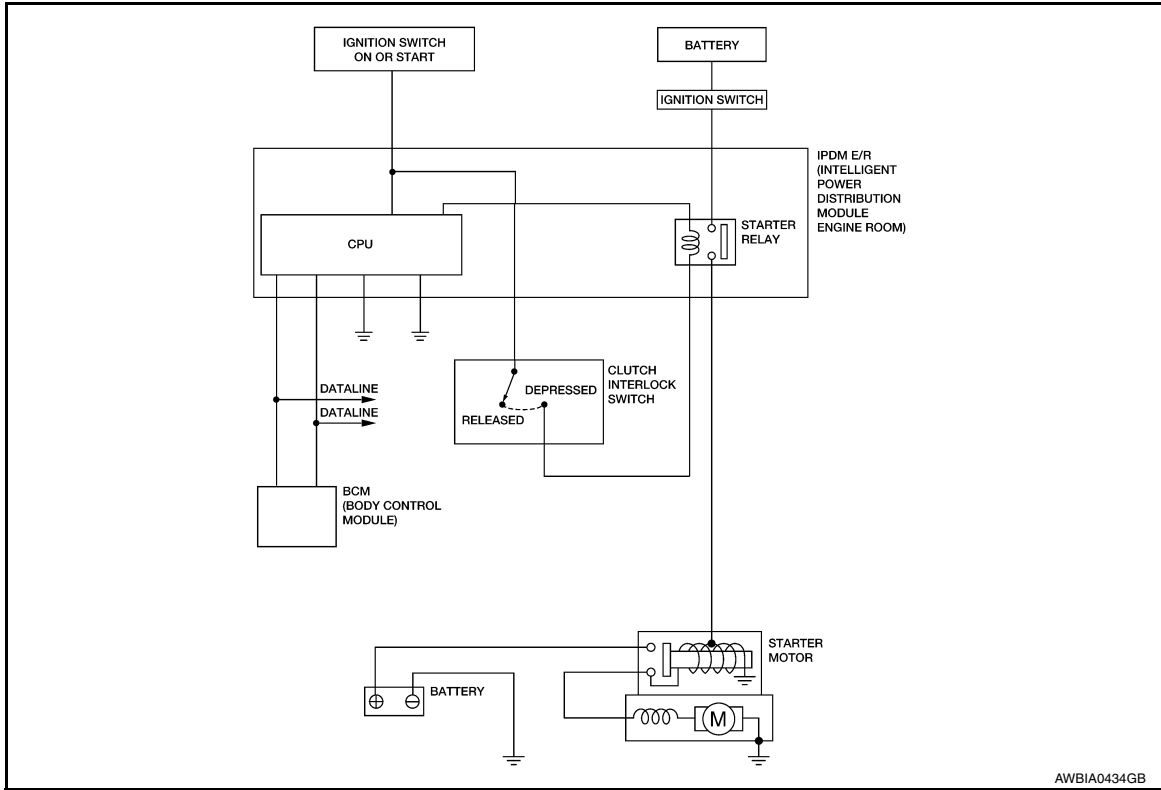
M/T WITHOUT CLUTCH INTERLOCK CANCEL SYSTEM

STARTING SYSTEM

< SYSTEM DESCRIPTION >

M/T WITHOUT CLUTCH INTERLOCK CANCEL SYSTEM : System Diagram

INFOID:000000012568948



AWBIA0434GB

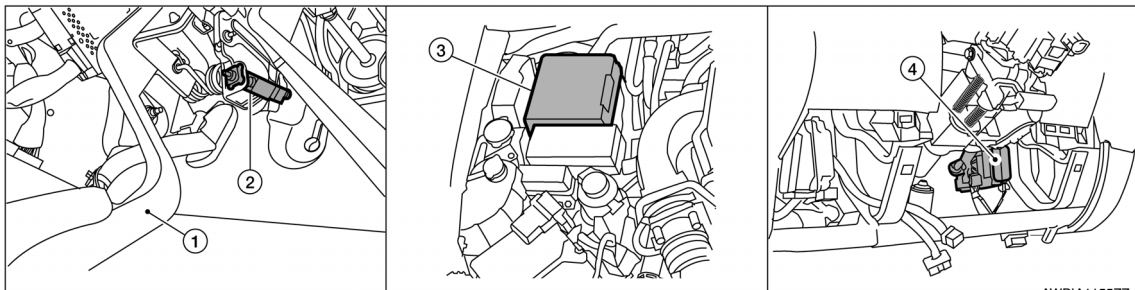
M/T WITHOUT CLUTCH INTERLOCK CANCEL SYSTEM : System Description

INFOID:000000012568949

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.

M/T WITHOUT CLUTCH INTERLOCK CANCEL SYSTEM : Component Parts Location

INFOID:000000012568950



AWBIA1155ZZ

1. Clutch pedal
2. Clutch interlock switch E169
3. IPDM E/R E119, E120, E122, E124
4. BCM M18 (view with lower instrument panel LH removed)

STARTING SYSTEM

< SYSTEM DESCRIPTION >

M/T WITHOUT CLUTCH INTERLOCK CANCEL SYSTEM : Component Description

INFOID:000000012568951

A

Component part	Description
Clutch interlock switch	Clutch interlock switch supplies power to the coil side of the starter relay when the clutch pedal is depressed to crank the engine.
BCM	BCM sends a starter request signal to the CPU of the IPDM E/R over the CAN communication lines.
IPDM E/R	CPU inside IPDM E/R operates the starter relay at the request of the BCM over the CAN communication lines.
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.

STR

C

D

E

F

G

H

I

J

K

L

M

N

O

P

B TERMINAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

DTC/CIRCUIT DIAGNOSIS

B TERMINAL CIRCUIT

Description

INFOID:000000012568952

Terminal "B" is constantly supplied with battery power.

Diagnosis Procedure

INFOID:000000012568953

Regarding Wiring Diagram information, refer to [STR-19. "Wiring Diagram - VQ40DE With Clutch Interlock Cancel System"](#), [STR-25. "Wiring Diagram - VQ40DE Without Clutch Interlock Cancel System"](#) or [STR-29. "Wiring Diagram - QR25DE"](#).

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 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 connector E210 and ground.

Terminals			Voltage (Approx.)
(+)	(-)		
Starter motor "B" terminal	Terminal		Battery voltage
E210	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 selector lever to P (Park) or N (Neutral) 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 0.5V
Battery positive terminal	E210	2		

Is the inspection result normal?

YES >> GO TO 3.

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

3. CHECK GROUND CIRCUIT STATUS (VOLTAGE DROP TEST)

1. Shift selector lever to P (Park) or N (Neutral) 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 0.2V

Is the inspection result normal?

B TERMINAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

- YES >> "B" terminal circuit is OK. Further inspection is necessary. Refer to [STR-5, "Work Flow \(With GR8-1200 NI\)"](#) or [STR-9, "Work Flow \(Without GR8-1200 NI\)"](#).
- 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

N

O

P

S CONNECTOR CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

S CONNECTOR CIRCUIT

Description

INFOID:000000012568954

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 (Park) or N (Neutral) position.

Diagnosis Procedure

INFOID:000000012568955

Regarding Wiring Diagram information, refer to [STR-19, "Wiring Diagram - VQ40DE With Clutch Interlock Cancel System"](#), [STR-25, "Wiring Diagram - VQ40DE Without Clutch Interlock Cancel System"](#) or [STR-29, "Wiring Diagram - QR25DE"](#).

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 selector lever to "P" (Park) or "N" (Neutral) position.
4. Check voltage between starter motor harness connector E211 (QR25DE) or E207 (VQ40DE) and ground.

(+)		(-)	Condition	Voltage (Approx.)
Connector	Terminal			
E211 (QR25DE)	1	Ground	When the ignition switch is in START position	Battery voltage
E207 (VQ40DE)				

Is the inspection result normal?

YES >> "S" circuit is OK. Further inspection is necessary. Refer to [STR-5, "Work Flow \(With GR8-1200 NI\)"](#) or [STR-9, "Work Flow \(Without GR8-1200 NI\)"](#).

NO >> GO TO 2.

2. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect IPDM E/R connector.
2. Check continuity between starter motor harness connector E211 (QR25DE) or E207 (VQ40DE) and the IPDM E/R harness connector E120.

Starter motor harness connector		IPDM E/R harness connector		Continuity
Connector	Terminal	Connector	Terminal	
E211 (QR25DE)	1	E120	19	Yes
E207 (VQ40DE)				

Is the inspection result normal?

YES >> Further inspection is necessary. Refer to [STR-5, "Work Flow \(With GR8-1200 NI\)"](#) or [STR-9, "Work Flow \(Without GR8-1200 NI\)"](#).

NO >> Repair or replace the harness or connectors.

STARTING SYSTEM

< WIRING DIAGRAM >

WIRING DIAGRAM

STARTING SYSTEM

Wiring Diagram - VQ40DE With Clutch Interlock Cancel System

INFOID:000000012568956

A

STR

C

D

E

F

G

H

I

J

K

L

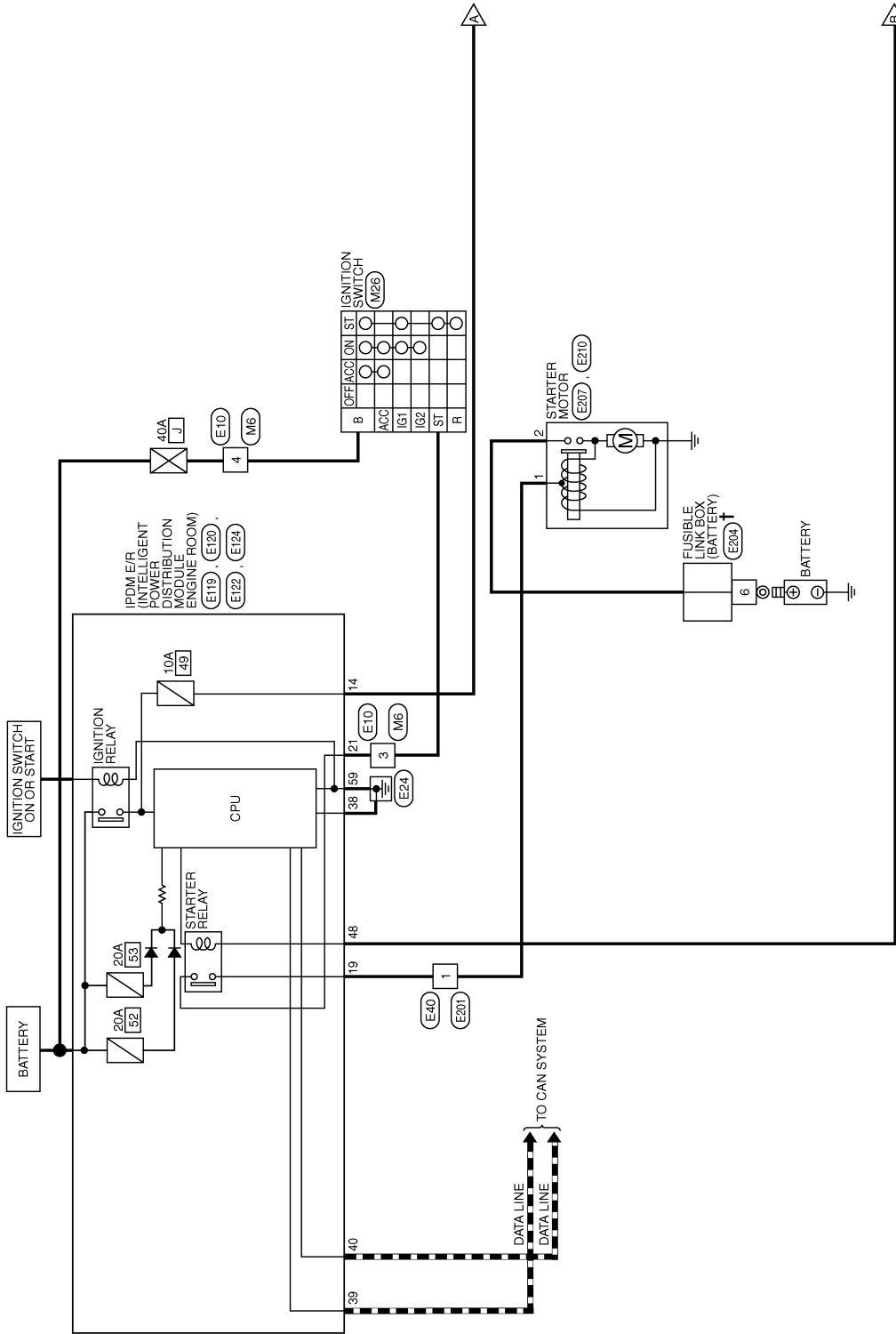
M

N

O

P

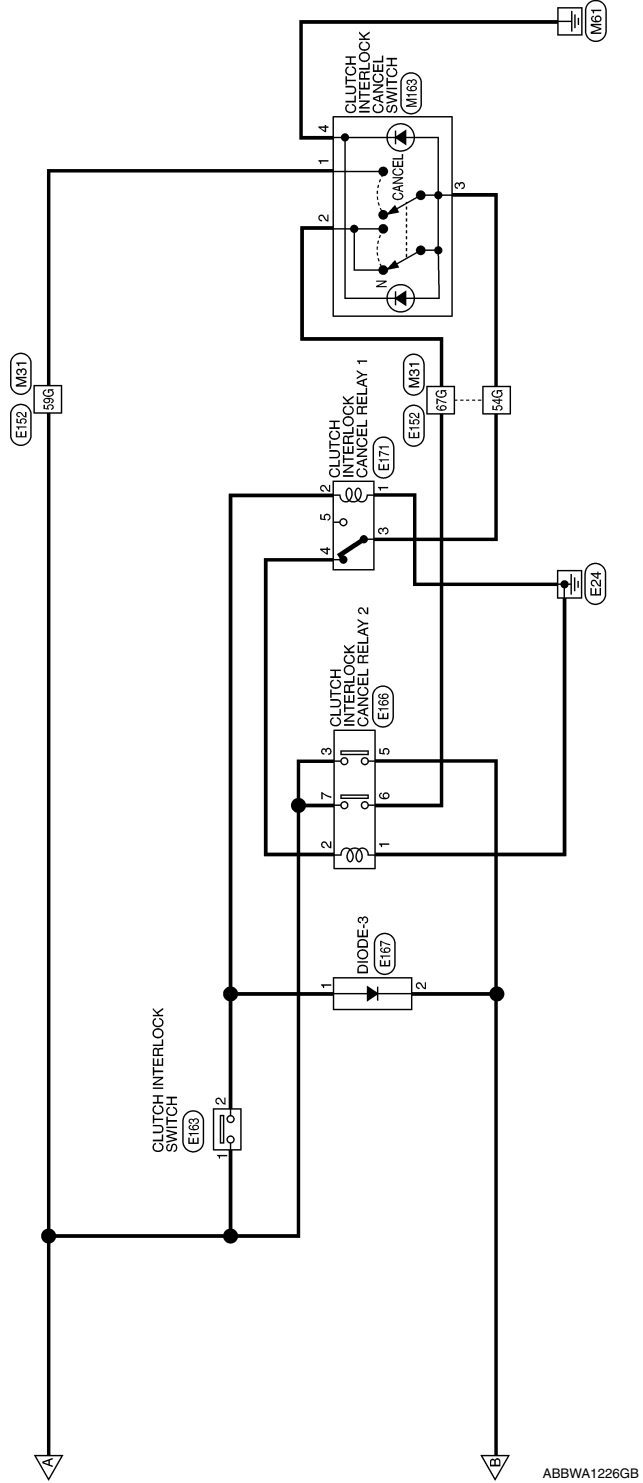
STARTING SYSTEM - VQ40DE WITH CLUTCH INTERLOCK CANCEL SYSTEM



ABBWA1404GB

STARTING SYSTEM

< WIRING DIAGRAM >



STARTING SYSTEM CONNECTORS - VQ40DE WITH CLUTCH INTERLOCK CANCEL SYSTEM

Connector No.	M6
Connector Name	WIRE TO WIRE
Connector Color	WHITE

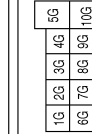


Connector No.	M26
Connector Name	IGNITION SWITCH
Connector Color	WHITE

Terminal No.	Color of Wire	Signal Name
3	GR	-
4	G	-

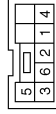
Terminal No.	Color of Wire	Signal Name
B	G	-
ST	GR	-

Connector No.	M31
Connector Name	WIRE TO WIRE
Connector Color	WHITE

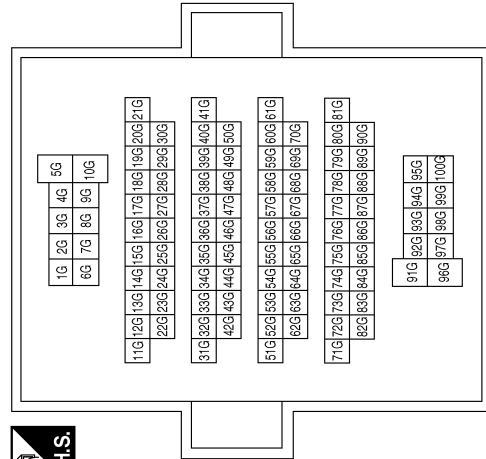


Terminal No.	Color of Wire	Signal Name
54G	BG	-
59G	W/G	-
67G	Y	-

Connector No.	M163
Connector Name	CLUTCH INTERLOCK CANCEL SWITCH
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
1	W/G	-
2	Y	-
3	BG	-
4	B	-





ABBIA2091GB

STARTING SYSTEM


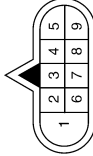
< WIRING DIAGRAM >

Connector No.	E119
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
14	W/G	A/T ECU IGN SUPPLY

Connector No.	E40
Connector Name	WIRE TO WIRE
Connector Color	GRAY



Terminal No.	Color of Wire	Signal Name
1	W	-

Connector No.	E10
Connector Name	WIRE TO WIRE
Connector Color	WHITE


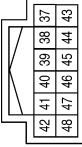
Terminal No.	Color of Wire	Signal Name
3	GR	-
4	G	-

Connector No.	E124
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
59	B	GND (POWER)

Connector No.	E122
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

Terminal No.	Color of Wire	Signal Name
38	B	GND (SIGNAL)
39	L	CAN-H
40	P	CAN-L
48	R	RANGE SW

Connector No.	E120
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

Terminal No.	Color of Wire	Signal Name
19	W	STARTER MTR
21	GR	IGN SW (ST)

ABBIA0871GB

STARTING SYSTEM

< WIRING DIAGRAM >

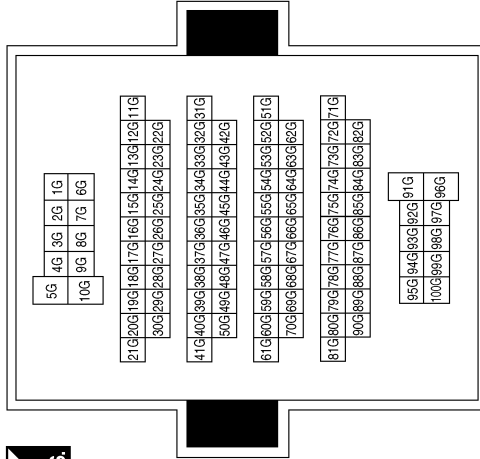
Connector No.	E163
Connector Name	CLUTCH INTERLOCK SWITCH (WITH CLUTCH INTERLOCK CANCEL SYSTEM)
Connector Color	BLUE



Terminal No.	Color of Wire	Signal Name
1	W/G	-
2	L	-

Terminal No.	Color of Wire	Signal Name
54G	BG	-
59G	W/G	-
67G	Y	-

Connector No.	E152
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Connector No.	E171
Connector Name	CLUTCH INTERLOCK CANCEL RELAY 1
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	B	-
2	W	-
3	BG	-
4	R	-
5	-	-

Connector No.	E167
Connector Name	DIODE-3
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	L	-
2	R	-

Connector No.	E166
Connector Name	CLUTCH INTERLOCK CANCEL RELAY 2
Connector Color	BROWN



Terminal No.	Color of Wire	Signal Name
1	B	-
2	R	-
3	W/G	-
5	B	-
6	Y	-
7	W/G	-

ABBIA2535GB

A
STR

C

D

E

F

G

H

I

J

K

L

M

N

O

P

STARTING SYSTEM

< WIRING DIAGRAM >

Connector No.	E201
Connector Name	WIRE TO WIRE
Connector Color	GRAY



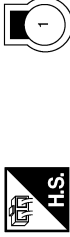
Terminal No.	1	Color of Wire	W	Signal Name	-
--------------	---	---------------	---	-------------	---

Connector No.	E204
Connector Name	FUSIBLE LINK BOX (BATTERY)
Connector Color	-



Terminal No.	6	Color of Wire	B/R	Signal Name	-
--------------	---	---------------	-----	-------------	---

Connector No.	E207
Connector Name	STARTER MOTOR (WITH VQ40DE)
Connector Color	GRAY



Terminal No.	1	Color of Wire	W	Signal Name	-
--------------	---	---------------	---	-------------	---

Connector No.	E210
Connector Name	STARTER MOTOR
Connector Color	-



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

ABBIA1561GB

STARTING SYSTEM

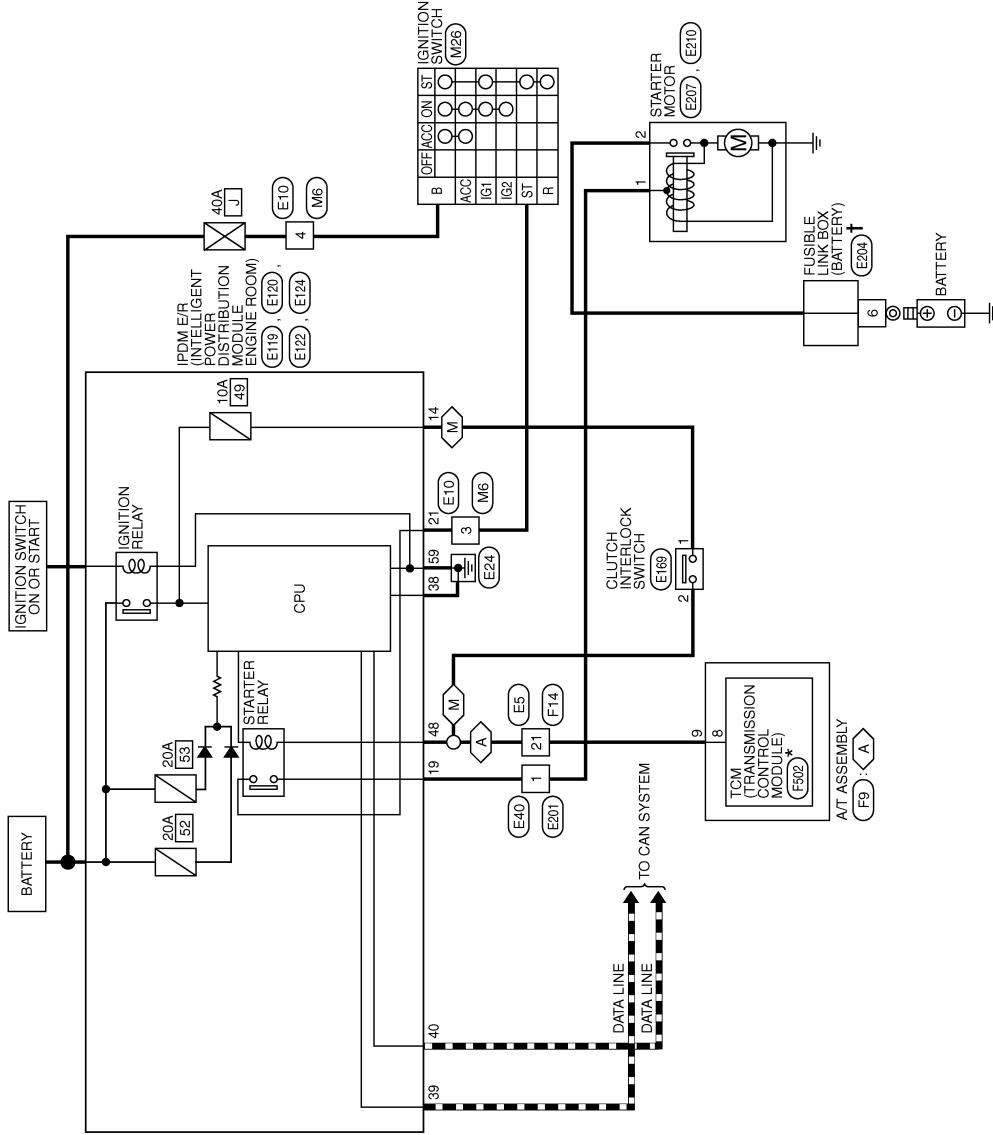
< WIRING DIAGRAM >

Wiring Diagram - VQ40DE Without Clutch Interlock Cancel System

INFOID:000000012568957

A : WITH AT
M : WITH MT

STARTING SYSTEM - VQ40DE WITHOUT CLUTCH INTERLOCK CANCEL SYSTEM



* :THIS CONNECTOR IS NOT SHOWN IN "HARNES LAYOUT" OF PG SECTION.
 † :THIS CONNECTOR IS AN INTEGRAL PART OF THE FUSIBLE LINK BOX (BATTERY).

ABBWA1405GB

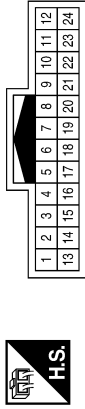
A
STR
C
D
E
F
G
H
I
J
K
L
M
N
O
P

STARTING SYSTEM

< WIRING DIAGRAM >

STARTING SYSTEM CONNECTORS - VQ40DE WITHOUT CLUTCH INTERLOCK CANCEL SYSTEM

Connector No.	E5
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	21	Color of Wire	R	Signal Name	-
--------------	----	---------------	---	-------------	---

Connector No.	M26
Connector Name	IGNITION SWITCH
Connector Color	WHITE



Terminal No.	B	Color of Wire	G	Signal Name	-
	ST	Color of Wire	GR	Signal Name	-

Connector No.	M6
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	3	Color of Wire	GR	Signal Name	-
	4	Color of Wire	G	Signal Name	-

Connector No.	E119
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE



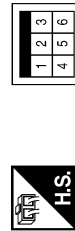
Terminal No.	14	Color of Wire	W/G	Signal Name	A/T ECU IGN SUPPLY
--------------	----	---------------	-----	-------------	--------------------

Connector No.	E40
Connector Name	WIRE TO WIRE
Connector Color	GRAY



Terminal No.	1	Color of Wire	W	Signal Name	-
--------------	---	---------------	---	-------------	---

Connector No.	E10
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	3	Color of Wire	GR	Signal Name	-
	4	Color of Wire	G	Signal Name	-

ABBIA0482GB

STARTING SYSTEM

< WIRING DIAGRAM >

Connector No.	E124
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	BLACK



59	58	57
62	61	60

Terminal No.	Color of Wire	Signal Name
59	B	GND (POWER)

Connector No.	E122
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE



42	41	40	39	38	37
46	47	46	45	44	43

Terminal No.	Color of Wire	Signal Name
38	B	GND (SIGNAL)
39	L	CAN-H
40	P	CAN-L
48	R	RANGE SW

Connector No.	E120
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE



21	20	19
24	23	22

Terminal No.	Color of Wire	Signal Name
19	W	STARTER MTR
21	GR	IGN SW (ST)

Connector No.	E204
Connector Name	FUSIBLE LINK BOX (BATTERY)
Connector Color	-



6

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

Connector No.	E201
Connector Name	WIRE TO WIRE
Connector Color	GRAY



5	4	3	2
9	8	7	6
1			

Terminal No.	Color of Wire	Signal Name
1	W	-

Connector No.	E169
Connector Name	CLUTCH INTERLOCK SWITCH (WITHOUT CLUTCH INTERLOCK CANCEL SYSTEM)
Connector Color	BLUE



1	2
---	---

Terminal No.	Color of Wire	Signal Name
1	W/G	-
2	R	-

ABBIA1218GB

A
STR

C

D

E

F

G

H

I

J

K

L

M

N

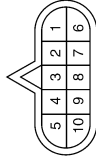
O

P

STARTING SYSTEM

< WIRING DIAGRAM >

Connector No.	F9
Connector Name	A/T ASSEMBLY
Connector Color	GREEN



Terminal No.	9	Color of Wire	R	Signal Name	-
--------------	---	---------------	---	-------------	---

Connector No.	E210
Connector Name	STARTER MOTOR
Connector Color	-



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

Connector No.	E207
Connector Name	STARTER MOTOR (WITH VQ40DE)
Connector Color	GRAY



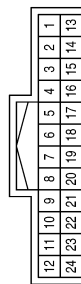
Terminal No.	1	Color of Wire	W	Signal Name	-
--------------	---	---------------	---	-------------	---

Connector No.	F502
Connector Name	TCM (TRANSMISSION CONTROL MODULE)
Connector Color	GRAY



Terminal No.	8	Color of Wire	G	Signal Name	START-RLY
--------------	---	---------------	---	-------------	-----------

Connector No.	F14
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	21	Color of Wire	R	Signal Name	-
--------------	----	---------------	---	-------------	---

ABBIA1562GB

STARTING SYSTEM

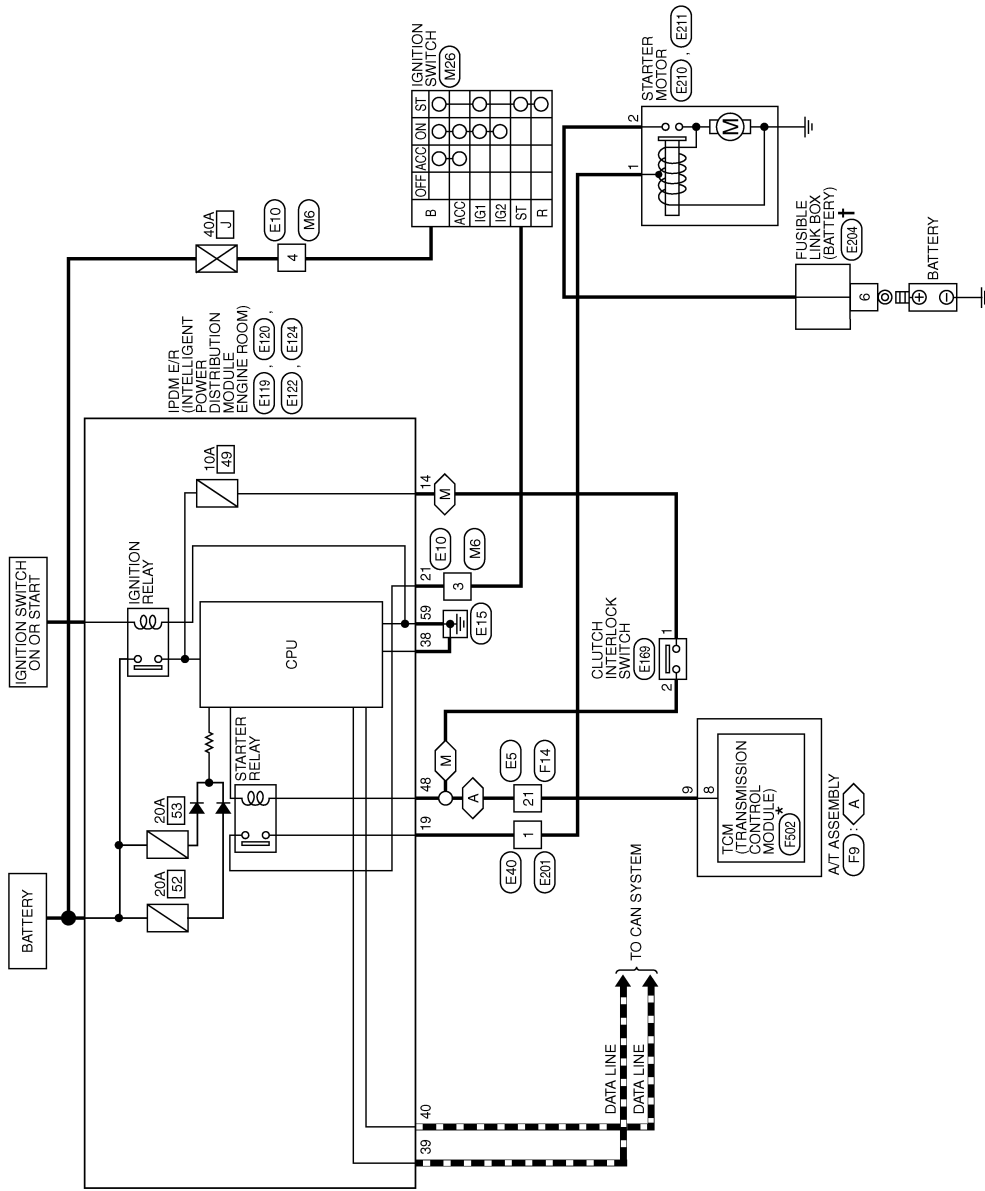
< WIRING DIAGRAM >

Wiring Diagram - QR25DE

INFOID:000000012568958

⬡ : WITH A/T
⬢ : WITH M/T

STARTING SYSTEM - QR25DE



*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.
†: THIS CONNECTOR IS AN INTEGRAL PART OF THE FUSIBLE LINK BOX (BATTERY).

ABBWA1406GB

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

STARTING SYSTEM

< WIRING DIAGRAM >

STARTING SYSTEM CONNECTORS - QR25DE

Connector No.	M6
Connector Name	WIRE TO WIRE
Connector Color	WHITE



3	2	1
6	5	4



B	ST	IG
R	ACC	BZ

Connector No.	M26
Connector Name	IGNITION SWITCH
Connector Color	WHITE



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
3	GR	-
4	G	-

Terminal No.	Color of Wire	Signal Name
B	G	-
ST	GR	-

Connector No.	E5
Connector Name	WIRE TO WIRE
Connector Color	WHITE



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
21	R	-

Connector No.	E10
Connector Name	WIRE TO WIRE
Connector Color	WHITE



1	2	3
4	5	6



1	2	3	4	5
6	7	8	9	

Connector No.	E40
Connector Name	WIRE TO WIRE
Connector Color	GRAY

Connector No.	E119
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE



9	8	7	6	5	4	3
18	17	16	15	14	13	12
11	10	9	8	7	6	5
4	3	2	1			

Terminal No.	Color of Wire	Signal Name
3	GR	-
4	G	-

Terminal No.	Color of Wire	Signal Name
1	W	-

Terminal No.	Color of Wire	Signal Name
14	W/G	A/T ECU IGN SUPPLY

STARTING SYSTEM

< WIRING DIAGRAM >

Connector No.	E124
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	BLACK



59	58	57
62	61	60

Terminal No.	59	Color of Wire	B	Signal Name	GND (POWER)
--------------	----	---------------	---	-------------	-------------

Connector No.	E122
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE



42	41	40	39	38	37
48	47	46	45	44	43

Terminal No.	38	Color of Wire	B	Signal Name	GND (SIGNAL)
	39		L		CAN-H
	40		P		CAN-L
	48		R		RANGE SW

Connector No.	E120
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE



21	20	19
24	23	22

Terminal No.	19	Color of Wire	W	Signal Name	STARTER MTR
	21		GR		IGN SW (ST)

Connector No.	E204
Connector Name	FUSIBLE LINK BOX (BATTERY)
Connector Color	-



6

Terminal No.	6	Color of Wire	B/R	Signal Name	-
--------------	---	---------------	-----	-------------	---

Connector No.	E201
Connector Name	WIRE TO WIRE
Connector Color	GRAY



5	4	3	2	1
9	8	7	6	

Terminal No.	1	Color of Wire	W	Signal Name	-
--------------	---	---------------	---	-------------	---

Connector No.	E169
Connector Name	CLUTCH INTERLOCK SWITCH (WITHOUT CLUTCH INTERLOCK CANCEL SYSTEM)
Connector Color	BLUE



1	2
---	---

Terminal No.	1	Color of Wire	W/G	Signal Name	-
	2		R		-

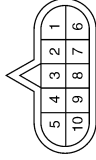
ABBIA1212GB

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

STARTING SYSTEM

< WIRING DIAGRAM >

Connector No.	F9
Connector Name	A/T ASSEMBLY
Connector Color	GREEN



Terminal No.	9	Color of Wire	R	Signal Name	-
--------------	---	---------------	---	-------------	---

Connector No.	E211
Connector Name	STARTER MOTOR (WITH QR25DE)
Connector Color	GRAY



Terminal No.	1	Color of Wire	W	Signal Name	-
--------------	---	---------------	---	-------------	---

Connector No.	E210
Connector Name	STARTER MOTOR
Connector Color	-



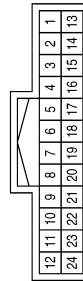
Terminal No.	2	Color of Wire	B/R	Signal Name	-
--------------	---	---------------	-----	-------------	---

Connector No.	F502
Connector Name	TCM (TRANSMISSION CONTROL MODULE)
Connector Color	GRAY



Terminal No.	8	Color of Wire	G	Signal Name	START-RLY
--------------	---	---------------	---	-------------	-----------

Connector No.	F14
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	21	Color of Wire	R	Signal Name	-
--------------	----	---------------	---	-------------	---

ABBIA1560GB

STARTING SYSTEM

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS

STARTING SYSTEM

Symptom Table

INFOID:0000000012568959

A

STR

Symptom	Reference
No normal cranking	Refer to STR-5. "Work Flow (With GR8-1200 NI)" or STR-9. "Work Flow (Without GR8-1200 NI)" .
Starter motor does not rotate	

C

D

E

F

G

H

I

J

K

L

M

N

O

P

STARTER MOTOR

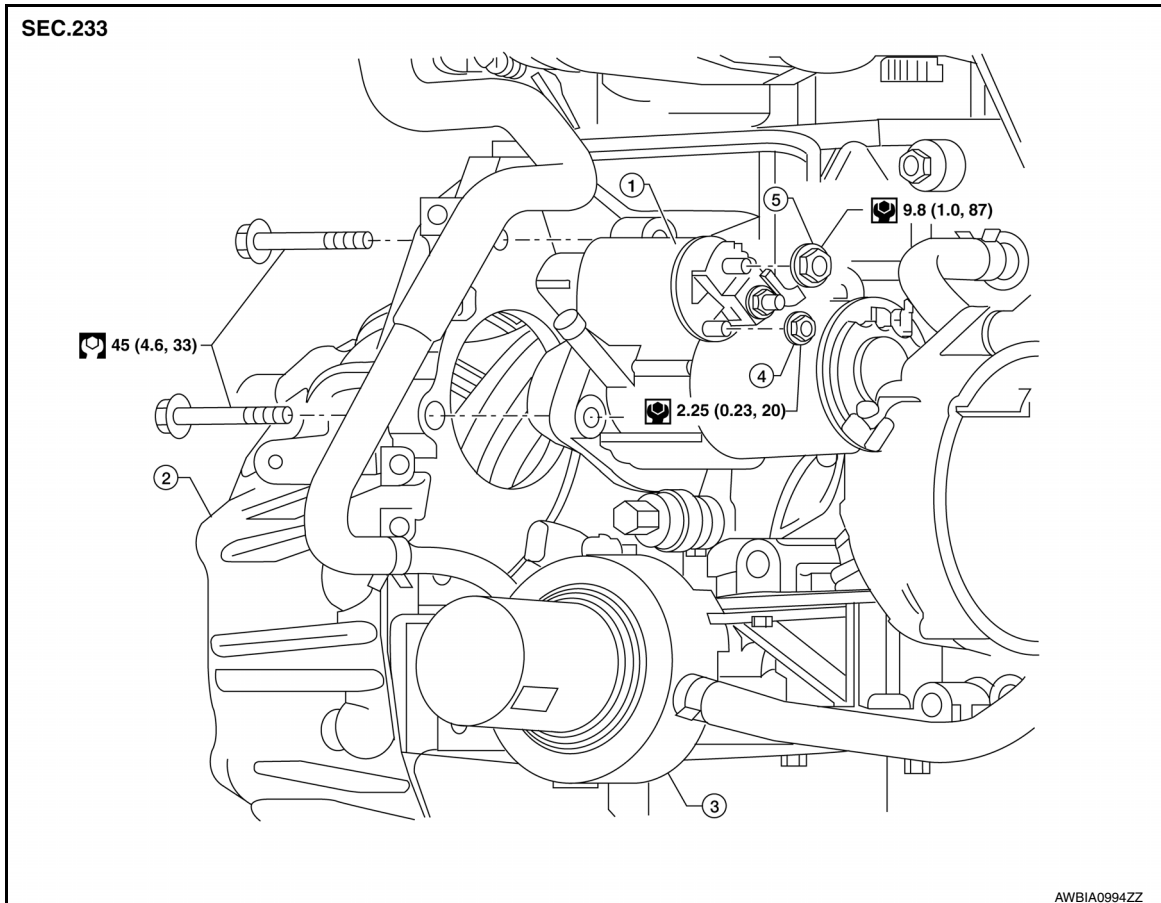
< REMOVAL AND INSTALLATION >

REMOVAL AND INSTALLATION

STARTER MOTOR

Removal and Installation (QR25DE)

INFOID:000000012568960



- | | | |
|---------------------------|-------------------------|----------------------|
| 1. Starter motor assembly | 2. Transmission housing | 3. Engine oil cooler |
| 4. Terminal "1" (S) nut | 5. Terminal "2" (B) nut | |

REMOVAL

1. Disconnect the negative battery terminal. Refer to [PG-89, "Removal and Installation"](#).
2. Remove the air cleaner cover and the air cleaner to intake manifold collector duct. Refer to [EM-25, "Exploded View"](#).
3. Remove terminal "1" (S) and terminal "2" (B) nuts.
4. Remove the two starter motor bolts, using power tools.
5. Remove the starter motor.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

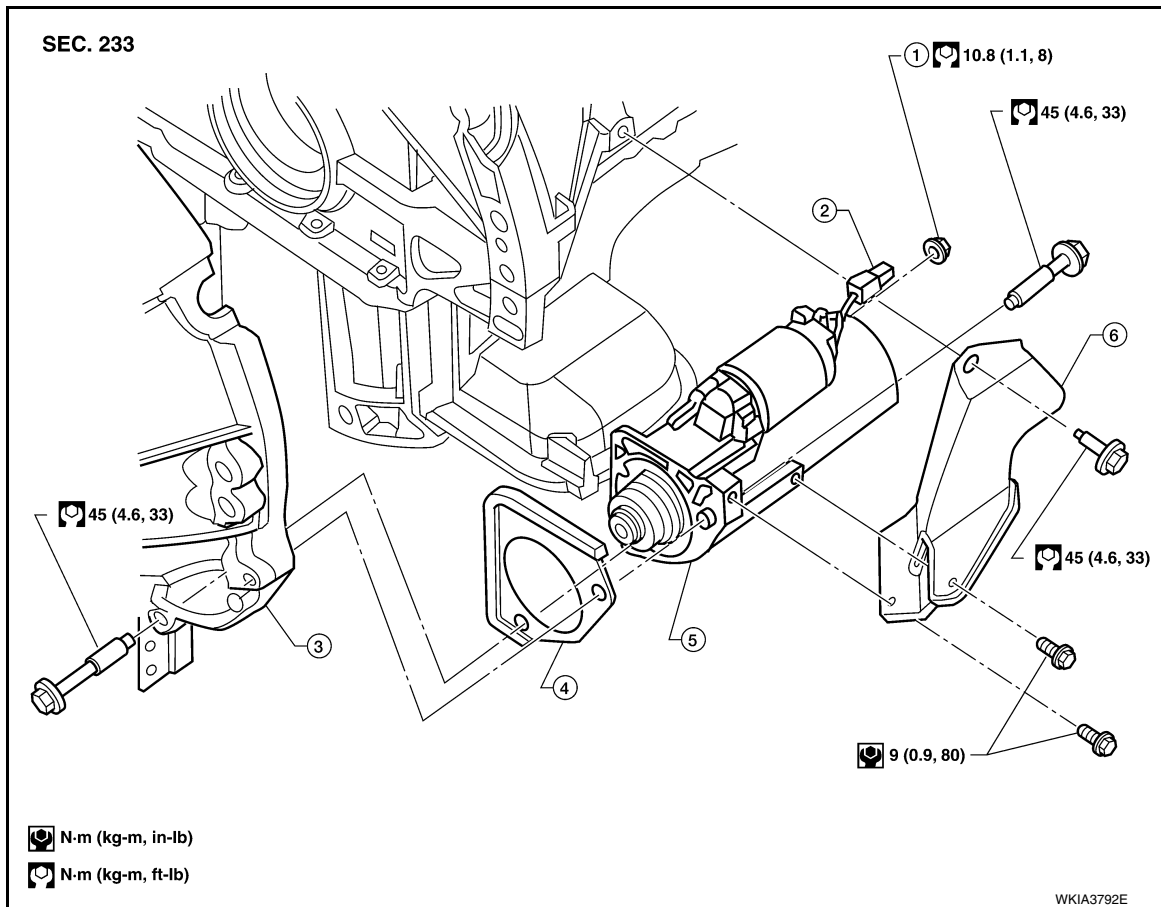
Be sure to tighten terminal nuts carefully.

STARTER MOTOR

< REMOVAL AND INSTALLATION >

Removal and Installation (VQ40DE)

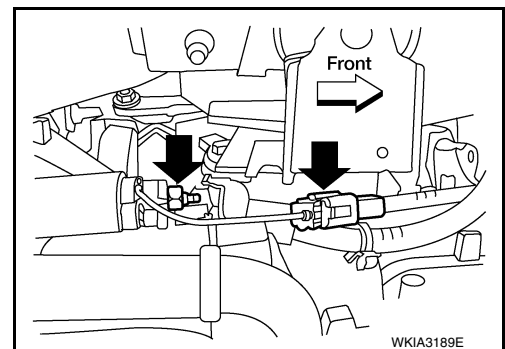
INFOID:000000012568961



- | | | |
|-------------------------------|-------------------------------|-------------------------|
| 1. Terminal "2" (B) nut | 2. Terminal "1" (S) connector | 3. Transmission housing |
| 4. Starter cover plate (rear) | 5. Starter motor assembly | 6. Starter cover |

REMOVAL

1. Disconnect the negative battery terminal. Refer to [PG-89, "Removal and Installation"](#).
2. Remove starter cover bolts and starter cover.
3. Disconnect terminal "1" (S) connector and remove terminal "2" (B) nut.
4. Remove the two starter motor bolts, using power tools.
5. Remove the starter motor.



INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

Be sure to tighten terminal "2" nut carefully.

STARTER MOTOR

< SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

STARTER MOTOR

Starter

INFOID:0000000012568962

Application		QR25DE	VQ40DE
Type*		Mitsubishi M000T88282	Mitsubishi M001TA0072
		Reduction gear type	
System voltage		12V	
	Terminal voltage	11V	
No-load	Current	Less than 90A	Less than 120A
	Revolution	More than 2,800 rpm	More than 3,100 rpm

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